

# WAVESTATION PERFORMANCE NOTES

**A/D**

**KORG**

## WAVESTATION A/D PERFORMANCE NOTES

Welcome to the exciting world of the Korg Wavestation A/D! These Performance Notes contain a number of charts designed to make it easy for you to get familiar with the factory Performances, Wave Sequences, and Scales. We've also included some hints on customizing the rhythmic Wave Sequence sounds for use with MIDI Clocks, using the Analog Inputs, and other useful information.

### MODULATION

The following abbreviations will be used to describe modulation:

AT = Aftertouch

WH = Mod Wheel

A-C = The X-axis of the joystick, left-to-right movement.

B-D = The Y-axis of the joystick, up-down movement

Vib. = Vibrato

Sometimes the Mod Wheel Routing uses a negative value. This means, when you move your controller's wheel forward, the effect lessens (chorus rate slows down, reverb mix gets "drier", etc.). This is indicated by a minus sign in parentheses (-) after the effect.

JOYSTICK - if moving the joystick will affect the sound, the affecting axis is listed.

MOD WHEEL - The Wavestation A/D receives your MIDI instrument's Mod wheel (in addition to other controllers) via MIDI. MIDI controllers may be incorporated into the Wavestation A/D's dynamic digital effects. In the past, the Mod wheel has been traditionally used to introduce vibrato into the sound. In the Wavestation A/D's factory sounds, the Mod wheel is often used to control the dynamic effects (chorus rate or reverb mix, for example). The Mod wheel routings are listed.

### VERTICAL BANKING

As much as possible (not always), Performances in ROM, RAM1, and RAM2 are placed in "vertical banks". This means that selecting a Performance and pressing the BANK soft key on the PERFORMANCE SELECT screen will take you to a similar type of Performance. For example, Performance location 0 (zero) in each bank (ROM, RAM1, RAM2) uses a rhythmic Wave Sequence. (Rhythmic elements are also found in Performances 10, 20, and 30 for both RAM1 and 2, but not ROM). RAM3 is not vertically banked.

### WAVE SEQUENCE EDITING

To encourage you to experiment, all Wave Sequence locations in the RAM2 bank have been left empty. You can copy over Wave Sequence steps into anyplace in RAM2. In fact, since the ROM Wave Sequences cannot be edited, you might want to first copy them into RAM2 so that you can edit them. To do this, do the following:

- ☛ Go to the GLOBAL page.
- ☛ Press UTIL (takes you to the UTILITIES page).
- ☛ Set From = ROM, and To = RAM2.
- ☛ Set Data To Transfer = WAVESEQUENCES.
- ☛ Press COPY.

...and now you've got an editable copy of the ROM Wave Sequences.

## **WAVE SEQUENCES and MIDI CLOCKS**

Any Wave Sequence can be edited to work with MIDI clocks. When using MIDI as the master clock for Wave Sequences, the number shown as the step's duration (Dur) is equivalent to its duration in MIDI clocks. Therefore, with 24 MIDI clocks equivalent to a quarter-note, just make the durations an even number division of 24; i.e., 12 for eighth notes, 6 for sixteenth notes, etc. (see chart below). Many of the Wave Sequences in the RAM3 Bank are set up for MIDI Clocks. Two other Performances, ROM Performance 0 (The Wave Song) and RAM1 Performance 0 (Ski Jam), may quickly be altered to work with external MIDI clocking, as the edited MIDI versions of these Wave Sequences are already available in the RAM1 bank. To try these out, do the following:

- ☛ Go to the GLOBAL page. Change Wave Sequence Sync from INTERNAL to MIDI.
- ☛ EXIT to PERFORMANCE SELECT.
- ☛ Press EDIT.
- ☛ Make sure the cursor is on Part 1. Press PATCH.
- ☛ Press WAVES.
- ☛ Move the cursor to highlight the word ROM next to osc A (A-ROM)
- ☛ Change ROM to RAM1. The Wave Sequence name should change to MIDISki for Ski Jam, or MIDsong for The Wave Song.

You should now be able to start up the external MIDI clock that is plugged into the Wavestation A/D's MIDI in, and play! (You did plug it in, didn't you?)

**NOTE 1:** Changing the tempo of the external MIDI clock will change the speed of the Wave Sequence.

**NOTE 2:** For best results, play the keys on the downbeat - though you may like the arrhythmic effects produced by "staggering" the keys. Also, when using a sequencer and syncing Wave Sequences to MIDI clocks, it's best to quantize all notes playing Wave Sequences to a few milliseconds before the beat. This will ensure that your sequencer sends out the notes before the clock message, so that the Wave Sequence rhythms will be right on the beat.

**NOTE 3:** Make sure to switch the Wave Sequence Sync (GLOBAL page) back to INTERNAL when you are done. None of the Wave Sequences will play if you've left the Wave Sequence Sync set to MIDI and there are no MIDI clocks coming in.

## **MIDI CLOCK to STEP DURATION**

This table shows the Step Duration required to achieve a given rhythmic value when syncing to MIDI Clocks.

<u>Note Value</u>	<u>Step Duration</u>
quarter-note	24
quarter-note triplet	16
eighth-note	12
eighth-note triplet	8
sixteenth-note	6
sixteenth-note triplet	4
thirty-second-note	3
thirty-second-note triplet	2

Using zero crossfades (Xfd) will give you the best attack for transients when creating rhythmic sequences, but sometimes you may want to use a crossfade of 1 or 2 to smooth things out a little.

## USING RAM 3 PERFORMANCES 45-49 with the ANALOG INPUTS

In the RAM 3 Bank, Performances 45 through 49 have been specially set up to work with the Analog Inputs. They demonstrate some of the ways in which you can process incoming audio - from a microphone, for instance - through the Wavestation A/D's effects.

To play RAM3 Performances 45-48:

- ☛ Plug a single external source, such as a microphone, into Input 1.
- ☛ Go to the Analog Input Assign page (path: GLOBAL - ANALOG), and set the Analog Inputs to **ENABLED**.

**NOTE:** The Inputs must be **ENABLED** for Performances 45-48 to work.

- ☛ Set the Analog Input Macro to **A-B MONO**.

#45 **PITCHSHIFT DOWN** is a MIDI-controlled pitch shifter; the amount of transposition is determined by incoming MIDI notes. C7 is equal to the original pitch; playing below C7 lowers the pitch.

#46 **STACCATO GATE** uses the **GATE** effect to rhythmically pulse the Analog Inputs. A MIDI note-on event is required to hear this effect (pressing the **TEST** softkey at the top level screen will also work). Use a sustained sound such as a synth pad for the input. Here the percussive wave sequences from the patch "Bad Dance" are used to gate the incoming signal; this is somewhat similar to the vocoder, but here the "modulator" is called the Control Source. Unlike the vocoder, you will not hear the Control Source signal. Any of the Buses may be used as the Control Source; here, it is set to **Bus C**. You might want to use an external sound source, such as a drum machine, as the Control Source; in this case, connect the drum machine to Input 2, and set the Analog Input Macro to **PARALLEL 1**. You would then need to turn off "Bad Dance" (Part 1) in the Performance. Also, you might need to adjust the Gate Threshold, depending on the Control Source's amplitude.

#47 **STEREO VOCODER** uses Bus A (Input 1) as the modulator and Bus C as the carrier. Play notes on your controller and talk into the mic for the vocoding effect to be heard. If desired, Input 2 can be assigned as the carrier by selecting the Macro **PARALLEL 1**, and turning off the Patch "String Pad" (Part 1).

#48 **VOCODER&FLANGER** shows one of the mono vocoders, plus the Stereo Flanger.

To play Performance 49:

- ☛ Go to the Analog Input Assign page (path: GLOBAL - ANALOG), and set the Analog Inputs to **DISABLED**. In this Performance, the Patch itself sets the Inputs to be used as Waves.
- ☛ Plug two different external sources, such as microphones, two other synths, tape tracks, or so on, into Inputs 1 and 2.

#49 **INPUTS->JOYSTIK** is a template for using both Analog Inputs as Waves in a 4 osc. Patch. Moving the joystick will bring up Input1 as Oscillator B, and Input 2 as Oscillator D, allowing you to do real-time Vector mixing over the two external sounds.

## USING THE ANALOG INPUTS WITH OTHER PERFORMANCES

You can send the Analog Inputs through the effects of any Performance, without any MIDI input (note-on events). To do so:

- ☛ If you're using a single source, such as a microphone, plug it into Input 1. If you're using two sources, plug them into both Inputs.
- ☛ Go to the Analog Input Assign page (path: GLOBAL - ANALOG), and set the Analog Inputs to **ENABLED**.
- ☛ Set the Analog Input Macro to **A-B MONO**.

Then, simply play or sing into the Input, and scroll through the Performances till you find something you like!

## WAVESTATION A/D PERFORMANCE NOTES

### ROM PERFORMANCES

<u>Performance</u>	<u>Comments</u>	<u>Joystick</u>	<u>Mod Wheel Routing</u>
0. The Wave Song	Rhythmic Performance.	-----	Chorus rate, Reverb mix
1. Deep Atmosphere		A-C, B-D	Reverb mix
2. Sting Waves		-----	Chorus rate, Reverb mix
3. Metropolitan	Velocity controls Reverb mix.	-----	Chorus rate, vibrato
4. Mini Lead	<u>Unison</u> Performance. Velocity affects Wave Sequence.	-----	Vibrato, Reverb mix
5. Tack Horns		A-C only	Chorus rate, Reverb mix, Vibrato
6. Guardians		A-C only	Negative delay(-), Reverb mix
7. Digital ResWave	Velocity affects Wave Sequence.	-----	Flanger speed, Reverb mix, Vibrato
8. Sandman	WH decreases effects.	-----	Chorus rate(-), Reverb mix(-)
9. Time Traveler		-----	Reverb mix
10. Song Bells		-----	Chorus rate, Reverb mix, Vibrato
11. Analog Punch		-----	Stereo delay mix, Vibrato
12. Cosmic Zone		-----	Chorus rate, Reverb mix
13. Super Clav		A-C only	Reverb mix, Chorus rate(-)
14. Toy Box		-----	Wet Plate mix
15. Analog Brass	Aftertouch affects chorus rate.	-----	Wet Plate mix, Vibrato
16. Modernesque		A-C only	Chorus rate, Reverb mix
17. Octave Strings		-----	Dry Plate mix, light Vibrato
18. Glass Tambu		A-C only	Chorus rate, Reverb mix, Vibrato
19. Vektar		A-C only	Chorus rate, Reverb mix
20. Whisper Voices		-----	Chorus rate, Wet Plate mix, Vibrato
21. Vulcan Harp	Velocity affects Reverb mix.	-----	Phaser speed & depth
22. Quarks		-----	Flanger speed, Reverb mix
23. Vocalise		-----	Chorus rate, Reverb mix
24. Gig Split	Split at C4.	A-C only	Chorus rate, Reverb mix
25. Touch Brass		-----	Reverb mix, Vibrato
26. Tine Piano		-----	Chorus rate
27. Warm Strings		-----	Reverb mix
28. Chiffy Kalimba	Velocity affects Chorus rate & Reverb mix.	-----	wheel has no function
29. Northern Lights		A-C, B-D	Chorus rate, Panning, light Vibrato
30. Bottle Air		-----	Chorus rate(-), Reverb mix, Vibrato
31. Rock Stack	Multi-layered & Split.	-----	Chorus rate, Reverb mix, Vibrato
32. Excalibur	Overall amplitude affects Delay mix (-).	-----	Chorus rate (also by aftertouch)
33. Wave Tables		-----	Chorus rate, Reverb mix
34. Bells		-----	Reverb mix
35. Prophet Horn		-----	Chorus rate, Plate mix(-), Vibrato
36. Mahogany		-----	Chorus rate, Reverb mix, Vibrato
37. Round Wound	Aftertouch vibrato.	-----	Chorus rate, Reverb mix
38. Digi Harp		-----	Reverb mix
39. Motion Mix		-----	Chorus rate, Reverb mix
40. Stereo Waves		-----	Stereo panning rate & depth
41. Screamer		-----	Chorus rate & depth, Vibrato
42. Paradise		-----	Chorus rate, Reverb mix
43. Digital Touch	Velocity affects Reverb mix.	-----	Chorus rate
44. Voice & Bell		-----	Chorus rate, Reverb mix, Vibrato
45. Resonant Synth	Velocity affects Wave Sequence.	-----	Chorus rate, Vibrato
46. Rhythm of the Wave	Part delay brings in low oct. after key-on.	-----	Effects mix
47. Introspective		-----	Chorus rate, Reverb mix
48. Wave Mallet		-----	Chorus rate, Reverb mix
49. Station Platform		-----	Chorus rate, Reverb mix

RAM 1 PERFORMANCES

<u>Performance</u>	<u>Comments</u>	<u>Joystick</u>	<u>Mod Wheel Routing</u>
0. Ski Jam	Split at C4. Rhythmic Performance.	-----	Chorus rate, E.Reflections mix, Vib.
1. Entropy		A-C only	Chorus rate, Reverb mix
2. Pinger		A-C, B-D	Chorus rate, Reverb mix
3. Reswacker		-----	E.Reflections mix
4. Lead Rock Guitar		-----	Vibrato
5. Softwaves		-----	Opens filt., amp for descending effect
6. Cascade Falls		A-C, B-D	Chorus rate, Reverb mix
7. Blow the Bottle	Split at C4 (Kick Bass is full keyboard).	A-C only	Chorus rate, Multi-tap mix, Vibrato
8. Magic Guitar		-----	Chorus rate, Reverb mix
9. Will I Dream?	Use WH to get bell harmonics.	A-C only	Reverb mix, Amp level of Res. sweep
10. Fire Dance	Rhythmic Performance.	-----	Chorus rate, Reverb mix
11. Analog Love Thang		A-C only	Vibrato, Dry Plate mix
12. Panned Waves		A-C only	Reverb mix, Vibrato
13. Super Res		A-C only	Vibrato
14. Ballerina Bells		A-C only	Hall mix, Harm. Chorus rate&depth
15. Soft Analog		A-C only	Vibrato, Wet Plate mix
16. Mod Wheel Air	Use WH for descending noise effect.	A-C only	Chorus rate, Reverb mix, Amp level
17. Bowed Strings		-----	Chorus rate, Reverb mix
18. Pluckrimba		-----	Chorus rate, Reverb mix
19. Vector Guitar		A-C only	Chorus rate, Reverb mix
20. Midnight Run	Echoed pattern below C4.	-----	Multitap mix&level, Pan mix&depth
21. African Sunset		A-C, B-D	Chorus rate, Dry Plate mix
22. Harmonic Motion		A-C only	Chorus rate, Reverb mix
23. Air Chorus & Bell	Velocity adds bell sound.	-----	Reverb mix
24. SunGlasses Kid	Split at C4. Hold for piano Wave Sequence.	-----	Chorus rate, Reverb mix, Vibrato
25. Stabby Horns	Velocity controls Flanger ramp speed.	-----	Vibrato, Plate mix
26. Soft EP w/Tine		-----	Chorus rate, Reverb mix
27. Artificial Strg		-----	Chorus rate, Reverb mix
28. The Pied Piper		-----	Multitap mix & level, Reverb mix
29. Vox Concrete		-----	Chorus rate, PingPong delay mix, Vib.
30. Snake Charmer	Rhythmic Performance.	-----	Chorus rate(-), Reverb mix
31. Rock Tine Piano		A-C only	Chorus rate, Reverb mix
32. Pressure Glass	AT controls Filter, Chorus rate&depth.	-----	Multitap mix, slight Vibrato
33. Vox Arpeggios	Arpeggio effect below F#4.	A-C only	Stereo Mod depth, Hall mix, Vibrato
34. Struck Bell	Velocity increases "struck" effect.	-----	Chorus rate, Reverb mix
35. Upright & Oboe	Split at G4.Joystick affects bass mix only.	A-C, B-D	Reverb mix
36. Refinery		A-C only	Reverb mix
37. Kick up da Bass	Joystick affects mix of bass and click.	A-C only	Vibrato
38. Syn Vox	ENV affects Delay mix.	A-C only	Chorus rate (also AT), Vibrato
39. Kingdom Come		-----	Chorus rate(-), Plate mix
40. Cat's Eye		A-C only	Chorus rate, Reverb mix
41. Jazz Mutes		A-C only	PingPong delay mix, Vibrato
42. VS Bell Pad		-----	Chorus rate(-), Reverb mix
43. Spectra		A-C, B-D	Chorus rate, Reverb mix
44. New Sparkle	Velocity switches bell tuning & panning.	-----	Chorus rate, Vibrato
45. Vektor Organ	WH has "drawbar" effect; gets brighter	A-C, B-D	Rotary speed, some amp levels
46. Alien Dreams		A-C, B-D	Multitap mix&level, Reverb mix
47. End of Voltaire		-----	Multitap mix(-), Plate mix
48. Kilimanjaro	Hold notes for wave seq. development.	A-C, B-D	Reverb mix, Quad pan mix&depth
49. Debussy On Wheels	Hold notes for harmonic development.	A-C, B-D	Panning, chorus rate, delay mix

RAM 2 PERFORMANCES

Performance	Comments	Joystick	Mod Wheel Routing
0. Pharoah's Jig	Rhythmic. Octaves add below C4.	-----	Stereo Mod pan, Reverb mix
1. City of Tomorrow	Velocity layers parts.	A-C, B-D	Chorus rate, Reverb mix
2. Spectrumize		A-C only	Chorus rate, Reverb mix
3. Fuzzy Pop Clav		A-C only	Reverb mix, Vibrato
4. ZZ Lead	<u>Unison</u> . Joystick to A for "hottest" level.	A-C only	Vibrato
5. Wack Flute		A-C only	Flanger ramp speed, Reverb mix
6. Glitter Vox		A-C only	Chorus rate, Vibrato
7. Bee Hive	Joystick 100% C, level goes to 0.	A-C only	Chorus rate, Vibrato
8. Waves On Wheels		A-C only	Reverb mix, Vibrato
9. 21st Century	Hold notes for harmonic development.	A-C, B-D	Panning
10. Sustain Pedal Jam	Play chords above C4; hold with damper.	A-C only	Reverb mix(-), Multitap mix
11. Nasty Harmonics		A-C, B-D	Chorus rate, Plate mix, Vibrato
12. Glider	Hold for development of sound.	A-C, B-D	Chorus rate, Vibrato
13. Mr. Wave Table		A-C, B-D	Chorus rate, Reverb mix, Vibrato
14. Alpine Bells		-----	Chorus rate, Reverb mix, Vibrato
15. The Big Brass	Joystick to C, solos Bari & Tenor.	A-C only	Reverb mix, Vibrato
16. Gentle Winds	Split at D#4.	-----	Chorus rate, Reverb mix
17. String & Woodwind		-----	Reverb mix
18. Rain Chiffs	Splits at B3 for part of sound.	-----	Chorus rate, Reverb mix
19. Guitar Rez		A-C, B-D	Reverb mix, Vibrato
20. ScrittiFunk	Uses 2 seqs. for polyrhythmic effect.	-----	Reverb mix, Stereo Pan mix&depth
21. Sonar Bell String		A-C only	Flanger speed, Reverb mix
22. New Zealand Vice	A-C can be used to mix Hard Sync level.	A-C only	Vibrato, Dry Plate mix (-)
23. Sunday Morning	A-C mixes organ and choir.	A-C only	Rotary rate (also AT), Reverb mix
24. Split on Sunset	Split at C4. A-C affects bass mix only.	A-C only	Chorus rate, Reverb mix, (Vib. bass)
25. Brass Orchestra		A-C only	Chorus rate, Reverb mix, Vibrato
26. Digipno & Breath	A-C mixes in "breathy" sound.	A-C only	Chorus rate, Reverb mix
27. Lassie Come Home		-----	Chorus rate, Reverb mix, Vibrato
28. Mellow Square Pad		A-C only	Chorus rate, Vibrato
29. Antarctica		-----	Chorus rate
30. Echo Hunters	Joystick affects mix of echoed part only.	A-C only	Chorus rate, Reverb mix
31. Organomics		A-C only	Rotary speed, Reverb mix (also AT)
32. Trans Atlantic		-----	Chorus rate
33. The Wave Guitar		-----	Chorus rate, Reverb mix, Vibrato
34. Bell Tree	Uses microtonal keyboard slope.	-----	Chorus rate
35. Palo Alto Pad		-----	Chorus rate, Reverb mix, Vibrato
36. Thick Pick	Use Mod wheel.	-----	Parametric Mid EQ width
37. Skip's Boom Bass	Velocity affects Wave Sequence.	-----	Vibrato
38. Folk Guitar		-----	Chorus rate, Reverb mix
39. Ivesian Split	Below split at C#4, part delays bring in 5ths.	-----	Plate mix (also AT)
40. Saturn Rings		A-C only	Stereo Mod Pan depth
41. Rotary Organ	Joystick mixes organ and click.	A-C only	Rotary speaker speed
42. Star Bell Sweep	Velocity adds bell.	A-C only	Reverb mix
43. Pop Box		A-C only	Vibrato, chorus rate
44. Xnaos Split	Split at D#4.	-----	Chorus rate, Reverb mix
45. Rock Steady	Joystick mixes in click.	A-C only	Chorus rate (also AT), Reverb mix
46. 20Sec. Invasion	Hold for development of sound.	-----	Ping Pong Delay mix
47. Chronos	Split at C4.	A-C only	Vibrato (also with AT)
48. Mambo Marimba!	Joystick 100% C, level goes to 0.	A-C only	Chorus rate, Reverb mix
49. The Big Pad	Hold for development of sound.	-----	Chorus rate, Ping Pong Delay mix

RAM 3 PERFORMANCES

<u>Performance</u>	<u>Comments</u>	<u>Joystick</u>	<u>Mod Wheel Routing</u>
0. Grand Piano 16'		-----	Reverb mix
1. Cello Ensemble		A-C	Vibrato
2. Alto Sax	ENV affects Parametric mid width (+3).	-----	Vibrato
3. Acoustic Guitar	ENV affects Parametric mid width (+6).	A-C	Vibrato
4. Dyno Slap Bass		-----	Vibrato
5. Mono Synth Lead	<u>Unison</u> . Velocity affects Reverb mix.	A-C	Vibrato
6. African Kalimba		A-C	Chorus rate, Reverb mix
7. Drum Kit		-----	Reverb mix
8. Snap Synth		-----	Vibrato
9. The Wave Police	Rhythmic split w/Horns. J-stick B adds Heli.	A-C, B-D*	Reverb mix, Vibrato
10. Piano Layers		A-C	Chorus rate, Reverb mix, Vibrato
11. Harp & Strings	KEY affects Reverb mix.	A-C	Chorus rate, Vibrato
12. CuCu Flute		A-C	Vibrato, Filter LFO
13. Nylon Guitar	ENV affects Reverb mix, Parametric width.	A-C	Vibrato
14. Sweet Fretless		-----	Vibrato
15. Synth Stabs		A-C	Chorus rate, Vibrato
16. Attack Bell		A-C	Reverb mix
17. Dream of Java	Velocity affects Chorus rate & Reverb mix.	A-C	Light vibrato
18. Funkanette		A-C	Vibrato
19. A Touch of Rain	Rhythmic below C4. Vel. adds more drums.	A-C, B-D*	Reverb mix, Light vibrato
20. Grand Piano 8'		-----	Parametric width (-), Reverb mix
21. Analog Strings		A-C	Chorus rate, Reverb mix, Vibrato
22. Breath Horns		-----	Vibrato
23. 12-StringGuitar	ENV affects Parametric mid width (+15).	A-C	Reverb mix, Vibrato
24. SynthBass Split	Split at D#4.	A-C	Chorus rate, Vibrato
25. Accordion		-----	Vibrato
26. Soft Kalimba	Velocity affects Chorus rate.	A-C	Reverb mix
27. Vel.DrumVocoder	Velocity switches from 8th to 16th pattern.	A-C	Vibrato, Dry mix of drums
28. Fire & Ice		A-C	Vibrato
29. Dr. Wave	Rhythm above Split (D#4); Bass below.	A-C, B-D*	Vibrato
30. The Piano Pad		A-C	Chorus rate, Reverb mix
31. Fr.Horn&Strings	Velocity affects Reverb mix.	-----	Chorus rate (also by aftertouch)
32. Pan Flute		A-C	Vibrato, Filter LFO
33. Solo Harp	ENV affects Chorus rate (+5).	-----	Reverb mix
34. Maxi Synth Bass		A-C	Vibrato
35. Wide Open Synth		A-C	Vibrato
36. Flash Pad		A-C	Chorus rate, Reverb mix, Vibrato
37. Tropical Forest	Hold keys down and wait for sound.	A-C	Reverb mix
38. Brass Stabs	ENV affects Parametric mid width.	A-C	Vibrato
39. Rain Dance	Rhythmic is C4 & below. All D for drums.	A-C, B-D*	Stereo Mod Pan mix
40. Bass&PianoSplit	Bass C4 and below.	-----	Vibrato, Reverb mix, Parametric (-)
41. Piano&Strings8'		A-C	Reverb mix, Vibrato
42. OrchestralSplit	Split at F#4. ENV affects Reverb mix.	-----	Chorus rate
43. Catalina Island	ENV affects Reverb mix, Parametric width.	A-C	Vibrato
44. Resonant Waves	ENV affects Flanger ramp speed.	A-C	Filter cutoff, Reverb mix, Vibrato
45. PITCHSHIFT DOWN	For Analog Inputs - see page 3.	-----	
46. STACCATO GATE	For Analog Inputs - see page 3.	-----	
47. STEREO VOCODER	For Analog Inputs - see page 3.	A-C, B-D*	Vibrato
48. VOCODER&FLANGER	For Analog Inputs - see page 3.	-----	Vibrato
49. INPUTS->JOYSTIK	For Analog Inputs - see page 3.	A-C, B-D	

\* these Performances use the joystick to highlight the rhythmic elements, especially Performances 9 and 29.



## ROM WAVE SEQUENCES

<u>Wave Sequence</u>	<u>Comments</u>
0. WSTouch	Exponential Velocity shifts the start step (+88).
1. DeepWav	
2. Quarks	
3. ResXwav	Time-sliced resonant filter. Exponential Velocity shifts the start step (+32).
4. Strings	
5. Unison	
6. WSMetal	Exponential Velocity shifts the start step (+58).
7. WS S&H	Simulates "pseudo-random" effect. Exp. Velocity shifts the start step (+50).
8. WSTable	Seq. tracks Linear Keyboard inversely (-105). Start step = 15.
9. WSVoice	
10. ResMove	
11. WSNoise	All 4 spectrum files, crossfaded.
12. LobWave	Vocal formant sequence.
13. FolowMe	Tine/metal attack; hold and wait for rest of Wave Sequence.
14. P5 Res	Time-sliced Prophet 5 resonant filter.
15. Complex	Sequence of VS waves.
16. WS Fade	
17. VelHarm	Tritone programmed at Step 6. Linear Velocity shifts the start step (+36).
18. Mini	Time-sliced Minimoog. Exponential Velocity shifts the start step (+18).
19. SoftWav	
20. Spectra	The start step tracks a Linear Keyboard (+13).
21. WSGrowl	Exponential Velocity shifts the start step (-85). Start step = 2.
22. SynWav1	
23. EnSweep	Uses ENV1 to sweep through sequence (changes with each wave's ENV1).
24. GateRez	Each step is held (DUR = GAT). Exp. Velocity shifts the start step (+110).
25. Marbles	
26. Ostinat	Root-4th-5th-octave melodic sequence.
27. Drops	Rhythmic sequence.
28. SloWave	Rhythmic sequence.
29. WavRytm	Rhythmic sequence.
30. Ski Jam	Rhythmic sequence.
31. WavSong	Rhythmic sequence.

## RAM 1 WAVE SEQUENCES

<u>Wave Sequence</u>	<u>Comments</u>
00. Partial	Try changing Loop Start and End points for variation.
1. Invashn	Special effect sequence. Used in "20Sec. Invasion".
2. PulsMod	Pulse file, time-sliced. Exponential Velocity shifts the start step (+50).
3. OB Res1	Time-sliced Oberheim resonant filter. "Open to closed" filter effect.
4. OB Res2	Reversed order of OB Res1. "Closed to open" filter effect.
5. Wave 13	Wavetable 13 from a PPG (odd-numbered waves only).
6. Sparks	Inharmonic series.
7. SonaNoi	
8. Whisper	Random-sounding sequence of speech sounds. Use at low level for best results.
9. WhSweep	Uses the Mod wheel to sweep through a resonant filter sequence (WH +127).
10. WavTabl	
11. Chrome	Produces crossfade of a single transient using a single step sequence.
12. DreamSq	New Pole crossfades to Air Vox, which is GATED (no loop).
13. BellSwp	A harmonic series sweep that decelerates towards the end.
14. XWind 1	
15. TineVel	Exponential Velocity shifts the start step (-70); starts at step 6.
16. Str Oct	Fades in an octave higher string sound after 3 seconds.
17. Breath	
18. OB Sax	Overblown Sax, time-sliced. Exponential Velocity shifts the start step (+85).
19. VelTran	Exponential Velocity shifts the start step (+87), producing different transients.
20. SynWav2	Linear Velocity shifts the start step (+85); every step detuned +/- 4 cents.
21. PlukRez	
22. TineRez	
23. RezStep	Try changing Loop Direction, Start, and End values for variation.
24. AtSweep	An atonal Wave Sequence.
25. Haitian	2 step sequence using the same sample, 1 semitone detuned for "shaker".
26. Rez Seq	Last step GATED.
27. 3/4 Jam	Rhythmic sequence.
28. SpecJam	Rhythmic sequence with SynthBass and Spectrums.
29. RaspRap	Rhythmic. A good example of sample transposition with no tempo change.
30. MIDISki	MIDI clockable version of Ski Jam.
31. MIDsong	MIDI clockable version of WavSong.

### RAM 3 WAVE SEQUENCES

NOTE: All rhythmic sequences are set for MIDI clocks, except \*

<u>Wave Sequence</u>	<u>Comments</u>
0. Snare	Rhythmic sequence.
1. 16 Rthm	Rhythmic sequence.
2. Kick	Rhythmic sequence.
3. DSdrms	Rhythmic sequence*.
4. Afrika	Rhythmic sequence*.
5. DSbass	Rhythmic sequence*.
6. Helicop	Special "Helicopter" effect sequence.
7. BizyVox	Rhythmic sequence.
8. MagiWnd	A splice of SynthPad2 with Magic Organ.
9. Gtr+Pno	An example of "splicing" an attack on a guitar on a piano waveshape.
10. Orch WS	Crossfade of several orchestral-type waves.
11. NoizBug	Interesting crossfade of Noise and Cricket files.
12. Rain D1	Rhythmic sequence.
13. RedRain	Rhythmic sequence.
14. W echoL	Rhythmic sequence. Start Step is 4.
15. Drum R	Rhythmic sequence.
16. Drum L	Rhythmic sequence.
17. W echoR	Rhythmic sequence.
18. Mr.Funk	Rhythmic sequence.
19. Kinko	Rhythmic sequence.
20. 1/4 Kik	Rhythmic sequence.
21. HHts 1	Rhythmic sequence.
22. TikTok	A MIDI clockable clock!
23. Snare 2	Rhythmic sequence.
24. DiscoBs	Rhythmic sequence. Synth Bass in a classic octave pattern.
25. Crazy'X	Rhythmic sequence.
26. Kik+Snr	Rhythmic sequence.
27. JoVox	Rhythmic sequence.
28. LoopDrm	Rhythmic sequence.
29. FunW/16	Rhythmic sequence.
30. Indstrl	Rhythmic sequence. Exponential Velocity +80 (Velocity sets a different start step).
31. WveStas	A synthesised pronunciation of "Wavestation".

## USER SCALES

Although all 12 User scales may be modified and overwritten, the first six have been preset to useful alternate tunings. These scales are drawn from historical models, as many different tunings were used before the relatively recent adoption of the system of Equal Temperament. The advantage of Equal Temperament, with its evenly spaced semitones, is in its greater mobility of modulation, so that a chord progression played in the key of C sounds roughly the same as the same progression played in F#. Sacrificed, however, is some of the purity of the individual intervals offered by the scales below. For this reason, various implementations of Just Intonation are gaining popularity among certain modern composers, while Meantone, Werkmeister, and Kirnberger tunings are often used by performers interested in the authentic reproduction of ancient music.

Remember that, to properly hear the intended effects of these tunings, you must be playing in the same Scale Key as is set on the Parts Detail page. A more sophisticated use of the Wavestation A/D's facilities is to set up 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!).

For figures showing the precise tunings of each step of these scales, please see the next page.

USER 1 is set to produce a Just Intonation appropriate for major keys. This temperament is intended to maintain much of the purity of fifths from the Pythagorean scale (see below), while correcting the tunings of the more commonly used thirds. Note the purity of the major and minor triads built on the tonic, fifth, third, and sixth degrees, and that of the major triad built on the fourth degree.

USER 2 is set to produce a Just Intonation appropriate for minor keys. Note the purity of the major and minor triads built on the tonic, fifth, and fourth degrees, that of the major triads built on the flat second, flat third, and flat sixth degrees, and that of the minor triads built on the natural third and natural sixth degrees.

USER 3 is set to produce a Meantone tuning. This system, commonly used up until the end of the Baroque period, allows only moderate amounts of transposition. The purity of diatonic intervals, while not so outstanding as that of Just Intonation, is still greater than that of Equal Temperament. The "Wolf" fifth, from the sharp fifth degree to the sharp second degree, is greatly out of tune, and was usually avoided...except for the more daring musicians, who enjoyed its extreme dissonance.

USER 4 is set to produce a Pythagorean tuning. This ancient Greek temperament is based on almost completely pure fifths, to the detriment of other intervals - notably, the thirds. To make all the fifths pure, it would be necessary to have a slightly sharp octave, and to avoid this one of the fifths (the interval from the sharp fourth degree to the sharp first degree) is made quite flat. This temperament was prized for its use in simple melodies, as opposed to harmonies, and was particularly popular among violinists.

USER 5 is set to produce a Werkmeister III scale. Created by German organist and music theorist Andreas Werkmeister, this scale was one of the many temperament systems developed towards the end of the Baroque period aimed at allowing relatively free transposition. It was to this new group of "Well-Tempered" tunings that J.S. Bach referred in the title to his "The Well-Tempered Clavier."

USER 6 is set to produce a Kirnberger III scale. This tuning, devised by Johann Philip Kirnberger in the early 18th century, was another popular "Well Tempered" tuning.

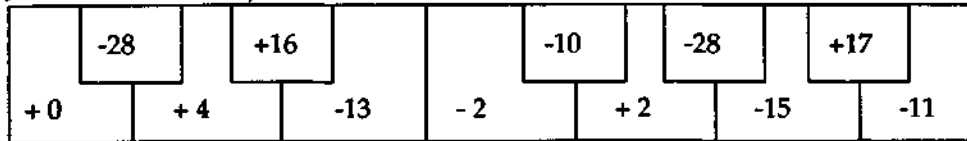
## MICROTONAL TABLES using WAVE SLOPE

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, and 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.

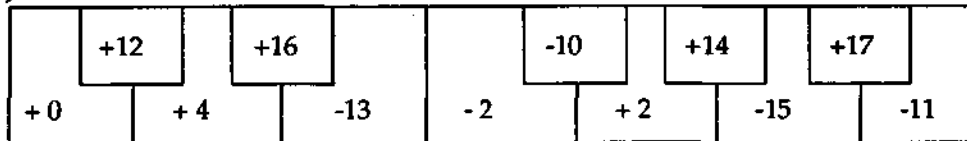
A Slope of 0.75 will produce three subdivisions for each whole-step (18 subdivisions per octave), for the Tripartate scale. A Slope of 0.5 will produce two subdivisions for each half-step (24 subdivisions per octave), for the quarter-tone scale.

**USER SCALES - Figures**

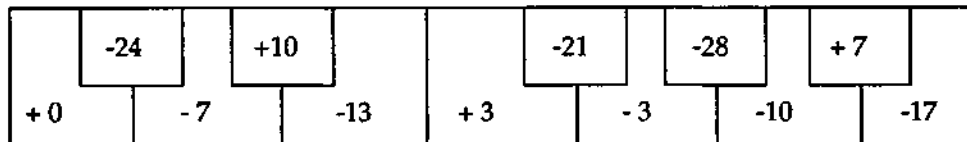
USER 1 Just Intonation - Major



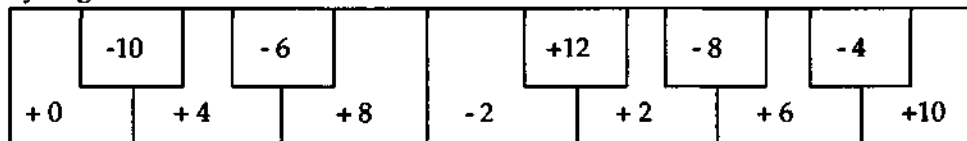
USER 2 Just Intonation - Minor



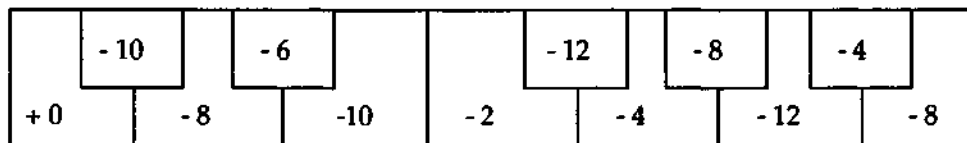
USER 3 Meantone



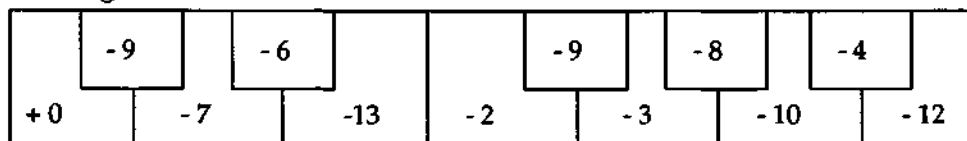
USER 4 Pythagorean



USER 5 Werkmeister III



USER 6 Kimberger III



## **SAVING DATA WITH MIDI SYSEX RECORDERS**

It is possible to back up the entire contents of the Wavestation A/D (Performances, Patches, Wave Sequences, Global data, User Scales, Multimode Setups, and the Performance Map) by using an external device to record its MIDI sysex data dumps. We'll look at how to do this using a Korg T-series keyboard, and also give some general hints for use with any MIDI sysex data recorder.

**NOTE:** The current MIDI Basic Channel is stored in the sysex data when it is sent from the Wavestation A/D. For the Wavestation A/D to receive the sysex file, it must be set to the same Basic Channel as was used when the data was sent.

When saving sysex data from the Wavestation A/D, it's important to know the sizes of each of the data types. The Wavestation A/D's sysex ALL dump takes up 203450 bytes, a very large amount of data - more than many sysex records can handle in a single pass. Because of this, it's usually better to save the Wavestation A/D's data in several separate files.

Here are the data sizes (in Bytes) for each Wavestation A/D sysex data dump:

All Patches, 1 Bank	29828
All Performances, 1 Bank	18108
All Wave Sequences, 1 Bank	17576
Global	122
Scales	297
Multimode Setups	5522
Performance Map	1042

The user's manual for your MIDI sysex recorder should tell you how many Bytes it can handle at one time.

## **T-SERIES KEYBOARDS**

Each T-series sysex file can hold a maximum of 65534 bytes, which is enough for a single Wavestation A/D Bank's Performances, Patches, and Wave Sequences. The three RAM Banks can thus be stored on a single T-series disk, leaving room for a fourth file containing either the setup data (Global, Scales, Multisets, and the Performance Map) or the data from a CARD, if you have one inserted.

To SAVE sysex data from a Wavestation A/D to a T-series keyboard, do the following:

- First, format a T-series disk to store the sysex data. Make sure to use the "PROG/COMBI/SEQ 4 Files" option, so that you can store all four files on the same disk; disks which are formatted to contain PCM data can only contain a single sysex file.
- Plug the MIDI Out of the Wavestation A/D into the MIDI In of the T-series keyboard.
- On the T-series, find DATA FILE under DISK (page up 3). Use VALUE to select File-A. Cursor down from "Load MIDI data," so that the screen says, "Awaiting MIDI data."
- On the Wavestation A/D, go to the sysex page (path: MIDI-SYSEX), and select the type of data that you want to send. For File-A, for instance, you could start with PATCH RAM1 ALL.
- After selecting the data type, press EXECUTE.

The Wavestation A/D screen should say, "TRANSMITTING MIDI SYSEX;" the T-series screen should say, "Receiving MIDI data." When the sysex dump is finished, the T's screen will show you the total size of the file(s) received.

You can continue sending sysex data from the Wavestation A/D. The T-series keyboard will "stack" sysex messages until the buffer runs out of room (if that happens, the message "ERROR: Memory overflow" will appear in the T's screen, and you will have to start over).

## **WAVESTATION A/D PERFORMANCE NOTES**

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- When you have "stacked" up enough data to fill the file (for instance, a single Bank's Performances, Patches, and Wave Sequences), press **SAVE** on the T-series keyboard.
- Select a new file (i.e., **FILE-B**) and continue until all the desired sysex data dumps have been saved.

To **LOAD** the sysex data from the T-series keyboard back into the Wavestation, do the following:

- Connect the **MIDI Out** of the T-series keyboard to the **MIDI In** of the Wavestation A/D.
- Make sure that the Wavestation A/D's **Memory Protect Internal** is set to **OFF**, and that its **MIDI Basic Channel** is the same as when the dump was made.
- Insert the disk containing the sysex files into the T-series keyboard, go to the **DATA FILE** page, select the desired File, and press **LOAD**. After the "are you sure?" message, the data is loaded from the disk into the T's buffer, and then immediately sent to the Wavestation.

The Wavestation A/D screen should say, "RECEIVING MIDI SYSEX," followed by a "SYSEX TRANSFER SUCCESSFUL" message, one for each sysex file that was "stacked" in the T's data file dump. A single file transfer can take up to 30 seconds from start to finish, so be patient! After the last "successful" message, your data has been loaded, and you're ready to go.

**KORG** KORG INC.

15-12, Shimotakaido 1-chome, Suginami-ku, Tokyo, Japan.

# WAVESTATION

ADVANCED VECTOR SYNTHESIS • WAVE SEQUENCING

## Player's Guide

by Stanley Jungleib and Dan Phillips

# A/D

# KORG

® ①

**av** AV Synthesis System

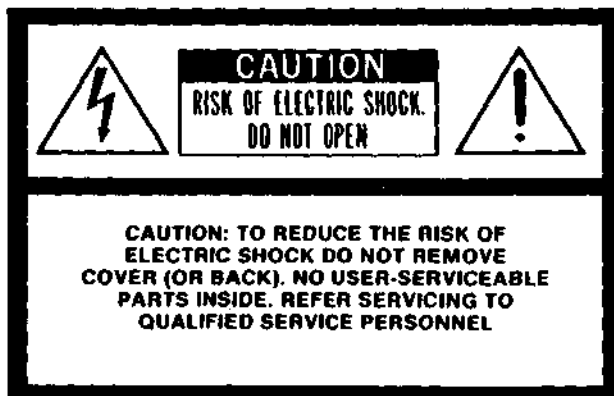


## **IMPORTANT SAFETY INSTRUCTIONS**

**WARNING**—When using electric products, basic precautions should always be followed, including the following:

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

### **SAVE THESE INSTRUCTIONS**





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



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

#### **GROUNDING INSTRUCTIONS**

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

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

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

### PRECAUTIONS

#### ■ ENVIRONMENT

Avoid exposing this unit to the following conditions:

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

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

#### ■ POWER SUPPLY

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

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

#### ■ INTERFERENCE WITH OTHER APPLIANCES

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

#### ■ HANDLE GENTLY

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

#### ■ CLEANING

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

### OWNER'S MANUAL

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

### THE BACKUP BATTERY

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

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### **KORG Wavestation A/D Player's Guide**

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**Alex Limberis**

**Scott Peterson**



# 1 WAVESTATION A/D OVERVIEW

## 1.1 INSTANT GRATIFICATION

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

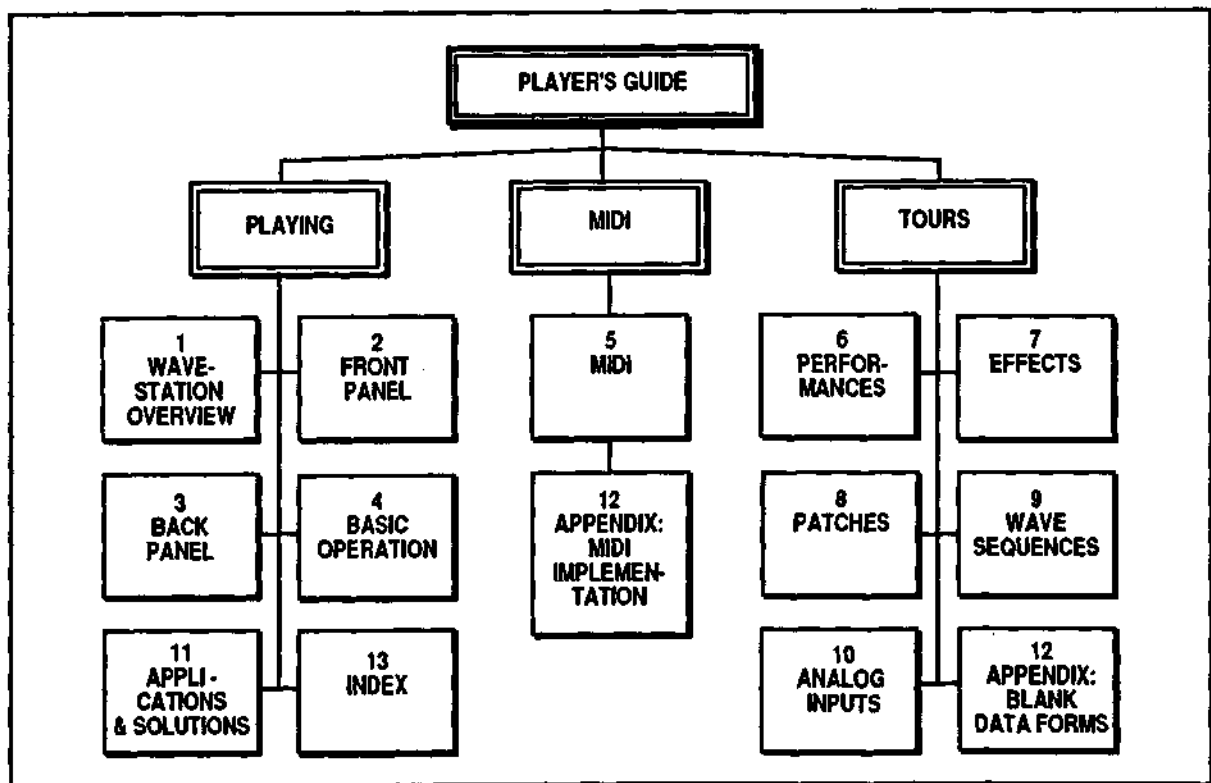
- ☛ Connect the Wavestation A/D to your master controller and audio system, and switch everything on.
- ☛ Play the Wavestation A/D with your controller, and select new Performances by turning the dial.
- ☛ To switch memory banks, press the BANK soft key (the first switch under the display).

To edit:

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

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

Figure 1-1 Player's Guide Overview





## 1.2 ABOUT THIS MANUAL

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

This guide does not cover programming custom sounds in depth. However, the Tour chapters (6 through 10) do introduce the Wavestation A/D's editing controls. They show you where to go to immediately make the most useful changes -- such as editing filter brightness or amplifier velocity response -- or to play with the fun things like Vector Synthesis, Wave Sequencing, and the Analog Inputs.

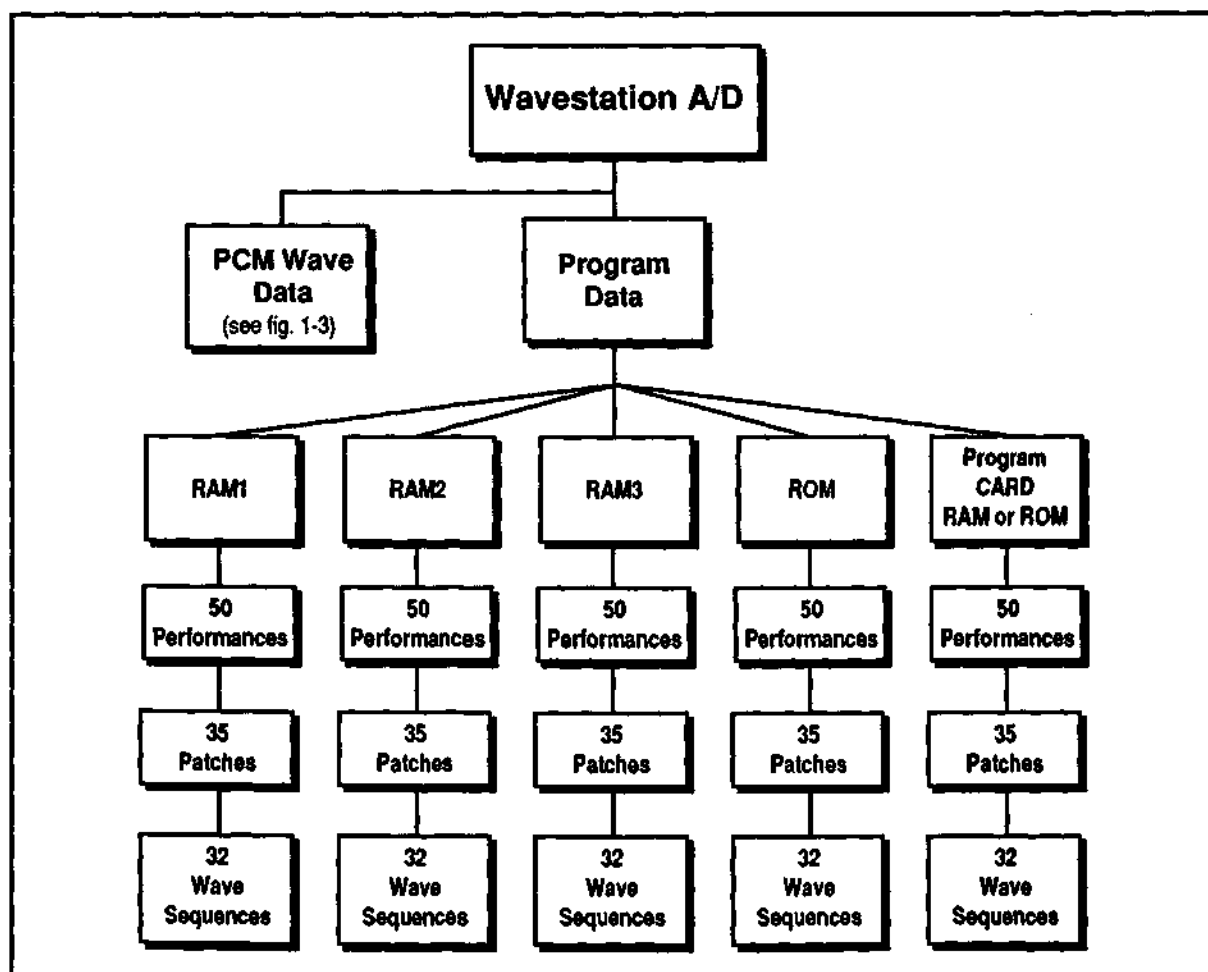
After familiarizing yourself with the Wavestation A/D using this guide, or if you require more information about any display page, please see the accompanying Wavestation A/D Reference Guide.

## 1.3 WHAT IS A BANK?

The Wavestation A/D has internal memory banks RAM1, RAM2, RAM3, ROM, and, if used, a plug-in CARD bank.

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

**Figure 1-2 Wavestation A/D Memory Banks - Program Data**



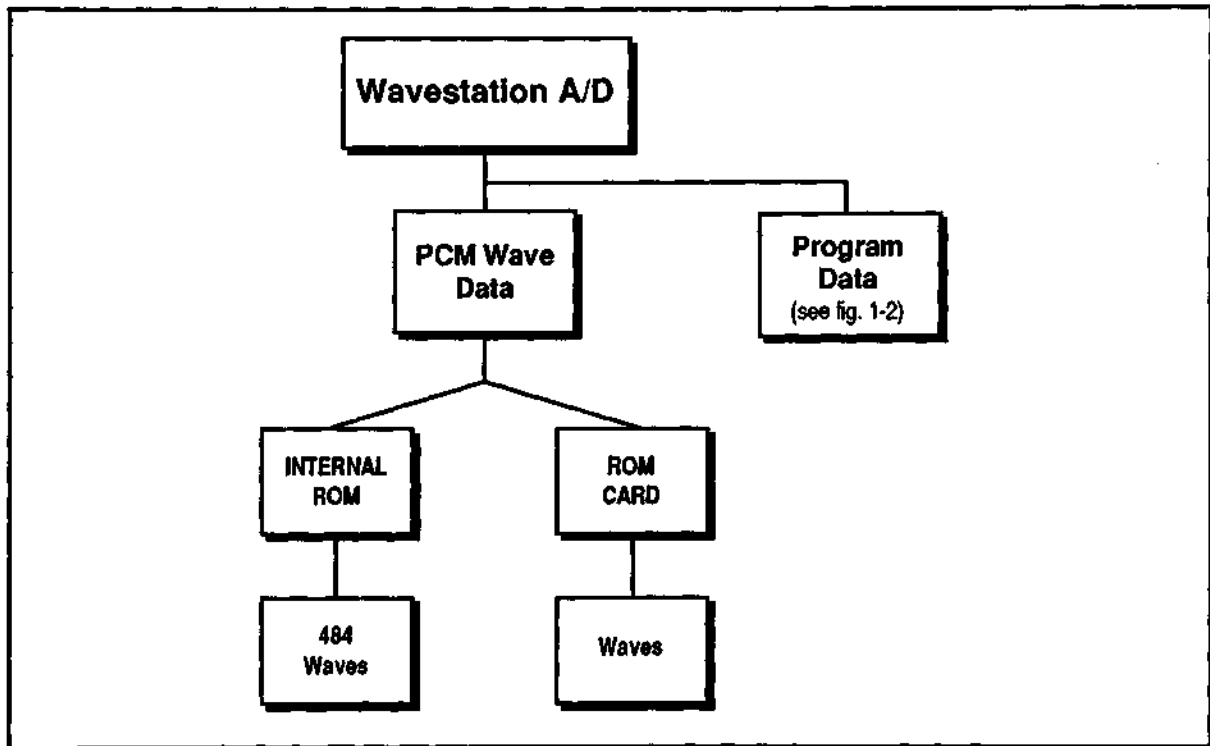
The ROM bank contains fixed factory sounds and their source material; it can't be changed.

RAM1, RAM2, and RAM3 are your work areas for custom sounds, although initially they are set with more factory sounds. The RAM banks are backed up with a long-life lithium battery (if the internal battery voltage drops, a warning appears).

Each bank contains 50 Performances, 35 Patches, and 32 Wave Sequences. In addition, there is a ROM wave memory of 484 PCM Waves.

