

EMULATOR IV OPERATION MANUAL

PROFESSIONAL DIGITAL SAMPLING SYSTEM

**Emulator IV
Professional Digital Sampling System**

Operation Manual

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• F1460 Rev. D

IMPORTANT NOTICE:

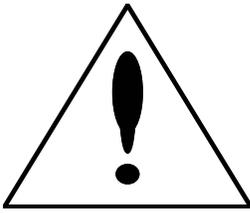
IN ORDER TO OBTAIN WARRANTY SERVICE ON YOUR EMULATOR IV UNIT, THE SERIAL NUMBER STICKER MUST BE INTACT AND YOU MUST HAVE A SALES RECEIPT OR OTHER PROOF OF PURCHASE. IF THERE IS NO SERIAL NUMBER STICKER ON THE E-IV, PLEASE CONTACT E-MU SYSTEMS AT ONCE.

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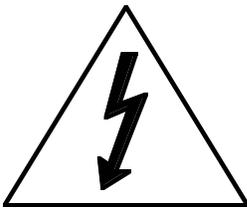
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WARNING: READ THIS FIRST



This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.



This symbol is intended to alert the user to the presence of un-insulated dangerous voltage within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

IMPORTANT SAFETY INSTRUCTIONS

Use in countries other than the U.S.A. may require the use of a different line cord or attachment plug, or both. To reduce the risk of fire or electric shock, refer servicing to qualified service personnel. To reduce risk of fire or electric shock do not expose this product to rain or moisture.

GROUNDING INSTRUCTIONS

This product must be grounded. If it should malfunction or break down, grounding provides a path of least resistance for electric current, reducing 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 properly installed and grounded in accordance with all local codes and ordinances.

DANGER

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

CAUTION

If the 6300, E-IV is rack mounted, a standard 19 inch open frame rack must be used.

USER-MAINTENANCE INSTRUCTIONS

1. The E-IV should be kept clean and dust free. Periodically wipe the unit with a clean, lint free cloth. Do not use solvents or cleaners.
2. There are no user lubrication or adjustment requirements.
3. Refer all other servicing to qualified service personnel.

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

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

1. Read all instructions before using the E-IV.
2. To reduce the risk of injury, close supervision is necessary when the E-IV is used near children.
3. Do not use the E-IV near water — for example near a bathtub, washbowl, kitchen sink, in a wet basement, on a wet bar, or near or in a swimming pool.

4. The E-IV should be situated so that its location or position does not interfere with its proper ventilation.
5. The E-IV should be located away from heat sources such as radiators, heat registers, fireplaces, stoves, or ovens.
6. The E-IV should only be connected to a power supply of the type described in the operating instructions and as marked on the product.
7. Care should be taken so that objects do not fall and liquids are not spilled into the enclosure of the E-IV through openings.
8. This E-IV may be equipped with a polarized line plug (one blade wider than the other). This is a safety feature. If you are unable to insert this plug into the outlet, do not defeat the safety purpose of the plug. Contact an electrician to replace your obsolete outlet.
9. The power supply cord of the E-IV should be unplugged from the outlet when left unused for a long period of time.
10. This product, in combination with an amplifier and headphones and speakers, may be capable of producing sound levels that could cause permanent hearing loss. Do not operate for a long period of time at a high volume level or at a level that is uncomfortable. If you experience any hearing loss or ringing in the ears, consult an audiologist.
11. The product should be serviced by qualified service personnel when:
 - A. The power supply cord 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 has been dropped or the enclosure damaged; or
 - E. The E-IV does not operate normally or exhibits a marked change in performance.
12. All servicing should be referred to qualified service personnel.

SAVE THESE INSTRUCTIONS

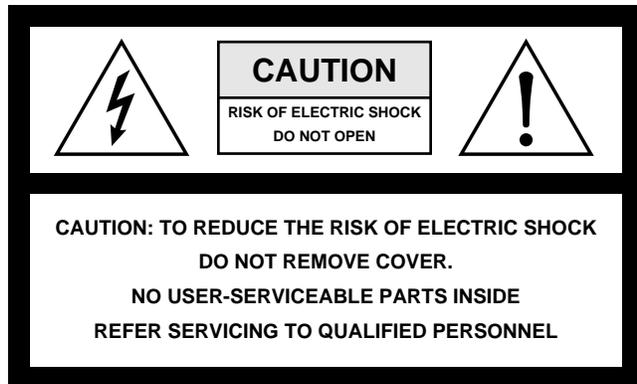
RADIO and TELEVISION INTERFERENCE

The equipment described in this manual generates and uses radio-frequency energy. If it is not installed and used properly--that is, in strict accordance with our instructions - it may cause interference with radio and television reception.

This equipment has been tested and complies with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of the FCC rules. These rules are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that the interference will not occur in a particular installation, especially if a "rabbit ear" TV antenna is used.

If the E-IV does cause interference to radio or television reception, you can try to correct the interference by using one or more of the following measures:

- Turn the television or radio antenna until the interference stops.
- Move the E-IV to one side or the other of the television or radio.
- Move the E-IV farther away from the television or radio.
- Plug the E-IV into an outlet on a different circuit than the television or radio.
- Consider installing a rooftop antenna with a coaxial lead-in between the antenna and television set.



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General Instructions

Introduction

Congratulations on your purchase of the E-IV Digital Sampling System! The various functions of the E-IV are organized in this manual by their module. Screen displays and step-by-step instructions are described for all aspects of use and operation. Sidebars are used to highlight important points or to give useful operational tips which might not be readily apparent.

If you are totally unfamiliar with samplers and synthesizers in general, you may need more information than this manual provides. We suggest that you read some of the many books and magazines on the subject of music synthesis. This will help you to get the most out of this extremely powerful instrument.

Important Upgrade information

The Emulator IV is a software-based device. The features and functions of the E-IV will be periodically enhanced and upgraded and the new software will be mailed to you on floppy disk. Please take a moment now to read the E-mu Systems warranty and to fill out and send in your warranty registration card. We NEED your mailing address in order to send you upgrades and manual revisions.

The Emulator IV

The E-IV was designed to be the ultimate in professional sampling instruments. Every feature of the E-IV expands the state-of-the-art in sampling instrument design, from ease of use to the impeccable audio specifications. For starters, the E-IV contains an incredible 128 channels of polyphony (64 stereo). The basic E-IV comes with 8 Megabytes of sample memory, but this is user-expandable up to 128 megabytes with standard SIMM modules. With fully expanded memory, the E-IV provides over 24 minutes of sampling time!

Sound Libraries

The E-IV has full access to the huge library of sounds available from E-mu and other sources. It is fully compatible with the legendary EIII and EIII-X libraries, and can transparently read Emax II and Akai S1000/S1100 banks as if they were its own.

Sound Storage

The E-IV can access up to 1000 samples per bank arranged in up to 1000 presets. The dual connector 50-pin SCSI interface provides access to high density media such as hard disks, magneto-optical disks or CD-ROM. The integral 3.5" floppy disk drive provides a convenient means of updating the E-IV software which is periodically being enhanced and improved. Most software upgrades will be mailed free to registered owners. The E-IV also has 3 rear panel option slots to accommodate hardware expansion cards.

Other professional features include selectable sample rates of 22.05 kHz, 24 kHz, 44.1 kHz, and 48 kHz. D/A converters are 18-bit linear. The Sigma-Delta A/D converters are 16-bit linear. Sampling can be performed in either mono or true stereo.

Advanced DSP

The E-IV's advanced features make sampling a breeze. Samples can be automatically truncated, normalized and placed on the keyboard as the sample is taken and advanced tools such as Auto Correlation, Loop Compression and Crossfade Looping allow even the most difficult sounds to be easily looped.

Samples can be digitally spliced and mixed with other samples, and dynamically controlled from the keyboard using velocity and positional crossfading and switching functions. Advanced digital processing features such as Sample Rate Conversion, Compression, Parametric Equalizer and Digital Tuning allow you to shape raw samples more quickly and with greater precision than computer based systems. Samples can easily be transferred between the E-IV and an external computer via SCSI if so desired.

Additional digital processing functions include: Time Compression and Expansion, which shorten or lengthen the time of samples without changing the pitch; Transform Multiplication, which can be used to create weird and wonderful new timbres; and Doppler which allows you to

move samples forward and backwards in space as well as from side to side.

Digital Hardware Features

The E-IV's digital hardware implements 128 Z-Plane filters. These digital filters are very "analog-sounding" and currently implement the following types of filters:

- 12, 24, or 36 dB/octave Lowpass filters with resonance
- 2nd & 4th order Highpass filters with resonance
- 2nd & 4th order Bandpass filters with resonance
- Three types of swept EQ filters
- Three phasers and one flanger with resonance
- Two morphing vocal formant filters

Modulation sources include three multi-stage envelope generators and two multi-wave LFOs per channel, as well as a full MIDI modulation control over virtually every parameter.

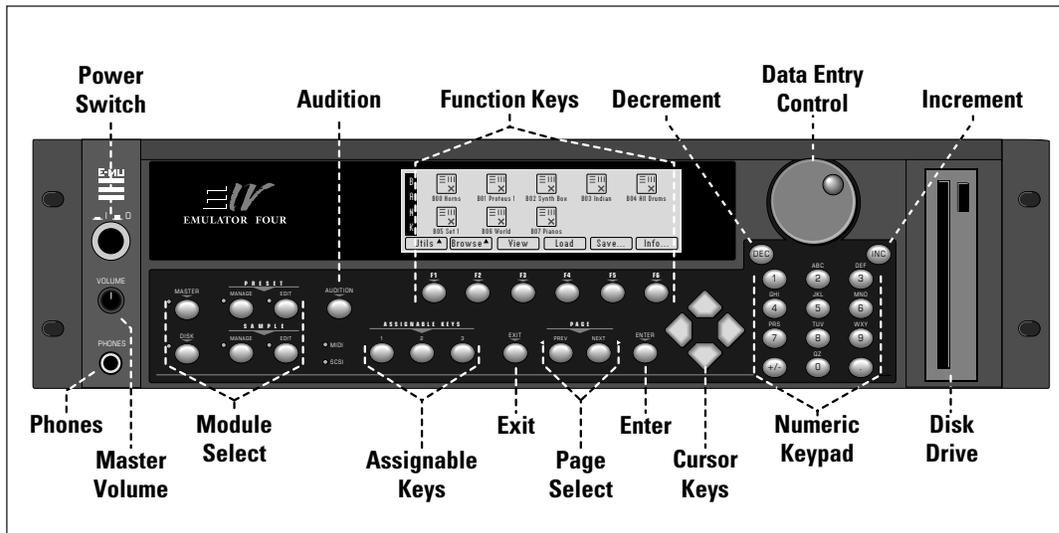
The E-IV is 16 part multi-timbral (32 MIDI channels with option card), allowing complex sequencing and sound effects creation, and can be controlled by remote control using an external computer.

- Eight balanced polyphonic audio outputs allow you to mix and process specific sounds. The main stereo outputs are simultaneously available at 1/4" phone jacks and XLR connectors.
- Resampling - The E-IV can resample its own output in the digital domain for layering and the creation of new and exciting effects.
- IBM compatible ASCII keyboard interface controls all E-IV operations including naming and browsing.
- A digital interface (AES/EBU & S/PDIF) is another standard option which facilitates the transfer of stereo digital audio between digital recorders, mixers, etc.

The E-IV is based on the latest G-chip and H-chip digital hardware. The G-chip allows smooth sample transposition over a 10-octave range while the H-chips retain the warm, musical character of traditional analog filters.

The E-IV is an extremely powerful and reliable seventh generation instrument. We at E-mu Systems sincerely hope it will help you realize and further your musical potential.

Main Controls



Volume Control

This is the master volume control for all outputs including digital I/O and the headphone output. The master volume is a digital control. For maximum dynamic range, set this control near or at maximum.

Module Select Keys

The functions of the Emulator IV are grouped according to their function in six modules. The Sample Manage and Sample Edit modules deal with operations at the sample level. The Preset Manage and Preset Edit modules deal with operations at the preset level. The Master module contains functions that affect the entire machine. Any function that has to do with the disk, such as loading, saving and the like is accessed through the Disk module.

MIDI & SCSI Indicator LEDs

The LEDs illuminate to show activity on the SCSI bus or incoming MIDI data.

Exit Button

The exit button allows you to back out of a module one menu at a time, each time the button is pressed. It can also be used anytime you do not want to execute a particular function. In the Sample Manage module, it can also be used to terminate the sampling process.

Function Keys

The lower line of the display will usually contain a row of up to six “soft key” buttons. These soft-key buttons indicate the function of the function keys directly below them.

Assignable Keys

These are user-assigned keys which can cause a jump to any screen.

Audition Button

The audition button allows you to play notes on the E-IV directly from the front panel without having a MIDI keyboard connected. The note that will be played is selected under “Tune” in the Master module. The Audition button also allows you to play samples directly from the hard disk before loading them when in the sample browser.

Page Select Keys

The previous and next page keys are primarily used to move back and forth between pages when multiple pages of options exist. Each button has an associated LED arrow which illuminates if there is more information on the previous or next page. Arrows in the top corners of the display also indicate if there are more available pages. In the preset selection screen, the page select keys can be used to select the previous or next preset.

Enter Button

The enter button is used to confirm a particular operation. Enter can be used in place of an affirmative function key response such as “OK” or “Go”. In the Disk Browser, pressing the Enter key will advance the selection from: Drives -> Folders -> Banks -> Presets -> Samples. (The Exit key reverses the progression.)

Tip: Holding down the Enter key while turning the data entry control allows “fine tuning” of the value by one number per click.

Cursor Keys

The left, right, up, and down cursor keys are primarily used to move the cursor around in the display. The cursor is a reversed-out section in the display which indicates the currently selected parameter. In the preset selection screen the left and right cursor keys can be used to select the previous or next preset.

Data Entry Control

The data entry control is a stepped, variable control which is used to change parameter values. The control increments or decrements the current value one unit each click. This control incorporates acceleration (values advance faster if the control is quickly turned).

Inc/Dec Keys

The increment and decrement keys are used primarily to duplicate the function of the data entry control when a finer degree of control is required. In the preset selection screen the inc/dec keys can be used to select the previous or next preset.

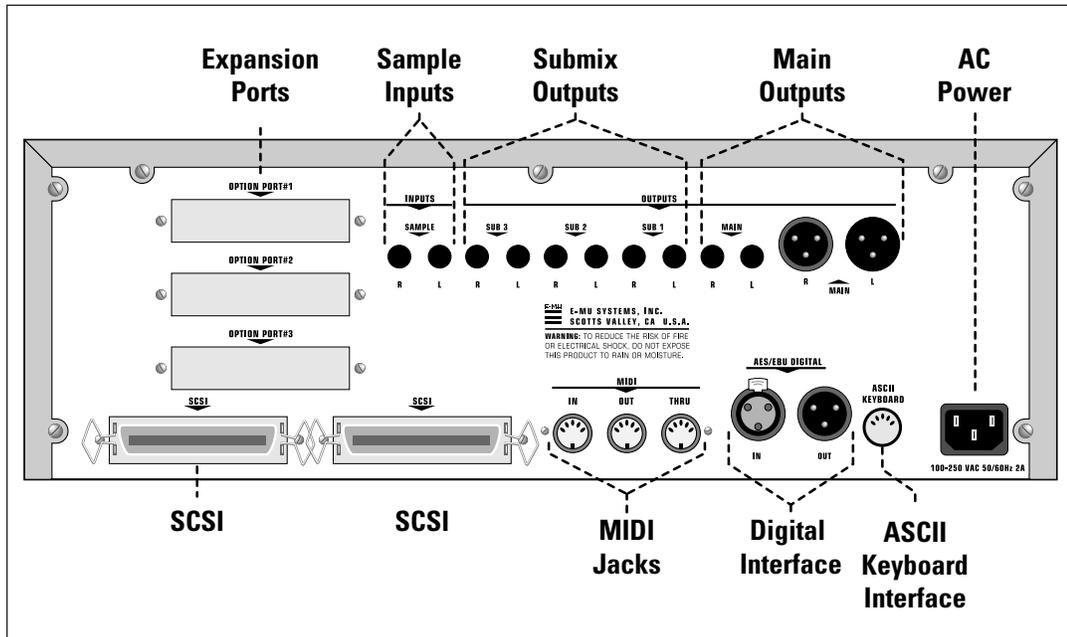
Numeric Key Pad

The numeric keypad is used to enter data in precise amounts. For example, if you wanted to select preset 10, enter 010 on the keypad and the preset will be instantly selected. The numeric keypad can be used anytime the data to be entered is a number. The numeric keypad can be used to select samples and presets when you know the exact number. You could simply enter the number without the leading zero as in “10”. In this case, after entering the number, you will be asked to confirm the value by pressing “Go”. The +/- key can be used to indicate if the value is positive or negative. The keypad can also be used for naming as each key is labeled “telephone-style” with 3 characters above the key.

Floppy Disk Drive

The floppy disk drive is used primarily to update the software of the E-IV, but can also be used to store and transfer sound banks in a pinch. Due to the low capacity of floppy disks, they are not practical for backing up sound data.

Connections



SCSI

SCSI is a high-speed parallel interface which is normally used to interface the E-IV with external mass storage devices such as hard disks or magneto-optical discs. The dual 50-pin SCSI ports can also be used to link the E-IV with an external computer for extremely fast file transfers. The E-IV contains advanced SCSI links to facilitate multiple "master" devices on the SCSI bus, such as multiple E-IVs or a computer and an E-IV.

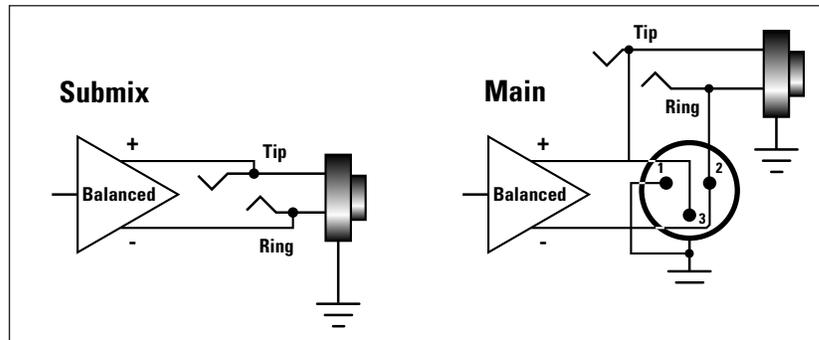
For more information on SCSI installation, see page 1-13. Also refer to the manual that accompanies your external SCSI device.

Sample Inputs

The two sample input jacks accept any level input from microphone to line level. Input impedance is $4K\Omega$. The gain of the sample input preamplifiers is controlled from the New screen in the Sample Manage module. When in the Sample Manage module the sample inputs can be monitored from the main outputs.

Main Outputs

The E-IV has provisions for a variety of output connection schemes. The most common hookup will probably be using the main stereo outputs. The main outputs are available at both XLR and 1/4" phone jacks. Both outputs are balanced outputs. Insert a stereo plug into the 1/4" output for a balanced signal or a standard mono plug for unbalanced signal. Output level is +4 dBm (approximately 1.23 volts RMS). Output impedance is 50 ohms.



Submix Outputs

In addition to the main stereo outputs, the E-IV has three additional pairs of balanced submix outputs which can be used when individual processing on specific instruments is desired. Any combination of channels can be programmed to appear at a submix output pair. Any voice can also be assigned to a submix pair (In the Amplifier screen of the Preset Edit module). MIDI channels can be assigned to the submix pair using the Multimode Mix function in the Master module. The Submix Outputs are balanced stereo jacks with +4 dBm outputs on the tip and ring of the jack. Output impedance is 50 ohms.

MIDI Connection

E-IV provides a MIDI IN, a MIDI OUT and a MIDI THRU port.

- The **MIDI IN** port connects to the MIDI OUT port of an external MIDI controller which could be a keyboard, a sequencer, MIDI drum kit or whatever. Note that the E-IV can only respond to information that your controller transmits. (i.e. If your MIDI keyboard does not have velocity and pressure sensitivity, the E-IV will not respond to velocity and pressure.)
- **MIDI OUT** can be connected to another MIDI instrument or computer. The MIDI OUT jack is used to transmit preset change information, or for MIDI sample dump information (transfers sample data).
- **MIDI THRU** simply re-transmits any information received at the MIDI IN port.

Digital I/O

The digital interface allows the E-IV to transfer digital audio back and forth with other digital devices equipped with AES/EBU or S/PDIF digital I/O. Keeping the signal in the digital domain is desirable to keep the signal to noise level as high as possible.

The digital input allows you to sample directly from a DAT recorder or other digital device. The digital output reflects the data at the stereo outputs of the E-IV. See the Sample Manage module and Output Format (located under Output in the Master menu) for more information.

AC Power Connection

The E-IV may be used in either 110 volt or 220 volt environments at either 50 Hz or 60 Hz. No change of voltage settings is required. The E-IV automatically switches itself for 110 or 220 volt operation.

Expansion Ports

Three expansion ports allow for additional hardware upgrades such as an additional MIDI port (which adds another 16 MIDI channels) and other options to be announced.

ASCII Keyboard Interface

A standard IBM PC style ASCII keyboard can be connected to the rear panel ASCII Keyboard connector. The keyboard must be connected before power is applied in order for the E-IV to recognize it. All the front panel controls of the E-IV can be accessed via the keyboard. Having an ASCII keyboard is also a real time saver when naming samples, presets and banks. The keyboard functions are charted below.

E-IV	ASCII KEYBOARD
Exit	Esc
Ten Key Pad	Ten Key Pad
Cursor Keys	Cursor Keys, Ten Key Pad
Page Keys	Ten Key Pad 3, 9
Numeric Selection	[Num Lock, Ten Key Pad]
Inc/Dec	+/-
F1-F6	[F1-F6]
Preset Edit	[Alt, A], [Alt, F], [Ctrl, E]
Sample Manage	[Alt, S]
Sample Edit	[Alt, D], [Ctrl, G]
Preset Manage	[Alt, P]
Master	[Alt, M]
Multimode	[Alt, Z]
Disk	[Ctrl, D]
Load Bank	[Ctrl, L], [Alt,]]
Save Bank	[Ctrl, S], [Alt, []
Search Dialog	[Ctrl, F] <i>in Browser</i>
Rename Dialog	[Ctrl, R] <i>in Browser</i>
Audition Preset/Sample	[Ctrl, A] <i>Depending on module</i>

► To Connect the E-IV to an Unformatted Hard Disk

1. Position the SCSI device and the E-IV in a stable location. Hard disk drives are particularly susceptible to shock and vibration. Make sure that you position your hard disk where it won't be bumped or moved while in use.
2. **Important:** Make sure that all power to the E-IV and the SCSI device is turned OFF.
3. Connect the SCSI device to your E-IV using a quality SCSI cable. Make sure that the connectors are firmly mated and that the wire "keepers" are locked in place. There are two type of SCSI cables in common use: the 50-pin Centronics type and the 25-pin DB connector type. The E-IV uses the 50-pin Centronics type connector.
4. Set the SCSI ID of your external SCSI device to any number other than 6. (6 is the default ID of the E-IV). Consult the operation manual of your SCSI device for this procedure.
5. Turn on the external SCSI device and the E-IV.
6. Make sure your hard disk really is unformatted. Formatting a hard disk erases all the data on it. Press the **Disk** button. If the display does not show the external hard disk icon, the hard disk is may be unformatted. Try mounting the drives (Utilities, in the Disk Browser). Also check that the SCSI ID is not set to 6 (E-IV's default).
7. Format the hard disk. While in the Disk Browser, press the soft key **Utils**. A new line of options will appear.
8. Select **Format**. The display will warn that formatting erases everything on the hard disk. Press the soft key **OK** to continue.
9. The E-IV will format the hard disk drive. Formatting takes a few minutes. The time will vary depending of the capacity of the disk..
10. After formatting, the hard disk will appear in the disk browser and is now ready to accept data. Use the left/right cursor keys or the data entry control to select the newly formatted hard drive. Use the function key under **Info...** to get information about the new drive.

 **Tip:** If the hard disk is already formatted with another file system, you can use the *Install File System* function instead of formatting the disk . See *Disk Utilities*.

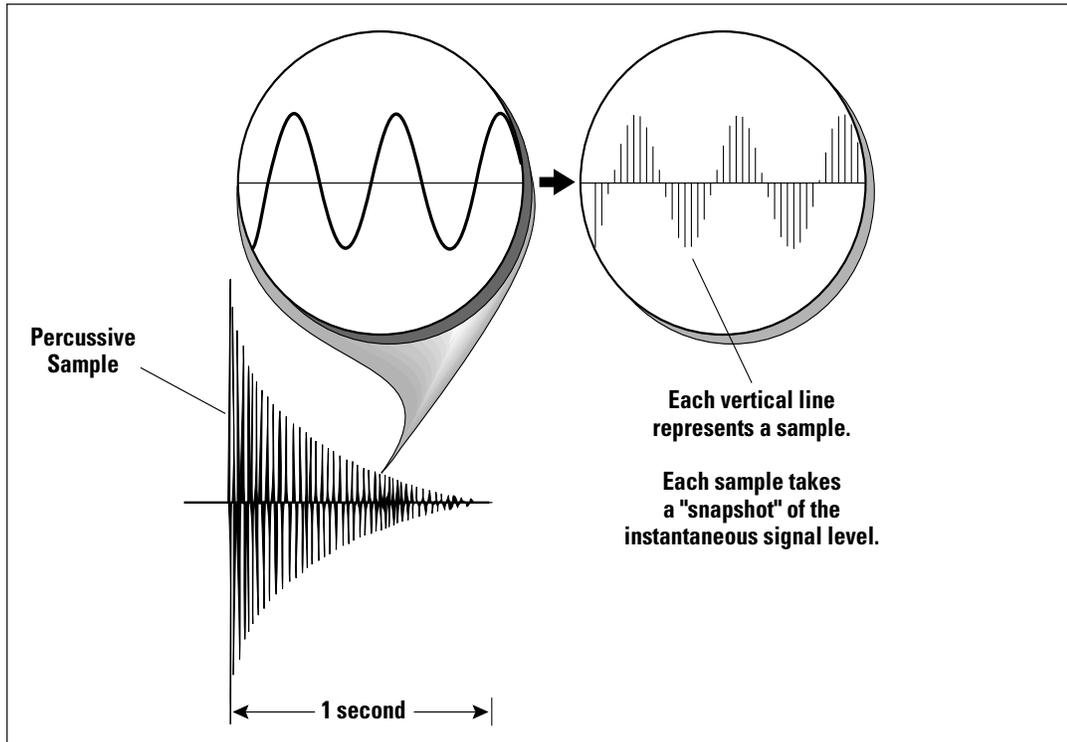
 **Tip:** Use the "Mount Drives" utility whenever an external SCSI device does not appear in the display.

► To Connect the E-IV to a Formatted SCSI Device

The E-IV will recognize and load from SCSI devices formatted for EIII, EIIIX, Emax II, ESI-32 and Akai S1000/S1100.

1. Position the SCSI device and the E-IV in a stable location.
2. **Important:** Make sure that all power to the E-IV and the SCSI device is turned OFF before you connect or disconnect the SCSI cable.
3. Connect the SCSI device to your E-IV using a quality SCSI cable. Make sure that the connectors are firmly mated and that the wire "keepers" are locked in place. The E-IV uses a 50-pin Centronics type connector.
4. Set the SCSI ID of your external SCSI device to any number other than 6. (6 is the default ID of the E-IV, although this number is user selectable. Master, Misc). Consult the operation manual of your SCSI device for this procedure.
5. Turn on the external SCSI device and the E-IV.
6. The SCSI device will appear as a new icon in the disk browser screen.

Sampling Basics



Throughout this manual we will use the terms and concepts described and defined below. Read through this section carefully, even if you don't retain it all. You can refer back periodically as you read through the manual until you understand the basics and definitions.

The E-IV is conceptually like a tape recorder. However, the recording process is very different since the E-IV digitally records into its computer memory. Sounds for the E-IV can be loaded via removable-media hard disk, magneto-optical disk or CD-ROM using the SCSI interface; or they can be sampled through the analog inputs or the AES/EBU digital interface; or even through the MIDI interface using MIDI Sample Dump.

Computers can accept information only in the form of numbers, so the E-IV accepts audio signals coded into binary numbers. Samplers work by examining (sampling) the incoming signal level at a very high rate (44,100 times a second for compact disc rate), and sequentially recording these different levels in memory. Once stored, these samples may be played back (in the proper sequence, of course) to reconstruct the original signal. For instance, if a two-second sound were being sampled at 44.1 kHz, it would require $2 \times 44,100$ or 88,200 samples to be recorded. As you might imagine, shorter sounds require fewer samples.

A sound can be manipulated once it has been recorded. Playing back the samples in reverse order from which they were stored plays the sound backwards. Playing back the samples at a faster rate than the rate at which they were stored raises the pitch. Playing back at a slower rate lowers the pitch, much like a tape recorder's variable speed control.

Advanced onboard sample editing processors such as Time Compression/Expansion and Doppler allow you to manipulate the sound in both time and space. Other digital processors provide standard studio functions such as parametric equalization, compression and exciter. Far more radical transformations are possible using our exclusive Transform Multiplication process.

Sounds can also be manipulated in real-time by filtering or by modulating amplitude and pitch.

Definitions

How the E-IV Organizes Sounds

It is important to understand how the E-IV organizes sounds in order to make best use of the instrument in the shortest possible time. Many terms will be introduced now that show up later in the manual.

You can think of the E-IV as resembling a collection of sound-organizing modules, all contained within the E-IV bank. Pathways indicate how information flows within the E-IV. Let's take a closer look at what makes up this information, and how it is transferred from one section of the instrument to another. The **Disk** is the largest element in the E-IV hierarchy; the **Sample** is the smallest element.

- **Disk Drive** - Floppy Disk, Hard Disks, CD-ROM Drives, Optical Drives, etc.
- **Folder** - Used to group and organize collections of Banks.
- **Bank** - All samples voices and presets - *Everything*, that resides in the E-IV's RAM (memory).
- **Preset** - One complete keyboard setup containing one or more voices.
- **Voice** - One complete sound which contains one or more samples with keyboard and velocity settings and all programmable synthesizer parameters.
- **Sample** - An individual digital recording with a name, sample rate and looping information.

We'll start with individual samples, then work our way through the system.

The Sample

Loading in any sound in mono or stereo creates a sample, the raw material with which the E-IV works. The total available sampling time can be divided up any way you like—one long sample, lots of short samples, a few medium samples, or any combination thereof.

The term sample commonly means two different things:

1. A **digital recording of a complete sound**, or
2. **Each snapshot of the sound that makes up the complete sample.** Confusing? You bet! In this manual, we'll assume sample means the complete recorded sound unless indicated otherwise.

You can modify a raw sample in several ways:

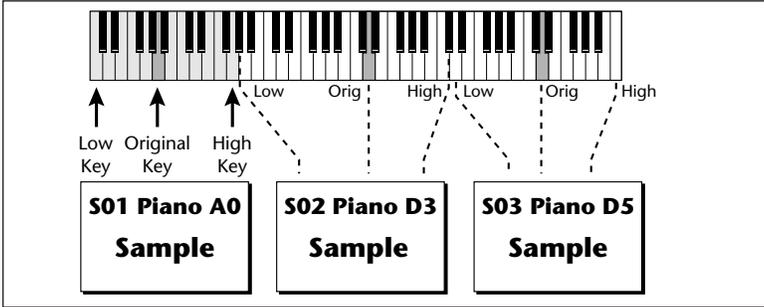
- **Transposition:** A sample can be transposed up or down in pitch to cover a particular range of the keyboard. By doing this, it is not necessary to record a sample for every key.
- **Sample Edit:** In the E-IV, sample editing might consist of Looping a sample (allowing even short samples to play indefinitely), Truncating (cutting off unneeded parts of a sample, thus saving memory), or any of a number of digital processes that actually change the raw sample data.

Samples can also be named. It is usually a good idea to name your samples with the original pitch as part of the name so that you can place it on the keyboard later at the proper pitch.

Voices

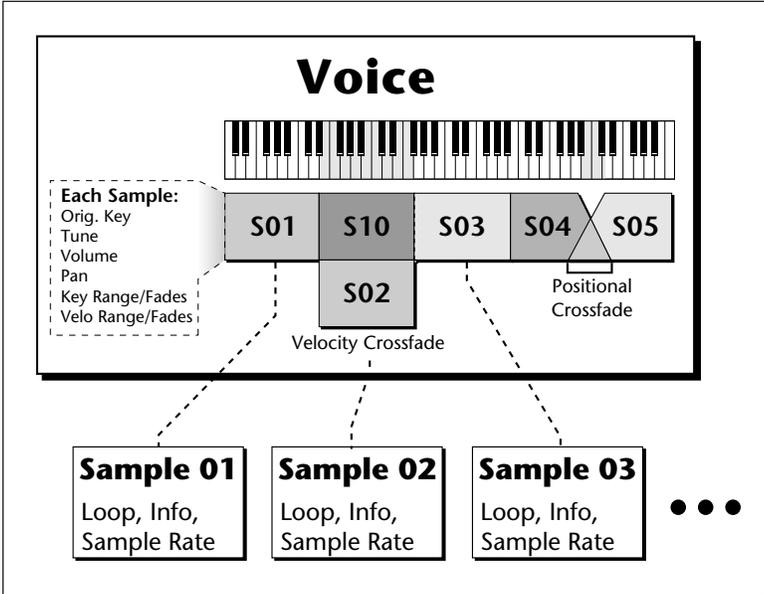
An Emulator IV voice is a complete sound which can be assigned to a range of the keyboard. A sample is the sound-generating portion of a voice. You can think of a voice as a complete instrument consisting of one or more samples, which can then be used as a building block in constructing more complicated presets. A voice consists of one or more samples, a low-pass filter with resonance, a dynamic amplifier, three, 6-stage envelope generators, two multi-wave LFOs and 16 modulation routings called “Cords” to connect everything together.

In a typical scenario, you might record several samples of an instrument (such as a piano), then place them into the same voice. Normally these samples would be placed side by side on the keyboard as in the diagram on the following page. You assign the sample to a range by setting the original



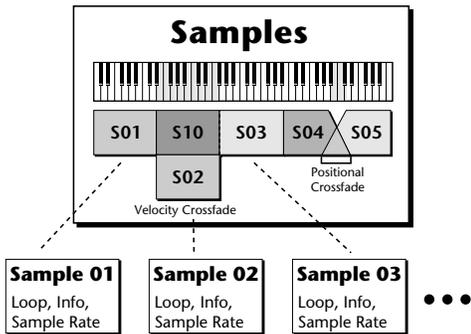
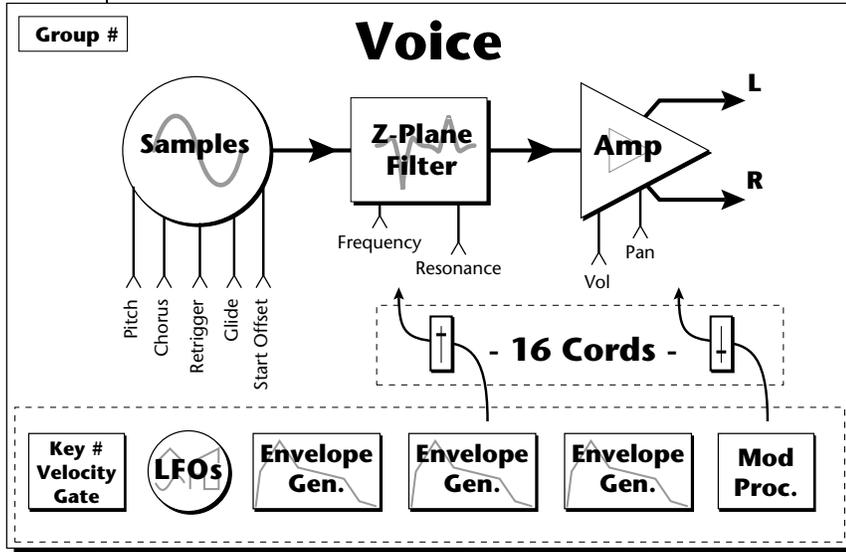
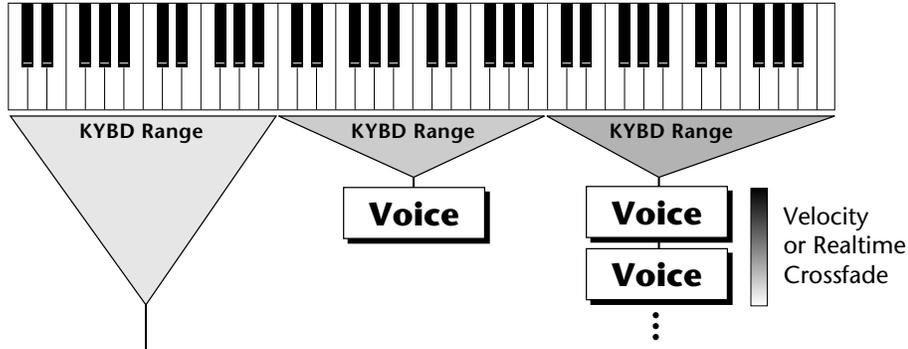
key, (which is usually the original pitch of the sample) a high key and a low key. The number of samples needed for a realistic emulation varies with the instrument, but in general, "More is better".

When a sample is taken, it is automatically placed into a voice with one sample. You can then place the voice (and its sample) on the keyboard.



If more than one voice is assigned to the same range, then pressing a key in that range will play all the voices assigned to that range. Voices assigned to the keyboard can be crossfaded by their position on the keyboard or the key velocity. Voices can also be switched or faded depending on the value of a realtime controller such as a modulation wheel, an LFO or an envelope generator.

Preset



The Preset

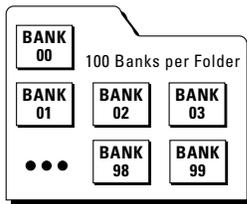
A voice can be assigned to a single note on the keyboard, or transposed polyphonically to cover a wider keyboard range. A preset is one entire keyboard setup consisting of one or more voices. The process of assigning, and optionally transposing, samples to specific ranges of the keyboard is called making a preset. Making a preset is a three-step process:

1. Create the preset and give it a number and name.
2. Place voices to different keyboard ranges. For example, with five voices you could assign each voice to cover one octave of a five octave keyboard. A voice can be assigned more than once within a given preset, and assigned to more than one preset. Up to 256 voices can be assigned to a single preset.
3. Choose from a number of available options that further define the preset. Some examples are: assigning samples to partially or fully overlap other samples, thus producing doubling effects, or assigning dynamic control to individual voices in a preset. Overlapping voices can be crossfaded using any modulation source. You can modify voice parameters and set up MIDI and dynamic processing parameters.

The Emulator IV allows you to be very flexible in the way you construct presets. Consider this — you can assign samples to the keyboard inside the voice *or* assign single sample voices to the keyboard. Unless you specify otherwise, only one sample is assigned per voice. In this case you would assign voices (and the single sample it contains) to the keyboard and create presets. On the other hand, you may wish to create finished voices *before* you start designing presets and treat the voice as your finished sound. In this case, the preset can be used to crossfade, layer or switch multiple complex voices.

The Bank

The memory bank contains samples, voices and presets. Everything that is loaded into the E-IV is part of the bank. Although the memory is volatile, meaning that the data disappears when you turn off power, all bank data can be saved permanently to the hard disk drive or other media to keep a record of your work. An E-IV bank can hold up to 1000 presets (000-999).



Folders

A folder can contain up to 100 banks (0-99). You can use folders to organize your sound banks or you might want to include all the banks used for a particular project in a folder. The number of folders in a disk depends on the size of the disk. As an example, a one gigabyte hard disk can hold 96 folders.

The Internal Drive

A disk drive is a memory storage device that stores banks of data. The E-IV has an optional internal hard disk drive which can be used to load and store bank data. The floppy drive on the E-IV is used mainly to update the operating system software. (The operating system of a computer consists of the instructions that tell the computer what to do.) Because of the large bank size of the E-IV (8-128 MB) the floppy disk is impractical for backing-up sound data, although it can be used to save sound banks if desired. However, other types of drives, as described below, can connect to the E-IV to provide efficient sound storage.

- **Floppy Disk Drive (Drive 0):** The floppy disk drive accommodates 3.5", double-sided, high-density (1.4MB) floppy disks. The floppy drive is used mainly as a convenient way to update the operating system software. As new enhancements are developed, the new software is distributed on floppy disks. This software can be copied into Flash RAM and made a permanent part of the E-IV.

To Update the Software of the E-IV

- 1) Turn off power to the E-IV.
- 2) Insert the floppy disk into the drive with the label side towards the center of the unit.
- 3) Turn on power.
- 4) Press Enter to update or Exit to cancel.
- 5) Wait for the E-IV to update its firmware.

- **Hard Disk Drive (Drive 1):** A hard disk provides the advantages of much higher memory capacity and far faster access time. However, the hard disk cannot be removed and its data must be backed up to another medium for safekeeping.

☑ **Undo:** *The E-IV contains a handy Undo feature which requires a hard disk.*

External Drives

The E-IV contains two SCSI (Small Computer Systems Interface) connectors on the rear panel. This interface is commonly used in the computer industry, so many devices made to work with computers—particularly mass storage devices—will also work with the E-IV. Here are some of the types of mass storage devices that can plug into the E-IV's SCSI connectors.

- **Hard Disk Drive:** A hard disk provides the advantages of much higher memory capacity and far faster access time. Transferring data to and from the E-IV is quite straightforward. However, you cannot remove a hard disk and replace it with another one—the disk is a permanent part of the drive. There are three main cautions involved with hard disks:
 1. Hard disks are sensitive to extreme mechanical shocks. If your hard disk falls off a keyboard stand, chances are the hard disk will be damaged.
 2. Make sure power is not interrupted when you write data to the hard disk.
 3. Hard disks have reached a very high level of reliability. However, they can fail from time to time (as can any part of a computer), so any data should be backed up periodically on some other medium.
- **Removable-media Hard Disk Drives:** These are similar to normal hard disk drives except that the disk itself can be removed and replaced with another disk. Disk densities can range from 44 Mbytes to well over 100 Mbytes per platter. Removable-media hard disk drives allow you to build a sound library of unlimited size and are quite handy for transferring sounds between machines. They're also perfect for backups.
- **CD-ROM Drive:** A CD-ROM is a playback-only (data cannot be written to it) mass storage memory device whose capacity is approximately 660 Megabytes. Quality CD-ROM libraries are available from several companies (E-mu Systems, InVision, Northstar, Q-Up Arts). These can be loaded into the bank as easily as you would load from a hard disk.

▣ **Importing:** *When a bank is imported from another sampler, the E-IV will organize the samples into voices and multisampled oscillators as logically as possible.*

For example, when importing from the EIII, samples with identical dynamic processing parameters will be placed into the same voice. Primary and secondary layers will be placed in groups 1 and 2.

- **Magneto-Optical Drive:** Basically a read/writable CD, these high speed, high density storage devices are currently the hottest thing around for storing large amounts of sound data. Typically a magneto-optical drive can hold upwards of 300 Mb per side and the removable cartridges can be used over and over. Disk access time is comparable to a normal hard disk.

Advantages: High-speed, high-density, reliable, removable.

Disadvantage: Slower than most hard disks. High cost (although prices are dropping fast).

Modules

A module controls a particular set of functions in the E-IV. There are six main modules: Master, Disk, Preset Manage, Preset Edit, Sample Manage and Sample Edit.

- **Activating a Module:** To work with a module, you must first activate it. Press the button associated with the desired module.
- **Softkey Menus:** Menus are selected using the soft keys along the bottom of the display. Pop-up menus may also be used when a field being edited has a small number of choices.
- **Page Selection:** Each module contains several pages which contain controls for additional functions.

In a graphical display, the different fields can be selected in the following ways:

- By pressing the arrow keys (up, down, left, right)
- By turning the data entry control
- By assigning an assignable key to jump directly to the screen you want to edit.

Pressing either the module button or the Exit button will cancel any operation.

The **Module** keys are located on the left side of the control panel. Each module affects a specific area of the Emulator IV's operation.

- **Disk:** This module controls everything to do with the disk drives where the Emulator IV's sounds are stored. You can browse through the disks, examine their contents and audition sounds directly from a hard disk before loading. If you are looking for a specific sound, the E-IV can help you find it with its "Find" function.
- **Master:** This module contains functions that affect the entire machine, such as master tuning offset, output headroom, output sample rate, LCD contrast, and more.
- **Sample Manage:** This "recording studio" module records sounds from the outside world into the bank. Features include adjustable preamp gain, variable threshold setting, and adjustable sample rate and length.
- **Sample Edit:** With this powerful module, you can edit a sample's length, loop (i.e. infinitely sustain) any portion of the sample and have the E-IV automatically find the best loop points (Auto Correlate). You could splice two different samples together, mix samples, or perform a variety of advanced digital signal processes on the sample.
- **Preset Manage:** This module handles the preset "housekeeping", allowing you to create new presets, copy them to any location, rename them or erase them.
- **Preset Edit:** This module lets you alter the synthesizer voice parameters of the Emulator IV, such as shaping the amplitude and filter dynamics or adjusting the keyboard dynamic response. Voices can be placed on the keyboard, moved around or shaped in just about any possible way.

Saving

The bank only retains data for as long as the E-IV is plugged in and turned on. Of course, we don't expect you to leave the thing on all the time, which brings us to the subject of saving data.

Pressing the **DISK** button on the control panel shuttles all the bank data (samples, voices and presets) to the drive of your choice. A hard disk permanently stores data so that even after turning off the E-IV, the disk will contain a record of your work.

IF YOU DO NOT SAVE A BANK, ALL BANK DATA WILL BE LOST WHEN YOU TURN OFF THE E-IV.

Do not wait until the end of a session to save. Save your work periodically in case of power failure or some other unforeseen circumstance that might erase the bank's memory. Hard disks are not infallible. All hard disk banks should be backed up periodically to another hard disk or other media. Should you improve the preset or sample later, you can always replace the original with the revised version. And if something goes wrong, the original will still be available to save you the ordeal of starting from scratch. **Whenever you have done enough work that you would hate to lose it, back it up!**

Since the disk contains a record of the bank data, loading the disk bank transfers all the sample and preset data into the bank. This will replace the existing bank data, if any.

Default

A default setting is what we've judged to be a useful initial setting, and remains in effect until you change it. For example, if you create a new preset, transpose will default to "0". Had it defaulted to +12, all new presets would be transposed up an octave.

Icons

An icon is a little picture of an object such as a floppy disk, a hard disk, folders, banks, presets or samples. In the disk browser screens, icons are used as an easy way to identify and select the appropriate object. When an icon is selected, the image will reverse (black to white & vice-versa).



D0 Floppy

This is the icon for the floppy disk drive.

The Cursor

The cursor is that small flashing line on the display. It sits under the number or letter that will be altered if you enter data. Entering a new value will overwrite the number or letter above the cursor, whereupon the cursor will move on to the next number or letter (if applicable). If the E-IV is expecting a two or three-digit number, in most cases you must enter all the required digits even if some of these are zeroes. If it is expecting a single-digit number, entering 8 would be sufficient. In the preset selection screen, the E-IV displays a soft key labeled "Go" after the first digit is entered. Pressing this key confirms the entered value and instantly

selects the preset. In other screens, you will be asked to “Press OK to Confirm Change” after entering a value. Although the method of data entry may vary slightly in the various modules, in all cases you will find that they are logical and very easy to use.

Data Entry Control & Increment/Decrement Keys

In virtually all instances where the data entry control selects options, the increment (Inc/Yes) and decrement (Dec/No) switches duplicate the data entry control. Press Inc/Yes to increase a value, or Dec/No to decrease by one value at a time.

Selecting

When the instructions say to select an option, you can use whatever method is most comfortable for you: the data entry control, the increment/decrement keys, the numeric keypad (if applicable) and, when naming, the keyboard keys. Some functions do not implement all these options; you can't go wrong by trying, though. If a function doesn't respond to the numeric keypad, for instance, then pressing the keypad will have no effect. Use the data entry control or the inc/dec keys instead.

The Big Re-Cap

- A sample is a raw sound that is loaded into the bank.
- A voice is a complete Emulator IV sound, consisting of one or more samples, processed through the dynamic signal processors, that is mapped onto the keyboard.
- To create a new preset, make sure you have all the samples required for the preset, then assign combinations of voices from the bank to specific sections of the keyboard.
- After arranging a bank, it can be saved to one or more drives.
- Since loading from a hard disk fills the bank with samples, voices and presets, you can group these voices and samples into new presets, process the samples contained in particular voices, or alter existing presets.

Instant Gratification

This short section is designed to get you playing sounds in the shortest amount of time. It contains only a partial explanation of disk operations. For more complete instructions, see Chapter 2, Disk Module.

► Loading a Bank from the Hard Disk

1. From the main screen, press the Arrow function key (F6) in the lower left corner of the display .



Four additional soft key choices will appear.



3. Press the Load function key (F4). The following screen will appear.



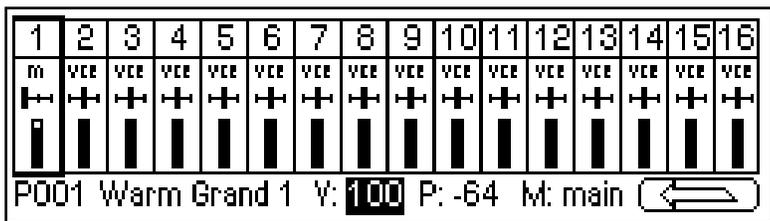
4. Choose a bank to load using the data entry control, the inc/dec keys or the numeric keypad. Press **OK** to load the bank or **Cancel** to cancel the operation. If you pressed "OK" the bank will be loaded and the first preset of the bank you selected will appear.

► **Selecting Presets**

1. The main preset selection screen is shown above. Presets can be selected using the data entry control, the cursor keys, the page keys, the inc/dec keys, the numeric keypad or from your MIDI controller. The previous and next presets are displayed in the upper corners of the display.
2. When using the numeric keypad to select presets, you may enter leading zeros (i.e. type 0, 0 and 2 to select preset 002) or simply type in 2, then press **Go**. If you do not enter the leading zeros a screen will appear to confirm your choice. Press **Go** to confirm your choice or **Cancel** to cancel the operation.

► **Selecting Multimode**

Multimode allows the Emulator IV to respond to multiple MIDI channels at once. Press the **Multi** function key (F6) to turn on Multimode and display the Multimode screen as the main screen. The Multimode screen is shown below.

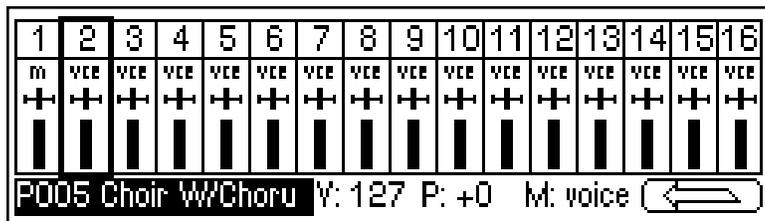


The MIDI Mix screen allows you to display and adjust the preset, volume, pan settings and output assignments for up to 16 MIDI channels (32 channels with the optional MIDI interface card). This is a useful feature to fine tune multi-timbral sequences. This screen also allows you to override the output channel programmed in the voice. Any volume pan and preset changes made over MIDI will be reflected in this display. (Volume = MIDI continuous controller channel #7, Pan = MIDI continuous controller channel #10).

❑ **Note:** MIDI channels 17-32 are not available unless you have the MIDI Interface Option Card installed, which adds 16 additional MIDI channels.

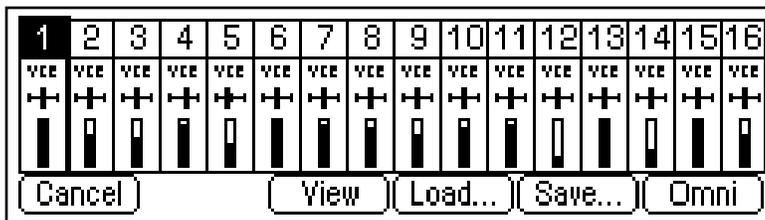
❑ **Note:** Pan ADDS to the pan setting made in the voice and is not an absolute pan setting.

⚡ **Tip:** Omni mode plays only the currently selected preset from any MIDI channel.

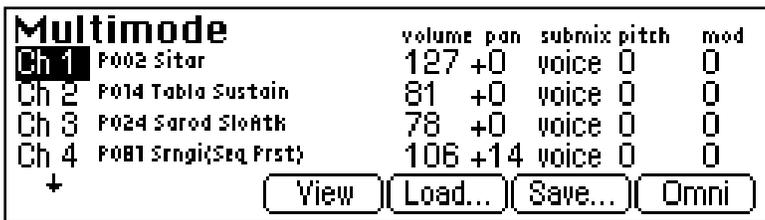


► **To Adjust the MIDI Mix**

1. Select the desired MIDI channel using the up/down cursor keys.
2. Select preset, volume, pan or the output assignments using the left/right cursor keys. Change the parameter values using the data entry control, the inc/dec keys, or the numeric keypad.
3. Press the NEXT page key to select MIDI channels 17-32.
4. Press the key to call up the Load, Save and Omni soft keys. Press **Omni** to return to normal mode.



5. Press the **View** key to change the display to list view mode. The list view screen displays the values of the pitch and modulation wheels. The amounts of the wheels can also be adjusted here, just as if you were moving the wheels on the controller.



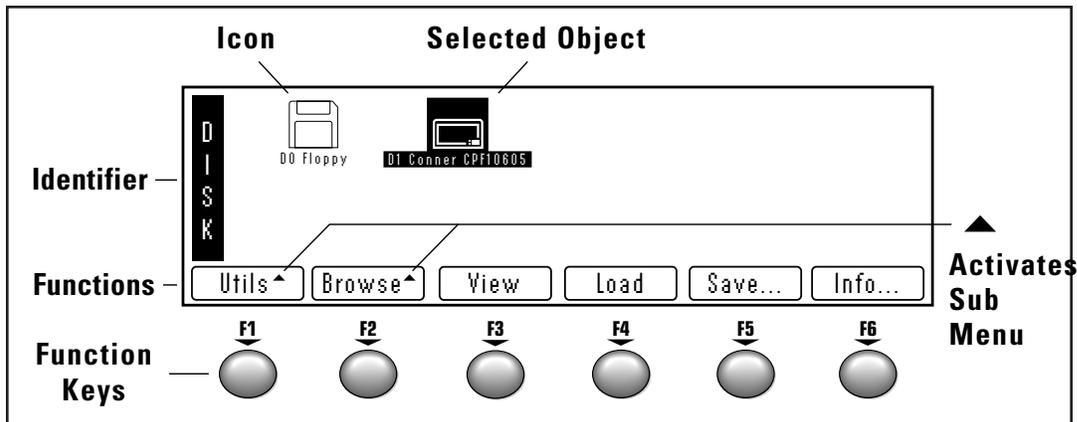
6. Press the right arrow key to display (or change) the values of MIDI controllers A-H.
7. Press the **View** key to toggle the MIDI Mix back to graphic display mode.

Disk Menu

2

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Disk Browser



The Disk Browser makes it easy to navigate through the different levels of the disk drives. Take the time to familiarize yourself with this section because the browser is such an integral part of the E-IV. A brief recap of the Emulator IV disk hierarchy is as follows:

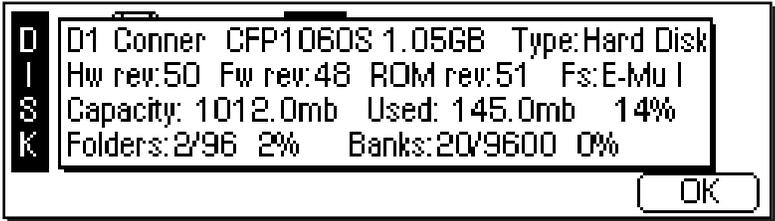
Tip: The *Info...* key gives information about the selected object..

The type of *View* (list or icon) you choose is remembered for each level.

- **Disk Drive** - Floppy disk, hard disks, CD-ROM drives, optical drives, etc.
- **Folder** - Used to group and organize collections of banks.
- **Bank** - A group of presets which can be loaded into the E-IV's memory.
- **Preset** - A complete sound: samples, voices and all programmable options.
- **Sample** - An individual digital recording with looping information.

► **To Browse the Disk:**

1. Press the **Disk** key. The LED will illuminate and the screen shown on the previous page will appear. If you do not have a hard disk connected, only the floppy disk will appear in the display
2. Use the left/right cursor keys, the inc/dec keys or the data entry knob to select the hard disk drive. The selected drive will be reversed out. In the diagram above, the Conner hard disk is selected. When an object is selected, its full name is displayed.
3. The browser lets you examine the various levels of the disk, such as banks, presets and samples.
4. Press the **View** function key (F3). The display now changes to a list format. Press the view key again to return to the icon display.
5. Press the **Info...** function key (F6), a pop-up window appears with information about the hard disk drive. Press the **OK** function key to return.



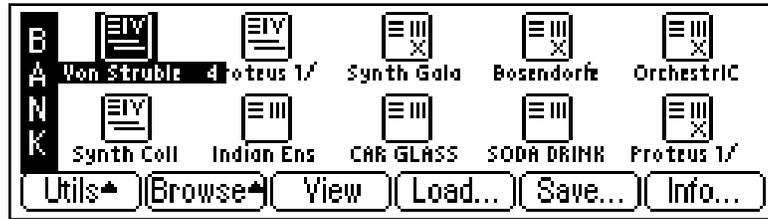
6. Press the **Browser** function key (F2). Another row of function key choices will appear.



7. Press the function key under **Banks**. The LED will illuminate and the screen shown on the next page will appear.

Disk

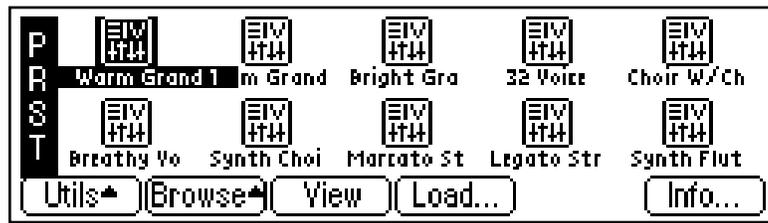
Tip: Use the Exit key to back out of the pages.



8. The display now shows the various banks of presets resident on the hard disk. Use the cursor keys, inc/dec keys, or the data entry knob to select the active object.

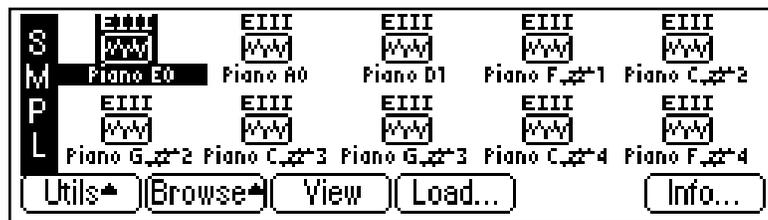
- If another page of choices exists, the right page arrow LED will be illuminated.

9. Choose one of the banks, then press the function key under **Browser** again, Press the function key under **Presets** to examine the presets in the selected bank.

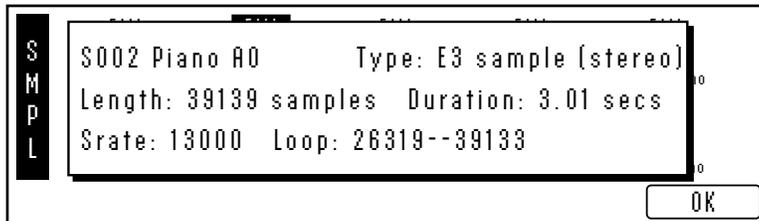


Tip: The Enter key can be used to step forward through the Folder, Bank, Preset and Sample browsers.

10. Choose one of the presets, then press the function key under **Browser** again, Press the function key under **Samples** to examine the samples in the selected preset.

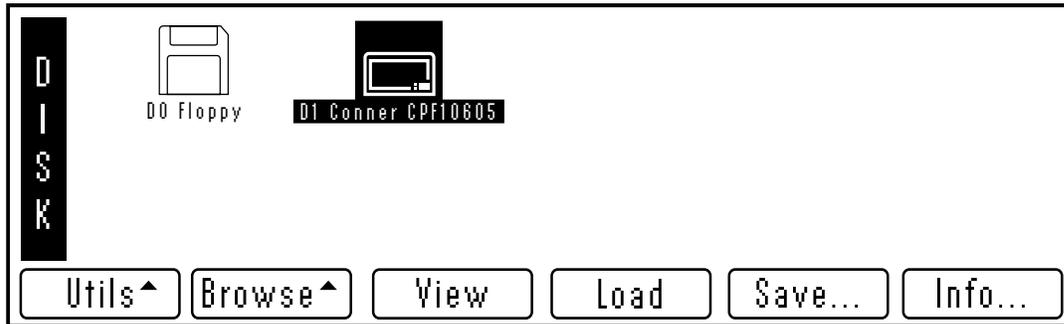


11. Pressing the **Audition** key while in the sample browser plays the selected sample directly from disk.
12. Press the **Info...** function key (F6). a pop-up window appears with information about the hard disk drive. Press the **OK** function key to return.



13. Pressing the **Exit** key “backs you out” of the pages. Press the exit key once from the sample browser to return to the bank page. Pressing **Exit** again puts you in the folder page. Press it once more and you're in the disk page. Press **Exit** one more time and you're out of the disk module altogether and back in the preset selection screen.

DISK



The disk page of the browser contains functions and operations related to storage media such as floppy disks, hard disks, CD-ROM drives, magneto-optical drives or whatever. When in the disk page, all drives which are connected to the SCSI port will appear as icons in the display.

DISK UTILITIES

The Disk Utilities menu contains several additional functions. Pressing the Utils function key (F1) from the disk browser enables a second row of soft keys.

- **Mount Drives:** Instructs the E-IV to check the SCSI bus for the presence of SCSI devices.
- **Copy System:** Allows you to update and make copies of the E-IV operating system supplied on floppy disk by E-mu Systems or your authorized dealer.
- **Format Disk:** Initializes a floppy disk or a hard disk drive to store Emulator IV data.
- **Install FS:** Allows you to install the E-IV file system on pre-formatted hard disks.
- **Backup:** Hard disk drives can and do fail from time to time. This function allows you to backup and restore your valuable data to another hard disk or SCSI media.
- **Find:** This function allows you to find specific samples presets, folders and banks anywhere in your library.

Mount Drives

This utility instructs the E-IV to check the SCSI bus for the presence of SCSI devices. Use this function whenever a connected SCSI device does not appear in the disk browser.

► To Mount Drives:

1. From the Disk Browser, press the **Utilities** function key (F1).
2. Press the **Mount** function key (F1). The E-IV will mount all SCSI devices.

Copy System

From time to time the E-IV operating system will be updated with new features and functions. This software is usually distributed on floppy disk and can be permanently copied into the E-IV's Flash RAM so that it will automatically load whenever you turn on the E-IV. Software can also be saved to a floppy disk in order to back it up.

Each version of software is numbered and is indicated when you select "About" under the "Utilities" menu in the Master module. Copying software will not affect any other data such as samples or presets.

► To Update the E-IV Software:

1. Turn off power to the E-IV.
2. Insert the E-IV software floppy disk with the label side toward the center of the E-IV.
3. Turn on power to the E-IV. The display will show the software version on the floppy and ask if you wish to update Flash RAM from the floppy software.
4. Press **Enter** to update, or **Exit** to cancel the operation.

► To Backup the E-IV Software to Floppy Disk:

1. From the Disk Browser, select the floppy drive using the data entry control, cursor keys or inc/dec keys.
2. Press the **Utilities** function key (F1).
3. Press the **CopySys** function key (F2). The display will ask you to insert a floppy disk. Insert a formatted floppy disk with the label side toward the center of the E-IV. (If the floppy disk is unformatted, the E-IV will ask if you want to format it.)

4. Press **Yes**, remove the current disk, insert a new disk and press **OK**. Otherwise, press **Cancel** or **Exit** to cancel the operation and return to the disk browser.

Format Disk

Before a new floppy disk or hard disk can record or store any data, it must be told how to record this data. This is called formatting. The floppy disk formatting procedure should be run on any new disk, or on recycled disks previously used with other systems (such as personal computers) since these will not be formatted correctly for the E-IV.

Formatting a hard disk or optical drive works exactly like formatting a floppy disk. If the hard disk drive is not shown in the disk browser, use the Mount Drive function. The hard disk or optical drive should now be displayed.

► To Format a Floppy Disk:

1. From the Disk Browser, select the floppy drive using the data entry control, cursor keys or inc/dec keys.
2. Press the **Utilities** function key (F1).
3. Press the **Format** function key (F3). The display will ask you to insert a floppy disk. Insert a floppy disk with the label side toward the center of the E-IV.
4. Consider the implications of your action. Formatting a floppy disk erases all information on that disk, *completely*. Press **OK** to format the disk or **Cancel** to cancel the operation. Formatting takes about a minute and a half.
5. After formatting the floppy disk, format another if desired. The display will ask you if you want to format another floppy. To do this, press **Yes**, remove the current disk, insert a new disk and press **OK**. Otherwise, press **Cancel** or **Exit** to cancel the operation and return to the disk browser.

► To Format a Hard Disk or Optical Disk:

1. From the Disk Browser, select the desired SCSI drive using the data entry control, cursor keys or inc/dec keys.
2. Press the **Utilities** function key (F1).
3. Press the **Format** function key (F3). The display will warn you if you are about to destroy Emulator IV data.

4. Press **OK** to format the disk or **Cancel** to cancel the operation. Formatting time varies depending on the size of the disk.

Install File System

Many new hard disk and optical drives as well as removable hard disk cartridges now come pre-formatted. This function allows you to install the E-IV file system on pre-formatted hard disks without having to reformat the disk. This can save quite some time, especially with large capacity disks. To find out if a disk is pre-formatted, try installing the file system first. If this doesn't work, format the disk normally.

► To Install the File System:

1. From the Disk Browser, select the desired SCSI drive using the data entry control, cursor keys or inc/dec keys.
2. Press the **Utilities** function key (F1).
3. Press the **Install FS** function key (F4). The display will warn you if you are about to destroy E-IV data.
4. Press **OK** to Install the file system on the disk or **Cancel** to cancel the operation. Installing the file system time takes a minute or more, depending on the size of the disk.

Backup

This function allows you to backup and restore a portion or the entire contents of the hard disk. You should develop the habit of backing up any and all important data or risk catastrophe at some future date. If you'd *hate* to lose it, **BACK IT UP!**

► To Backup your Hard Disk Data:

1. From the Disk Browser, select the SCSI drive you want to back up using the cursor keys, inc/dec keys or the data entry control.
2. Press the **Utils** function key (F1).
3. Press the **Backup** function key (F5). The display will warn you if you are about to overwrite the current bank in RAM.
4. Press **OK** to continue or **Cancel** to cancel the operation. The following screen will appear.



Disk

■ Notes on Bank Compatibility:

1) E-IV can load banks from e-64, ESI-32, EIIIX, EIII, Emax II, and Akai hard disks or CD-ROMs.

2) E-IV cannot load banks from ESI-32, EIIIX, EIII, Emax II or Akai floppies.

3) If E-IV backs up an ESI-32/EIIIX bank, the ESI-32/EIIIX will no longer be able to load it.



5. Select the destination drive using the inc/dec keys, or data entry control.
6. Move the cursor down to “Backup Type” and select the type of backup mode with the inc/dec keys or data entry control.

Your choices are:

- **All:** Transfers all banks from the source disk to the destination disk.
- **Range:** Transfers a selected range of banks from the source disk to the destination disk.
- **Incremental:** Transfers only those banks which have been modified since the last backup.
- **Range:** Transfers a selected range of banks from the source disk to the destination disk.

7. Move the cursor down to “Destination Bank Numbers” to select where the banks will be placed on the destination disk.

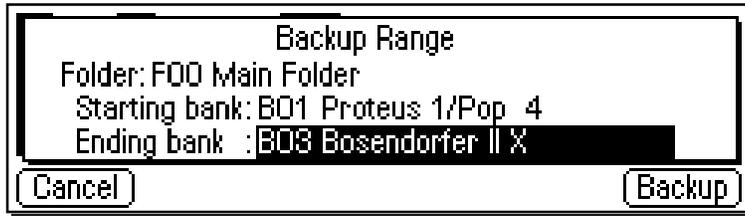
Your choices are:

- **Same as Source:** Copies the banks into the same numbered bank locations on the destination disk.
- **Use Empty:** Copies the banks into the lowest consecutive empty bank locations on the destination disk.

8. When you have made your choices, press **OK** to continue or **Cancel** to cancel the operation.

Choosing All or Incremental causes the backup to begin immediately. Choosing “Range”, causes the following screen to appear.

Tip: Use “Same as Source” when backing up to an ESI-32 or EIIIIX drive if you want these machines to see your E-IV files. They will overwrite any files stored in those locations. The ESI-32 and EIIIIX cannot load E-IV files, but the drive can be used for both machines. Use “Use Empty” if backing up to an ESI-32 or EIIIIX drive and you want the E-IV files to be invisible to those machines. In this case, ESI or EIIIIX files will not be overwritten.



9. Select the Folder to be copied.
10. Select the starting and ending banks of the range to be copied, then press **Backup**.

► **To Restore your Hard Disk Data:**

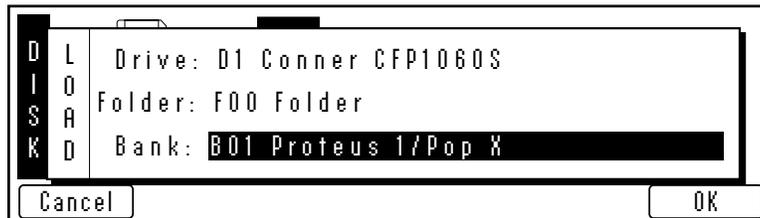
Select your backup disk in the disk browser and simply backup to your regular work disk.

LOAD BANK

A bank can be loaded directly from the disk browser.

► **To Load a Bank:**

1. From the Disk Browser, press the **Load** function key (F4).
The following screen will appear:



2. Choose a bank to load using the data entry control, the inc/dec keys or the numeric keypad. You may also change the current drive or folder by using the up/down cursor keys to select the drive or folder. Press **OK** to load the bank or **Cancel** to cancel the operation. If you pressed "OK" the bank will be loaded and the main preset selection screen will appear.



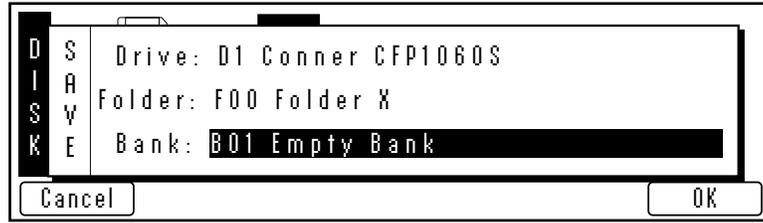


SAVE BANK

A bank can be saved to disk from the disk browser.

► To Save a Bank:

1. From the Disk Browser, press the **Save** function key (F5). The following screen will appear:



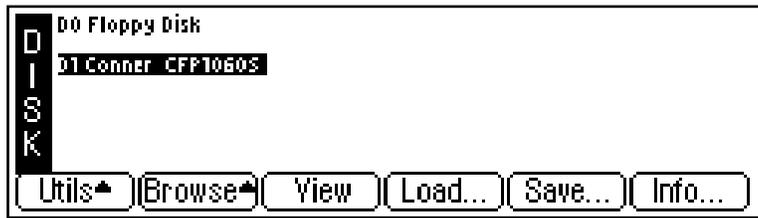
2. Choose a location for the bank using the data entry control, the inc/dec keys or the numeric keypad. You may change the current drive or folder by using the up/down cursor keys to select the drive or folder. Press OK to load the bank or Cancel to cancel the operation. If you pressed "OK" the bank will be saved and the main preset selection screen will appear. If you are about to overwrite an existing bank, the display will warn you.

VIEW...

The display can be changed to a list format instead of the normal icon-based format.

► To Change the Display View:

From the Disk Browser, press the **View** function key (F3). The screen will change to a list format. The List view is shown below. Pressing the View function key again toggles the view back to icon view.

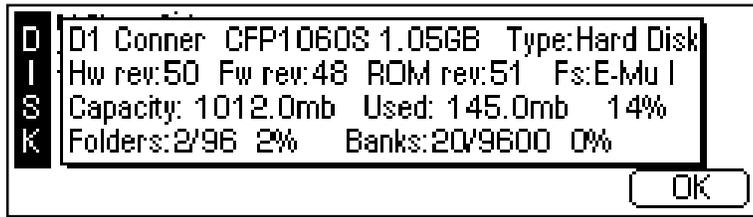


INFO...