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

**Figure 1-3 Wavestation A/D Memory Banks - PCM Wave Data**



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

### 1.4 WHAT IS A PERFORMANCE?

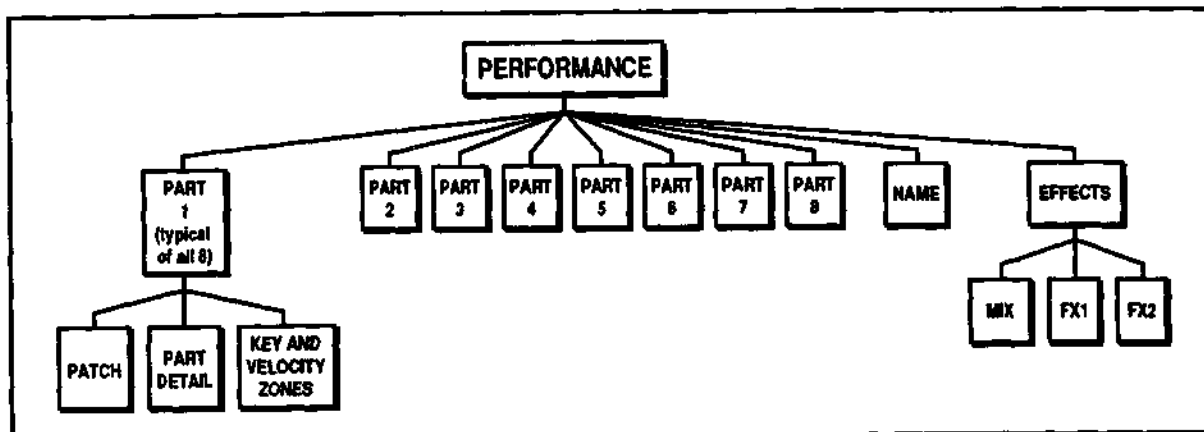
The simplest answer is that Performances are the highest level of sound control in the Wavestation A/D. Performances have no sounds in themselves, but organize and add effects to Patches, which do create sounds.

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

There are 50 Performances in each bank, so you have a minimum of 200 Performances available - 250 if a Performance Card is in use.

Please see Figure 1-4.

Figure 1-4 Performance Structure



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

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

### Effects

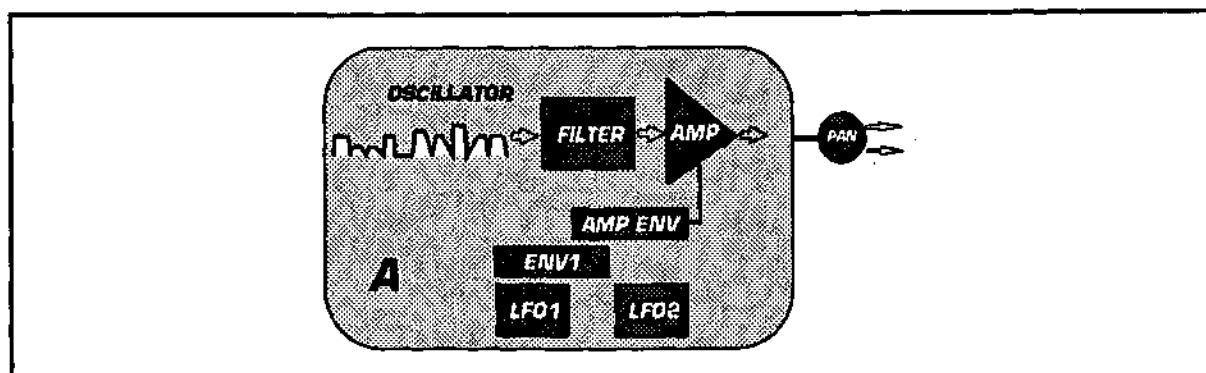
Each Performance also memorizes an effects and output routing configuration, two effects program selections for the twin effects processors, and all of the parameters contained in those two effects.

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

## 1.5 WHAT IS A PATCH?

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

Figure 1-5 A Voice Patch



Each Bank holds 35 Patches, for a total of 175 (with a ROM or RAM card inserted).

To hear an individual Patch you can:

- ☛ Select a Performance which has only one Part.
- ☛ Select a SOLO function for any Part.

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

### 1.6 WHAT IS A WAVE?

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

There are 484 internal wave choices available, and more can be accessed via optional PCM Cards. Each wave has a unique timbre. Waves can be single-cycle or few-cycle waveforms that loop continuously, sampled transients followed by loops, or sampled transients which play only once.

For more about waves, please see Chapter 8.

### 1.7 WHAT IS A WAVE SEQUENCE?

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

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

Each Bank holds 32 Wave Sequences, for a total of 128. The total Wave Sequence Step memory per bank is 500 steps, for a total of 2500 (with an optional RAM CARD). One Wave Sequence can have up to 255 steps.

For more about Wave Sequences, please see Chapter 9.

## 2 FRONT PANEL

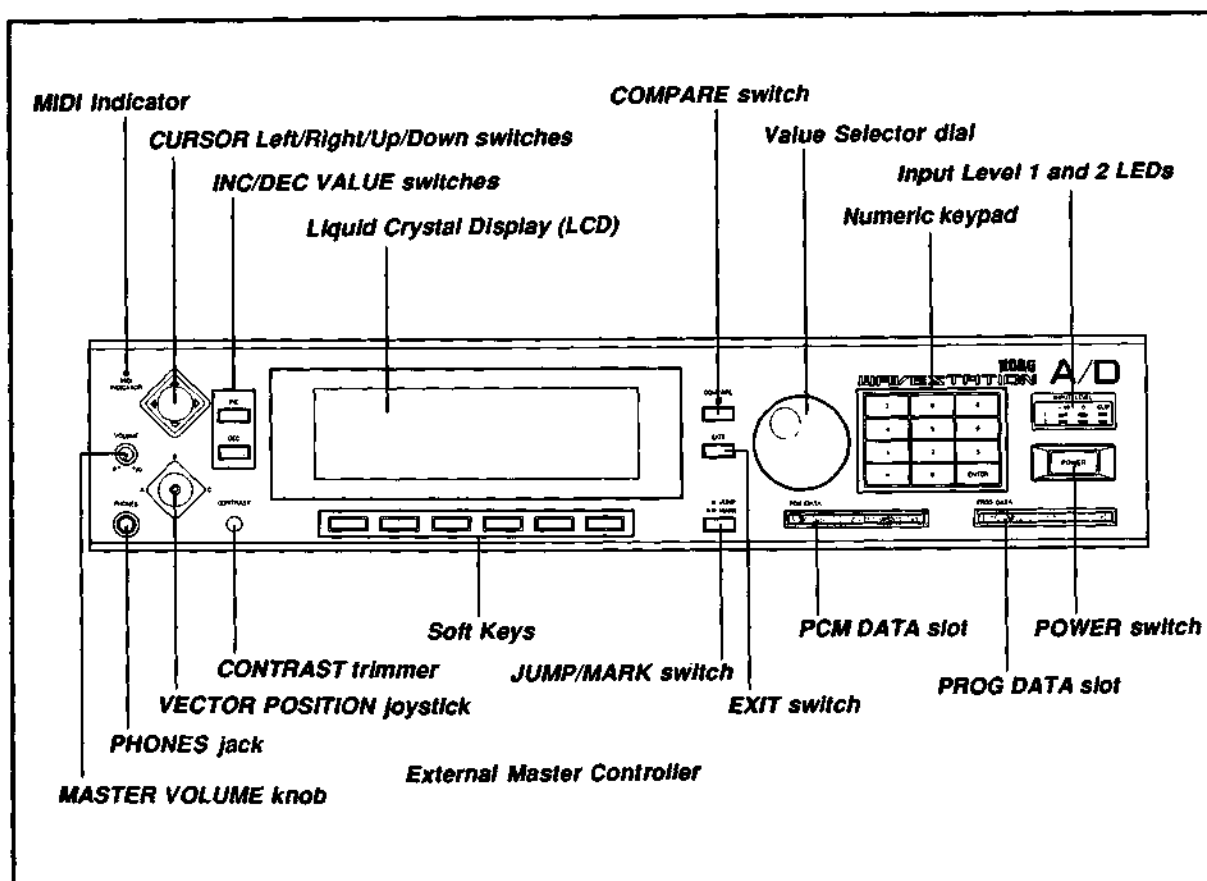
### 2.1 GENERAL

This chapter identifies and describes all controls and displays on the front panel. There are three main types of player's controls:

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

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

Figure 2-1 Front Panel



## **2.2 PERFORMER'S CONTROLS**

### ***VECTOR POSITION Joystick***

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

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

In MIDI MULTI and MONO modes, local and incoming MIDI controllers are kept separate, so that the sound will not be affected by moving the local joystick unless it is being routed back to the Wavestation A/D via MIDI. In OMNI and POLY modes, both the local joystick and incoming MIDI are recognized.

The MIDI REMAP page, discussed below, allows you to use MIDI controllers for joystick movements. Even if your controller doesn't have a joystick, you may still be able to use a combination of other controllers (wheels, sliders, footpedals, etc.) for this purpose.

### ***MASTER VOLUME knob***

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

### ***External Master Controller***

Since this is a rack-mount module, many aspects of performance depend on the capabilities of your master controller. If your controller does not send aftertouch, for instance, then the Wavestation A/D will not receive any aftertouch data. For more information on using your master controller with the Wavestation A/D, see Section 4, BASIC OPERATION.

## **2.3 DISPLAYS**

### ***Liquid Crystal Display (LCD)***

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

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

### **Input Level 1 and 2 LEDs**

These two sets of three LEDs each display the levels of the signals at the Analog Inputs. The leftmost LEDs show that their respective Inputs are receiving a low signal (-10dB), the middle LEDs show the optimum level (-3dB), and the rightmost LEDs show that the signal is clipping. The clipping LEDs stay lit for about half of a second, so that you can easily see that clipping has occurred.

### **MIDI Indicator**

This LED lights up whenever the Wavestation A/D receives any MIDI data which it has been set to recognize. This can be very useful when troubleshooting your MIDI setup.

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

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

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

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

The exception to the above is MIDI Volume (controller #7) on the two Analog Input Channels; this is always received, regardless of any other settings.

## **2.4 DISPLAY CONTROLS**

### **Soft Keys**

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

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

### **CURSOR Left/Right/Up/Down switches**

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

### **COMPARE switch**

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

COMPARE again brings back the edited version. This may be repeated as many times as you wish.

***EXIT switch***

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

***JUMP/MARK switch***

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

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

**2.5 DATA ENTRY CONTROLS**

The three sections of the Data Entry Controls - dial, numeric keypad, and Inc/Dec buttons - all affect data in the same way. They each have their advantages - the dial is useful for sweeping through a large range of values, the Inc/Dec buttons are good for fine adjustments, and the numeric keypad makes it easy to quickly enter an exact value. You may find that you prefer specific data entry controls for specific situations.

***Value Selector dial***

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

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

***INC/DEC VALUE switches***

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

***Numeric keypad***

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

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

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

To cancel an edit, simply select another field with the cursor switches before pressing ENTER (if you've already pressed ENTER, you can still use the COMPARE switch).



## **2.6 OTHER CONTROLS**

### ***CONTRAST trimmer***

Adjust this for the most comfortable viewing of the LCD.

### ***POWER switch***

The power switch is located on the front panel.

## **2.7 CARD SLOTS**

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

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

### ***PROG DATA slot***

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

### ***PCM DATA slot***

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

## **2.8 OUTPUTS**

### ***PHONES jack***

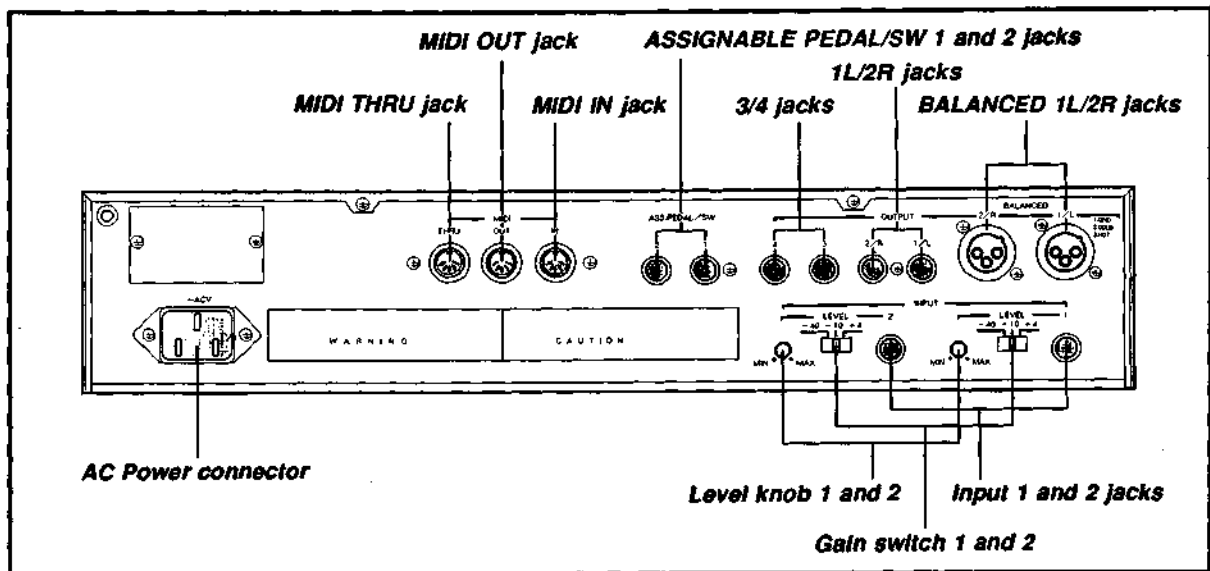
A copy of 1/L and 2/R. This standard quarter-inch phone jack accommodates stereo headphones of any impedance. KORG Model KH-1000 is suitable.

## 3 BACK PANEL

### 3.1 GENERAL

This chapter identifies and describes components on the back panel.

Figure 3-1 Back Panel



### 3.2 INPUTS

#### AC Power connector

A detachable cord is provided.

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

#### MIDI IN jack

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

#### Input 1 and 2 jacks

These inputs allow the Wavestation A/D to process audio signals in a variety of ways. External audio signals can be used in Patches, just as if they were PCM waveforms. During recording, mixdown, or in performance, you might also wish to send the signals of external instruments (other keyboards, sound modules, guitars, etc) through the Wavestation A/D's effects, along with the internal sounds. You might sometimes even wish to use the Wavestation A/D as a stand-alone effects processor. Some of the effects, such as the Vocoders, Mod Pitch Shift - Delay, and

the Compressor, are specifically designed to work with the Analog Inputs. For more information, see Section 10, ANALOG INPUTS.

### ***Gain switch 1 and 2***

These controls work together with the Level knobs to set the initial gain of the analog inputs. -40 (dBu) should be used for microphones, -10 (dBu) should be used for consumer audio line-level equipment (mixers, synthesizers, electric guitars, etc.), and +4 (dBu) should be used for professional line-level equipment.

### ***Level knob 1 and 2***

These controls work together with the Gain switches to set the initial gain of the analog inputs. Turning to the left attenuates the level, and turning to the right boosts the level.

### ***ASSIGNABLE PEDAL/SW 1 and 2 jacks***

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

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

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

## **3.3 OUTPUTS**

### ***MIDI OUT jack***

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

### ***MIDI THRU jack***

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

### ***1L/2R jacks***

For normal stereo use, use these phone jack outputs.

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

### ***3/4 jacks***

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

### ***BALANCED 1L/2R jacks***

These duplicate the output of the 1L/2R jacks, with balanced lines for professional applications.

## 4 BASIC OPERATION

### 4.1 GENERAL

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

If you have any difficulties when setting up your Wavestation A/D, please refer to the Appendix, Section 11.1, TROUBLESHOOTING.

### 4.2 PREPARATION

#### *Power*

- Check that the Wavestation A/D power switch is set to OFF. Only turn this switch back ON after all connections have been made to your power, MIDI, and audio setups.

#### *Volume Settings*

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

#### *MIDI Connection*

- Since the Wavestation A/D has no keyboard of its own, you must play it from an external MIDI controller. To receive MIDI, connect a cable from the controller's MIDI OUT port to the Wavestation A/D's IN port.
- If you are working in a sequencing environment, you may wish to use your sequencer's MIDI through function (if it provides one) to route the MIDI out of your master controller through the sequencer and back into the Wavestation A/D. For more information, please see your sequencer's manual.

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

When shipped, the Wavestation A/D is initially in Omni mode, which means that it receives data on all 16 MIDI channels. This is appropriate for a basic setup with a master controller and a number of "stacked" tone modules.

- If you wish to use the Wavestation A/D in a sequencing environment, you will probably want to change the MIDI MODE to either POLY or MULTI. For more information on this and other MIDI operations, please see Chapter 5.

#### *Audio Connection*

- Connect the Wavestation A/D's audio outputs to your sound system.  
For monophonic operation, use jack 1/L only. Stereo playback is highly recommended, if your amplification system allows it.

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For stereo, use 1/L and 2/R. If you are connecting the Wavestation A/D to a mixer with balanced inputs, use the Balanced 1/L and 2/R jacks.

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

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

### Footswitches/Footpedals

- ☛ Connect any desired footswitches or pedals to the ASSIGNABLE PEDAL/SW 1 and 2 inputs.

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

## 4.3 POWER-ON

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

### Start-up Instructions

- ☛ Connect the AC power cord from Wavestation A/D back panel to the specified power outlet.
- ☛ Switch power on to the Wavestation A/D and other sound-generating devices first. On the Wavestation A/D, the KORG logo appears briefly in the display.
- ☛ Switch on low-level devices such as mixers and signals processors.
- ☛ Finally, switch on the power amplifier(s).
- ☛ For power-off, reverse this sequence (it is not necessary to always disconnect the Wavestation A/D's power cord).

### Normal Indications

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



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

**Volume Adjustment**

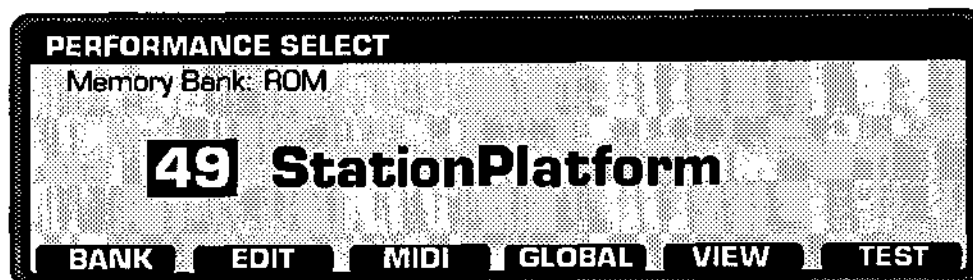
- While playing the Wavestation A/D from your controller, gradually turn its MASTER VOLUME knob clockwise (to raise the volume), and then adjust your sound system volume to the desired level.

**Pre-Play Check**

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

**4.4 PERFORMANCE SELECT PAGE**

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



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

It displays the name of the current memory Bank at the top of the screen.

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

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

**4.5 SELECTING BANKS**

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

- To select a different memory bank, press BANK.

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

BANK cycles through the bank choices, allowing you to quickly switch between them.

For information on changing Banks from MIDI, see Section 5.8, MIDI BANK SELECT and PROGRAM CHANGE.

## 4.6 SELECTING PERFORMANCES

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

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

- ☛ For random access (34, 17, 42, . . . 5) you can use the keypad. Type in the desired Performance number and press ENTER.
- ☛ To select Performances from your MIDI controller, you may use MIDI Program Changes. The Wavestation A/D also implements a new feature of the MIDI spec, the Bank Select message (controller #32), which allows you to select from all of the instrument's 200 Performances (250 with a Program Card inserted). For more information, see Section 5.8, MIDI BANK SELECT and PROGRAM CHANGE.

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

Note that 49 is the greatest number you can enter; if you type in a larger value and then press ENTER, it will be changed to 49. This is because all Performances are numbered 49 or less; any greater number is interpreted to mean, "the largest value available." This is true for all values: you can't exceed their limits. If you're ever curious about the maximum value of a particular parameter, you can type in a large number (such as 9999) and press ENTER; the maximum value will be displayed.

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

## 4.7 PLAYING

- ☛ When auditioning Performances, be sure to try all of the physical modulation controllers available to you on your controller: not just velocity, but aftertouch, the wheels, and the sustain footswitch. You should also try out the Wavestation A/D's joystick, or set up your master controller to act as the joystick (see the Reference Guide [MIDI REMAP]).
- ☛ To prevent unwanted modulation, periodically check that the MODULATION wheel is fully lowered on your controller.

### *Polyphony*

The Wavestation A/D can play up to 32 notes simultaneously, depending on the current Performance and the polyphony of your master controller.

### *Aftertouch*

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

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

**Pitch wheel**

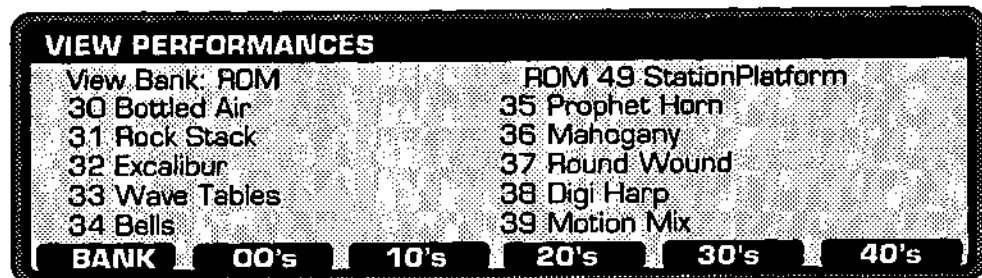
The Wavestation A/D's response to your master controller's Pitch Bend is determined by its own internal settings. The Global page contains the default Pitch Bend range. Each Patch can also override this with its own range setting.

**Modulation wheel**

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

**4.8 VIEWING PERFORMANCE SETS**

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



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

**4.9 USING CARDS**

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

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

The UTILITIES page also allows you to quickly copy to and from Program cards. To back up an entire RAM bank onto an inserted, formatted card, enter RAM 1/2/3 as the From: parameter, and enter CARD as the To: parameter. Select Data to Transfer: ALL, and press the MOVE softkey. To move an entire card bank into RAM, select CARD as the From: parameter, and RAM 1/2/3 as the To: parameter, and then proceed as above.

You can use fresh Program RAM cards just like the internal banks RAM1, RAM2, and RAM3. However, after a while, you will probably create some Performances that combine different types of resources. For example, you might have a CARD Performance that uses a RAM1 Patch, or a RAM2 Patch that uses a CARD Wave. You will have to keep these relationships straight. The blank data sheets



provided at the back of this manual may help. In general, if a Performance calls for a CARD resource which isn't there, it doesn't play that resource.

### 4.10 GLOBAL SETTINGS

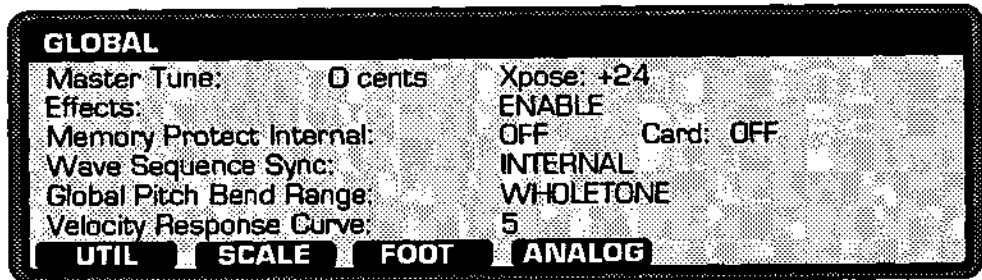
The Global parameters help to adapt the instrument to the playing environment. Thus, it is important to at least be aware of the powers that lurk on the GLOBAL page. In this section we are going to cover Master Tune only. For the other global parameters, please see the Reference Guide.

#### Paths

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

**Path: GLOBAL**

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



### 4.11 MASTER TUNE

Found at the top of the GLOBAL page, these parameters raise or lower the basic pitch of the instrument. For example, you may want to fine-tune the Wavestation A/D to a piano, or transpose the keyboard to accommodate a singer's range.

To fine tune the Wavestation A/D:

- While playing from your controller, select the Master Tune parameter and adjust the dial to raise or lower the basic pitch.

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

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

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

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

To transpose the entire Wavestation A/D:

- Select the Xpose parameter and adjust the dial to the desired transposition. Each number equals one semitone, so that -1 is down a half step, +12 is up an octave, and so on.

***Not Enough Tuning Range?***

If all Performances are off by the same interval, check that the Xpose parameter is set to 0, or a multiple of 12.

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

Another, less likely, source of detuning is the interruption of PITCH wheel information – leaving the instrument “hung” away from A-440 tuning. To clear this problem, make sure all incoming MIDI cables are solidly connected, and adjust the Wavestation A/D back into range by re-centering the external controller’s pitch wheel.

If you are using the Analog Inputs in a Patch, it is important to remember that they cannot be tuned by the Wavestation A/D. If you are using another synthesizer as a sound source, for instance, you must adjust the tuning on that instrument itself.

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

## **5 USING MIDI**

### **5.1 GENERAL**

The Wavestation A/D's robust MIDI implementation meets modern demands for use as an expressive multi-timbral synthesis module. In MIDI MULTI or MONO modes, the Wavestation A/D can handle 16 channels of MIDI input. Up to 16 multi-timbral setups (Multisets) can be defined, each including 16 Performances and settings for the Multi-Digital Effects (MDE) processor. You can even program an independent channel for effects modulation. This chapter covers the basic points of these MIDI operations.

Other MIDI applications are covered in the Reference Guide (under MIDI RECEIVE, MIDI REMAP, and MULTI-MODE SETUP).

### **5.2 FACTORY DEFAULTS**

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

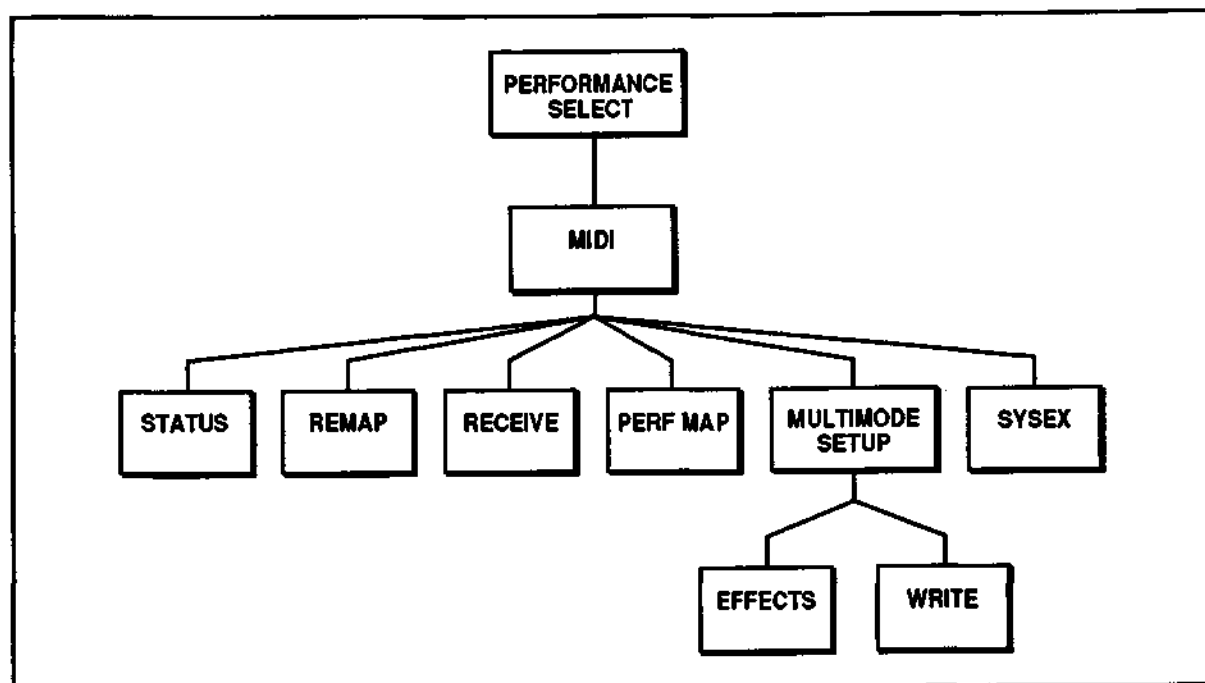
All data, such as the full MIDI note range, preset selections, and wheels, are recognized by default in the factory Performances. Monophonic and polyphonic aftertouch are recognized but may or may not have an obvious effect, depending on the specific Patches which are programmed into the current Performance.

To use the Wavestation A/D in a sequencer environment where it needs to receive on a specific channel, you will need to set it to POLY mode and select the desired channel, as described in Section 5.4 below. To use Wavestation A/D as a multi-timbral sound module, so that it is playing a number of Performances at once, you will need to set it to MULTI mode and create a Multimode Setup, as described in Section 5.11.

In the previous chapter, you may have noticed a Wave Sequence Sync parameter on the GLOBAL page. This feature can be used to synchronize wave sequence steps to MIDI clocks. When this is set to MIDI, each step sounds for the number of MIDI clocks equal to the step's Duration parameter. A step duration of 24, for instance, equals one quarter note; a duration of 12 equals an eighth note; a duration of 6 equals a sixteenth note, and so on.

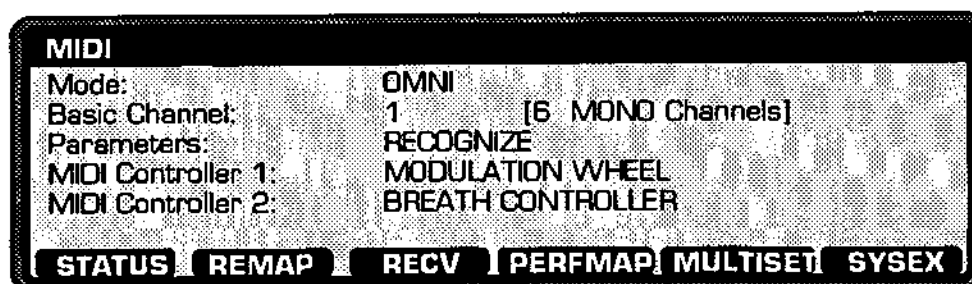
Figure 5-1 shows the organization of the MIDI menus and their references. For example, from the PERFORMANCE SELECT page, press MIDI to get to the main MIDI page. Then press any of the soft keys shown for their corresponding functions.

Figure 5-1 MIDI Menus



### 5.3 SELECTING MIDI FUNCTIONS

Path: MIDI

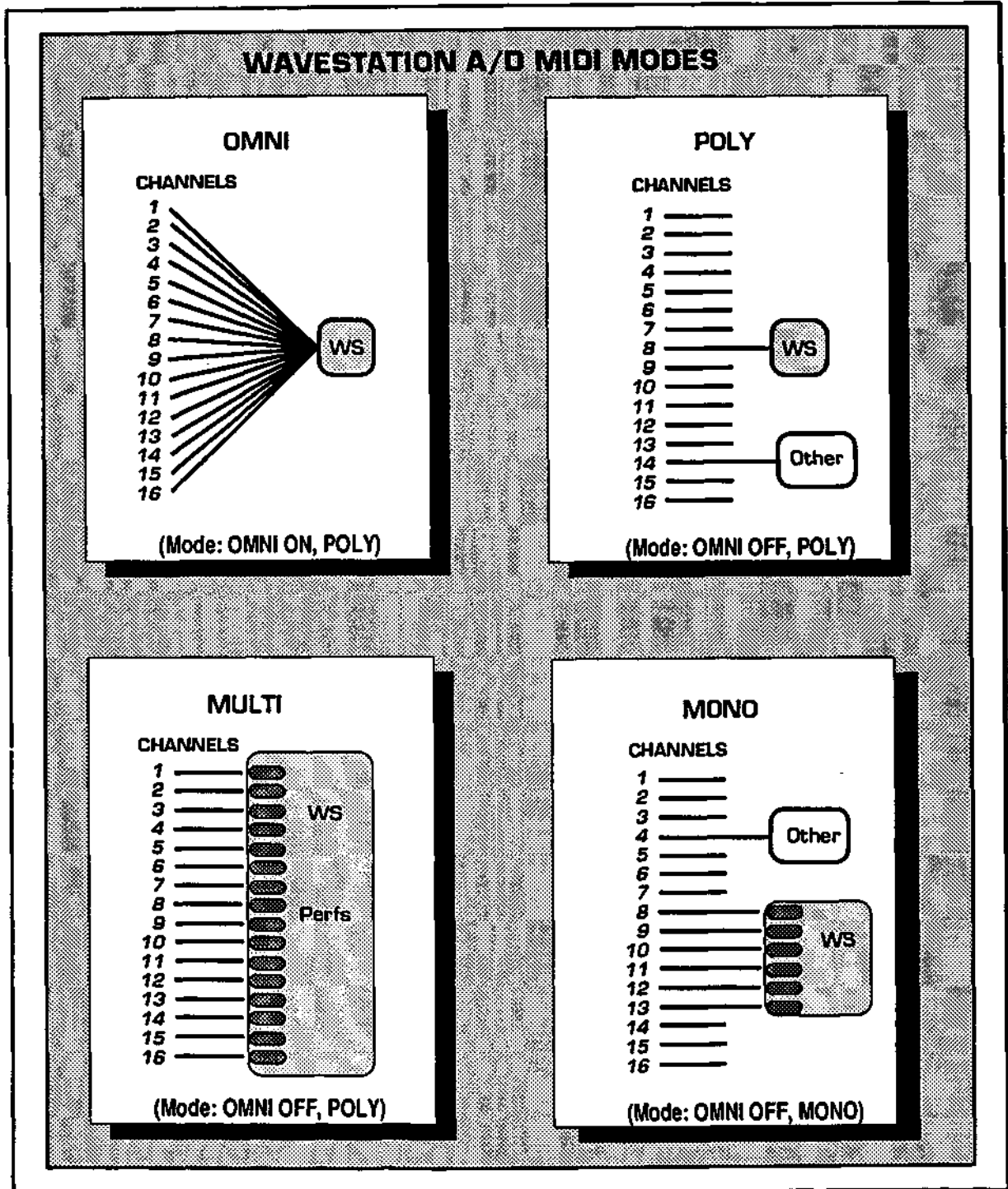


As you can see, this is where the main MIDI functions are set or chosen.

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

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

Figure 5-2 MIDI Modes



**NOTE:** In MULTI and MONO modes, local and incoming MIDI controllers are kept separate, so that the sound will not be affected by moving the local joystick unless it is being routed back to the Wavestation A/D via MIDI. In OMNI and POLY modes, local and MIDI controllers are shared.

## 5.4 SETTING THE MIDI MODE

For your specific setup, you may want to switch the Wavestation A/D to POLY mode so that it responds to only one channel, or you may want to switch to MULTI mode for multi-timbral operation.

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

OMNI means that the Wavestation A/D receives on all channels.

POLY means that the Wavestation A/D receives on the Basic Channel (as set in Section 5.5 below).

MULTI means that the Wavestation A/D receives on all 16 channels, routing channel data to up to 16 different Performances according to the current Multi Mode Setup. Please see Section 5.11, MULTIMODE SETUPS.

MONO is used most often by guitar controllers. It means that the incoming instrument is spread out over a number of consecutive channels (typically six), to which certain global parameters may apply. The "# MONO CHANNELS" parameter, which only appears in MONO mode, sets the total number of channels to be used. The channels used begin with the current Basic Channel, up to the number of mono channels requested, to the limit of 16. For example, if the Basic channel is set to 1, and the "# MONO Channels" set to 6, then the Wavestation A/D would receive MIDI on channels 1 through 6.

## 5.5 ADJUSTING THE BASIC CHANNEL

- Cursor to the second field on the MIDI page, labeled Basic Channel.

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

In OMNI mode the channel number is ignored, while in MULTI mode, all channels set to ON (on the Multiset page) respond to MIDI.

## 5.6 PARAMETERS

The default for this parameter is DISABLE. If you are not specifically using this feature, leave it at that setting to avoid sending unnecessary data.

If this is set to TRANSMIT (or RECOGNIZE & TRANSMIT), the Wavestation A/D will send out MIDI System Exclusive messages whenever any parameter is edited- ENV 1 level one, for instance, or LFO 2 rate. These messages may be recorded by a sequencer and later received by the Wavestation A/D. This allows yet another way to automate real-time timbre changes, such as MIDI-synced filter sweeps. To receive parameter change messages, this must be set to RECOGNIZE or RECOGNIZE & TRANSMIT.

This setting has no effect on Sysex data dumps.

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

## 5.7 MIDI CONTROLLER 1 AND 2 ASSIGNMENT

In addition to its normal response to MIDI Controllers, as outlined in the MIDI Implementation Chart at the back of this manual, the Wavestation A/D allows you to assign two additional MIDI Controllers as modulation sources. These appear as MIDI Controller 1 and 2 in the Modulation Matrix, and are set by the parameters of the same name on the MIDI page.

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

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

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

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

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

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

## 5.8 MIDI BANK SELECT and PROGRAM CHANGE

The original MIDI Program Change command allowed you to choose between a maximum of 128 programs. Technology has progressed since then, and now the Wavestation A/D can hold up to 250 Performances when a Program Card is inserted - too many for Program Changes alone to handle. By using the newly created Bank Select message in conjunction with Program Changes, you can access each one of the Wavestation A/D's Performances via MIDI.

The Wavestation A/D's five internal Banks are divided into three MIDI Banks, each accessed by a different value of the MIDI Bank Select message (MIDI Controller #32). RAM1 and RAM2 correspond to Controller #32, value 0; ROM and CARD correspond to the same controller, with a value of 1; and RAM3 corresponds to the same controller, with a value of 2.

MIDI Banks 0 and 1 each have 100 Performances, since they are comprised of two internal Banks each; in these, MIDI Program Changes 0-49 select Performances from the first internal Bank (RAM1 or ROM, respectively), and Program Changes 50-99 select Performances from the second (RAM2 or CARD). MIDI Bank 2 contains only one internal Bank, RAM3, and so Program Changes 0-49 call up RAM3 Performances 0-49, respectively.

This means that, unless you are using the Performance Select Map (as discussed in Section 5.10 below), MIDI program changes operate as follows:

<u>MIDI</u> <u>BANK/PROG</u>	<u>Wavestation</u> <u>A/D</u>	<u>Performance</u>
0/0	RAM1	0
...	RAM1	...
0/49	RAM1	49
0/50	RAM2	0
...	RAM2	...
0/99	RAM2	49
1/0	ROM	0
...	ROM	...
1/49	ROM	49
1/50	CARD	0
...	CARD	...
1/99	CARD	49
2/0	RAM3	0
...	RAM3	...
2/49	RAM3	49

When a Bank Select message is received, the Wavestation A/D waits until it receives a Program Change message, at which point it changes both the Bank and the Performance number. If a Program Change is received without being preceded by a Bank Select, the Wavestation A/D simply selects that Performance in the current MIDI Bank. Changing banks by using the BANK soft key on the Performance Select page also changes the current MIDI Bank.

If you have used the front panel Bank soft key to select a program in the ROM bank, for instance, MIDI Program Changes alone will only select Performances from the ROM or CARD Banks (MIDI Bank 1). To use a MIDI keyboard or other controller to select a Performance from a different MIDI Bank, you must first send the appropriate Bank Select message (or use the Performance Select Map, as described in Section 5.10 below). The Wavestation A/D itself always sends this message when you change a Performance from the front panel, so if you are recording Program Changes into a sequencer, Bank Selects will happen automatically.

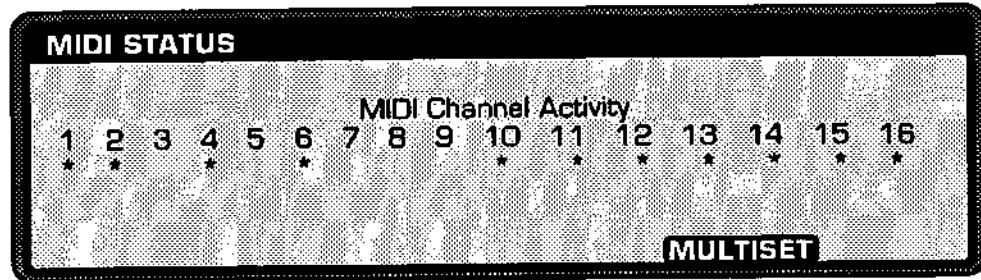
**NOTE:** The Bank Select message is a MIDI Controller, just like the Mod Wheel or Mod Pedal. If you are using an older sequencer (or other MIDI processor) and filtering out Controllers, Bank Selects will probably be filtered out as well. If Performances are not being changed properly by your MIDI system, make sure that you are not filtering Controllers.

Some older sequencers may also send Bank Select after Program changes, if they are recorded on the same clock. This will cause the Bank Select to be ignored until the next Program Change is received. Manually inserting a Bank Select just before the Program Change will solve this problem.



## 5.9 MIDI STATUS DISPLAY

Path: MIDI - STATUS



The Wavestation A/D includes a feature that is very handy when you are troubleshooting your MIDI setup. The STATUS page shows graphically when and on what channel data is being received at the MIDI IN jack. When data is received on a particular channel, the asterisk (\*) under its number appears. If data is not being received, you know that the problem probably lies in either the MIDI controller or, more likely, a cable or its routing.

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 A/D's MIDI settings, while the MIDI Indicator LED only lights for data that the Wavestation A/D will respond to.

For instance, let's say that the Wavestation A/D 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 A/D receives data on that channel, the MIDI LED will light, and an asterisk (\*) will appear under the "1" on the STATUS page. If it receives data on other channels, such as 3 or 15, the STATUS page will show activity on those channels, but the MIDI Indicator LED will not be lit - because the Wavestation A/D 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 A/D is set to recognize all desired data. The MIDI RECEIVE page is discussed in the Reference Guide.

The TEST soft key on the PERFORMANCE SELECT page also provides an easy way to test the audio connections to the Wavestation A/D. Pressing this soft key causes the instrument to play a middle C on the currently selected Performance. The soft key's label then changes to STOP, and pressing it again (or pressing any other button, for that matter) will cause the Wavestation A/D to stop playing the note. If this produces any sound, then you know that your audio connections are OK.

For more information, see the Appendix, Section 11.1, TROUBLESHOOTING.

## 5.10 PERFORMANCE SELECT MAP

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

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

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

The Performance Select Map allows you to do just this. All 127 possible MIDI Program Change commands may be mapped to any of the Wavestation A/D's 200 Performances (250, if a ROM or RAM Card is inserted).

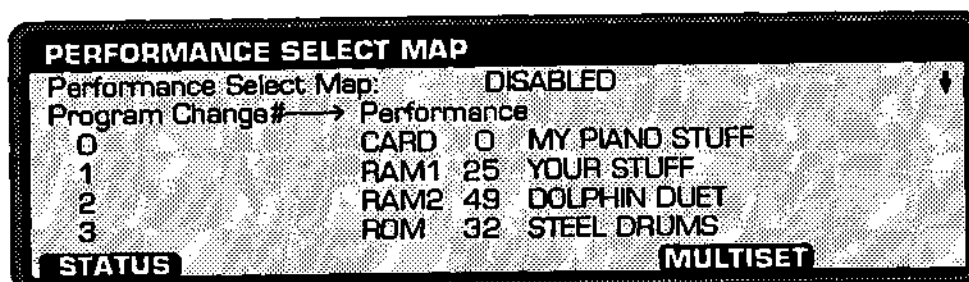
For example, you can easily construct a map that does this:

Received MIDI Prog Change#	Bank	Performance
0	CARD	49 ULTIMO
1	RAM1	0 Ski Jam
2	RAM1	0 Ski Jam
3	ROM	34 Bells
...		
127	ROM	30 Bottled Air

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

### Accessing the Performance Select Map

Path: MIDI - PERFMAP



### Performance Select Map

This parameter switches the Performance Select Map on and off.

DISABLED is the default. This means that the map is not used, so Performances are selected as explained under Section 5.8, MIDI BANK SELECT and PROGRAM CHANGE.

ENABLE means that the custom map is used.

### Editing the Performance Select Map

- Scroll down the list to select the line of the desired MIDI program change number.
- Cursor across to select the desired BANK (ROM, RAM1, RAM2, RAM3, or CARD).
- Cursor right one more field to select the desired Performance within the bank.

## 5.11 MULTIMODE SETUPS

The Wavestation A/D is designed to function elegantly as a multi-timbral sound module in a sequencing environment. The Multimode Setup page allows you to create groups of up to 16 Performances, one per MIDI channel, each of which can be played simultaneously. There are 16 such groups, called Multisets.

Normally, each Performance has its own Effects programming. However, in MULTIMODE you can have 16 Performances -- but you can't have 32 effects! So, the Wavestation A/D ignores all of its Performance Effect programming, and instead each of 16 Multimode Setups (Multisets) has its own Effects assignments. These have exactly the same power as the Performance Effects.

The Multimode Setup 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 send and receive Multimode Setup changes, this is not always necessary - because each channel of a Multimode Setup responds to MIDI Program Changes *independently*. This means that, in MULTI and MONO modes, the Wavestation A/D functions as up to 16 discrete synthesizers.

In addition to use in sequencing, the Multisets also make it easy to create multi-timbral programs for alternate controllers, such as MIDI guitars.

Path: MIDI - MULTISSET

MULTIMODE SETUP			[MULTISSET is EDITED]	
Multimode Setup: 15			FX Control Chan: 4	
MIDI	CH	Level	Performance:	
1	ON	127	ROM	16 Modernesque
2	ON	105	CARD	13 Trombone
3	ON	127	ROM	31 Rock Stack
4	OFF	55	RAM1	0 Ski Jam
[STATUS]			[WRITE]	
[XMIT]			[PERFMAP]	
[EFFECTS]			[REMAP]	

To use the Multimode Setups:

- Change the Mode parameter on the MIDI page to MULTI (or MONO, for use with alternate controllers such as MIDI guitars).
- Go to the MULTIMODE SETUP page.
- Select the Performance desired for each MIDI channel by cursoring to the Bank and Performance number fields, and using the dial, keypad, or Inc/Dec. This can be changed by MIDI Program Change messages.
- Set the level desired for each Performance. Changing this value sends out MIDI Volume messages (Controller #7) on that channel; this value also responds to MIDI Volume messages received on that channel.
- Select the desired effects, by pressing the EFFECTS softkey.
- Play the Multiset from your sequencer or controller.

The current Multimode Setup may be changed by cursoring to that field and using the dial, keypad, or Inc/Dec.

For more information, please see the Reference Guide [MULTIMODE SETUP].

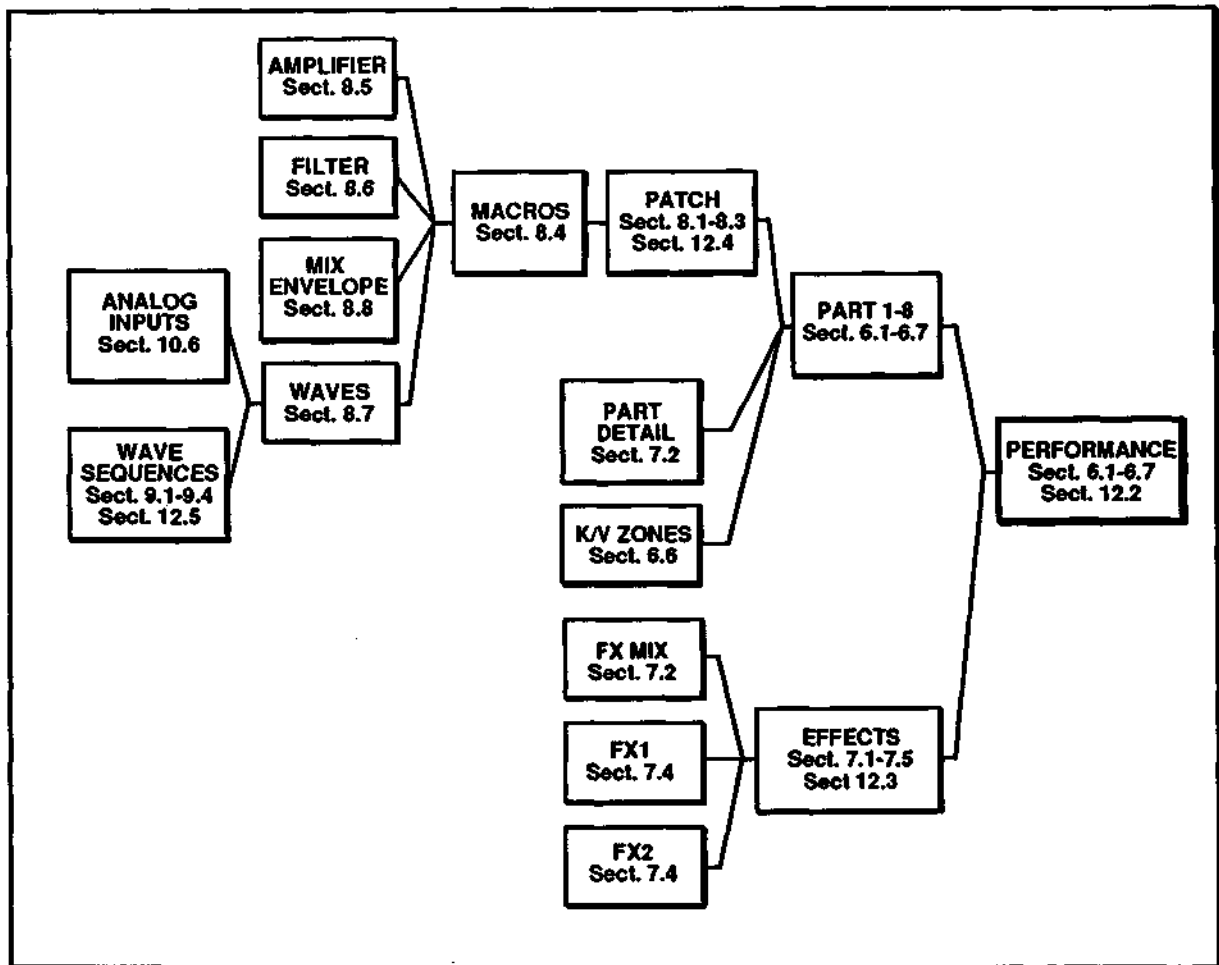
# 6 PERFORMANCE TOUR

## 6.1 OVERVIEW OF EDITING

Chapters 6 through 10 tour across the Wavestation A/D's editing system, showing you where to make some of the most important and useful custom settings. The goal is to start you making real, useful edits as quickly as possible. Therefore, we will concentrate on the "how," and not the "why," of each operation.

Figure 6-1 is a map of the Wavestation A/D's *architecture*, along with references to corresponding sections in the remainder of this manual.

**Figure 6-1 Wavestation A/D Performance Signal Flow**



If you were to create a new sound by strictly following signal flow, you would start with an initialized Patch, setting the oscillator structure and sync mode, picking waves or wave sequences, and applying vector synthesis. Then you might set up Macros for the voice amp, filter, pitch and pan, possibly touching up the details for individual waves or modules. After building or editing up to eight such Patches, you would assign them to newly initialized Parts of a Performance, set their key and velocity zones and other playback details. As a final touch, you

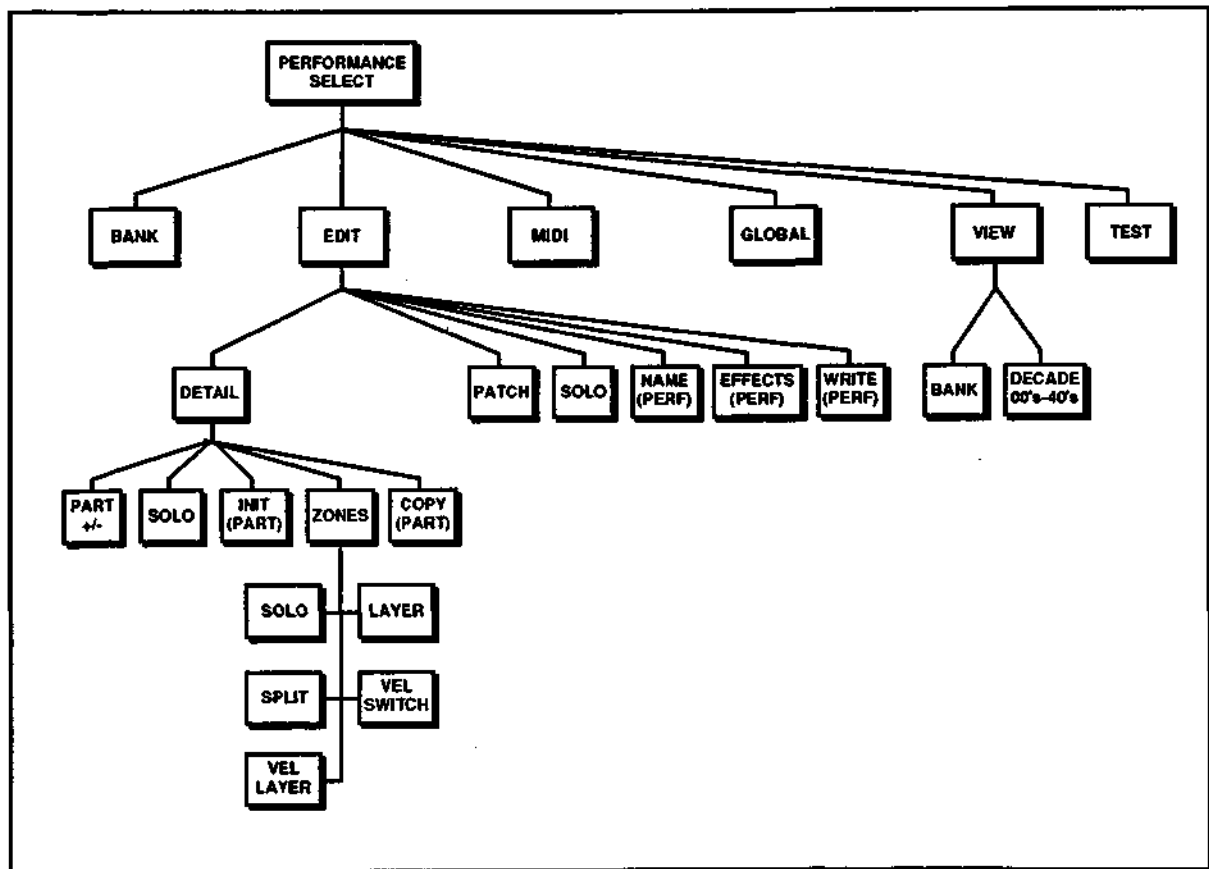
would probably pick an effects configuration and assign the Parts to the Multi Digital Effects (MDE) processor. You might even use the MDE to route patches to the auxiliary output jacks.

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

## 6.2 OVERVIEW OF PERFORMANCES

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

Figure 6-2 Performance Menus



### Memory Protection

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

### 6.3 ASSIGNING PATCHES TO PARTS

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

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

Editing the Parts couldn't be simpler.

- First, select the EDIT PERFORMANCE page.

Path: EDIT

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

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

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

Editing the Patch selection turns the COMPARE light on. It also invokes the "Performance is edited" warning on the top line. (Similar messages appear on all pages that have a WRITE function. This is to remind you that you are working with something you might want to save.)