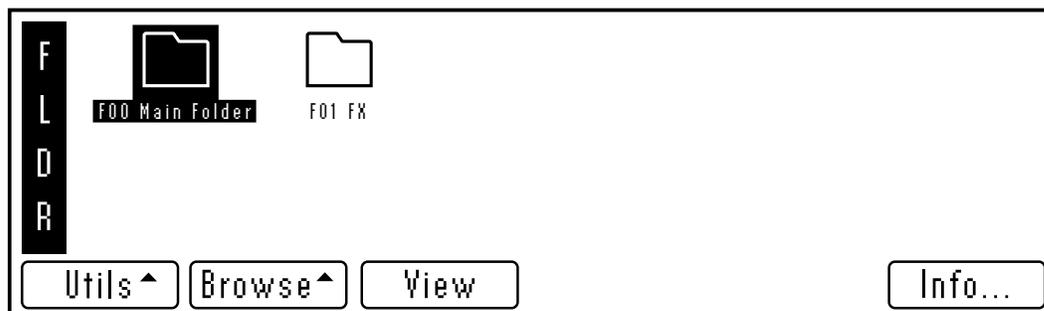
The Emulator IV can display information on the selected disk drive.

► To Get Disk Info:

From the Disk Browser, press the **Info...** function key (F6). A pop-up window will appear with the vital statistics of the selected disk.



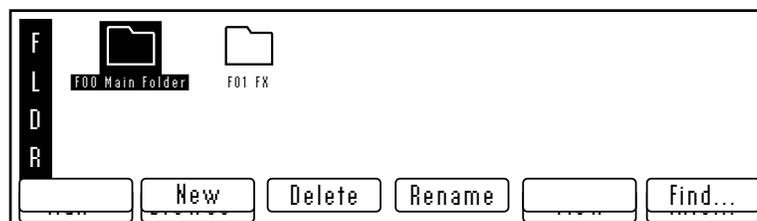
FOLDER



Folders help you organize your banks of sounds by providing another level between the bank and disk level. You may want to organize your banks by a particular project or by the type of sounds contained within, such as: Sound Effects, Pianos, Strings, etc. If you do not wish to use folders, simply place everything on the disk into one folder. You can skip over the folder level in the browser and forget that folders even exist.

FOLDER UTILITIES

The Folder Utilities menu contains several additional functions. Pressing the **Utils** function key (F1) from the folder browser enables a second row of soft keys.



- **New:** Allows you to create a new folder.
- **Delete:** Allows you to delete an unwanted folder
- **Rename:** Allows you to rename the selected folder
- **Find:** Allows you to search the disk for a particular folder.

New

This utility allows you to create a new folder.

► To Create a New Folder:

1. From the Folder Browser, press the **Utilities** function key (F1).
2. Press the **New** function key (F2). A pop-up window will appear prompting you to name your new folder.
3. Press **OK** after naming the new folder and it will appear on the screen.

Delete

This utility allows you to delete a folder and all of its contents.

► To Delete a Folder:

1. From the Folder Browser, select the folder you wish to delete using the cursor keys, inc/dec keys or the data entry control.
2. Press the **Utilities** function key (F1).
3. Press the **Delete** function key (F3). A pop-up window will appear asking you if you want to delete the folder.
4. Press the **OK** function key (F6) to delete the folder and its contents or the **Cancel** function key (F1) to cancel the operation.

Rename

This utility allows you to rename a folder.

► To Rename a Folder:

1. From the Folder Browser, select the folder you wish to rename using the cursor keys, inc/dec keys or the data entry control.
2. Press the **Utilities** function key (F1).
3. Press the **Rename** function key (F4). A pop-up window will appear prompting you to rename the folder.
4. Change the name of the folder. Letters can be selected using the numeric pad, data entry control, inc/dec keys and cursor keys, or using an ASCII keyboard.

Tip: The up/down cursor keys add and delete spaces when renaming. The tab key on an ASCII keyboard clears the entire name.

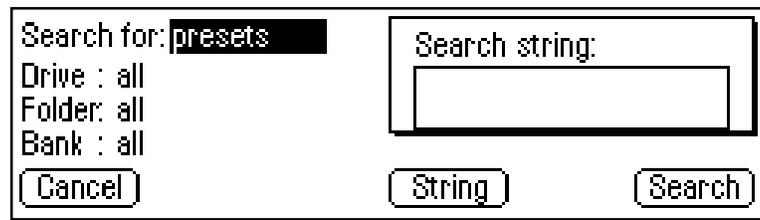
5. Press the **OK** function key (F6) to confirm the new name or the **Cancel** function key (F1) to cancel the operation.

Find...

This utility searches for folders, banks, presets, or samples on the disk for a particular search string (a pattern of letters and numbers). If it finds the selected string anywhere in the name, the item will be selected. Use the Find utility again to find additional matching items.

► To Find:

1. From the Folder Browser, press the **Utils** function key (F1).
2. Press the **Find** function key (F6). The screen shown below will appear.



Search for: presets
Drive : all
Folder: all
Bank : all
Cancel String Search

3. Select the type of item (folder, bank, preset or sample) you wish to search for. If you have an idea of where the item is located, you can narrow the search by inputting additional data on the drive, folder or bank. Selecting "All" tells the E-IV to search everything.
4. Press the **String** function key (F4), and enter the search string. Letters can be selected using the numeric pad, data entry control, inc/dec keys and cursor keys, or using an ASCII keyboard.
5. Press the **Search** function key (F6) to search for the item or the **Cancel** function key (F1) to cancel the operation.

VIEW

The display can be changed to a list format instead of the normal icon-based format.

► To Change the Display View:

From the Folder Browser, press the **View** function key (F3). The screen will change to a list format.

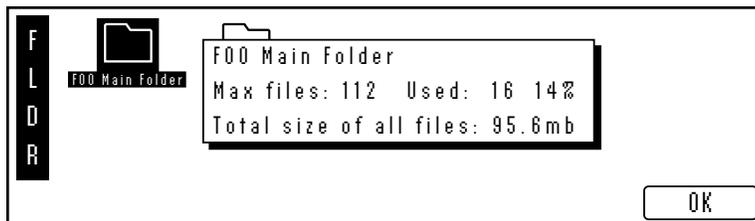
Pressing the View function key again toggles the view back to icon view.

INFO...

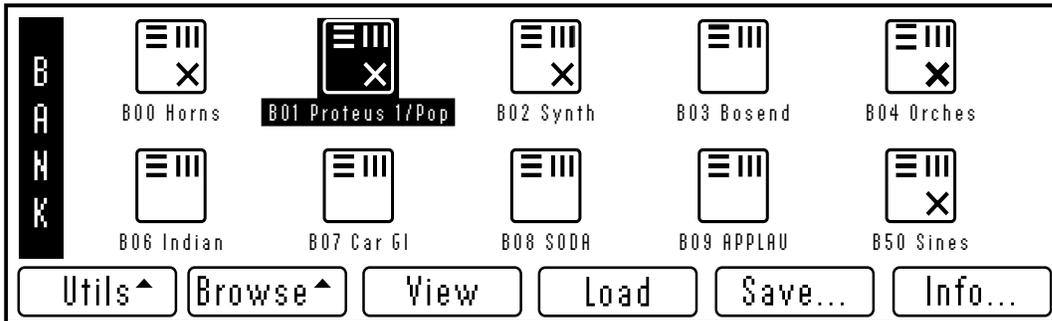
The E-IV can display information on the selected folder.

► To Get Folder Info:

1. From the Folder Browser, press the **Info... function** key (F6). A popup window will appear with the vital statistics of the selected disk.



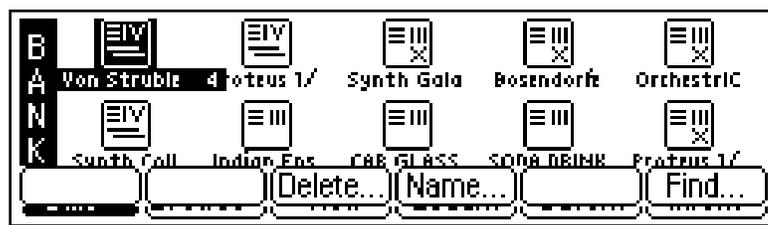
BANK



The Bank is a set of up to 1000 presets which can be loaded into and saved to disk from the Emulator IV's internal memory (RAM). When you save to disk, that collection of presets and samples is a bank. Banks can be constructed as large as the memory in your E-IV will allow, which in the case of 128 MB, is large.

BANK UTILITIES

The Bank Utilities menu contains several additional functions. Pressing the **Utils** function key (F1) from the bank browser enables a second row of soft keys.



- **Delete:** Allows you to delete an unwanted bank.
- **Name:** Allows you to name or rename the selected bank.
- **Find:** Allows you to search the disk for a particular bank.

Delete

This utility allows you to delete an entire bank.

► To Delete a Bank:

1. From the Bank Browser, select the bank you wish to delete using the cursor keys, inc/dec keys or the data entry control.
2. Press the **Utilities** function key (F1).
3. Press the **Delete** function key (F3). A pop-up window will appear asking you if you want to delete the bank.
4. Press the **OK** function key (F6) to delete the bank or the **Cancel** function key (F1) to cancel the operation.

Rename

This utility allows you to rename a bank.

► To Rename a Bank:

1. From the Bank Browser, select the bank you wish to rename using the cursor keys, inc/dec keys or the data entry control.
2. Press the **Utilities** function key (F1).
3. Press the **Rename** function key (F4). A pop-up window will appear prompting you to rename the bank.
4. Change the name of the bank. Letters can be selected using the numeric pad data entry control, inc/dec keys and cursor keys, or using an ASCII keyboard.
5. Press the **OK** function key (F6) to confirm the new name or the **Cancel** function key (F1) to cancel the operation.

 **Tip:** The up/down cursor keys add and delete spaces when renaming. The tab key on an ASCII keyboard clears the entire name.

Find...

This utility searches your disk library for a particular pattern of letters and numbers (a search string). If it finds the selected string anywhere in the name, the bank will be selected. Use the Find utility again to find additional matching items.

► To Find:

1. From the Bank Browser, press the **Utilities** function key (F1).
2. Press the **Find** function key (F6). The screen shown below will appear.

```

Search for: presets
Drive : all
Folder: all
Bank : all
Cancel      String      Search
  
```

3. Select the type of item (folder, bank, preset or sample) you wish to search for. If you have an idea of where the item is located, you can narrow the search by inputting additional data on the drive, folder or bank. Selecting "All" tells the E-IV to search everything.
4. Press the **String** function key (F4), and enter the search string. Letters can be selected using the numeric pad, data entry control, inc/dec keys and cursor keys, or using an ASCII keyboard.
5. Press the **Search** function key (F6) to search for the item or the **Cancel** function key (F1) to cancel the operation.

LOAD BANK

A bank can be loaded from the bank browser.

► To Load a Bank:

1. From the Bank Browser, select the bank you wish to load using the cursor keys, inc/dec keys or the data entry control.

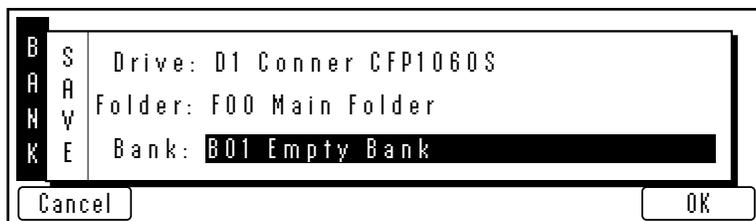
2. Press the **Load** function key (F4).
3. Loading a bank overwrites the bank currently in memory unless you choose to Merge the banks.
4. Press **Yes** to overwrite the current bank or **Cancel** to cancel the operation.
5. Press **Merge** to add the new bank to the current bank in memory.
6. A pop-up dialog box will appear, prompting you to select the starting destination preset. Use the data entry control, inc/dec keys or the numeric pad to select the starting destination preset. As the new bank is merged, its presets will “fill in” any empty presets after this preset.

SAVE BANK

A bank can be saved to disk from the bank browser.

► To Save a Bank:

1. From the Bank Browser, press the **Save** function key (F5). The following screen will appear:



2. Choose a location for the bank using the data entry control, the inc/dec keys or the numeric keypad. You may change the current drive or folder by using the up/down cursor keys to select the drive or folder. Press **OK** to load the bank or **Cancel** to cancel the operation. If you pressed “OK” the bank will be saved and the main preset selection screen will appear. If you are about to overwrite an existing bank, the display will warn you.



VIEW

The display can be changed to a list format instead of the normal icon-based format.

► To Change the Display View:

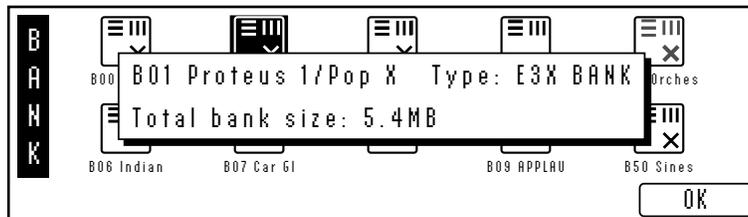
From the Bank Browser, press the **View** function key (F3). The screen will change to a list format. Pressing the View function key again toggles the view back to icon view.

INFO...

The E-IV can display information on the selected bank.

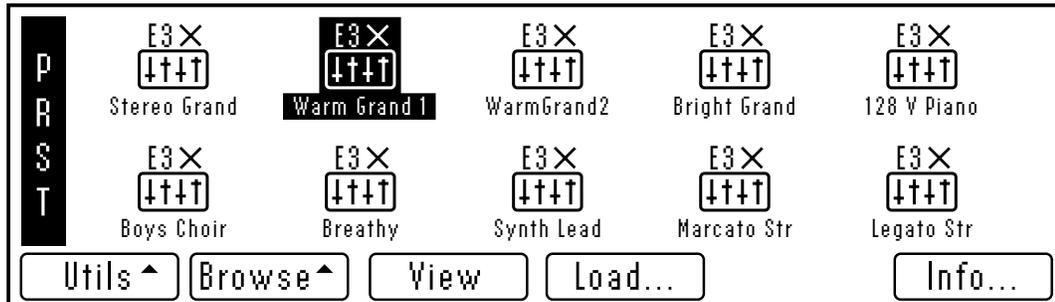
► To Get Bank Info:

1. From the Bank Browser, press the **Info...** function key (F6). A popup window will appear with the vital statistics of the selected bank.



2. Press **OK** to return to the bank browser.

PRESET



A preset is one complete keyboard setup containing voices and samples arranged on the keyboard together with all programmable synthesizer parameters.

UTILITIES

The Utilities menu contains several additional functions. Pressing the Utils function key (F1) from the preset browser enables a second row of soft keys. Only one option is currently implemented.

- **Find:** Allows you to search the disk for a particular bank.

Find...

This utility searches your disk library for a particular pattern of letters and numbers (a search string). If it finds the selected string anywhere in the name, the bank will be selected. Use the Find utility again to find additional matching items.

► To Find:

1. From the Preset Browser, press the **Utilities** function key (F1).

2. Press the **Find** function key (F6). The screen shown below will appear.

The screenshot shows a search interface with the following elements:

- Search for:** A text field containing the word "presets".
- Drive :** A dropdown menu set to "all".
- Folder:** A dropdown menu set to "all".
- Bank :** A dropdown menu set to "all".
- Search string:** A separate text input field, currently empty.
- Buttons:** Three buttons at the bottom: "Cancel", "String", and "Search".

3. Select the type of item (folder, bank, preset or sample) you wish to search for. If you have an idea of where the item is located, you can narrow the search by inputting additional data on the drive, folder or bank. Selecting "All" tells the E-IV to search everything.
4. Press the **String** function key (F4), and enter the search string. Letters can be selected using the numeric pad, data entry control, inc/dec keys and cursor keys, or using an ASCII keyboard.
5. Press the **Search** function key (F6) to search for the item or the **Cancel** function key (F1) to cancel the operation.

LOAD PRESET

An individual preset can be loaded into the bank from the preset browser. This is a way you can create your own custom banks. Simply load in the desired presets, then save the bank to disk.

► To Load a Preset:

1. From the Bank Browser, select the bank containing the preset you wish to load using the cursor keys, inc/dec keys or the data entry control.
2. From the Preset Browser, select the preset you wish to load.
2. Press the **Load** function key (F4). A pop-up window will prompt you to select the destination preset.

4. Choose a location for the preset using the data entry control, the inc/dec keys or the numeric keypad. You may overwrite an existing preset or choose an empty preset as the destination.
5. Press **OK** to load the selected preset or **Cancel** to cancel the operation.

VIEW

The display can be changed to a list format instead of the normal icon-based format.

► To Change the Display View:

From the Preset Browser, press the **View** function key (F3). The screen will change to a list format. Pressing the View function key again toggles the view back to icon view.

INFO...

The E-IV can display information on the selected preset.

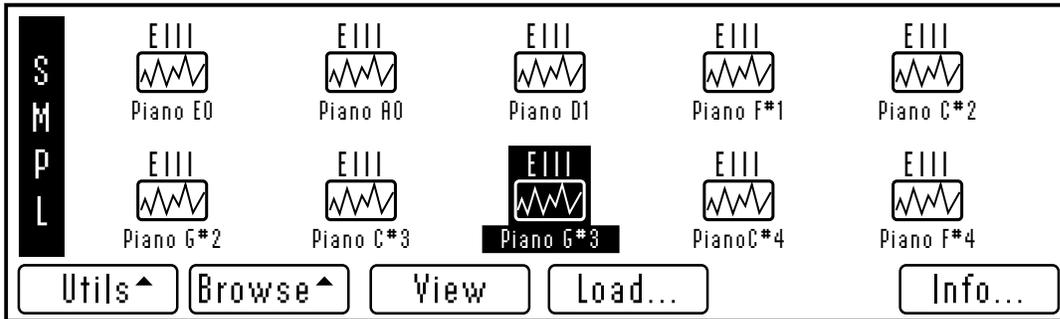
► To Get Preset Info:

1. From the Preset Browser, press the **Info...** function key (F6). A popup window will appear with the vital statistics of the selected preset.



2. The preset size indicates the amount of memory that the programmable preset parameters occupy. It does not include the samples used in the preset. Press **OK** to return to the preset browser.

SAMPLE



A sample is the most basic E-IV sound element and consists of the digitized sound together with truncation and looping parameters.

UTILITIES

The Utilities menu contains several additional functions. Pressing the **Utils** function key (F1) from the sample browser enables a second row of soft keys. Only one option is currently implemented.

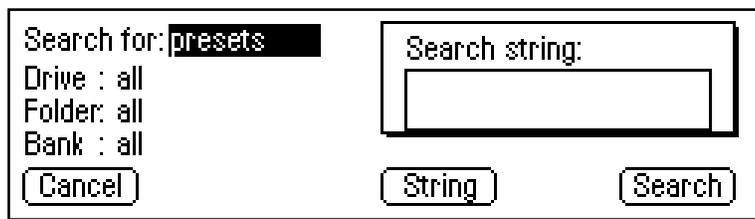
- **Find:** Allows you to search the bank for a particular sample.

Find...

This utility searches your disk library for a particular pattern of letters and numbers (a search string). If it finds the selected string anywhere in the name, the bank will be selected. Use the Find utility again to find additional matching items.

► To Find:

1. From the Sample Browser, press the **Utils** function key (F1).
2. Press the **Find** function key (F6). The find screen (shown on the following page) screen will appear.



3. Select the type of item (folder, bank, preset or sample) you wish to search for. If you have an idea of where the item is located, you can narrow the search by inputting additional data on the drive, folder or bank. Selecting “All” tells the E-IV to search everything.
4. Press the **String** function key (F4), and enter the search string. Letters can be selected using the numeric pad, data entry control, inc/dec keys and cursor keys, or using an ASCII keyboard.
5. Press the **Search** function key (F6) to search for the item or the **Cancel** function key (F1) to cancel the operation.



LOAD SAMPLE

An individual sample can be loaded into the bank from the sample browser. This is an easy way to create your own custom presets. Simply load in the desired samples, build your preset, then save the bank to disk.

► To Load a Sample:

1. From the Bank Browser, select the bank containing the preset you wish to load using the cursor keys, inc/dec keys or the data entry control.
2. From the Sample Browser, select the sample you wish to load.
3. Press the **Load** function key (F4). A pop-up window will prompt you to select the destination sample.
4. Choose a location for the sample using the data entry control, the inc/dec keys or the numeric keypad. You may overwrite an existing sample or choose an empty sample as the destination.
5. Press **OK** to load the selected sample or **Cancel** to cancel the operation.

VIEW

The display can be changed to a list format instead of the icon-based format.

► To Change the Display View:

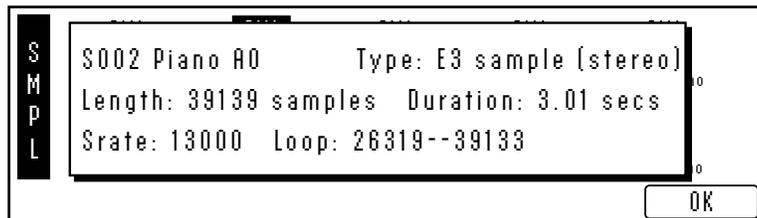
From the Sample Browser, press the **View** function key (F3). The screen will change to a list format. Pressing the View function key again toggles the view back to icon view.

INFO...

The E-IV can display vital information on the selected sample.

► To Get Sample Info:

1. From the Sample Browser, press the **Info...** function key (F6). A popup window will appear with information about the selected preset.



2. The window indicates: sample length, duration in seconds, the sample rate, and the loop points in samples. Press **OK** to return to the sample browser.

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<i>Preferences</i>	3-32

Master

Memory Statistics

Memory Statistics				
Type	Used	Available		
Preset	484k	1655k	29%	
Sample	5mb	8mb	62%	

Utils▲ Bank▲ Tune Output Misc MIDI▲

The Master Menu contains functions which affect the entire machine, not just certain presets, or banks such as overall tuning, LCD contrast, MIDI modes etc.

The main screen shows the E-IV's memory status. There are two types of memory in the Emulator IV, preset memory and sample memory. An E-IV contains around half a megabyte of preset memory. The amount of sample memory can vary from 8 megabytes to 128 megabytes. Preset memory is used to hold the preset parameter information. Sample memory contains the actual samples. Presets require much less memory than samples, so you are not likely to ever run out, even when creating huge banks.

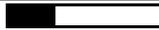
The master menu contains six main sub menus:

- **Utilities** - Controls for the assignable keys, test tones and volume control recalibration. Also contains the channel status indicator, credits and software version display.
- **Bank** - Allows you to name or erase the bank and set a bank to be auto-loaded on power-up.
- **Tuning** - Contains functions related to tuning.
- **Output** - Contains functions related to the audio outputs and the digital audio interface.
- **Miscellaneous** - LCD contrast and SCSI utilities, etc.
- **MIDI** - Contains global MIDI controls, velocity curve and other miscellaneous MIDI functions.

Master

 **Tip:** The Master settings are saved into flash RAM when you exit the module.

Utilities

Memory Statistics				
Type	Total	Used		
Preset	545k	185k	33%	
Sample	8mb	4mb	50%	
Utils▲	Bank▲	Tune	Output	Misc
				MIDI▲

The Master Utilities menu contains several additional functions.

- Assignable Keys
- Channel Volume
- Reference Tones
- Recalibration
- Test Access
- About the E-IV

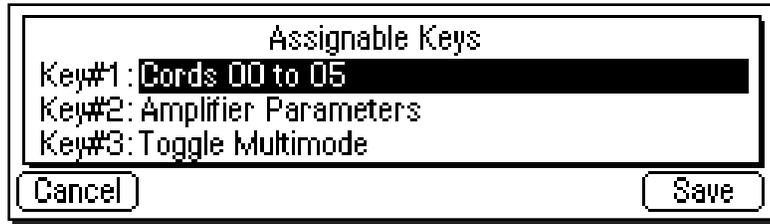
ASSIGNABLE KEYS

The three assignable keys on the front panel of E-IV can be programmed to call up any almost any screen with a single key press. This saves you from having to page through multiple menus to find the screen you want to edit. The assignable keys can be programmed either from the assignable keys screen or directly from any screen you are working in.

► To Program the Assignable Keys from the Master Menu

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **Utilities** function key (F1). A second row of soft keys will appear.
3. Press the **AsnKey** function key (F1). The following screen will appear.

Master



4. Use the data entry control or the inc/dec keys to change the screen associated with each assignable key.
5. Press **Save** to store the assignable keys settings and return to the memory statistics screen.
6. Press **Cancel** to cancel the operation and return to the memory statistics screen.

► **To Program an Assignable Key from the Current Screen**

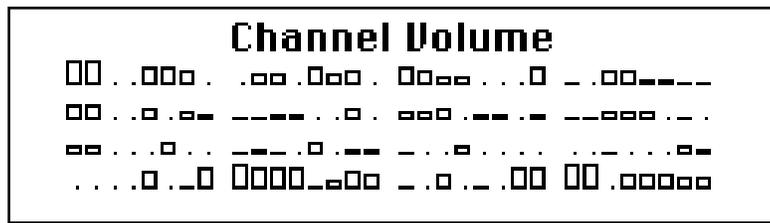
This method allows you to program an assignable key to the screen you are currently in.

1. Press and hold one of the assignable keys from any screen in the Emulator IV.
2. After two seconds a pop up window will appear informing you that the assignable key has been programmed for the current screen.



CHANNEL VOLUME

This function calls up a bar graph display showing the volume of all 128 output channels of the E-IV. The channel status display is a useful indicator of your channel usage. The 128 channels of the E-IV are assigned in a circular order, (i.e. 1, 2, 3... 128, then back to 1). Channels become available for reassignment when their output volume falls below a certain level.



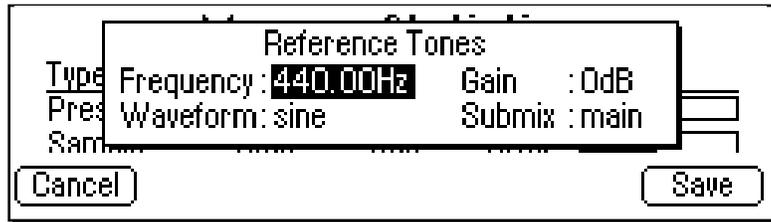


TONES

This function generates accurate reference tones which can be used to troubleshoot your audio system without loading a bank or to test each output of the E-IV.

► To Enable the Reference Tone

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **Utilities** function key (F1). A second row of soft keys will appear.
3. Press the **Tones...** function key (F3). The following screen will appear.



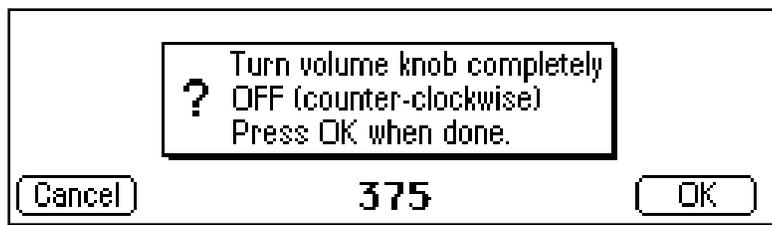
4. Adjust the frequency, waveform, gain, and the output submix channel using the data entry control or inc/dec keys.
5. Press **Exit** to return to the memory statistics screen.

RECALIBRATION

This screen allows you to recalibrate the front panel volume control on the E-IV. The analog components of the volume control may change slightly over time. Use this function if the front panel volume control does not seem to be functioning properly.

► To Recalibrate the Volume Control

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **Utilities** function key (F1). A second row of soft keys will appear.
3. Press the **Recal...** function key (F4). The following screen will appear.



4. Follow the instructions and adjust the volume knob to the minimum position, then press OK.
5. The display will ask you to move the control to the maximum position. Do this and press OK.
6. The high and low values will be displayed. Press **OK** to store the values in Flash RAM and return to the memory statistics screen. Press **Cancel** or **Exit** to cancel the operation and return to the memory statistics screen.

TEST ACCESS

This screen provides access to the Service Center diagnostic routines. Some of the diagnostic routines have the potential to destroy the data on your hard disk. It is for this reason that the diagnostics are protected from casual use by a secret password.

► To Access the Diagnostic Access Screen

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
3. Press the **Utilities** function key (F1). A second row of soft keys will appear.
5. Press the **Tests** function key (F5). A pop up dialog box will appear asking for the diagnostics password.
8. Enter the proper password then press **OK** to enter the diagnostics menus. *tsr92 9ft w0nk t'no6 uoy ?t9fw
 .tsr92 s 9d t'nblrow ti uoy blot 9w ti ?brow229*



ABOUT THE EMULATOR IV

This screen displays the current software version resident in the E-IV. It also credits the creators of the E-IV and displays the phone number to order additional sounds.

►To List the Software Version

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **Utilities** function key (F1). A second row of soft keys will appear.
3. Press the **About...** function key (F6). A pop-up dialog box lists the resident software version.
4. Press **Exit** to return to the memory statistics screen.

Bank

Type	Total	Used		
Preset	543k	113k	20%	
Sample	8mb	4mb	50%	
Erase...	Name...	Auto...		

The Bank submenu currently contains only two functions, which allow you to name and erase the bank.

ERASE BANK

Erasing a bank erases ALL the memory in the Emulator IV RAM which includes all samples, voices and presets. Erasing the bank does not erase anything stored on your hard disk, only the contents of the E-IV's RAM.

► To Erase the Bank:

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **Bank** function key (F2). A second row of soft keys will appear.
3. Press the **Erase...** function key (F1). A pop-up dialog box will appear asking you if you want to erase all presets and samples.
4. Press the **OK** to erase the bank or **Cancel** to cancel the operation.

Master

Caution: *Auto Bank Load works on bank numbers, not their names. If you move a bank to another location or switch removable media, the bank may not load or the wrong bank may be loaded on power-up.*

NAME BANK

This utility allows you to name the current bank.

► To Name the Bank:

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **Bank** function key (F2). A second row of soft keys will appear.
3. Press the **Name...** function key (F2). A pop-up dialog box will appear asking you to enter the new bank name.
4. Name the bank. Letters can be selected using the numeric keypad, data entry control, inc/dec keys and cursor keys, or using an ASCII keyboard.
5. Press **OK** to clear the bank or **Cancel** to cancel the operation.

AUTO BANK LOAD

This function automatically loads the selected bank whenever the E-IV is first powered up.

► To Set the Auto Load Bank:

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **Bank** function key (F2). A second row of soft keys will appear.
3. Press the **Auto...** function key (F3). The pop-up dialog box shown below will appear.

Bank Auto-Load	
Drive :	01 Conner GFP10603
Folder:	F00 Main Folder
Bank :	B06 Indian Ensemble
<input type="button" value="Cancel"/>	<input type="button" value="Save"/>

4. Set the bank to be automatically loaded on power up. Banks can be selected using the numeric keypad, data entry control, inc/dec keys and cursor keys.
5. Press **Save** to confirm your choice or **Cancel** to cancel the operation.

Tune



The tune submenu contains three additional functions.

TUNING OFFSET

Tuning Offset adjusts the overall tuning of the Emulator IV so that it can be tuned to other instruments. The range of tuning offset is ± 100 cents or 1 semitone in approximately 1.2 cent increments.

► To Change the Tuning Offset:

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **Tune** function key (F3). The following screen will appear.
3. If it is not already there, move the cursor to the tuning offset amount using the cursor keys or by pressing the F1 key.
4. Adjust the tuning offset of the E-IV using the data entry control, or inc/dec keys.
5. Press the **Exit** key to return to the memory statistics screen.

Master

★ Caution: Turn off transposition before selecting or modifying any presets to prevent confusion. Transpose transposes the key number rather than the sample assignment. Selecting the zone and any other use of the keyboard will show the transposed key number.

Master

TRANPOSE

This function transposes the Emulator IV in half-step intervals. The range of transposition is ± 1 octave. Transpose allows you to play in a different key without having to use different fingerings. Transpose will also allow you to play beyond the range of your physical keyboard.

► To Change the Transposition:

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **Tune** function key (F3). The following screen will appear.
3. Move the cursor to the transposition amount using the cursor keys or by pressing the F2 key.
4. Adjust the transposition of the E-IV using the data entry control, or inc/dec keys.
5. Press the **Exit** key to return to the memory statistics screen.

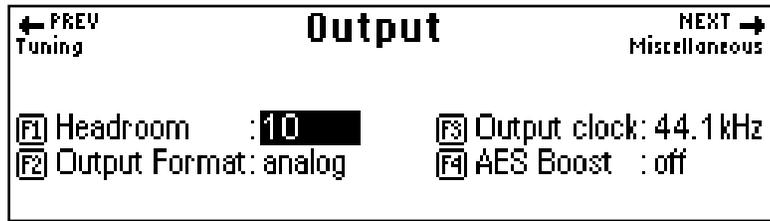
AUDITION KEY

This function allows you to set the key that will be played when the audition key on the front panel is pressed (except in the Sample Edit module where the audition key auditions samples from disk). The audition key allows you to audition sounds from the Emulator IV without having a MIDI keyboard connected.

► To Change the Audition Key:

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **Tune** function key (F3). The following screen will appear.
3. If it is not already there, move the cursor to the audition key using the cursor keys or by pressing the F3 key.
4. Select the audition key using the data entry control, or inc/dec keys.
5. Press the **Exit** key to return to the memory statistics screen.

Output



The Output submenu contains functions dealing with the Emulator IV's audio and digital outputs.

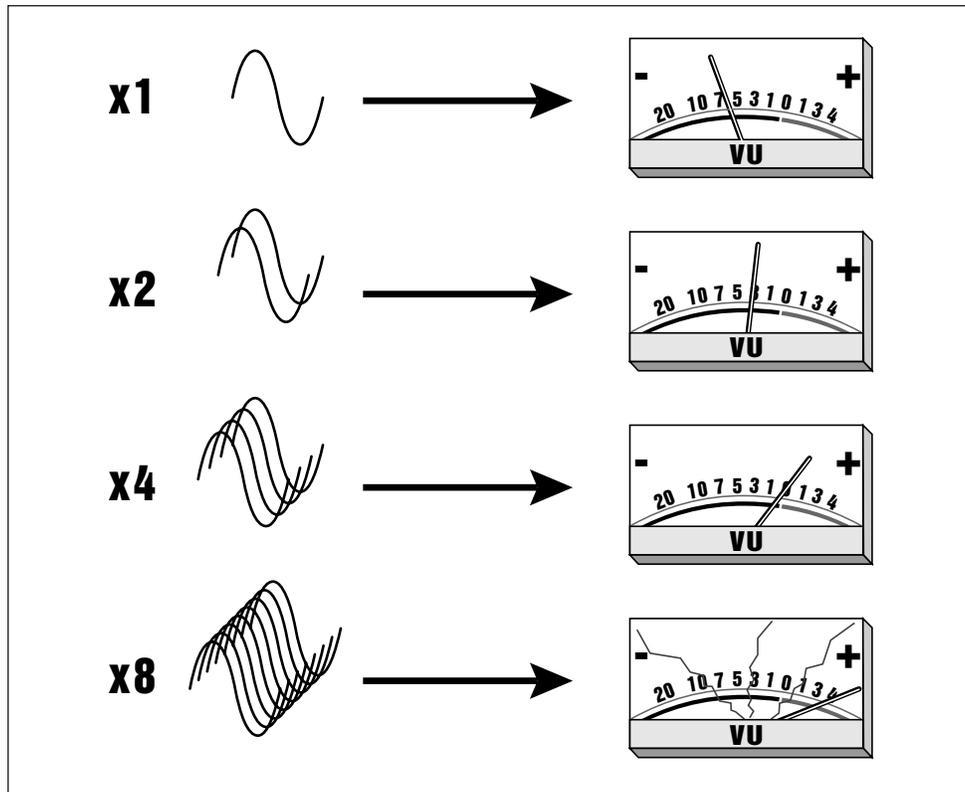
HEADROOM

Headroom is the amount of dynamic range remaining before clipping will occur. Unlike a CD player, a sampler must play multiple channels at once. Each channel boosts the headroom requirement by 3 dB. The amount of headroom on the E-IV is adjustable from 0 dB to 15 dB in 1 dB increments (with the front panel volume control set to maximum). A headroom setting of 0 dB for example, will provide the hottest output level, (and the highest signal to noise ratio) but may produce “clipping” if too many notes are played at once. The default headroom setting on the E-IV is 10 dB, which maintains an excellent signal to noise ratio while keeping a reasonable amount of headroom in reserve. If you hear the signal clipping or breaking up, raise the amount of headroom. The headroom adjustment also controls the level of the digital output. The headroom setting is retained in flash RAM.

Tip: *The headroom adjustment also controls the level of the digital audio output.*

Master

Master



Each additional channel adds +3 dB to the output level of the E-IV. Increasing the headroom allows you to play more channels without clipping.

► To Change the Headroom:

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **Output** function key (F4). The output menu will appear.
3. If it is not already there, move the cursor to the headroom amount using the cursor keys or by pressing the F1 key.
4. Adjust the amount of remaining headroom of the E-IV using the data entry control, or inc/dec keys.
5. Press the **Exit** key to return to the memory statistics screen.