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

If a Performance is heavily layered and you choose a soft Patch, the change may not be obvious.

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

This is a way to hear individual Patches.

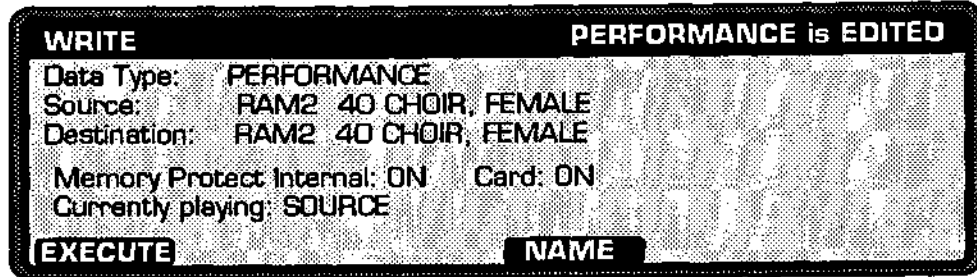
### 6.4 SAVING A PERFORMANCE

Try to save everything that sounds good or would take a lot of work to rebuild. RAM Cards make this easy. You can also save to RAM1, RAM2, or RAM3, or use the SYSEX DATA TRANSMIT page to record the data with a MIDI sequencer, data disk, or librarian program. For more information on Sysex, see the Reference Guide [SYSEX DATA TRANSMIT].

**NOTE:** Before attempting to write to a RAM card, disable its protection switch. After a writing session, re-enable the Protection switch to prevent battery drain when power is switched off.

- On the EDIT PERFORMANCE page (shown above), press WRITE.
- On the WRITE page, select the target destination Bank and Number for the edited Performance.

Path: EDIT - WRITE

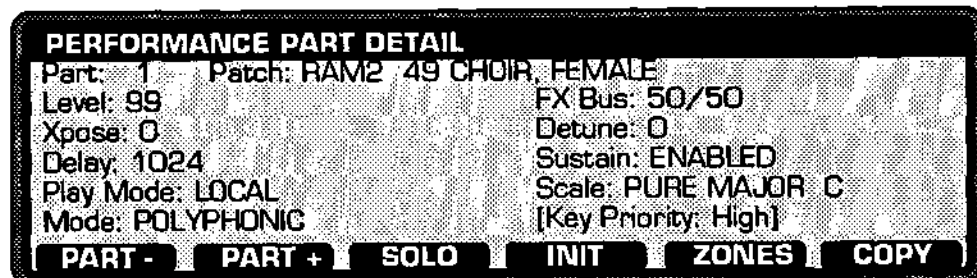


- To hear the destination, change the "Currently Playing" field to DESTINATION.
- To write the changes into memory, press EXECUTE.

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

## 6.5 EDITING PART DETAILS

Path: EDIT - DETAIL



This page shows the details of each Performance Part. At the top of the page is the most important parameter: the name of the Patch assigned to this Part.

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

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

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

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

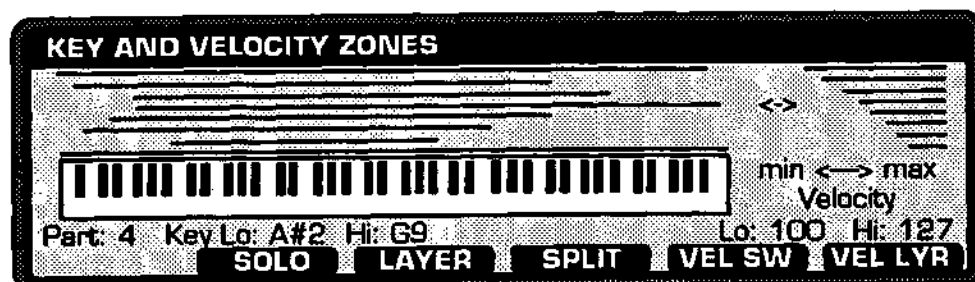
### Other Parameters

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



## 6.6 CHANGING KEYBOARD ZONES

Path: EDIT - DETAIL - ZONE



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

### Automatic Zoning

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

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

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

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

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

VEL LYR is similar to VEL SW, except that instead of forming discrete velocity zones, the zones overlap. As shown in the display page above, all Parts are set to a maximum velocity of 127, but each Part is assigned an increasingly higher minimum velocity. Part 1 would be played from the entire velocity range, Part 2 from 26-127, Part 3 from 51-127, and so on. This allows you to quickly set a basic timbre (such as a pad) to always sound, with other timbres (such as attack transients) being added to the basic sound when the keyboard is played harder. The harder you play, the more layers are heard.

**Manual Zoning**

- To establish the basic characteristics of the ZONE, first use automatic zoning. (Press LAYER, SPLIT, VEL SW, or VEL LYR.)
- To select any Part for specific editing, adjust the Part number using the Up/Down cursors.

The double arrow moves to the corresponding display line.

- Select the desired zone parameter by cursoring left/right.
- Enter desired key and velocity limits using the dial, INC/DEC, or keypad. Key and velocity limits may also be entered over MIDI from your master controller by playing the desired keys and velocities.

**6.7 INITIALIZING A PART**

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

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

# 7 EFFECTS TOUR

## 7.1 OVERVIEW OF THE EFFECTS SYSTEM

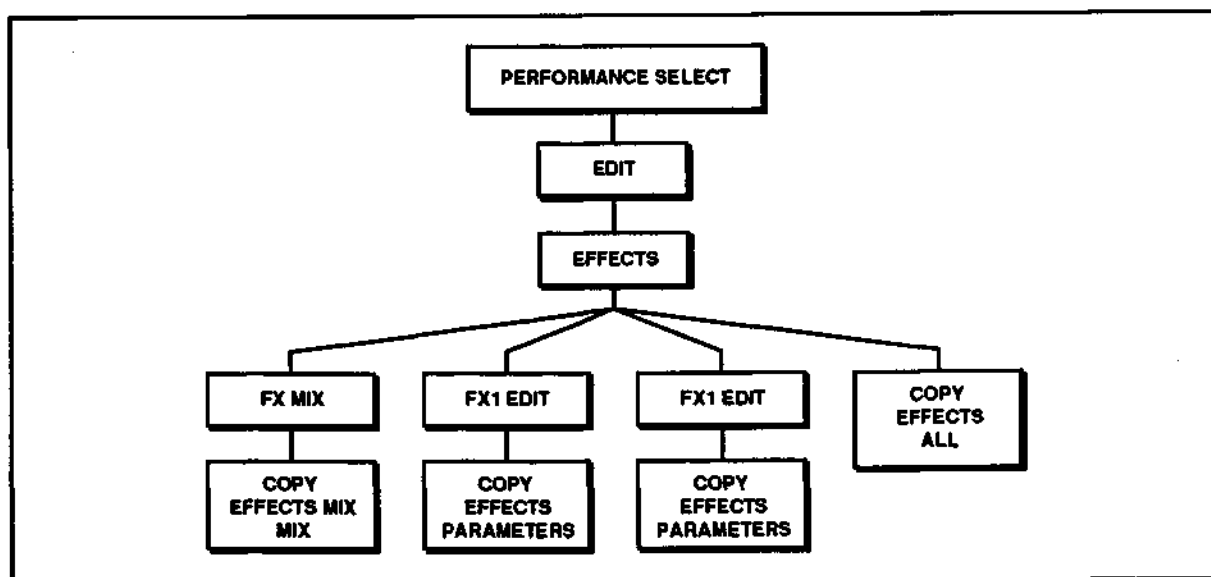
The Wavestation A/D includes a self-contained Multi Digital Effects (MDE) processor. This module has two important functions. First, it provides two independent and identical processors, called EFFECT 1 and EFFECT 2 (or, FX1 and FX2). Each of these run one of 55 different effects programs (such as reverb, delay, distortion, and so on).

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

There are two levels of Effects editing, although both occur within the Performance (or Multiset - see below). The higher level is where you choose either parallel or series processing, and where you select one of the effects programs for FX1 and FX2. These adjustments are covered in the next few sections.

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

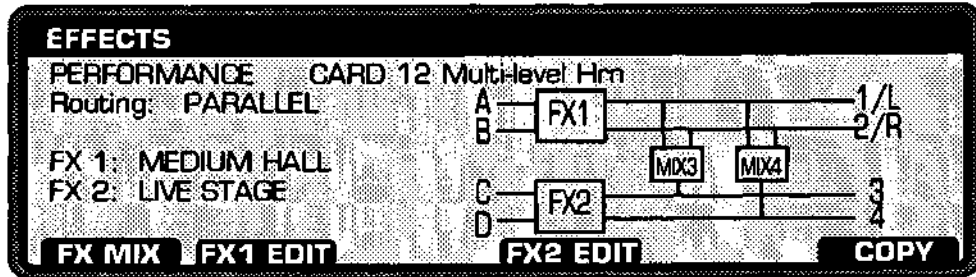
Figure 7-1 Effects Menus



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

## 7.2 EFFECTS BUSES AND ROUTING

Path: EDIT - EFFECTS



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

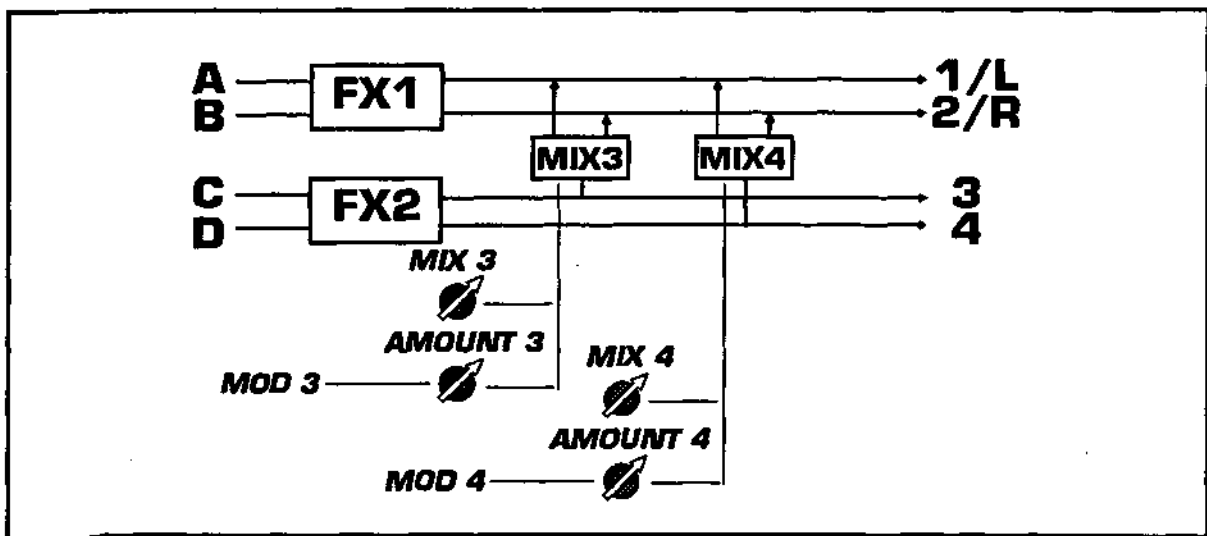
The MDE has four inputs (A - D) arranged as two buses. You route Patches to these inputs by using the FXBus parameter, as discussed below in Section 7.3.

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

### Parallel Routing

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

Figure 7-2 Parallel Routing



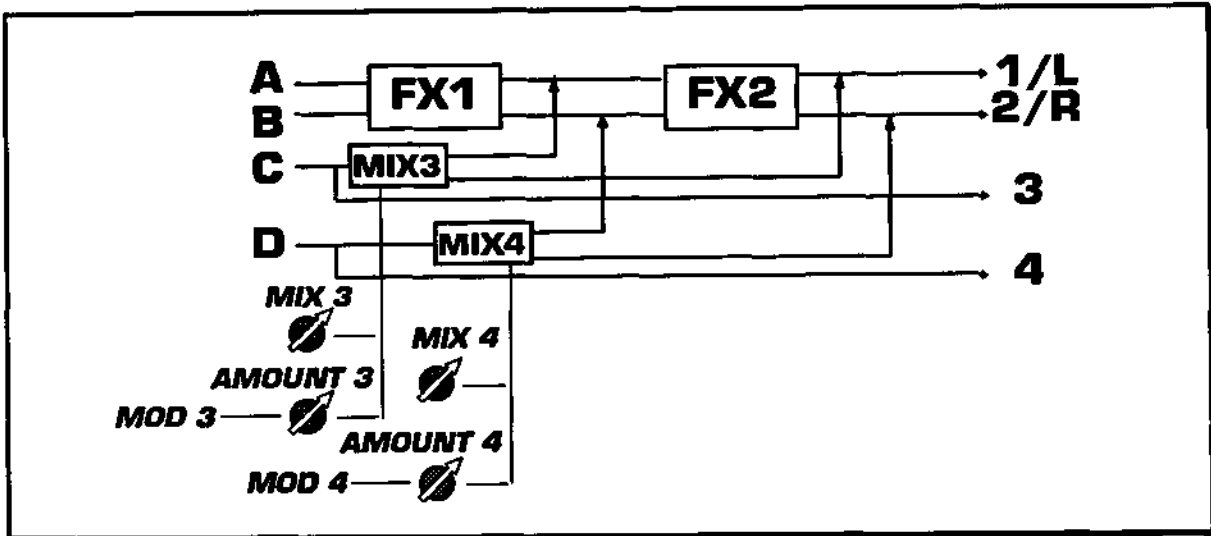
## KORG Wavestation A/D Player's Guide

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

### Series Routing

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

Figure 7-3 Series Routing



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

### FX Mix

Path: EDIT - EFFECTS - FX MIX

**EFFECTS MIX**

PERFORMANCE CARD 28 Multi-level Hrm

Routing: PARALLEL

Mix 3: LEFT      Mix 4: RIGHT

Mod 3: WHEEL    Mod 4: WHEEL

Amt 3: +15      Amt 4: -15

FX1 EDIT
FX2 EDIT
COPY

### Mix 3/4

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

When the Stereo Vocoders are used, the Effects Mix works in a slightly different way; for more information, see the description of the Stere Vocoder-Delay effects in the Reference Guide, or see Section 10.7 of this Player's Guide.

### Mod 3/4

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

#### SYMBOL Modulation Source

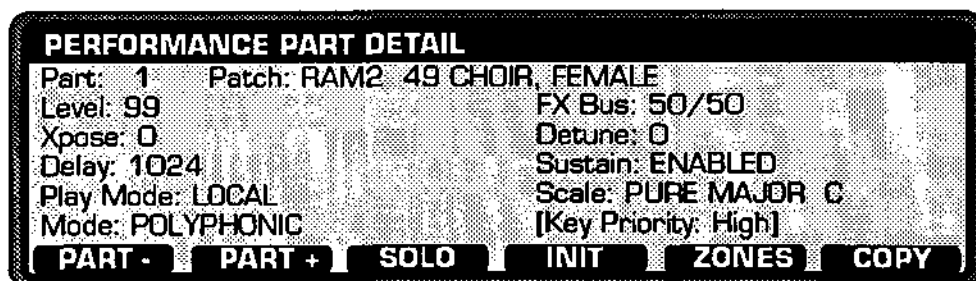
NONE	No modulation
WHEEL	Mod wheel
AT	Channel aftertouch
VEL	Last Note-On velocity (Not gated by Note-Off)
KEY	Highest key number; if none down, then last key
ENV	Summed amplitude envelopes of all buses
KEYDN	Key down gate
FSW	Footswitch momentary, push-on/release-off   (On FOOT PEDAL ASSIGN,
FSWTOG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

### Amount 3/4

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

## 7.3 ROUTING PATCHES INTO THE MDE

Path: EDIT - DETAIL



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

## KORG Wavestation A/D Player's Guide

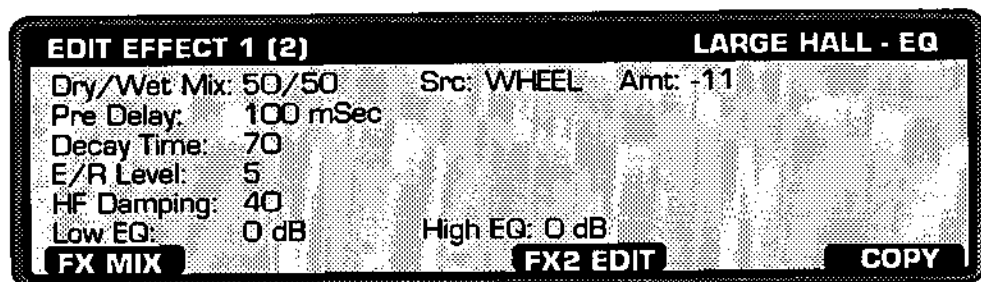
---

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

BUS-A	Bus A only
99/1 - 1/99	Panned to A/B
BUS-B	Bus B only
BUS-C	Bus C only
C+D	Centered to C/D
BUS-D	Bus D only
ALL	All four buses
PATCH	Bus selected at Patch level, on the Patch Bus Assignment page

### 7.4 EFFECTS EDITING

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



This example just shows one of the 55 effects you might see here. Each effect contains a number of parameters that can be accessed and adjusted.

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

### 7.5 SELECTING PERFORMANCE EFFECTS

Having learned about the effects system, you can now choose the desired configuration and try different effects by dialing the Effect 1 or Effect 2 fields. Not all effects sound good with all sounds, and both may benefit from careful editing. For example, to discourage muddiness as you increase the reverb depth, you may want to shorten some envelope times in the Patch.

A descriptive list of the effects choices follows.

### 7.6 EFFECTS LIST

00 No Effect

#### REVERB - EQ

01 Small hall reverb - EQ

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

02 Medium hall reverb - EQ

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

**03 Large hall reverb - EQ**

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

**04 Small room reverb - EQ**

A light, tight room good for thickening.

**05 Large room reverb - EQ**

A warm, tight room.

**06 Live stage - EQ**

A dense, tight room.

**07 Wet plate reverb - EQ**

A dense, open plate.

**08 Dry plate reverb - EQ**

A light, open plate.

**09 Spring reverb - EQ**

Resonant springs.

**EARLY REFLECTIONS**

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

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

**10 Early reflections - EQ 1**

Dense early reflections .

**11 Early reflections - EQ 2**

Modulated early reflections .

**12 Early reflections - EQ 3**

This effect uses a reverse envelope on the early reflections.

**GATED REVERB - EQ**

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

**13 Forward gated reverb - EQ**

**14 Reverse gated reverb - EQ**



**STEREO DELAY**

**15 Stereo delay**

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

**16 Ping-pong delay**

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

**DUAL MONO DELAY**

**17 Dual mono delay**

Two separate, parallel delays.

**MULTI - TAP DELAY - EQ**

**18 Multi-tap delay - EQ 1**

Two multi-repeat, parallel delays with input modulation.

**19 Multi-tap delay - EQ 2**

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

**20 Multi-tap delay - EQ 3**

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

**STEREO CHORUS - EQ**

**21 Stereo chorus - EQ**

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

**22 Quadrature chorus - EQ**

Two parallel chorus circuits using quadrature-phased LFOs.

**23 Crossover chorus - EQ**

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

**HARMONIC CHORUS**

**24 Harmonic chorus**

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

**STEREO FLANGER - EQ**

**25 Stereo flanger - EQ 1**

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

**26 Stereo flanger - EQ 2**

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

**27 Crossover flanger - EQ**

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

Crossover flanger uses phase-synchronous LFOs.

**ENHANCER - EXCITER - EQ**

**28 Enhancer - exciter - EQ**

A stereo exciter with spatial delays.

**DISTORTION - FILTER - EQ**

**29 Distortion - filter - EQ**

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

**30 Overdrive - filter - EQ**

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

**STEREO PHASER**

**31 Stereo phaser 1**

Phaser 1 uses phase-synchronous LFOs.

**32 Stereo phaser 2**

Phaser 2 uses phase-inverted LFOs.

**ROTARY SPEAKER**

**33 Rotary speaker**

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

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

**STEREO MOD - PAN - EQ**

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

**34 Stereo mod - pan - EQ**

Two parallel dynamic pan effects with phase-synchronous LFOs.

**35 Quadrature mod - pan - EQ**

Two parallel dynamic pan effects with quadrature-phased LFOs.

**EQUALIZATION**

**36 Stereo parametric equalizer**

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

**STEREO COMBINATION MODULATED/FIXED DELAY - EQ**

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

**37 Chorus - stereo delay - EQ**

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

**38 Flanger -stereo delay - EQ**

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

**DUAL MONO DELAY - REVERB**

**39 Delay/hall**

A monophonic delay in parallel with a monophonic hall reverb.

**40 Delay/room**

A monophonic delay in parallel with a monophonic room reverb.

**DUAL MONO FIXED/MOD DELAY**

**41 Delay/chorus**

A monophonic delay in parallel with a monophonic chorus.

**42 Delay/flanger**

A monophonic delay in parallel with a monophonic flanger.

**DUAL MONO DELAY - OVERDRIVE - DISTORTION**

**43 Delay/distortion-filter**

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

**44 Delay/overdrive-filter**

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

**DUAL MONO DELAY - PHASER**

**45 Delay/phaser**

A monophonic delay in parallel with a monophonic phaser.

**DUAL MONO DELAY - ROTARY**

**46 Delay/rotary**

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

**STEREO PITCH SHIFTER**

**47 Stereo Pitch Shifter**

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

**48 Mod Pitch Shift - Dly**

This 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.

This effect allows the Wavestation to control the pitch of the Analog Inputs. Some applications of this include "whammy-bar" pitch bending and special effects, such as transposing speech down to make it sound ominous, or up to create a humorous "helium voice."

**STEREO COMPRESSOR-LIMITER/GATE**

**49 Stereo Comp-Lim/Gate**

The compressor provides an automatically controlled volume envelope, which can be used to smooth out the level of an incoming signal (often done with guitars and vocals), or used to give a sound more "punch" (often done with drums).

**SMALL VOCODER**

The Vocoder effects superimpose the timbre of one signal (the Modulator) onto that of a second signal (the Carrier). A standard application of this is the "talking" instrument, in which you talk into a microphone and a guitar or keyboard sound is made to mimic the harmonic content of the speech. The Vocoders may be used for a number of other effects, including creating choral effects from a single singer and performing cross-modulation on two internal or external sounds.

The Vocoder does its timbral modification by dividing the Modulator and Carrier up into a number of different frequency bands; the more frequency bands which are used, the greater the definition of the Vocoder effect. To achieve the highest quality Vocoder, the Stereo Vocoder-Delay 1/2 algorithms (see below) use both effects slots; the Small Vocoder 1/2/3/4 algorithms use the normal effects configuration, making another effect simultaneously available.

**50 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.

**51 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.

**52 Small Vocoder 3**

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

**53 Small Vocoder 4**

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

**STEREO VOCODER-DELAY**

The two Stereo Vocoder - 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.

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

**54 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.

**55 Stereo Vocoder - Delay 2**

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

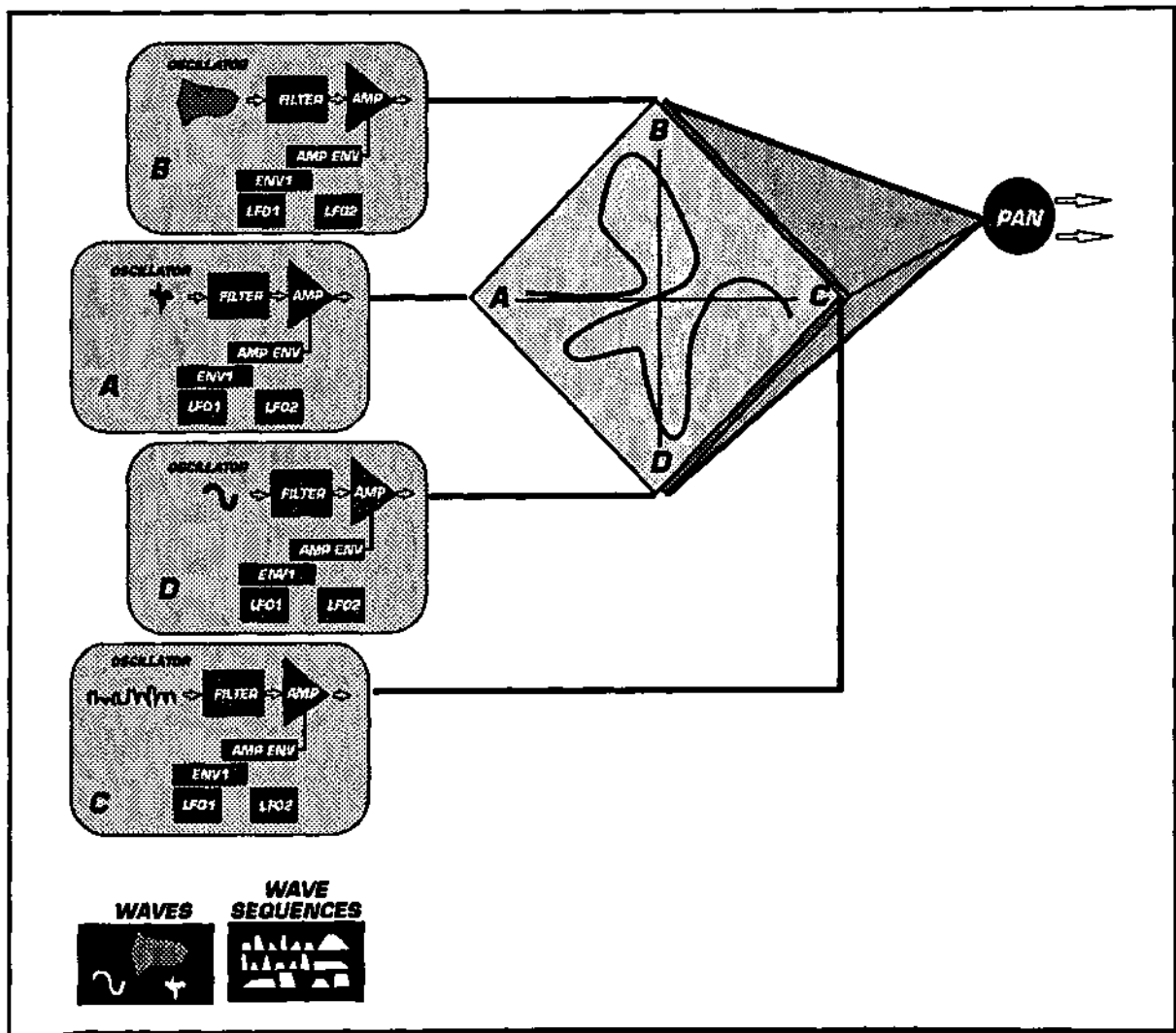
## 8 PATCH TOUR

### 8.1 OVERVIEW OF PATCHES

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

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

Figure 8-1 Four-Oscillator Patch Signal Flow



**Oscillator Structure**

A Patch can be defined to operate with four, two or one oscillator(s) -- which are actually complete voices. This structure choice creates the basic capabilities of the sound. More oscillators can produce richer, more detailed sounds, but using fewer oscillators allows you to play more keys (voices) simultaneously.

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

**Voice-based Patches**

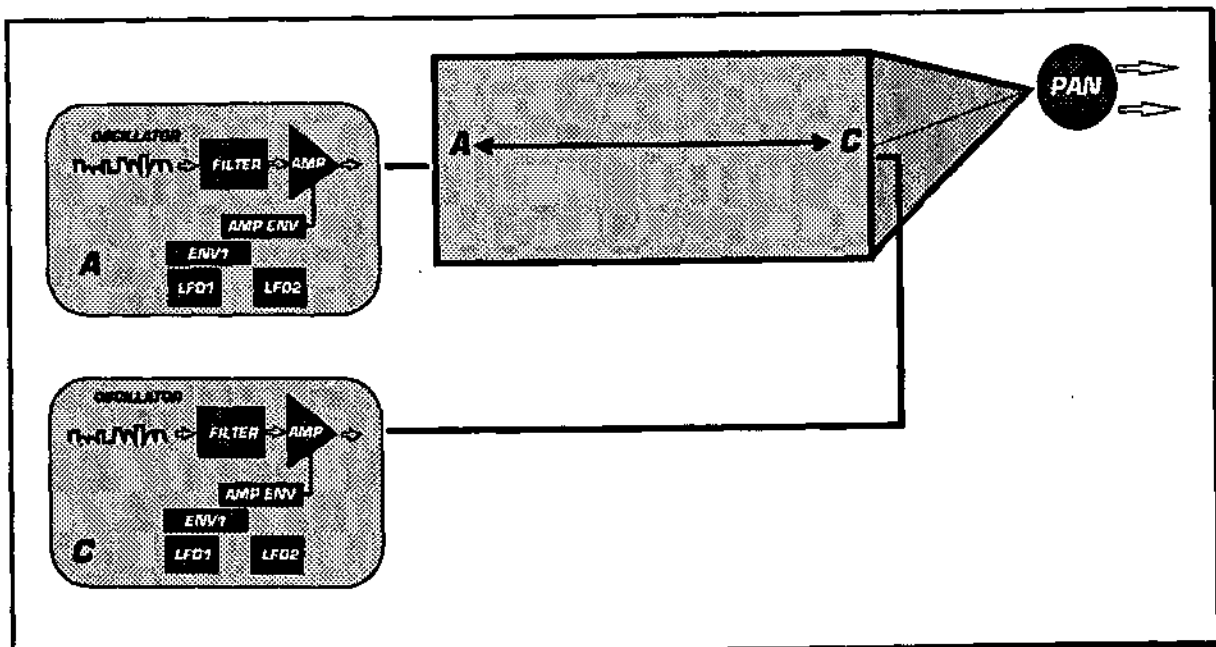
All Patch controls default to a Wave choice of ALL. So, normally, all four-, two-, or one oscillator(s) are summed together and receive the same synthesizer processing by common filter and amp parameters. However, a Patch can be made much more complex because each oscillator is in fact a complete synthesizer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

**Vector Synthesis**

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

When the structure is two oscillators, one-dimensional dynamic mixing is still available. For example, you can still easily fade a transient into an interesting continuous wave, or use Wave Sequences for the two oscillators (as shown in Figure 8-2).

**Figure 8-2 Two-Oscillator Patch Signal Flow**



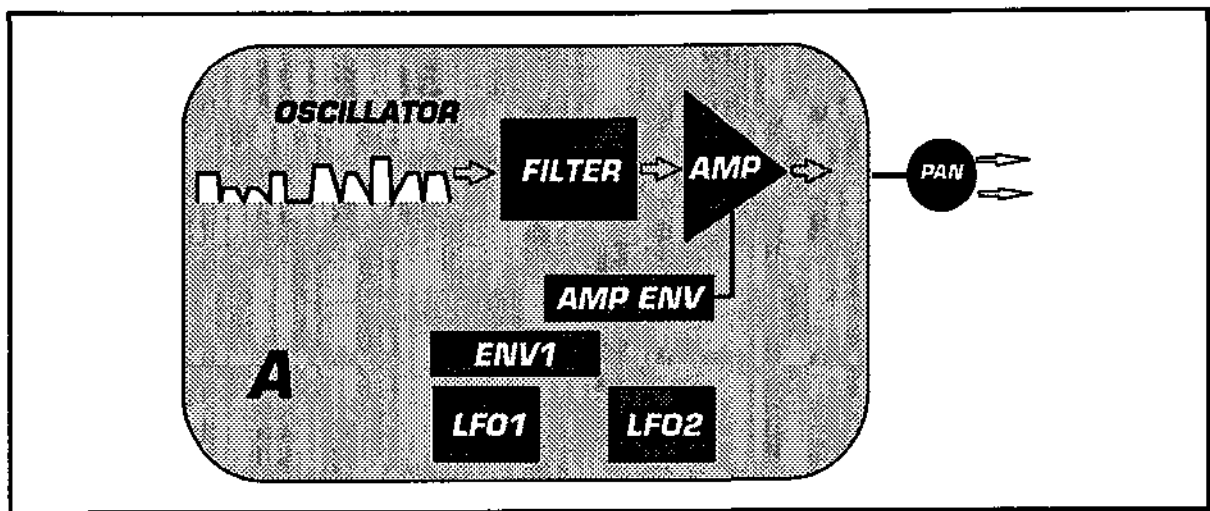
## Waves

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

## Wave Sequencing

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

Figure 8-3 Single-Oscillator Patch Signal Flow



## Filter

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

## Pan

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

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

The PATCH BUS ASSIGNMENT page may be used to assign oscillators to any of the four outputs, allowing the joystick to control stereo or even quadraphonic panning.

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

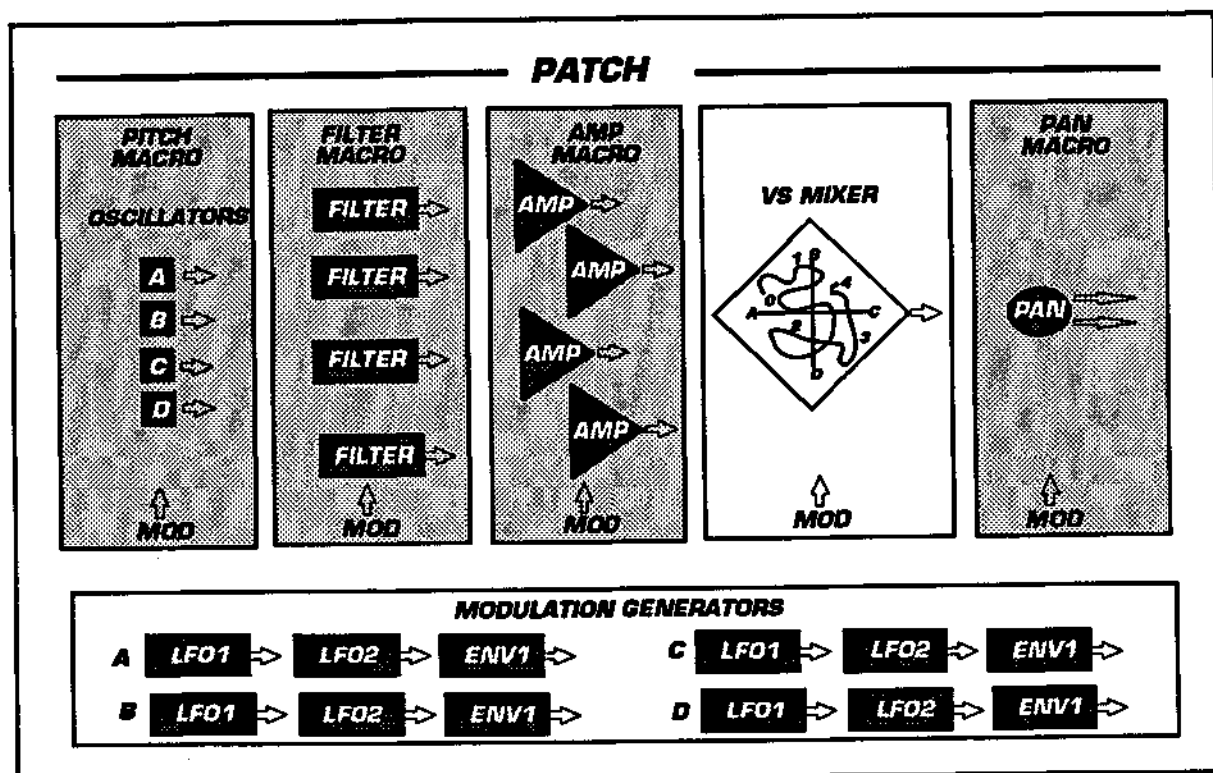
On the EFFECTS MIX page, the Mix 3/4 parameters of Parallel routing allow continuous control of pan via the modulation matrix. Finally, the Stereo Mod-Pan effects offer complex, LFO-driven panning.



**Macros**

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

Figure 8-4 Patch Macros (In grey)

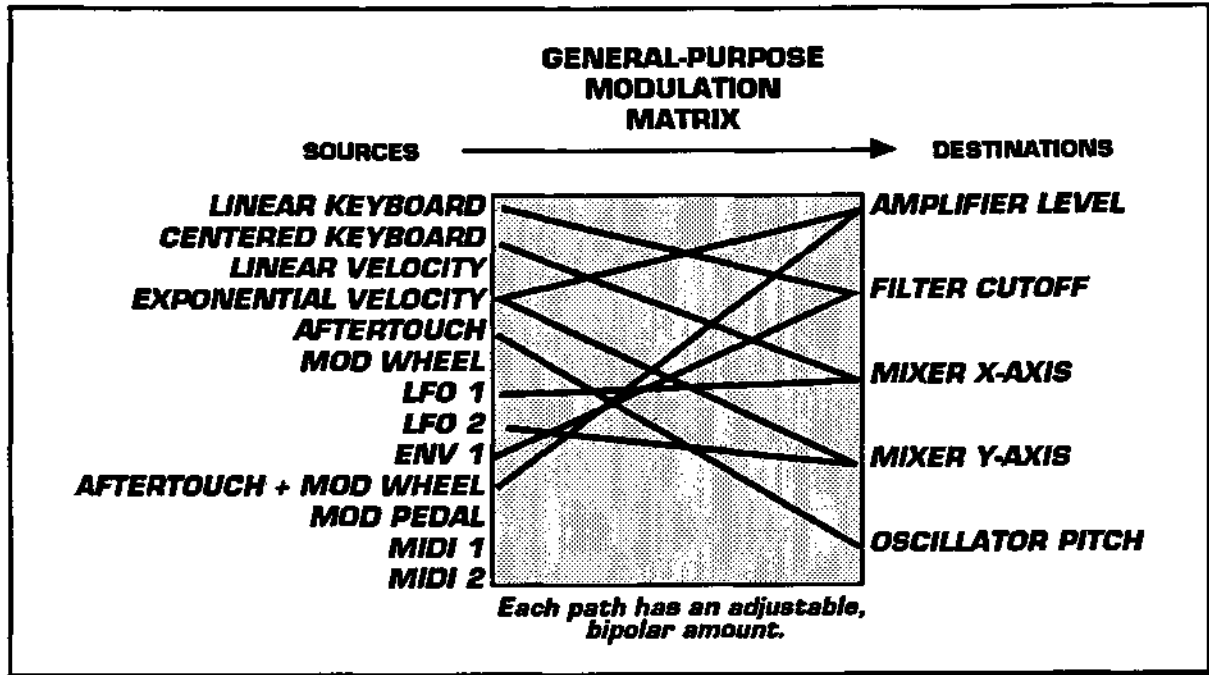


**Modulation**

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

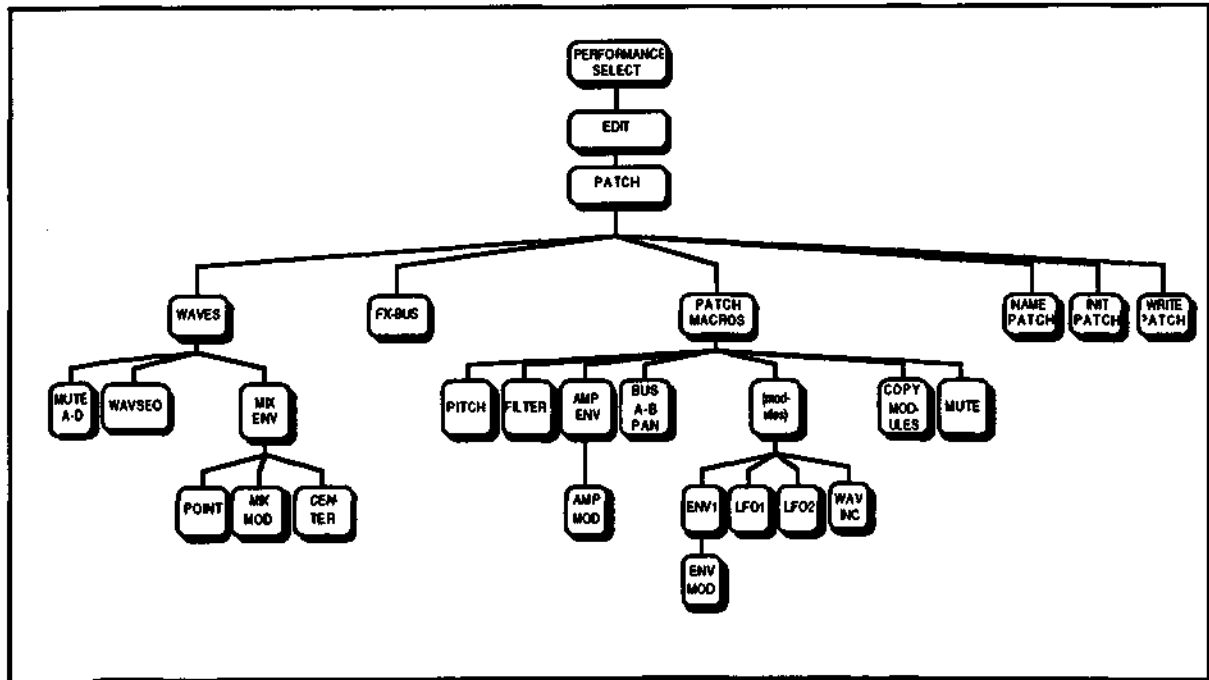
Figure 8-5 shows a typical way in which the general-purpose modulation sources and destinations could be patched. There are many more possible destinations than can be shown here.

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



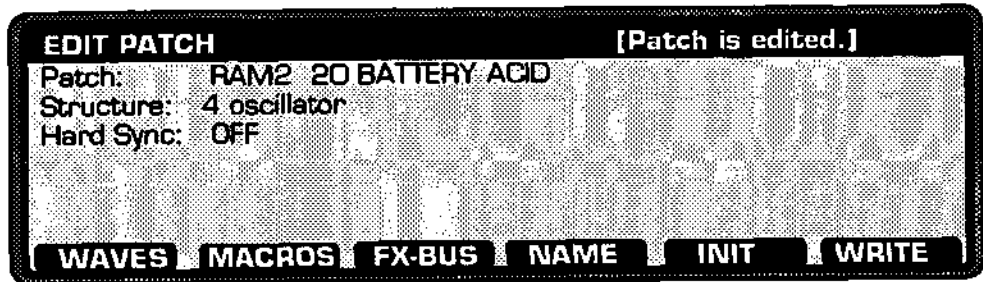
Finally, Figure 8-6 shows the menu organization of all the Patch resources.

Figure 8-6 Patch Menus



## 8.2 ENTERING PATCH EDIT MODE

Path: EDIT - PATCH



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

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

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

- To initialize a Patch, select INIT.

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

- Press YES.

Now you start from scratch.

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

### **Structure**

You can change the Structure at any time. When you change to a larger structure, the data for oscillator A is copied into the new oscillators. When you change to a smaller structure, data for unused oscillators is erased.

### **Hard Sync**

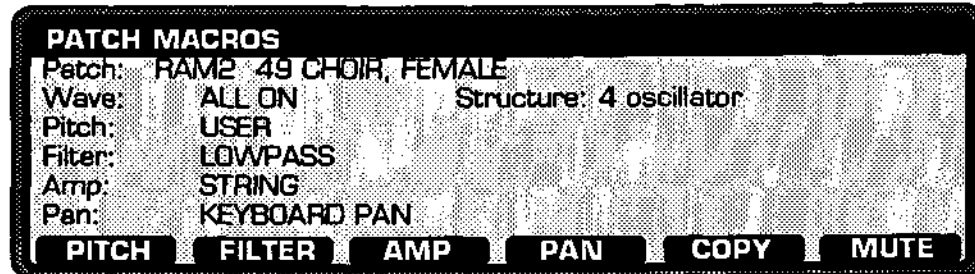
When ON, B/C/D are synced to A. This means that regardless of the length of their cycles, they will always restart at the same time oscillator A does. This allows you to vary timbre by modulating the pitch of oscillators B, C, and D - see the Reference Guide [EDIT PATCH]. If the Structure is one oscillator,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

## 8.3 SAVING A PATCH

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

## 8.4 SELECTING MACROS

Path: EDIT - PATCH - MACROS



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

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

### *Pitch*

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

### *Filter*

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

### *Amp*

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

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

Remember that this Macro can only do its work if the filter output contains enough sound material in the first place. For example, if the sound has a slow attack, the percussive amplifier Macros won't be very effective.

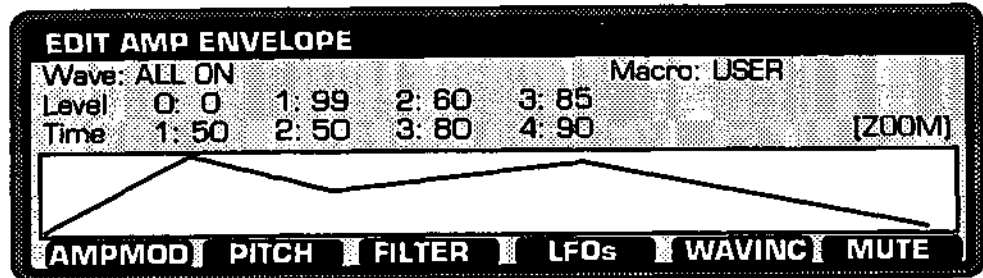
### *Pan*

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

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

## 8.5 TWEAKING THE AMPLIFIER

Path: EDIT - PATCH - MACROS - AMP



Suppose that the Amp Macro you have selected is close, but not quite right for the Patch you want. Perhaps you need to speed up the envelopes so that you can play it faster. Here is where you do it.

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

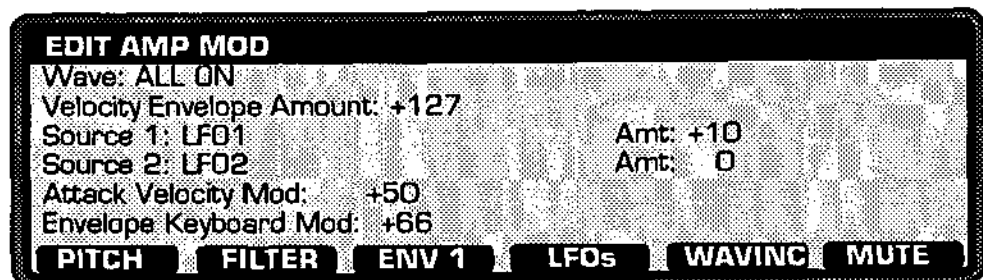
- Cursor to the desired fields and change the values.

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

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

### Amplifier Modulation

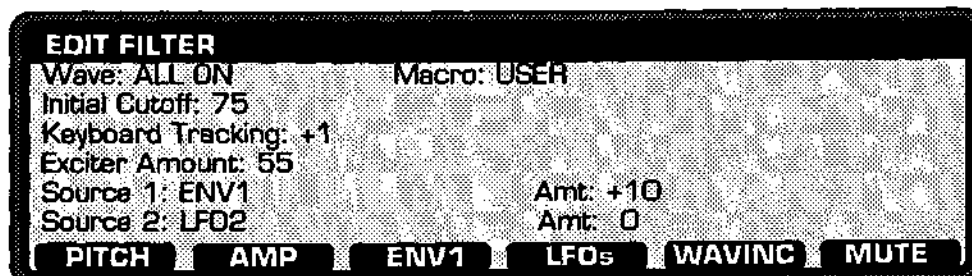
Path: EDIT - PATCH - MACROS - AMP - AMPMOD



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

## 8.6 TWEAKING THE FILTER

Path: EDIT - PATCH - MACROS - FILTER



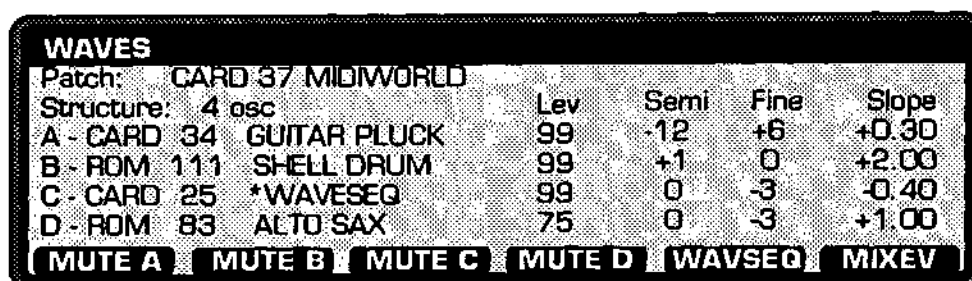
The filter module determines overall tone color. The FILTER page contains the frequently-used Cutoff and modulation Source settings. In practice, you often need to balance these adjustments against each other.

Try using the exciter to increase high-end clarity.

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

## 8.7 ASSIGNING WAVES

Path: EDIT - PATCH - WAVES



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

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

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

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

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

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

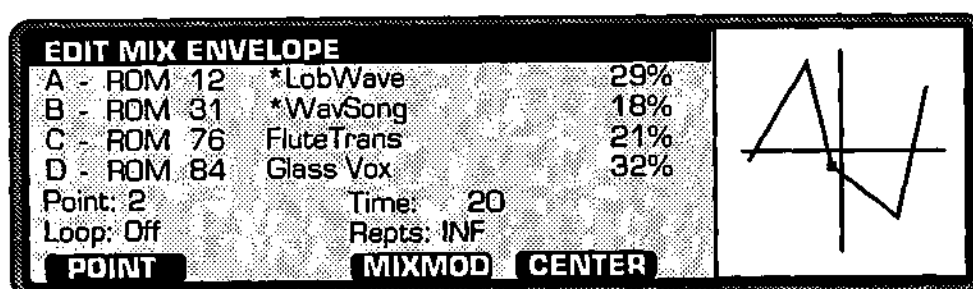
Conversely, decreasing the slope from +1.00 shrinks the oscillator tuning.

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

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

### 8.8 VECTOR SYNTHESIS

Path: EDIT - PATCH - WAVES - MIXEV



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

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

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

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

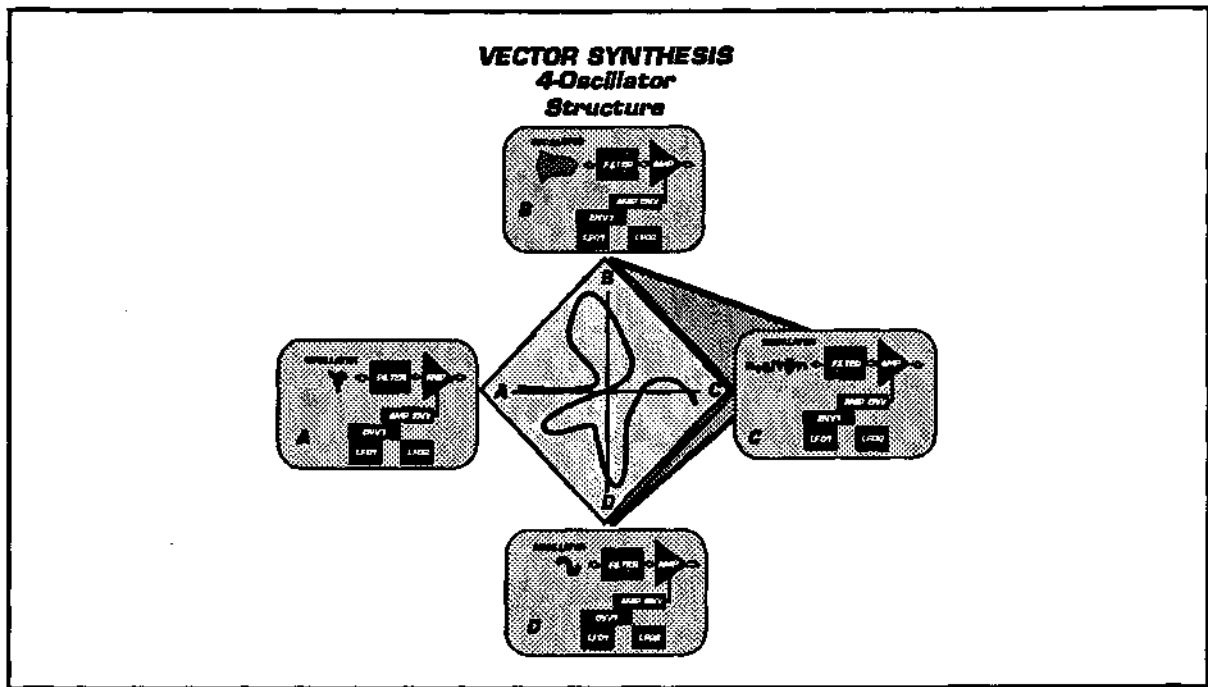
The Mix Envelope implements *Vector Synthesis* by allowing you to set the relative loudness of each oscillator at each of five break-points. You can also set the time values for each of the four envelope segments. Altogether, this allows you outstanding control of the dynamic mixture of the oscillators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

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

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

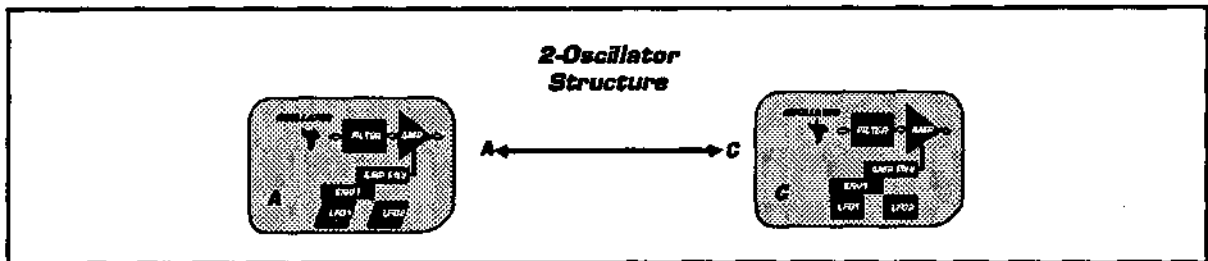
Nothing prevents you from choosing Wave Sequences for the oscillators, and applying Vector Synthesis over all four of them.

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



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

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



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

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

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



## 9 WAVE SEQUENCE TOUR

### 9.1 INTRODUCTION TO WAVE SEQUENCING

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

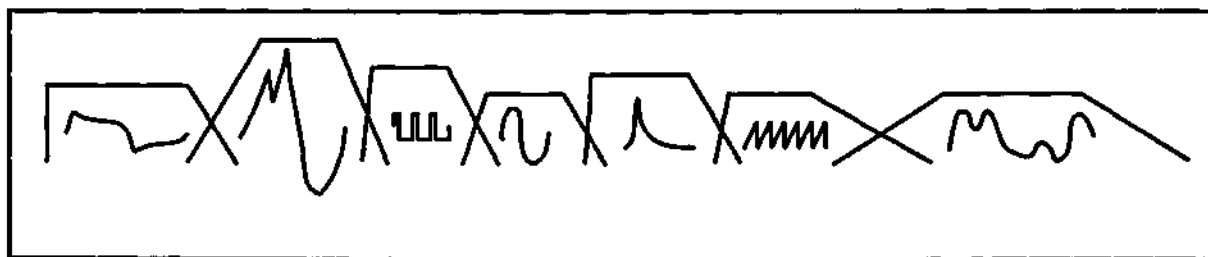
You are probably aware of MIDI sequencers that play synthesizers by sending notes to them. Imagine a MIDI setup of several different synthesizers and samplers, each with their own characteristic sounds. Now suppose that you have created a multi-timbral sequence which plays these instruments and switches patches on them so quickly that perhaps 50 different sounds can be heard during one note. It seems that such a system, if you could pull it off, would be capable of some astonishing sounds.

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

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

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

*Figure 9-1 A Wave Sequence with Seven Steps*

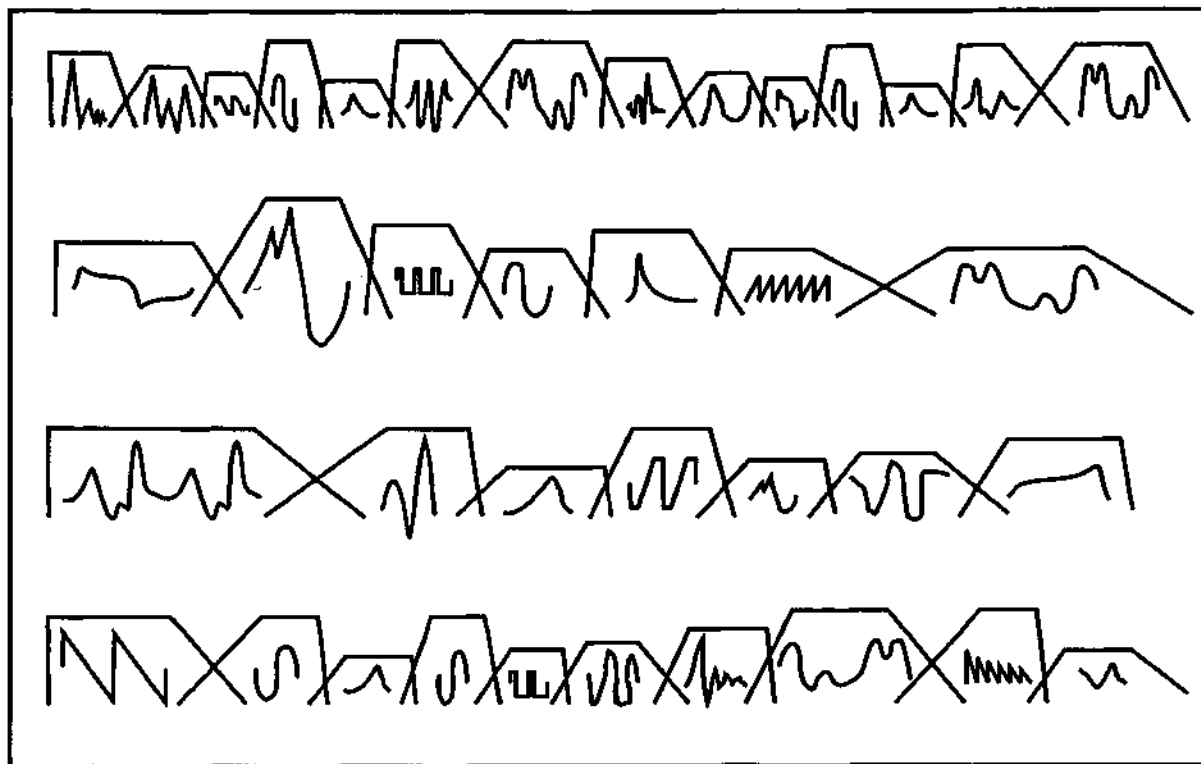


Note that this rough drawing is not a waveform, but a picture of the overall amplitude envelope of the wave sequence. Generally, a Wave Sequence crossfades between the wave steps.

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

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

**Figure 9-2 Four Wave Sequences (In one note)**



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

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

It is debatable whether we can imagine sounds as complex and potentially expressive as are suggested by four-track wave sequencing without actually having the Wavestation A/D with which to hear and communicate them. Orchestrating such a density of timbre might well qualify as advanced synthesis – composition enveloping *music concrete*, resynthesis, and “granular” synthesis, which until now has appeared only in computer music research centers. In a few hours you can be whipping out sound collages that until fairly recently would have taken a battery of tape artists or computer programmers several weeks to create. Seen in this light, the Wavestation A/D actually offers a major, expensive studio art form in a performer's package.

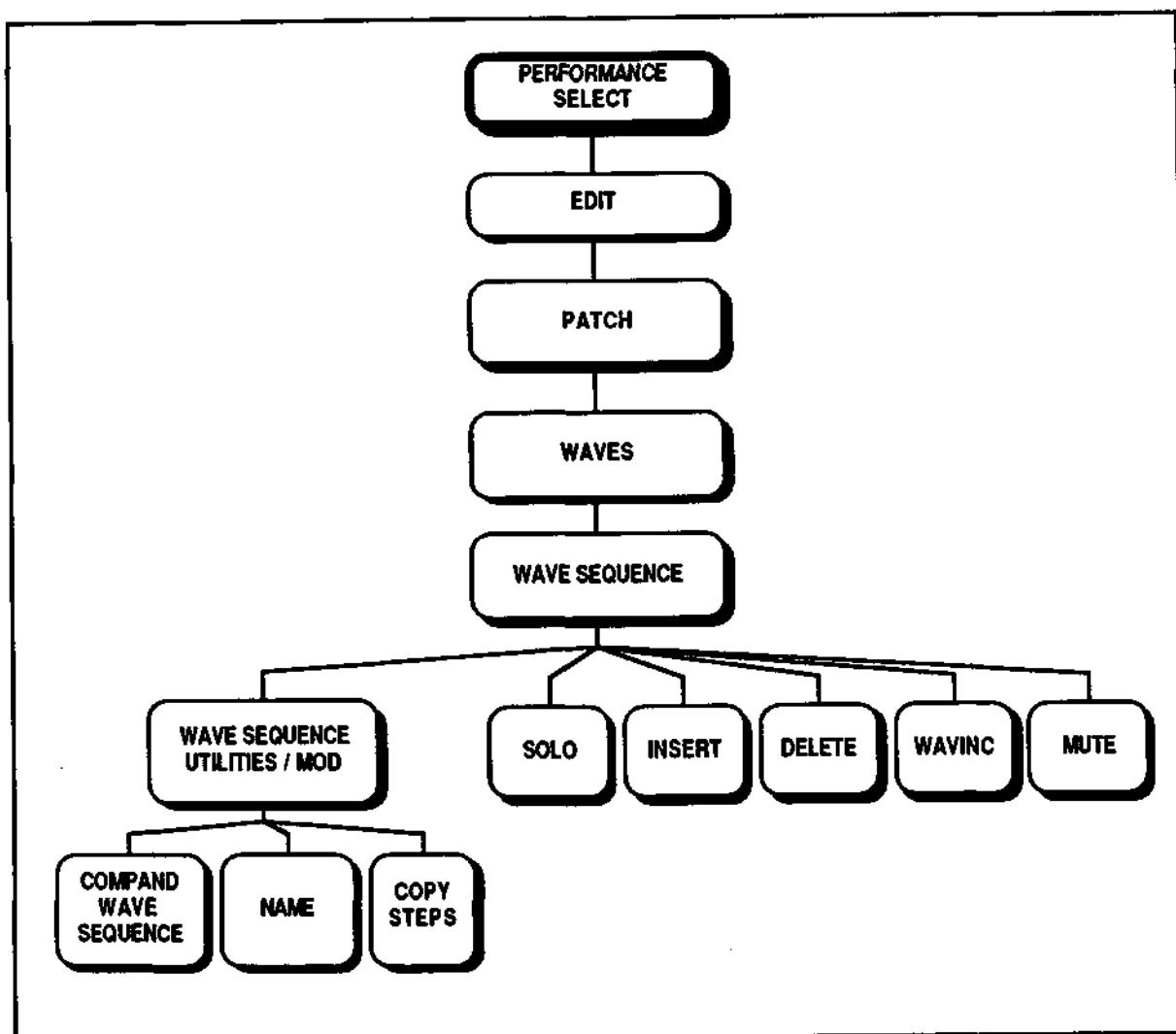
create. Seen in this light, the Wavestation A/D actually offers a major, expensive studio art form in a performer's package.

By this time you might be thinking that the Wavestation A/D offers a mind-boggling amount of timbral versatility - and you'd be right. By combining the precision of wavetable oscillators, the accuracy of sampled sounds, the dynamics of Vector Synthesis and Wave Sequencing, and a dual effects processor, as well as proven expressive modulation paths rooted in its voltage-controlled heritage, the Wavestation A/D has everything you need to create astounding sounds.

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

So you can start doing just that, let's move on to Wave Sequence editing! Figure 9-3 shows how the Wave Sequencing system is organized.

**Figure 9-3 Wave Sequence Menus**



## 9.2 BUILDING WAVE SEQUENCES

Path: EDIT - PATCH - WAVES - WAVSEQ

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

WAVE SEQUENCE							
Wave:	A	ON	Wave Seq:	RAM2 31	Richter		↓
Step	Wave		Semi	Fine	Lev	Dur	Xfd
1	CARD	37 Trumpet	-24	0	75	395	124
2	ROM	100 SynthPad	-12	+1	56	Gate	10
3	ROM	101 Birdland	0	-20	80	482	733
Loop Dir:	B/F	Start:	3	End:	7	Repts:	OFF
UTILS    SOLO    INSERT    DELETE    WAVING    MUTE							

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

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

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

## 9.3 WAVE SEQUENCE UTILITIES and MODULATION

Path: EDIT - PATCH - WAVES - WAVSEQ - UTILS

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

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

Modulating the Wave Sequence start step can be a very useful, expressive trick. You can, for instance, create a Wave Sequence of a number of waves with different, interesting attack transients, and then set Velocity as the Mod source. By playing at different velocities, you select which wave sounds first, changing the attack transient on every note if you so desire. This is a little like using the Key/Velocity Zones page to set up a velocity switch - but you can use modulation to select from up to 127 of the 255 waves in a single Wave Sequence, with up to four of those playing in one patch, and up to eight patches playing at one time...there are a lot of sounds waiting to be created; see what you can discover.

## 10 ANALOG INPUTS TOUR

### 10.1 INTRODUCTION TO THE ANALOG INPUTS

So far, this Player's Guide has been primarily concerned with the many ways of getting sound out of the Wavestation A/D. There is one remaining topic, however; another feature which makes this instrument unique among modern digital synthesizers - the ability to bring sounds in, in real time. This is what the "A/D" stands for - Analog to Digital conversion.

The Analog Inputs enable you to do a number of different things. A simple but very effective application is to use the Wavestation A/D's effects to process external sound sources. Synthesizers, electric guitars, singers, laughing hyenas - anything that you can get a signal from, or capture with a microphone, can take advantage of the Wavestation A/D's MDE effects. Two additional processing options - a filter and an exciter - are available for each Input on the ANALOG INPUT ASSIGN page itself.

Another possibility is that of using external sounds as waves, source material for the Wavestation A/D's synthesis engines. A sound from another synthesizer - or, for that matter, an entire audio mix - can become the basis for a Wavestation A/D Patch, with filtering, amplitude envelopes, panning, and so on.

Additionally, the Vocoder effects open up new possibilities for innovative timbres. The Vocoder can combine any internal sounds and/or Analog Inputs into hybrid textures, such as "talking guitars" or voice-boxes.

Perhaps best of all, the Wavestation A/D's powerful sound creation facilities are still active alongside the Analog Inputs, so you can use external and internal sounds at the same time!

### 10.2 SETTING UP THE ANALOG INPUTS

First of all, you need to connect a source to the inputs - a synthesizer, guitar, microphone, or mixer output, for instance - and set the initial gain levels. To do this:

- ☛ Turn the output of the Wavestation A/D all the way down.
- ☛ If you are using outputs 3 and 4, turn the mixer channels which they feed into all the way down.
- ☛ Plug the output(s) of your source into the Analog Input(s). If you are using a mixer output as the source, make sure that the Wavestation A/D's outputs are not part of that mix - otherwise, a feedback loop would be created.
- ☛ Set the initial gain for each of the inputs, using the Gain and Level controls on the back panel. For most synthesizers, mixers, and signal processors, the Gain should be set to the middle setting of -10 dBu. For microphones, it should be set to the lowest setting of -40 dBu. For some professional audio equipment, the highest setting of +4 dBu should be used.
- ☛ After setting the initial gain, adjust the Level knob while looking at the level LEDs on the front panel. The rightmost LED indicates digital clipping, and stays lit for about a third of a second, so that it is easy to see.

The signal should be such that the leftmost (-10) and middle (-3dB) LEDs are lit as much as possible without the clipping LED lighting at all. Digital clipping is much more noticeable than its analog counterpart, and should be avoided.

- Turn the Wavestation A/D's output and mixer channels back to their normal levels.

If you wish to make quick adjustments to the volume of the Inputs after setting the initial gain and level, you can use the VOL parameter on the Analog Input Assign page, discussed below. The VOL for each of the Inputs can also be controlled in real time by MIDI Volume (Controller #7).

- On the ANALOG INPUT ASSIGN page, set Inputs to ENABLED, and select one of the Analog Macros to route the Inputs within the Wavestation A/D. For more information on the Analog Macros, see below.

Now that you know how to set up the Inputs, let's look at some applications for them.

### 10.3 PROCESSING EXTERNAL SOUND SOURCES

You can use the Wavestation A/D's MDE effects to process external sound sources for a number of purposes, in both live and studio situations. In addition to adding effects, the Wavestation A/D (in conjunction with a MIDI sequencer) can serve as an automated two-channel mixer. The combination of these abilities is especially effective in processing live instruments or singers, or recorded tracks. To demonstrate some of the possibilities of this, we'll go through a detailed example.

Let's say that you are working on a multitrack recording with two tracks - lead vocal and guitar - which you want to process through the Wavestation A/D. The vocal will be run through an Early Reflections effect, and the Quadrature Chorus will be used on the guitar. First, using the direct outputs from your mixer channels or the tape deck itself, you should follow the directions in Section 10.2, SETTING UP THE ANALOG INPUTS, using Input 1 for the vocal and Input 2 for the guitar. Connect the Wavestation A/D's outputs to the board you'll use for the mixdown, and be sure that the routing is such that this signal is not being fed back into the Analog Inputs.

Next, go to the Analog Input Assign page.

Path: GLOBAL-ANALOG

ANALOG INPUT ASSIGN									
Inputs:ENABLED					Macro:PARALLEL 1				
INPUT MIDI					FX BUS				
#	CHAN	VOL	FILT	XCTR	A	B	C	D	
1	1	127	99	0	ON	ON	OFF	OFF	
2	2	127	99	0	OFF	OFF	ON	ON	

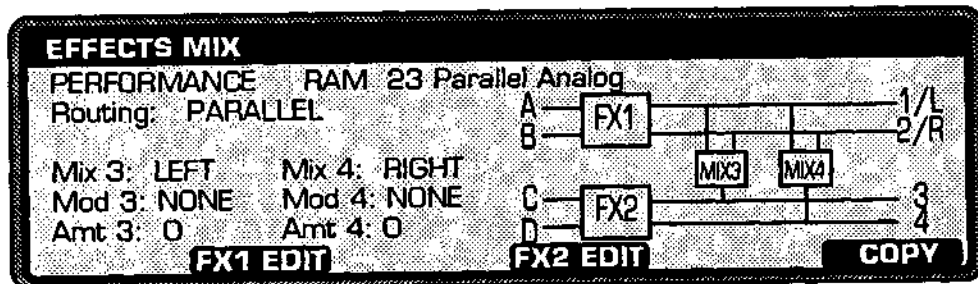
You will recall, from the Effects Mix graphic, that there are four sources feeding into the two effects: Buses A, B, C, and D. To process external sound sources through the Wavestation A/D's effects, you must first assign the Analog Inputs to at least one of these Effects Buses (if you were using the Inputs as waves,

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however, the Inputs should be OFF for all the Buses). You could set up each of the Buses by hand, but you can also simply dial up one of the preset Macros, which provide most of the commonly used settings. In this case, you could use the PARALLEL 1 Macro, as shown on the previous page.

The FILT (filter) and XCTR (exciter) parameters provide initial signal processing for the Inputs. If the sound is too bright, for instance, you might try turning down the filter; if you want to add high-end clarity, try increasing the exciter amount.

In this example you're processing two separate sources through two different effects, so you'll want to set up the two effects in a Parallel configuration - Early Reflections 1 as Effect 1, Quadrature Chorus as Effect 2. The PARALLEL 1 Macro, as shown on the previous page, will then send Input 1 (the vocal) to Effect 1 (Early Reflections), and Input 2 (guitar) to Effect 2 (Chorus).



If you're using only the stereo outputs (1 and 2), you should go to the Effects Mix page and set Mix 3 and 4 to Left and Right, respectively. This will ensure that the output of Effect 2 is included in the mix. Setting the Mix 3/4 parameters to OFF will remove them from the stereo mix, sending them to outputs 3 and 4 only. For more information on the Effects Mix page, see Section 7.2, Effects Buses and Routing.

This done, you are now set up to mix! You might first wish to use a Performance (or Multiset) to save this effects configuration, so it can quickly be recalled at a later date.

### 10.4 MIDI MIXING WITH THE ANALOG INPUTS

As mentioned above, the volume of each Input may be independently controlled, in real time, by MIDI Volume. If you have a MIDI sequencer that can be synchronized to your tape recorder, you can use the Wavestation A/D as an automated mixer, controlling anything from simple fade-outs to complex muting sequences from a MIDI sequencer. Continuing with the example from Section 10.3, let's say that you want to mute several sections of the vocal part and fade out the end of the guitar solo.

First of all, set up a MIDI sequencer to record from and play back to the Wavestation A/D, as described in Chapter 5 (Using MIDI). You should also set up your sequencer to synchronize with your tape recorder, following the directions for your particular sequencer and synchronization equipment. Then, go back to the Analog Input Assign page.

The MIDI CHAN parameter on this page sets the MIDI channel upon which each Input will receive MIDI Volume. Since the Wavestation A/D's Performances also respond to MIDI Volume, it's best to set the Analog Inputs to channels which you don't intend to use for other purposes - eg., something other than the Basic Channel. We'll set them to 15 and 16, so that if you're using a Multiset for this

recording, you'll still have 14 free channels. In general, you should decide on the channels which you wish to use for the Analog Inputs, and then leave them at that setting.

Since you can use your sequencer to record and edit MIDI Volume changes, the mix does not have to be performed in real time - it can be done track by track, allowing you to perfect every nuance. This being the case, we'll start by doing the fade-out of the guitar solo.

### ***Fade-outs***

Cursor to the Input 2 Vol parameter, so that this can be changed by moving the rotary dial (or other data entry controls). To ensure that the initial volume level is correct, you'll record a level of 127 (the maximum) at the beginning of the sequence, by moving the dial slightly counterclockwise ("down") and then back clockwise ("up") to 127. As you move the dial, the Wavestation A/D sends out MIDI Volume messages (Controller #7) to the sequencer, which records them. Be careful not to record over this initial setup data.

Next, sync your sequencer to the tape deck as normal, begin recording on the sequencer (after the initial volume data), and run the tape to the end of the solo. When you want the fade to begin, slowly move the dial to turn the Input 2 Volume to zero. You can now play the sequence back, and hear your fade "performed" by the sequencer and the Wavestation A/D. You can even edit the fade, if your sequencer is capable.

### ***Muting***

Programming mutings on the vocal track can be done in a similar way. Insert the initial volume level and prepare to record, as described above. Unlike gradual fades, mutings are instantaneous volume changes, and so instead of mixing with the dial, you'll use the numeric keypad. At the beginning of each mute, you'll record a level of 0; at the end of each mute, you'll return the volume to the initial level (let's say 127). Remember that, when using the numeric keypad, values are not changed until the ENTER key is pressed, so you can initiate a mute with a single button-press, allowing for greater timing precision. For the first mute, type in "0" well ahead of time, and then hit ENTER at the exact moment that you want the mute to begin. To end the mute, type in the initial volume "127" ahead of time, and then hit ENTER when you want the mute to end. For complex muting sequences, you may want to record in several passes.

If your sequencer can edit controller data, you can use this for even finer control over volume changes. Since the Inputs use the standard MIDI Volume controller, you can also use any device which can send controller messages - such as hardware or software faders - to do your mixing.

Remember that, in addition to adjusting the Input volumes, you can also modulate the effects in real time. You can use this to change the amount of reverberation from section to section, for instance, or add delay on only the last word of every chorus.



## 10.5 OTHER ANALOG INPUT ASSIGN SETUPS

### *Stereo source to serial effects*

If you use any synthesizers or samplers which don't feature built-in effects, you can simply connect their audio outputs to the Wavestation A/D's Analog Inputs and *voilà* - chorus, reverb, flange, and delay to your heart's content. This is especially convenient if you are already stacking the sound of a module with that of the Wavestation A/D, as it allows you to easily apply global effects to the entire timbre.

If you are using a single, stereo source, such as a sampler (like the KORG DSS-1) or other synthesizer (like the KORG DW-8000), you may want to process it through both effects. To do this, dial up the A-B STEREO Macro, as shown below, and use a Serial effects configuration.

ANALOG INPUT ASSIGN									
Inputs:ENABLED					Macro:A-B STEREO				
INPUT MIDI					FX BUS				
#	CHAN	VOL	FILT	XCTR	A	B	C	D	
1	1	127	99	0	ON	OFF	OFF	OFF	
2	2	127	99	0	OFF	ON	OFF	OFF	

For sending a stereo source through Effect 2 only, you can use the C-D STEREO Macro, adjusting the Effects Mix accordingly.

### *Mono source to serial effects*

If you wish to process a single, non-stereo source (such as a guitar) through serial effects, you can use the A-B MONO Macro, as shown below. Make sure to connect the source to Input 1.

ANALOG INPUT ASSIGN									
Inputs:ENABLED					Macro:A-B MONO				
INPUT MIDI					FX BUS				
#	CHAN	VOL	FILT	XCTR	A	B	C	D	
1	1	127	99	0	ON	ON	OFF	OFF	
2	2	127	99	0	OFF	OFF	OFF	OFF	

For sending a monophonic source through Effect 2 only, you can use the C-D MONO Macro, adjusting the Effects Mix accordingly.

## 10.6 USING EXTERNAL SOUNDS AS WAVES

If you scroll to the end of the list of PCM waves on the WAVES page, you'll see the two choices Input 1 and Input 2 - the two Analog Inputs. These can be used just like the PCM waves, and processed through filters, amp envelopes, panning, etc. The only functions not available are those that alter pitch, such as the settings on the PITCH page, and the Semitone, Fine tuning, and Slope parameters on the WAVES page. Playing notes over MIDI also will not change the pitch of the Inputs, unless the source sound is being generated by a MIDI instrument (see below).

Generally, when using the Inputs as waves, you should make sure that they are not being routed on the Analog Inputs Assign page. To do this, set Inputs to DISABLED on the ANALOG INPUT ASSIGN page (this only turns off the bus routing - Inputs can always be used as waves).

When you use the Input 1/2 waves, audio coming into the Analog Inputs is not constantly sent to the effects, as in the examples above; it is instead gated by the keyboard. This means that, just like PCM waves, the Inputs are only heard when a key is depressed.

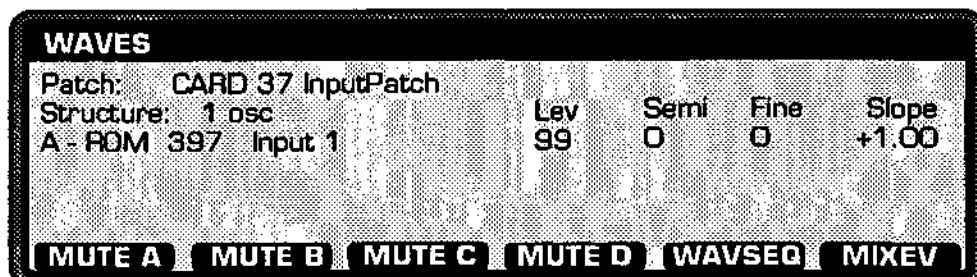
As with the examples above, you can still use internal Wavestation A/D sounds along with the Analog Input waves. A four-oscillator patch, then, might use one Input and three ROM PCM waves.

### *Processing another MIDI synthesizer*

If you wish to use a sound from another MIDI synthesizer, sampler, etc. as a wave, there is an elegant way of accomplishing this.

*This technique works best with monophonic (one note at a time) playing.*

- First, connect that synth to the Wavestation A/D's Analog Input(s).
- Set up your MIDI system so that your master controller is received by both the Wavestation A/D and the source synthesizer.
- Create a new Patch and go to the WAVES page.
- If your source is non-stereo, assign Input 1 as wave A and skip the next step.



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- If your source is stereo, change the structure to 2 osc structure. Assign Input 1 as wave A and Input 2 as wave C, and then go to the PATCH BUS ASSIGNMENT page. Set Wave A ON for only Bus A, and Wave C ON for only Bus B, as shown below. This will cause the inputs to be hard-panned, left and right, to the stereo outputs. Make sure that the FX Bus parameter on the Performance Part Detail page is set to PATCH, so that the assignments you just made will be used.

PATCH BUS ASSIGNMENT							
Patch:	RAM2	34	SINUSOID	PATCH			
	WAVE		FXBUS	A	B	C	D
A:	ROM 397	Input 1		ON	OFF	OFF	OFF
C:	ROM 398	Input 2		OFF	ON	OFF	OFF

WAVES    MACROS

- Since your master controller is playing both the Wavestation A/D and the source synthesizer, they will both trigger notes simultaneously. This means that as soon as a note starts on your source synthesizer, with its filter envelope, amplitude envelope, etc., the Wavestation A/D's own envelopes will start up. The two synthesizers are thus synchronized, enabling you to create a sound accurately combining the sound of both instruments.

Also, although the Wavestation A/D itself is not changing the pitch of the Analog Inputs, the pitch is controlled at the source synthesizer via MIDI. The Mod Pitch Shift - Delay effect can also be used for modulatable pitch changes, such as "whammy bar" effects.

- Create a Patch to process the source synthesizer by adjusting the Patch Macros parameters.

### Using other sounds as waves

Other sounds, such as environmental recordings or noise sources, may provide interesting material for waves. In general, these sources should be fairly continuous, making sound all of the time, so that when you press down the key, there will be something for the Wavestation A/D to play. Using intermittent sources, however, may provide for interesting, semi-aleatoric timbres.

You might, for instance, try recordings of wind, sea, or crowd noises. Try setting up a looped sound on a sampler, or an interesting timbre on a synthesizer, and holding down the sustain pedal to make them sound indefinitely as you play on the Wavestation A/D. Experimentation is the key here.

One of the more interesting and traditional uses of external sounds is that of the vocoder, which is discussed next in its own section.

## 10.7 USING THE VOCODER EFFECTS

The Vocoder effects superimpose the timbre of one signal (the Modulator) onto that of a second signal (the Carrier). A standard application of this is the "talking" instrument, in which you talk into a microphone and a guitar or keyboard sound is made to mimic the harmonic content of the speech. Other uses discussed below include simulated choirs and timbral cross-modulation, and many variations are possible depending on the characteristics of the sounds fed into the effect.

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.

### *Using the Vocoder to create "talking" instruments*

This Vocoder application uses a single microphone input to modulate internal Patches. To create the talking instrument:

- ☛ Set up the Analog Inputs, as explained above, with a microphone going into Input 1.
- ☛ On the Analog Input Assign page, dial up the SINGLE Macro.
- ☛ Initialize a Performance.
- ☛ Select the Patch(es) which you would like to be modulated by the Input. It's best to use sounds with a wide frequency range, such as sawtooth-like waves.
- ☛ In the Performance Part Detail page, set the FX Bus for all Parts to "B."
- ☛ Select Stereo Vocoder -Delay 1 or 2 as Effect 1 for the Performance. These effects are so powerful that they require both effects slots, so you'll notice that Effect 2 changes to read Stereo Vocoder -Delay also.
- ☛ Press the soft key FX 1 EDIT, so that you can set up the Vocoder.
- ☛ On the Vocoder edit page, set the Modulator Bus to "A" (which you assigned Analog Input 1 to, above) and the Carrier Bus to "B" (the Parts in the Performance).
- ☛ Speak into the microphone while playing the Wavestation A/D with your controller. As you speak, the Wavestation A/D Patches will follow the formants of your voice, so that they appear to talk. Try experimenting with both loud whispers and voiced speech.

You can use this technique with lead lines, for a voice-box effect. You can also achieve a choir-like sound by using choral or vocal Patches as the Carrier(s). Try

using the ROM vocal Patches numbered 9 through 12, such as Air Vox, and playing chords while speaking into the microphone. This should sound like a choir, "singing" your words.

If you wish to use this effect with an external instrument, such as another synthesizer, guitar, etc:

- ☛ Set up the Analog Inputs, as explained above, with a microphone going into Input 1 and the Carrier source (guitar, other synthesizer, etc.) going into Input 2.
- ☛ On the Analog Input Assign page, select the A-B STEREO Macro.
- ☛ Set up the Vocoder as explained in the last example, with A as the Modulator and B as the Carrier.
- ☛ Play the external instrument while speaking or whispering into the microphone.

This can also be used for special effects, such as making a barking dog or revving car appear to talk.

### ***More Vocoder applications***

The above examples use pitched sound as a Carrier; you might also try using noise. ROM waves 70 (New Pole), 117 (White Noise), and 118-122 (Spectrum 1 through 4) are good for this purpose; modulating these sources with speech or percussion can produce interesting results.

Speech effects are the most commonly used application of the Vocoder, and they're what the first vocoders were designed to do; but they are not by far the limit of its capabilities. Using internal sounds as both Carrier and Modulator is a way to achieve new, dynamic timbres. You can, for instance, combine Vector and/or Wave Sequence sounds in this cross-timbral synthesis, and then store them as a new Performance. In addition to modulating one sound with another, it's possible to use a single sound to modulate itself. To do this, either place the same sound on two Parts (similar to the example above), or simply assign the FX Bus of a single Part to 50/50.

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

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

The Effects Mix Series routing works in a special way with the Stereo Vocoder-Delay effects, 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 Buses C and D are heard at full volume, along with the Vocoder output. You can use this feature to route sounds around the Vocoder to the A/B outputs, or - by using buses C and/or D as the Modulator - 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.

Remember that, because 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 and Analog Input Assign pages, as well as the Performance Part Detail FX Bus parameter, are configured appropriately.

# 11 APPLICATIONS AND SOLUTIONS

## 11.1 WIND CONTROLLERS

The capabilities of the Wavestation A/D are well-suited to work with MIDI wind controllers. Setting up the Wavestation as a whole for a wind controller takes several small adjustments to its MIDI configuration, and converting an individual Performance for breath control is a matter of a few simple steps, first on the Performance Part Detail page, and then on several of the Patch Macros pages.

### *Setting up MIDI*

- Set your wind controller to send Breath Controller.
- On the MIDI page, set MIDI Controller 1 to BREATH CONTROLLER. This means that breath control can be used as a modulator anywhere in the Wavestation A/D by calling up MIDI 1 as a mod source.
- Also on the MIDI page, set the Basic Channel to match the channel of your controller.
- On the same page, set MIDI Mode to POLY. It isn't necessary to use MIDI MONO mode.
- Go to the MIDI RECEIVE page, and make sure that Controllers are set to ENABLE. This will ensure that the Wavestation A/D is receiving Breath Controller messages.

### *Modifying a Performance for a Wind Controller*

- Find a Performance which sounds interesting to you.
- Go to the Performance Part Detail page of the first Part (path: EDIT-DETAIL); set the Mode to UNI LEGATO, and the Key Priority to LAST. Some of the factory Performances, such as ROM 4 Mini Lead, are already set up this way. Repeat this procedure for each Part in the Performance, and then save the Performance by going to the Write Performance page.  
If the Performance is from the ROM Bank, you'll have to save it to a different location in RAM1, 2, or 3, or on a Program Card.
- Go to the Edit Amp page of the first Part's Patch (path: EDIT-PATCH-MACROS-AMP). Set the Wave parameter at the top of the page to ALL, or A if it is a one-oscillator Patch. Change the Amp Macro to DEFAULT, which is an envelope with an abrupt attack and a short release.
- Go to the Edit Amp Mod page of the first Part's Patch (from the Edit Amp page, press the AMP MOD soft key). Check that the Wave parameter at the top of the page is still set to ALL, or A if it is a one-oscillator Patch. Set Source 1 to MIDI 1, and then go to the Amt (modulation amount) parameter at the right side of the page. Turn the amount for Source 1 to +127, and the amount for Source 2 to 0. Additionally, set the Velocity Envelope Amount to 0.

This means that the Patch's volume will be completely controlled by the breath output of your instrument.

- Go to the Edit Filter page of the same Patch (from the Edit Amp Mod page, press the FILTER soft key). The way in which you convert the filter to breath control will depend on your own taste and the nature of the Patch; you may want breath to have very little effect on the timbre, or you may wish for it to have complete control.

As a starting point, make sure that the Wave parameter is set to ALL, or A if it is a one-oscillator Patch. Envelope 1 is usually one of the modulation Sources; replace this with MIDI 1. This should give you a suitable amount of breath control on the filter; if you like, you can come back later and tweak it to perfection.

- Save the edited Patch by going to the Write Patch page. If the Patch is from the ROM Bank, you'll have to save it to a different location in RAM1,2, or 3, or on a Program Card. Keep in mind that any other Performances which use this Patch will also be changed.
- Repeat the above three steps for each Part in the Performance, and you're ready to play!

### **Changing Performances via MIDI**

The Wavestation A/D's five internal Banks are grouped into three MIDI Banks. MIDI Bank 0 is comprised of RAM1 and RAM2, MIDI Bank 1 of ROM and CARD, and MIDI Bank 3 of RAM3. Performances within these MIDI Banks may be selected, as always, by using Program Change messages, but switching from one MIDI Bank to another - from RAM2 to ROM, for instance - requires the use of the MIDI Bank Select message (Controller #32). For more information on MIDI Bank Select, please see Section 5.8, MIDI Bank Select and Program Change.

Since many older controllers do not offer an easy way of sending the recently implemented MIDI Bank Select message, you may find it convenient to use the Performance Select Map. This feature allows you to assign any incoming MIDI Program Change number to any Wavestation A/D Performance, without using Bank Select. For more information on the Performance Select Map, please see Section 5.10.

### **Advanced Wind Controller Tips**

The Wavestation allows you to change Performances without disrupting the reverb effect. To do this, the Performances you are changing between must use the same reverb algorithm (Small Hall, for instance) in the same effects slot (such as FX 2) of the same configuration (eg., Serial). You can also do this when changing from a Parallel to a Serial effects configuration (or vice versa), as long as the reverb is in the FX 1 slot.

Although the above example only shows how to assign breath control to alter volume and filter cutoff, the Wavestation A/D's sophisticated modulation matrix allows you to do much more than that. Breath control can be routed to any number of destinations, including pan (through the FX mix), pitch, LFO depth and/or rate, and Wave Sequence step, as well as effects parameters.

The Dry/Wet Mix of the Reverbs, for example, may be modulated. Try setting that parameter to Wet, and then using MIDI 1 (which you assigned to breath control in the above example) as the modulator, with an amount of -15. This means that the harder you blow, the less reverb there is; as you play softer, the reverb increases. Another expressive use of effects modulation is to route breath control to the Hot Spot in the Distortion or Overdrive effects.

## **11.2 GUITAR CONTROLLERS**

Several features of the Wavestation A/D are specifically designed for the use of MIDI guitar controllers. Setting it up to be played from a guitar controller takes only a few small adjustments.

The simplest way to use the Wavestation A/D with a MIDI Guitar is to play the same Performance with each string, so that as you play chords or lines that jump from string to string, the sound remains consistent. Some guitar controllers also have the ability to send out different program changes for each string, allowing you to play different sounds for bass and lead lines, or to achieve special effects. Even if your controller can't send different program changes for each string by itself, you can still get a similar effect by using the Wavestation A/D's Multisets. These three methods are discussed below.

### ***Setting up MIDI***

The basic MIDI setup is the same for all the guitar controller methods described below.

- ☛ Set up your MIDI Guitar controller to transmit in MIDI MONO mode, as described in its manual.

This should cause it to transmit each string's notes on a different MIDI channel. Next, set up the Wavestation A/D to respond to each string independently by putting it in MIDI MONO mode.

- ☛ On the MIDI page, set the MIDI Mode to MONO, and the number of MONO Channels to 6 - one for each string.
- ☛ On the same page, set the Basic Channel to match that of your guitar controller. This determines the first of the six channels to which the Wavestation A/D will respond; for instance, if the Basic Channel is 1, the six MONO channels will be 1, 2, 3, 4, 5, and 6.

### ***Changing Performances via MIDI***

The Wavestation A/D's five internal Banks are grouped into three MIDI Banks. MIDI Bank 0 is comprised of RAM1 and RAM2, MIDI Bank 1 of ROM and CARD, and MIDI Bank 3 of RAM3. Performances within these MIDI Banks may be selected, as always, by using Program Change messages, but switching from one MIDI Bank to another - from RAM2 to ROM, for instance - requires the use of the MIDI Bank Select message (Controller #32). For more information on MIDI Bank Select, please see Section 5.8, MIDI Bank Select and Program Change.

Since many older guitar controllers do not offer an easy way of sending the recently implemented MIDI Bank Select message, you may find it convenient to use the Performance Select Map. This feature allows you to assign any incoming MIDI Program Change number to any Wavestation A/D Performance, without using Bank Select. For more information on the Performance Select Map, please see Section 5.10.



### ***Playing the same Performance from each string***

For this method, you'll use a Multiset as a template, but you won't actually play the Performances or Effects stored in the Multiset. Instead, you'll set up your guitar controller to send out the same program change for each string (for some controllers, this may be the only choice). Additionally, you'll make it so that the Multiset Effects are changed by those same Program Change messages, so that when you call up a Performance to be played, you'll also call up its effects. This makes the Wavestation A/D act almost as if it were in the MIDI Mode POLY, except that each of your strings controls its own monophonic Performance, allowing for more natural guitar voice-leading.

- Set up your guitar controller to send out the same Program Change message for each string, consulting your manual if necessary.
- Go to the Wavestation A/D's MIDI REMAP page (path: MIDI-REMAP), and set Change Multi FX w/Prog to ENABLED, and Change Multi w/Prog to DISABLED. This enables changing of Multiset Effects with MIDI Program Changes.
- Go to the MULTIMODE SETUP page (path: MIDI-MULTISET), and set the FX Control channel to one of the channels which you are sending on - the Basic Channel is a good choice. This determines the MIDI channel on which Program Changes will change the Multiset Effects.

Now, you're set up and ready to play!

### ***Playing different Performances from each string, using Program Changes***

In the previous example, you configured your guitar controller to send identical Program Change messages for each of its six strings. The Wavestation A/D, however, can play different Performances - and receive separate Program Changes - on up to 16 MIDI channels, more than enough to allow each string its own, separate sound. If your MIDI guitar is so capable, you can use its master controller functions to determine which Wavestation A/D Performances are played by each string. For more information on multi-timbral operation of the Wavestation A/D, please see Section 5.11, Multimode Setups, of this Player's Guide, and the entries under MIDI RECEIVE and MULTIMODE SETUP in the Reference Guide.

The MIDI configuration of the Wavestation A/D is very similar to that of the previous method, except that you may wish to set the Multiset Effects Control Channel to a seventh MIDI channel, so that effects changes may be controlled separately from Performance changes. For more information on the Change Multi FX w/Prog feature, please see the MIDI REMAP section of the Reference Guide.

- Set up your guitar controller to send out the desired Program Change messages for each string, consulting your manual if necessary.
- Go to the Wavestation A/D's MIDI REMAP page (path: MIDI-REMAP), and set Change Multi FX w/Prog to ENABLED, and Change Multi w/Prog to DISABLED. This enables changing of Multiset Effects with MIDI Program Changes.
- Go to the MULTIMODE SETUP page (path: MIDI-MULTISET), and set the FX Control channel either to one of the channels which you are sending on - the Basic Channel is a good choice. This determines the MIDI channel on which Program Changes will change the Multiset Effects.

That's it! You're ready to go.

***Playing different Performances from each string, using Multisets***

Even if your guitar controller can't send out separate Program Changes for each string, you can achieve a similar effect by using the Wavestation A/D's Multimode Setups. Each of the 16 Multisets can store separate Performances to be played by each MIDI channel, in addition to effects. You can also set up the Wavestation A/D to use Program Change messages to switch between Multisets. For more information on Multisets, please see Section 5.11, Multimode Setups, of this Player's Guide, and the entries under MIDI RECEIVE and MULTIMODE SETUP in the Reference Guide.

- Set up your guitar controller to transmit Program Change messages in a simple fashion, so that its program 1 sends out Program Change #1, program 2 sends out Program Change #2, and so on.
- Go to the MIDI REMAP page (path: MIDI-REMAP), and set Change Multi w/Prog to ENABLED, and Change Multi FX w/Prog to DISABLED. This will cause Program Changes on the Basic Channel to change the current Multiset. For more information on this feature, please see the MIDI REMAP section of the Reference Guide.
- Go to the PERFORMANCE SELECT MAP page (path: MIDI-PERFMAP), and make sure that the Map is set to DISABLED. This will ensure that MIDI Program Change #1 calls up Multiset #1, Program Change #2 calls up Multiset #2, and so on.
- Go to the MULTIMODE SETUP page (path: MIDI-MULTISET), and assign the desired Performances to each channel.
- Go to the EFFECTS page by pressing the EFFECTS soft key, and set up your desired effects.
- Before sending a program change from your controller, save the edited Multiset by going to the WRITE page.
- Repeat the above three steps to create any other desired Multisets.

After creating the rest of your Multisets, you're ready to play!

## 11.3 TROUBLESHOOTING

### *Wavestation A/D Makes No Sound*

- ☛ Perhaps someone has edited the current Performance into silence - try selecting a few from the ROM bank.
- ☛ As a basic check of the Wavestation A/D audio, press the TEST soft key on the Performance Select page. When TEST is pressed, its label changes to STOP, and the Wavestation A/D will play a middle C on the current Performance. The note will continue to sound until the STOP softkey (or any other button, for that matter) is pressed.

If TEST produces a sound, then your problem is probably in your MIDI system, and you should proceed to MIDI Troubleshooting, below.

If TEST does not produce a sound, then your problem is probably in your audio system, and you should proceed to Audio Troubleshooting, below.

### *Audio Troubleshooting*

- ☛ Check the MASTER VOLUME knob and volume pedal (if used). The polarity of a Volume Pedal is also important; if this is inverted, the volume will be at zero when the pedal is at maximum. If this seems to be the case, change the polarity of the pedal on the FOOT PEDAL ASSIGN page, under GLOBAL.
- ☛ If you still do not obtain audio output, it is easy to check whether the problem is in the Wavestation A/D or your sound system by plugging headphones directly into the front panel PHONES jack. If you can hear sound through the headphones, check the connections to your sound system.
- ☛ If you don't hear any sound through the headphones, do the MIDI check explained below.

### *MIDI Troubleshooting*

- ☛ Check that the MIDI Indicator LED, located on the front panel, blinks when you play on your controller.

Blinking indicates that the Wavestation A/D is receiving recognized MIDI data, as set by the MIDI Mode and Basic Channel parameters (see below). When you play your controller or sequencer, you should see this light blinking.

- ☛ If the MIDI Indicator LED is not blinking, check to see that your MIDI cable connections are properly made (MIDI Out from your controller or sequencer to MIDI In on the Wavestation A/D).

If you are using a MIDI patch bay, or the "through" function of a sequencer, try directly connecting the MIDI Out of your controller with the MIDI In of the Wavestation A/D.

If the connections seem to be OK, but the MIDI LED still is not blinking, make sure that the Wavestation A/D is set to receive the channel on which your controller or sequencer is sending. First, find out what channel is being sent by going to the MIDI Status page, which is a more sophisticated version of the MIDI LED. It displays an asterisk (\*) under the number of each MIDI channel on which the Wavestation A/D is receiving MIDI data, whether or not that channel is being

recognized. If your controller is sending on channel 3, for instance, you will see an asterisk under the "3" every time you press down a key.

- Go to the MIDI STATUS page (path: MIDI-STATUS). Play on your controller, and note the channel number(s) under which an asterisk (\*) appears.

Next, press EXIT to get back to the MIDI page, and check to see which MIDI Mode (OMNI, POLY, MULTI, or MONO) the Wavestation A/D is currently in.

- If it is set to OMNI Mode, the Wavestation A/D will respond to MIDI information on any channel. If the STATUS page showed any activity, then, you should be hearing something. If you aren't, check again to see that the audio connections are OK.
- If it is set to POLY Mode, then the Wavestation A/D will ignore all MIDI data except that which it receives on its Basic Channel. Adjust either the Wavestation A/D's Basic Channel or your controller's send channel so that they match.
- If it is set to MULTI Mode, go to the MULTIMODE SETUP page (reachable by pressing the MULTI softkey on the MIDI page). In this mode, the Wavestation A/D can receive on up to 16 channels simultaneously. Check to see that the desired channels are turned ON (the second column), and that their levels are reasonably high (the third column).
- If it is set to MONO Mode, note the (#) MONO CHANNELS parameter to the right of the Basic Channel. This sets the total number of channels to be used. These begin with the current Basic Channel, up to the number of mono channels requested, to the limit of 16. For example, if the Basic Channel is set to 1, and the "# MONO Channels" set to 6, then the Wavestation A/D would receive MIDI on channels 1 through 6. Check that these parameters are set appropriately.

This mode, like MULTI, uses Multisets to assign Performances to the different MIDI channels. Go to the MULTIMODE SETUP page by pressing the MULTI softkey on the MIDI page, and check to see that the desired channels are turned ON (the second column), and that their levels are reasonably high (the third column).

There are a few MIDI parameters which can cause silence regardless of the current MIDI mode.

- In a MIDI network, a controller can send unintended low Volume control messages. If you think this is the case, try raising the same controller, or reset the Wavestation A/D by cycling power off, then on.
- Check that the Play Mode on the PERFORMANCE PART DETAIL page is set to BOTH or LOCAL for each Part. If any are set to MIDI, they will not sound, but will only continue to transmit MIDI Program changes and controller data from the joystick and any connected pedals.

For more information on the Wavestation A/D and MIDI, see Section 5 (MIDI).

### ***The Wavestation A/D doesn't respond to some MIDI notes***

- Check that the Note On/Off parameter on the MIDI RECEIVE page is set to ALL.

This feature is designed to allow you to link two Wavestation A/Ds (or an A/D and a Wavestation keyboard) together. Setting one instrument to EVEN and the other to ODD causes each to ignore half of the MIDI notes (playing a single whole-tone scale), effectively doubling the available polyphony. Unless you have two modules operating in this manner, Note On/Off should be set to ALL.

### ***Notes cut off unexpectedly***

- Check the All Notes Off parameter on the MIDI RECEIVE page, and try setting it to IGNORE.

Some controllers send this MIDI message whenever there are no keys held down, and this can occasionally cause notes to cut off; ignoring the message will solve this problem.

### ***The Analog Inputs sound distorted***

- Check the LED Level indicators on the front panel. If the clipping LED is lit, adjust the Gain and Level controls on the back panel.

For most synthesizers, mixers, electric guitars, and signal processors, the Gain switch should be at the middle setting of -10 dB. For microphones, it should be at the lowest setting of -40 dB. For some professional audio equipment, the highest setting of +4 dB should be used.

After setting the Gain switch, fine tune the input volume by adjusting the Level knob.

### ***When Analog Inputs are used, polyphony is reduced***

If you are using the Analog Input Assign page to route the Inputs to the effects, the Wavestation A/D reserves 2 voices for each Input; if you use the Inputs as waves, all 32 voices are available.

### ***Local footpedals do not function correctly***

If you are using a footpedal plugged into the back of the Wavestation A/D, as opposed to over MIDI, and the pedal seems to be functioning oppositely from the way that you would expect (sustaining when it is not depressed, and damping when it is depressed, for example), the polarity of the pedal may be set incorrectly.

- Try changing the Polarity parameter for that footpedal on the FOOT PEDAL ASSIGN page.

If you are using the pedal as MOD PEDAL or FX SWITCH, remember that the values may be scaled and inverted at the modulation destination. A positive value from the pedal, then, may produce a decrease in modulation, depending on the settings of the Patches and Effects in the current Performance.

### ***Only one step of a Wave Sequence is being played***

There are several possible causes for this situation.

- ☛ Check the Wave Sequence Sync parameter on the Global page. Unless you are specifically using MIDI clocks to control the playback of the Wave Sequence, this should be set to INTERNAL. If you are intending to use MIDI clocks for sync, make sure that your clock source - probably a sequencer or drum machine - is indeed sending MIDI clocks, and that its MIDI Out is connected to the Wavestation A/D's MIDI In. MIDI Time Code is not the same as MIDI Clocks, and will not work for this purpose.
- ☛ Check that the SOLO soft key on the Wave Sequence page is not marked by brackets, which indicates that SOLO is on. If it is, press the soft key again to turn it off.

If SOLO is on, only the currently selected Wave Sequence Step is played.

- ☛ Check that the Mod Amount parameter on the Wave Sequence Utilities page is set to greater than 0, or that the Mod Source parameter is set to Linear Keyboard, Centered Keyboard, Linear Velocity, or Exponential Velocity.

If the source is not one of the four listed above, and the Mod Amount is set to a very small amount (such as 0), then only the start step of the sequence will be played.

### ***ROM Wave Sequences cannot be edited***

Each time you make any change to a Wave Sequence, the change is saved. Since you cannot write to ROM, you cannot directly edit a ROM Wave Sequence. If you first copy the Wave Sequence to a RAM bank, you can then edit it as much as you like.

- ☛ Go to the UTILITIES page, under GLOBAL, and copy the ROM Wave Sequence into either the RAM1, RAM2, RAM3, or CARD banks. It may now be edited.

### ***Wave Sequence does not seem to sync to MIDI***

- ☛ Check that Wave Sequence Sync parameter on the GLOBAL page is set to MIDI.

If this is set to INTERNAL, MIDI clocks will not affect Wave Sequences.

- ☛ Check that the step durations are in multiples of 6 (12, 24, etc.) for all Wave Sequences in the current Performance.

A duration of 24 equals one quarter note; 12 equals an eighth note; 6 equals a sixteenth note, and so on.

- ☛ Check that rhythm is not partially due to the Wave Sequence being run through a delay effect. If this is the case, you should adjust the delay time to match the tempo of the MIDI clocks.
- ☛ For best results when using a sequencer and syncing Wave Sequences to MIDI clocks, quantize all notes playing Wave Sequences to a few milliseconds before the beat. This will ensure that your sequencer will send out the notes before the clock message, so that the Wave Sequence rhythms will be right on the beat.

### ***When a Performance is used in a Multiset, not all Parts are heard***

#### ***When the Effects Mix of a Performance is changed, not all Parts are heard***

If you have changed the FX Mix of a Performance, or if you are using it in a Multiset and have not explicitly copied the effects from the original Performance, waves assigned to the C and/or D buses may not be heard.

- ☛ Check the Mix 3/4 parameters on the EFFECTS MIX page, and make sure that these are not set to OFF. If they are, change them to another setting.

If any of your Parts are assigned to the C,D,or C+D FX Buses (or if the Part is assigned to Patch, and the Patch FX Bus Assign has Waves which are routed to only C and/or D), and you are using only the stereo outputs, then it is necessary to use the Mix 3/4 parameters on the FX MIX page to route those Parts to the stereo outs. ROM 0 Wave Song is an example of such a Performance.

### ***Performance Effects seem to have changed***

If Effects have been set to DISABLE on the GLOBAL page, no effects will be heard.

- ☛ Go to the GLOBAL page, and make sure that the Effects are set to ENABLE.

When you play a Performance in MIDI MULTI or MONO modes, it is processed through the effects for the current Multiset, as opposed to its own effects.

- ☛ Check the MODE parameter on the MIDI page. If this is set to MULTI or MONO, the Performance is using the effects of the current Multiset (which may be accessed through the MULTI button on this page).
- ☛ Change the MIDI MODE to OMNI or POLY, which will enable the Performance to use its own effects.
- ☛ On the EFFECTS COPY page, copy the effects from the desired Performance into the Multiset.

### ***Performance Effects cannot be edited***

#### ***Multiset Effects cannot be edited***

There are two sets of effects in the Wavestation A/D: those that belong to Performances, and those that belong to Multisets. The MODE parameter on the MIDI page determines, among other things, which set of effects is in use. If the MIDI MODE is set to OMNI or POLY, the Performance effects are heard; if it is set to MULTI or MONO, the Multiset effects are heard.

Only the effects currently in use may be edited. Thus, if you are in OMNI or POLY modes, Multiset effects cannot be edited; if you are in MULTI or MONO modes, the Performance effects cannot be edited.

Also, if Effects have been set to DISABLE on the GLOBAL page, the effects will not be heard, and cannot be edited.

- ☛ Go to the GLOBAL page, and make sure that the Effects are set to ENABLE.

## 11.4 ERROR MESSAGES

### **ARE YOU SURE?**

Generally, any action that alters memorized data needs to be confirmed. Press YES to carry out the action, and NO or EXIT to cancel the action.

### **BATTERY LOW (INTERNAL)**

If you see this indicator, immediately take whatever steps you can to back-up your custom patches by RAM card or MIDI, and then bring the instrument to a qualified repair center.

### **BATTERY LOW (RAM CARD)**

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

Follow the instructions provided with the card for replacing the battery. After battery replacement, copy desired data to the card.

### **CANNOT COPY STEREO VOCODER FX PARAMETERS - USE COPY FX ALL**

Since the Stereo Vocoder-Delay 1/2 effects take up both effects slots, it doesn't make sense to copy them to a single slot. To copy these effects to a Performance or Multiset, use the COPY EFFECTS ALL page instead. To get to this page, go back up to the EFFECTS page, and press COPY.

### **CANNOT COPY ALL STEPS - NO MORE STEP MEMORY AVAILABLE**

### **CANNOT INSERT STEP - NO MORE STEP MEMORY AVAILABLE**

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

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

### **CANNOT WRITE TO ROM CARD**

You tried to write to a ROM card.

### **CARD IS NOT FORMATTED**

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

### **CARD NOT INSERTED**

A Card must be inserted for the operation to work.

### **EFFECTS ARE DISABLED**

When Effects has been set to DISABLE on the GLOBAL page, they may not be edited. To edit the effects, go to the GLOBAL page and set Effects to ENABLE them.



**GLOBAL CARD PROTECT SETTING IS ON**

You tried to write to a RAM Card while GLOBAL Memory Protect CARD was enabled. To un-protect the memory, go to the GLOBAL page.

**GLOBAL INTERNAL MEMORY PROTECT IS ON**

You tried to write to RAM 1, 2, or 3 while GLOBAL Memory Protect Internal was enabled. To un-protect the memory, go to the GLOBAL page.

**KORG CARD FORMAT MISMATCH**

The KORG PROG DATA card inserted is not formatted for the Wavestation A/D or Wavestation keyboard. If it is a RAM card, you can format it (see UTILITIES). Specifically, you cannot use M1/M3r/T-series Program cards without re-formatting them (and thus erasing all of the M1/M3r/T-series data).

**MUST EDIT MULTI FX IN MULTI/MONO MODE**

When the MIDI Mode is set to OMNI or POLY, Multiset effects cannot be edited. To edit the effects of the Multiset, change the MIDI Mode to MULTI or MONO.