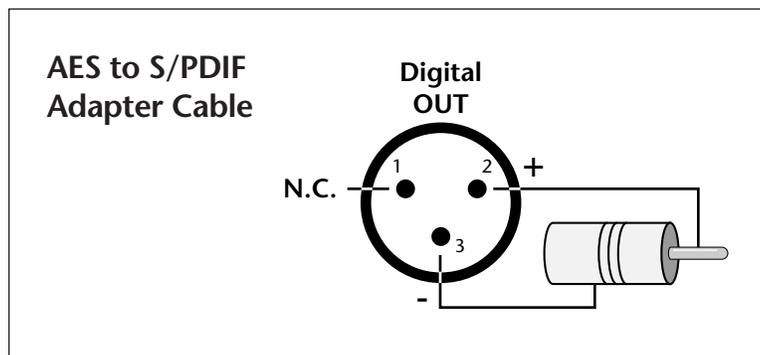
OUTPUT FORMAT

The Emulator IV is equipped with a digital audio output for interfacing with other digital audio equipment. Both the AES/EBU (professional) and the S/PDIF (consumer) formats are supported. The digital audio interface carries two channels of audio information which mirrors the audio at the main outputs. The analog and digital outputs are always active. **This function optimizes the output of the Emulator IV for whatever format is being used.**

Tip: Always use high-quality, low-capacitance, three-wire cable for the AES/EBU interface to insure data integrity.

► To Change the Output Format:

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **Output** function key (F4). The output menu will appear.
3. Move the cursor to the output format using the cursor keys or by pressing the F2 key.
4. Set the output format using the data entry control, or inc/dec keys.
5. Press the **Exit** key to return to the memory statistics screen.



Tip: The headroom adjustment, the master volume control, AES Boost and the zone level all control the output level of the digital audio output. These controls can be adjusted when transferring digital audio to optimize the signal level.

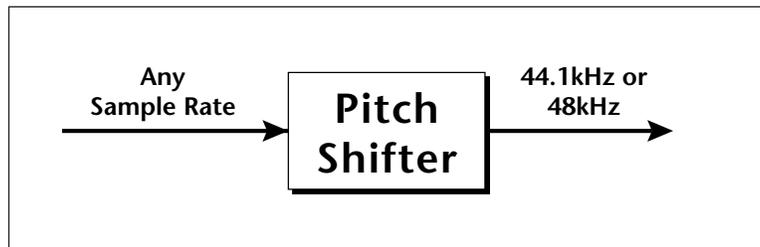
To connect the E-IV's digital audio output to consumer gear, it may be necessary to use an adapter cable. This adapter should be constructed using video-grade cable.

OUTPUT CLOCK

This function is used to adjust the output sample rate of the Emulator IV between 44.1 kHz or 48 kHz. This function sets the output rate of the entire machine (analog as well as digital outputs). If you wish to sample at 48 kHz, the output clock should also be set to 48 kHz or the output sample rate will be interpolated down to 44.1 kHz. Digital audio recorders will automatically record at the clock rate of the source, so set this control at 48 kHz to record into a DAT recorder.

► To Change the Output Clock Rate:

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **Output** function key (F4). The output menu will appear.
3. Move the cursor to the output clock using the cursor keys or by pressing the F4 key.
4. Set the output clock rate using the data entry control, or inc/dec keys.
5. Press the **Exit** key to return to the memory statistics screen.



The E-IV uses "constant sample rate" pitch shifting technology which outputs at either 44.1 kHz or 48 kHz regardless of the input sample rate.

AES BOOST

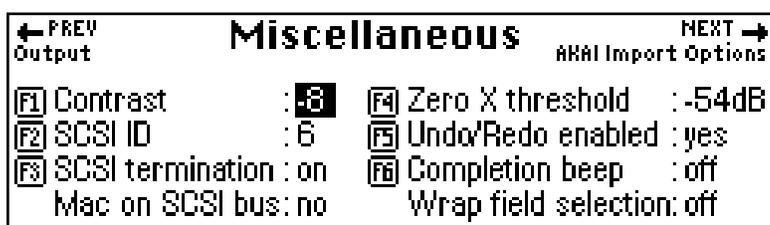
When this function is on, the gain of the digital output is boosted by +6 dB. This allows a better signal to noise ratio when using only a few of the Emulator IV's output channels. Caution: playing back too many channels with AES Boost On may cause digital overload and clipping.

► To Change the Digital Output Level:

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **Output** function key (F4). The output menu will appear.
3. Move the cursor to AES Boost using the cursor keys or by pressing the F4 key.
4. Turn AES Boost On or Off using the data entry control, or inc/dec keys.
5. Press the **Exit** key to return to the memory statistics screen.

A black rectangular button with rounded corners, oriented vertically. The word "Master" is written in white, bold, sans-serif font, rotated 90 degrees counter-clockwise.

Miscellaneous



Master

The Misc submenu, as the name suggests, contains master miscellaneous functions which don't fit in any other category. The Next key reveals another page containing several Akai import options.

CONTRAST

This function allows you to change the viewing angle of the front panel LCD so that it may be easily read from either above or below. The angle is adjustable from +7 to -8. Adjust the contrast for the most comfortable viewing.

► To Change the Contrast:

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **Misc** function key (F5). The Miscellaneous menu will appear.
3. Move the cursor to the contrast amount using the cursor keys or by pressing the F1 key.
4. Set the contrast using the data entry control, or inc/dec keys.
5. Press the **Exit** key to return to the memory statistics screen.

E4 SCSI ID

This utility allows you to change the SCSI ID number of the Emulator IV in the event that it conflicts with a device on the SCSI bus having the same ID number.

►To Change the ID Number of the E-IV:

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **Misc** function key (F5). The Miscellaneous menu will appear.
3. Move the cursor to the SCSI ID number using the cursor keys or by pressing the F2 key.
4. Select the ID number using the data entry control, or inc/dec keys.
5. Press the **Exit** key to return to the memory statistics screen.

SCSI TERMINATION ON/OFF

This utility allows you to turn the internal SCSI termination On or Off under software control. Termination helps reduce line echoes or standing waves on the SCSI bus. Only the first and last device in a SCSI chain should be terminated. This function should normally be left On, since the E-IV is usually connected at one end of the SCSI line.

►To Turn SCSI Termination On or Off:

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **Misc** function key (F5). The Miscellaneous menu will appear.
3. Move the cursor to the SCSI Termination On/Off using the cursor keys or by pressing the F3 key.
4. Turn SCSI Termination On or Off using the data entry control, or inc/dec keys.
5. Press the **Exit** key to return to the memory statistics screen.

Master

MAC ON SCSI BUS

The Emulator IV contains special software which allows multiple “Master” devices to peacefully coexist on the SCSI bus. A Macintosh computer connected to the SCSI bus along with the E-IV presents special requirements. Turn this function **On** if you have a Macintosh connected to the SCSI bus.

►To Enable a Macintosh on the SCSI Bus:

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **Misc** function key (F5). The Miscellaneous menu will appear.
3. Move the cursor to “Mac on SCSI Bus”.
4. Turn “Mac on SCSI Bus” On or Off using the data entry control, or inc/dec keys.
5. Press the **Exit** key to return to the memory statistics screen.

ZERO CROSSING THRESHOLD

Background

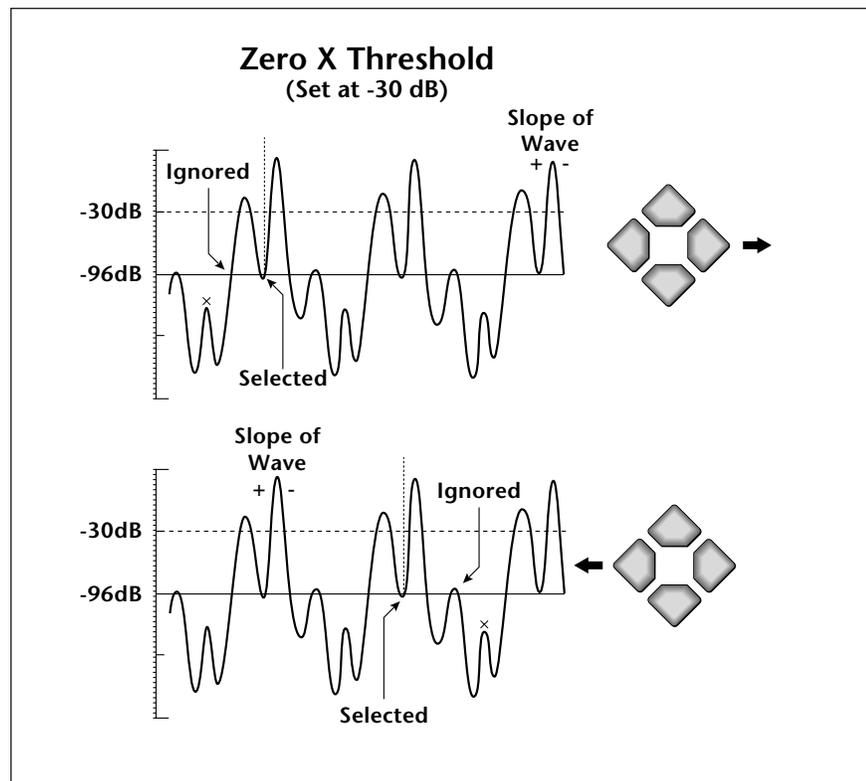
The term zero crossing refers to the point at which the positive slope of a waveform passes through zero. In many sample editing applications, such as splicing and looping, it is useful to locate zero crossings in order to make glitch-free joins and loops. On some signals, however, a simple zero crossing may not be effective because the signal contains excessive noise or low-level, high-frequency harmonics. In these cases, every few samples may cross through zero. By setting a zero crossing threshold, we can ignore low-level zero crossings and wait for the signal to reach a certain level before choosing the next zero-crossing. Zero crossing threshold sets a level that a signal must exceed before the next zero crossing with a positive slope is selected. The selected zero crossing threshold is used in the Auto-Truncate function or whenever you manually select a zero crossing using the cursor keys.

The diagram on the following page illustrates zero crossing in action. The small x marks the initial position. To move forward through the sound to the next zero crossing,

press the right cursor button, as shown in the upper diagram. The E-IV will find the first zero crossing on the positive slope after the signal has crossed the designated threshold.

To move backward through the sound to the next zero crossing, as shown in the lower diagram, press the left cursor button. The Emulator IV will find the first zero crossing on the positive slope after the signal has crossed the designated threshold.

Use the data entry control or inc/dec buttons to select the zero crossing threshold. A setting of -96 dB will be the most sensitive; a setting of -30 dB will be the least sensitive. The selected zero crossing threshold is used in the auto-truncate function or whenever you manually select a zero crossing using the left/right cursor keys. If auto truncate does not seem to be working well, try adjusting the zero crossing threshold.



►To Set the Zero-Crossing Threshold:

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **Misc** function key (F5). The Miscellaneous menu will appear.
3. Move the cursor to Zero-X Threshold using the cursor keys or the F4 key.
4. Set the desired zero-crossing threshold using the data entry control, or inc/dec keys.
5. Press the **Exit** key to return to the memory statistics screen.

UNDO/REDO ENABLE

Background - Undo and Redo

During many Sample Editing operations, the E-IV will automatically back up the sample being processed and store this backup on the system drive (hard disk). If you do not like the results of the processing, you can call up the Undo function, and restore the original sample from the system drive. (Ah, if only life itself were so simple.) Best of all, the processed sample will now move onto the system drive. Thus, if you decide you liked the processed version better after all, you can actually undo the undo. (Redo.)

The display will inform you if there is not enough memory to back up a sample onto the system drive. You then have two choices: either free up some additional memory by erasing banks on the system drive, or disable the backup process using this function. Of course, if backup is disabled, you will not be able to undo an operation.

★ **Caution:** *Undo/Redo cannot backup to a floppy disk drive. A hard disk drive must be connected.*

►To Enable Undo/Redo:

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **Misc** function key (F5). The Miscellaneous menu will appear.
3. Move the cursor to Undo/Redo Enable using the cursor keys or the F5 key.

4. Enable or disable Undo/Redo using the data entry control, or inc/dec keys.
5. Press the **Exit** key to return to the memory statistics screen.

COMPLETION BEEP ON/OFF

Certain sample editing operations, may take some time to process, especially with longer samples. This function, when On, causes the E-IV to output a beep tone from the main outputs whenever it has finished processing its task.

► To Enable the Completion Beep

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **Misc** function key (F5). The Miscellaneous menu will appear.
3. Move the cursor to Completion Beep On/Off using the cursor keys.
4. Enable or disable Completion Beep using the data entry control, or inc/dec keys.
5. Press the **Exit** key to return to the memory statistics screen.

Master

WRAP FIELD SELECTION

When wrap field selection is On, moving the cursor past the last selection in a window makes it jump back up to the first selection. With wrap field selection Off, the cursor will NOT move past the last selection in a window by pressing the right or down cursor keys. You have to use the up or left cursor key to go back.

► To Turn Wrap Field Selection On or Off:

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **Misc** function key (F5). The Miscellaneous menu will appear.
3. Move the cursor to Wrap Field Selection using the cursor keys.

4. Turn Wrap Field Selection On or Off using the data entry control, or inc/dec keys.
5. Press the **Exit** key to return to the memory statistics screen.

AKAI IMPORT OPTIONS

The Emulator IV has the ability to read Akai S1000 and S1100 programs, samples or volumes. This page contains several options related to the import of Akai samples. There are a few differences between the Akai samplers and the E-IV. For this reason a number of Akai program parameters are ignored, during the conversion process. In most cases however, the converted programs and samples should sound and behave very much like the originals.

The Akai options are as follows:

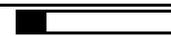
- **Combine L/R into Stereo:** When this option is set to On, the E-IV will look within an Akai keygroup for left/right samples that can be combined into a single stereo sample. If the first ten characters of the 12 character sample name match, and the last two characters are “-L” and “-R”, they will be combined into an E-IV stereo sample. Program parameters for the new stereo sample are taken from the left sample. The right side parameters are ignored. When this function is Off, stereo samples are not created and each sample is placed in a separate voice.
- **Adjust Fractional Loops:** Sample looping is implemented differently on the E-IV and the Akai. Because of this difference, certain loops may “tick” slightly or appear out of tune after being transferred from the Akai. This function will automatically repair any incorrect sample loops after being transferred. Be advised that the transfer may take slightly longer (up to 15% more time) with Adjust Fractional Loops turned On.
- **Akai Sampler SCSI ID:** If you have an Akai sampler connected to the SCSI bus the E-IV needs to know its SCSI ID in order to avoid SCSI conflicts. The Akai SCSI ID should be entered *before* connecting the sampler onto the SCSI chain. You do NOT have to set this parameter for Akai formatted storage devices as these will be recognized automatically.

► **To Set the Akai Import Options:**

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **Misc** function key (F5). The Miscellaneous menu will appear.
3. Press the **Next** page key. The AKAI Import Options menu will appear.
4. Move the cursor to the desired option using the cursor keys and change the parameter using the data entry control or the inc/dec keys.
5. Press the **Exit** key to return to the memory statistics screen.

A black rectangular button with rounded corners, featuring the word "Master" written vertically in white, bold, sans-serif font.

MIDI GLOBALS

Memory Statistics				
Type	Total	Used		
Preset	521k	113k	21%	
Sample	8mb	4mb	50%	
Mode	Cntrls1	Cntrls2	Prefs	

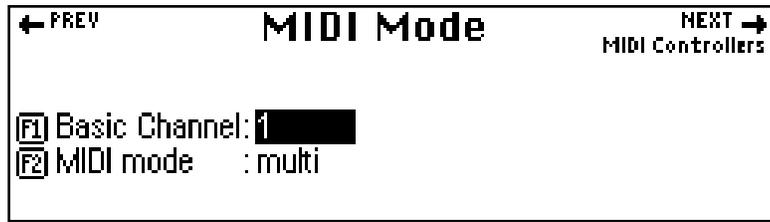
Master

The MIDI Global Menu allows you to change the MIDI parameters which affect the overall MIDI operation. The MIDI Globals menu is accessed by pressing the MIDI key from the Memory Statistics screen.

The MIDI Globals menu contains three sub menus:

- **Mode** - Selects MIDI basic channel and mode.
- **Controls 1 & 2** - Sets the MIDI controller numbers received by the E-IV.
- **Preferences** - Miscellaneous MIDI functions.

MIDI Mode



BASIC CHANNEL

The Basic MIDI Channel is only used when the Emulator IV is set to Poly Mode. In Poly Mode, the E-IV only receives MIDI data on the selected basic channel and ignores data on all other channels.

► To Set the Basic MIDI Channel

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **MIDI** function key (F6). The MIDI Globals sub menu will appear.
3. Press the **Mode** function key (F1). The MIDI Mode menu will appear.
4. Move the cursor to Basic Channel using the cursor keys or the F1 key.
5. Set the basic MIDI channel using the data entry control, or inc/dec keys.
6. Press the **Exit** key twice to return to the memory statistics screen.

Master

MIDI MODE

The Emulator IV can be used in either of three MIDI modes:

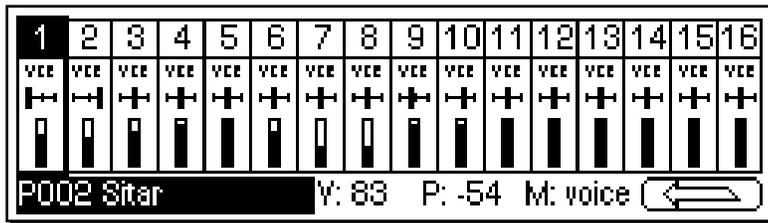
- **Omni Mode** - Receives MIDI data on any and all channels at once and plays the current preset.
- **Poly Mode** - Receives MIDI data only on the basic channel and plays the current preset.
- **Multi Mode** - Receives MIDI data on any and all channels at once and plays the preset assigned to each MIDI channel as assigned in the main Multimode screen.

► To Change the MIDI Mode

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **MIDI** function key (F6). The MIDI Globals sub menu will appear.
3. Press the **Mode** function key (F1). The MIDI Mode menu will appear.
4. Move the cursor to MIDI Mode using the cursor keys or the F2 key.
5. Change the MIDI model using the data entry control, or inc/dec keys.
6. Press the **Exit** key twice to return to the memory statistics screen.

MULTI MODE - MIDI MIX

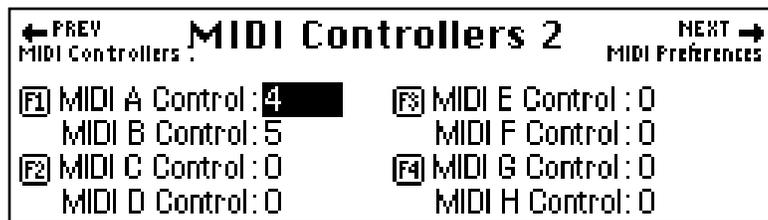
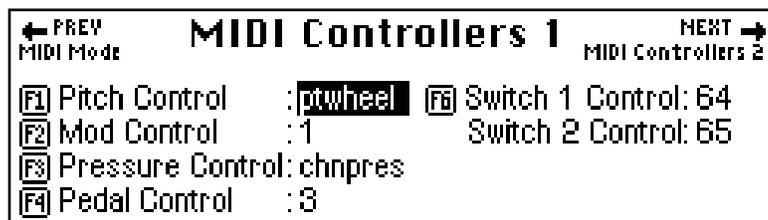
When Multimode is selected as the MIDI mode, the main display of the Emulator IV transforms from a single preset selection screen into a MIDI Mix screen. The MIDI Mix screen allows you to display and adjust the preset, volume, pan settings and output assignments for up to 32 MIDI channels. This is a useful feature to fine tune multi-timbral sequences. This screen also allows you to override the output channel programmed in the voice. Any volume, pan and preset changes made over MIDI will be reflected in this display. (Volume = MIDI continuous controller channel #7, Pan = MIDI continuous controller channel #10)



► To Change the MIDI Mix

1. Set the MIDI mode to **Multi** as described on the previous page, or simply select Multi after pressing the  key on the main preset screen.
2. Select the desired MIDI channel using the up/down cursor keys.
3. Select preset, volume, pan or the output channel using the left/right cursor keys. Change the parameter values using the data entry control, the inc/dec keys, or the numeric keypad.
- Pan **ADDS** to the pan setting made in the voice and is not an absolute pan setting.
4. Press the **NEXT** page key to select MIDI channels 17-32. MIDI channels 17-32 are not valid unless you have the MIDI Interface Option Card installed, which adds 16 additional MIDI channels.
5. Set MIDI mode to Poly or Omni to change the main screen back to a single preset display format.

MIDI Controllers



This menu is where you assign 8 MIDI continuous controllers which will be received by the Emulator IV. Match these numbers to the controllers transmitted by your MIDI keyboard. The 8 MIDI controllers will be used by all presets. (Note: the names attached to the controllers such as “Pitch Control” and “Mod Control” are arbitrary. They can be assigned to any destination in the Preset Edit menu.)

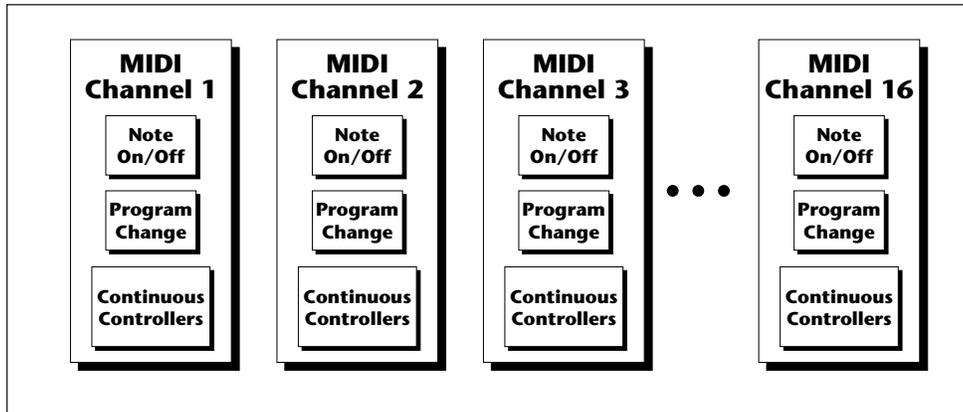
► To Setup the MIDI Controllers

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **MIDI** function key (F6). The MIDI Globals sub menu will appear.
3. Press the **Controls 1** or **2** function key (F2 or F3). The MIDI Controllers menus shown above will appear.
4. Move the cursor to desired controller name using the cursor keys or the indicated “F” keys.
5. Select the MIDI controller numbers using the data entry control, or inc/dec keys.
6. Press the **Exit** key twice to return to the memory statistics screen.

Master

ABOUT MIDI CONTROLLERS

You probably already know that there are 16 MIDI channels that can be used. Each of the 16 MIDI channels uses basically 3 types of messages; *note on/off*, *program changes*, and *continuous controller* messages.



Your MIDI keyboard, in addition to describing which note was played, also sends *realtime control* information. Realtime control sources include such things as pitch wheels or levers, modulation wheels or levers, control pedals, aftertouch, etc. and are used to add more expression or control.

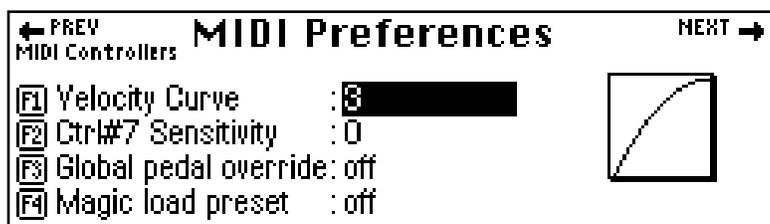
Your MIDI keyboard sends out realtime controller information on separate channels called *continuous controller channels*. There is a set of 32 continuous controller channels for each of the 16 MIDI channels. Some of the controller channels, such as pitch wheel, volume, and pan have been standardized. For example, volume is usually sent on continuous controller channel #7.

The E-IV allows you to route any continuous controller to any realtime modulation destination. The connections for a particular preset are completed in the Preset Edit menu.

Tip: A few of the standardized MIDI Controller numbers are listed below.

- 1 - Modulation Wheel or Lever
- 2 - Breath Controller
- 3 - Aftertouch: Rev 1 DX7
- 4 - Foot Pedal
- 5 - Portamento Time
- 6 - Data Entry
- 7 - Volume
- 8 - Balance
- 9 - Undefined
- 10 - Pan
- 11 - Expression

MIDI Preferences



Master

This submenu contains several additional global MIDI functions.

VELOCITY CURVE

Incoming velocity values can be scaled by one of eight curves to better adapt to your playing style or MIDI controller. Selecting “linear” leaves the velocity data unaltered. The shape of the selected curve is displayed in the window. Select the curve that works best for you.

► To Set the Velocity Curve:

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **MIDI** function key (F6). The MIDI Globals submenu will appear.
3. Press the **Prefs** function key (F3). The MIDI Preferences submenu will appear.
4. Move the cursor to Velocity Curve using the cursor keys or the F1 key.
5. Set the Velocity Curve using the data entry control, or inc/dec keys.
6. Press the **Exit** key twice to return to the memory statistics screen.

CONTROLLER #7 SENSITIVITY

This function allows you to tailor the E-IV's response to MIDI continuous controller #7 (Volume) to your own taste or to better match other equipment. Higher numbers compress the volume control range, cutting the sound off at higher controller #7 values.

►To Adjust MIDI Controller #7 Sensitivity:

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **MIDI** function key (F6). The MIDI Globals sub menu will appear.
3. Press the **Prefs** function key (F3). The MIDI Preferences submenu will appear.
4. Move the cursor to Ctrl #7 Sensitivity or press the F3 key.
5. While sending controller #7 messages adjust the sensitivity using the data entry control, or inc/dec keys.
6. Press the **Exit** key twice to return to the memory statistics screen.

GLOBAL PEDAL OVERRIDE

This feature overrides any footpedal assignments made in the voice and forces the footpedal to become a master volume pedal which emulates the front panel volume control.

►To Turn Global Pedal Override On/Off

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **MIDI** function key (F6). The MIDI Globals sub menu will appear.
3. Press the **Prefs** function key (F3). The MIDI Preferences submenu will appear.
4. Move the cursor to Global Pedal Override using the cursor keys or the F3 key.
5. Turn Global Pedal Override On or Off using the data entry control, or inc/dec keys.
6. Press the **Exit** key twice to return to the memory statistics screen.

Master

MAGIC LOAD PRESET

This feature allows a MIDI command to load banks from the hard disk. The “Magic Preset” is a preset number which tells the Emulator IV that the next preset change command that it receives over MIDI is the bank number to be loaded. Therefore, to load a hard disk bank over MIDI, two program change commands must be sent, the Magic Preset and the bank number. As an example, if the Magic Preset is set at “P85”, and the E-IV receives a preset change command of 85 followed by a preset change command of 11, the E-IV will load bank 11 from the hard disk. If multiple SCSI drives are connected, the E-IV will load from the drive most recently accessed. The Magic Preset is user definable and can be turned off or set to any preset number from 0 to 127. MIDI Load Bank always works, regardless of MIDI Global settings.

► To Set the Magic Load Preset

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **MIDI** function key (F6). The MIDI Globals sub menu will appear.
3. Press the **Prefs** function key (F3). The MIDI Preferences submenu will appear.
4. Move the cursor to Magic Load Preset using the cursor keys or the F4 key.
5. Set the Magic Preset using the data entry control, or inc/dec keys.
6. Press the **Exit** key twice to return to the memory statistics screen.

Sample Manage

4

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**Sample
Manage**

SAMPLE MANAGE



This “recording studio” module records sounds from the outside world into the bank. Features include adjustable preamp gain, variable threshold setting, and adjustable sample rate and length. Samples can also be named, copied, erased and automatically placed on the keyboard.

The Sample Manage menu contains six main sub menus:

- **Utilities** - Contains the Erase, Copy, Defragment and MIDI sample dump functions.
- **Name** - Allows you to name your samples.
- **New** - The recording studio where sounds are sampled into the E-IV. This module also contains automatic DSP and setup functions such as auto-truncate, auto-normalize, auto-sample placement, auto looping
- **Place** - Allows you to manually place the sample onto any keyboard range.
- **Export** - Allows you to export a sample into another bank.
- **Info** - Displays information on the selected sample.



Utilities



The Sample Utilities menu contains several functions.

- Erase Sample
- Copy Sample
- Sample Dump
- Defragment Memory

Sample
Manage

ERASE SAMPLE

Individual samples can be erased from the bank using this function.

► To Erase a Sample:

1. Press the **Sample Manage** key. The LED will illuminate and the main screen will appear.
2. Select the sample to be erased using the data entry control, inc/dec keys, or the numeric keypad.
3. Press the **Utils** function key (F1). A second row of soft keys will appear.
4. Press the **Erase...** function key (F1). A pop-up dialog box will appear asking you if you want to erase all presets and samples.
5. Press **OK** to erase the bank or **Cancel** to cancel the operation.

6. A pop-up dialog box will appear asking you if you want to defragment memory after erasing.
7. Press **Yes** to defragment memory and erase the sample. Press **No** to erase the sample without defragmenting memory, or **Cancel** to cancel the entire operation.

■ **Note:** For more information about Defragmenting Memory, see page 4-7.

COPY SAMPLE

Samples can be copied to other sample numbers within the bank.

► To Copy a Sample:

1. Press the **Sample Manage** key. The LED will illuminate and the main screen will appear.
2. Press the **Utils** function key (F1). A second row of soft keys will appear.
3. Press the **Copy...** function key (F2). A pop-up dialog box will appear asking you to select the destination sample location.
4. Select the destination sample location using the data entry control, inc/dec keys or the numeric keypad.
5. Press **OK** to copy the sample or **Cancel** to cancel the operation.

SAMPLE DUMP

MIDI Sample Dump allows sample data to be transferred to and from the Emulator IV using the MIDI Sample Dump Standard. This is a way of transferring samples to and from other samplers. Although none of the preset parameters are transferred, sample loop data is retained. If imported samples have loop problems such as “ticks or pops”, the Sample Integrity function (Sample Edit, Utilities) may be able to automatically repair them. Otherwise adjust the loop points.

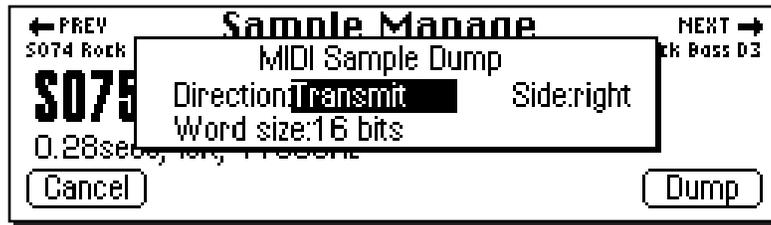
The E-IV can transmit sample data with a word size of either 14 or 16 bits (Certain instruments require the use of the 14 bit word size). In addition, for instruments that use 14 bits or less, 14 bit mode transmits data 30% faster.

Before initiating MIDI Sample Dump, make sure that the MIDI cables are properly connected. A single MIDI cable (open-loop) is sufficient but the data transfer will be much faster if two MIDI cables are used (closed-loop). The closed-



loop allows the two units to handshake and prevents idle time between each data packet. The cables should be connected between the MIDI In and MIDI Out of both units.

In the Sample Dump Standard and in the E-IV, samples are assigned numbers and these numbers are the same. For example, sample #36 transferred from another device to the E-IV will overwrite sample location 36.



► **To Send or Receive a Sample:**

1. Press the **Sample Manage** key. The LED will illuminate and the main screen will appear.
2. Select the sample to be transmitted or received using the data entry control, inc/dec keys, or the numeric keypad.
3. Press the **Utils** function key (F1). A second row of soft keys will appear.
4. Press the **Dump...** function key (F2). A pop-up dialog box will appear with several choices.

Direction: Select Transmit or Receive.

Word Size: Select 14 or 16 bits.

Side: If the sample is stereo, you have the option to select the right or left side.

5. Select the sample using the data entry control, inc/dec keys or the numeric keypad. Press **OK** to dump the sample or **Cancel** to cancel the operation.

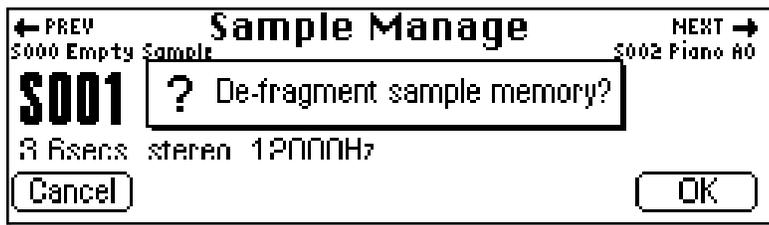
When receiving a sample, the currently selected sample will be overwritten by the incoming sample.

DEFRAGMENT MEMORY

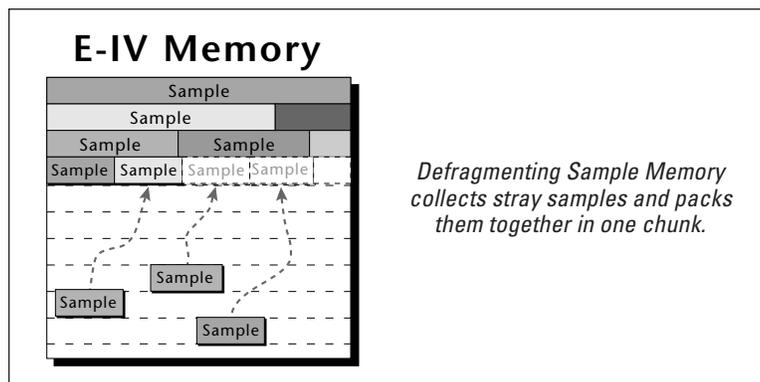
When samples are erased or truncated, empty spaces are left in the sample memory of the E-IV until the bank is saved to disk. Because the memory space is not filled efficiently, we call this condition “Fragmented Memory”. Fragmented memory may limit new sample size, even though you have plenty of memory left. This function allows you manually de-fragment the memory before saving it to disk. The E-IV automatically defragments when it saves a bank to disk.

► To Defragment Sample Memory:

1. Press the **Sample Manage** key. The LED will illuminate and the main screen will appear.
2. Press the **Utils** function key (F1). A second row of soft keys will appear.
3. Press the **Defrag...** function key (F4). A pop-up dialog box will appear asking you if you want to de-fragment sample memory.

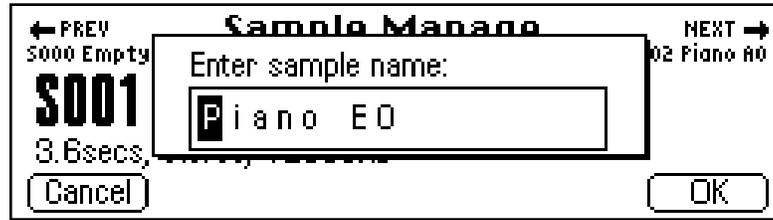


4. Press **OK** to defragment memory or **Cancel** to cancel the operation.



Sample
Manage

Name Sample



This function allows you to name or rename any sample in the bank.

► To Name a Sample:

1. Press the **Sample Manage** key. The LED will illuminate and the main screen will appear.
2. Select the sample to be named using the data entry control, inc/dec keys, or the numeric keypad.
3. Press the **Name** function key (F4). A pop up dialog box will appear asking you to enter the new sample name
4. Name the sample. Letters can be selected using the numeric keypad, data entry control, inc/dec keys and cursor keys, or using an ASCII keyboard.
5. Press **OK** to confirm the new name or **Cancel** to cancel the operation.

**Sample
Manage**

Create Sample (New)

```
← PREV          Create Sample          NEXT →
Name Sample
Thresh: 60dB | _____ | Source: resample 16 bit
Left  : on  | _____ | Length: 1.0secs
Right  : on  | _____ | (25.0secs avail.)
Monitor: on  | _____ |
ADC Gain: 0dB | _____ | [Arm] [Force]
```

This submodule prepares the Emulator IV for sampling. It also contains the sampling trigger controls and automatic DSP and auto-sample placement controls. The following functions are integrated into this important screen.

- Threshold
- Left and Right Input Meters
- Sample Through Monitor Select
- ADC Gain
- Sampling Source and Source Sample Rate
- Sample Length
- Arm Sample
- Force Sample
- Automatic DSP
- Automatic Sample Placement



LEFT/RIGHT CHANNELS

- **Left Channel:** This line shows the left input level and whether the channel is On or Off. Use the inc/dec keys or data entry control to enable or disable recording into the left channel. When sampling into one channel only, turn off the other channel to conserve memory.
- **Right Channel:** This line shows the right input level and whether the channel is On or Off. Use the inc/dec keys or data entry control to enable or disable recording into the right channel. When sampling into one channel only, turn off the other channel to conserve memory.