**MUST EDIT PERF FX IN OMNI/POLY MODE**

When the MIDI Mode is set to MULTI or MONO, Performance effects cannot be edited. To edit the effects of the Performance, change the MIDI Mode to OMNI or POLY.

**PART IS EMPTY**

You have tried to edit a Part which has no Patch assigned to it. Assign a Patch, or move to a different Part.

**PROTECTED CARD**

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

**SYSEX TRANSFER COMPLETED**

Confirms successful data transfer.

**SYSEX CHECKSUM ERROR**

A data error occurred during SysEx reception.

This message will remain on the screen until you press the CONT softkey. SysEx dumps contain a large amount of data, and it is possible for small parts of it to become garbled. Normally, simply re-transmitting the data is all that is needed. If this does not work, try using another MIDI cable. It is also possible that the stored data itself has become corrupted...which is why it's always good to keep several backups of all important data.

**SYSEX WRITE PROTECT ERROR**

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

## 12 APPENDIX

### 12.1 SPECIFICATIONS AND OPTIONS\*

System:	Advanced Vector Synthesis. 24-bit digital processing, 19-bit DAC.
Wave Memory:	484 sampled and single-cycle waveforms.
Program Memory:	1 ROM Bank, 3 RAM Banks, and 1 Card Bank
Tone generator:	20 bit resolution 32 voices including individual filters, amps, LFOs, and envelopes.
Macros:	Voicing templates for Pitch, Filter, Amp, Pan, Env1, Analog Inputs, and Keyboard/Velocity Zoning.
Effects:	55 effects programs. Up to 6 simultaneous digital effects, with dynamic modulation.
Performances:	200 internal, 50 in card.
Patches:	140 internal, 35 in card.
Wave Sequences:	128 internal, 32 in card.
Wave Sequence Steps:	2000 internal, 500 in card.
Multi-Mode Setups:	16 configurations of multi-timbral, 16-channel MIDI reception.
Performance Controllers:	Joystick and Master Volume.
Control inputs:	Assignable footswitch/pedal 1 and 2.
Card slots:	PCM data, PROG data.
MIDI:	IN, OUT, THRU. Extensive Multi-timbral capability.
Display:	64 x 240 pixel back-lit LCD with soft-key menu system.
Inputs:	Analog Inputs 1, 2 with 64x oversampling ADC. Sensitivity (referenced to 0.775v RMS, high impedance): Mic -40 dBu, Line -10 dBu, Pro +4 dBu Input Impedance: 47 k $\Omega$
Outputs:	1/L, 2/R, Balanced 1/L, 2/R, 3, 4, headphone
Power consumption:	12 W
Dimensions:	430 (w) x 89 (h) x 406 (d) mm
Weight:	5.1 kg
Options:	RAM card (MCR-03), ROM card (WPC-XX), PCM card (WSC-XX) Foot Controller EXP-2, Damper Pedal DS-1, Footswitch PS-2

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

12.2 PERFORMANCE DATA FORMS

Performance Bank, Number, Name:								
Part#	1	2	3	4	5	6	7	8
<b>PATCH</b>								
Bank								
Number								
Name								
<b>ZONES</b>								
Key Low								
Key High								
Velocity Low								
Velocity High								
<b>DETAILS</b>								
Level								
FX Bus								
Delay								
Transpose								
Detune								
Sustain								
Play Mode								
Scale								
Mode								
Key Priority								
<b>EFFECTS</b>	<b>Effect 1</b>	<b>Effect 2</b>		<b>Routing</b>				
Mix3	Mod3	Amt3	Mix4	Mod4	Amt4			

Performance Bank, Number, Name:								
Part#	1	2	3	4	5	6	7	8
<b>PATCH</b>								
Bank								
Number								
Name								
<b>ZONES</b>								
Key Low								
Key High								
Velocity Low								
Velocity High								
<b>DETAILS</b>								
Level								
FX Bus								
Delay								
Transpose								
Detune								
Sustain								
Play Mode								
Scale								
Mode								
Key Priority								
<b>EFFECTS</b>	<b>Effect 1</b>	<b>Effect 2</b>		<b>Routing</b>				
Mix3	Mod3	Amt3	Mix4	Mod4	Amt4			

## 12.3 EFFECTS DATA FORMS

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

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

**12.4 PATCH DATA FORMS**

KORG Wavestation A/D Patch Data														
<b>GENERAL</b>						<b>Bank</b>			<b>MACROS</b>					
#/Name						Pitch			Filter					
Waves ALL A B C D						Amp			Pan					
Structure 4 2 1						FX-BUS			PITCH					
Hard Sync OFF ON						A B C D			Pitch Wheel Range					
<b>WAVES</b>						Lev			Semi					
Osc Bank/#/Name						Fine			Slope					
A						A			B					
B						C			D					
C						Pitch Ramp Amt			Ramp Time					
D						Source 1			Vel Amt					
						Amount			Source 2					
						Amount								
<b>MIX ENVELOPE</b>														
Point 0 1 2 3 4														
Mix A/B/C/D %														
Times X														
Loop Repeats														
<b>MIX MOD</b>														
X Source 1						Amount			Y Source 1			Amount		
X Source 2						Amount			Y Source 2			Amount		
<b>FILTER</b>						<b>BUS A-B PAN</b>								
Initial Cutoff						Velocity Amount								
Keyboard Tracking						Keyboard Amount								
Exciter Amount						Notes								
Source 1						Amount								
Source 2						Amount								
<b>AMP ENVELOPE</b>														
Point 0 1 2 3 4						Notes								
Levels 0														
Times X														
<b>AMP MOD</b>														
Velocity Env Amount														
Source 1						Amount								
Source 2						Amount								
Attack Velocity Mod														
Envelope Keyboard Mod														
<b>ENVELOPE 1</b>														
Point 0 1 2 3 4						Notes								
Levels														
Times X														
Velocity Amount														
<b>ENV1 MOD</b>														
Velocity Env. Amount														
Attack Velocity Mod														
Env Kybd Mod														
<b>LFO1</b>						<b>LFO2</b>								
Rate						Initial Amount			Rate			Initial Amount		
Shape						Sync			Shape			Sync		
Delay						Fade-in			Delay			Fade-in		
Depth Mod Source						Amount			Depth Mod Source			Amount		
Rate Mod Source						Amount			Rate Mod Source			Amount		

*For individual wave parameter blocks, please see next page.*

<b>PATCH:</b>				<b>WAVE:</b>							
<b>FILTER</b>				<b>BUS A-B PAN</b>							
Initial Cutoff				Velocity Amount							
Keyboard Tracking				Keyboard Amount							
Exciter Amount				Notes							
Source 1		Amount									
Source 2		Amount									
<b>AMP ENVELOPE</b>											
Point	0	1	2	3	4	Notes					
Levels					0						
Times	X										
<b>AMP MOD</b>											
Velocity Env Amount											
Source 1		Amount									
Source 2		Amount									
Attack Velocity Mod											
Envelope Keyboard Mod											
<b>ENVELOPE 1</b>											
Point	0	1	2	3	4	Notes					
Levels											
Times	X										
Velocity Amount											
<b>ENV1 MOD</b>											
Velocity Env. Amount											
Attack Velocity Mod											
Env Kybd Mod											
<b>LFO1</b>				<b>LFO2</b>							
Rate	Initial Amount			Rate	Initial Amount						
Shape	Sync			Shape	Sync						
Delay	Fade-in			Delay	Fade-in						
Depth Mod Source	Amount			Depth Mod Source	Amount						
Rate Mod Source	Amount			Rate Mod Source	Amount						

<b>PATCH:</b>				<b>WAVE:</b>							
<b>FILTER</b>				<b>BUS A-B PAN</b>							
Initial Cutoff				Velocity Amount							
Keyboard Tracking				Keyboard Amount							
Exciter Amount				Notes							
Source 1		Amount									
Source 2		Amount									
<b>AMP ENVELOPE</b>											
Point	0	1	2	3	4	Notes					
Levels					0						
Times	X										
<b>AMP MOD</b>											
Velocity Env Amount											
Source 1		Amount									
Source 2		Amount									
Attack Velocity Mod											
Envelope Keyboard Mod											
<b>ENVELOPE 1</b>											
Point	0	1	2	3	4	Notes					
Levels											
Times	X										
Velocity Amount											
<b>ENV1 MOD</b>											
Velocity Env. Amount											
Attack Velocity Mod											
Env Kybd Mod											
<b>LFO1</b>				<b>LFO2</b>							
Rate	Initial Amount			Rate	Initial Amount						
Shape	Sync			Shape	Sync						
Delay	Fade-in			Delay	Fade-in						
Depth Mod Source	Amount			Depth Mod Source	Amount						
Rate Mod Source	Amount			Rate Mod Source	Amount						







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#### 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<sup>®</sup>** KORG INC.

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# WAVESTATION

ADVANCED VECTOR SYNTHESIS • WAVE SEQUENCING

## Reference Guide

by Stanley Jungleib and Dan Phillips

# A/D

# KORG

® ②

**av** AV Synthesis System

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### **KORG Wavestation A/D Reference Guide**

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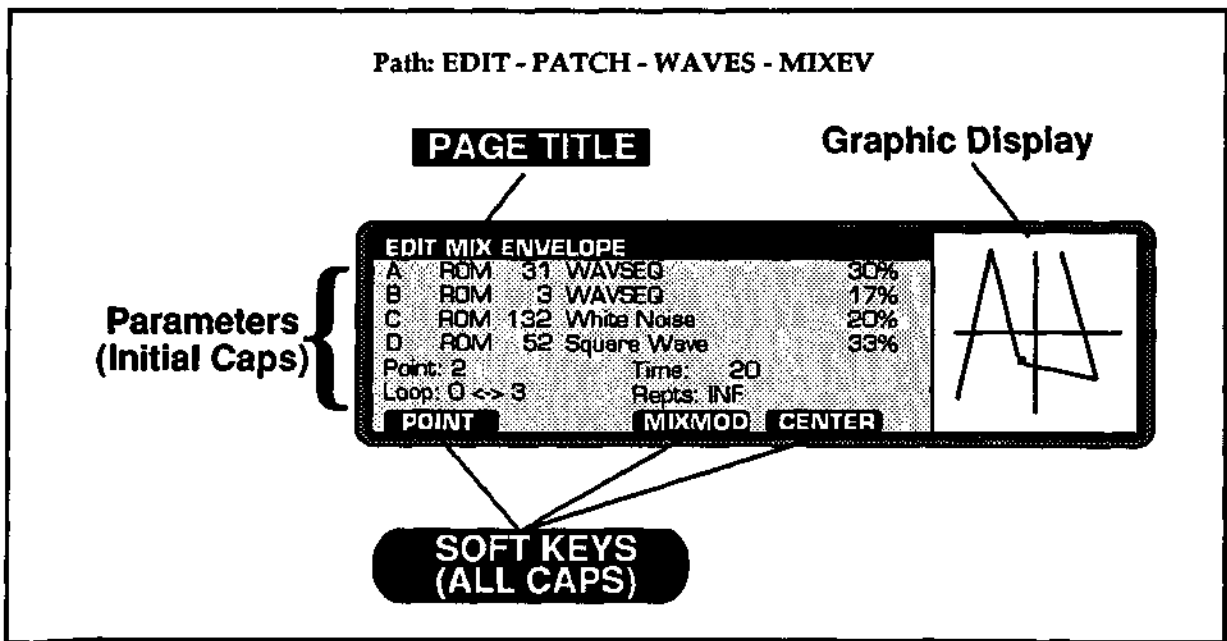
**ABOUT THIS MANUAL**

The Wavestation A/D 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 A/D screen.

The Wavestation A/D's operating system is organized into over 40 display pages. For easy reference, this manual corresponds as closely as possible to the pages displayed. Each display page has a corresponding section here. The page reference sections are arranged alphabetically by page title.

See the figure below. For each page you will find:

- the path describing how to get there,
- a picture of the page (except for the simplest pages),
- an entry for each parameter (in Initial Caps), and
- an entry for each soft key (in ALL CAPS).



**ANALOG INPUT ASSIGN**

Path: GLOBAL-ANALOG

ANALOG INPUT ASSIGN									
Inputs:ENABLED					Macro:A-B STEREO				
INPUT	MIDI				FX BUS				
#	CHAN	VOL	FILT	XCTR	A	B	C	D	
1	1	127	99	0	ON	OFF	OFF	OFF	
2	2	127	99	0	OFF	ON	OFF	OFF	

Using the Analog Inputs, external sound sources may be processed through the Wavestation A/D's effects, and may also be used as waves, just like internal and Card PCM. For more information, see Section 10 of the Player's Guide, ANALOG INPUTS TOUR.

**Inputs**

DISABLED means that the Analog Input routings on this page are not active. The Inputs should be DISABLED when you are using Inputs as Waves, or when you are not using them at all.

ENABLED is the default, and means that the Analog Inputs are routed as shown on this page.

**Macro**

There are a number of Input configurations stored as Macros, so that you can quickly dial up settings for most common applications. These include SINGLE, A-B STEREO, C-D STEREO, A-B MONO, C-D MONO, PARALLEL 1, and PARALLEL 2.

**INPUT #**

This shows the Analog Input number affected by the parameters on the right.

**MIDI CHAN**

This parameter sets the MIDI channel on which MIDI Volume will be sent and received for the Input (see VOL below). Each Input may be set to a separate channel. Selecting "NONE" means that MIDI Volume will be neither transmitted nor received on that Input.

These channels are used for MIDI reception and transmission regardless of the MIDI mode (OMNI, POLY, MULTI, MONO); they are thus an exception to normal MIDI operation. In POLY mode, for instance, the Wavestation A/D ignores all data not on the Basic Channel - except for MIDI Volume on the Analog Input channels.

The Wavestation A/D also uses MIDI Volume to control the levels of Performances. If you are using MIDI to control the Analog Inputs, it is best to keep 2 channels reserved for that purpose. If you are in POLY mode, for instance, set these channels to something other than the Basic Channel; if you are in MULTI mode, use only a maximum of 14 channels for Performances, keeping the other 2 for the Inputs.

## **VOL**

This parameter scales the initial gain settings of each Input. Changing this parameter sends MIDI Volume data (Controller #7) on the channel set under MIDI CHAN; this may be recorded by a sequencer and played back into the Wavestation A/D for automated mixing.

This feature works great as a quick level adjust, but for optimum fidelity, the initial gain should be carefully set by using the Gain and Level controls on the Back panel.

For most synthesizers, mixers, electric guitars, and signal processors, the Gain switch should be set to the middle setting of -10 dBv. For microphones, it should be set to the lowest setting of -40 dBv. For some professional audio equipment, the highest setting of +4 dBm should be used. After setting the initial gain, adjust the Level knob while looking at the input level LEDs on the front panel.

The rightmost LED indicates digital clipping, and stays lit for about a third of a second, so that it is easy to see. Adjust the Level knob so that the leftmost (-10) and middle (-3dB) LEDs are lit as much as possible without the clipping LED lighting at all. Digital clipping is much more noticeable than its analog counterpart, and should be avoided.

## **FILT**

The default value for this parameter is 99, at which point no filtering occurs.

This parameter sets the filter cutoff for each of the Analog Inputs. This 12 dB per octave lowpass filter is the same as that used in the Wavestation A/D's synthesis engines. If the source going into one of the Analog Inputs is too bright, try turning down the FILT value.

## **XCTR**

The default value for this parameter is 0, at which point no excitation occurs.

This parameter sets the exciter amount for each of the Analog Inputs. If you wish to add extra high-frequency clarity to the sound, or want to make it cut through a mix, try increasing the exciter amount.

## **FX BUS A, B, C, D**

ON means that the Input is routed to this effects bus.

OFF means that the Input is not routed to this effects bus.

### ***Using the Analog Inputs as waves***

If you scroll to the end of the list of PCM waves on the WAVES page, you'll see the two choices Input 1 and Input 2 - the two Analog Inputs. These can be used just like the PCM waves, and processed through filters, amp envelopes, panning, etc. The only Patch functions not available are those that alter pitch, such as the settings on the PITCH page, and the Semitone, Fine tuning, and Slope parameters on the WAVES page. Playing notes over MIDI also will not change the pitch of the Inputs, unless the source sound is being generated by a MIDI instrument. The Mod Pitch Shift - Delay effect, however, can be used for pitch bending and transposition.

Generally, when using the Inputs as waves, you should make sure that they are not being routed on the Analog Inputs Assign page. To do this, all the FX BUS assignments on that page should be set to OFF.

When you use the Input 1/2 waves, incoming audio is not constantly sent to the effects, as when it is routed by the ANALOG INPUTS ASSIGNMENT page; it is instead gated by the keyboard. This means that, just like PCM waves, the Inputs are only heard when a key is depressed.

As with using the Analog Inputs Assign page to route the Inputs to the effects, you can still use internal Wavestation A/D sounds along with the Analog Input waves. A four-oscillator patch, then, might use one Input and three internal PCM waves.

For a tutorial on this feature, see Section 10.6 of the Player's Guide, USING EXTERNAL SOUNDS AS WAVES.

## COPY EFFECTS ALL

**Paths:**

*Performance*    **EDIT - EFFECTS - COPY**

*Multiset*        **MIDI - MULTISSET - EFFECTS - COPY**

Use this function to copy all effects programming between Performances or Multisets. Specifically, this includes the two effects choices for FX1 and FX2, up to 14 parameters for each choice, the Routing, and effects mix (FX MIX) parameters.

**Source**

Source can be either a Performance or a MULTI MODE Setup.

The default source is the current Performance or MULTI MODE Setup.

**Routing**

Shows the current SERIES or PARALLEL effects routing configuration.

**Effect 1**

Shows the source effect selected for Effect 1.

**Effect 2**

Shows the source effect selected for Effect 2.

**Destination**

Destination can be either a Performance or a MULTI MODE Setup.

**EXECUTE**

Starts the operation.

<b>COPY EFFECTS - MIX</b>
---------------------------

**Paths:**

*Performance*    **EDIT - EFFECTS - FX MIX - COPY**

*Multiset*        **MIDI - MULTISSET - EFFECTS - FX MIX - COPY**

Use this function to copy the Routing and FX MIX parameters between Performances or MULTI MODE Setups.

**Source**

Source can be either a Performance or a MULTI MODE Setup.

The default source is the current Performance or MULTI MODE Setup.

**From Routing**

Shows the current SERIES or PARALLEL effects routing configuration.

**Destination**

Destination can be either a Performance or a MULTI MODE Setup.

**To Routing**

Shows the current destination routing that will be overwritten.

**EXECUTE**

Starts the operation.

## **COPY EFFECTS - PARAMETERS**

**Paths:**

*Performance*    EDIT - EFFECTS - FX1 (2) - COPY

*Multiset*        MIDI - MULTISSET - EFFECTS - FX1 (2) - COPY

Use this function to copy the program and all parameters between effects, or between Performances or MULTI MODE Setups.

**Source**

Source can be either a Performance or a MULTI MODE Setup.

The default source is the current Performance or MULTI MODE Setup.

**From Effect 1 or 2**

Select the desired source effect number.

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

**Destination**

Destination can be either a Performance or a MULTI MODE Setup.

**To Effect 1 or 2**

Select the desired destination effect number.

**EXECUTE**

Starts the operation.

## **COPY MODULES**

**Path:** EDIT - PATCH - MACROS - COPY

This function allows you to copy Patch parameter modules from any or ALL waves of one Patch to another.

You can duplicate any user macro you have created.

Examples of how to use this function would be to initialize new Patches to a specific modulation configuration of your choice, or to impose a uniform envelope over different percussion waves in a Patch.

### **Source Module**

Module values are: ALL, PITCH, FILTER, AMP ENV, AMP MOD, PAN, LFO 1, LFO 2, ENV1, ENV1 MOD, MIX ENV, FX-BUS.

### **Source Wave**

ALL, A, B, C, D. If the Source wave is ALL, Destination wave must be ALL.

### **Source Patch**

The Patch to copy from.

### **Destination Module**

Module values are the same as for the source.

The Source selection limits the Destination. For example, if the source is LFO1, then the destination can only be LFO1 or LFO2.

### **Destination Wave**

The wave(s) to receive the modules.

### **Destination Patch**

The Patch to receive the modules.

### **EXECUTE**

Starts the operation.



**COPY PART**

**Path: EDIT - DETAIL - COPY**

**COPY PART** allows you to copy one Part's parameters to another. This includes all of the parameters on the **PERFORMANCE PART DETAIL** page, including the selected Patch, Transposition, Delay, FX Bus Routing, and so on.

**Source Performance / Part**

The Part to be copied.

**Destination Performance / Part**

The Part to be copied over.

**EXECUTE**

Starts the operation.

## COPY WAVE SEQUENCE STEP

# COPY WAVE SEQUENCE STEP

Path: EDIT - PATCH - WAVES - WAVSEQ - UTILS - COPY

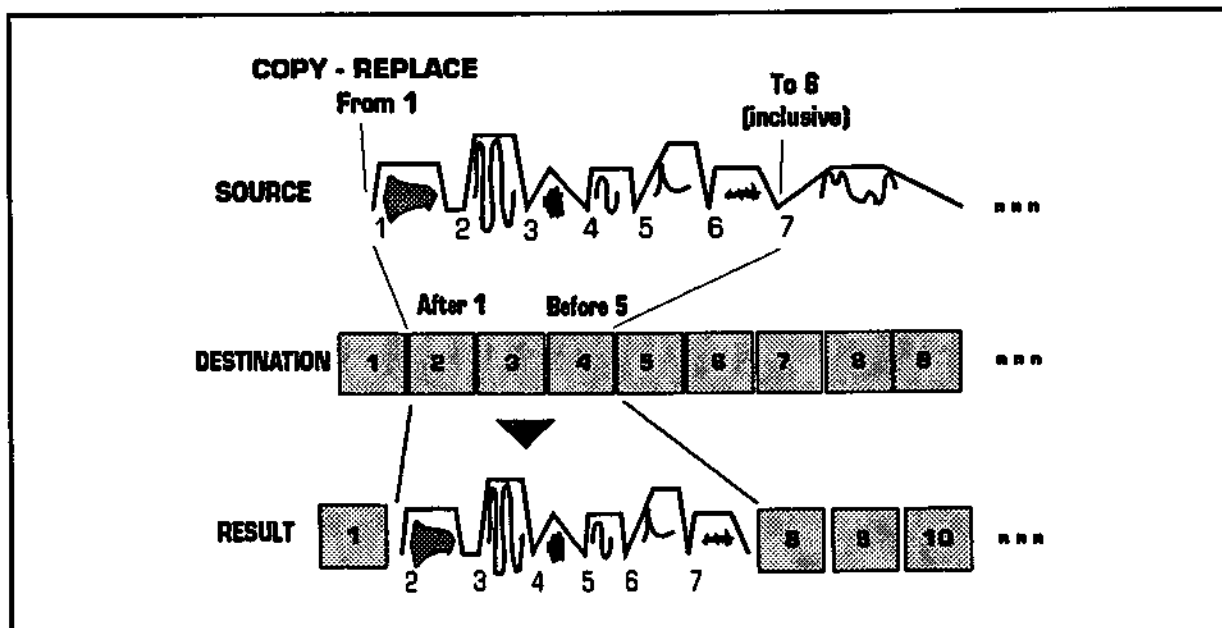
**COPY WAVE SEQUENCE STEP**

Source Wave Sequence:	CARD 16 OB Sax
From Step: 1	CARD 54 PLUCK
To Step: 6	ROM 47 ALTO SAX
Dest Wave Sequence:	RAM1 31 Richter
After Step: 1	CARD 32 BANJO
Before Step: 5	ROM 38 TENOR SAX

**EXECUTE**

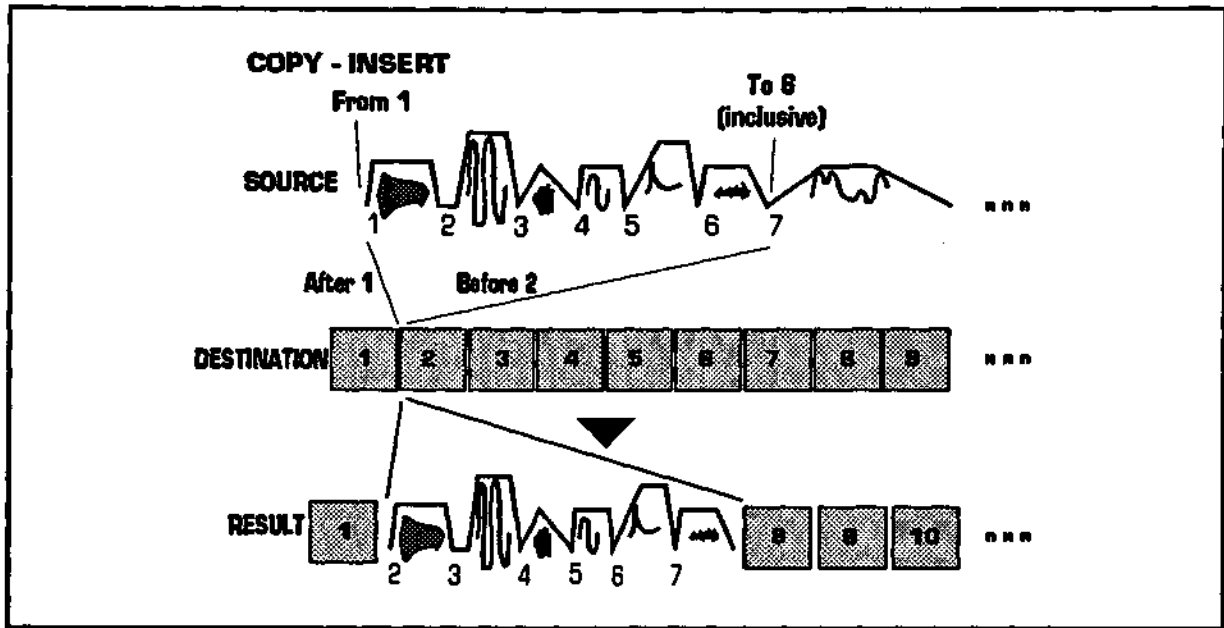
**NOTE:** During the copy operation, both the original and new versions of the destination wave sequence are remembered. The new version is temporarily stored in the available wave sequence step memory. To leave room for this, the number of steps that the destination will contain after the copy operation cannot exceed that of the available steps in the destination bank.

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.



You can also use copying to clear a Wave Sequence, by copying an empty sequence over its entire range (from BEG to END).

Copying can also *insert* multiple steps into a Destination sequence. For example, copying From step 1, To step 6 (which is 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.



**Source**

Bank, number, and name of the Wave Sequence containing the range to be copied.

**Source From**

First step of range to be copied.

**Source To**

Last step of the desired source range to be copied.

**Destination**

Selects the Bank, number, and name of the destination.

**Destination After**

In the destination sequence, the step that the copied steps will follow.

After step is always one less than 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.

**Destination Before**

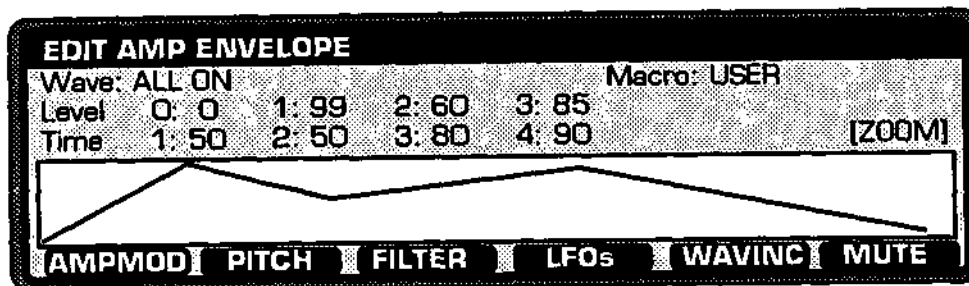
The step that follows the copied steps.

**EXECUTE**

Starts the operation.

## EDIT AMP ENVELOPE

Path: EDIT - PATCH - MACROS - AMP



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

### Wave

The current wave being edited.

Selecting ALL allows you to edit all oscillators at once.

If A, B, C, or D is selected, the individual oscillator's macro is modified.

ON or MUTED is displayed next to the Wave selection. To mute or un-mute a wave, select the wave and then press MUTE, or cursor to the field and scroll.

If a multi-oscillator Patch is selected and some of the oscillators are muted then "---" will appear.

### Macro

Any edits made to this page change the Macro label to USER. To cancel your edits, just re-select any internal macro. The Amp Macros include DEFAULT, PIANO, ORGAN, ORGAN RELEASE, BRASS, STRING, CLAV, DRUM, RAMP, ON, and OFF, which can serve as a programmable mute.

**Levels 0 - 3**

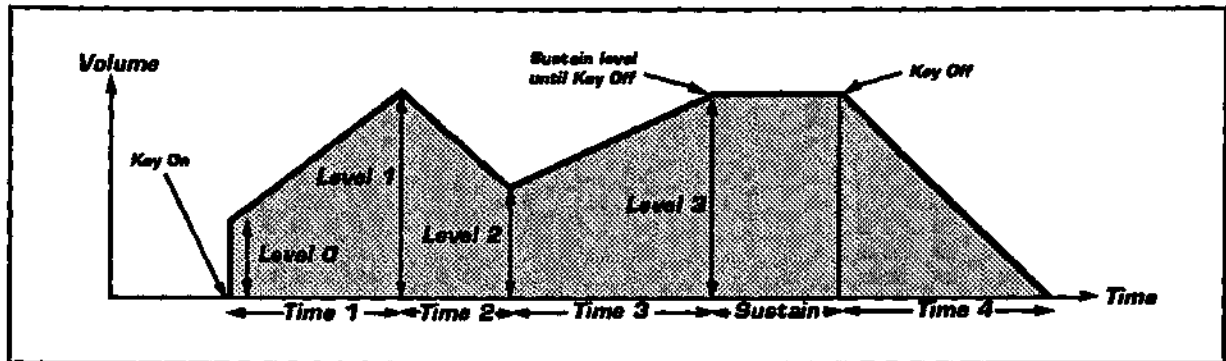
0 - 99. The levels of the breakpoints in the envelope determine its shape.

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.



**Times 1 - 4**

The duration of the selected envelope segment. The envelope times adjust the rate at which the note develops. Longer times 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.

**ZOOM**

When you raise the combined time values sufficiently, the screen will automatically zoom out to maintain the overall view. The ZOOM indicator reminds you that you are viewing a compressed envelope rather than one of normal scale.

**AMPMOD**

Goes to EDIT AMP MOD.

**PITCH**

Goes to EDIT PITCH.

**FILTER**

Goes to EDIT FILTER.

## EDIT AMP ENVELOPE

### LFOs

Goes to EDIT LFO 1.

### WAVINC

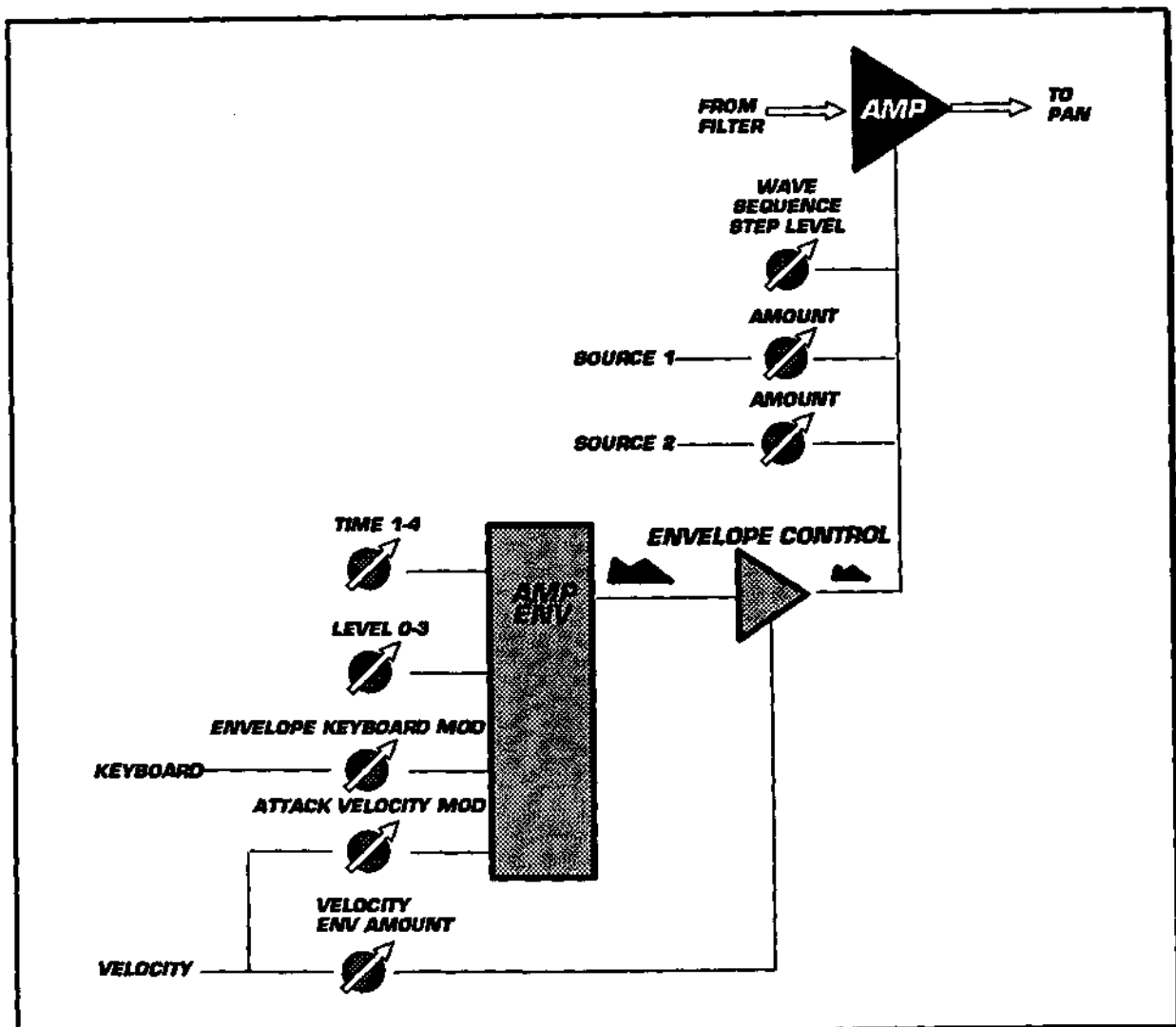
Increments the Wave selection in order: ALL, A, B, C, D, ALL...

### MUTE

Pressing MUTE silences the current Wave selection and displays the word MUTED next to the current Wave. (For example, if Wave is set to ALL and you press MUTE, all are muted.)

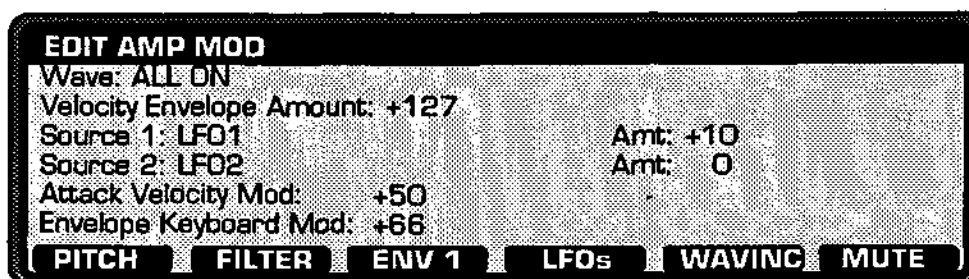
If you leave the EDIT PATCH level either by EXITing or by using a JUMP, the mutes are automatically disabled.

### Amplifier Module Block Diagram



## EDIT AMP MOD

Path: EDIT - PATCH - MACROS - AMP - AMPMOD



Please see figure under EDIT AMP ENVELOPE.

### Wave

The current wave being edited.

Selecting ALL allows you to edit all oscillators at once.

If A, B, C, or D is selected, the individual oscillator patch is modified.

ON or MUTED is displayed next to the Wave selection. To mute or un-mute a wave, select the wave and then press MUTE, or cursor to the field and scroll.

If a multi-oscillator Patch is selected and some of the oscillators are muted then "----" will appear.

### 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.

### Source / Amount 1, 2

The modulation sources can be any of those listed in the discussion of 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.

**Attack Velocity Modulation**

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

Positive values 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.

**Envelope Keyboard Modulation**

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

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

**PITCH**

Goes to EDIT PITCH.

**FILTER**

Goes to EDIT FILTER.

**ENV1**

Goes to EDIT ENVELOPE 1.

**LFOs**

Goes to EDIT LFO 1.

**WAVINC**

Increments the Wave selection in order: ALL, A, B, C, D, ALL . . .

**MUTE**

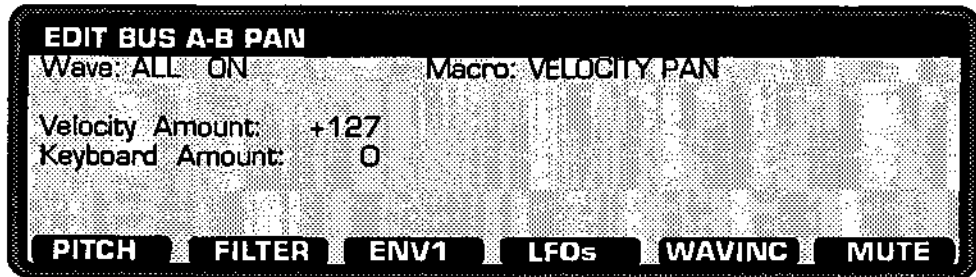
Pressing MUTE silences the current Wave selection and displays the word MUTED next to the current Wave. For example, if Wave is set to ALL and you press MUTE, all are muted.

If you leave the EDIT PATCH level either by EXITing or by using a JUMP, the mutes are automatically disabled.



# EDIT BUS A-B PAN

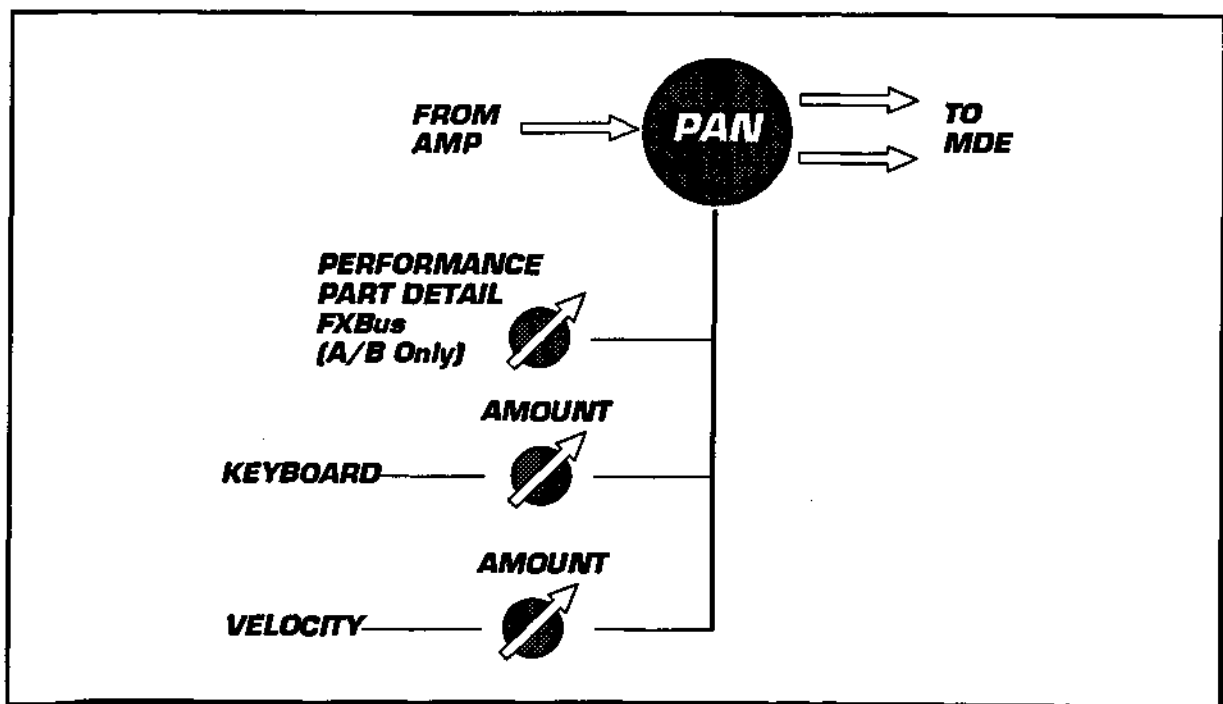
Path: EDIT - PATCH - MACROS - PAN



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 PERFORMANCE PART DETAILS page, with the FX Bus parameter. 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, these modulators have no effect.

## Pan Block Diagram



### **Wave**

The current wave being edited.

Selecting ALL allows you to edit all oscillators at once.

If A, B, C, or D is selected, the individual oscillator patch is modified.

ON or MUTED is displayed next to the Wave selection. To mute or un-mute a wave, select the wave and then press MUTE, or cursor to the field and scroll.

If a multi-oscillator Patch is selected and some of the oscillators are muted then "---" will appear.

### **Macro**

Any edits made to this page change the Macro label to USER. To cancel your edits, just re-select any internal macro. The Pan Macros include OFF, KEYBOARD PAN, VELOCITY PAN, and KEY + VELOCITY.

### **Velocity Amount**

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

A velocity of 1 (very low) will always place the note at the pan position set in the FX Bus parameter (PERFORMANCE PART DETAIL page). Greater velocities will affect the pan as discussed below.

With positive values, greater velocities will pan notes further to the right. For rightward panning across the entire stereo field, set the FX Bus parameter (PERFORMANCE PART DETAIL page) to BUS - A.

With negative values, greater velocities will pan notes further to the left. For leftward panning across the entire stereo field, set the FX Bus parameter (PERFORMANCE PART DETAIL page) to BUS - B.

### **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 (PERFORMANCE PART DETAIL page) to 50/50.

Positive values 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.

### **PITCH**

Goes to EDIT PITCH.

### **FILTER**

Goes to EDIT FILTER.

**ENV1**

Goes to EDIT ENVELOPE 1.

**LFOs**

Goes to EDIT LFO 1.

**WAVINC**

Increments the Wave selection in order: ALL, A, B, C, D, ALL . . .

**MUTE**

Pressing MUTE silences the current Wave selection and displays the word MUTED next to the current Wave. For example, if Wave is set to ALL and you press MUTE, all are muted.

If you leave the EDIT PATCH level either by EXITing or by using a JUMP, the mutes are automatically disabled.

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

For other ways to set and modulate Pan, see:

the PERFORMANCE PART DETAIL page, FX Bus parameter;

the PATCH BUS ASSIGNMENT page;

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

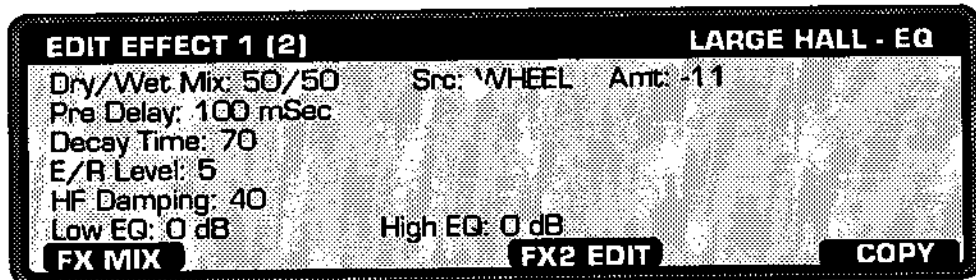
and the Stereo Mod-Pan effect.

## EDIT EFFECT 1 (2)

**Paths:**

*Performance* EDIT - EFFECTS - FX1 EDIT (or FX2 EDIT)

*Multiset* MIDI - MULTISSET - EFFECTS - FX1 EDIT (or FX2 EDIT)



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

**NOTE:** Performance effects may only be edited when the MIDI mode is set to OMNI or POLY; MULTI MODE Setup effects may only be edited when the MIDI mode is set MULTI or MONO.

### Title

At the right of the top line, the current FX macro is displayed. This field may be changed.

### Parameters per Effect

The specific parameters on the page vary with the 26 different effects types. See below.

### FX MIX

This soft key takes you to the Routing EFFECTS MIX page.

### FX1 / 2 EDIT

This soft key takes you to the other FX module.

### COPY

Goes to COPY EFFECTS - PARAMETERS.

## WAVESTATION MDE EFFECTS

Here is a descriptive list of the Wavestation A/D's effects programs, provided by its Multi Digital Effects (MDE) processor. 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.

Most of the effects allows you to modulate one or more parameters in real time. The list of effects modulation sources is slightly different from that of the Patch Macros.

### SYMBOL Modulation Source

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

### **NO EFFECT**

#### **00 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.

#### **01 Small hall reverb - EQ**

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

#### **02 Medium hall reverb - EQ**

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

#### **03 Large hall reverb - EQ**

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

#### **04 Small room reverb - EQ**

A light, tight room good for thickening.

**REVERB - EQ (cont.)**

- 05 Large room reverb - EQ**  
A warm, tight room.
- 06 Live stage - EQ**  
A dense, tight room.
- 07 Wet plate reverb - EQ**  
A dense, open plate.
- 08 Dry plate reverb - EQ**  
A light, open plate.
- 09 Spring reverb - EQ**  
Resonant springs.

**Parameters**

**Dry/Wet Mix**

**DRY, 99/1, . . . 1/99, WET**

Output balance of processed and unprocessed sound.

**Dry/Wet Mix mod source**

**Mod source**

**Dry/Wet Mix mod amount**

**-15 to +15**

**Pre Delay**

**0 to 400 ms**

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 Reflection Level**

**0 to 10**

Level of early reflections.

**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.)

**Low EQ**

**-12 to +12 dB**

Control for cutting or boosting the low frequencies.

EQ affects reverb only, not direct signal.

**High EQ**

**-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 (in series Routing), gives especially high-quality reverberation.

**10 Early reflections - EQ 1**

Dense E/R.

**11 Early reflections - EQ 2**

Modulated E/R.

**12 Early reflections - EQ 3**

This effect uses a reverse envelope on the early reflections. 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.

**Parameters*****Dry/Wet Mix******DRY, 99/1, . . . 1/99, WET***

Output balance of processed and unprocessed sound.

***Dry/Wet Mix mod source******Mod source******Dry/Wet Mix mod 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.

***Low EQ******-12 to +12 dB***

Control for cutting or boosting the low frequencies.

EQ affects reflections only, not direct signal.

***High EQ******-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.

#### **13 Forward gated reverb**

#### **14 Reverse gated reverb**

##### **Parameters**

<b>Dry/Wet Mix</b>	<b>DRY, 99/1, . . . 1/99, WET</b> Output balance of processed and unprocessed sound.
<b>Pre Delay</b>	<b>0 to 200 ms</b> Time between the direct sound and the first early reflections.
<b>Decay Time</b>	<b>10 - 800 ms (in 10 ms steps)</b> Decay time for the early reflections.
<b>Gate Hold Time</b>	<b>0 to 800 ms (in 10 ms steps)</b> The time the gate will remain open after the modulation source goes below the threshold.
<b>Gate Key Source</b>	<b>Mod source</b>
<b>Gate Threshold</b>	<b>0 - 100</b> The level at which the gate will open.

### **STEREO DELAY**

A stereo delay in which the delay times for the left and right channels are synchronized to 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. The relationship between the left and right channel delay times can be set to one of 43 different ratios.

#### **15 Stereo delay**

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

#### **16 Ping-pong delay**

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

##### **Parameters**

<b>Dry/Wet Mix</b>	<b>DRY, 99/1, . . . 1/99, WET</b> Output balance of processed and unprocessed sound.
<b>Dry/Wet Mix mod source</b>	<b>Mod source</b>
<b>Dry/Wet Mix mod amount</b>	<b>-15 to +15</b>



**STEREO DELAY (cont.)**

<b>Input Level mod source</b>	<b>Mod source</b> Positive-going modulation swells effect in; negative-going modulation swells effect out.
<b>Input Level mod amount</b>	<b>-15 to +15</b> Determines depth of input level modulation. Negative mod amount values invert modulation so that positive-going modulation swells effect out, and vice-versa.
<b>Delay Time</b>	<b>0 to 500 ms</b>
<b>Delay Time mod source</b>	<b>Mod source</b>
<b>Delay Time mod amount</b>	<b>-15 to +15</b>
<b>Left/Right Delay Factor</b>	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 .6, so the relationship of the delay times is: left = (Delay Time) x 0.6, right = (Delay Time) x 1. Conversely, 5:3 means the relationship is: left = (Delay Time) x 1, right = (Delay Time) x 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
<b>Feedback</b>	<b>-100 to +100</b> Amount of feedback (negative values produce inverted phase).

**DUAL MONO DELAY**

**17 Dual mono delay**

Two separate, parallel delays.

**Parameters**

<b>Dry/Wet Mix CH A (left)</b>	<b>DRY, 9/1, . . . 1/9, WET</b>
<b>Delay Time CH A (left)</b>	<b>0 to 500 ms</b> Time between processed and unprocessed sound.
<b>Feedback CH A (left)</b>	<b>-100 to +100</b> Amount of feedback (negative values produce inverted phase). In effect, this is the number of delay repeats.
<b>Dry/Wet Mix CH B (right)</b>	<b>DRY, 9/1, . . . 1/9, WET</b>
<b>Delay Time CH B (right)</b>	<b>0 to 500 ms</b> Time between processed and unprocessed sound.
<b>Feedback CH B (right)</b>	<b>-100 to +100</b>

### **MULTI - TAP DELAY - EQ**

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

#### **18 Multi-tap delay - EQ 1**

Two multi-repeat, parallel delays.

#### **19 Multi-tap delay - EQ 2**

Two multi-repeat, parallel delays with cross panning.

#### **20 Multi-tap delay - EQ 3**

Two multi-repeat, parallel delays with crossover feedback.

#### **Parameters**

##### ***Dry/Wet Mix***

***DRY, 99/1, . . . 1/99, WET***

Output balance of processed and unprocessed sound.

##### ***Dry/Wet Mix mod source***

***Mod source***

##### ***Dry/Wet Mix mod amount***

***-15 to +15***

##### ***Input Level mod source***

***Mod source***

##### ***Input Level mod amount***

***-15 to +15***

##### ***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).

##### ***Low EQ***

***-12 to +12 dB***

Control for cutting or boosting the low frequencies. EQ affects both the wet and dry signals.

##### ***High EQ***

***-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.

**21 Stereo chorus - EQ**

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

**22 Quadrature chorus - EQ**

Two parallel chorus circuits using quadrature-phased LFOs. Quadrature-phased LFOs can be described as "phase offset" LFOs.

**23 Crossover chorus - EQ**

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

**Parameters****Footswitch****DISABLE/ENABLE**

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

**Delay Time Left****0 to 500 ms**

Time between processed and unprocessed sound.

**Delay Time Right****0 to 500 ms**

Time between processed and unprocessed sound.

**LFO Rate****0.03-30 Hz**

Speed of modulation (frequency).

**LFO Rate mod source****Mod source****LFO Rate mod 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.

**Low EQ****-12 to +12 dB**

Control for cutting or boosting the low frequencies. EQ affects the wet signal only.

**High EQ****-12 to +12 dB**

Control for cutting or boosting the high frequencies. EQ affects the wet signal only.

## HARMONIC CHORUS

### 24 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, thus excluded. This is especially effective for bass and other low frequency sounds.

#### Parameters

<b>Footswitch</b>	<b>DISABLE/ENABLE</b> Enables or disables use of EFFECTS SWITCH to turn effect on or off.
<b>Delay Time Left</b>	<b>0 to 500 ms</b> Time between processed and unprocessed sound.
<b>Delay Time Right</b>	<b>0 to 500 ms</b> Time between processed and unprocessed sound.
<b>LFO Rate</b>	<b>0.03-30 Hz</b> Speed of modulation (frequency).
<b>LFO Rate mod source</b>	<b>Mod source</b>
<b>LFO Rate mod amount</b>	<b>-15 to +15</b>
<b>LFO Depth</b>	<b>0 to 100</b>
<b>LFO Depth mod source</b>	<b>Mod source</b>
<b>LFO Depth mod amount</b>	<b>-15 to +15</b>
<b>Split Point</b>	<b>160 Hz to 10 kHz</b>

## 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.

### 25 Stereo flanger - EQ 1

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

### 26 Stereo flanger - EQ 2

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

### 27 Crossover flanger - EQ

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

Crossover flanger uses phase-synchronous LFOs.

#### Parameters

<b>Footswitch</b>	<b>DISABLE/ENABLE</b> Enables or disables use of EFFECTS SWITCH to turn effect on or off.
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**STEREO FLANGER - EQ (cont.)**

<b>Top Delay</b>	<b>0 to 200 ms</b>
<b>Range</b>	<b>0 to 100</b> LFO sweep range.
<b>Ramp Speed</b>	<b>Manual, 1 to 100</b> If set to Manual, the mod source directly controls the flanger.
<b>Ramp Speed mod source</b>	<b>Mod source</b>
<b>Ramp Speed mod amount</b>	<b>-15 to +15</b>
<b>Output Mix</b>	<b>-10 to +10</b> Output balance of direct and delayed sound. Negative values produce inverted phase.
<b>Resonance</b>	<b>-100 to +100</b> Amount of flanger feedback.
<b>Low EQ</b>	<b>-12 to +12 dB</b> Control for cutting or boosting the low frequencies. EQ affects the wet signal only.
<b>High EQ</b>	<b>-12 to +12 dB</b> Control for cutting or boosting the high frequencies. EQ affects the wet signal only.

**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.

**28 Enhancer - Exciter - EQ****Parameters**

<b>Dry/Wet Mix</b>	<b>DRY, 9/1, . . . 1/9, WET</b> Output balance of processed and unprocessed sound.
<b>Harmonic Density</b>	<b>0 to 100</b> Amount of excitation.
<b>Hot Spot</b>	<b>1 to 20</b> Central frequency emphasized by exciter.
<b>Stereo Width</b>	<b>0 to 100</b> Level of inverted delay crossover.
<b>Delay</b>	<b>1 to 100</b> Crossover delay time.
<b>Low EQ</b>	<b>-12 to +12 dB</b> Control for cutting or boosting the low frequencies. EQ affects both the wet and dry signals.
<b>High EQ</b>	<b>-12 to +12 dB</b> 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.

**29 Distortion - Filter - EQ**

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

**30 Overdrive - Filter - EQ**

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

***Parameters***

***Dry/Wet Mix***

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

Output balance of processed and unprocessed sound.

***Footswitch***

***DISABLE/ENABLE***

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.

***Hot Spot mod source***

***Mod source***

***Hot Spot mod amount***

***-15 to +15***

***Resonance***

***0 to 100***

Filter "Q" factor. This controls the amount of "wah" effect.

***Level***

***0 to 100***

Output level of the effect.

***Level mod source***

***Mod source***

***Level mod amount***

***-15 to +15***

***Low EQ***

***-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.

***High EQ***

***-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 most effective on electronic piano and guitar sounds.

**31 Stereo phaser 1**

Phaser 1 uses phase-synchronous LFOs.

**32 Stereo phaser 2**

Phaser 2 uses phase-inverted LFOs.