SAMPLING SOURCE & SAMPLE RATE

- **Analog Sampling:** Choose between 22.05 kHz, 24 kHz, 44.1 kHz or 48 kHz when using the analog inputs. The sample rate should be at least twice as high as the highest frequency component in the sound being sampled.
- **Digital Sampling:** Choose between 32 kHz, 44.1 kHz or 48 kHz when using the digital input. The display setting should match the sample rate of the incoming digital data, otherwise the Arm and Force Sample soft keys cannot be selected. If a digital source is not connected, the AES clock indicator on the lower line of the display will read “no AES” and sampling will be disabled.

The E-IV will display a sample overload message when digital audio containing “Full Code” data (all 1's) is detected. This is a correct response and indicates that the input data has been clipped at some point. Full code data may distort in the E-IV because changing the pitch may cause a slight gain increase. If possible, reduce the level of the incoming digital data to the E-IV if you see an overload message.

- **Resampling:** This function allows you to resample the main outputs of the Emulator IV as you are playing. Resampling allows you to build up extremely dense sounds or record a note sequence to be played back with a single key. There are two resampling modes, 16 bit and 18 bit. Use 16 bit mode for monophonic or duophonic passages or when you are not playing too many notes at once. 18 bit mode gives you more headroom for playing many notes at once.

► To Set the Sample Source:

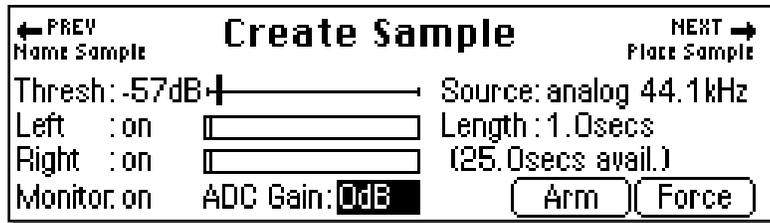
1. Press the **Sample Manage** key. The LED will illuminate and the main screen will appear.
2. Press the **New** function key (F3). The “Create Sample” screen will appear.
3. Move the cursor to “Source” using the cursor keys.
4. Select the desired sampling source using the data entry control or inc/dec keys.
5. Press the **Exit** key to return to the Sample Manage screen.

ADC GAIN

ADC stands for Analog-to-Digital Converter. Set the analog sample level with the data entry control or inc/dec keys so that the left and right side meters indicate optimum sampling level. Play the sound to be sampled and observe the bar graph display. The signal level should be set so that the peak bar comes close to the extreme right side without actually reaching it. The gain is adjustable from -10 dB to +50 dB in 1 dB steps. This control has no effect on the digital input.

►To Set the ADC Gain:

1. Press the **Sample Manage** key. The LED will illuminate and the main screen will appear.
2. Press the **New** function key (F3). The following display will appear.



3. Move the cursor to “ADC Gain” using the cursor keys.
4. While monitoring the sound to be sampled on the VU meters, adjust the ADC Gain using the data entry control, or inc/dec keys. Set the level so that the bars never quite reach the top of the meter range.
5. Press the **Exit** key to return to the Sample Manage screen or **Arm** or **Force** to begin sampling.



THRESHOLD

In the Arm Sampling mode, sampling begins when the input signal exceeds the threshold setting. Set the sampling threshold high enough so that it is not triggered by background noise, but low enough that all of the signal is captured. Sampling is actually initiated just **before** the threshold is exceeded in order to preserve the attack transient of the sound. Presampling times are preset for 12 mS at 44.1 kHz and 17 mS at 24 kHz.

►To Set the Sample Threshold:

1. Press the **Sample Manage** key. The LED will illuminate and the main screen will appear.
2. Press the **New** function key (F3). The “Create Sample” display will appear.
3. If it is not already there, move the cursor to “Threshold” using the cursor keys.
4. While observing the input signal on the VU meters, adjust the sampling threshold using the data entry control, or inc/dec keys.
5. Press the **Exit** key to return to the Sample Manage screen.

SAMPLE LENGTH

This function allows you to select the amount of sampling (recording) time prior to sampling. The maximum available length depends on the amount of memory available and the sampling rate.

►To Set the Sample Length:

1. Press the **Sample Manage** key. The LED will illuminate and the main screen will appear.
2. Press the **New** function key (F3). The “Create Sample” display will appear.
3. Move the cursor to “Length” using the cursor keys.
4. Set the desired sample length using the data entry control, or inc/dec keys. The display shows the amount of available sampling time on the line immediately below the sample length.
5. Press the **Exit** key to return to the Sample Manage screen or Arm or Force to begin sampling.

ARM SAMPLING

Upon initiating this soft key, the E-IV will begin sampling as soon as the sound to be sampled exceeds the sampling threshold.

►To Arm Sampling:

1. Press the **Sample Manage** key. The LED will illuminate and the main screen will appear.
2. Press the **New** function key (F3). The Create Sample display will appear.
3. Press the **Arm** function key (F5) to arm sampling. Sampling will commence as soon as the input signal exceeds the programmed threshold.
4. Press **Cancel** or **Exit** to stop sampling before the programmed length.

FORCE SAMPLING

Upon initiating this soft key, the E-IV will begin sampling immediately.

►To Force Sampling:

1. Press the **Sample Manage** key. The LED will illuminate and the main screen will appear.
2. Press the **New** function key (F3). The Create Sample display will appear.
3. Press the **Force** function key (F6) to force sampling. Sampling will commence immediately.
4. Press **Cancel** or **Exit** to stop sampling before the programmed length.

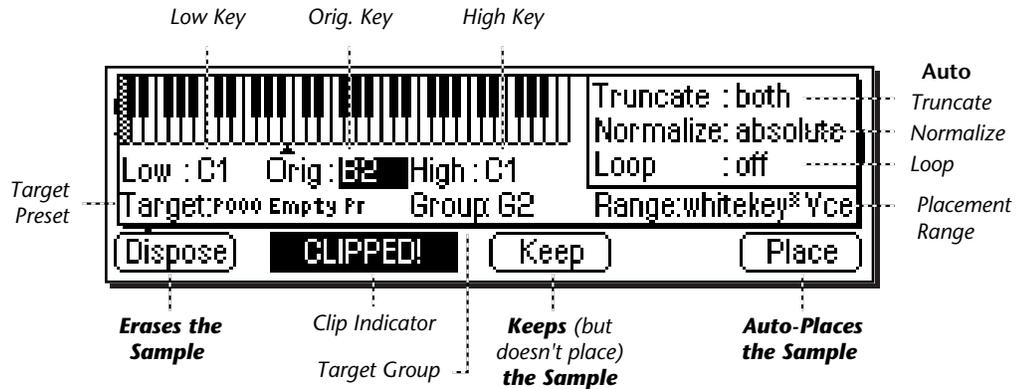
MONITOR ON/OFF

Allows you to monitor through the main outputs while sampling is occurring. Monitoring may be turned On or Off. Normally this function will be On so that you can monitor your sample quality, but there may be instances, such as a feedback loop in your mixing board, where you would turn sample monitor Off.



AUTOMATIC PARAMETERS

After sampling, the automatic parameters screen will appear. If the sample clipped during sampling, the display will inform you at this time.



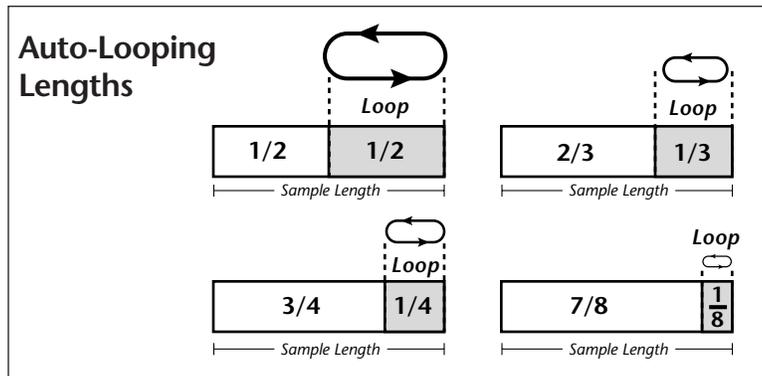
- **Dispose:** Erases the sample and returns you to the New Sample menu.
- **Keep:** Keeps the sample and performs the auto-DSP functions, but does not auto-place the sample. Returns you to the New Sample menu.
- **Place:** Keeps the sample, performs the auto-DSP functions and auto-place functions, then returns you to the New Sample menu.

The automatic DSP parameters are as follows:

- **Auto Truncate:** (Off, Start, End, Both)
Automatically truncates the start or end of the sample or both. The Zero Crossing Threshold parameter (Master, Misc.) determines the point at which truncation begins.
- **Auto Normalize:** (Off, Absolute, Relative)
Automatically increases the amplitude of a sample until the largest peak reaches 100% of full scale. Relative mode increases the amplitude of stereo samples until the largest peak of one side reaches 100%. Both sides maintain their proper amplitude relationship. Absolute mode increases the left and right samples to full level independently. Absolute and Relative have no effect when sampling in mono.

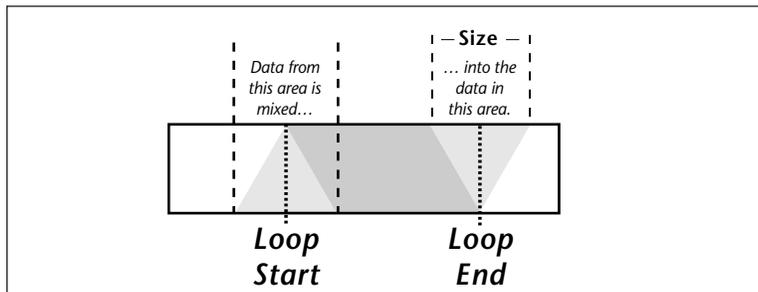
- **Auto Loop:** (Off, Whole, 1/2, 1/2 + xfd, 1/3, 1/3 + xfd, 1/4, 1/4 + xfd, 1/8, 1/8 + xfd)

This function automatically loops and autocorrelates the sample, then crossfade loops it if desired. Matching the loop length to the type of sample is important for getting the best results from auto-loop. Ensemble sounds are notoriously hard to loop and are best looped manually.



Select the auto looping length to match the type of sound. Loop on sections of the sound where the tone and amplitude are fairly static.

- Crossfade looping smoothly crossfades between the waves on either side of the loop so that the data at the loop splice points are identical. Since Crossfade looping permanently modifies the sample data, you may want to turn this feature off when doing important sampling. Auto-crossfade is a linear crossfade and sets the crossfade size to 1/2 the loop length. Experiment with auto-loop using 1/4 to 1/3 sized loops to start. In most cases, you'll find that auto-loop produces amazingly good results.



Crossfade Looping uses data from around the loop start point and crossfades this data into the area around the loop end point.

⚠ Caution: Be sure to change the target preset when resampling or you may place the sample into the same preset you are sampling from.

💡 Tip: You can use the Expand function in the Preset Edit menu to create individual voices for each sample.

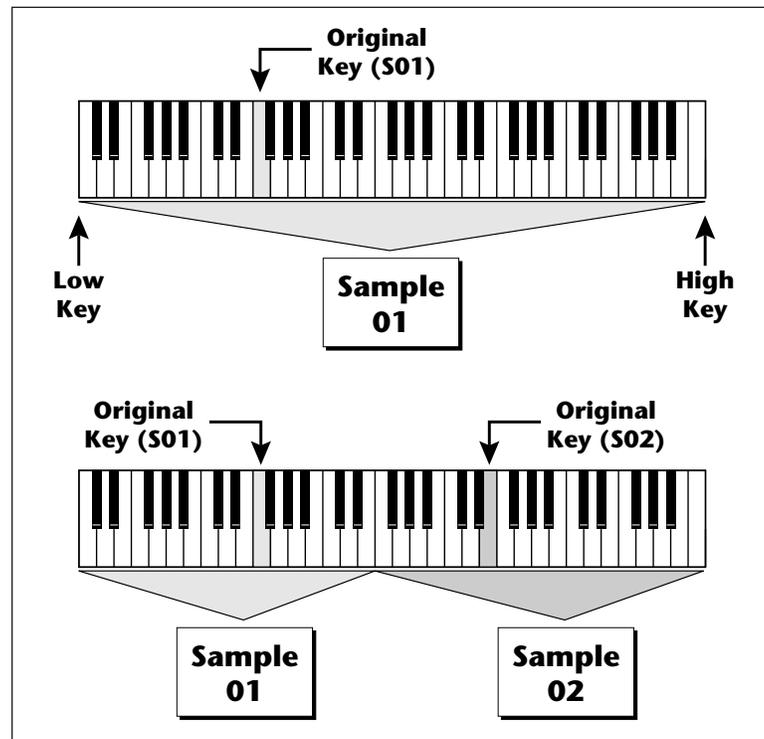
Sample Manage

The auto-placement parameters place the sample on the keyboard.

- **Target Preset:** Selects the preset where the sample will be auto-placed.
- **Target Group:** Selects a group number for the sample.
- **Range:** Samples will be placed on the keyboard according to the selected placement range, beginning with the original key. The original key can be changed at any time to change the placement of samples.

The choices for range are:

Auto* Multisample: This function places consecutive samples into a multisample voice at the original key you select from your MIDI keyboard. As you take additional samples, the low and high keys are adjusted in order to fit the new samples onto the keyboard.



Auto Multisample: The first sample is placed over the entire keyboard. When a new sample is taken, the low and high keys are automatically adjusted to accommodate the new sample.*

You don't ever have to set the low and high keys! Simply define the original pitch and you're finished. Samples are automatically named using the name of the preset appended with the original key name (i.e. Strings C1).

White Key* Voice: A new sample will be placed on the lowest available white key beginning at the original key you select (C1 is the default starting key). Each new sample will create a new voice.

1 Key* Voice: A new sample will be placed on the lowest available white or black key beginning at the original key you select (C1 is the default starting key). Each new sample will create a new voice.

2-24 Key* Voice: New samples will be placed over a keyboard range consisting of the number of keys selected. You can select the starting key by manually setting the original key (C1 is the default starting key). Each new sample will create a new voice.

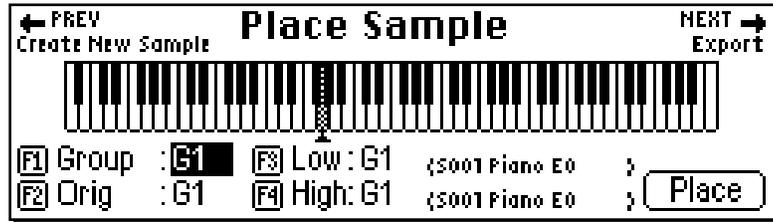
► **To Create an Auto-Multisample:**

This function works especially well for sampling other synthesizers.

1. Press the **Sample Manage** key. The LED will illuminate and the main screen will appear.
2. Press the **New** function key (F3). The Create Sample display will appear.
3. Set up the sampling parameters such as sample length, sample source and take the sample. The auto-placement screen will appear.
4. Press the original key on your MIDI keyboard.
5. Set Truncate to **Both**, Normalize to **Relative**, Loop to **1/4 + xfade**. Set Range to **auto* Multisample**. Set the target preset to an empty location.
6. Press **Place**. The E-IV asks you to name the preset (if it was empty). Name the preset and press **OK**.
7. The E-IV will perform the DSP functions, then auto-place the sample.
8. If you wish to take additional samples do so now. Simply define the original key using your MIDI keyboard then press **Place** after taking each sample.



Place Sample

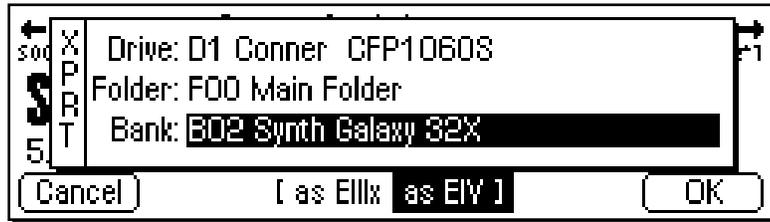


After sampling, a sample is automatically assigned to its own voice. This function allows you to place the voice (and the sample) onto a range of the keyboard without leaving the Sample Manage module.

► To Place a Sample:

1. Press the **Sample Manage** key. The LED will illuminate and the main screen will appear.
2. Select the sample to be placed using the data entry control, inc/dec keys, or the numeric keypad.
3. Press the **Place** function key (F5). The screen shown above will appear.
4. The sample can also be assigned a group number at this stage as a convenience. Use the data entry control or inc/dec keys to change the group number if desired.
5. Set the Original key and the High and Low keys for the voice. Use the Cursor keys or function keys to select the parameter and the inc/dec keys, your MIDI keyboard or the data entry control to change the key range.
6. Press **Place** to confirm placement or **Exit** to cancel the operation.

Export Sample



This function allows you to export a single sample as a self-contained bank in either E-IV or EIIIx format.

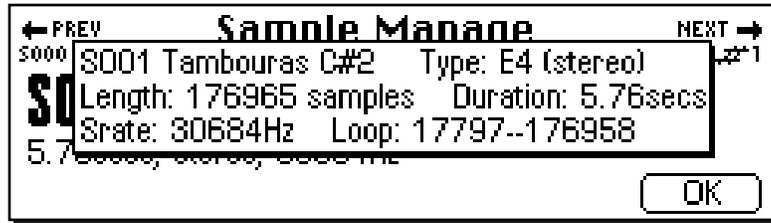
Suppose you were experimenting and modified a sample using the sample edit module. The sample data is permanently changed. You want to keep the modified sample, but if you save the bank, the original sample will be lost. Using this function, you can export the modified sample to a new bank and have both!

► To Export a Sample:

1. Press the **Sample Manage** key. The LED will illuminate and the main screen will appear.
2. Select the sample to be exported using the data entry control, inc/dec keys, or the numeric keypad.
3. Press the **Export** function key (F5). The screen shown above will appear.
4. Select the destination drive, folder and bank using the cursor keys and data entry control. You cannot write into an existing bank without erasing it. Usually you will choose an empty bank.
5. Select either E-IV or EIIIx format for the samples. Press **F3** for EIIIx or **F4** for E-IV format.
6. Press **OK** to export the sample or **Cancel** to cancel the operation.



Get Info



This function displays a sample's size in number of samples and duration in seconds. It also lists the amount of memory remaining.

► To Get Information about a Sample:

1. Press the **Sample Manage** key. The LED will illuminate and the main screen will appear.
2. Select the desired sample using the data entry control, inc/dec keys, or the numeric keypad.
3. Press the **Info...** function key (F6). A pop-up window appears with information about the sample.
4. Press the **OK** function key to return to the main Sample Manage screen.

**Sample
Manage**

Sample Edit

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**Sample
Edit**

SAMPLE EDIT



The Sample Edit menu allows you to modify the actual sample data in order to perform functions such as: sample looping, sample truncation and splicing, equalization, time compression, sample rate conversion and many others. In the sample edit module we are working with the most basic element of the E-IV hierarchy, the sample. It is important to note that every one of these functions except basic looping PERMANENTLY modifies the sample data.

The Sample Manage menu contains six main submenus:

- **Utilities** - Cut, Copy, Paste, DC Filter, Sample Calculator Sample Integrity.
- **Loop Type** - Turns Looping and Loop in Release On or Off.
- **Tools 1** - Looping controls, Truncation, Taper, Gain, Stereo<->Mono conversion, Swap Left and Right channels.
- **Tools 2** - Sample Rate Conversion, Digital Tuning, Compressor, Parametric EQ, Reverse Sample.
- **Tools 3** - Time Compression, Pitch Change, Transform Multiplication, Doppler/Pan, Exciter.
- **Undo** - Allows you to undo any sample editing process.



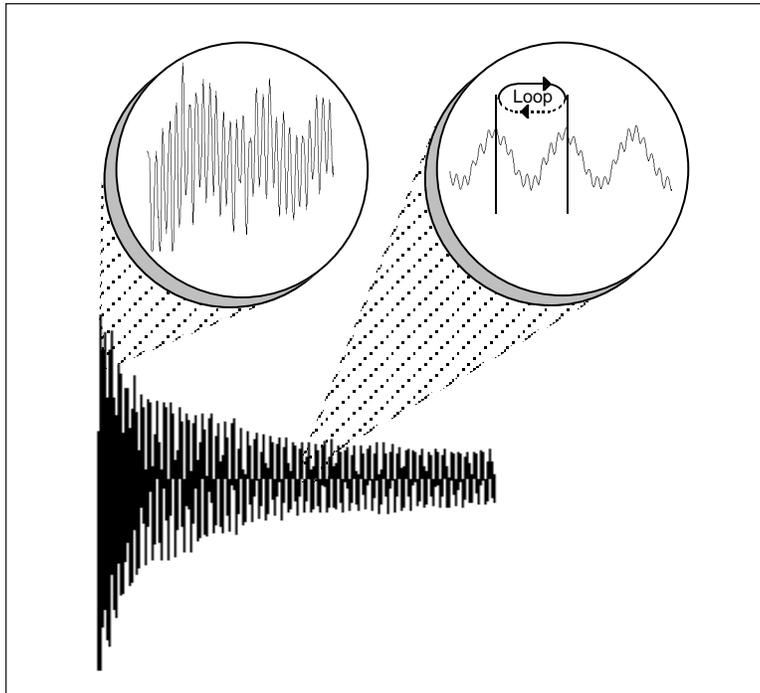
BACKGROUND: About Looping

Sampling is the process of storing sounds in digital memory. Since each individual sample (not the complete sample, but each element of the sample) requires one memory slot, memory requirements increase if you sample long sounds or use high sampling rates.

How Looping Works

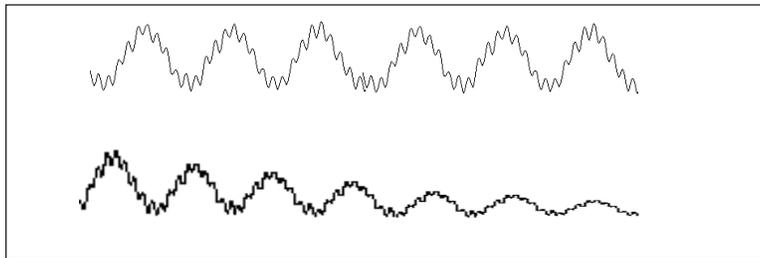
Looping is a technique that can extend a sound's length without using lots of memory. It is based on the fact that many sounds start off with a complex attack transient, then settle down to a comparatively steady sound. Listen carefully to a plucked guitar string. The first part of the sound consists of a complex mixture of pick noise and several harmonics; after a while, the string decays down to a pretty steady repetitive waveform.

Since the latter part of the waveform is repetitive, there is no need to waste memory sampling several seconds of it. Instead, you can mark off a loop of the repetitive section, and instruct the E-IV to play that looped section for as long as the key is held down. After playing to the end of the loop, the E-IV will jump back to the beginning of the loop and play through the loop again. This process repeats until you release the key playing back the sample.



Creating Attack & Decay Characteristics for the Looped Portion

One potential problem is that the loop repeats at the same level. This is usually acceptable for sustaining instruments (flute, organ, brass, etc.), but is unacceptable for plucked or struck sounds, which decay over time. Fortunately, the Dynamic Processing module provides a means to shape the attack, sustain, and decay characteristics of a sample. You can create a decay during the looped portion, and simulate pluck or struck sounds.



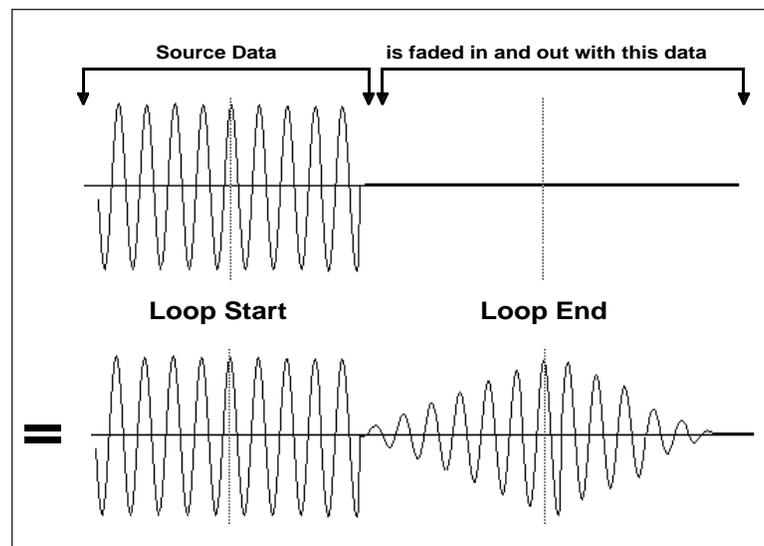
Artificial Decay can be applied to a looped sound.

Loop Compression

The looped section of the sample can be compressed, which “evens out” any changes in amplitude. Changes in amplitude can cause “breathing” effects, thumping or clicks.

Crossfade Looping

The Emulator IV fades between the beginning and end of the loop so that as the end fades out, the beginning fades in. This virtually eliminates the clicks and pops that can occur with other types of looping.

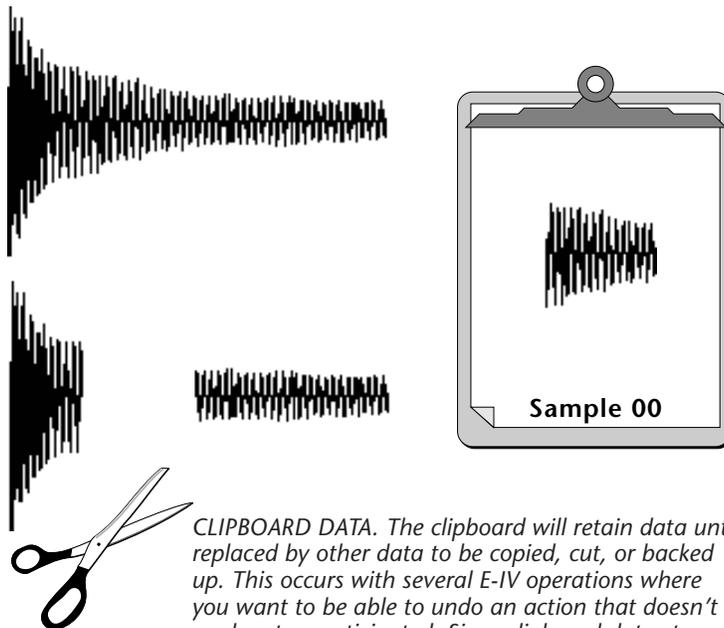


Crossfade Looping takes sound data from around the loop start point and fades it into the sound data around the loop end point so that the data at those loop points is identical.

BACKGROUND: Cut, Copy, Paste & Undo

Imagine a printout of a sample. Now imagine that you have a pair of scissors capable of cutting a piece out of that sample (or a copy of that piece if you don't want to affect the original), as well as a clipboard to neatly hold the cut or copied piece. Now imagine that you can either perfectly insert the clipboard contents at any given point in any sample, *or* mix the clipboard contents in with any sample, starting at any designated point. The Emulator IV can do all this, and all electronically. The E-IV also provides Auto Correlation and Crossfade functions that result in seamless transitions between the cut, copied, and pasted parts.

Tip: The clipboard contents are designated as Sample 000.



CLIPBOARD DATA. The clipboard will retain data until replaced by other data to be copied, cut, or backed up. This occurs with several E-IV operations where you want to be able to undo an action that doesn't work out as anticipated. Since clipboard data stays intact when you call up another sample, data can be cut or copied from one sample and pasted to another.

**Sample
Edit**

 **Caution:** *Undo and Redo cannot backup to a floppy disk drive. A hard disk drive must be connected.*

Undo and Redo

During several Emulator IV sample edit operations such as cut, paste, and sample rate conversion, the E-IV will automatically back up the sample being processed and store this backup on the main hard disk drive. If you do not like the results of the processing, you can call up the Undo function, and restore the original sample from the main drive. (Ah, if only life itself were so simple.) Best of all, the processed sample will now move onto the main drive. Thus, if you decide you liked the processed version better after all, you can actually undo the undo. (Redo.)

Insufficient Hard Disk Drive Memory

The display will inform you if there is not enough memory to back up a sample onto the hard disk drive. You then have two choices: either free up some additional memory by erasing banks on the hard disk drive, or call up the Undo function and disable the backup process. Of course, if backup is disabled, you will not be able to undo an operation.

Typical Applications

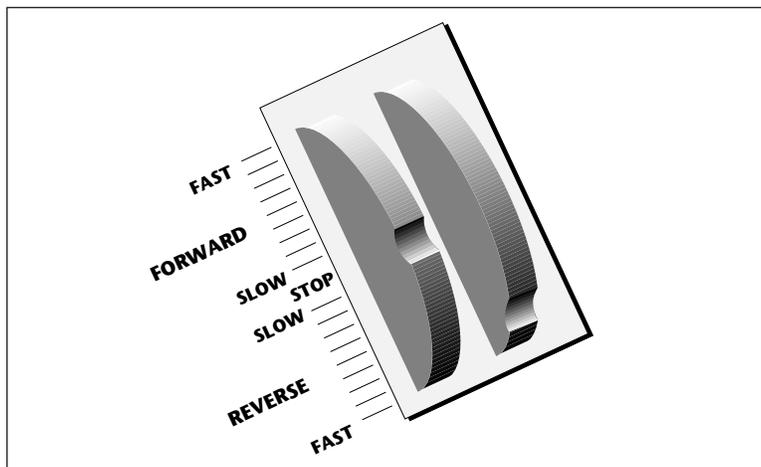
Typical cut/copy/paste applications would be to splice the beginning of one sample to the end of another, or to mix two samples together to conserve memory. (Do this by copying an entire sample, then pasting it at the beginning of the second sample using the mix option.) You can splice an attack transient on to a synthesizer waveform loop to produce realistic sounds that take up virtually no memory, or take out a pop or click in a sample. Another possibility is for flanging and chorusing. Paste (mix) a sample to itself, offset from the beginning by a few hundred samples or so, to thicken up the sound.

We suggest you practice cut, copy, and paste techniques on a spoken phrase. Samples of political speeches can be particularly amusing when subjected to cut and paste operations.

BACKGROUND: The Scrub Wheel

The Scrub Wheel is an Emulator IV function that allows you to use the pitch wheel in many Sample Edit functions to quickly move through a sound, similar in concept to rocking the reels of a reel-to-reel tape recorder. The scrub wheel makes it easy to locate a particular section of a sound because you are able to hear the sound as you move through it.

To use the scrub wheel, move the pitch wheel of your MIDI keyboard while in a Sample Edit function such as Truncation or Looping. If the pitch wheel is moved slightly forward, the sound will play slowly through its length. If the wheel is pushed forward all the way, the sound will play through faster. If the wheel is moved backwards (towards you) the sound will play backwards through the sound. The scrub wheel operates like the accelerator on your car: the harder you press it, the faster it goes.



E-IV SCRUB WHEEL. Move the wheel slightly to advance slowly through the sound. Move the wheel more to advance quickly through the sound.

**Sample
Edit**

BACKGROUND: Autocorrelation & Zero-Crossing

Auto Correlation

First of all, just what does auto correlation mean? Auto correlation simply means automatic correlation or comparison. The computer analyzes the signal around the loop points you have specified and then moves the end point of the loop until it finds a section of the wave that closely matches the section around the start point. Auto correlation may be used again and again with the computer moving the analysis window slightly each time to try to zero in on the optimum loop.

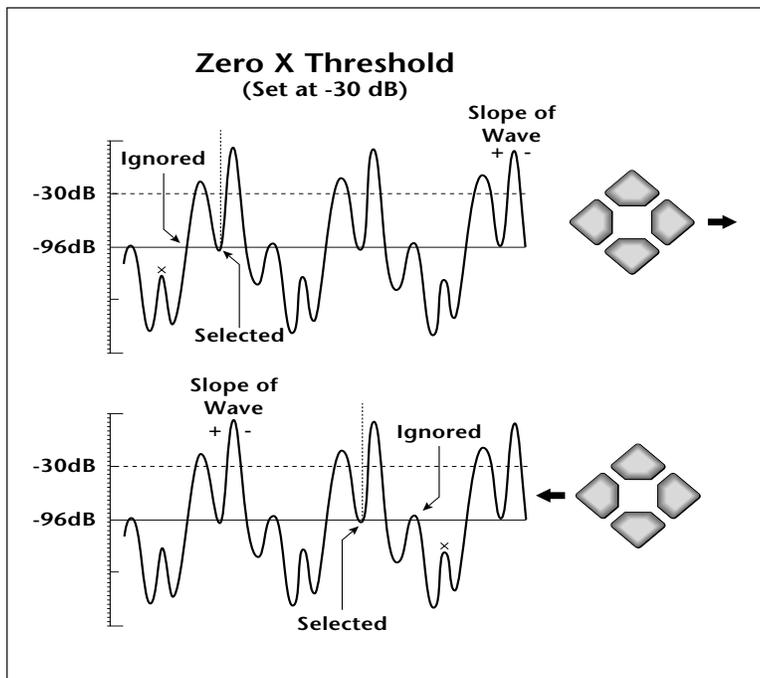
Zero Crossing

The term zero crossing refers to the point at which the positive slope of a waveform passes through zero. In many sample editing applications, such as splicing and looping, it is useful to locate zero crossings in order to make glitch-free joins and loops. On some signals, however, a simple zero crossing may not be effective because the signal contains excessive noise or low-level, high-frequency harmonics. In these cases, every few samples may cross through zero. By setting a zero crossing threshold, we can ignore low-level zero crossings and wait for the signal to reach a certain level before choosing the next zero-crossing. Zero crossing threshold sets a level that a signal must exceed before the next zero crossing with a positive slope is selected. The selected zero crossing threshold is used in the Auto-Truncate function or whenever you manually select a zero crossing using the cursor keys.

The diagram on the following page illustrates zero crossing in action. The small x marks the initial position. To move forward through the sound to the next zero crossing, press the right cursor button, as shown in the upper dia-

gram. The E-IV will find the first zero crossing on the positive slope after the signal has crossed the designated threshold.

To move backward through the sound to the next zero crossing, as shown in the lower diagram, press the left cursor button. The Emulator IV will find the first zero crossing on the positive slope after the signal has crossed the designated threshold.



Adjust the zero crossing threshold according to the type of wave you are processing. A setting of -96 dB is most sensitive and can be used for finding the start point of a sound. Settings closer to -30 dB are less sensitive and suited for finding zero-crossings in complex waves.

**Sample
Edit**

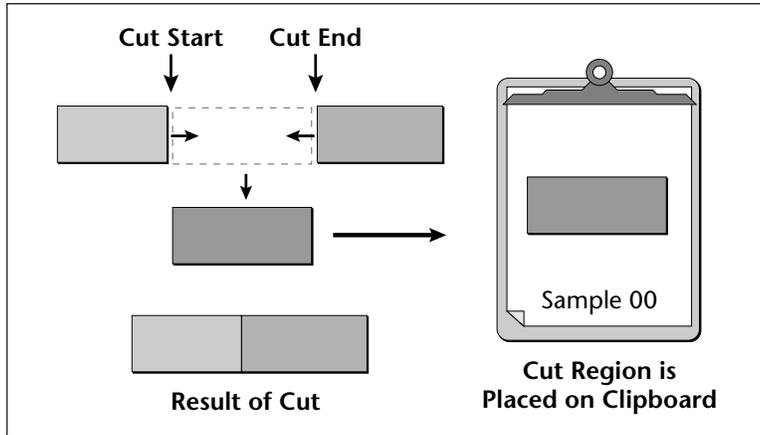
Utilities



The Sample Utilities menu contains several additional functions.

- Cut Section
- Copy Section
- Paste Section
- DC Filter
- Sample Calculator
- Sample Integrity

**Sample
Edit**



Tip: The clipboard contents are designated as Sample 00.

CUT SECTION

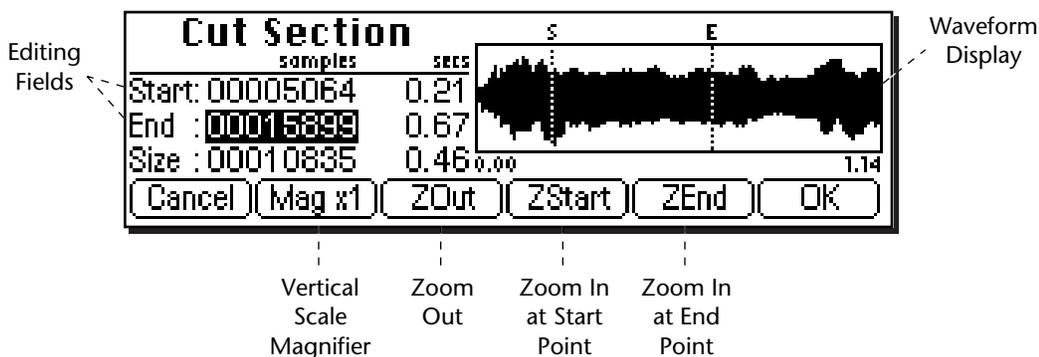
Portions of a sample can be cut, copied, and pasted to other samples, or the samples from which they came. The Cut function removes a section of a sample, and stores the cut portion in a special part of memory called the clipboard. For more information see the section Background: Cut, Copy, Paste, and Undo.