**Parameters*****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***

**DISABLE/ENABLE**  
Enables or disables use of EFFECTS SWITCH to turn effect on or off.

***Center***

**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.

***LFO Rate mod source***

**Mod source**

***LFO Rate mod amount***

**-15 to +15**

***LFO Depth***

**0 to 100**

***LFO Depth mod source***

**Mod source**

***LFO Depth mod amount***

**-15 to +15**

***Feedback***

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

## ROTARY SPEAKER

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

### 33 Rotary speaker

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

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

#### Parameters

##### **Dry/Wet Mix**

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

Output balance of processed and unprocessed sound.

##### **Footswitch**

**DISABLE/ENABLE**

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 two different speeds.

##### **Rotor Speed mod source**

**Mod source**

##### **Rotor Slow Speed**

**0.03-30 Hz**

##### **Rotor Fast Speed**

**0.03-30 Hz**

**NOTE:** Setting Rotor fast speed slower than Rotor slow speed produces a nice 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.

### 34 Stereo mod - pan - EQ

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

### 35 Quadrature mod - pan - EQ

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



**STEREO MOD - PAN - EQ. (cont.)**

**Parameters**

<b>Dry/Wet Mix</b>	<b>DRY, 9/1, . . . 1/9, WET</b> Output balance of processed and unprocessed sound.
<b>Dry/Wet Mix mod source</b>	<b>Mod source</b>
<b>Dry/Wet Mix mod amount</b>	<b>-15 to +15</b>
<b>LFO Rate</b>	<b>0.03-30 Hz</b> Speed of modulation (frequency).
<b>LFO Depth</b>	<b>0 to 10</b> The amount of crossover to the opposite side.
<b>LFO Depth mod source</b>	<b>Mod source</b>
<b>LFO Depth mod amount</b>	<b>-15 to +15</b>
<b>Low EQ</b>	<b>-12 to +12 dB</b> Control for cutting or boosting the low frequencies. EQ affects both the wet and dry signals.
<b>High EQ</b>	<b>-12 to +12 dB</b> 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.

**36 Stereo parametric EQ**

**Parameters**

<b>High Frequency</b>	<b>1 kHz to 16 kHz</b> High shelving cutoff frequency.
<b>High Level</b>	<b>-12 to +12 dB</b> High EQ level.
<b>Mid Frequency</b>	<b>1 to 100</b> Midrange filter center frequency.
<b>Mid Level</b>	<b>-12 to +12 dB</b>
<b>Mid Width</b>	<b>1 - 100</b> Mid frequency filter resonance.
<b>Mid Frequency mod source</b>	<b>Mod source</b>
<b>Mid Frequency mod amount</b>	<b>-15 to +15</b>
<b>Low Frequency</b>	<b>32 Hz to 1 kHz</b> Low EQ shelving cutoff frequency.
<b>Low Level</b>	<b>-12 to +12 dB</b> Low EQ level.

**STEREO COMBINATION MODULATED/FIXED DELAY - EQ**

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

**37 Chorus - Stereo delay - EQ**

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

**38 Flanger -Stereo delay - EQ**

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

**Parameters**

<b>Flanger/Chorus Delay Time</b>	<b>0 to 50 ms</b>
<b>LFO Rate</b>	<b>0.03-30 Hz</b> Speed of modulation (frequency).
<b>LFO Depth</b>	<b>0 to 100</b>
<b>Flanger Feedback</b>	<b>-100 to +100</b> Amount of feedback (negative values produce inverted phase).
<b>Dry/Wet Mix</b>	<b>DRY, 99/1, . . . 1/99, WET</b> Output balance of processed and unprocessed sound.
<b>Echo Delay Time</b>	<b>0 to 450 ms</b>
<b>FTSW Sample</b>	<b>ENABLE/DISABLE</b> Enables use of EFFECTS SWITCH to sample and recirculate the delay line. A crossfade sample technique is used to minimize glitches.
<b>Delay Feedback</b>	<b>-100 to +100</b> Amount of feedback (negative values produce inverted phase).
<b>Low EQ</b>	<b>-12 to +12 dB</b> Control for cutting or boosting the low frequencies. EQ is applied to the wet signal only; the direct signal is unaffected.
<b>High EQ</b>	<b>-12 to +12 dB</b> Control for cutting or boosting the high frequencies. EQ is applied to the wet signal only; the direct signal is unaffected.

**DUAL MONO DELAY - REVERB**

**39 Delay/hall**

A monophonic delay in parallel with a monophonic hall reverb.

**40 Delay/room**

A monophonic delay in parallel with a monophonic room reverb.

**Parameters**

**Ch A (Delay)**

**Dry/Wet Mix**

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

Output balance of processed and unprocessed sound.

**Delay Time**

**0 to 500 ms**

**Delay Feedback**

**-100 to +100**

Amount of feedback (negative values produce inverted phase).

**Ch B (Reverb)**

**Dry/Wet Mix**

**DRY, 99/1, . . . .1/99, WET**

Output balance of processed and unprocessed sound.

**Pre Delay**

**0 to 250 ms**

Time between the direct sound and the first early reflections.

**Decay Time**

**0-99**

Reverb decay time after pre delay.

**High Frequency Damping**

**0 to 99**

The larger the value set, the faster the high frequencies are damped.

**DUAL MONO FIXED/MOD DELAY**

**41 Delay/Chorus**

A monophonic delay in parallel with a monophonic chorus.

**42 Delay/Flanger**

A monophonic delay in parallel with a monophonic flanger.

**Parameters**

**Ch A (Delay)**

**Dry/Wet Mix**

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

Output balance of processed and unprocessed sound.

**Delay Time**

**0 to 500 ms**

**Delay Feedback**

**-100 to +100**

Amount of feedback (negative values produce inverted phase).

### **DUAL MONO FIXED/MOD DELAY (cont.)**

#### **Parameters**

##### **Ch B (Chorus/Flanger)**

<b>Delay Time</b>	<b>0 to 500 ms</b>
<b>LFO Rate</b>	<b>0.03-30 Hz</b> Speed of modulation (frequency).
<b>LFO Depth</b>	<b>0 to 100</b>
<b>Feedback</b>	<b>-100 to +100</b> Amount of feedback (negative values produce inverted phase).

### **DUAL MONO DELAY - OVERDRIVE - DISTORTION**

#### **43 Delay/Distortion-filter**

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

#### **44 Delay/Overdrive-filter**

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

#### **Parameters**

##### **Ch A (Delay)**

<b>Dry/Wet Mix</b>	<b>DRY, 9/1, . . . 1/9, WET</b> Output balance of processed and unprocessed sound.
<b>Delay Time</b>	<b>0 to 500 ms</b>
<b>Delay Feedback</b>	<b>-100 to +100</b> Amount of feedback (negative values produce inverted phase).

##### **Ch B (Overdrive/Distortion)**

<b>Edge</b>	<b>1 to 111</b> Distortion drive amount.
<b>Hot Spot</b>	<b>1 - 100</b> "Wah" filter frequency.
<b>Resonance</b>	<b>0 to 100</b> "Wah" effect depth.
<b>Level</b>	<b>0 to 100</b> Distortion output level.

**DUAL MONO DELAY - PHASER****45 Delay/Phaser**

A monophonic delay in parallel with a monophonic phaser.

This phaser has more phase shift than the stereo phaser.

**Parameters****Ch A (Delay)****Dry/Wet Mix****DRY, 9/1, . . . 1/9, WET**

Output balance of processed and unprocessed sound.

**Delay Time****0 to 500 ms****Delay Feedback****-100 to +100**

Amount of feedback (negative values produce inverted phase).

**Ch B (Phaser)****Center****0 to 100**

Center frequency which phase shift affects.

**LFO Rate****0.03-30 Hz**

Speed of modulation (frequency).

**LFO Depth****0 to 100****Feedback****-100 to +100**

Amount of feedback (negative values produce inverted phase).

**DUAL MONO DELAY - ROTARY SPEAKER****46 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.

**Parameters****Ch A (Delay)****Dry/Wet Mix****DRY, 9/1, . . . 1/9, WET**

Output balance of processed and unprocessed sound.

**Delay Time****0 to 500 ms****Delay Feedback****-100 to +100**

Amount of feedback (negative values produce inverted phase).

**Ch B (Rotary Speaker)****Acceleration****1 to 15****Slow Rotor Speed****0.03-30 Hz****Fast Rotor Speed****0.03-30 Hz****Rotor Speed mod source****Mod source**

## STEREO PITCH SHIFTER

### 47 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.

#### Parameters

<b>Dry/Wet Mix</b>	<b>DRY, 9/1, . . . 1/9, WET</b> Output balance of processed and unprocessed sound.
<b>Dry/Wet Mix mod source</b>	<b>Mod source</b>
<b>Dry/Wet Mix mod amount</b>	<b>-15 to +15</b>
<b>Delay Left</b>	<b>0 to 500 ms</b>
<b>Delay Right</b>	<b>0 to 500 ms</b>
<b>Shift</b>	<b>1 to 100</b>

## MOD PITCH SHIFT-DELAY

### 48 Mod pitch shift-Dly

This 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.

This effect allows the Wavestation A/D to control the pitch of the Analog Inputs. Some applications of this include "whammy-bar" pitch bending and special effects, such as transposing speech down to make it sound ominous, or up to create a humorous "helium voice."

#### Parameters

<b>Dry/Wet Mix</b>	<b>DRY, 9/1, . . . 1/9, WET</b> Output balance of processed and unprocessed sound.
<b>Dry/Wet Mix mod source</b>	<b>Mod source</b>
<b>Dry/Wet Mix mod amount</b>	<b>-15 to +15</b>
<b>Delay Left</b>	<b>0 to 490 ms</b>
<b>Delay Right</b>	<b>0 to 490 ms</b>
<b>Feedback</b>	<b>0 to 100</b> This is the feedback amount for the delay lines.
<b>Max Shift</b>	<b>-12 to +12</b> This is the maximum amount of pitch shift, in semitones.
<b>Shift Scaler</b>	<b>1 to 100%</b> This determines the initial amount of pitch shift without modulation, as a percentage of the Max Shift amount.
<b>Shift Scaler mod source</b>	<b>Mod source</b>
<b>Shift Scaler mod amount</b>	<b>-15 to +15</b> 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****49 Stereo comp-lim/Gate**

The compressor provides an automatically controlled volume envelope, which can be used to smooth out the level of an incoming signal (often done with guitars and vocals), or used 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. This can be used to minimize background noise, such as pickup hum or off-mike breathing, which occurs in between notes or phrases.

**Parameters*****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.

***Control Source Sensitivity******0-10***

This parameter sets the input level for the Control Source.

***Compression Ratio******0 to 100***

This parameter sets the amount of compression.

***Compression Threshold******0 to 100***

This parameter sets the level at which compression will begin.

***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**

The Vocoder effects superimpose the timbre of one signal (the Modulator) onto that of a second signal (the Carrier). A standard application of this is the "talking" instrument, in which you talk into a microphone and a guitar or keyboard sound is made to mimic the harmonic content of the speech. The Vocoder may be used for a number of other effects, including creating choral effects from a single singer and performing cross-modulation on two internal or external sounds.

The Vocoder does its timbral modification by dividing the Modulator and Carrier up into a number of different frequency bands; the more frequency bands which are used, the greater the definition of the Vocoder effect. To achieve the highest quality Vocoder, the Stereo Vocoder-Delay 1/2 algorithms (see below) use both effects slots; the Small Vocoder 1/2/3/4 algorithms use the normal effects configuration, making another effect simultaneously available.

### **SMALL VOCODER (cont.)**

The Vocoder may be used with any combination of the internal sounds and/or Analog Inputs. 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 and Analog Input Assign pages, as well as the Performance Part Detail FX Bus parameter, are configured appropriately. For more information on the Vocoders and Analog Inputs, see Section 10 of the Player's Guide.

#### **50 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.

#### **51 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.

#### **52 Small vocoder 3**

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

#### **53 Small vocoder 4**

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

#### **Parameters**

<b>Modulator Bus</b>	<b>A,B,C,D</b> FX Bus used as source for the Vocoder Modulator.
<b>Modulator Bus Sensitivity</b>	<b>0 to 100</b> This sets the input level for the Modulator. If you hear distortion, try turning this value down.
<b>Carrier Bus</b>	<b>A,B,C,D</b> FX Bus used as source for the Vocoder Carrier.
<b>Carrier Bus Sensitivity</b>	<b>0 to 100</b> This sets the input level for the Carrier. If you hear distortion, try turning this value down.
<b>Sibilance</b>	<b>0 to 10</b> Controls the amount of high frequencies from the Modulator (such as vocal consonants, as in "ch" and "ss") included in the mix.
<b>Sibilance mod source</b>	<b>Mod source</b> The default mod source is KEYDN, which allows you to use the Key Down time to gate the sibilance amount.
<b>Sibilance mod amount</b>	<b>-15 to +15</b>

### **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.



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 the NULL 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 the stereo outputs. 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 Vocoder and Analog Inputs, see the discussion of the Small Vocoder, above, as well as Section 10 of the Player's Guide.

**54 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.

**55 Stereo vocoder - Delay 2**

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

***Parameters***

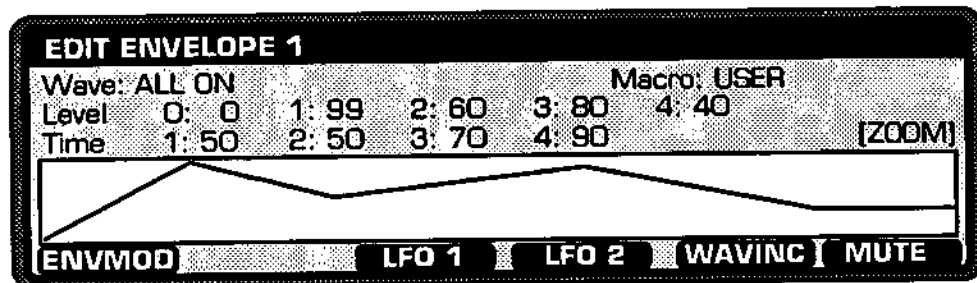
<b><i>Modulator Bus</i></b>	<b><i>A,B,C,D</i></b> FX Bus used as source for the Vocoder Modulator.
<b><i>Modulator Bus Sensitivity</i></b>	<b><i>0 to 100</i></b> This sets the input level for the Modulator. If you hear distortion, try turning this value down.
<b><i>Carrier Bus</i></b>	<b><i>A,B,C,D</i></b> FX Bus used as source for the Vocoder Carrier.
<b><i>Carrier Bus Sensitivity</i></b>	<b><i>0 to 100</i></b> This sets the input level for the Carrier. If you hear distortion, try turning this value down.
<b><i>Sibilance</i></b>	<b><i>0 to 10</i></b> Controls the amount of high frequencies from the Modulator (such as vocal consonants, as in "ch" and "ss") included in the mix.
<b><i>Sibilance mod source</i></b>	<b><i>Mod source</i></b> The default mod source is KEYDN, which allows you to use the Key Down time to gate the sibilance amount.
<b><i>Sibilance mod amount</i></b>	<b><i>-15 to +15</i></b>
<b><i>Stereo Width</i></b>	<b><i>0 to 10</i></b> Increasing this value causes the stereo effect to become more prominent.
<b><i>Delay Time</i></b>	<b><i>0 to 1000 ms</i></b>
<b><i>Feedback</i></b>	<b><i>0 to 100</i></b>
<b><i>Delay Level</i></b>	<b><i>0 to 100</i></b>

# EDIT ENVELOPE 1

**Paths:**

*Patch Macros* EDIT - PATCH - MACROS - (Module) - ENV 1

*Patch Waves* EDIT - PATCH - WAVES - MXEV - MIXMOD - ENV 1



Since ENV 1 can be a modulation source for many of the Wavestation A/D's parameters, EDIT ENVELOPE 1 is accessible through a number of pages. These include the EDIT AMP MOD, EDIT FILTER, EDIT LFO 1 (2), EDIT PAN, and EDIT PITCH pages under PATCH MACROS, and the EDIT MIX MOD page under WAVES.

This envelope is exactly like the AMP ENV, except that Level 4 is adjustable (rather than always 0).

## Wave

The current wave being edited.

Selecting ALL allows you to edit all oscillators at once.

If A, B, C, or D is selected, the individual oscillator patch is modified.

ON or MUTED is displayed next to the Wave selection. To mute or un-mute a wave, select the wave and then press MUTE, or cursor to the field and scroll.

If a multi-oscillator Patch is selected and some of the oscillators are muted then "---" will appear.

## Macro

Any edits made to this page change the Macro label to USER. To cancel your edits, just re-select any internal macro. The Envelope 1 Macros include DEFAULT, PIANO, ORGAN, ORGAN RELEASE, BRASS, STRING, CLAV, DRUM, RAMP, ON, and OFF.

**Levels 0 - 4**

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

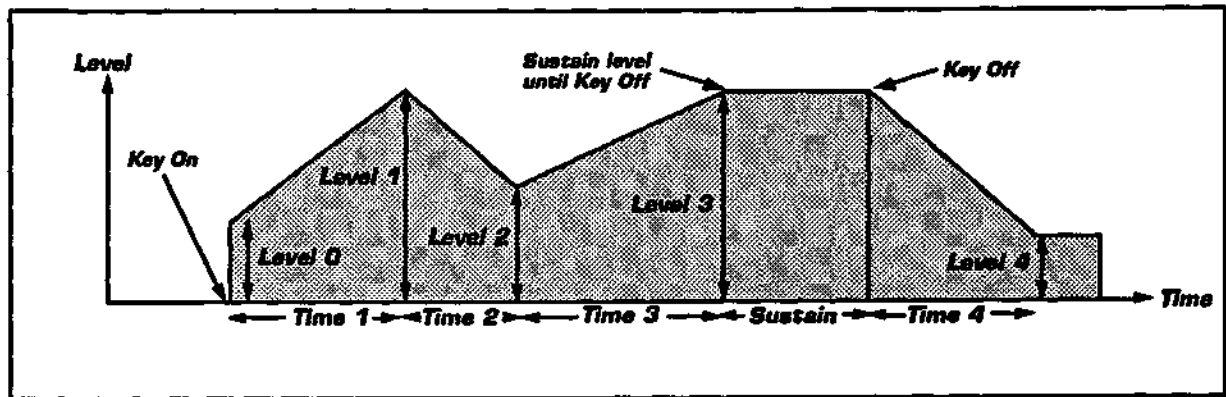
Level 0 is the initial level after a Key On.

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.

**Times 1 - 4**

The duration of the selected envelope segment. The envelope times adjust the rate at which the note develops. Longer times 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.)

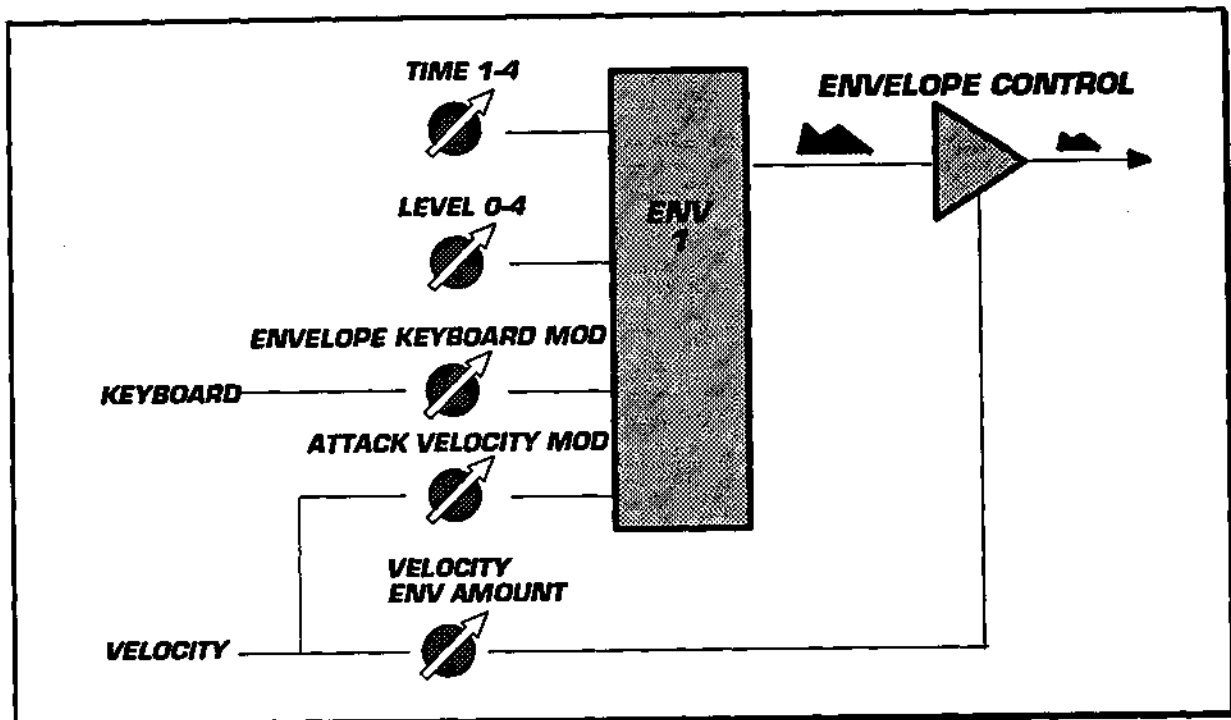
Time 4 is the release time.

**ZOOM**

When you raise the combined time values sufficiently, the screen will automatically zoom out to maintain the overall view. The ZOOM indicator will appear to remind you that you are viewing a compressed envelope rather than one of normal scale.

## EDIT ENVELOPE 1

### Envelope 1 Block Diagram



### ENVMOD

Goes to EDIT ENV MOD.

### LFO1 / LFO2

Goes to EDIT LFO 1 or EDIT LFO 2.

### WAVINC

Increments the Wave selection in order: ALL, A, B, C, D, ALL...

### MUTE

Pressing MUTE silences the current Wave selection and displays the word MUTED next to the current Wave. For example, if Wave is set to ALL and you press MUTE, all are muted.

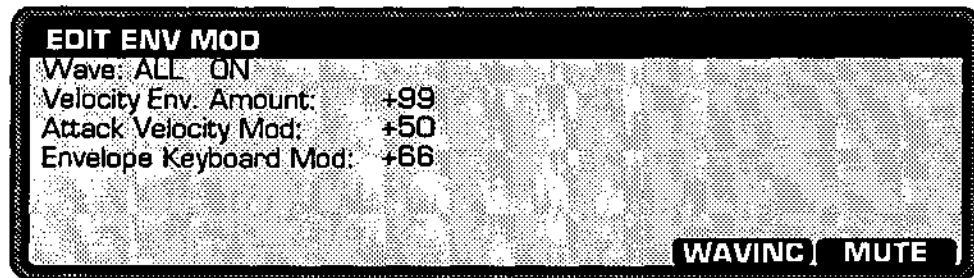
If you leave the EDIT PATCH level either by EXITing or by using a JUMP, the mutes are automatically disabled.

## EDIT ENV MOD

**Paths:**

*Patch Macros* EDIT - PATCH - MACROS - (Module) - ENV1 - ENV MOD

*Patch Waves* EDIT - PATCH - WAVES - MIXEV - MIXMOD - ENV1 -  
ENV MOD



Please see figure under EDIT ENVELOPE 1.

**Wave**

The current wave being edited.

Selecting ALL allows you to edit all oscillators at once.

If A, B, C, or D is selected, the individual oscillator patch is modified.

ON or MUTED is displayed next to the Wave selection. To mute or un-mute a wave, select the wave and then press MUTE, or cursor to the field and scroll.

If a multi-oscillator Patch is selected and some of the oscillators are muted then "----" will appear.

**Velocity Env Amount**

+/- 127. Raising or lowering this control from 0 makes the envelope level increasingly dependent on velocity. Positive values convert harder playing into deeper modulation. Negative values do the opposite.

**Attack Velocity Modulation**

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

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

**Envelope Keyboard Modulation**

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

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

**WAVINC**

Increments the Wave selection in order: ALL, A, B, C, D, ALL . . .

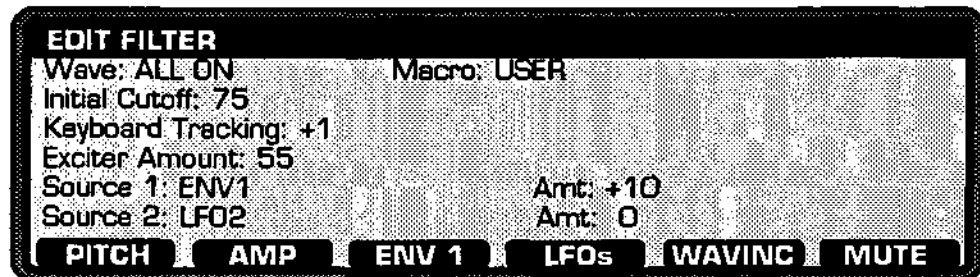
**MUTE**

Pressing MUTE silences the current Wave selection and displays the word MUTED next to the current Wave. For example, if Wave is set to ALL and you press MUTE, all are muted.

If you leave the EDIT PATCH level either by EXITing or by using a JUMP, the mutes are automatically disabled.

## EDIT FILTER

Path: EDIT - PATCH - MACROS - FILTER



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

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

### Wave

The current wave being edited.

Selecting ALL allows you to edit all oscillators at once.

If A, B, C, or D is selected, the individual oscillator patch is modified.

ON or MUTED is displayed next to the Wave selection. To mute or un-mute a wave, select the wave and then press MUTE, or cursor to the field and scroll.

If a multi-oscillator Patch is selected and some of the oscillators are muted then "--" will appear.

### Macro

Any edits made to this page change the Macro label to USER. To cancel your edits, just re-select any internal macro. The Filter Macros include BYPASS, LOWPASS, LOWPASS/LFO, and AFTERTOUCHE SWEEP.

### Initial Cutoff

The basic tone control for subtractive synthesis.

0 - 99. Higher values set a higher cutoff, therefore a brighter timbre.

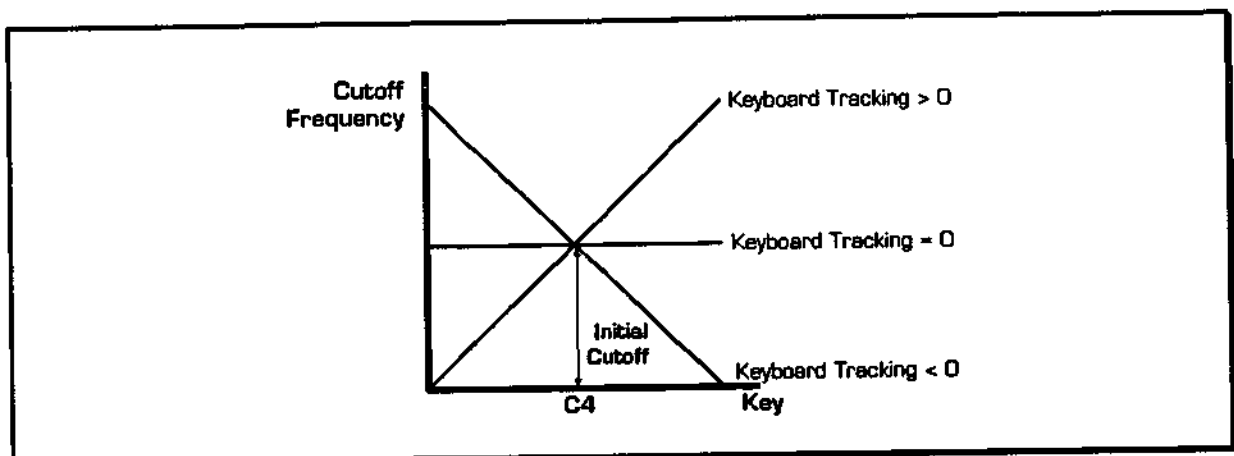
### Keyboard Tracking

+/- 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.)



### Exciter Amount

0 - 99

Increasing the exciter amount extends and clarifies the higher frequencies.

### Source / Amount 1, 2

The modulation sources can be any of those listed in the discussion of the PATCH MACROS page.

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

### PITCH

Goes to EDIT PITCH.

### AMP

Goes to EDIT AMP ENVELOPE.

### ENV1

Goes to EDIT ENVELOPE 1.



**LFOs**

Goes to EDIT LFO 1.

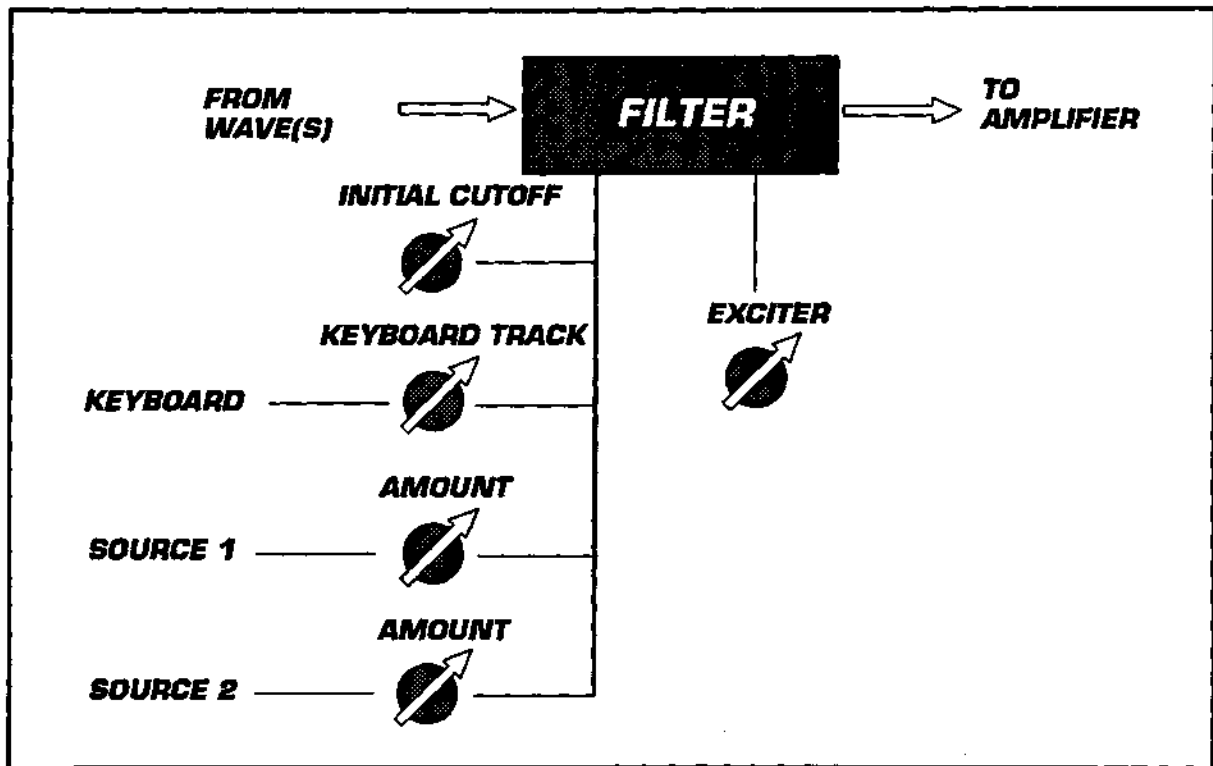
**WAVINC**

Increments the Wave selection in order: ALL, A, B, C, D, ALL . . .

**MUTE**

Pressing MUTE silences the current Wave selection and displays the word MUTED next to the current Wave. For example, if Wave is set to ALL and you press MUTE, all are muted.

If you leave the EDIT PATCH level either by EXITing or by using a JUMP, the mutes are automatically disabled.

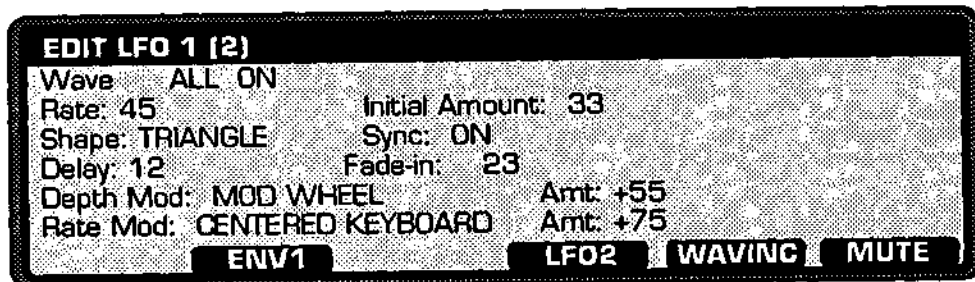
**Filter Block Diagram**

**EDIT LFO 1 (2)**

**Paths:**

*Patch Macros* EDIT - PATCH - MACROS - (Module) - LFOs

*Patch Waves* EDIT - PATCH - WAVES - MIXEV - MIXMOD - LFOs



Since the LFOs can be modulation sources for so many of the Wavestation A/D's parameters, EDIT LFO 1 (2) is accessible through a number of pages. These include the EDIT AMP ENVELOPE, EDIT AMP MOD, EDIT ENVELOPE 1, EDIT FILTER, EDIT PAN, and EDIT PITCH pages under PATCH MACROS, and the EDIT MIX MOD page under WAVES.

**Wave**

The current wave being edited.

Selecting ALL allows you to edit all oscillators at once.

If A, B, C, or D is selected, the individual oscillator patch is modified.

ON or MUTED is displayed next to the Wave selection. To mute or un-mute a wave, select the wave and then press MUTE, or cursor to the field and scroll.

If a multi-oscillator Patch is selected and some of the oscillators are muted then "----" will appear.

**Rate**

0-99. Speed of LFO.

**Initial Amount**

0-127. Basic depth of LFO.

**Shape**

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

**Sync**

OFF. LFOs are free-running.

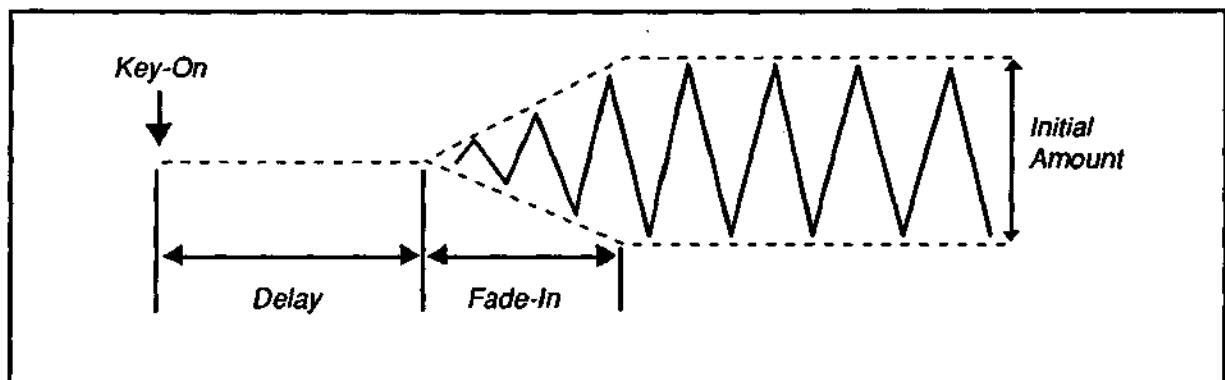
ON. The LFOs are synchronized to start at Key On. This way, the modulation always starts on a positive phase. This is useful for preventing the attack of note from being swallowed by the negative modulation phase.

**Delay**

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

**Fade-in**

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, Amt**

+/- 127. Source control for modulation of the LFOs output.

**Rate Mod, Amt**

+/- 127. Source control for modulation of the LFOs rate.

**ENV1**

Goes to EDIT ENVELOPE 1.

**LFO1 / LFO2**

Goes to EDIT LFO 1 or EDIT LFO 2.

### WAVINC

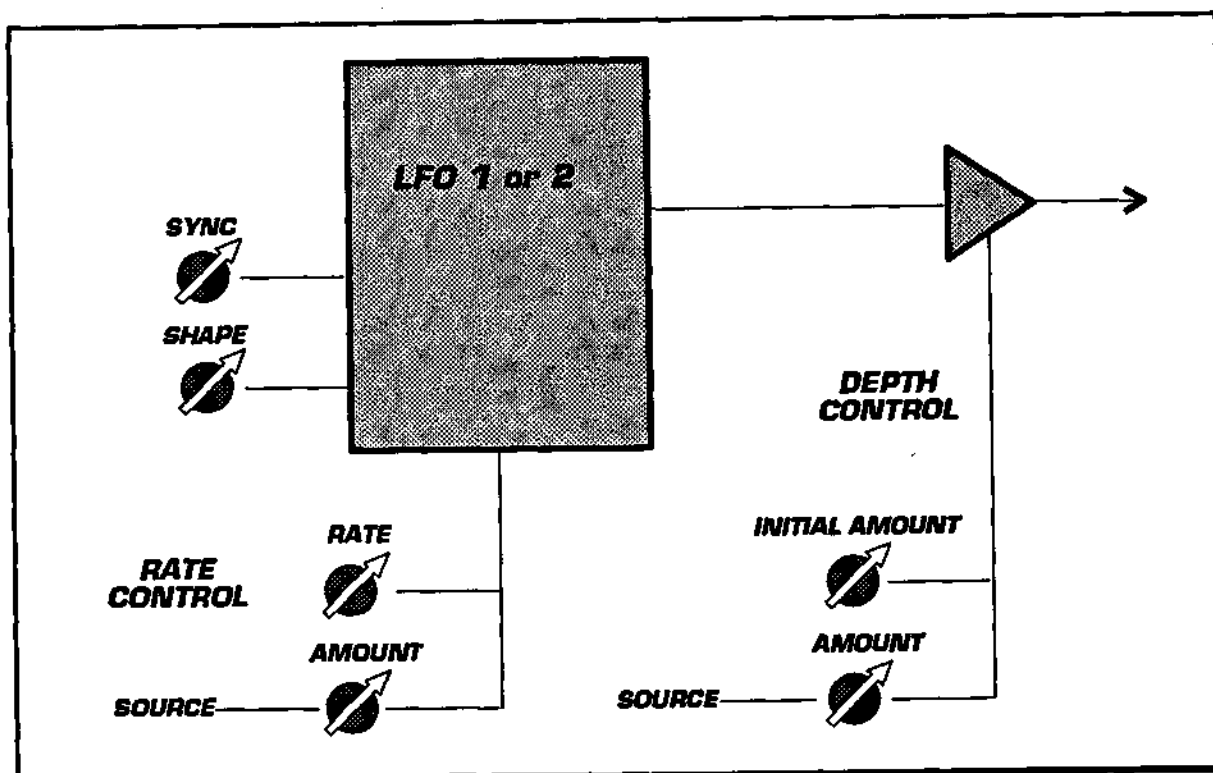
Increments the Wave selection in order: ALL, A, B, C, D, ALL . . .

### MUTE

Pressing MUTE silences the current Wave selection and displays the word MUTED next to the current Wave. For example, if Wave is set to ALL and you press MUTE, all are muted.

If you leave the EDIT PATCH level either by EXITing or by using a JUMP, the mutes are automatically disabled.

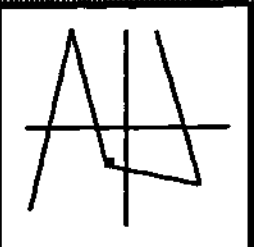
### LFO Block Diagram



**EDIT MIX ENVELOPE (VECTOR SYNTHESIS)**

Path: EDIT - PATCH - WAVES - MIXEV

EDIT MIX ENVELOPE			
A - ROM: 12	*LobWave		30%
B - ROM: 31	*WavSong		17%
C - ROM: 76	FluteTrans		20%
D - ROM: 84	Glass Vox		33%
Point: 2	Time: 20		
Loop: Off	Repts: INF		
<b>POINT</b>	<b>MIXMOD</b>	<b>CENTER</b>	



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

If a 1-oscillator Structure is selected, you can't access this page.

All three envelopes in the Wavestation A/D (Amplifier, Mix, and Envelope 1) have 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).

**Wave**

Waves 0-31 in each bank are Wave Sequences, identified by an asterisk (\*) before their names.

Waves 32 and up are ROM waves -- single cycles, multi-samples, attack transients. PCM ROM cards hold waves numbered from 32 up.

**Mix Percentages**

Use the joystick to adjust the mix percentages of each Wave at the currently selected point. The total is always 100%.

**Point**

The current point number. Pressing the POINT soft key repeatedly increments the point number. On the envelope graph, the current point is marked with a square.

**Times**

The duration of the selected envelope segment. The envelope times adjust the rate at which the note develops.

**Loop**

Normally, while the key is held, 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. Please see the example on the next page.

OFF is the default.

## EDIT MIX ENVELOPE (Vector Synthesis)

### Forward Loops

0 → 3

1 → 3

2 → 3

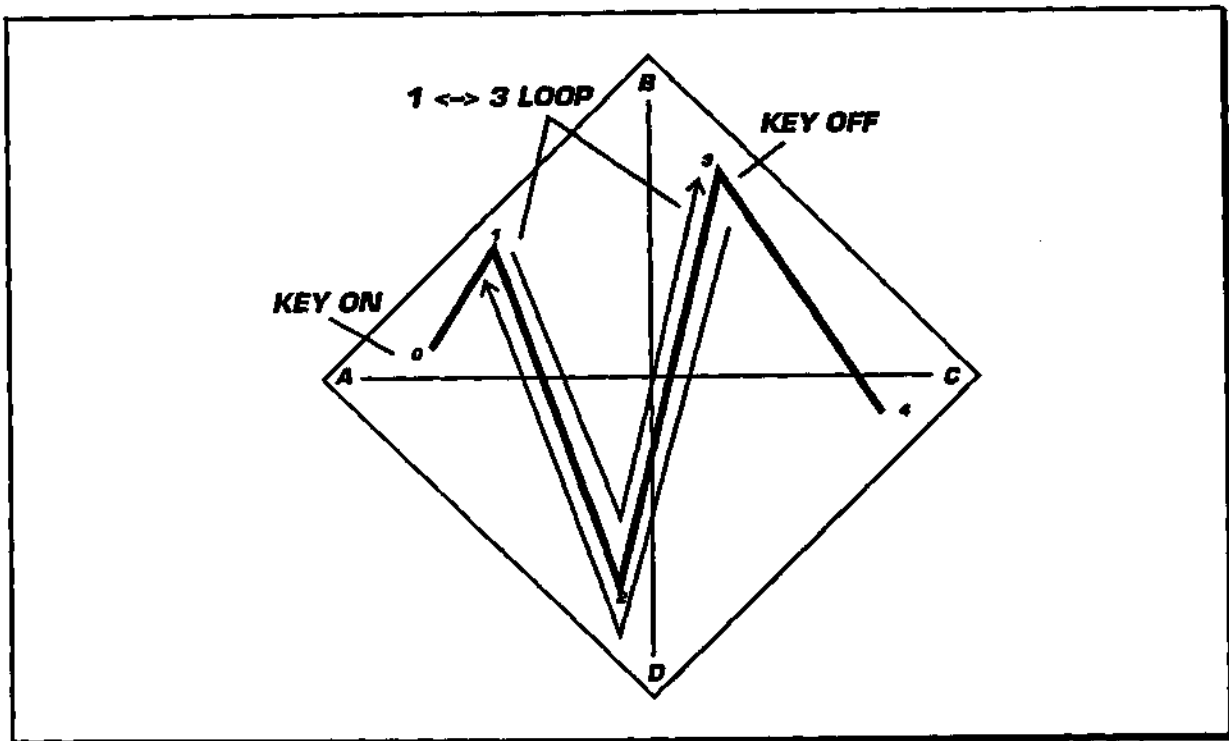
### Bidirectional Loops

0 ↔ 3

1 ↔ 3

2 ↔ 3

### BIDIRECTIONAL 1 ↔ 3 example:



### Repeats

This parameter only matters if envelope looping is on.

OFF means the loop does not repeat.

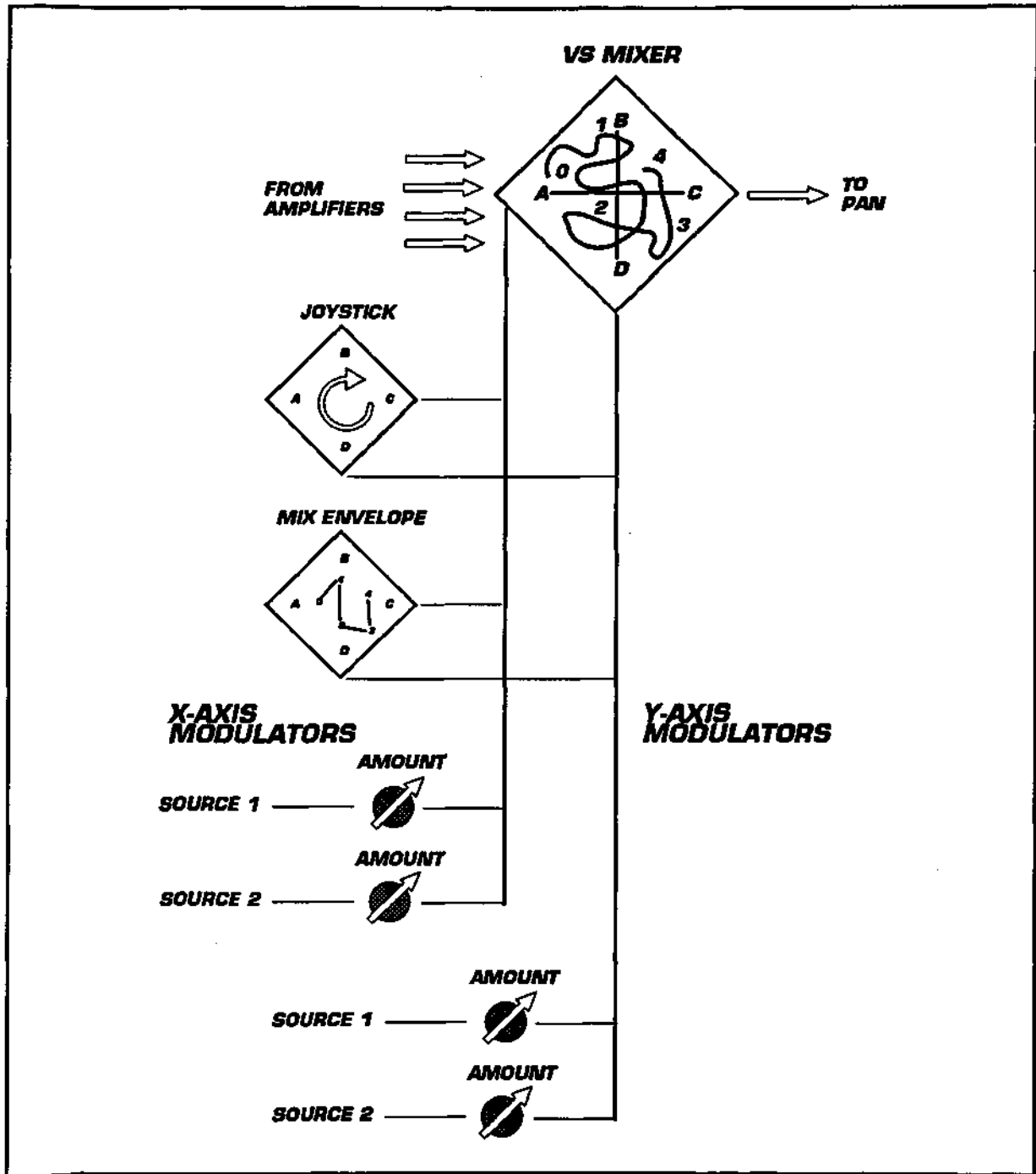
1 - 126 limit the looping to a specific number.

INF repeats continue through the amp envelope release phase.

### POINT

Increments the Point parameter. On the envelope graph, a small square indicates the current point.

Mix Block Diagram



**MIXMOD**

Goes to EDIT MIX MOD.

**CENTER**

Sets the mix at the current point to equal amounts of each wave.

**EDIT MIX MOD**

Path: **EDIT - PATCH - WAVES - MIXEV - MIXMOD**

**EDIT MIX MOD**  
Patch: CARD 22 SUPER SOUND  
X Source 1: LFO1 Amt: +15  
X Source 2: ENV1 Amt: -23  
[Y Source 1: LFO2 Amt: -52]  
[Y Source 2: LINEAR VELOCITY Amt: +85]

**ENV1 | LFO1 | LFO2**

Each of the two mixer dimensions can have two modulating sources in addition to the mixer envelope (and joystick).

The Y-Axis source lines appear only when the Structure is four oscillators.

If Structure is 1 oscillator, you can't access this page.

Please see the Mix Block Diagram in the **EDIT MIX ENVELOPE** section.

**Patch**

The current Patch being edited.

**Source / Amount 1, 2**

The modulation sources can be any of those listed in the discussion of the **PERFORMANCE MACRO** page.

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

**ENV1**

Goes to **EDIT ENVELOPE 1**.

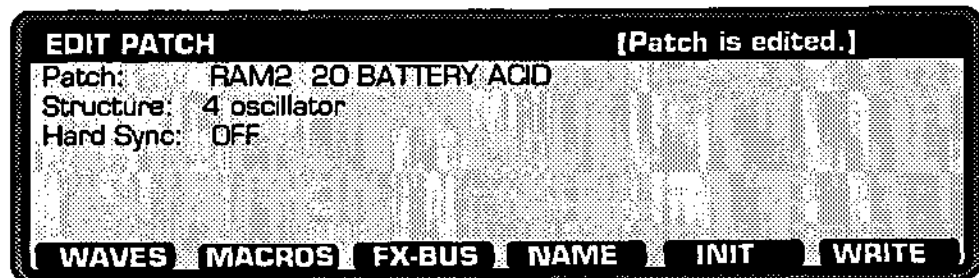
**LFOs**

Goes to **EDIT LFO 1** or **EDIT LFO 2**.



## EDIT PATCH

Path: EDIT - PATCH



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

Patches are the sonic backbone of the Wavestation A/D. 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 in ROM may be edited and saved to RAM banks or Cards.

### Patch

Desired Bank and Patch Number/Name.

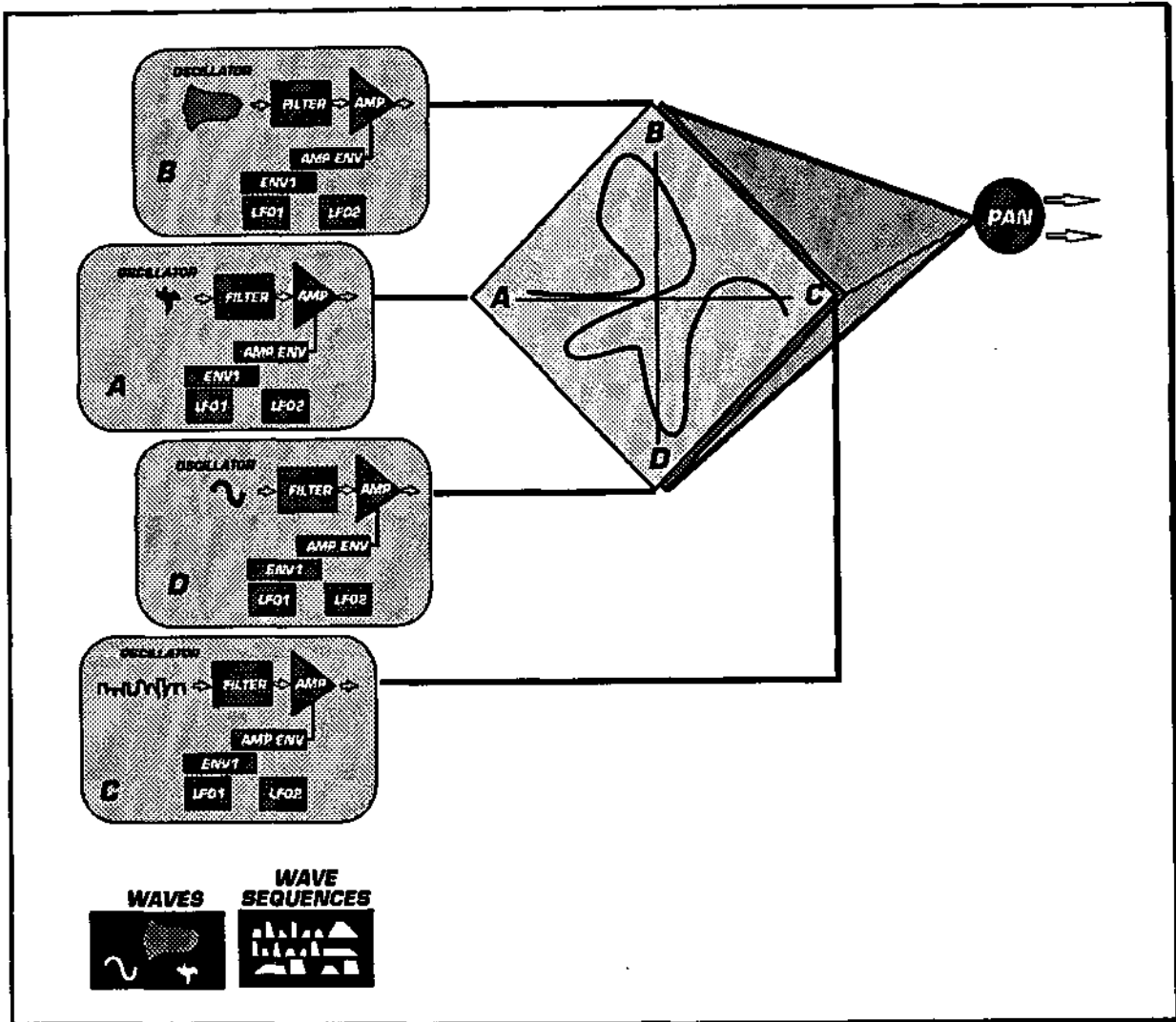
**NOTE:** Selecting a different Patch changes the Patch used by the currently selected Part. This causes the current Performance to be edited.

### Structure

There are 32 oscillators, and this parameter is how you allocate them to Patches. Four, two, or one oscillator Structures may be selected.

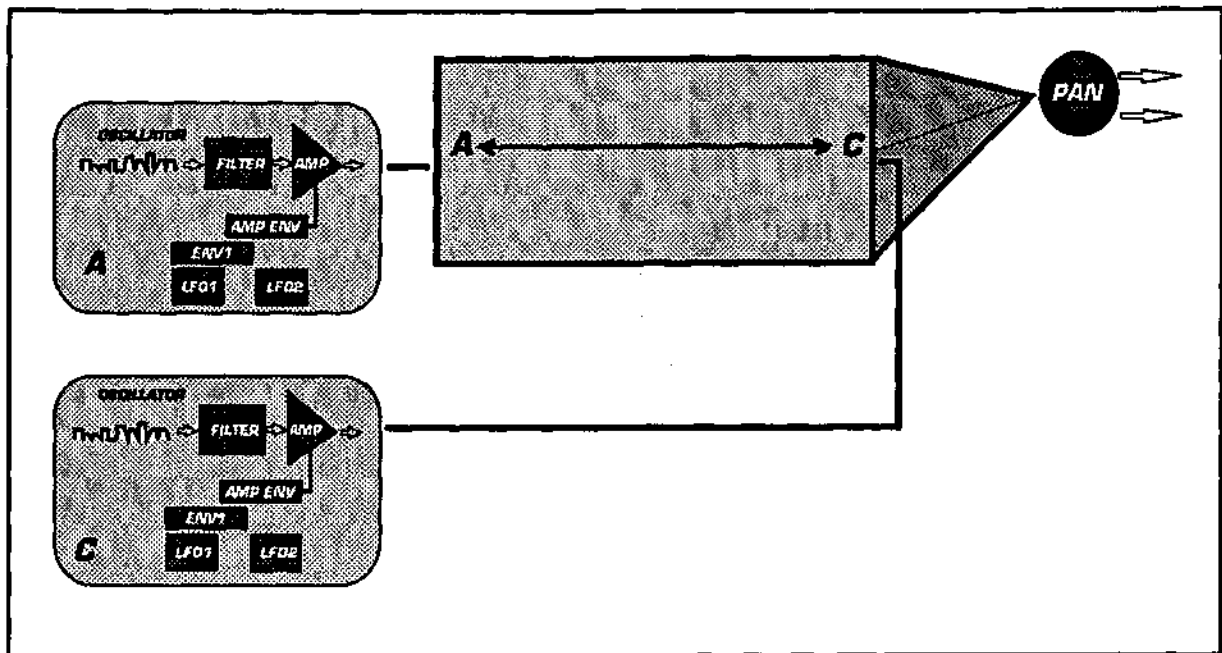
### 4-Oscillator Structure

Four-oscillator Patches have the richest sound. They also qualify for Vector Synthesis treatment through the two-dimensional dynamic mixer. Any oscillator can use Waves or Wave Sequences.



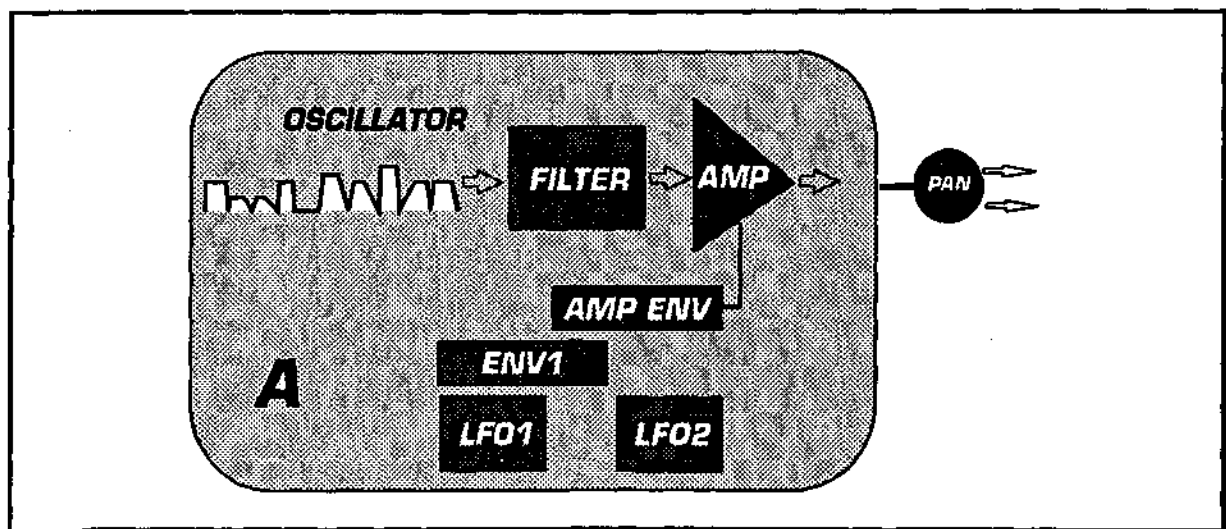
## 2-Oscillator Structure

Two-oscillator Patches allow one-dimensional, linear mixing.



## 1-Oscillator Structure

Single-oscillator Patches do not offer any 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.



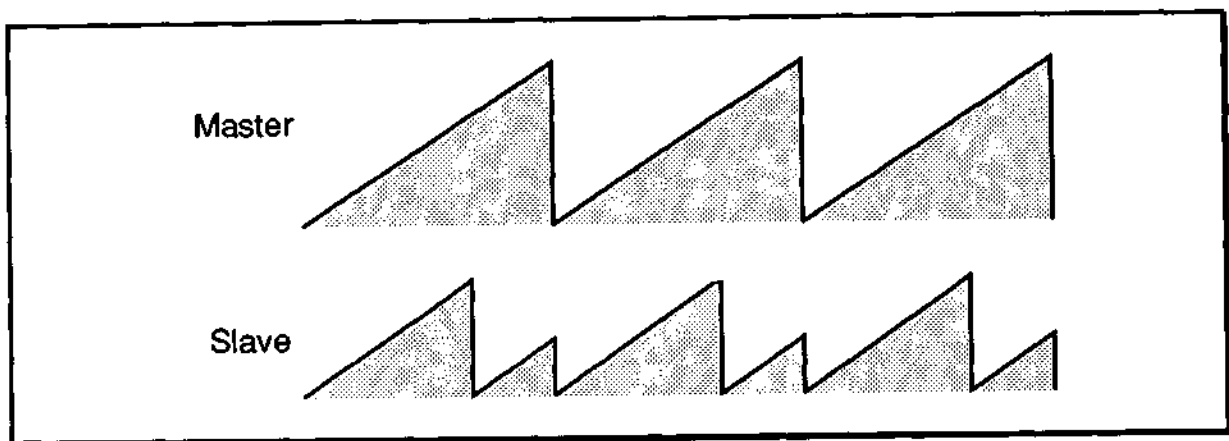
**Hard Sync**

The "hard sync" function is only available if the Patch has a Structure of two or more oscillators.

OFF is the default. The oscillators are free-running.

ON means that oscillator C (and B/D, if four-oscillator) 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.



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.

**WAVES**

Goes to WAVES.

**MACROS**

Goes to PATCH MACROS.

**FX-BUS**

Goes to PATCH BUS ASSIGNMENT.

**NAME**

Goes to NAME PATCH.

**INIT**

Goes to INITIALIZE PATCH.

**WRITE**

Goes to WRITE PATCH.

**EDIT PERFORMANCE**

Path: EDIT

EDIT PERFORMANCE				[PERFORMANCE is EDITED]			
Performance: CARD 12 GIGSET 1							
PART#		PATCH		PART#		PATCH	
1:	CARD	12	Trumpet	5:	ROM	22	Waterphone
2:	CARD	13	Trombone	6:	CARD	27	Shakuhachi
3:	RAM2	14	Soprano Sax	7:	RAM2	14	Soprano Sax
4:	--	--	--	8:	RAM1	34	Yore Guess
<b>DETAIL</b>		<b>PATCH</b>		<b>SOLO</b>		<b>NAME</b>	
						<b>EFFECTS</b>	
						<b>WRITE</b>	

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 eight Parts in a Performance contain a Patch. In addition, Parts can customize Patches in a variety of ways, through the KEY and VELOCITY ZONES and PERFORMANCE PART DETAILS pages (and 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.

**Performance**

The bank, number, and name of the Performance being edited.

**Part**

There are eight Parts in a Performance. Unused Parts can be assigned an "empty" Patch (displayed as --).

**Patch**

You can add or change a Part's Patch simply by scrolling the desired Number or Bank.

If no Patch is desired, select "--", by dialing the Patch number field fully counter-clockwise.

To add a Patch, cursor to "--" and press INC, dial, or enter the number from the keypad.

## **EDIT PERFORMANCE**

---

### **DETAIL**

Goes to PERFORMANCE PART DETAIL.

### **PATCH**

Goes to EDIT PATCH and allows editing of the Patch in the currently selected Part.

### **SOLO**

SOLO allows the current Part to be heard by itself.

### **NAME**

Goes to NAME PERFORMANCE.

### **EFFECTS**

Goes to EFFECTS.

### **WRITE**

Goes to WRITE PERFORMANCE.

## EDIT PITCH

Path: EDIT - PATCH - MACROS - PITCH

EDIT PITCH			
Wave: ALL	ON	Macro: USER	
Pitch Wheel Range:	SEMITONE		
Pitch Ramp Amt: -75	Time: 25	Vel Amt: +99	
Source 1: LFO 1		Amt: +127	
Source 2: ENV 1		Amt: -73	
FILTER	AMP	ENV1	LFOs
WAVING		MUTE	

The Pitch module controls the frequency modulation of the Patch waves.

A Pitch Ramp is included, which lets you start the note a bit flat or sharp, at an amount controlled by velocity. Subtle nuance and inflections such as these contribute expressiveness to synthesized sounds.

The functions on this page have no effect on the Analog Inputs; to change the pitch of the Inputs, use the Mod Pitch Shift - Delay effect.

### Wave

The current wave being edited.

Selecting ALL allows you to edit all oscillators at once.

If A, B, C, or D is selected, the individual oscillator patch is modified.

ON or MUTED is displayed next to the Wave selection. To mute or un-mute a wave, select the wave and then press MUTE, or cursor to the field and scroll.

If a multi-oscillator Patch is selected and some of the oscillators are muted then "---" will appear.

### Macro

Any edits made to this page change the Macro label to USER. To cancel your edits, just re-select any internal macro. The Pitch Macros include DEFAULT, ENVELOPE1 BEND, DESCENDING SWEEP, ASCENDING SWEEP, AFTERTOUCHE BEND, MIDI-BEND, and AFT + MIDI-BEND.

### Pitch Wheel Range

GLOBAL means that the Patch's bend range will be set by the Pitch Wheel Range parameter on the GLOBAL page. (See the Player's Guide.)

OFF, SEMITONE, WHOLETONE, MINOR 3RD, MAJOR 3RD, PERFECT 4TH, DIMINISHED 5TH, PERFECT 5TH, MINOR 6TH, MAJOR 6TH, DOMINANT 7TH, MAJOR 7TH, OCTAVE. These values override the GLOBAL settings.

## **EDIT PITCH**

---

### **Pitch Ramp Amt**

+/- 127. The difference between initial and base pitch.

### **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.

### **Pitch Ramp Vel Amt**

+/- 127. This controls the sensitivity of the pitch ramp time to velocity.

0 means there is no effect. Positive values convert harder playing into faster ramps. Negative values create slower ramps from harder playing.

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

The modulation sources can be any of those listed in the discussion of the PATCH MACRO page.

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

### **FILTER**

Goes to EDIT FILTER.

### **AMP**

Goes to EDIT AMP ENVELOPE.

### **ENV1**

Goes to EDIT ENVELOPE 1.

### **LFOs**

Goes to EDIT LFO 1.

### **WAVINC**

Increments the Wave selection in order: ALL, A, B, C, D, ALL . . .

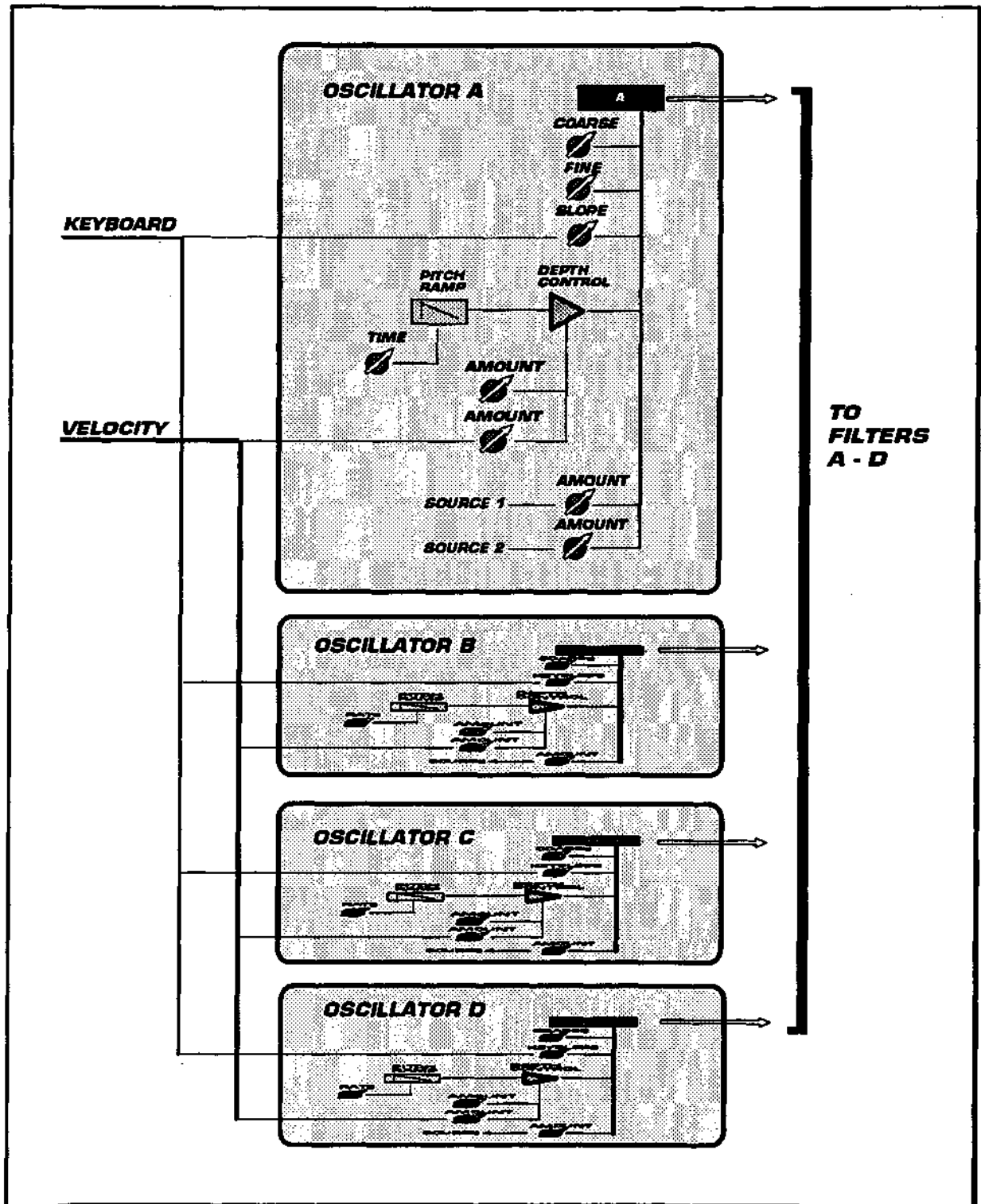
### **MUTE**

Pressing MUTE silences the current Wave selection and displays the word MUTED next to the current Wave. (For example, if Wave is set to ALL and you press MUTE, all are muted.)

If you leave the EDIT PATCH level either by EXITing or by using a JUMP, the mutes are automatically disabled.



Pitch Block Diagram



## **EDIT SCALE**

**Path:** GLOBAL - SCALE

The PERFORMANCE PART DETAIL page includes a Scale field which allows you to select a different intonation for each Part. There are 16 tuning tables; four in ROM, and 12 User-defined in RAM. The User scales may be saved to an external librarian via MIDI Sysex (see Sysex Data Transmit).

### **Scale Type**

The ROM tables are:

**EQUAL TEMPERAMENT 1.** The default, most widely used keyboard tuning.

**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.

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

In the Part Detail page, in addition to setting the Scale to be played, it is possible to select a tonic Key. Many 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, chords not diatonic to the selected Key will often sound out of tune. The Key setting does not affect the EQUAL TEMPERAMENT scales, except when they are currently being edited.

### **Step Adjustment**

The fine-tuning parameters for each of the twelve steps in a scale are laid out on the page somewhat like a keyboard. It is important to remember, however, that this is a relative display of scale degrees, related to the Scale Key which has been set in the Part Detail page. The "C" key in the display represents the tonic note of that Scale Key. If the Part Detail 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 message, "USER SCALE is EDITED," appears at the top of the page.

Although you may always edit any of the Scales, you will only hear the immediate results of your editing if a Part in the current Performance is set to play the Scale to be edited. 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.

### **WRITE**

Goes to WRITE SCALE.

***Microtonal Scales using Wave Slope***

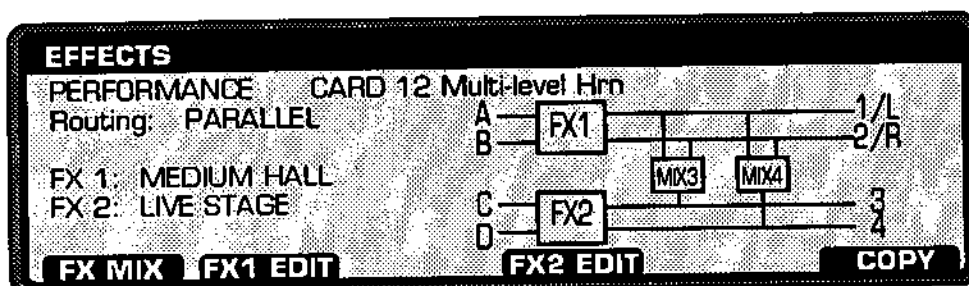
If you are interested in experimenting with microtonal scales, try using the Slope parameter on the Waves page to produce more (or less) than 12 equal subdivisions per octave. Remember that each Wave in a Patch may be set to a different slope, and so if you wish to set an entire Performance to play in 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.

## EFFECTS

**Paths:***Performance*    EDIT - EFFECTS*Multiset*        MIDI - MULTISSET - EFFECTS

For a general discussion of the effects system, please see Chapter 7, "Effects Tour," in the Player's Guide.

**NOTE:** Performance effects may only be edited when the MIDI mode is set to OMNI or POLY; MULTI MODE Setup effects may only be edited when the MIDI mode is set MULTI or MONO.

**Performance**

The current Performance (or MULTI MODE Setup) to which the effects parameters belong.

**Routing**

PARALLEL or SERIES, as explained in the Player's Guide.

**FX 1/2**

These are the effects program selectors for each FX. A complete list of the effects programs is under EDIT EFFECTS 1/2.

**FX MIX**

Goes to EFFECTS MIX.

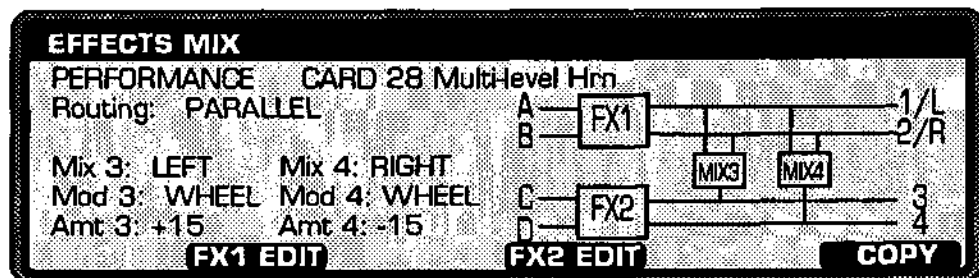
**FX1 / 2 EDIT**

Goes to EDIT EFFECTS 1/2.

**COPY**

Goes to COPY EFFECTS - ALL.

## EFFECTS MIX

**Paths:****Performance** EDIT - EFFECTS - FX MIX**Multiset** MIDI - MULTISSET - EFFECTS - FX MIX

**NOTE:** Performance effects may only be edited when the MIDI mode is set to OMNI or POLY; MULTI MODE Setup effects may only be edited when the MIDI mode is set MULTI or MONO.

**Performance**

The current Performance (or MULTI-MODE Setup), to which the effects parameters belong.

**Routing**

SERIES or PARALLEL operation.

**Mix 3/4**

Both configurations include Mix 3/4 parameters. In both cases, the Mix 3 and Mix 4 parameters control the initial mixture levels. The parallel mix is a stereo pan. The series mix is a wet/dry assignment to effect 2 with Bus C panned hard left, and Bus D hard right. The configuration diagrams in Section 7.2 of the Player's Guide show how the mixture function changes with the configuration.

When the Stereo Vocoders are used, the Effects Mix works in a slightly different way; for more information, see the description of the Stereo Vocoder-Delay effects in this Reference Guide, or see Section 10.7 of the Player's Guide.

**Mod 3/4**

The Mod parameters allow you to achieve dynamic control over the MDE mix in the configuration. For example, you can easily control reverb or flanging depth from a footpedal.

## **EFFECTS MIX**

---

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 include:

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

### **Amt 3/4**

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.

### **FX1 / 2 EDIT**

This soft key takes you to the EDIT EFFECT 1(2) parameter pages.

### **COPY**

Goes to COPY EFFECTS - MIX.

## FOOT PEDAL ASSIGN

Path: GLOBAL - FOOT

FOOT PEDAL ASSIGN		
	Function	Polarity
PEDAL/SW 1:	SUSTAIN	+
PEDAL/SW 2:	VOLUME	-

Here is where you program the two foot control inputs. For the desired input, set the function and polarity, as follows.

The PEDAL/SW 1 (2) jacks accept either a switch or a continuous pedal.

### Function

**VOLUME** allows the pedal to control the Part volume level as well as transmit MIDI Controller #7.

**MOD PEDAL** allows the pedal to be a modulation source transmitted as MIDI Controller #4 (Foot Controller). This is the "PEDAL" mod source on the EFFECTS MIX and EDIT EFFECT 1 (2) pages.

**SUSTAIN** causes notes to be held while the pedal is depressed, like the piano sustain pedal. This is transmitted as MIDI Controller #64.

**EFFECTS SWITCH** transfers the pedal for use by the Effects section. This is the FSW and FSWTOG Mod sources on the EFFECTS MIX and EDIT EFFECT 1/2 pages. This is transmitted as MIDI Controller #12.

**PERF ADVANCE** means that stepping on the footswitch selects the next Performance.

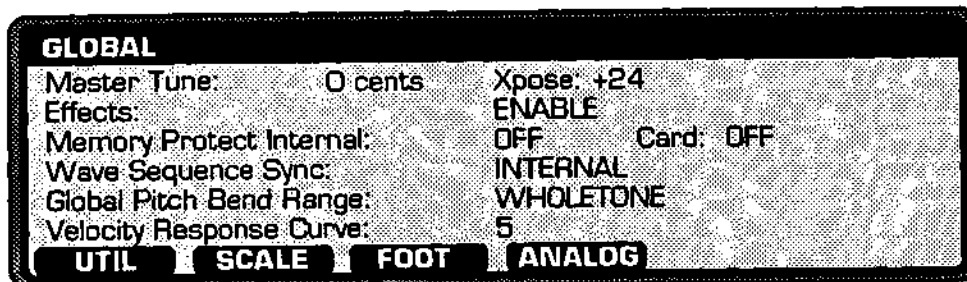
**DISABLE** ignores the input.

### Polarity

This field allows you to adjust to the polarity of the footswitch or pedal, so that both normally open and normally closed designs will work properly. If your pedal seems to be functioning oppositely from what you would expect (sustaining when it is not depressed, and damping when it is depressed, for example) try changing this parameter.

**GLOBAL**

Path: GLOBAL



This page contains system settings for the Wavestation A/D as a whole.

### Master Tuning

Master tuning adjusts the global pitch of the Wavestation A/D within a range of +/- 99 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.

### Xpose

This parameter transposes MIDI key numbers received by the Wavestation A/D within a range of +/- 24 semitones. Setting Xpose to +4, for instance, will transpose incoming MIDI notes up by 4 semitones.

### Effects

This Effects setting allows you to override all Performance Effect programming by disabling the Multi Digital Effect (MDE) processor.

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

DISABLE means that the MDE 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.



### Memory Protect Internal

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.

### Memory Protect Card

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 on when not saving.

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

### Wave Sequence Sync

INTERNAL is normal. This means that Wave Sequences sync to an internal clock. MIDI clocks are ignored.

MIDI means that Wave Sequences sync to MIDI clocks. The number of MIDI 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.

### Global Pitch Bend Range

Each Patch can select this global setting or use its own bend depth parameter.

The Range is OFF, SEMITONE, WHOLETONE, MINOR 3RD, MAJOR 3RD, PERFECT 4TH, DIMINISHED 5TH, PERFECT 5TH, MINOR 6TH, MAJOR 6TH, DOMINANT 7TH, MAJOR 7TH, OCTAVE.

Set the Pitch bend range for the maximum depth you like.

### Velocity Response Curve

Velocity Response Curve adjusts the Wavestation A/D'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.

**GLOBAL**

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**UTIL**

Goes to UTILITIES.

**SCALE**

Goes to EDIT SCALE.

**FOOT**

Goes to FOOT PEDAL ASSIGN.

**ANALOG**

Goes to ANALOG INPUT ASSIGN.

**INITIALIZE (PART, PATCH)**

**Paths:**

*Part*            **EDIT - DETAIL - INIT**

*Patch*          **EDIT - PATCH - INIT**

The INITIALIZE function operates similarly on both Parts and Patches. It sets neutral, default parameters for building an object from scratch.

If INIT is selected, an "Are you sure. . .?" warning message appears. Pressing YES confirms the operation.

**Type and Item**

The Data Type field depends on what page you were on (PERFORMANCE PART DETAIL or EDIT PATCH) when you pressed INIT.

Exiting the INIT page returns to the page active prior to entering INIT.

Data Type cannot be edited from this page.

**YES**

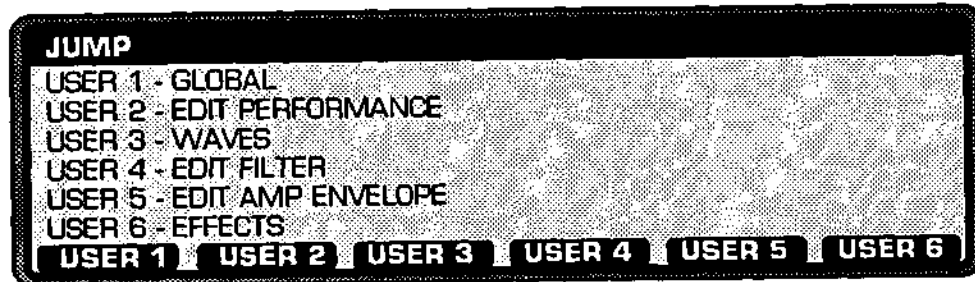
Starts the operation.

**NO**

Cancels the operation and exits.

**JUMP**

**Path:** Click the JUMP/MARK switch.



This page shows the current assignment of each MARK key.

To immediately go to the page listed, press the desired key.

Double clicking the JUMP/MARK switch goes to the MARK page.

EXIT returns to the previous page.

Jump functions in a special way with the Effects, Effects Mix, Copy Effects (All, Mix, and Parameters), and Write pages. These pages can all be reached by multiple paths (eg. Copy Effects, which may be accessed from both Performances and Multimode Setups). In Marking one of these pages, you will notice that the "Marked Page" display at the top of the screen shows only the page title (eg. Copy Effects) and not the current editing mode (eg. Performance or Multimode Setup).

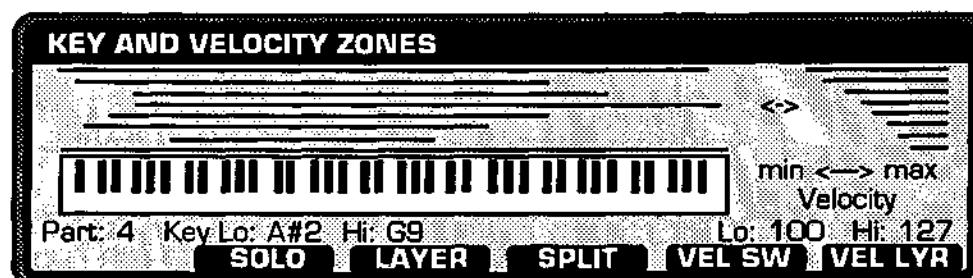
When you set such a Marker, and Jump to it later, the Wavestation A/D will determine your current editing mode, and send you to the appropriate page. For instance, you might set a Marker while editing Effects in a Multiset. When you next Jump to that Marker, the Wavestation A/D will look at your current position in the page hierarchy. If you are in the pages under Multimode, the Jump will take you to Multimode Effects. If you are in the pages under Edit Performance, it will take you to Performance Effects.

When you exit one of these pages after Jumping to it, the Wavestation A/D takes you out by the path from which you last manually entered that page. This is not necessarily the path from which it was initially Marked, nor necessarily the path of your current editing mode.

Jump is not active in the Name or Init pages.

## KEY AND VELOCITY ZONES

Path: EDIT - DETAIL - ZONES



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

The PERFORMANCE PART DETAIL page sets the sound of the Part, but the ZONE page determines where and how the Part is played by the controller. Automatic adjustments for layering, velocity switching, etc., may also be done on this page.

The double-arrow pointer in the middle right of the display selects the current Part to be edited. It may be moved vertically by the up/down cursors, or by scrolling in the Part field. The key and velocity limits can be entered over MIDI, or with the standard data entry controls.

The traditional keyboard modes of single, layered, split, and the sampler-inspired velocity-controlled modes have evolved into a general-purpose system that permits any combination of key and velocity voicings.

For example, the former single mode is the same as a Performance with one Part, whose Key Limits are at the extremes C-1 and G9, with a Velocity Range of 1-127.

Double, Dual, or Layer mode is the same as a two-Part Performance with similar zoning.

Split mode would be a two-Part Performance, with one Part zoned C-1 to B4 and the other zoned C5 - G9. In addition, you might use the Transpose parameter (in Performance Part Detail) to move both Patches into the center of their playable ranges.

Since eight layers are available, though, virtually any arrangement of layering and splitting is possible - there is no reason to be constrained to the simple examples above. 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.

## **KEY AND VELOCITY ZONES**

---

### **Part**

This selects the current Part. The double arrow moves up and down to show you which line displays the current settings.

### **Key Low - High**

The note range defaults to the extremes of C-1 and G9.

The key limits can be entered over MIDI or with the dial, keypad, or Inc/Dec.

### **Velocity Low - High**

The velocity range defaults to the extremes of 1 and 127.

The velocity limits can be entered over MIDI or with the dial, keypad, or Inc/Dec.

### **SOLO**

SOLO allows the current Part to be heard by itself.

### **LAYER**

This switch sets the key and velocity ranges for each Part to their limits.

### **SPLIT**

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 keyboard. 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**

If Velocity Switch is pressed, the current Parts will be distributed over the velocity range of 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.

### **VEL LYR**

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.

**A ZONE EXAMPLE**

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

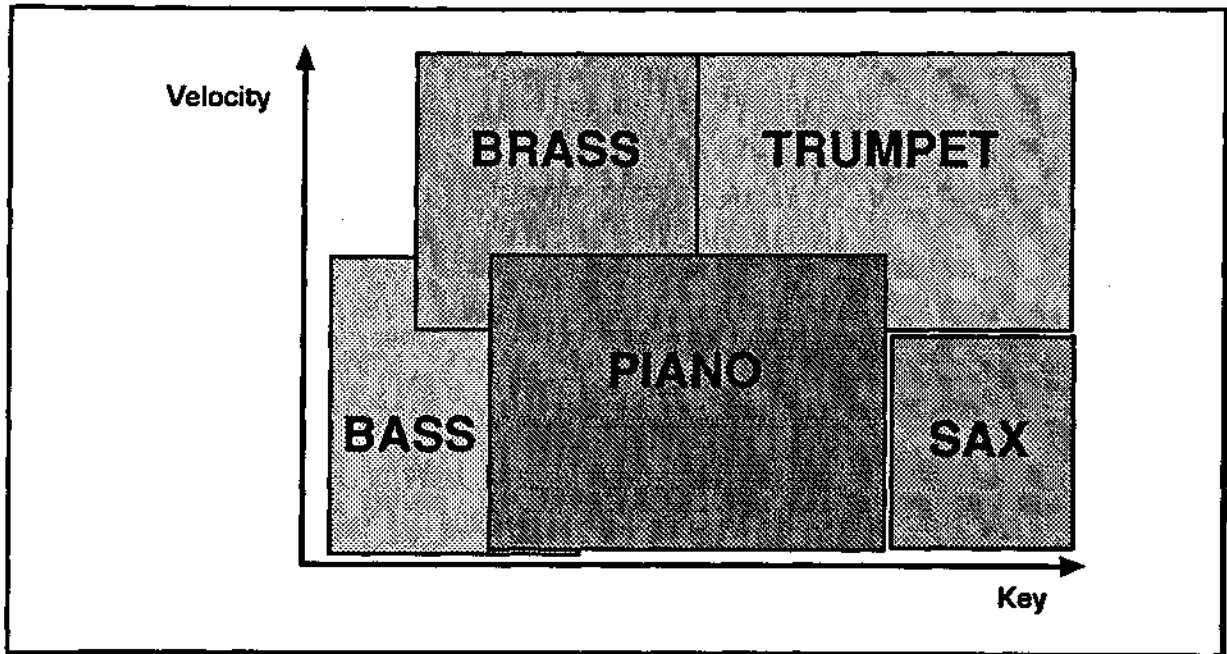
The Bass Patch plays on the bottom quarter of the keyboard, with a soft to medium touch.

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

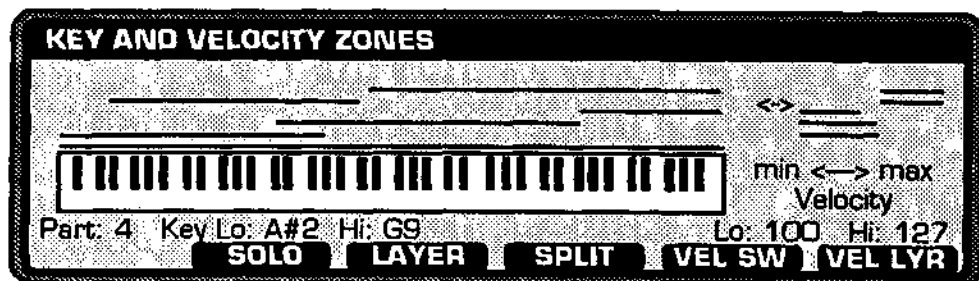
Sax plays at the high end of the keyboard, with low velocity.

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

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

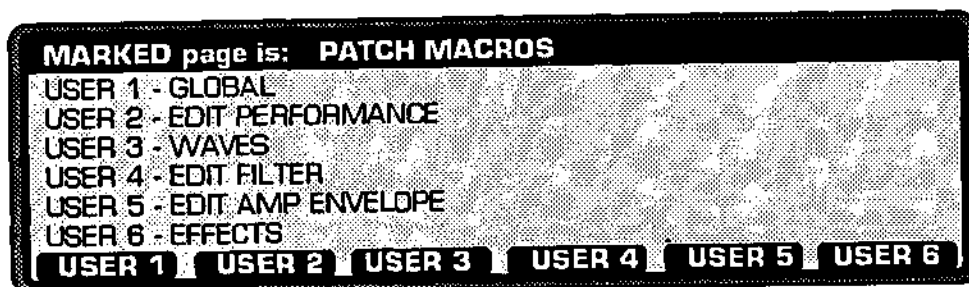


Assuming the Trumpet is Part 1 and the Bass is Part 5, setting up this example on the KEY AND VELOCITY ZONES page would produce a zone chart resembling this:



# MARK

**Path:** Double-click the JUMP/MARK switch.



MARK sets a "bookmark" on a display page, so that you can then use JUMP to return to it quickly.

The name of the marked page appears on the top parameter line. The page names are taken from the top line of each page.

Pressing one of USER 1 - 6 assigns the marked page to that soft key. No warning is given if you overwrite an assignment.

JUMP/MARK goes to the JUMP page (toggles).

EXIT returns to the previous page, without marking.

Mark functions in a special way with the Effects, Effects Mix, Copy Effects (All, Mix, and Parameters), and Write pages. These pages can all be reached by multiple paths (eg. Copy Effects, which may be accessed from both Performances and Multimode Setups). In Marking one of these pages, you will notice that the "Marked Page" display at the top of the screen shows only the page title (eg. Copy Effects) and not the current editing mode (eg. Performance or Multimode Setup).

When you set such a Marker, and Jump to it later, the Wavestation A/D will determine your current editing mode, and send you to the appropriate page. For instance, you might set a Marker while editing Effects in a Multiset. When you next Jump to that Marker, the Wavestation A/D will look at your current position in the page hierarchy. If you are in the pages under Multimode, the Jump will take you to Multimode Effects. If you are in the pages under Edit Performance, it will take you to Performance Effects.

When you exit one of these pages after Jumping to it, the Wavestation A/D takes you out by the path from which you last manually entered that page. This is not necessarily the path from which it was initially Marked, nor necessarily the path of your current editing mode.

Mark is not active in the Name or Init pages.



## MIDI

Path: MIDI

<b>MIDI</b>	
Mode:	OMNI
Basic Channel:	1 [6 MONO Channels]
Parameters:	RECOGNIZE
MIDI Controller 1:	MODULATION WHEEL
MIDI Controller 2:	BREATH CONTROLLER
<span style="border: 1px solid black; padding: 1px 5px;">STATUS</span> <span style="border: 1px solid black; padding: 1px 5px;">REMAP</span> <span style="border: 1px solid black; padding: 1px 5px;">RCV</span> <span style="border: 1px solid black; padding: 1px 5px;">PERFMAP</span> <span style="border: 1px solid black; padding: 1px 5px;">MULTISET</span> <span style="border: 1px solid black; padding: 1px 5px;">SYSEX</span>	

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.

### Mode

OMNI, POLY, MULTI, or MONO. If MULTI or MONO is selected, playback will be determined by the current MULTI MODE Setup (MULTISET).

### Basic Channel

This is the main channel select parameter.

If the Mode is MONO, an additional "Number of MONO Mode Channels" field appears. If using a guitar controller, you might set this to 6. The Channels used for MONO Mode begin with the current Basic Channel, up to the number of mono 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 MONO channels, you must set a Basic Channel no higher than 11 (11, 12, 13, 14, 15, 16).

If Mode is MULTI, the Basic Channel is ignored in favor of the Multi-Mode Setups.

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 A/D itself. For more information on System Exclusive, please see SYSEX DATA TRANSMIT.

### Parameters

This controls the reception and transmission of SysEx parameter changes. When any parameter is edited (ENV 1 level one, for instance, or LFO 2 rate), the Wavestation A/D can send out SysEx messages to be recorded by a sequencer or received by another Wavestation A/D or the Wavestation keyboard. This allows yet another way to automate real-time timbre changes. A large amount of data is sent out by this feature, and 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 A/D's parameters are neither transmitted nor received. This is the default.

RECOGNIZE. The Wavestation A/D will respond to, but not transmit, parameter changes.

TRANSMIT. The Wavestation A/D will transmit, but not respond to, parameter changes.

RECOGNIZE & TRANSMIT. The Wavestation A/D will both transmit and respond to parameter changes.

### MIDI Controllers 1 and 2

As explained in section 5.7 of the Player's Guide, these parameters define the MIDI controllers available for the modulation matrix and effects modulation.

### STATUS

Goes to MIDI STATUS, an input indicator page. Please see section 5.9 in the Player's Guide.

### REMAP

Goes to MIDI REMAP.

### RECEIVE

Goes to MIDI RECEIVE.

### PERFMAP

Goes to PERFORMANCE SELECT MAP. Please see section 5.10 in the Player's Guide.

### MULTISET

Goes to MULTI-MODE SETUP.

### SYSEX

Goes to SYSEX DATA TRANSMIT.

## MIDI RECEIVE

Path: MIDI - RECEIVE

<b>MIDI RECEIVE</b>	
Program Change:	ENABLE
Aftertouch:	ENABLE
Pitch Bend:	ENABLE
Controllers:	ENABLE
Note on/off:	ALL
All Notes Off:	IGNORE

The MIDI RECEIVE page allows you to configure the Wavestation A/D for your MIDI system. In most cases, the default parameters shown on the above screen 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 disabled within individual Patches.

The first four parameters all have the same possible values: DISABLE or ENABLE.

DISABLE means that the message type is ignored.

ENABLE means that the message type is recognized.

### Program Change

This parameter controls the reception of Program Change messages.

### 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 and the Modulation Wheel.

### Note

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

## MIDI RECEIVE

---

In such applications the two Wavestations would typically be programmed identically (the SYSEX DATA TRANSMIT "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 A/D recognizes all Note messages.

EVEN means that only the even note numbers are played.

ODD means that only the odd note numbers are played.

### All Notes Off

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, check to see that this parameter is set to IGNORE.

RESPOND 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).

IGNORE means that key events will be uninterrupted by All Notes Off messages.

### MIDI RECEIVING

The figure on the next page shows how you might use the Wavestation A/D in a sequencer environment. In this setup, the Wavestation A/D's MIDI Mode is set to MULTI, so that it can simultaneously play several parts from the sequencer.

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

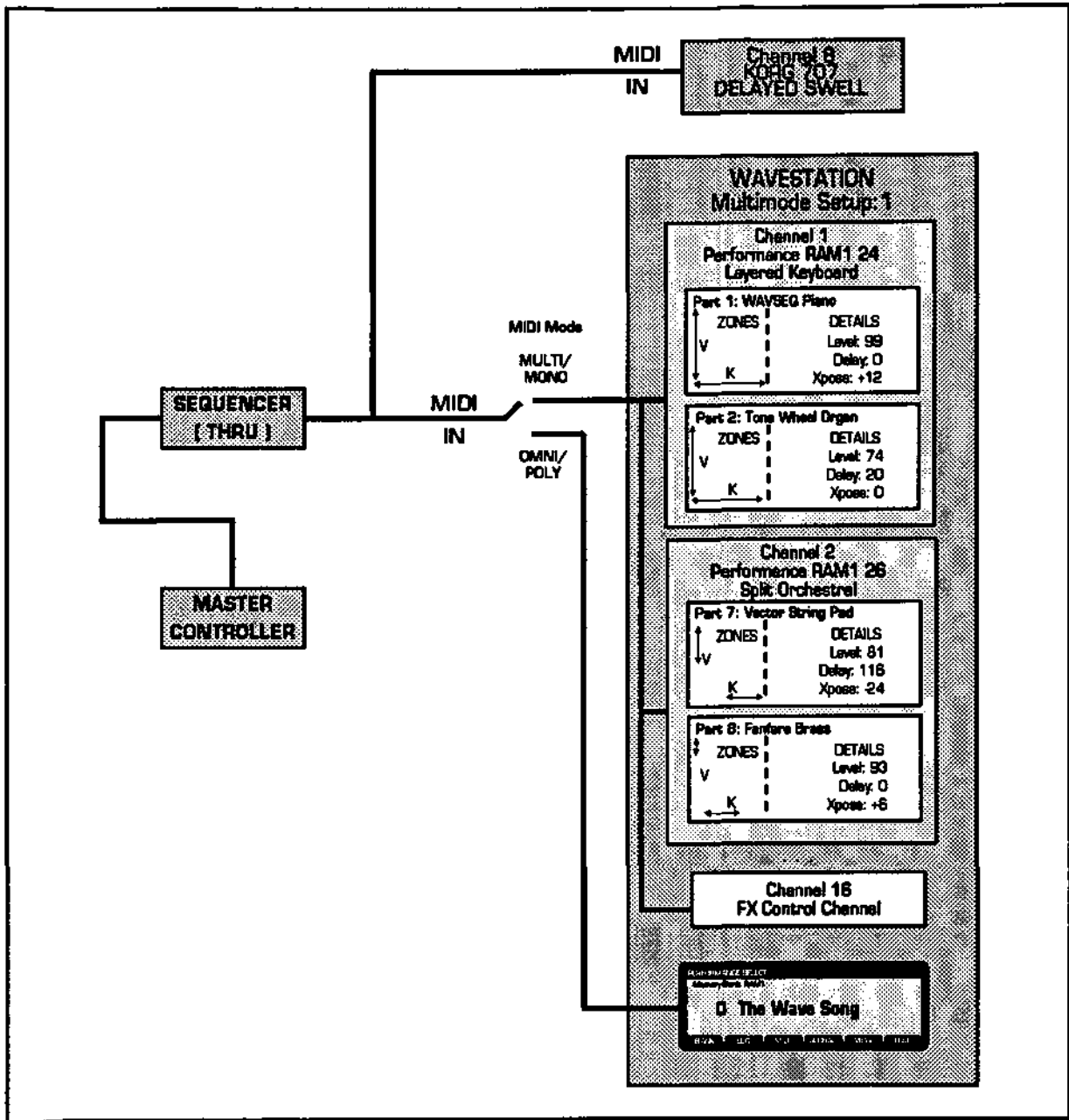
The current Multimode Setup is configured so that only MIDI channels 1 and 2 play Wavestation A/D Performances. A layered keyboard sound, made of organ and piano Patches, is on channel 1; a split consisting of strings and brass is on channel 2. The FX control channel, which allows you to modulate the Multiset effects in real time using MIDI controllers, is set to 16.

Note that the Performance shown on the Performance Select Screen - in this case, Vector Future - is only played in POLY or OMNI modes. Since this Wavestation A/D is currently in MULTI mode, this is not played.

A Korg 707 synthesizer, playing a slow pad, is responding to channel 8. This channel has been turned OFF on the Wavestation A/D's MULTIMODE SETUP page, so the Wavestation A/D doesn't play this data.

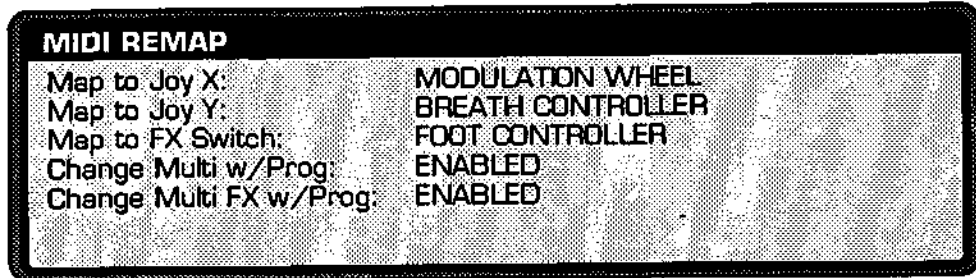
Note that all of the Parts have a Play Mode of LOCAL or BOTH. Parts with a setting of MIDI do not play internal sounds, no matter which Patch they are assigned; they only send out MIDI information, such as Program Changes and Controllers. Parts with a setting of LOCAL will play internal sounds, but will not transmit Program Changes or Controllers over MIDI. Parts set to BOTH will both play internal sounds and transmit Program Changes and Controllers.

MULTI-TIMBRAL EXAMPLE



**MIDI REMAP**

Path: MIDI - REMAP



**Map to Joy X**

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, pedals, etc. to change the Vector Position and modulate the effects using the Mod Source JOY - X.

**Map to Joy Y**

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, pedals, etc. to change the Vector Position and modulate the effects using the Mod Source JOY - Y.

**Map to FX Switch**

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 FSW and FSW TOG (Foot Switch Toggle).

**Change Multi w/Prog**

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

This parameter allows Multisets to be changed by MIDI Program Changes received on the Basic Channel. Since there are 16 Multisets, Program Change numbers are wrapped around to match up with Multiset numbers. This means that Program Changes 0-15 call up Multisets 0-15; Program Changes 16-31 also call up Multisets 0-15; so do Program Changes 32-47, and so on.

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).

ENABLED means that this feature is on.

DISABLED means that this feature is off.

### **Change Multi FX w/Prog**

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.

ENABLED means that this feature is on. When a MIDI Program Change is received, it normally calls up one of the Wavestation A/D's Performances. In this case, however, only the effects of the Performance are called up, and applied to the current Multiset. This makes it easy to change effects during a song while using the Wavestation A/D 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.

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

# MULTIMODE SETUP

Path: MIDI - MULTISSET

**MULTIMODE SETUP** [MULTISSET is EDITED]

Multimode Setup: 15			FX Control Chan: 4	
MIDI	CH	Level	Performance:	
1	ON	127	CARD	12 Trumpet
2	ON	105	CARD	13 Trombone
3	ON	127	RAM1	11 Soprano Sax
4	OFF	55	RAM2	49 Ship's Mast

STATUS
XMIT
EFFECTS
PERFMAP
REMAP
WRITE

**NOTE:** To use this mode you must first set the MIDI Mode to MULTI or MONO. This is done on the MIDI page.

MULTI and MONO modes enable the Wavestation A/D to receive multi-timbrally, one Performance per channel. The MULTIMODE SETUP page provides a table assigning any Performance to any MIDI channel. Any channel may also be ignored.

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

The Multimode Setup 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 send and receive Multimode Setup changes via MIDI 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 and MONO modes, the Wavestation A/D functions as up to 16 discrete synthesizers.

Multimode Setups are stored in internal nonvolatile RAM and can be dumped via MIDI System Exclusive.

## Multimode Setup

This displays the number of the current Multimode Setup (0-15). Changing this number sends a MIDI System Exclusive command, which may be recorded and played back to the Wavestation A/D by an external sequencer. This enables you to automate the selection of different Multimode Setups for different songs, to change effects, MIDI Channel on/off configurations, etc.



Note that this message, like MIDI Program Changes, sends only the number of the Multiset, and not the Multiset data. To send the actual data (Performances selected for each channel, levels, etc.), use the XMIT button.

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. Since there are 16 Multisets, Program Change numbers are wrapped around to match up with Multiset numbers. This means that Program Changes 0-15 call up Multisets 0-15; Program Changes 16-31 also call up Multisets 0-15; so do Program Changes 32-47, and so on.

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).

### **FX Control Channel**

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), it is necessary to designate which one's controllers will be routed to effects modulation.

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

For example, let's assume that the current Multimode Setup'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 Multimode Setup'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 Multimode Setup.

### **MIDI**

MIDI Channel number. Note that this channel list scrolls downwards.

### **Channel**

On causes the channel to be recognized.

Off causes the channel to be ignored.

If your sequencer addresses only 16 MIDI channels (or less), try turning some of the Multiset's channels Off to free up channels for other instruments in your setup.

### **Level**

Each channel has its own volume level. This parameter allows you to easily balance the volumes of the Multiset. Changing this parameter sends MIDI Volume data (Controller #7) on that particular channel; this may be recorded by a sequencer and played back into the Wavestation A/D for automated mixing.

### **Performance Bank, Number**

Performance assigned to the channel.

## MULTIMODE SETUP

---

### STATUS

Goes to the STATUS page. Please see section 5.9 in the Player's Guide.

### XMIT

Sends a SysEx dump of the Multiset data. This duplicates the MULTISSET function on the SYSEX DATA TRANSMIT page.

### EFFECTS

Goes to EFFECTS.

Each MULTI setup has its own Effects section, which overrides all PERFORMANCE Effects.

### PERFMAP

Goes to PERFORMANCE SELECT MAP. Please see section 5.10 in the Player's Guide.

### REMAP

Goes to MIDI REMAP.

### WRITE

Goes to WRITE MULTI MODE SETUP.

## NAME (PERFORMANCE, PATCH, WAVE SEQUENCE, CARD)

**Paths:**

<i>Performance</i>	EDIT - NAME
<i>Patch</i>	EDIT - PATCH - NAME
<i>Wave Sequence</i>	EDIT - PATCH - WAVES - WAVSEQ - UTILS - NAME
<i>Card</i>	GLOBAL - UTIL - NAME

**NAME**  
 PATCH RAM2 49 CHOIR, FEMALE

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z  
 a b c d e f g h i j k l m n o p q r s t u v w x y z  
 0 1 2 3 4 5 6 7 8 9 ! " # \$ % & ' ( ) \* + , - . / : ; < = > ? [ \ ] ^ \_ { | }

WRITE
CLEAR
SPACE
RESET
CANCEL

The NAME page functions identically in all places it is used. The table of characters always displays your current character selection.

**Type and Item**

The first line tells you what you are naming. This will be either a Performance, Patch, Wave Sequence, or Card, depending on what you were editing when you pressed NAME.

**Character Position**

The left/right cursor highlights the character *position* in the item's name.

To select the character position, use the left/right cursor keys.

Each name can have 15 characters (except for Wave Sequences, which can have seven). On some pages, the full name may be abbreviated to allow for data.

**Character Field (Value)**

To select a character value (a letter or a number), use the dial, or cursor up/down.

To select a number you can also use the keypad.

You can use the dial to move through all three lines in the table continuously, or jump from line to line by using the up/down cursors. As you scroll, the current character position in the name field duplicates the current character selected by the dial.

**WRITE**

Goes to the WRITE page, if naming a Patch or Performance.

## **NAME**

---

### **CLEAR**

This sets the name to all spaces, which is especially useful before naming something for the first time.

### **SPACE**

This is a shortcut for writing a space.

### **RESET**

This clears your edits, restoring the original name, without leaving the page.

### **CANCEL**

Exits the page, leaving the name unchanged. This is the same as pressing RESET, then EXIT.

### **The EXIT switch**

Exiting leaves the edited name in the edit buffer.

# PATCH BUS ASSIGNMENT

Path: EDIT - PATCH - FX-BUS

PATCH BUS ASSIGNMENT							
Patch: RAM2 34 SINUSOID PATCH							
	WAVE		FXBUS	A	B	C	D
A:	ROM 161	Sine		ON	OFF	OFF	OFF
B:	ROM 33	Hard EP		OFF	ON	ON	ON
C:	CARD 37	Trumpet		ON	OFF	OFF	OFF
D:	ROM 192	VS64		OFF	ON	ON	ON
<b>WAVES</b>		<b>MACROS</b>					

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

PATCH must be selected as the FX BUS setting in PERFORMANCE PART DETAIL if the Part is to use the bus settings made on this page. Otherwise, settings made here will be superseded.

By assigning each wave of a 2 or 4 oscillator patch to a separate bus, it is possible to use the mix envelope and the joystick to affect the pan position. With 4 oscillators, it is even possible to have quadraphonic panning, useful for film and multimedia applications.

## Patch

The Patch to which these waves selections belong.

## Wave

Waves are ROM or CARD only.

In each bank, waves 0-31 are actually Wave Sequences. These are identified by an asterisk (\*) before their names.

Waves #32 and up are ROM waves, including multi-samples, attack transients, and single- and few-cycle loops. The last two waves are the Analog Inputs.

## FXBUS A, B, C, D

ON means that the wave is routed to this effects bus.

OFF means that the wave is not routed to this effects bus.

## WAVES

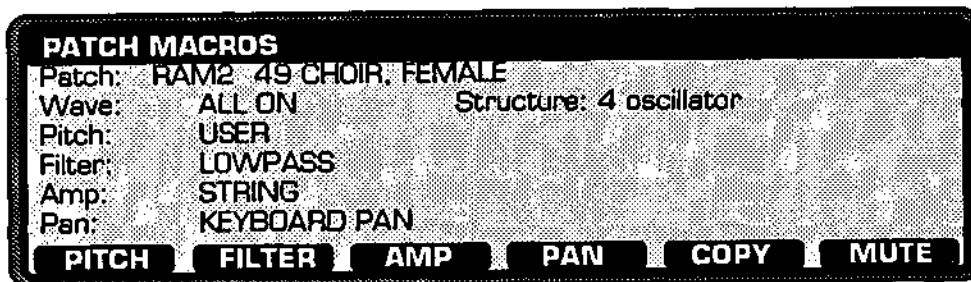
Goes to WAVES.

## MACROS

Goes to PATCH MACROS.

# PATCH MACROS

Path: EDIT - PATCH - MACROS



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 a Patch's synthesis modules (pitch, filter, amp, and pan).

The macros are a great way to quickly try different processing ideas. For the hard-core 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 one of the four modules (PITCH, FILTER, AMP, PAN).