► To Cut a Section:

1. Press the **Sample Edit** key. The LED will illuminate and the main sample edit screen will appear.
2. Select the sample to be cut using the data entry control, inc/dec keys, or the numeric keypad.
3. Press the **Utils** function key (F1). A second row of soft keys will appear.



- Press the **Cut** function key (F1). The following screen will appear. (If the sample is stereo, you will first be asked to select the right side, left side or both.)



A visual display of the waveform appears with several controls.

- **Editing Fields:** Move the cursor to the desired field to change the Start and End points of the cut.
- **Magnification:** Adjusts the vertical scale for 1x, 2x, 4x, or 8x magnification. Pressing the button repeatedly, rotates through the 4 options.
- **Zoom Start:** Magnifies the waveform to display finer detail around the Start point.
- **Zoom End:** Magnifies the waveform to display finer detail around the End point.
- **Zoom Out:** Reverses the effect of Zoom Start and Zoom End.

- Specify the start and end points for the portion of the sample to be cut.
- Press **OK** to cut the section or **Cancel** to return to the main Sample Edit screen.
- If you are not happy with the resulting cut or want to compare before and after, press the **Undo** function key (F6).

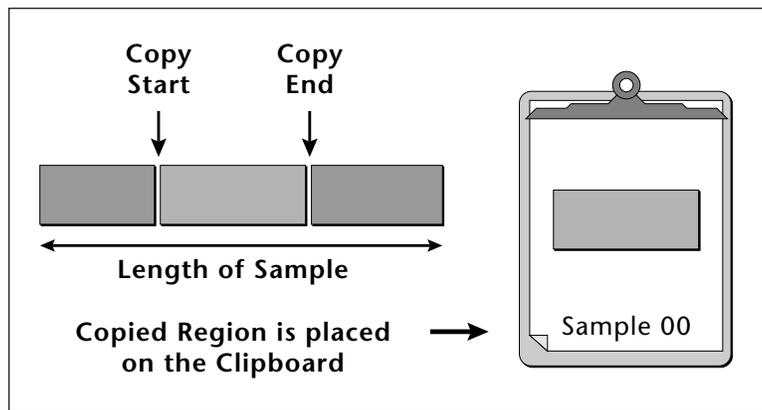
Tip: Holding down the Enter key while turning the data entry control allows “fine tuning” of the value by one number per click.

Sample Edit

Tip: The left and right cursor keys will change the start and end points so that they automatically fall on positive zero-crossing points in the waveform.

COPY SECTION

Portions of a sample can be cut, copied, and pasted to other samples, or the samples from which they came. The Copy function allows you to duplicate a section of a sample, and store that duplicate in a special part of memory called the clipboard. For more information see the section Background: Cut, Copy, Paste, and Undo.

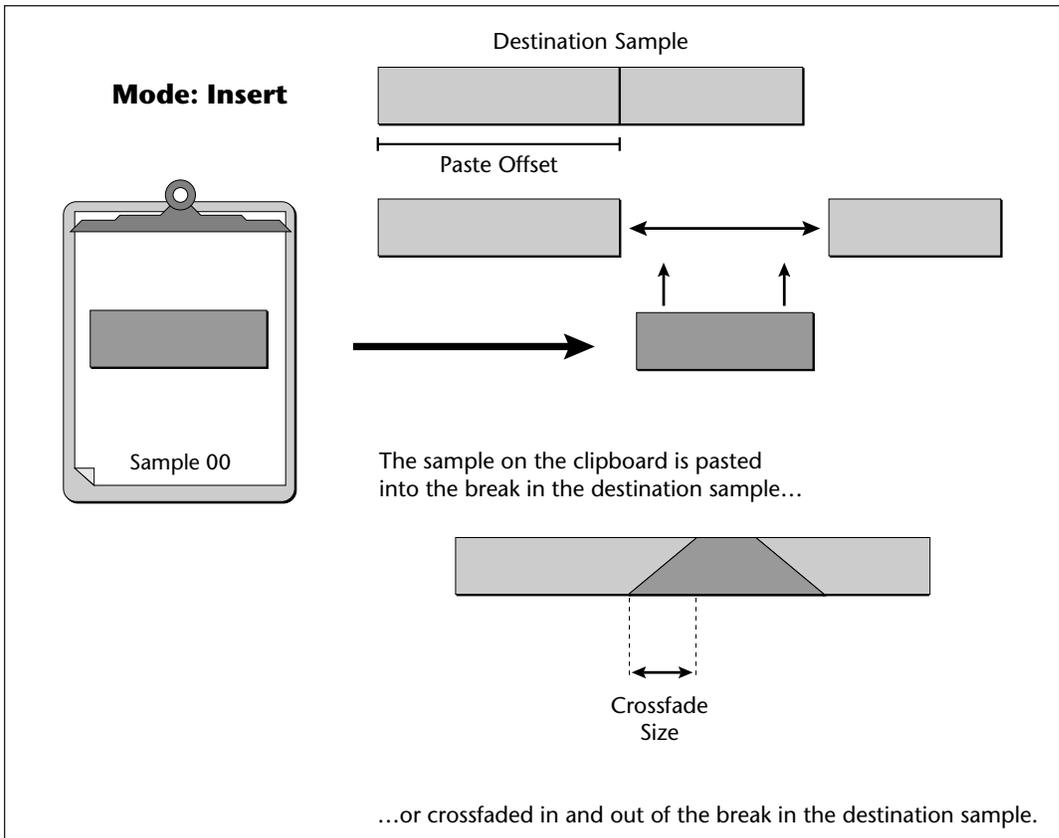


Tip: The clipboard contents are designated as Sample 000.

► To Copy a Section:

1. Press the **Sample Edit** key. The LED will illuminate and the main sample edit screen will appear.
 2. Select the sample to be copied using the data entry control, inc/dec keys, or the numeric keypad.
 3. Press the **Utils** function key (F1). A second row of soft keys will appear.
 4. Press the **Copy** function key (F2). The Copy Section screen will appear. (If the sample is stereo, you will first be asked to select the right side, left side or both.)
- The Copy Section display is identical to the display in Cut Section. See Cut Section for a full description of the controls.
5. Specify the Start and End points for the portion of the sample to be copied using the data entry control, left/right cursor keys, inc/dec keys or the numeric keypad.
 6. Press **OK** to cut the section or **Cancel** to return to the main Sample Edit screen.





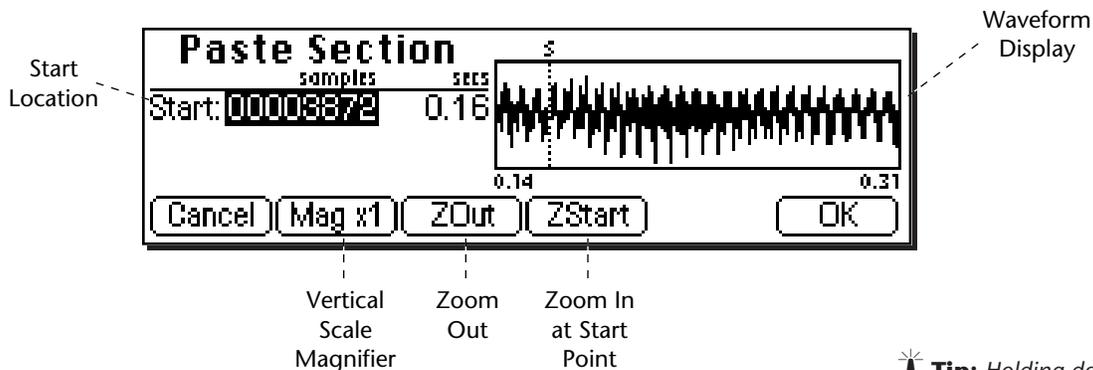
Sample Edit

PASTE SECTION

Portions of a sample can be cut, copied, and pasted to other samples, or the samples from which they came. Paste takes the clipboard contents and either inserts them in a sample at a specified point, or mixes them with a sample starting at a specified point. For more information see the section Background: Cut, Copy, Paste, and Undo.

► **To Paste a Section:**

1. Press the **Sample Edit** key. The LED will illuminate and the main sample edit screen will appear.
2. Select the sample that you want to paste the clipboard contents into using the data entry control, inc/dec keys, or the numeric keypad.
3. Press the **Utils** function key (F1). A second row of soft keys will appear.
4. Press the **Paste** function key (F3). If the sample is stereo, you will first be asked to select the right side, left side or both. The following screen will appear.



A visual display of the waveform appears with several controls.

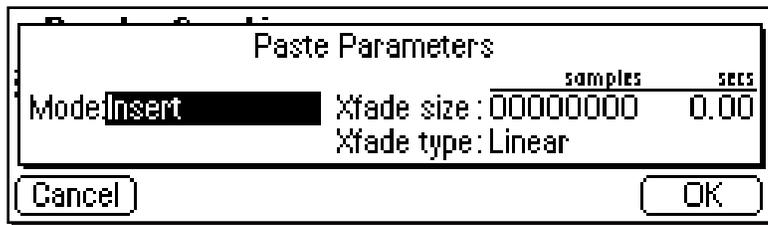
- **Start Location:** Selects the starting location where the clipboard sample will be pasted.
- **Magnification:** Adjusts the vertical scale for 1x, 2x, 4x, or 8x magnification. Pressing the button repeatedly, rotates through the 4 options.
- **Zoom Start:** Magnifies the waveform to display finer detail around the Start point.
- **Zoom Out:** Reverses the effect of Zoom Start.

5. Specify the start point for the clipboard sample to be pasted into, then press **OK**. The following screen will appear.

Tip: Holding down the Enter key while turning the data entry control allows "fine tuning" of the value by one number per click.



Tip: The left and right cursor keys will change the start and end points so that they automatically fall on positive zero-crossing points in the waveform.



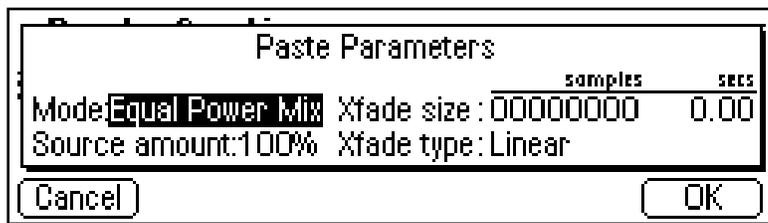
6. Choose whether to insert or mix the clipboard contents at the point selected in step 5.

Insert opens up a space in the sample into which the clipboard contents fit. **Equal Power Mix** and **Linear Mix** combine the clipboard contents with existing samples, starting at the point selected in step three. Normally, you will always use Equal Power. Use Linear Mix when the signals are very similar or when Equal Power causes a gain in amplitude.

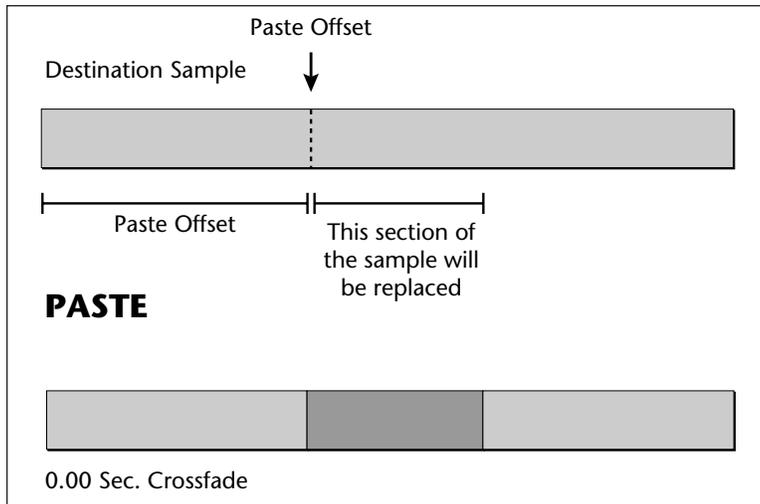
7. Set the Crossfade Size and Type.

- **Equal Power:** This is a weighted crossfade that produces no apparent level shift. You will normally use this mode.
- **Linear:** This provides a straight mathematical crossfade.

8. If you chose Linear or Equal Power Mix in step 6, another field in the display will appear.

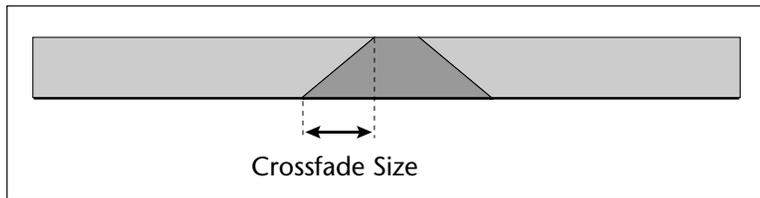


9. You have the option to select the level of the clipboard contents to be mixed (**Source Amount**). 100% indicates a replacement. Refer to the diagrams on the following page.

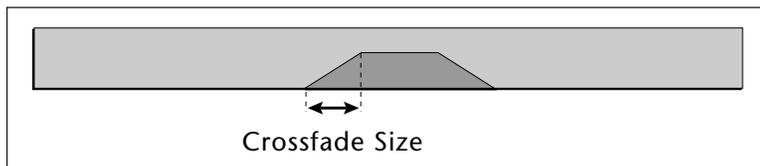


Mode: Mix **Source Amount = 100%**
 After the start point, a section of the destination will be replaced with the clipboard contents.

Tip: To replace one side of a stereo sample: Mix the clipboard with a source amount of 100% into the side you wish to replace.



Mode: Xfade Mix **Source Amount = 100%**
 The clipboard contents will be gradually mixed into the destination sample and will replace the destination when the fade reaches 100%.



Mode: Xfade Mix **Source Amount = 50%**
 The clipboard contents will be gradually mixed into the destination sample and reach a maximum of 50-50 mix.

8. Press **OK** to paste the section or **Cancel** to return to the main Sample Edit screen.

Note: If you are not happy with the resulting paste or want to compare before and after, press the Undo function key (F6).



★ Caution: If the sample sounds clipped after DC Filtering, Undo, then attenuate the sample by 2 dB. Next, DC Filter the sample and Normalize using Change Gain.

DC FILTER

Removes the DC component from a sample, centering the waveform around the zero axis.

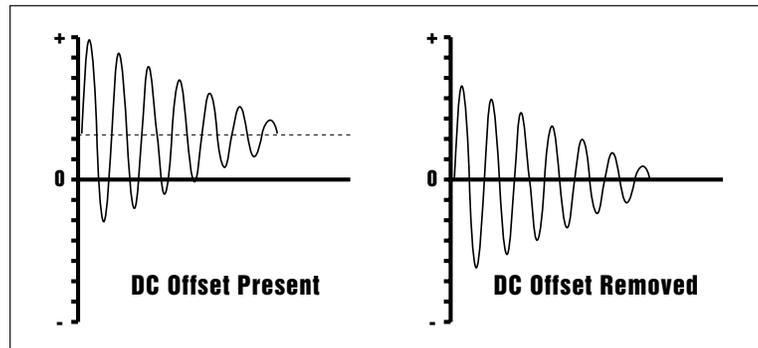
►To DC Filter:

1. Press the **Sample Edit** key. The LED will illuminate and the main sample edit screen will appear.
2. Select the sample that you want to DC Filter using the data entry control, inc/dec keys, or the numeric keypad.
3. Press the **Utils** function key (F1). A second row of soft keys will appear.
4. Press the **DC Filter** function key (F4). The following screen will appear.



The positive and negative peaks of the sample are expressed in 16 bit samples. Full scale for a 16-bit sample is ± 32767 . Use the peak values to see how close you are to full scale. If one of the peaks is too close to 32767, DC Filtering may cause the signal to clip. **Mean** is the DC bias present in the sample. The lower the number, the less bias is present.

5. Press **OK** to DC Filter or **Cancel** to cancel the operation.



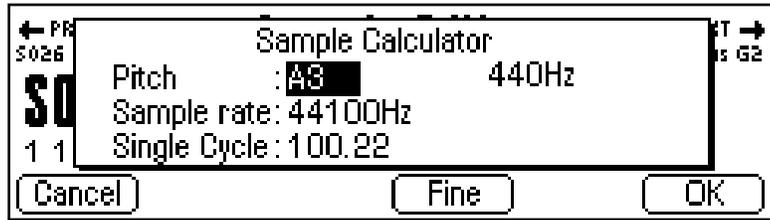
Sample Edit

SAMPLE CALCULATOR

Use the sample calculator to compute sample rates for perfect single cycle loops.

► To Use the Sample Calculator:

1. Press the **Sample Edit** key. The LED will illuminate and the main sample edit screen will appear.
2. Press the **Utils** function key (F1). A second row of soft keys will appear.
3. Press the **Calc** function key (F5). The following screen will appear.



4. Select the pitch using the keyboard, inc/dec keys or the data entry control. The number of samples for a single-cycle loop changes for each note.
 5. Select the sample rate using the inc/dec keys or the data entry control. The number of samples for a single-cycle loop changes for each sample rate.
- **Coarse/Fine** - Fast forward through the values using Coarse, then switch to Fine for single digit editing.
 - **Frequency Indicator** - Displays the fundamental frequency of the selected note.
 - If the single-cycle value shown is not an integer number, adjust the sample rate value so that it does become an integer number, then use the Sample Rate Convert function to convert the sample to the new rate.
6. Press **OK** or **Cancel** to return to the Sample Edit screen.

Sample
Edit

SAMPLE INTEGRITY

Imported samples may occasionally have slight looping problems (heard as ticks) due to data corruption of the sample header file. This function remedies the problem by reconstructing the sample header.

►To Fix all Samples:

1. Press the **Sample Edit** key. The LED will illuminate and the main sample edit screen will appear.
2. Press the **Utils** function key (F1). A second row of soft keys will appear.
4. Press the **Integ** function key (F6). The display will ask if you want to, "Fix all Samples?".
5. Press **OK** to fix all samples in the bank or **Cancel** to return to the Sample Edit screen.

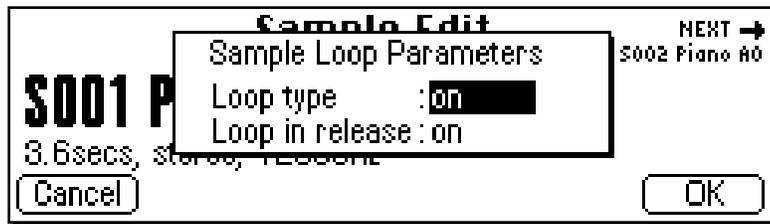
**Sample
Edit**

Loop Type

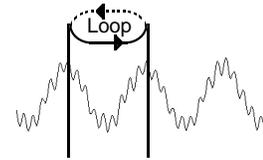
This submenu allows you to turn looping On or Off and to select whether the Loop in Release function is On or Off.

► To Set the Loop Type

1. Press the **Sample Edit** key. The LED will illuminate and the main sample edit screen will appear.
2. Press the **LpType** function key (F2). The following screen will appear.



3. Select Loop Type as either On or Off.
 - **Off:** The loop is disabled and the sample plays as recorded.
 - **On:** The sample plays normally until it reaches the end of the loop. It then jumps back to the start point and replays through the loop. Upon reaching the loop end, it again re-plays the loop. This looping process continues for as long as the key is pressed.
4. Select whether Loop in Release is On or Off.



★ Caution: Samples imported from the EIII having forwards/backwards loops will play back on the E-IV. However, the loop data will be permanently modified to contain the forwards/backwards sound data. Changing the loop points on imported forwards/backwards loops could have unpredictable results and is not recommended.

**Sample
Edit**

- **Off:** Lifting your finger off a key initiates the release phase of the amplifier envelope in the voice. If Loop in Release is off, the loop will not continue during the release phase. The portion of the sample after the loop will be played during release. The signal may cut off abruptly after you remove your fingers from the keys if the sample has been truncated after the loop.
 - **On:** With Loop in Release on, the loop will keep playing—even after you lift your finger off the key—for the duration of the amplifier envelope release.
5. Press **OK** to enter the new values or **Cancel** to cancel your changes.

Tools 1

This submodule contains the basic digital processing tools listed below.

- **Looping**
- **Truncation**
- **Taper**
- **Gain Change**
- **Stereo to Mono Conversion**
- **Swap Left <-> Right**

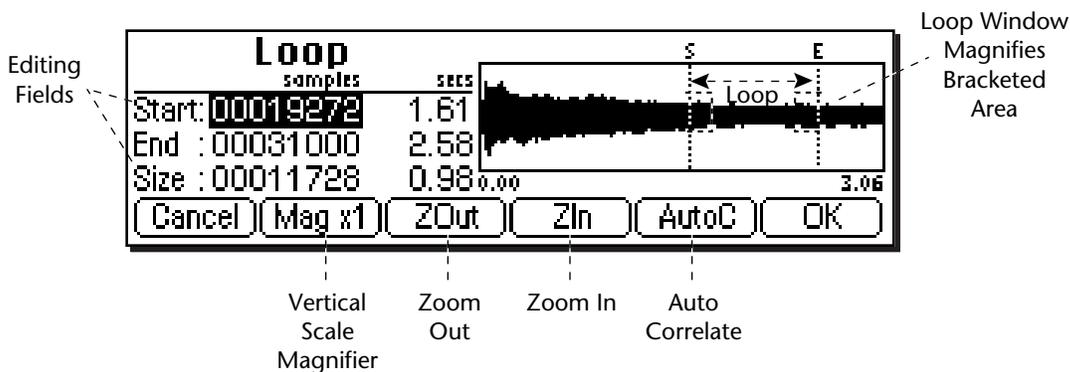
LOOP

If you have a difficult time finding good loop points, the Emulator IV can assist you with the Auto Correlation function. If Auto Correlation doesn't produce acceptable results, the beginning and end of a loop can be crossfaded to help mask loop discontinuities. For more information, see Background: About Looping at the beginning of this section.

► To Set the Loop Points

1. Press the **Sample Edit** key. The LED will illuminate and the main sample edit screen will appear.
2. Select the sample that you want to loop using the data entry control, inc/dec keys, or the numeric keypad.
3. Press the **Tools 1** function key (F3). Another row of soft keys will appear.
4. Press the **Loop** function key (F1). The following screen will appear.





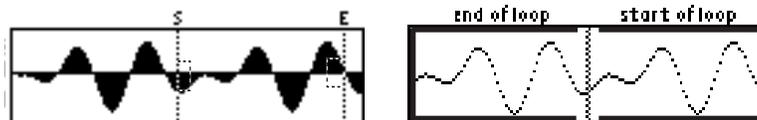
Tip: Holding down the Enter key while turning the data entry control allows “fine tuning” of the value by one number per click.

Caution: You cannot Undo loop points.

A visual display of the waveform appears with several controls.

- **Editing Fields:** Move the cursor to the desired field to change the Start and Size of the loop. The Loop Start and Size parameters are interrelated, i.e. adjust the size value if you are not able to move the start point where you wish and vice-versa.
- **Magnification:** Adjusts the vertical scale for 1x, 2x, 4x, or 8x magnification. Pressing the button repeatedly, rotates through the 4 options.
- **Auto Correlate:** Allows the Emulator IV to analyze the waveform and find likely loop points.
- **Zoom In:** Magnifies the waveform to display fine detail and brings up the loop window
- **Zoom Out:** Reverses the effect of Zoom In and displays the entire sample.

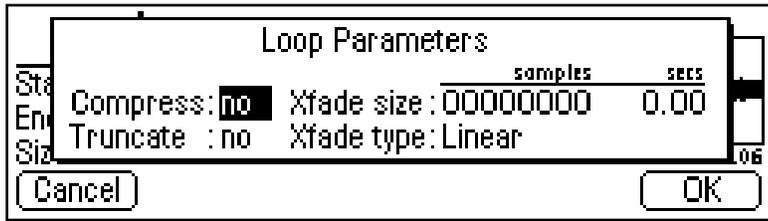
When you **Zoom In** on the waveform, the **Loop Window** appears. The loop window magnifies the splice point of the loop as shown by the bracketed area in the diagrams below.



The line in the center of the magnified loop window shows the exact splice point of the loop. You can use the left and right cursor keys to select zero-crossings for the loop start.

Sample Edit

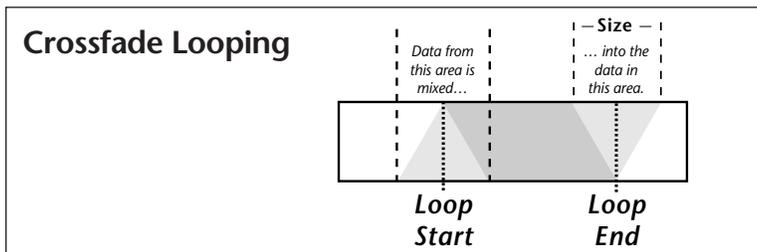
5. Press the **Auto Correlate** soft key (F5) if you want the Emulator IV to help you find likely loop points.
6. Press **OK** when you have a good loop. The following screen will appear with several more looping tools.



Tip: Looping is an art which takes a bit of practice to learn. Auto Correlate works best when you have already found a fairly good loop point by ear. The Emulator IV provides several different types of tools to help you loop almost any sound.

- **Compress Loop:** Compression “evens out” the level changes during the loop portion which are perceived as amplitude modulation or “breathing” effects.
- **Truncate:** (After Loop) Discards any information after the loop end point in order to conserve memory.
- **Crossfade Size:** (Crossfade Loop) This function smoothly crossfades between the waves on either side of the loop so that the waveform at the loop point is identical. Crossfading looping is a powerful looping tool, but since it alters the sound data, timbral or amplitude variations may be noticeable. A size of 0.00 disables crossfade looping.

Tip: Use larger crossfade loop sizes with complex sounds; shorter sizes when you simply want to mask a slight tick in the loop.



- **Crossfade Type - Equal Power:** This is a weighted crossfade that produces no apparent level shift, and is the commonly used mode.
 - **Crossfade Type - Linear:** This provides a straight mathematical crossfade. Use linear mode with samples whose splice points are already close to optimum, such as a sample that has already been auto correlated.
7. Press **OK** to perform the operations or continue. Press **Cancel** to cancel the loop operation.

Tip: The Loop parameters modify the sample data, but can be “Undone” if you are not happy with the results. You might even want to make another copy of the sample as insurance.

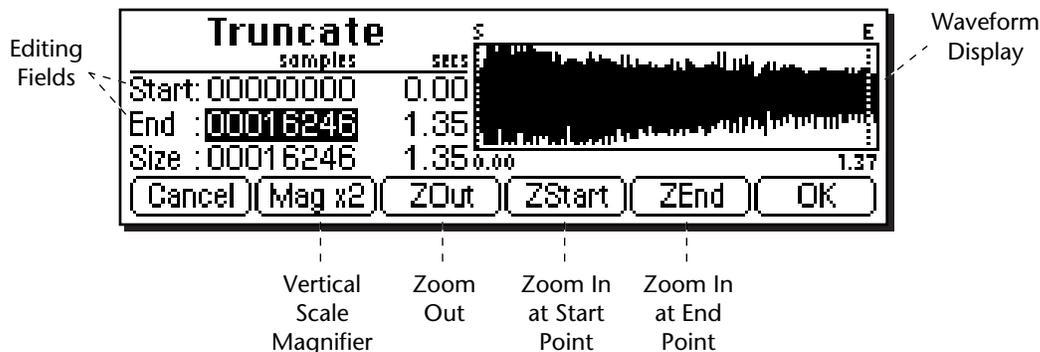
Sample Edit

TRUNCATION

Truncation shortens a sample's length by trimming off individual samples from the beginning and/or end. Truncation is most often used to remove unneeded portions of a sample to conserve memory, but it can also be used to change instrument characteristics such as removing the attack from a plucked string note or isolating a particular section of a sample.

► To Truncate a Sample:

1. Press the **Sample Edit** key. The LED will illuminate and the sample edit screen will appear. Select the sample.
2. Press the **Tools 1** function key (F3). Another row of soft function keys will appear.
3. Press the **Truncate** function key (F2). The following screen will appear.



Sample Edit

Tip: Holding down the Enter key while turning the data entry control allows "fine tuning" of the value by one number per click.

- **Editing Fields:** Move the cursor to the desired field to truncate the Start and End points of the sample.
- **Magnification:** Adjusts the vertical scale for 1x, 2x, 4x, or 8x magnification. Pressing the button repeatedly rotates through the 4 options.
- **Zoom Start:** Magnifies the sample to display finer detail around the Start point.
- **Zoom End:** Magnifies the sample to display finer detail around the End point.
- **Zoom Out:** Reverses the effect of Zoom Start and Zoom End.

- Specify the start and end points for the sample truncation using the data entry control, left/right cursor keys, inc/dec keys or the numeric keypad.
- Press **OK** to truncate the sample or **Cancel** to cancel the truncation.

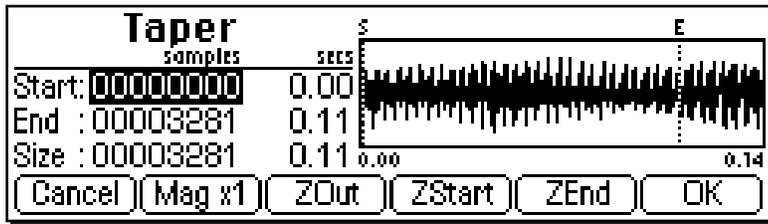
❑ **Note:** If you are not happy with the resulting truncation or want to compare before and after, press the Undo function key (F6).

TAPER

Taper allows you to create an artificial decay on percussion samples where the original decay is absent, create an artificial fast attack on a sound (such as bowed violin with a slow attack), or clean up background noise when editing dialog.

► To Taper a Sample:

- Press the **Sample Edit** key. The LED will illuminate and the sample edit screen will appear. Select the sample.
- Press the **Tools 1** function key (F3). Another row of soft function keys will appear.
- Press the **Taper** function key (F3). The following screen will appear.

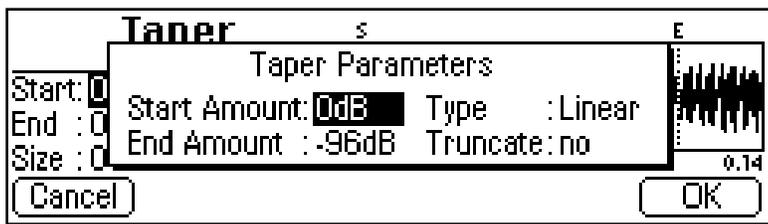


⚡ **Tip:** Taper the ends of sounds before splicing to avoid clicks or pops at the splice point.

Insure that a sample starts at 0 and that no click happens at note on by using a very short taper (-96 to 0) on the attack.

❑ **Note:** The Taper display is identical to the display in Truncate. See Truncate for a full description of the controls.

- Specify the Start and End points for the portion of the sample to be tapered using the data entry control, left/right cursor keys, inc/dec keys or the numeric keypad.
- Press **OK** to continue on to the next page of options or **Cancel** to cancel the operation.



⚡ **Tip:** The left and right cursor buttons will change the start and end points so that they fall on positive zero-crossing points in the waveform.

Sample Edit

⚠ Caution: When using Taper Gain, avoid clipping the signal with too much gain. The Normalize display in the Gain Change submodule can be used as a sample headroom indicator.

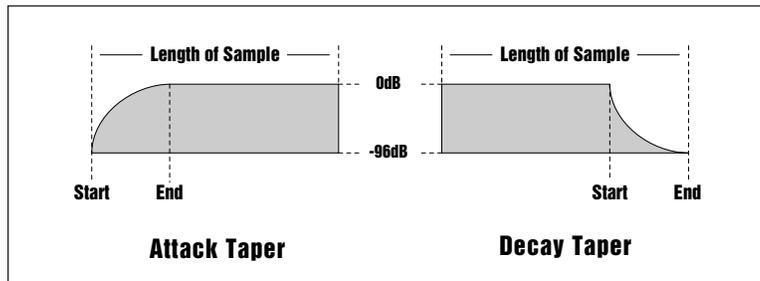
📌 Tip: Percussive and plucked sounds are notoriously hard to loop. By Taper boosting the entire plucked sound +3 dB to +5 dB), using the default Start and End settings, a very natural kind of compression is applied which makes looping these sounds much easier.

Start with 0 dB and Taper up to +3 dB. As the sound decays, the gain will be boosted, leaving the attack of the sound unaffected.

Sample Edit

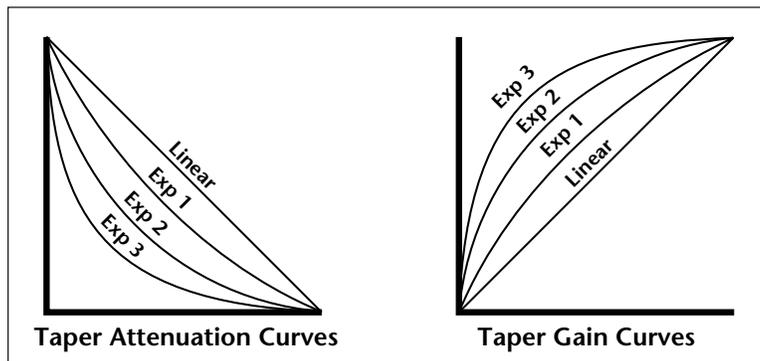
Several more tapering parameters are shown.

- **Start Amount:** This is the amount of attenuation or gain applied at the start of the and is variable from -96 dB to +96 dB.
- **End Amount:** This is the amount of attenuation or gain applied at the end of the selected section and is also variable from -96 dB to +96 dB.
- **Type:** Selects the type of taper curve: Linear, Exponential 1, Exponential 2, Exponential 3. Graphs of these curves are shown below.
- **Truncate:** (After Taper) Discards any information after the taper end point in order to conserve memory.



The diagram above shows the effect of Taper gain and attenuation on a sample using the Exp 3 curve.

- Specify the taper parameters using the data entry control, or the inc/dec keys.
- Press **OK** to taper the sample or **Cancel** to cancel the operation.

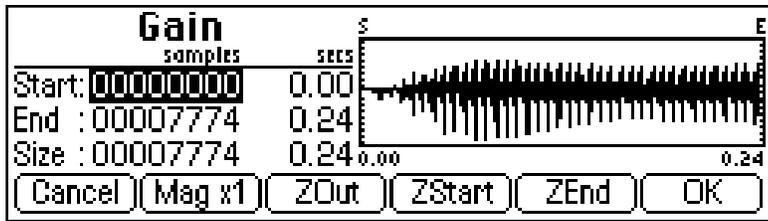


GAIN CHANGE

Gain Change alters the level of all or part of a sample.

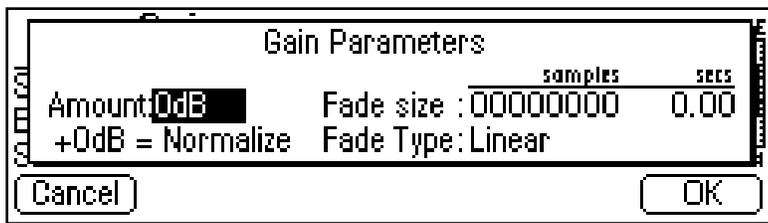
► To Change the Gain of a Sample:

1. Press the **Sample Edit** key. The LED will illuminate and the main sample edit screen will appear.
2. Select the sample that you want to Gain Change using the data entry control, inc/dec keys, or numeric keypad.
3. Press the **Tools 1** function key (F3). Another row of soft function keys will appear.



4. Press the **Gain** function key (F4). The following screen will appear.
- The Gain Change display is identical to the display in Truncate. See Truncate for a full description of the controls.
5. Specify the Start and End points for the portion of the sample to be gain changed using the data entry control, left/right cursor keys, inc/dec keys or the numeric keypad.
6. Press **OK** to continue on to the next page of options or **Cancel** to cancel the operation.

Tip: The Start and End points are "remembered" from module to module so that you can perform successive operations on the same section of the sample.

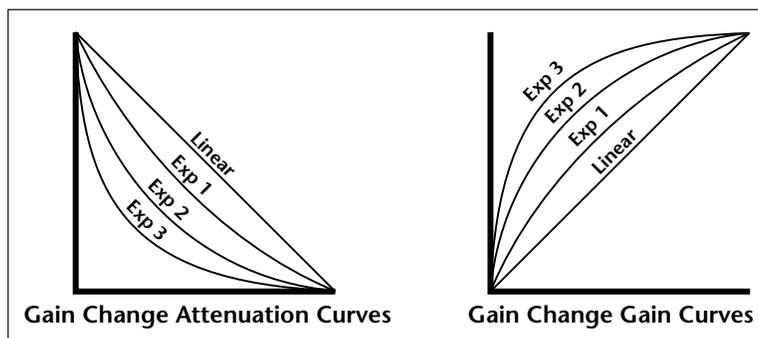


Several more parameters are shown.