This will show the current parameter values which comprise the macros. For example, in the case of the amplifier envelope, you'll see a graph of the current envelope shape.

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

## Patch

The current Patch being edited.

## Wave

The current wave being edited.

Selecting ALL allows you to edit all oscillators at once.

If A, B, C, or D is selected, the individual oscillator patch is modified.

If Structure is 2 oscillator, Wave is either A, C, or ALL (no B or D).

If Structure is 1 oscillator, Wave is always A.

ON or MUTED is displayed next to the Wave selection. To mute or un-mute a wave, select the wave and then press MUTE, or cursor to the field and scroll.

If a multi-oscillator Patch is selected and some of the oscillators are muted then "----" will appear.

**Structure**

The number of oscillators is determined by the Structure setting, as explained under EDIT PATCH.

**Pitch**

The Pitch macros perform various modulations on the oscillators. Choices include: DEFAULT, ENVELOPE1 BEND, DESCENDING SWEEP, ASCENDING SWEEP, AFTERTOUCHE BEND, MIDI-BEND, AFT + MIDI-BEND.

**Filter**

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

**Amp**

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

Amp Macros are:

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

Remember that this macro can only do its work if the filter output contains enough sound material in the first place. For example, if the sound has a slow attack, the percussive amplifier macros won't be very effective.

**Pan**

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

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

**PITCH**

Goes to EDIT PITCH.

**FILTER**

Goes to EDIT FILTER.

**AMP**

Goes to EDIT AMP ENVELOPE.

**PAN**

Goes to EDIT BUS A-B PAN.

## **PATCH MACROS**

---

### **COPY**

Goes to COPY MODULES.

### **MUTE**

Pressing MUTE silences the current Wave selection and displays the word MUTED next to the current Wave. (For example, if Wave is set to ALL and you press MUTE, all are muted.)

If you leave the EDIT PATCH level either by EXITing or by using a JUMP, the mutes are automatically disabled.

### **Modulation Sources**

In addition to the basic "analog" patch resources mentioned above, the Patch has an extensive modulation system. Each oscillator voice contains ENV 1, LFO 1 and LFO 2, which are only reached by moving down to the level of individual Patch modules (Filter, Amp, etc.).

**NOTE:** Since the three modulators (ENV1, LFO 1/2) are separate from the Pitch, Filter, Amp and Pan modules, they are not controlled by these Macros. For example, you might choose a tremolo or vibrato macro which uses an LFO. But the speed of the modulation is not controlled by the macro. Instead, it depends on the settings of LFO 1 (or 2).

Modulation sources include:

LINEAR KEYBOARD

CENTERED KEYBOARD (centered around middle C (C4))

LINEAR VELOCITY

EXPONENTIAL VELOCITY

LFO 1, LFO 2

ENV 1

AFTERTOUCH

AFTERTOUCH + MOD WHEEL (the sum of the values of aftertouch and mod wheel)

MOD WHEEL

MIDI 1 and 2

MOD PEDAL

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



**PERFORMANCE PART DETAIL**

Path: EDIT - DETAIL

**PERFORMANCE PART DETAIL**

Part: 1	Patch: RAM2 49 CHOIR, FEMALE
Level: 99	FX Bus: 50/50
Xpose: 0	Detune: 0
Delay: 1024	Sustain: ENABLED
Play Mode: LOCAL	Scale: PURE MAJOR C
Mode: POLYPHONIC	(Key Priority: High)

PART -
PART +
SOLO
INIT
ZONES
COPY

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

After assigning a Patch to a Part, you can further customize it by way of this page, and KEY AND VELOCITY ZONES.

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.

**Part**

The number of the current Part, 1-8. Adjust with the PART + or PART - soft keys.

**Patch**

The Patch currently assigned to the Part.

**Level**

Volume level of the Part.

**FX Bus**

This parameter controls the routing of the Patch to the MDE. (The MDE controls the routing to the back panel.) See EFFECTS.

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 the joystick to affect the pan position.

## **PERFORMANCE PART DETAIL**

---

### **Delay**

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

### **Xpose**

Semitone transposition of the Part, with a range of +/- 24 steps.

### **Detune**

Fine tuning of the Part in cents. A cent is 1/100 of a semitone.

### **Sustain**

DISABLE/ENABLE. Chooses whether the Part responds to the Sustain Pedal.

### **Play Mode**

LOCAL means that the Part will play internal sounds, but not transmit Program Changes or Controllers over MIDI.

MIDI means that the Part will not play internal sounds, but will continue to transmit Program Changes and Controllers over MIDI.

BOTH means that the Part will both play internal sounds and transmit Program Changes and Controllers.

### **Scale**

This parameter determines the intonation of the Part.

EQUAL TEMPERAMENT 1. This is the default, most widely used keyboard tuning.

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 EDIT SCALE page.

**Mode**

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

UNI LEGATO mode is monophonic, so that only one key is played at a time. If you play legato, notes are not re-triggered. 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 mode is also monophonic, so that only one key is played at a time. Each new note re-triggers the envelopes.

POLYPHONIC mode plays voices up to the maximum number of voices. This is the normal mode.

**Key Priority**

This only appears when 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.

**PART +/-**

PART - and PART + inc/decrement the current Part number.

**SOLO**

SOLO allows the current Part to be heard by itself.

**INIT**

Goes to INITIALIZE PART.

**ZONES**

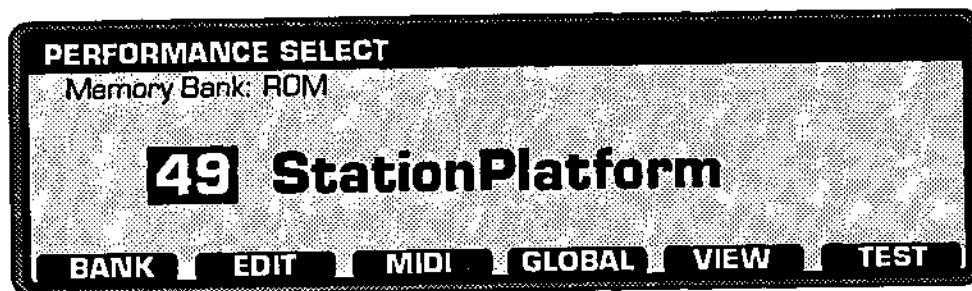
Goes to KEY AND VELOCITY ZONES.

**COPY**

Goes to COPY PART.

**PERFORMANCE SELECT**

**Path:** None -- this is the starting point of all paths.



The PERFORMANCE SELECT page is the highest level of the Wavestation A/D's menu system. It appears when you switch power on or after you press the EXIT switch a sufficient number of times.

Using this page is the subject of Chapter 4, "Basic Operation," in the Player's Guide.

**Memory Bank**

The current memory Bank is the first field on the page. You can press the BANK soft key 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 can simultaneously use Patches from ROM, RAM2, RAM3, and a card. Likewise, a RAM2 Patch can use ROM or card PCM waves, or Wave Sequences from all five banks.

**ROM**

There has to be a place where you can get some known sounds to start with. The ROM bank fills this role. ROM Performances use only ROM Patches and ROM waves.

**RAM1/RAM2/RAM3**

These banks are the user's work area, although they are initially filled with additional Factory Performances, Patches, and Wave Sequences.

**CARD**

This selection uses the PROG DATA card slot. This can be a RAM or ROM card.

**Current Performance**

Each bank contains 50 performances. Select them with dial or keypad, or the INC/DEC switches.

**BANK**

BANK cycles through the five bank choices (ROM, RAM1, RAM2, RAM3, and CARD, if inserted).

MIDI has been enhanced with a Bank Select message, which the Wavestation A/D is one of the first instruments to implement. When you change Performances, both a Program Change and a Bank Select message are transmitted. The Wavestation A/D has three banks, represented by MIDI Controller #32, values 0 (RAM1/2), 1 (ROM/CARD), and 2 (RAM3), respectively.

For more information, please see Section 5.8 of the Player's Guide.

**EDIT**

Goes to EDIT PERFORMANCE.

**MIDI**

Goes to MIDI. See Chapter 5, "USING MIDI," of the Player's Guide.

**GLOBAL**

Goes to GLOBAL Settings. See Section 4.10 of the Player's Guide.

**VIEW**

Goes to VIEW PERFORMANCES.

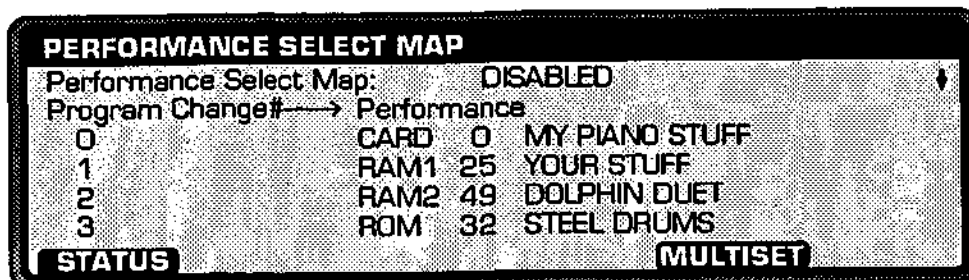
**TEST**

When TEST is pressed, its label changes to STOP, and the Wavestation A/D will play a middle C on the current Performance. The note will continue to sound until the STOP softkey (or any other button, for that matter) is pressed.

This feature allows you to easily confirm that the Wavestation A/D and your audio system are properly connected.

# PERFORMANCE SELECT MAP

Path: MIDI - PERFMAP



Please see Section 5.10 of the Player's Guide, which discusses this page in depth.

The Performance Select Map allows you to assign a different Wavestation A/D Performance to be called up by each of 128 incoming MIDI program changes. This can be useful in configuring the Wavestation A/D as a sound module in a system under the control of 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.

## Performance Select Map

This parameter switches the Performance Select Map on and off.

DISABLED is normal and the default. This means that the map is not used, so Performances are selected as explained under section 5.8 of the Player's Guide.

ENABLE means that the Performance Select Map is used.

## Program Change #

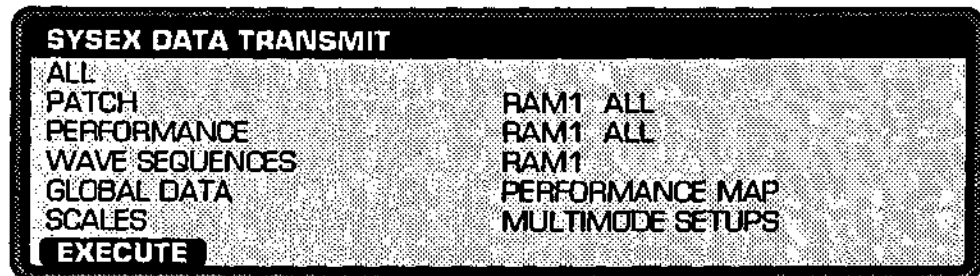
This is the MIDI Program Change number to be mapped to the Performance on the right. This is a list; it may be scrolled through with the dial, keypad, or inc/dec.

## Performance

This is the bank, number, and name of the Performance that will be selected by the MIDI Program Change on the left. The same Performance may be selected by multiple MIDI Program Changes.

## SYSEX DATA TRANSMIT

Path: MIDI - SYSEX



For more 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 A/Ds (or an A/D and the Wavestation keyboard), 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 A/D's Basic Channel must be the same as when the dump was originally made.

If you are using two or more Wavestation A/Ds in the same setup, you may wish to maintain different sets of Performances on each instrument. In this case, giving each of the Wavestation A/Ds 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 A/D data to another Wavestation or to a MIDI bulk storage device. The Wavestation A/D also responds to dump requests.

The Wavestation A/D's complete System Exclusive implementation also allows convenient remote operation with a computer-based editor.

The following transferable data types are available. The data type currently selected to be transmitted is indicated by inverse video.

### All

Sends all data in the Wavestation A/D's internal RAM, including all the data types listed below. To send RAM Card data, you must use the separate Patch, Performance, and Wave Sequences commands.

### Patch

Selecting ALL will send the entire selected Bank of Patches. Selecting a number (00-34) will send only that Patch from the selected Bank.

## **SYSEX DATA TRANSMIT**

---

### **Performance**

Selecting ALL will send the entire selected Bank of Performances. Selecting a number (00-34) will send only that Performance from the selected Bank.

### **Wave Sequences**

Select the Bank of Wave Sequences to be transmitted.

### **Global Data**

There is one set of global data.

### **Scales**

There is one set of twelve user scales.

### **Performance Map**

There is one Performance Select Map.

### **Multi-Mode Setups**

There is one set of 16 Multi-Mode Setups.

## **EXECUTE**

Sends the selected data type (indicated by reverse video). While the Wavestation A/D is transmitting, it displays the flashing message, "TRANSMITTING MIDI SYSEX."

Success, or any problem with the SysEx transfer, is reported.

### **Receiving SysEx**

The Wavestation A/D 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, 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.

If a message is not received correctly, the screen will display the message "SYSEX CHECKSUM ERROR." This message will remain on the screen until you press the CONT softkey. 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.



## UTILITIES

Path: GLOBAL - UTIL

**UTILITIES**

From: CARD CONCERT SET 1  
To: RAM1

Data to Transfer: ALL

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) use the MOVE function with Data to Transfer set to ALL.

### From

RAM1, RAM2, RAM3, ROM, or CARD are possible.

### To

RAM1, RAM2, RAM3, or CARD are possible.

### Data to Transfer

Performances, Patches, Wave Sequences or All are possible.

### COPY

Starts the transfer. Makes an identical copy of the selected data type in the "From" bank and puts it in the "To" bank. For transferring data to and from a RAM Card, it is generally better to use the MOVE function (see below).

### MOVE

Copies the selected data, and also changes all source Bank references 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 to Transfer 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

## UTILITIES

---

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 A/D 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 to Transfer parameter set to ALL.

If you use the MOVE function with PERFORMANCES selected as the Data to Transfer, 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 to Transfer, 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.

With Wave Sequences, there is no difference between MOVE and COPY.

## NAME

Goes to NAME CARD.

## FORMAT

If inserting a card invokes one of the following messages:

CARD IS NOT FORMATTED

KORG CARD FORMAT MISMATCH

then to use the card in the Wavestation A/D you must first format it.

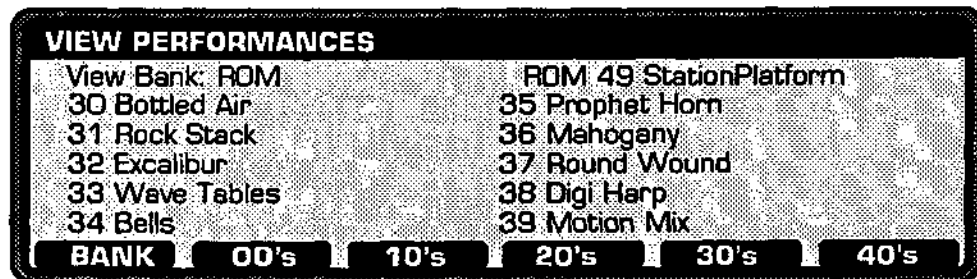
Pressing FORMAT brings up the message, "ARE YOU SURE?" Since formatting will erase all of the data on the card, you should be certain that it contains no important data. Pressing NO or EXIT returns you to the UTILITIES page. Pressing YES formats the card and then brings up the NAME CARD page, which allows you to name the card.

Attempting to format a ROM Card or write-protected RAM Card will cause the Wavestation A/D 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!

## VIEW PERFORMANCES

Path: VIEW



View Performances allows you to look at Wavestation A/D Performances in groups of ten at a time, so that you can quickly find a particular sound.

### View Bank

Select Bank to be viewed by pressing BANK.

### Current Performance

Shows the Performance that is currently selected.

### Performance Set

The numbers and names of the 10 Performances in this decade.

### BANK

BANK cycles through the five bank choices (RAM1, RAM2, RAM3, ROM, and CARD, if inserted).

### DECADE (00 - 40)

Selects the group of ten Performances to be viewed.

**WAVE SEQUENCE**

Path: EDIT - PATCH - WAVES - WAVSEQ

**WAVE SEQUENCE**

Wave: A ON      Wave Seq: RAM2 31 Richter      ↑

Step	Wave	Semi	Fine	Lev	Dur	Xfd
1	CARD 37 Trumpet	+24	0	75	395	124
2	ROM 100 SynthPad	-12	+1	56	Gate	10
3	ROM 101 Birdland	0	-20	80	482	733

Loop Dir: B/F      Start: 3      End: 7      Repts: OFF

UTILS
SOLO
INSERT
DELETE
WAVINC
MUTE

For an introduction to Wave Sequences, please see Chapter 9, "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 waves linked together and played sequentially, and are capable of creating very sophisticated dynamic textures.

There is no separate buffer for Wave Sequence edits. All Wave Sequence edits are automatically saved, and therefore WRITE and COMPARE do not apply.

Wave Sequence Step memory is 500 steps per bank. One sequence can be 255 steps maximum. Typically a sequence will 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, copy a blank one over it using the COPY WAVE SEQUENCE function which can be selected from the WAVE SEQUENCE UTILITIES page.

**Wave**

This is the oscillator to which the wave sequence is assigned.

On means that the selected Wave is sounding.

Mute means that the selected Wave is not sounding.

This field cannot be set to ALL.

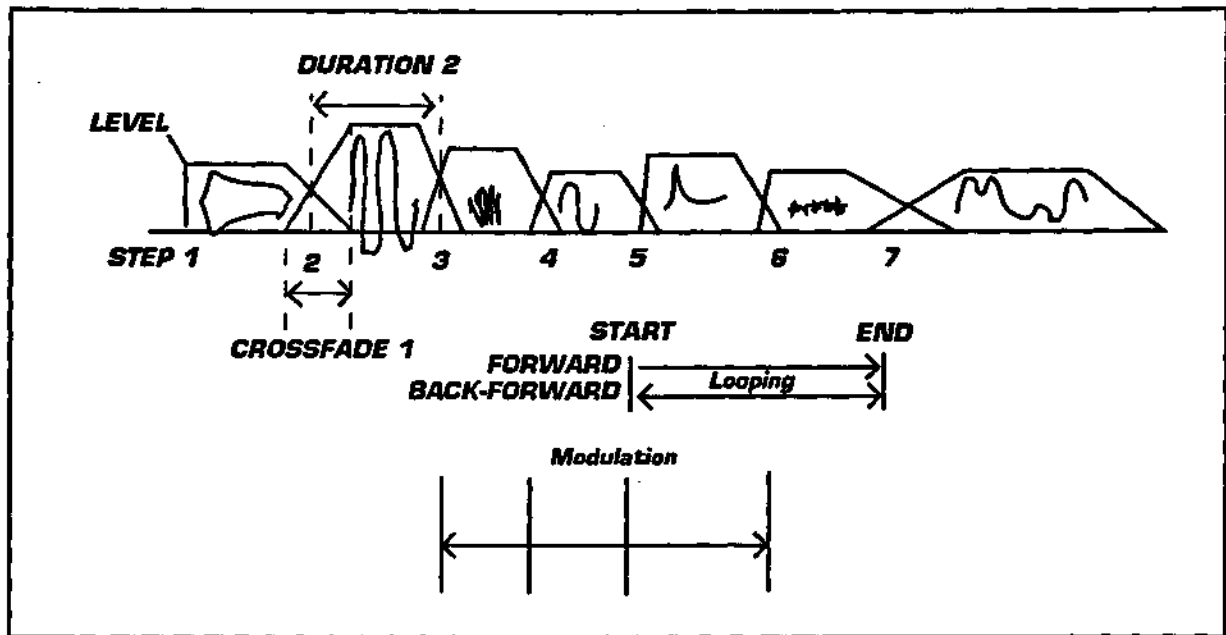
**Wave Sequence**

Bank and number.

If the Wave Sequence bank is ROM, no editing is allowed.

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.

Wave Sequence Diagram



**Step**

The number of steps per Wave Sequence is variable; the last step in each Wave Sequence is the END.

The number of steps available per sequence is 255 (to a total of 500 per bank).

**Wave**

The PCM wave to be played during this step.

**Semi**

+/- 24. The oscillator base pitch in semitones.

0 = A-440 tuning.

12 = one octave up, and so on.

**Fine**

Offsets the base pitch in cents (1/100 semitone).

**Lev**

The step loudness.

**Dur**

The length of time that the step will play.

1 - 499, or GATE. (GATE means "while the key is held.")

## WAVE SEQUENCE

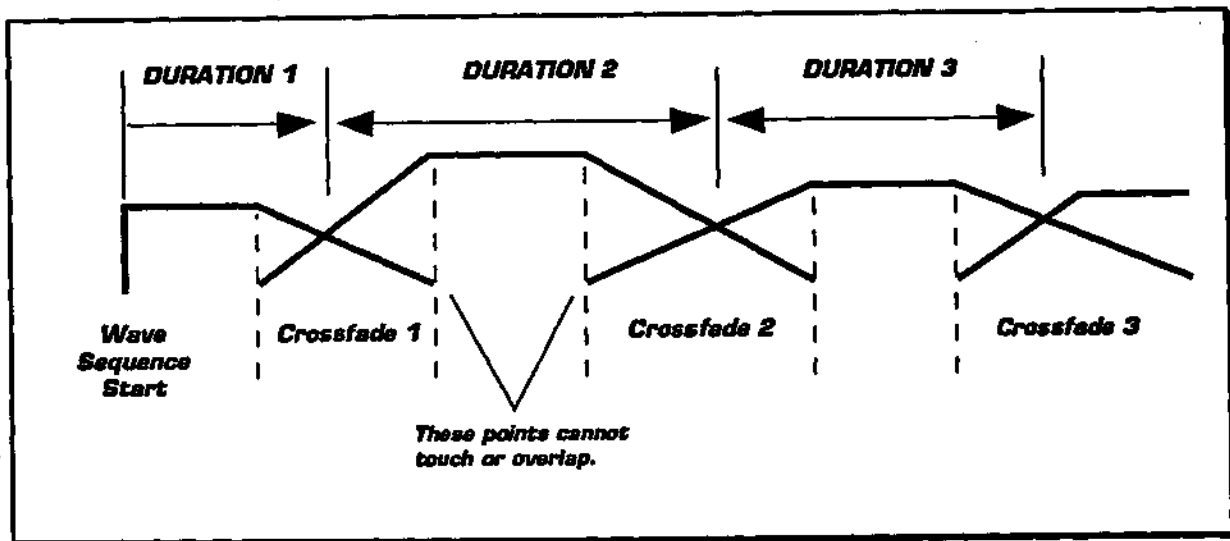
If the duration exceeds the actual length of a sampled transient, there will be silence during the end.

If the duration is set to Gate, the sequence does not proceed beyond that step until key-off occurs.

If (GLOBAL page) Wave Sequence Sync is set to MIDI, the duration is controlled by MIDI, and this parameter 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 (Crossfade)

0 - 998. The amount of overlap between the end of this step and the start of the next step.



### Loop Dir

You can set a loop over a range of steps so that it plays continuously while the note is held. The actual number of times that the loop plays is set at Repeats (discussed below).

FOR 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.

### Start

The loop start cannot be past the loop end.

### End

The last step of the Wave Sequence loop cannot exceed the number of steps in sequence.

**Repeats**

If repeats are OFF, the sequence plays as programmed.

1 - 126. If there is a set number of repeats, the loop repeats until count is finished and then plays as programmed, even if the key has been released.

If repeats are INF, the sequence loops throughout the amp envelope's release phase.

**UTILS**

Goes to WAVE SEQUENCE UTILITIES.

**SOLO**

Pressing SOLO allows playing of only the highlighted step, if any.

**INSERT**

To add a step, press INSERT. The default wave for the new step is same as the last highlighted step, except for insertions to the first step or the END (see below). Steps are added before the selected step.

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. Also, if you INSERT at the END, the inserted PCM wave's number will be one greater than that of the old last step.

These shortcuts are useful for working with the sets of "time-sliced" ROM waves that are included in the Wavestation A/D, 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 press INSERT repeatedly, until the entire string has been entered.

If there is no more step memory, a message appears, "no more step memory available".

**DELETE**

Deletes the highlighted step.

**WAVINC**

Increments the Wave selection in order: A, B, C, D, A . . .

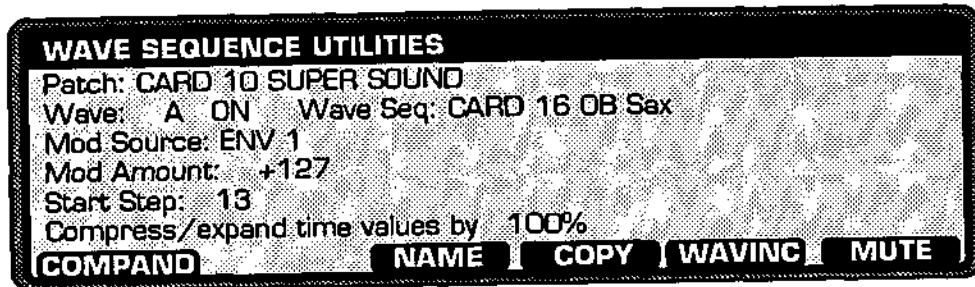
**MUTE**

Pressing MUTE silences the current Wave selection and displays the word MUTED next to the current Wave.

If you leave the EDIT PATCH level either by EXITing or by using a JUMP, the mutes are automatically disabled.

**WAVE SEQUENCE UTILITIES**

Path: EDIT - PATCH - WAVES - WAVSEQ - UTILS



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.

**Patch**

Bank and number.

**Wave**

Oscillator to which this Wave Sequence is assigned.

On means that the selected Wave is sounding.

Mute means that the selected Wave is not sounding.

This field cannot be ALL.

**Wave Sequence**

Bank and number.

If the Wave Sequence bank is ROM, no editing is allowed.

Wave Sequences are always selected from the first 32 "wave locations" in each bank.

**Mod Source**

Any normal modulation source (see PATCH MACROS).

Your choice of modulation sources affects the way in which the Wave Sequence is actually modulated.

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, using a negative Mod Amount. The Mod wheel is fully lowered (off). You play a key and hear the wave assigned to step 13 for as long as you hold the key (if step 13 happened to be a transient, you would hear only that single event.) Raise the Mod wheel, and the first change message detected causes the wave sequence to go to step 12. The next changes increment or decrement the step number.

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. 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.

### **Mod 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.

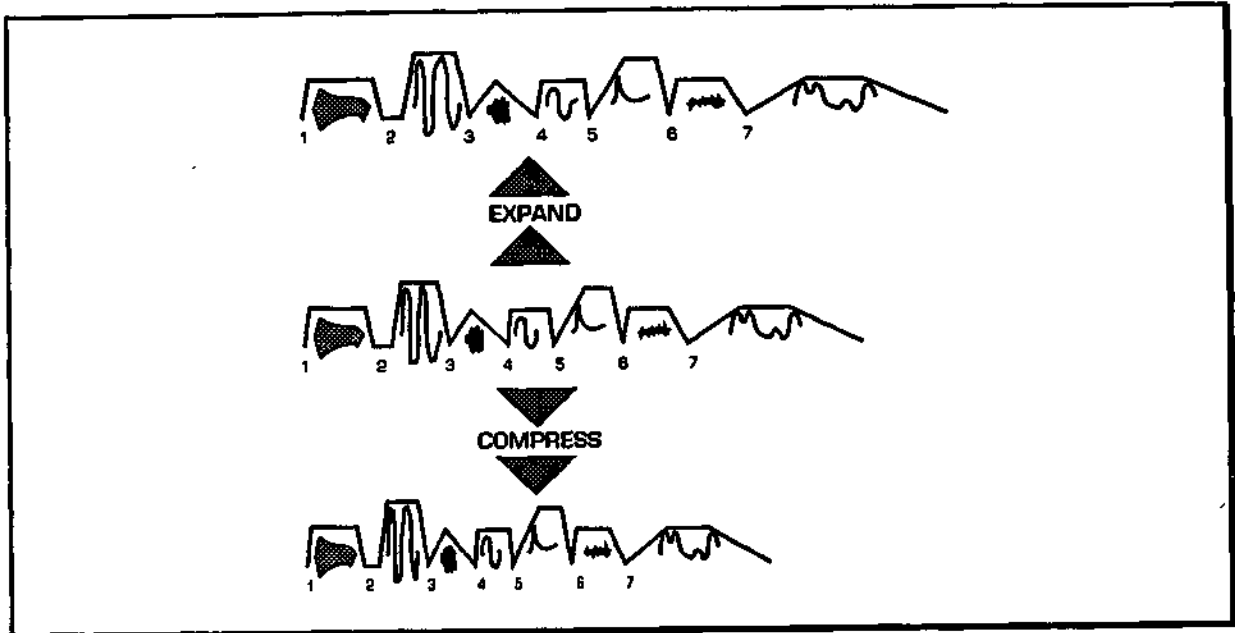
If you construct a Wave Sequence so that the waves at the beginning are bright, and the waves towards the end are more muted, you can use negative modulation to create an effect similar to the Sample Start Point Modulation feature found on some samplers. Normal playing occupies the middle, more-or-less 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.

### **Start Step**

The Wave Sequence step on which playback will normally start.

### Wave Sequence Time Scaling Illustration



### Compress/Expand

Scales all time values 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.

Press COMPAND to apply this function.

Note that the compression or expansion applies only to Wave Sequence time parameters. It has no affect on the envelopes of any sampled transients in use.

### COMPAND

Starts the operation.

### NAME

Goes to NAME WAVE SEQUENCE.

### COPY

Goes to COPY WAVE SEQUENCE STEP.

### WAVINC

Increments the Wave selection in order: A, B, C, D, A . . .

### MUTE

Pressing MUTE silences the current Wave selection and displays the word MUTED next to the current Wave.

If you leave the EDIT PATCH level either by EXITing or by using a JUMP, the mutes are automatically disabled.

# WAVES

Path: EDIT - PATCH - WAVES

<b>WAVES</b>						
Patch:	CARD 37 MIDWORLD					
Structure:	4 osc	Lev	Semi	Fine	Slope	
A - CARD	34 GUITAR PLUCK	99	-12	+6	+0.30	
B - ROM	111 SHELL DRUM	99	+1	0	+2.00	
C - CARD	25 *WAVESEQ	99	0	-3	-0.40	
D - ROM	83 ALTO SAX	75	0	-3	+1.00	
<b>MUTE A</b>		<b>MUTE B</b>		<b>MUTE C</b>		<b>MUTE D</b>
<b>WAVSEQ</b>			<b>MIXEV</b>			

Waves are the source material for instruments created by Patches.

There can be up to four Waves in a Patch. Waves can be short transients, multi-sampled sounds, single (or several) cycle waveshapes, Wave Sequences, or Analog Inputs. 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. The ability to use Patches to process external sounds from the Analog Inputs further extends the Wavestation A/D's aural palette.

## Patch

The Patch to which these waves selections belong.

## Structure

The number of oscillators is determined by the Structure setting, as explained under EDIT PATCH.

If the structure is two oscillators, only oscillators A and D are available.

If the structure is one oscillator, only oscillator A is available.

## Wave

PCM waves are ROM or CARD only - there is no RAM for waveshapes.

In each bank, waves 0-31 are actually Wave Sequences. These appear with an asterisk (\*) before their names.

Waves #32 and up are ROM waves, including multi-samples, attack transients, and single- or few-cycle loops.

The last two waves, Input 1 and Input 2, represent the Analog Inputs. When used as waves, these sources are gated by the keyboard, so that they sound only when notes are played. For more information, see ANALOG INPUTS in this Reference Guide, and Section 10.6 of the Player's Guide, USING EXTERNAL SOUNDS AS WAVES.

## WAVES

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### Lev

Sets the master level for the wave selection. This amount scales the settings made under Edit Amp Envelope.

### Semi

+/- 24. The oscillator base pitch in semitones.

0 = A-440 tuning

12 = one octave up, and so on.

### Fine

Offsets the base pitch in cents (1/100 semitone).

### Slope

A slope of +1.00 is the standard intonation, with 12 divisions per octave.

2.00 means the pitch changes two octaves over a range of one octave of keyboard or MIDI input.

0.50 means that an octave of pitch is spread out over two octaves of keyboard. This allows you to play the quarter-tone scale.

A 0.00 slope plays all notes at middle C (C4).

A negative slope inverts the keyboard.

### MUTE A - D

These allow you to selectively disable each oscillator so that you can easily hear the one(s) you are working on.

MUTE switches do not appear for any oscillator that is unused by the current Structure.

### WAVSEQ

Goes to EDIT WAVE SEQUENCE. This soft key only appears if Wave Sequences are selected for at least one oscillator.

### MIXEV

Goes to EDIT MIX ENVELOPE. If the Structure is 1 oscillator, this soft key doesn't appear.

## WRITE (PERFORMANCE, PATCH, Multi Mode Setup, Scale)

Path:

*Performance*    EDIT - WRITE  
*Patch*            EDIT -- PATCH - WRITE  
*Scale*            GLOBAL -- SCALE - WRITE  
*Multi-Setup*    MIDI - MULTISSET - WRITE

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

Potential destination Patches and Performances may be auditioned, so that you can avoid overwriting important voice data.

### Type and Item

The Data Type field is the same type as was being edited prior to entering the WRITE page. Since WAVE SEQUENCES are automatically saved, this page does not apply to them.

Exiting the WRITE page returns to the page active prior to entering WRITE.

Data Type cannot be edited from this page.

### Source

Source fields cannot be edited from this page.

### Destination

The default destination is the same number as the source.

After writing, this destination becomes the new SOURCE.

### Memory Protection

Located here for convenience, this duplicates the settings on the GLOBAL page.

To WRITE to RAM1, RAM2, or RAM3, Memory Protect Internal must be Off.

To WRITE to CARD, Memory Protect Card must be Off.

## **WRITE**

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### **Currently Playing**

Initially this is set to SOURCE. Changing it to DESTINATION allows you to audition different destinations to write over.

### **EXECUTE**

Starts the operation.

### **NAME**

Goes to NAME (data type) for Performances or Patches only.

## APPENDIX 1: COMPATIBILITY

The Wavestation A/D is completely compatible with Program and PCM data created for the Wavestation keyboard. The Wavestation A/D adds several features not present in the keyboard version, however, and this means that you have to be slightly careful when transferring data in the other direction, from the A/D to the keyboard.

This appendix addresses the four main improvements made to the Wavestation A/D, in addition to several items in the SysEx implementation, and how these are handled by the Wavestation keyboard. The keyboard itself has had a major software update; those with this update are referred to as "3.0 or later," and those without it are referred to as "pre-3.0."

### **Extra RAM Bank**

The Wavestation A/D has a third Bank of program data, RAM3, which is not present on the keyboard. Sysex dumps of RAM3 Patches, Performances, and Wave Sequences will be ignored by the keyboard.

Additionally, if you use RAM3 Patches (or Wave Sequences) in RAM1, RAM2, or CARD Performances (or Patches) and then transfer them to the keyboard by using Cards or Sysex dumps, the references to RAM3 will be changed to ROM. If a Performance in RAM2 uses a RAM3 Patch, for instance, after the transfer it will use the similarly-numbered Patch in the ROM Bank.

This points out, once again, the desirability of self-contained Banks, in which Performances only use Patches and Wave Sequences from that same Bank (or from the ROM bank, which is always available).

Similarly, RAM3 Performances used in the Performance Select Map and Multisets will be changed to ROM performances when received, via SysEx dump, by the Wavestation keyboard. Please note also that pre-3.0 Wavestation keyboards will not recognize the SysEx PERFORMANCE MAP dump; if you wish to transfer the Performance Map to such a keyboard, use the ALL dump instead.

### **Extra PCM waves**

The Wavestation A/D has double the PCM sound ROM of the original Wavestation keyboard (Wavestations may be upgraded to include this extra PCM by installation of the optional EXK-W expansion kit). This means that the A/D has a large number of additional PCM waveforms which are not included in the keyboard; any wave numbered over 396 is part of this expanded PCM. When transferring a Patch which uses these waves to a pre-3.0 Wavestation keyboard, the wave numbers will be "clipped" to 396 (Pulse31), and that Patch will therefore not sound the same. On a 3.0 or later Wavestation keyboard, the appropriate number will be shown, but the name will be shown as NO EXP and the wave will not sound. 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 a 3.0 or later Wavestation keyboard, the correct wave numbers will be shown, but steps using expanded PCM will be shown as NO EXP and will not sound. On pre-3.0

keyboards, however, the results are somewhat different. 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 have to re-program it using waves from the non-expanded PCM.

### **Extra effects**

The Wavestation A/D's Stereo Mod Pitch Shift/Delay, Compressor - Limiter/Gate, and Vocoder effects are not present in pre-3.0 Wavestation keyboards (these extra effects are featured in 3.0 or later keyboards). If a Performance which uses these effects is transferred to a pre-3.0 keyboard, they will appear as effect #0, NO EFFECT, and will not be heard. As long as these effects are not edited, they will still be intact if transferred back to a Wavestation A/D, but changing the effects will erase the original data.

The Distortion/Overdrive effects are slightly enhanced in the Wavestation A/D (and in 3.0 or later Wavestation keyboards), with the addition of a modulation source and amount on the output level. These parameters will not appear on pre-3.0 keyboards, but the effects will otherwise function normally.

### **Analog Inputs**

The Wavestation keyboard does not have the Analog Inputs, and so the Wavestation A/D functions which use this feature are not available on the keyboard. In particular, Patches which use the Inputs as waves will appear on the keyboard similarly to those which use expanded PCM; older keyboards will change the wave to number 396, Pulse31, and newer keyboards will retain the old number but display the text, NO A/D.

### **Miscellaneous System Exclusive transfers**

The Wavestation keyboard offers a number of features for use as a MIDI controller. Although the Wavestation A/D 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 A/D.

The Wavestation A/D'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 3.0 or later keyboard's own Local Xpose, which is not referenced by the A/D. This is because the Wavestation A/D deals entirely with MIDI notes, whereas the keyboard deals with notes both from MIDI and its own keyboard.

The parameters for the new MIDI REMAP and ANALOG INPUT ASSIGN pages will not be recognized by the Wavestation keyboard.



## 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=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=64 Sustain Switch		v= 0 - 63: off, 64 - 127: on
c=100 Registered Parameter # lsb		v= 0 ~ 1 Note 2, 3
c=101 Registered Parameter # msb		v= 0 Note 2, 3

Note 1: Only received with registered parameter select

Note 2: Only received on the basic channel if in MULTI mode.

Note 3: Pitch bend range, Master fine tune.

#### 1.4. Program Change

Status	1100nnnn (Cn)	n=Channel no
Patch Number	0ppppppp	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 - 2	0 = RAM1/RAM2 1 = ROM/CARD 2 = RAM3

## A2 MIDI RECEIVED DATA

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### 1.6. Channel (mono) Pressure (After Touch)

Status 1101nnnn (Dn) n=Channel number  
Value 0vvvvvvv v=0 ~127

### 1.7. Polyphonic (key) Pressure (After Touch)

Status 1010nnnn (An) n=Channel Number  
Note No. 0kkkkkkk k=0~127  
Value 0vvvvvvv

### 1.8. Pitch Bend Change

Status 1110nnnn (En)  
Value LSB 0uuuuuuu  
Value MSB 0vvvvvvv

### 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. System Messages

### 2.1. Real Time Messages

Real time messages

#### Timing Clock

Status 11111000 (F8)  
Used for Wave Sequence Sync function.

#### Active Sensing

Status 1111110 (FE)  
If active sense is ever received, then a data byte must be received every 300 ms. Otherwise all voices will be turned off.

### 2.2. System Exclusive Messages

Please refer to SYSEX DATA TRANSMIT section.

## APPENDIX 3: MIDI TRANSMITTED DATA

Note that messages are transmitted using running status whenever possible. If the status has not changed within 500 milliseconds, then the next message transmitted 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=4 Foot Control		v= 0 ~ 127
c=6 Data Entry (msb)		v= 0 ~ 127 Note 1, 2
c=7 Volume		v= 0 ~ 127
c=12 FX Controller		v= 0:off, 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=64 Sustain Switch		v= 0:off, 127: on
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.

#### 1.2. Program Change

Status	1100nnnn (Cn)	n=Channel no.
Program Number	0ppppppp	p= 0 ~ 127 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 - 2	0 = RAM1/RAM2 1 = ROM/CARD 2 = RAM3

### 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 SYSEX DATA TRANSMIT page.

<h2 style="text-align: center;">APPENDIX 4: MIDI SYSTEM EXCLUSIVE FORMAT</h2>
---

**Bold Face** type denotes parameters which are used by the Wavestation keyboard only, and are not referenced by the Wavestation A/D.

### 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  
0nnnnnnnnnn 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
40	Single Patch Dump
49	Single Performance Dump
4C	All Patch Dump (within bank)
4D	All Performance Dump (within bank)
50	All Data (system, patch, performance, wave sequence) Dump
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
23	Data Load Completed
24	Data Load Error
11	Patch Write Command
1A	Performance Write Command
21	Write Complete Message

22	Write Error Message
5B	Multi Mode Setup Select
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
00000xxx (0x)	Bank number (0..4)
0xxxxxxx	Patch number.
Nibble data	Patch structure (section 5.2)
0ccccccc	Checksum
11110111 (F7)	End of exclusive.

## **A4 MIDI SYSTEM EXCLUSIVE FORMAT**

---

### **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
00000xxx (0x)	Bank number (0..4)
0xxxxxxxx	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
00000xxx (0x)	Bank number (0..4)
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
00000xxx (0x)	Bank number (0..4)
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 data (as described below).

F0 42 3n 28	Wavestation sysex header
01010001 (51)	System Setup Dump
Nibble data	System structure (section 5.7)
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 5.8)
0ccccccc	Checksum
11110111 (F7)	End of exclusive

**2.1.7 Wave Sequence Data**

F0 42 3n 28	Wavestation sysex header
01010100 (54)	Wave Sequence Dump
00000xxx (0x)	Bank number (0..4)
Nibble data	Ws_block structure (section 5.5)
0ccccccc	Checksum
11110111 (F7)	End of exclusive

**2.1.8 Multi Mode Setup Data**

In this data, references to RAM3 are changed to ROM, for compatibility with the keyboard. This message is always accompanied by the Multi Mode Setup Extended 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

**2.1.9 Multi Mode Setup Expanded Data**

In this data, references to RAM3 are allowed. This message always accompanies the Multi Mode Setup 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

## **A4 MIDI SYSTEM EXCLUSIVE FORMAT**

---

### **2.1.10 Performance Map Data**

In this data, references to RAM3 are changed to ROM, for compatibility with the keyboard. This message is always accompanied by the Performance Map Extended Data (as described below).

F0 42 3n 28	Wavestation sysex header
01011101 (5D)	Performance Map Dump
Nibble data	Performance Map_block structure (section 5.9)
0ccccccc	Checksum
11110111 (F7)	End of exclusive

### **2.1.11 Performance Map Expanded Data**

In this data, references to RAM3 are allowed. This message always accompanies the Performance Map Data (as described above).

F0 42 3n 28	Wavestation sysex header
01011111 (5F)	Performance Map Dump Extended
Nibble data	Performance Map_block structure (section 5.10)
0ccccccc	Checksum
11110111 (F7)	End of exclusive

### **2.1.12 Micro Tune Scale Data**

F0 42 3n 28	Wavestation sysex header
01011010 (5A)	Micro Tune Scale Dump
Nibble data	Mtune_block structure (section 5.6)
0ccccccc	Checksum
11110111 (F7)	End of exclusive

### **2.1.13 All Data**

This message is always accompanied by the Multi Mode Setup Expanded Data, the Performance Map Expanded Data, the System Setup 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 5.11)
0ccccccc	Checksum
11110111 (F7)	End Of exclusive



**2.1.14 Parameter Change Messages**

The normal parameter change messages include parameters numbered up to 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

**2.1.15 Parameter Change Messages Expanded**

The expanded parameter change messages include parameters numbered 380 and greater. 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

**2.1.16 Multi-Mode Setup Select**

Sent whenever the current multi set is changed. 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

## A4 MIDI SYSTEM EXCLUSIVE FORMAT

### 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
01000010 (42)	KORG ID
00101000 (28)	Wavestation family code (LSB)
00000000 (00)	(MSB)

00000001 (01)	Member code (LSB)
00000000 (00)	(MSB)
0xxxxxxx (0x)	Minor software version (LSB)
0xxxxxxx (0x)	(MSB)
0xxxxxxx (0x)	Major software version (LSB)
0xxxxxxx (0x)	(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
00000xxx (0x)	Bank number (0..4)
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
00000xxx (0x)	Bank number (0..4)
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
00000xxx (0x)	Bank number (0..4)
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
00000xxx (0x)	Bank number (0..4)
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

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---

### **4.1.7 Wave Sequence Data Dump Request**

F0 42 3n 28	Wavestation sysex header
00001100 (0C)	Wave Sequence Dump Request
00000xxx (0x)	Bank number (0..4)
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
00000xxx (0x)	Bank number (0..4)
0ppppppp (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
00000xxx (0x)	Bank number (0..4)
0ppppppp (pp)	Performance number (0-49)
11110111 (F7)	End of exclusive

## **4.3 Device Inquiry Message**

11110000 (F0)	System Exclusive
01111110 (7E)	Non Real Time
0xxxxxxx (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
                            (-1 = stereo) */
    ubyte   Part_Mode;      /* KEYBOARD ASSIGN MODE
                            (Polyphonic,UNI) */
                                /* bit 6 */
                                /* 1 = Patch is from Expansion RAM Bank
                                (RAM3) */

                                /* bit 5-4 */
                                /* 00= **** */
                                /* 01= Local play mode*/
                                /* 10= MIDI play mode*/
                                /* 11 = Both */

                                /* bit 3-2 */
                                /* 00= **** */
                                /* 01= polyphonic*/
                                /* 10= unison re-trigger*/
                                /* 11= unison legato*/

                                /* bit 1-0 */
                                /* 00= low note*/
                                /* 01= high note*/
                                /* 10= last note*/
                                /* 11 = **** */

```

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```
    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*/
    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
byte      S1_Pitch_Amt; /* Modulation Source 1 to Pitch
byte      S2_Pitch;     /* Modulation Source 2 to Pitch
byte      S2_Pitch_Amt; /* Modulation Source 2 to Pitch
byte     Key_Filter;    /* Keyboard to Filter Cutoff Amount*/
byte     S1_Filter;     /* Modulation Source 1 to Filter
byte     S1_Filter_Amt; /* Modulation Source 1 to Filter
byte     S2_Filter;     /* Modulation Source 2 to Filter
byte     S2_Filter_Amt; /* Modulation Source 2 to Filter
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*/
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*/

```

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```
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*/
```



```

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 3 = 1; Wave D uses RAM3 waveseq */
                           /* Bit 2 = 1; Wave C uses RAM3 waveseq */
                           /* Bit 1 = 1; Wave B uses RAM3 waveseq */
                           /* Bit 0 = 1; Wave A uses RAM3 waveseq */

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

In this data, references to RAM3 are changed to ROM, for compatability with the keyboard.

```

/*      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_Chان_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_Chان; /* 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**

In this data, references to RAM3 are allowed. It is otherwise the same as the normal Multi Mode Setup structure above.

**5.5 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 */
    wavstep wavstep_block[501]; /* 501 wave seq steps */
    ws_name  ws_name_block[32]; /* 32 wave seq names */
} ws_block;

```

## 5.6 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;

```

**5.7 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_kd;         /* LOCAL_KBD */
  byte    xmit_program_enable; /* XMIT PROG CHANGE */
  byte    xmit_pressure_enable; /* XMIT AFTERTOUCH */
  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;
```

**5.8 System Setup Expanded Data Structure**

This contains data not supported by the keyboard version, including various MIDI remapping features, local transpose, and analog inputs parameters.

```
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;
} system_ext;

```

### 5.9 Performance Map Structures

In this data, references to RAM3 are changed to ROM, 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;

```

### 5.10 Performance Map Expanded Structures

In this data, references to RAM3 are allowed. It is otherwise the same as the normal Performance Map structure above.

### 5.11 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;

```

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### 5.12 Parameter Number Table

enum /\* Parameter numbers. \*/

```
{
/* 0 */ CURRENT_BANK,
/* 1 */ CARD_NAME,
/* 2 */ CURRENT_PROG,
/* 3 */ PROG_NAME,
/* 4 */ MIDI_MODE,
/* 5 */ MIDI_BASE_CHAN,
/* 6 */ NUM_MONO_CHANS,
/* 7 */ KEY_NUM_OFFSET,
/* 8 */ MIDI_PARAM_ENABLE,
/* 9 */ CONTROLLER_1,
/* 10 */ CONTROLLER_2,
/* 11 */ XMIT_MODE,
/* 12 */ LOCAL_KBD,
/* 13 */ XMIT_PROG_CHANGE,
/* 14 */ XMIT_AFTERTOUCH,
/* 15 */ XMIT_PITCH_BEND,
/* 16 */ XMIT_CONTROLLERS,
/* 17 */ REC_PROG_CHANGE,
/* 18 */ REC_AFTERTOUCH,
/* 19 */ REC_PITCH_BEND,
/* 20 */ REC_CONTROLLERS,
/* 21 */ REC_NOTE_ON_OFF,
/* 22 */ REC_ALL_NOTES_OFF,
/* 23 */ PROGMAP_ENABLE,
/* 24 */ PROGMAP_CHANGE_NUM,
/* 25 */ PROGMAP_PROG_BANK,
/* 26 */ PROGMAP_PROG_NUM,
/* 27 */ PROGMAP_PROG_NAME,
/* 28 */ CURRENT_MULTISSET,
/* 29 */ MULTISSET_FX_CONTROL_CHAN,
/* 30 */ MULTISSET_CHAN,
/* 31 */ MULTISSET_CHAN_ENABLE,
/* 32 */ MULTISSET_LEVEL,
/* 33 */ MULTISSET_PROG_BANK,
/* 34 */ MULTISSET_PROG_NUM,
/* 35 */ MULTISSET_PROG_NAME,
/* 36 */ SYSEX_PATCH_BANK,
/* 37 */ SYSEX_PATCH_NUM,
/* 38 */ SYSEX_ALL_BANK,
/* 39 */ SYSEX_WAVESEQ_BANK,
/* 40 */ SYSEX_PROG_BANK,
/* 41 */ SYSEX_PROG_NUM,
/* 42 */ MASTER_TUNE,
/* 43 */ EFFECTS_ENABLE,
/* 44 */ MEM_PROTECT_INTERNAL,
/* 45 */ MEM_PROTECT_CARD,
/* 46 */ PITCH_BEND_RANGE,
/* 47 */ VELOCITY_RESPONSE,
/* 48 */ SAVE_DATA_TYPE,
/* 49 */ SAVE_SOURCE_BANK,
/* 50 */ SAVE_SOURCE_NUM,
/* 51 */ SAVE_SOURCE_NAME,
/* 52 */ SAVE_DEST_BANK,
/* 53 */ SAVE_DEST_NUM,
/* 54 */ SAVE_DEST_NAME,
/* 55 */ SAVE_PLAY,
/* 56 */ CURRENT_PART,
/* 57 */ PART_PATCH_BANK,
/* 58 */ PART_PATCH_NUM,
/* 59 */ PART_PATCH_NAME,
/* 60 */ PART_MODE,
/* 61 */ PART_VOLUME,
/* 62 */ PART_OUTPUT,
/* 63 */ PART_KEY_LIMIT_LOW,
/* 64 */ PART_KEY_LIMIT_HIGH,
/* 65 */ PART_VEL_LIMIT_LOW,
/* 66 */ PART_VEL_LIMIT_HIGH,
/* 67 */ PART_TRANSPOSE,
/* 68 */ PART_DETUNE,
/* 69 */ PART_SUS_ENABLE,
/* 70 */ PART_DELAY,
/* 71 */ PART_UNI_NOTE_PRIORITY,
/* 72 */ PART_MTUNE_TAB,
/* 73 */ PART_MTUNE_KEY,
/* 74 */ PART_MIDI_XMIT_CHAN,
/* 75 */ PART_PLAY_MODE,
/* 76 */ PART_PROG_CHANGE_XMIT,
/* 77 */ PATCH_STRUCTURE,
/* 78 */ PATCH_HARD_SYNC,
/* 79 */ CURRENT_WAVE,
/* 80 */ PATCH_PITCH_MACRO,
/* 81 */ PATCH_FILTER_MACRO,
/* 82 */ PATCH_AMP_MACRO,
/* 83 */ PATCH_PAN_MACRO,
/* 84 */ PATCH_ENV_MACRO,
/* 85 */ PATCH_PITCH_BEND_RANGE,
/* 86 */ PATCH_PITCH_RAMP_AMT,
/* 87 */ PATCH_PITCH_RAMP_RATE,
/* 88 */ PATCH_PITCH_VEL_AMT,
/* 89 */ PITCH_SOURCE_1,
/* 90 */ PITCH_SOURCE_1_AMOUNT,
/* 91 */ PITCH_SOURCE_2,
/* 92 */ PITCH_SOURCE_2_AMOUNT,
/* 93 */ FILTER_MOD_CUTOFF,
/* 94 */ FILTER_MOD_TRACKING,
/* 95 */ FILTER_EXCITER_AMOUNT,
/* 96 */ FILTER_MOD_SOURCE1,
/* 97 */ FILTER_MOD_SOURCE1_AMT,
/* 98 */ FILTER_MOD_SOURCE2,
/* 99 */ FILTER_MOD_SOURCE2_AMT,
/* 100 */ GP_ENV_LEVEL_0,
/* 101 */ GP_ENV_LEVEL_1,
/* 102 */ GP_ENV_LEVEL_2,
/* 103 */ GP_ENV_LEVEL_3,
/* 104 */ GP_ENV_LEVEL_4,
/* 105 */ GP_ENV_RATE_1,
/* 106 */ GP_ENV_RATE_2,
/* 107 */ GP_ENV_RATE_3,
/* 108 */ GP_ENV_RATE_4,
/* 109 */ GP_VEL_ENV_AMT,
/* 110 */ AMP_ENV_LEVEL_0,
/* 111 */ AMP_ENV_LEVEL_1,

```

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```

/* 112 */ AMP_ENV_LEVEL_2,
/* 113 */ AMP_ENV_LEVEL_3,
/* 114 */ AMP_ENV_RATE_1,
/* 115 */ AMP_ENV_RATE_2,
/* 116 */ AMP_ENV_RATE_3,
/* 117 */ AMP_ENV_RATE_4,
/* 118 */ AMP_MOD_VEL_ENV_AMOUNT,
/* 119 */ AMP_MOD_SOURCE_1,
/* 120 */ AMP_MOD_SOURCE_1_AMOUNT,
/* 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_SRC1,
/* 204 */ MIX_MOD_X_SRC1_AMT,
/* 205 */ MIX_MOD_X_SOURCE2,
/* 206 */ MIX_MOD_X_SRC2_AMT,
/* 207 */ MIX_MOD_Y_SRC1,
/* 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,

```

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```
/* 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,
/* 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_PARAMS,
/* 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 */ ENVI_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,
/* 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 greater than 379 are sent as expanded parameter change messages. Parameters 380-404 are ignored by the Wavestation 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_CONTROLO,
/* 406 */ LOCAL_XPOSE, /* Keep right
before last */
/* 407 */ PARAM END /* Must be
last */
};

```

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