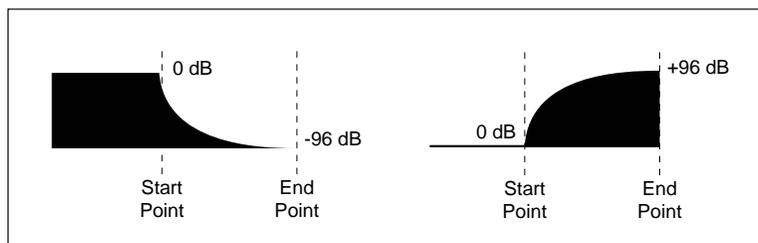
Sample
Edit

- **Amount:** This is the amount of attenuation or gain applied to the selected section and is also variable from -96 dB to +96 dB.
- **Normalize:** This is a display showing the amount of gain change needed to achieve normalization or 0 dB headroom. Adding more positive gain change than the amount shown in the normalize display will cause the signal to clip.
- **Fade Size:** Set the length of the crossfade between the unaffected sample and the full amount of gain change.
- **Fade Type:** Selects the type of fade curve: Linear, Exp. 1, Exp. 2, Exp. 3. The graphs of these curves are shown below.

☑ **Note:** If you are not happy with the resulting gain change or want to compare before and after, press the Undo function key (F6).



7. Specify the gain change parameters using the data entry control, or the inc/dec keys.
8. Press OK to change the gain of the sample section or Cancel to cancel the operation.



Gain fade-out and fade-in using the exponential 3 curve.

**Sample
Edit**

STEREO <-> MONO

Converts a stereo sample to mono or a mono sample to stereo. Converting to stereo duplicates the sample on both sides and slightly detunes them. Converting to mono sums both sides of the stereo sample and divides by two.

►To Convert a Sample:

1. Press the **Sample Edit** key. The LED will illuminate and the main sample edit screen will appear.
2. Select the sample that you want to convert using the data entry control, inc/dec keys, or the numeric keypad.
3. Press the **Tools 1** function key (F3). Another row of soft function keys will appear.
4. Press the **S <-> M** function key (F5). A pop up display will ask you to confirm the operation.
5. Press **OK** to convert the selected sample or **Cancel** to cancel the operation.

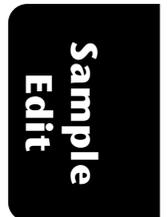
SWAP LEFT & RIGHT

Swaps sides of a stereo sample or moves a mono sample to the other side.

►To Swap Sides:

1. Press the **Sample Edit** key. The LED will illuminate and the main sample edit screen will appear.
2. Select the sample that you want to swap using the data entry control, inc/dec keys, or the numeric keypad.
3. Press the **Tools 1** function key (F3). Another row of soft function keys will appear.
4. Press the **SwapLR** function key (F6). A pop up display will ask you to confirm the operation.
5. Press **OK** to swap the selected sample or **Cancel** to cancel the operation.

 **Tip:** *converting mono samples to stereo enables you to process each sample separately using copy, cut and paste.*



Tools 2

This submodule contains the digital processing tools listed below.

- **Sample Rate Convert:** Converts the sample to any sample rate between 7000 Hz and 50000 Hz.
- **Digital Tuning:** Digitally re-tunes a sample within a range of ± 1 octave.
- **Compression:** The compressor dynamically changes the gain of the sample based on the amplitude envelope of the sample. This is a non-realtime implementation of a full featured dynamic range compressor.
- **Parametric Equalization:** This is a digital (non real-time) implementation of a one band parametric EQ, with +12 dB boost or -48 dB of cut and completely variable frequency and bandwidth controls.
- **Reverse Sample:** Reverses all or part of a sample.

SAMPLE RATE CONVERT

Sampling at a high sample rate provides better frequency response than sampling at a slower rate, but uses up more memory. If you need to reclaim some of that memory, and are willing to trade off sample frequency response, samples can be converted from a higher rate to a lower one. Use your ear to compare sounds at the two sample rates. If you can't tell the difference, use the lower rate.

Sample Rate Conversion can be used for saving memory, increasing the upward transposition range of a sound, or exactly matching the sample rate to a multiple of the sounds frequency for perfect single cycle loop (use the sample calculator).

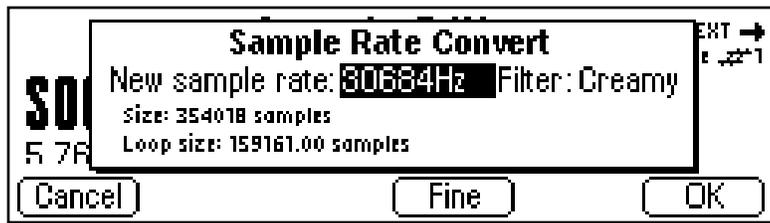
- **Filtering** - Sample rate converters contain a low pass filter to prevent aliasing in the output. While the amount of filtering is automatically applied depending on the amount of change, three ranges of low pass filtering are provided to allow you more control over the output.

Crunchy	- Least amount of filtering - High frequency content retained, but sample may contain audible artifacts.
Smooth	- A medium amount of low pass filtering.
Creamy	- Maximum amount of low pass filtering - Some high frequencies will be removed.

► **To Change the Sample Rate**

1. Press the **Sample Edit** key. The LED will illuminate and the main sample edit screen will appear.
2. Select the sample that you want to process using the data entry control, inc/dec keys, or the numeric keypad.
3. Press the **Tools 2** function key (F4). Another row of soft keys will appear.
4. Press the **SrCnv** function key (F1). The following screen will appear.

☑ **Note:** If you are not happy with the resulting conversion or want to compare before and after, press the **Undo** function key (F6).



5. Enter the new sample rate using the data entry control, inc/dec keys, or the numeric keypad. The Emulator IV will calculate the new sample size and new loop size.
- **Coarse/Fine** - Fast forward through the values using Coarse, then switch to Fine for single digit editing.
6. Set the low pass filter to the desired range: Crunchy, Smooth or Creamy.
 7. Press **OK** to change the sample rate or **Cancel** to cancel the operation.



DIGITAL TUNING

Digital Tuning allows you to change the pitch of a sound in order to splice or combine it with another sound of a different pitch. Try offsetting the pitch of a copied sample by a few cents, then combine it with the original for flange and chorus effects. If a sample is slightly out of tune, it is usually better to fix the sample once and for all, rather than re-tuning the sample every time it is placed on the keyboard.

• **Filtering** - Digital Tuning utilizes a low pass filter to prevent aliasing in the output. Filtering is automatically applied depending on the amount of tuning, but the three ranges allow you to have more control over the output.

Crunchy - Least amount of filtering - High frequency content retained, but sample may contain audible artifacts.
Smooth - A medium amount of low pass filtering.
Creamy - Maximum amount of low pass filtering. Some high frequencies will be removed.

► To Retune a Sample

1. Press the **Sample Edit** key. The LED will illuminate and the main sample edit screen will appear.
2. Select the sample that you want to tune using the data entry control, inc/dec keys, or the numeric keypad.
3. Press the **Tools 2** function key (F4). Another row of soft keys will appear.
4. Press the **DigTune** function key (F2). The following screen will appear.



5. Enter the tuning amount in cents using the data entry control, or inc/dec keys. The Emulator IV will calculate the new sample size and new loop size.
6. Press **OK** to retune the sample or **Cancel** to cancel the operation.

■ **Note:** Re-tuning pitch downward increases the sample size. Re-tuning pitch upwards decreases the sample size.

**Sample
Edit**

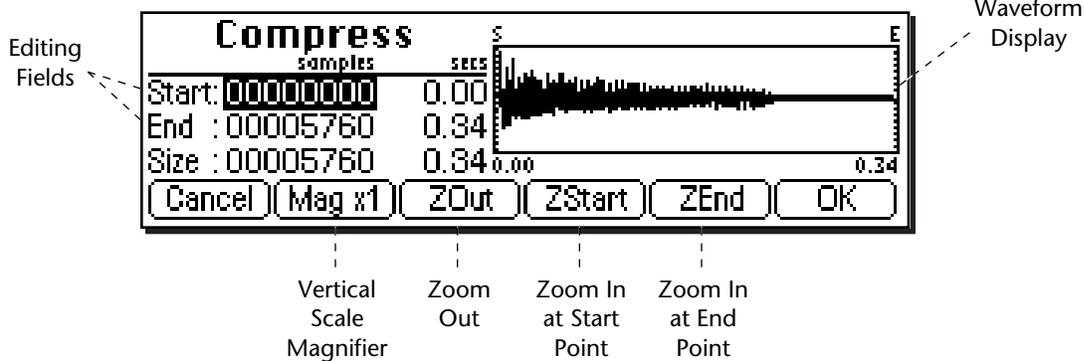
COMPRESSOR

The Digital Compressor is a digital (non-realtime) equivalent of an analog dynamic range compressor with attack and release times, adjustable threshold, adjustable ratio, and three modes of operation.

Tip: The Start and End points are “remembered” from module to module so that you can perform successive operations on the same section of the sample.

► To Compress a Sample:

1. Press the **Sample Edit** key. The LED will illuminate and the main sample edit screen will appear.
2. Select the sample that you want to compress using the data entry control, inc/dec keys, or the numeric keypad.
3. Press the **Tools 2** function key (F4). Another row of soft keys will appear.
4. Press the **Compr** function key (F3). The following screen will appear.



A visual display of the waveform appears with several controls.

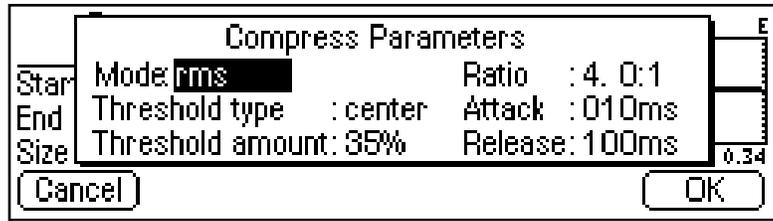
- **Editing Fields:** Move the cursor to the desired field to change the Start and End points of the sample section to be compressed.
- **Magnification:** Adjusts the vertical scale for 1x, 2x, 4x, or 8x magnification. Pressing the button repeatedly, rotates through the 4 options.
- **Zoom Start:** Magnifies the waveform to display finer detail around the Start point of the selected section.
- **Zoom End:** Magnifies the waveform to display finer detail around the End point of the selected section.
- **Zoom Out:** Reverses the effect of Zoom Start & Zoom End.

Tip: Holding down the Enter key while turning the data entry control allows “fine tuning” of the value by one number per click.

Sample Edit

5. Specify the start and end points for the section of the sample to be processed.
6. Press **OK** when you have selected the desired section or press **Cancel** to cancel the operation.

If you pressed “OK”, the following screen will appear.



Mode

- **RMS:** Root-mean-square or an “average of the magnitude of the signal”. RMS represents the “true” energy content of a signal.
- **Peak:** Uses the peak amplitude of a signal to determine the amplitude. The peak amplitude is a meaningful measurement in a digital system because of the 96 db (16-bit) headroom limit.

Threshold

- **Above:** Only signal levels above the threshold % will be affected by the compressor.
- **Center:** Signal levels above as well as below the threshold % will be affected by the compressor.
- **Below:** Only signal levels below the threshold % will be affected by the compressor.
- **%:** Determines the threshold level as a percentage of 100% of 16-bits.

Compression Ratio

Determines the amount of compression or expansion. Ratios of greater than 1:1 **compress** dynamic range. Ratios of less than 1:1 **expand** dynamic range.

- **Compression:** Reduces the amount of dynamic range. Levels remain more constant.
- **Expansion:** Expands the amount of dynamic range. Changes in level are exaggerated.

Attack Time

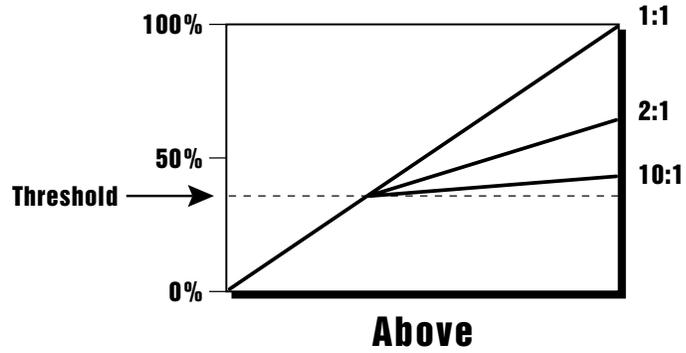
Determines how quickly the gain will be turned down. The attack time is variable from 0 to 999 milliseconds.

Release Time

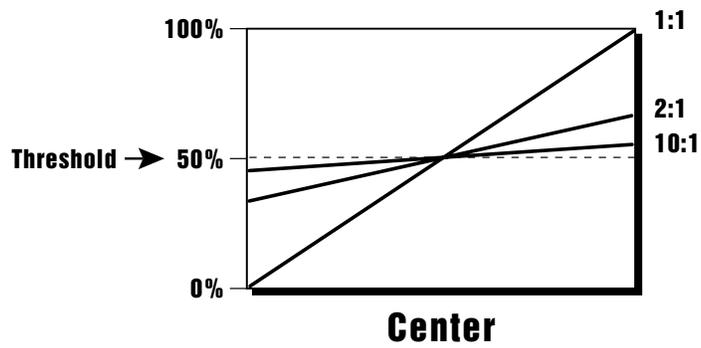
Determines how quickly the gain will be turned up. The release time is variable from 0 to 999 milliseconds.

7. Press **OK** when you have set the desired options or press **Cancel** to cancel the operation.

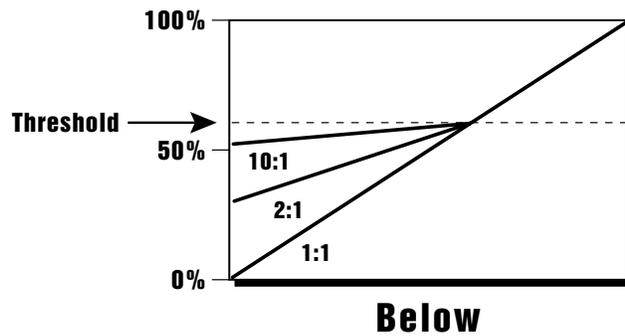
Only signal levels ABOVE the Threshold percentage will be affected by the compressor.



Signal levels ABOVE as well as BELOW the Threshold % will be affected by the compressor.



Only signal levels BELOW the Threshold percentage will be affected by the compressor.



USING THE DIGITAL COMPRESSOR

Limiter

A limiter prevents the signal from exceeding a preset level (threshold). Signal levels below the threshold will be unaffected.

Set the controls as follows:

Threshold: Above, XX% (where XX is the limit point).

Ratio: >10:1

Attack Time: 1 mS

Release Time: approximately 100 mS

Musical Compression (e.g. Guitar)

This type of compression tries to keep the volume constant, generally to increase the sustain of the instrument. As the note dies away, the compressor will boost the level in an effort to keep the level constant.

Set the controls as follows:

Threshold: Center, XX% (where XX is the compression point).

Ratio: approximately 4:1

Attack Time: 1 mS to 100 mS

Release Time: > 100 mS

Noise Reduction

Noise reduction will reduce low levels even further in the assumption that low levels are noise.

Set the controls as follows:

Threshold: Below, approx. 30%

Ratio: approximately 0.7:1

Attack Time: approximately 100 mS

Release Time: approximately 100 mS

Tip: The Start and End points are “remembered” from module to module so that you can perform successive operations on the same section of the sample.

Tip: The left and right cursor buttons will change the start and end points so that they fall on positive zero-crossing points in the waveform. This will minimize clicks in the sound when processing only part of a sample.

Sample Edit

Tip: Holding down the Enter key while turning the data entry control allows “fine tuning” of the value by one number per click.

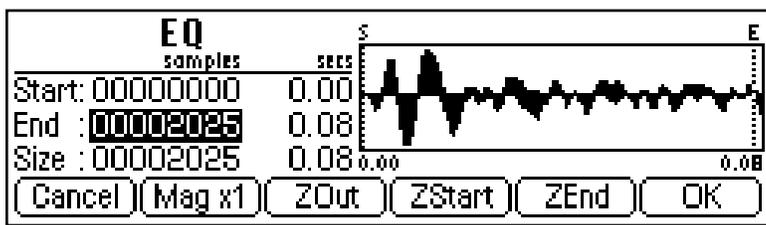
PARAMETRIC EQUALIZER

Parametric EQ allows you adjust the individual parameters of the filter. **Boost/Cut** controls “how much” of the signal will be boosted or cut. **Center Frequency** sets the center frequency to be boosted or cut, and the **Bandwidth** control sets the width of the band to be boosted or cut. The three parameters are diagrammed below.

The parametric equalizer is a digital (non real-time) equivalent of an analog equalizer with +12 db of boost and a whopping -48 dB of cut. Accurate center frequency and bandwidth controls are precise and exceptionally wide range.

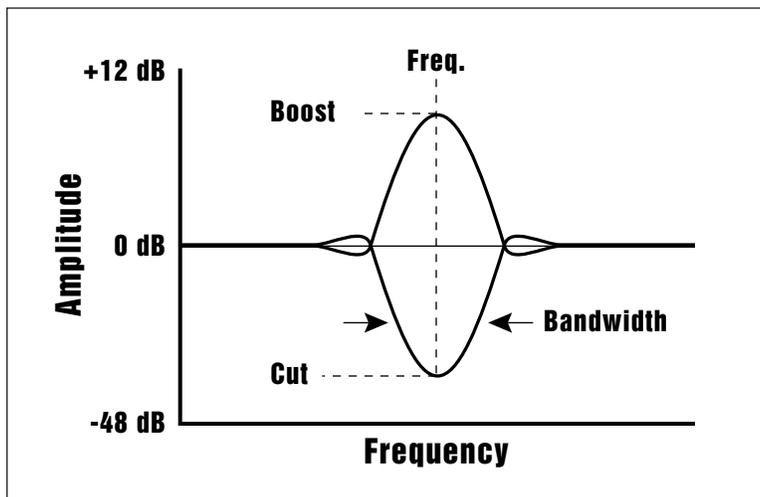
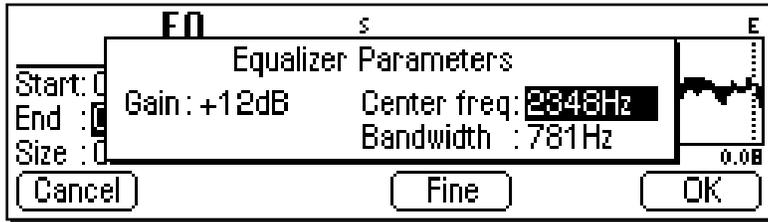
►To Filter a Sample:

1. Press the **Sample Edit** key. The LED will illuminate and the main sample edit screen will appear.
2. Select the sample that you want to equalize using the data entry control, inc/dec keys, or the numeric keypad.
3. Press the **Tools 2** function key (F4). Another row of soft keys will appear.
4. Press the **ParEQ** function key (F4). The following screen will appear.



- The Select Section display controls are identical to the controls in Truncate. See Truncate for a full description of the controls.
5. Specify the Start and End points for the portion of the sample to be EQ'ed using the data entry control, left/right cursor keys, inc/dec keys or the numeric keypad.
 6. Press **OK** to continue on to the next page of options or **Cancel** to cancel the operation.

The parametric equalizer parameters are shown.



Tip: A standard analog parametric equalizer may be useful in order to locate the frequencies which need EQ. The digital EQ can then be used to actually filter the sample with ultra-low noise and phase linear response.

- **Gain:** Controls “how much” boost or cut will be applied to the signal.
 - **Center Frequency:** Selects the center frequency to be boosted or cut.
 - **Bandwidth:** Sets the width of the band to be boosted or cut.
7. Specify the parametric equalizer parameters using the data entry control or the inc/dec keys.
 - **Coarse/Fine:** Fast forward through the values using Coarse, then switch to Fine for single digit editing.
 8. Press **OK** to process the sample section or **Cancel** to cancel the operation.

**Sample
Edit**

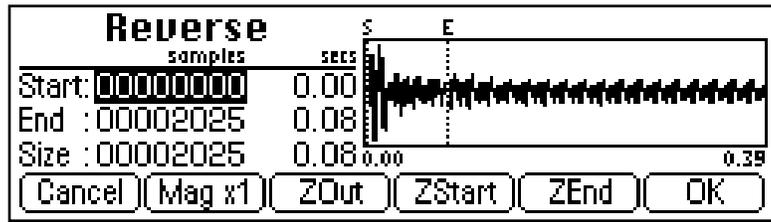
REVERSE SECTION

Reverses all or part of a sample.

Tip: The left and right cursor buttons will change the start and end points so that they fall on positive zero-crossing points in the waveform. This will minimize clicks in the sound when processing only part of a sample.

►To Reverse a Sample:

1. Press the **Sample Edit** key. The LED will illuminate and the main sample edit screen will appear.
2. Select the sample that you want to reverse using the data entry control, inc/dec keys, or the numeric keypad.
3. Press the **Tools 2** function key (F4). Another row of soft keys will appear.
4. Press the **Rev** function key (F5). The following screen will appear.



Tip: The Start and End points are "remembered" from module to module so that you can perform successive operations on the same section of the sample.

- The Select Section display controls are identical to the controls in Truncate. See Truncate for a full description of the controls.
5. Specify the Start and End points for the portion of the sample to be reversed using the data entry control, left/right cursor keys, inc/dec keys or the numeric keypad.
 6. Press **OK** to reverse the section or **Cancel** to cancel the operation.

**Sample
Edit**

Tools 3

This submodule contains the advanced digital processing tools listed below.

- **Time Compression:** This function changes the length of a sample without changing the pitch. This can be very useful for fitting samples to the beat of a song or fitting dialog into a spot. Samples can be compressed or expanded in length from 50% to 200%.
- **Pitch Change:** This function changes the pitch of a sample without changing the time relationships between events. The maximum amount of pitch change is ± 1200 cents (\pm one octave).
- **Transform Multiplication:** This function merges two sounds together in a unique way which can create many strange and beautiful sonic textures. Frequencies common to the original sounds are accentuated while uncommon frequencies are discarded.
- **Doppler:** This unique function allows you to dramatically move a sound from front to back and side to side in a 2-D space. Several pre-computed paths are available.
- **Exciter:** This function adds brilliance and “cut” to a sample, helping it to stand out in a mix. The exciter works by adding high order harmonics related to the source material.

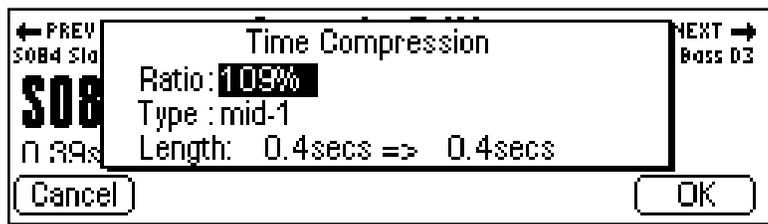


TIME COMPRESSION

This function allows you to change the length of a sample without changing the pitch. This is a useful function for fitting samples to the beat of a song or fitting dialog into a spot. Samples can be compressed or expanded in length from 50% to 200%.

► To Compress the Time of a Sample:

1. Press the **Sample Edit** key. The LED will illuminate and the main sample edit screen will appear.
2. Select the sample that you want to process using the data entry control, inc/dec keys, or the numeric keypad.
3. Press the **Tools 3** function key (F5). Another row of soft keys will appear.
4. Press the **TC** function key (F1). The following screen will appear.



5. Enter the desired time compression (or expansion) ratio using the data entry control, inc/dec keys, or the numeric keypad. The lower line of the display will change to show the resulting length of the compressed or expanded sample.

- **Time Compression Ratios:** 200% = Doubles the Length
50% = Half the Length

6. Select the general type of sample to be processed.

The choices are listed on the following page.

deep	Predominant deep bass (to 14 Hz)
bass	Predominant bass (to 20 Hz)
mid-1	Average source material
mid-2	Average source material (high-mids)
high	Source material with high frequencies
tight	Maintains time accuracy - Drum loops
broad	Low bass energy but critical highs
broad-smooth	Both high & low freq. - Smooth output
difficult	Inharmonic or broadband material
noisy	Non-pitched - Sound Effects, etc.

■ **Note:** If you are not happy with the results of Time Compression, simply Undo, then choose another algorithm.

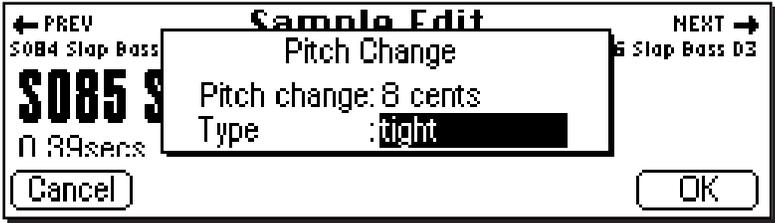
7. Press **OK** to process the sample or **Cancel** to cancel the operation.

PITCH CHANGE

This function is the exact opposite of Time Compression in that it changes the pitch of a sample without changing the time. The maximum amount of pitch change is ± 1200 cents (\pm one octave).

► **To Change the Pitch of a Sample:**

1. Press the **Sample Edit** key. The LED will illuminate and the main sample edit screen will appear.
2. Select the sample that you want to process using the data entry control, inc/dec keys, or the numeric keypad.
3. Press the **Tools 3** function key (F5). Another row of soft keys will appear.
4. Press the **PC** function key (F2). The following screen will appear.



5. Enter the desired pitch change interval in cents using the data entry control, inc/dec keys, or the numeric keypad.
6. Select the general type of sample to be processed.

The choices are:

deep	Predominant deep bass (to 14 Hz)
bass	Predominant bass (to 20 Hz)
mid-1	Average source material
mid-2	Average source material (high-mids)
high	Source material with high frequencies
tight	Maintains time accuracy - Drum loops
broad	Low bass energy but critical highs
broad-smooth	Both high & low freq. - Smooth output
difficult	Inharmonic or broadband material
noisy	Non-pitched - Sound Effects, etc.

■ **Note:** If you are not happy with the results of Pitch Change, simply Undo, then choose another algorithm.

7. Press **OK** to process the sample or **Cancel** to cancel the operation.

TRANSFORM MULTIPLICATION

This unique function merges two sounds together in a way that frequencies common to both sounds are accentuated while uncommon frequencies are discarded. Because of this characteristic, Transform Multiplication tends to work best with sounds that are harmonically rich. Using this function is easy, just pick two sounds and go. The length of the resulting sample will be equal to that of the current sample.

► To Transform Multiply Two Samples:

1. Press the **Sample Edit** key. The LED will illuminate and the main sample edit screen will appear.
2. Select the first sample that you want to multiply using the data entry control, inc/dec keys, or the numeric keypad.
3. Press the **Tools 3** function key (F5). Another row of soft keys will appear.

Sample Edit

★ **Caution:** Transform Multiplication can take quite a bit of time with longer samples. Begin your experiments with short samples or even sample attacks as these will give good initial results.

4. Press the **XMult** function key (F3). The following screen will appear.



5. Select the second sample to be multiplied using the data entry control or the inc/dec keys. The second line of the window will show the sample length and rate of the second sample.
6. Press **OK** to begin processing or **Cancel** to cancel the operation.

Transform Multiplication Ideas:

- Try using the same sound for both samples.
- Splicing silence to the beginnings or ends of short samples can change the spectral characteristics of the result.
- Using speech as one of the sources, it is possible to "speak from within" violins, bassoons, cymbals, etc.

DOPPLER

This function allows you to apply a programmed sound path to a mono sample or the left side of a stereo sample. The result is a stereo sample with pitch shifted and left-right gains adjusted according to the path. The sound can move dramatically forward-back and left-right in a 2-D space in front of the listener. Several interesting programmed paths are available.

►To Doppler Shift a Sample:

1. Press the **Sample Edit** key. The LED will illuminate and the main sample edit screen will appear.
2. Select the first sample that you want to multiply using the data entry control, inc/dec keys, or the numeric keypad.
3. Press the **Tools 3** function key (F5). Another row of soft keys will appear.
4. Press the **Doppler** function key (F4). The following screen will appear.





The doppler parameters are as follows:

- **Path:** Sets the course that the sound will travel.
- **Pitch Shift:** (On/Off) When pitch shift is turned Off, the processor functions as an auto-panner.
- **Threshold:** Certain sound paths may take the sound source very far away from the listener, resulting in little or no resulting amplitude. The “Threshold” parameter specifies the maximum amplitude attenuation of the original sample that will ever occur. By setting this parameter appropriately, you can ensure that the resulting sample will produce at least a minimum amplitude output at every point along the path. A setting of 0 dB would prevent any amplitude changes whatsoever. A setting of -96 dB would not prevent the sound from completely fading away at some points.
- **Duration:** The Path Duration allows you to scale the path time so that it runs to completion in a time shorter than the length of the sample. The default value is always the length of the sample. If auto-repeat is Off (see below), the sound will remain at the end of the path until the sample is complete.
- **Auto Repeat:** Auto repeat causes the path to repeat if the end is reached before the sample has completely played. Auto repeat will only occur if path duration is set to a value less than the sample length. The default setting for auto repeat is Off.
- **Normalize After:** This function (when On) automatically normalizes the sample after the doppler processing has been performed.

5. Specify the doppler parameters using the data entry control or the inc/dec keys.

The Path choices are as follows:

Fast-by (L->R) ---- Sound moves left to right quickly
Slow-by (L->R) --- Sound moves left to right slowly
Far->Near (fast) - Sound moves far away to close quickly
Far->Near (slow) Sound moves far away to close slowly
Near->Far (fast) - Sound moves close to far away quickly
Near->Far (slow) Sound moves close to far away slowly
Small Circle----- Sound moves in an 8 ft. circle in front
Medium Circle -- Sound moves in a 50 ft. circle in front
of you
Large Circle----- Sound moves in a 120 ft. circle in
front of you
Huge Circle ----- Sound moves in a 250 ft. circle in
front of you
Random 1 ----- Sound moves in a random path in
front of you
Random 2 ----- Sound moves in a different random
path

The computed paths are always initially scaled to the length of the sample, although this time may be changed using the Duration parameter.

6. Press **OK** to process the sample or **Cancel** to cancel the operation.

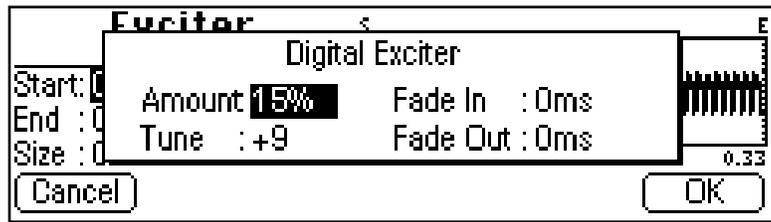


EXCITER

This function adds brilliance and “cut” to a sample, making stand out in a mix. This effect is especially effective on vocal samples to which it adds sheen, clarity and presence. The exciter works by generating new harmonics related to the source material.

►To Add Excitement to a Sample:

1. Press the **Sample Edit** key. The LED will illuminate and the main sample edit screen will appear.
2. Select the first sample that you want to multiply using the data entry control or the inc/dec keys.
3. Press the **Tools 3** function key (F5). Another row of soft keys will appear.
4. Press the **Exciter** function key (F5). The standard Start & End Point selection screen will appear. Specify the start and end points for the effect, then press **OK** to continue or **Cancel** to cancel the operation.



The exciter parameters are as follows:

- **Amount:** Sets the intensity of the effect. Lower values (<40%) tend to work best as they keep the effect subtle.
- **Tune:** Sets the frequency range of the effect. Higher numbers emphasize higher frequencies.
- **Fade In:** Sets the amount of time from the start point for the effect to fade in to the programmed amount.
- **Fade Out:** Sets the amount of time before the end point that it will take for the effect amount to fade out to zero.

5. Specify the exciter parameters using the data entry control or the inc/dec keys.
6. Press **OK** to process the sample or **Cancel** to cancel the operation.

Undo

Have you ever wanted a time machine so that you could go back and undo a mistake? This function may be the next best thing. Whenever you perform a sample edit function, the E-IV backs up the original version of the sample if “Undo/Redo” is enabled (Master, Miscellaneous). The original sample is placed on the clipboard and can be instantly restored by pressing Undo.

►To Restore a Sample to its Original State

1. Press the **Sample Edit** key. The LED will illuminate and the main sample edit screen will appear.
2. Press the **UNDO!** function key (F6). The original sample will be restored and the processed sample will be stored in the clipboard.

►To Compare a Processed Sample with the Original Sample:

1. Press the **Sample Edit** key. The LED will illuminate and the main sample edit screen will appear.
2. Press the **UNDO!** function key (F6). The original sample will be restored and the processed sample will be stored in the clipboard.
3. Press the **REDO!** function key (F6). The processed sample will be restored and the original sample will be stored in the clipboard. You can continue switching back and forth until you decide which sample you want to keep.



**Sample
Edit**

Preset Manage

6

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**Preset
Manage**

PRESET MANAGE



This module handles the preset “housekeeping” functions such as: creating, erasing, copying, exporting naming presets. You can also find out how much memory a preset uses, to which output it is assigned, and if it is linked to another preset.

The Preset Manage menu contains five main sub menus:

- **Name** - Allows you to name or rename a preset.
- **Erase** - Allows you to erase a preset from memory.
- **Copy** - Allows you to copy a preset to another location.
- **New** - Creates a new preset location.
- **Export** - Allows you to export a preset into another bank.
- **Info** - Displays information on the selected preset.



Name Preset



This function allows you to name any preset in the bank.

► To Name a Preset:

1. Press the **Preset Manage** key. The LED will illuminate and the main screen will appear.
2. Select the preset to be named using the data entry control, inc/dec keys, or the numeric keypad.
3. Press the **Name** function key (F1). A popup dialog box (shown above) will appear asking you to enter the new preset name.
4. Name the preset. Letters can be selected using the numeric keypad, data entry control, inc/dec keys and cursor keys, or using an ASCII keyboard.
5. Press **OK** to confirm the new name or **Cancel** to cancel the operation.

Erase Preset



This function allows you to erase any preset in the bank.

► To Erase a Preset:

1. Press the **Preset Manage** key. The LED will illuminate and the main screen will appear.
2. Select the preset to be erased using the data entry control, inc/dec keys, or the numeric keypad.
3. Press the **Erase...** function key (F2). A pop up dialog box (shown above) will appear asking you if you want to erase the preset.
4. Press **OK** to erase the preset or **Cancel** to cancel the operation.



Copy Preset



Presets can be copied to other preset numbers within the bank.

► To Copy a Preset:

1. Press the **Preset Manage** key. The LED will illuminate and the main screen will appear.
2. Press the **Copy...** function key (F3). A pop up dialog box (shown above) will appear asking you to select the destination preset location.
3. Select the destination preset location using the data entry control, inc/dec keys or the numeric keypad.
4. Press **OK** to copy the preset or **Cancel** to cancel the operation.

New Preset



This function creates a home for your great samples.

► To Create a New Preset:

1. Press the **Preset Manage** key. The LED will illuminate and the main screen will appear.
2. Press the **New...** function key (F4). A popup dialog box (shown above) will appear asking you to select the destination preset location.
3. Select the destination preset location using the numeric keypad, data entry control, inc/dec keys or using an ASCII keyboard.
5. Press **OK** to confirm the new preset location or **Cancel** to cancel the operation.



Export Preset



This function allows you to export a preset to another bank.

Suppose you were experimenting and modified a preset using the preset edit module. You might want to keep the modified preset, but if you save the bank, the original preset will be lost. Using this function, you can export the modified preset and its samples to a new bank and have both!

► To Export a Preset:

1. Press the **Preset Manage** key. The LED will illuminate and the main screen will appear.
2. Select the preset to be exported using the data entry control, inc/dec keys, or the numeric keypad.
3. Press the **Export** function key (F5). The screen shown above will appear.
4. Select the destination drive, folder and bank using the cursor keys and data entry control. You cannot write into an existing bank without erasing it. Usually you will choose an empty bank.
5. Press **OK** to export the preset or **Cancel** to cancel the operation.

Get Info



This function displays the preset's size in bytes, lists the number of samples used and lists the amount of remaining memory. It also tells you if the preset is linked to another and to which output it is assigned.

► To Get Information about a Preset:

1. Press the **Preset Manage** key. The LED will illuminate and the main screen will appear.
2. Select the desired preset using the data entry control, inc/dec keys, or the numeric keypad.
3. Press the **Info...** function key (F6). A pop up window (shown above) appears with information about the sample.
4. Press the **OK** function key to return to the Preset Manage screen.



Preset Edit

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BACKGROUND: Programming Basics

This chapter explains how preset sounds are constructed in E-IV. It also contains important background information on the various programming aspects of the instrument.

If you are new to synthesizers and electronic music, you may need more background information than this manual provides. There are many books dedicated to synthesizer basics and MIDI available through your local music dealer. Magazines such as Keyboard and Electronic Musician, which are available at most newsstands, contain current information on the subject, as well as valuable programming tips.

Your initial involvement with E-IV will most likely consist of using the existing presets and selecting MIDI channels. While the factory banks and presets are very good, there are probably some things you would like to change, perhaps the LFO speed, the filter brightness, or the attack time. You may also want to make your own custom presets using complex modulation routings.

Editing Presets

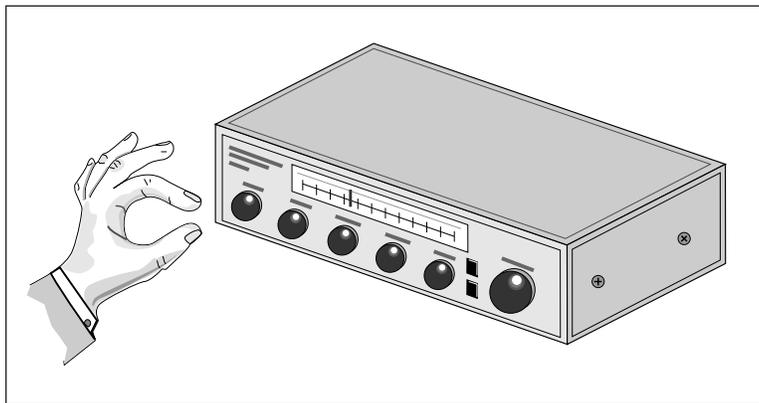
It's easy to create new presets by using the Preset Edit menu to modify existing presets. This is really the best way of getting acquainted with E-IV. If you don't like the results, simply reload the preset and you'll be back to the original sound. Changes are not made permanent until you SAVE a bank. Therefore, you can experiment all you want with presets, voices and samples without worrying about losing a sound.

We encourage you to actually try out the different functions as you read about them. Hearing what a control actually does will remove a lot of the mystery associated with it.

The Emulator IV has an extensive modulation implementation using two multi-wave LFO's (Low Frequency Oscillators), three envelope generators, and the ability to respond to multiple MIDI performance controllers. You can simultaneously route any combination of these control sources to multiple destinations.

MODULATION

Modulation means to *dynamically change* a parameter, whether it be the volume (amplitude modulation), the pitch (frequency modulation), or whatever. Turning the volume control on your home stereo rapidly back and forth would be an example of amplitude modulation. To modulate something we need a modulation *source* and a modulation *destination*. The source is your hand turning the knob, and the destination is the volume control. If we had a device that would automatically turn the volume control, we would also call that device a modulation source.



Turning the volume control back and forth on your home stereo is an example of Amplitude Modulation.

The Emulator IV is designed so that for each of the variable parameters, such as the volume, there is an initial setting which can be changed by a modulation source. Therefore in the case of volume, we have an initial volume and we can change or modulate that volume with a modulation source. Positive modulation *Adds* to the initial amount. Negative modulation *Subtracts* from the initial amount.

MODULATION SOURCES

The main modulation sources on E-IV are *Envelope Generators*, *Performance Controllers* and *Low Frequency Oscillators*. In the previous example, an envelope generator could be routed to automatically turn the volume control as programmed by the envelope, or, a low frequency oscillator could be routed to turn the volume control up and down in a repeating fashion. The main mod sources are listed below.

Keyboard Key

Which key is pressed.

Key Velocity

How fast the key is pressed.

Up Velocity

How fast the key is released.

Gate

High if the key is pressed, low when the key is released.

Pitch and Mod Wheels

Synthesizer pitch bend and modulation wheels.

Keyboard Pressure (mono aftertouch)

Key Pressure applied after the key is initially pressed.

Pedal

A synthesizer pedal controller.

Miscellaneous Controllers A & B

Any type of MIDI continuous controller data.

Low Frequency Oscillators (2 per preset)

Generate repeating waves.

Envelope Generators (3 per preset)

Generate a programmable “contour” which changes over time when a key is pressed.

Noise & Random Generators

Generate spectrums of noise and random signals.

Footswitches

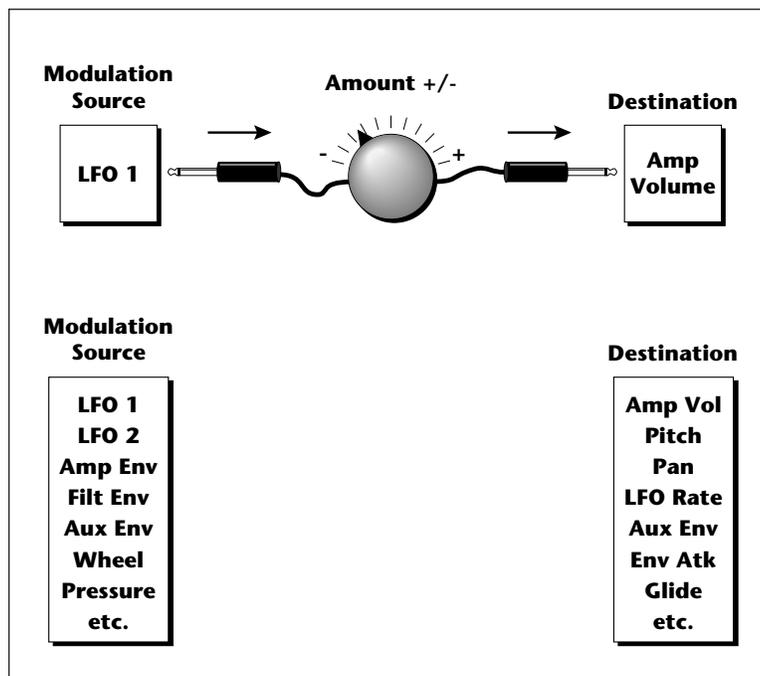
Change a parameter when a footswitch is pressed.

MODULATION CORDS

To connect a modulation Source to a Destination you use a **Cord**. (*Patchcord*—A holdover from the days when modules of an analog synthesizer were connected together with physical cords. Nowadays, we still need a way to connect modules together, but the cords are in software.)

The E-IV lets you connect the modulation sources in almost any possible way to the modulation destinations. You can even modulate other modulators. Each cord also has an amount parameter which determines “how much” modulation is applied to the destination. The modulation amount can be positive or negative and will either add or subtract from the initial value.

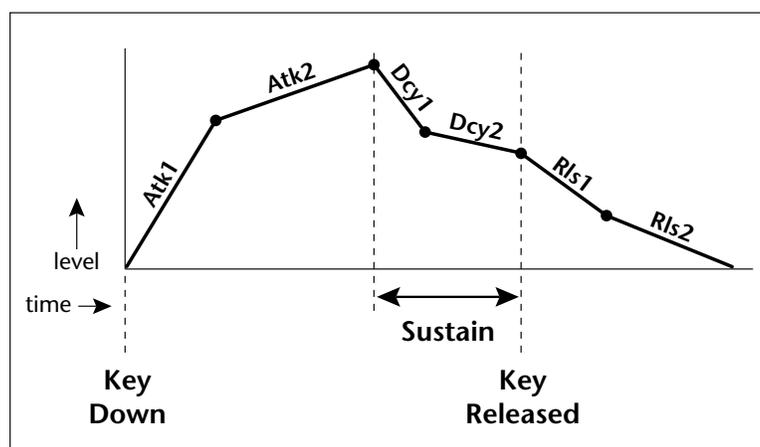
To use a modulation cord, you must connect a modulation Source to a modulation Destination. Think of it as if you are connecting an actual cord. **You must connect both ends of the cord for the cord to work.** There are 16 general purpose cords per voice.



ENVELOPE GENERATORS

An envelope can be described as a “contour” which can be used to shape the sound in some way over time. There are three envelope generators on the E-IV and all of them are the rate/level type.

This is how the rate/level envelopes work: When a key is pressed, envelope starts from zero and moves toward the Attack 1 Level at the Attack 1 Rate. As soon as it reaches this first stage, it immediately begins the Attack 2 phase and moves toward the Attack 2 level at the Attack 2 rate. As long as the key is still held, the envelope continues on through the Decay 1 and Decay 2 stages. If the key is still held when the envelope reaches the end of Decay 2, it simply stops there waiting for you to release the key. When you release the key, the envelope continues through its Release 1 and Release 2 stages, stopping at the end of the Release 2 stage. The rate/level envelopes give maximum flexibility to program both complex and simple envelopes.



The Amplifier Envelope generator controls the volume of the voice over time and has 6 stages: Attack 1, Attack 2, Decay 1, Decay 2, Release 1 and Release 2. The Filter Envelope generator controls the filter morph and also has 6 stages. Unlike the amplifier envelope, however, the filter envelope has the ability to go negative as well as positive. There is also an Auxiliary Envelope generator which is a general purpose envelope. The auxiliary envelope is identical to the filter envelope and can also go negative as well as

positive. The time of each stage can be adjusted to create myriad envelope shapes, which in turn shape the sound over time.

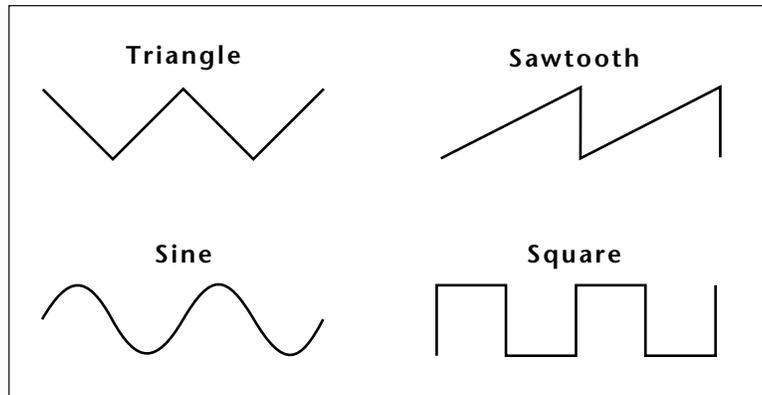
- The way the volume of a sound changes over time determines how we perceive that sound. For example, a bell struck with a hammer is instantly at full volume, then slowly dies away. A bowed violin sound fades in more slowly and dies away slowly. Using the Amplifier Envelope, you can simulate different types of instrument volume envelopes by programming them appropriately.

Tip: By routing the Auxiliary Envelope to control the pitch (Cords) you can easily hear the shape of the envelopes you are creating.

LOW FREQUENCY OSCILLATORS (LFOs)

A Low Frequency Oscillator or LFO is simply a wave which repeats at a slow rate. The E-IV has two multi-wave LFOs for each of its 128 channels. The LFO waveforms are: Triangle, Sine, Sawtooth, and Square.

By examining the diagram of the LFO waveforms, you can see how the LFO will affect a modulation destination. Suppose we are modulating the pitch of an instrument. The

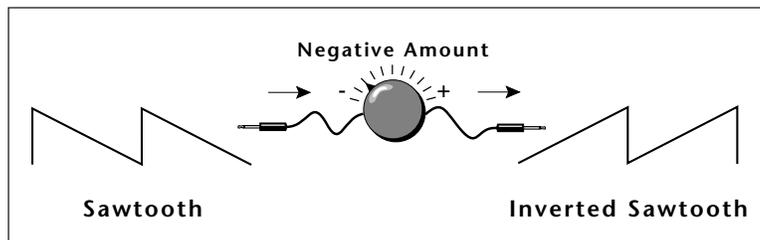


sine wave looks smooth, and will smoothly change the pitch. The square wave changes abruptly, and will abruptly change the pitch from one pitch to another. The sawtooth wave smoothly decreases, then abruptly changes back up. The sound's pitch will follow the same course. Controlling the pitch of an instrument is an easy way to hear the effects of the LFO waves.

Like the Auxiliary Envelope, the LFOs can be routed to control any realtime functions such as Pitch, Filter, Panning, or Volume. A common use for the LFO is to control the pitch of the sound (LFO -> Pitch). This effect is called vibrato and is an important performance parameter. Many presets use this routing with the modulation wheel controlling “how much” LFO modulation is applied. Another common effect, Tremolo, is created by controlling the volume of a sound with the LFO (LFO -> Volume).

Another use for the LFOs might be to add a slight bit of animation to the sound by routing the LFO to control the filter. In this example, the LFO amount would be set low, for a subtle effect.

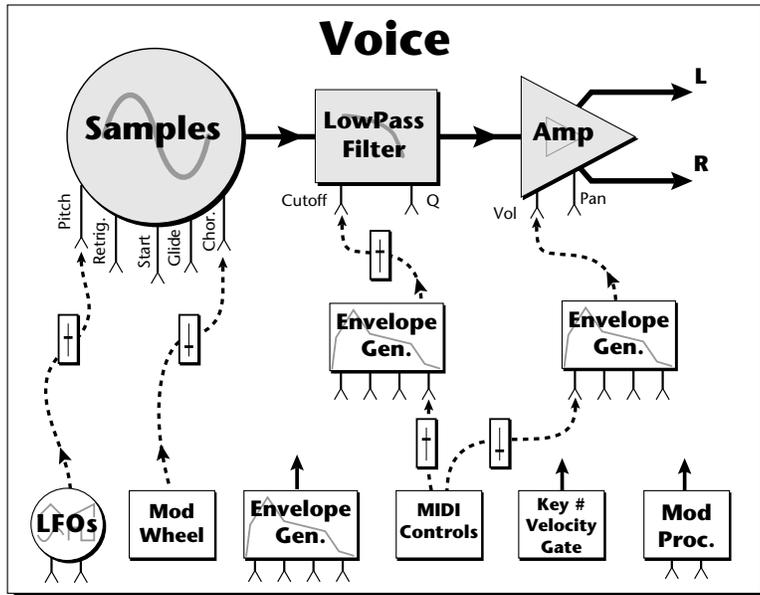
When the amount of an LFO is a negative value, the LFO shape will be inverted. For example, inverting the sawtooth wave produces a wave that smoothly increases, then instantly resets down.



MODULATION DESTINATIONS

The Cords section of the Preset Edit module is where you connect sources to destinations. Each cord has an amount control associated with it to control how much modulation is applied.

Cords 00 to 05				EMJ	V1: A-1-C7		
#	source	dest	amount	#	source	dest	amount
00:	Vel~	Filter	+28%	03:	ModWl	CO3Amt	+13%
01:	PitWl	Pitch	+9%	04:	Vel~	FilFreq	+24%
02:	Lfo1~	Pitch	+0%	05:	Pedal	FilFreq	+0%



The Cords screen on the previous page and the diagram above show how modulation sources are connected to destinations. The modulation sources can control any of the destinations in the voice.

- Note-on modulation sources, such as key, velocity and gate are only measured once at note-on time. Realtime modulation sources such as LFOs, envelope generators and modulation wheels can be varied continuously.

The possible modulation routings are completely flexible as shown in the diagram above. Multiple sources can control the same destination, or a single source can control multiple destinations.

+	0 ... 127
~	-64 ... +63
<	-127 ... 0

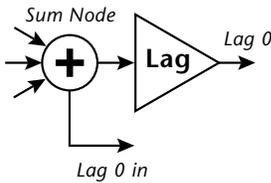
Several of the modulation sources use the designators shown at left to indicate their polarity.
 "+" modulation adds to the current value.
 "~" is useful when you want the modulation to center around zero. (As when controlling Filter Fc.)
 "<" would be useful for controlling volume, as it only subtracts from the initial value.

Modulation Sources

Off
 Crossfade Random
 Key (+, ~), Velocity (+, ~, <)
 Release Velocity, Gate
 Pitch Wheel, Mod Wheel
 Pressure, Pedal
 MIDI A-H, Foot Switch 1 & 2
 Flip-Flop Foot Switch 1 & 2
 MIDI Volume (Contr. 7)
 MIDI Pan (Contr. 10)
 Key Glide
 Volume Envelope (+, ~, <)
 Filter Envelope (+, ~, <)
 Aux. Envelope (+, ~, <)
 LFO 1 & 2 (+, ~)
 White Noise, Pink Noise
 kRandom 1 & 2,
 Lag 0 in (summing amp out)
 Lag 1 in (summing amp out)
 Lag Processor 0 & 1
 DC Offset, Summing Amp
 Switch, Absolute Value
 Diode, Flip-Flop, Quantizer
 Gain 4x

Modulation Destinations

Off
 Key Sustain, Fine Pitch, Pitch
 Glide, Chorus Amt
 `Chorus Position ITD
 `Sample Start, Sample Loop
 Sample Retrigger
 Filter Freq., `Filter Resonance
 Amplifier Volume, Amp Pan
 Amplifier Crossfade
 Volume Envelope Rates (all)
 Vol. Env. Atk, Dcy, Release
 Filter Envelope Rates (all)
 Filt. Env. Atk, Dcy, Release
 Aux. Envelope Rates (all)
 Aux. Env. Atk, Dcy, Release
 LFO 1 & 2 Rates
 Lag Processor In 0 & 1
 Summing Amp, Switch
 Absolute Value
 Diode, Flip-Flop, Quantizer
 Gain 4x
 Cord 0-15 Amount



Tip: The Lag Processors can also be used as 2 additional summing amps. Lag0in and Lag1in are available as modulation sources which are the sum of any cords connected to the Lag in destination. The summing amp is before the lag processor as shown above.

MODULATION PROCESSORS

Modulation processors are devices which can modify modulation sources such as LFOs and envelope generators before they are applied to a destination. The E-IV's modulation processors allow you to create patches and do tricks which would not be possible otherwise. The following modulation processors are currently implemented.

Switch Outputs a digital "1" when the input is greater than "0".

Summing Amp .. Allows you to mix several modulation signals together before applying them to a destination. This saves cords when the output is to be routed to multiple destinations.

Lag Processors ... Slows down rapid changes in the input signal. The output "lags" behind the input at a programmed rate (set in the LFO 2 screen).

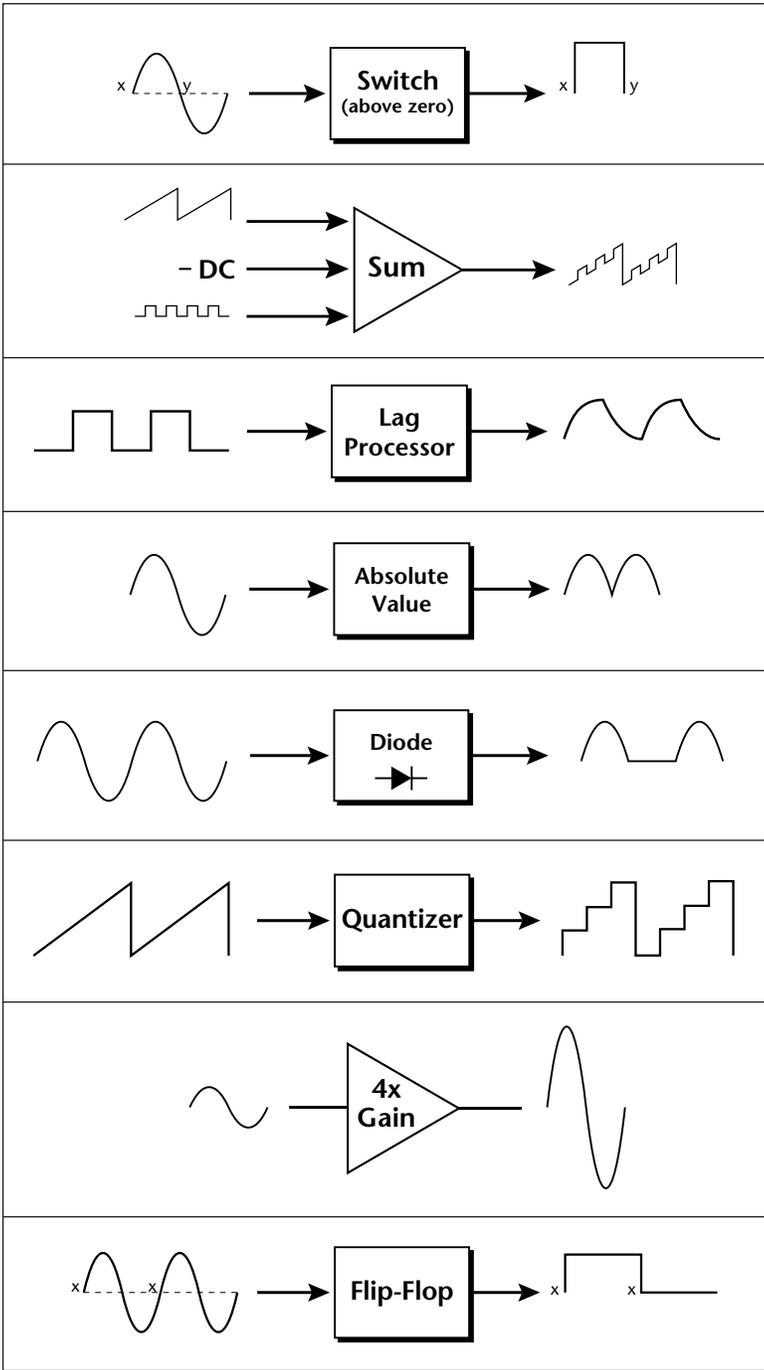
Absolute Value .. This function inverts negative values presented to it and leaves positive values alone. This device outputs only positive values.

Diode This function only allows positive values to pass and blocks negative values.

Flip-Flop The output of this processor alternates between a digital "1" and digital "0" each time the input goes positive from zero or a negative value. If an LFO wave were input, the output would be a square wave of half the input frequency.

Quantizer With the input cord set to 100%, the output value is limited to 16 discrete values (If input = sawtooth, then output = staircase). The value of the input cord controls the number of steps. The value of the output cord controls the size of the steps.

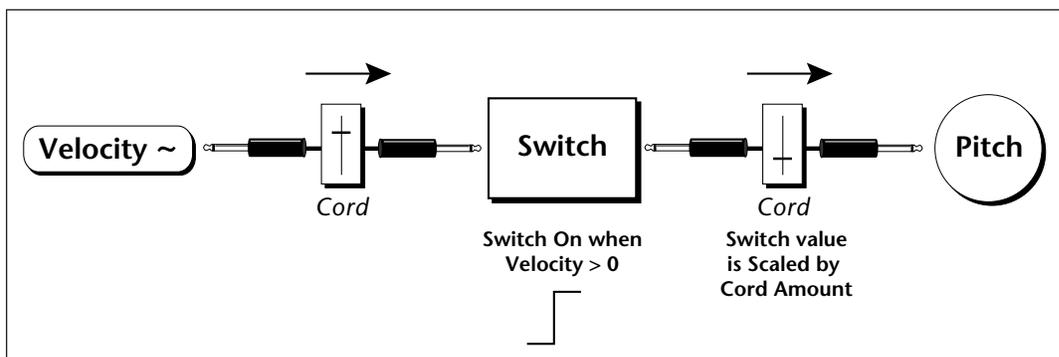
4x Gain This processor multiplies the input value by 4 to amplify modulation sources.



**Modulation
Processors**

Modulation processors are inserted into a modulation routing as shown in the diagram below.

The modular analog synthesizers of yesteryear were incredibly flexible, partly because processing devices could be connected in any order. Modulation processors are designed according to this modular concept. They can be linked and used in a wide variety of ways limited only by your imagination. Consider the following example:



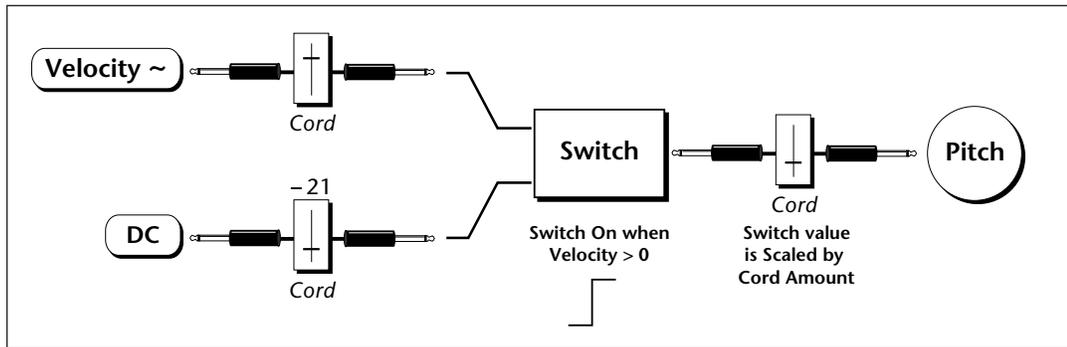
This patch would be programmed in the Cords screen as shown below.

Cords 00 to 05			[A] EDITING 5 VOICES: A-1-C7		
source	dest	amount	source	dest	amount
00: Vel~	Switch	+100%	03: Off	Off	+13%
01: Switch	Pitch	+22%	04: Off	Off	+36%
02: Off	Off	+0%	05: Off	Off	+0%

This particular patch shifts the overall pitch up a fifth when the key velocity exceeds 64. Velocities below 64 will play at normal pitch and velocities of 64 and above will be raised a perfect fifth. The Velocity “~” source scales the played velocity around zero. In other words, low velocities (below 64) will have negative values and high velocities (64 and above) will be positive. A velocity of 64 would be zero. The **Switch** module only outputs a “1” if the input value is greater than zero. This digital “1” value can be scaled through the attenuator on the patchcord to raise or lower the pitch by any amount. In this case, a scaling value of +22 raises the pitch by a perfect fifth. The amount of the

patchcord on the input to the switch is unimportant because ANY velocity value equal or greater than 64 will flip the switch. If the input cord amount were a negative value however, the action of the velocity would be reversed and velocities less than 64 would raise the pitch and velocities equal or greater than 64 would play the original pitch.

But what if you wanted the velocity switch point to be something other than 64? Thanks to the modulation processors, it can be done. Here's how.



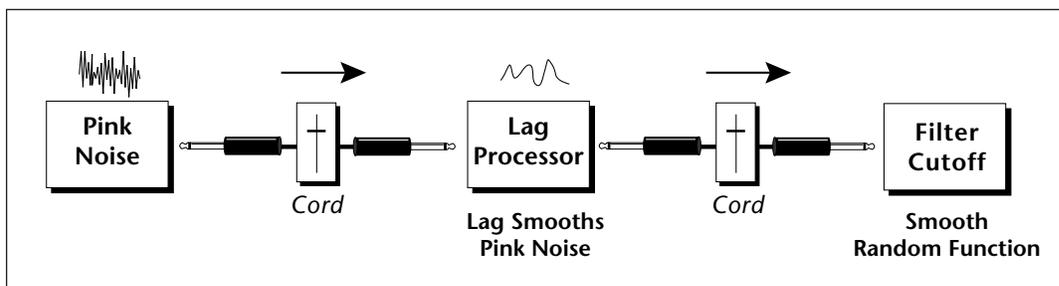
Connect the DC level to the input of the switch along with the velocity value. **Note that more than one modulation source can be applied to the input of a processor.**

The value of the DC offset determines the velocity switch point and is adjusted using the patchcord's attenuator. By setting the DC amount to a negative amount, higher velocity values are required to trip the switch. Setting the DC value to a positive value would bring the velocity switch point down.

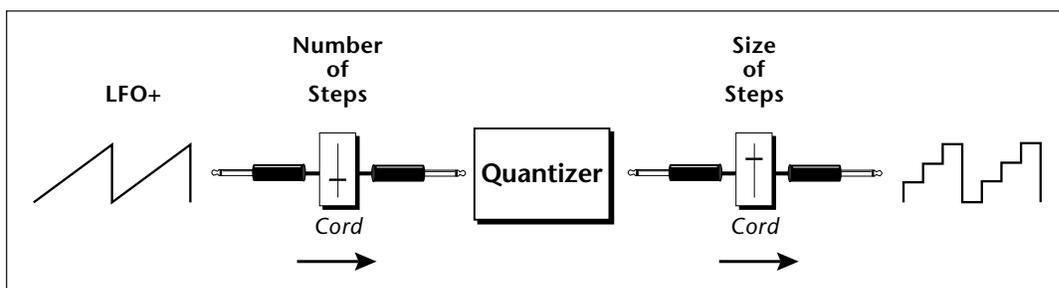
The Cords screen for this patch is shown below.

Cords 00 to 05			[A] EDITING 5 VOICES: A-1-C7				
#	source	dest	amount	#	source	dest	amount
00:	Vel~	Sum	+100%	03:	Switch	Pitch	+22%
01:	DC	Sum	-21%	04:	Off	Off	+0%
02:	Sum	Switch	+100%	05:	Off	Off	+0%

Another example routes the Pink Noise generator through one of the Lag Processors in order to derive a smooth random function. A smooth random wave is useful in small amounts to add a degree of natural variation to timbre when routed to filter cutoff. Normal pink noise is low pass filtered audio frequency noise with a 3 dB/octave slope to give equal energy per octave. Emulator IV pink noise is actually more like very low frequency filtered (mauve) noise, but it is perfect for use as a random control source.



The **Quantizer** can generate interesting whole-tone scales when envelope generators or LFOs are routed to the input. The quantizer turns a smoothly changing input signal into a series of steps. By routing the output of the quantizer to Pitch and adjusting the cord amounts, you can control both the number of steps and the pitch interval of each step.



The input cord amount controls how many steps will be generated. With a sawtooth wave (LFO+) feeding the input and the cord amount set to 100%, sixteen steps will be generated. The output cord amount controls the size (or interval) of the steps.

Try setting up the following patch exactly as shown below using your favorite preset as a starting point.

```

LFO 1 [M] V1: A-1-C7
Rate : 0.35 Sync: key sync
Shape : sawtooth
Delay : 0
Variation: 0%
[Utils] [ Tuning Amp/Filt Lfo/Aux Cords ]
  
```

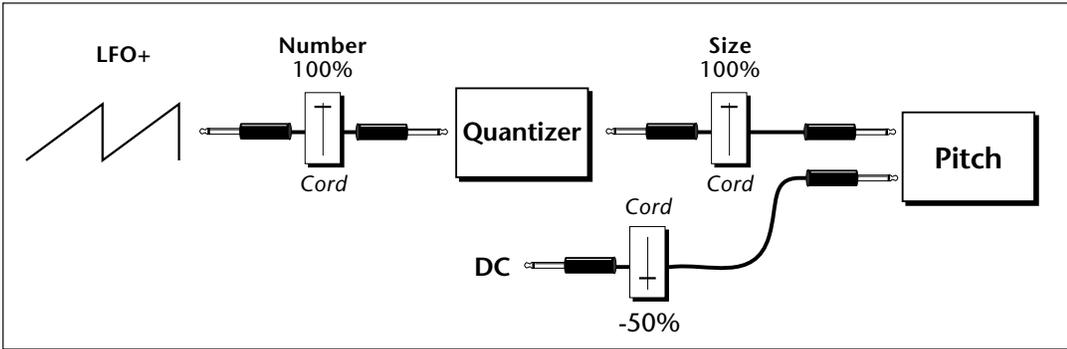
```

Cords 00 to 05 [M] V1: A-1-C7
** source dest amount ** source dest amount
00: Lfo1 + Quantize +100% 03: Off Off +0%
01: Quantiz Pitch +100% 04: Off Off +0%
02: DC Pitch -50% 05: Off Off +0%
[Utils] [ Tuning Amp/Filt Lfo/Aux Cords ] [Zero]
  
```

Tip: The 4x Amp can be used to get more steps or increase the interval of the quantizer.

This patch generates an ascending arpeggio every time a key is pressed. The block diagram of the patch is shown below. The patch is very straightforward except for the DC offset which was added in to bring the pitch down into tune. (Sometimes you have to fix a problem, but it's nice to know that there's a way around it to achieve the desired result.)

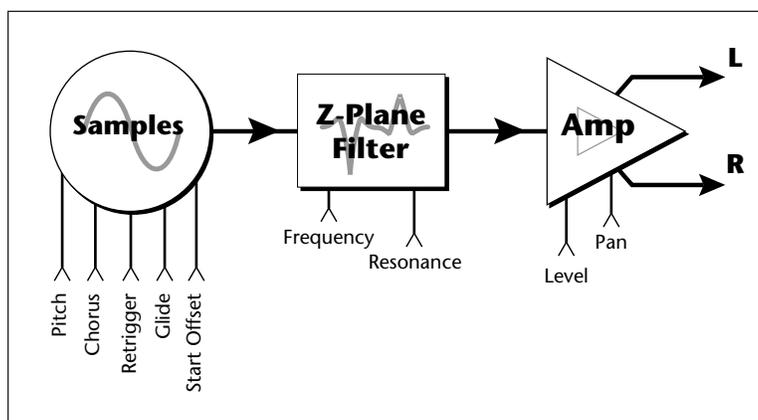
Tip: Experiment with this patch by connecting other sources and destinations to the quantizer.



You can probably start to see some of the possibilities (and there are many). Whenever you find yourself wishing for some esoteric type of control, take a minute and think if there is a way to achieve the desired result using the modulation processors.

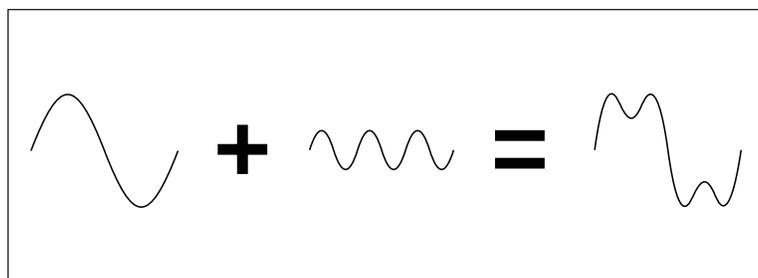
BACKGROUND: Dynamic Filter

The block diagram of the signal path is shown below.



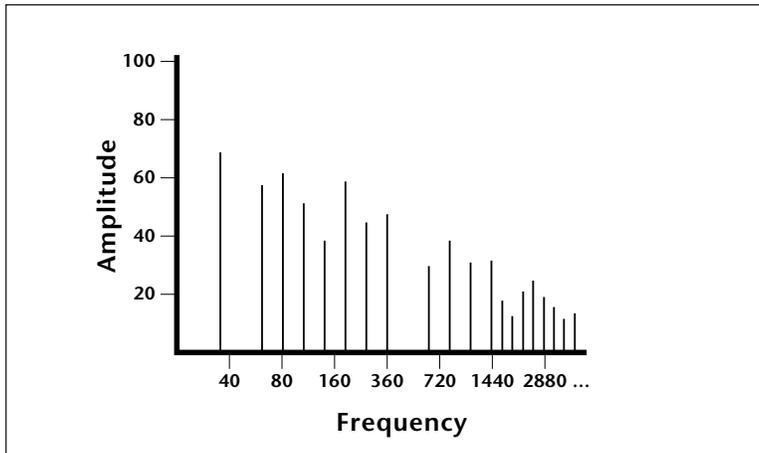
A *Low Pass* filter is a powerful synthesizer filter which can dramatically alter the sound of a sample.

To understand how a filter works, we need to understand what makes up a sound wave. A sine wave is the simplest form of sound wave. Any waveform except a sine wave can be analyzed as a mix of sine waves at specific frequencies and amplitudes.



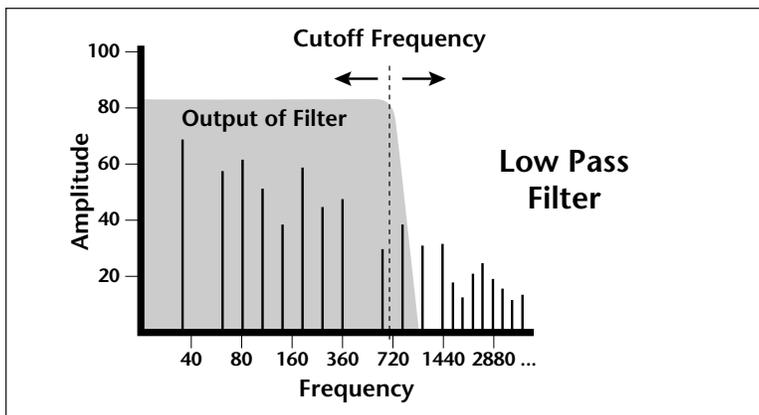
Any waveform can be analyzed as a mixture of sine waves.

One way to represent complex waveforms is to use a chart with frequency on one axis and amplitude on the other. Each vertical line of the chart represents one sine wave at a specific amplitude and frequency.

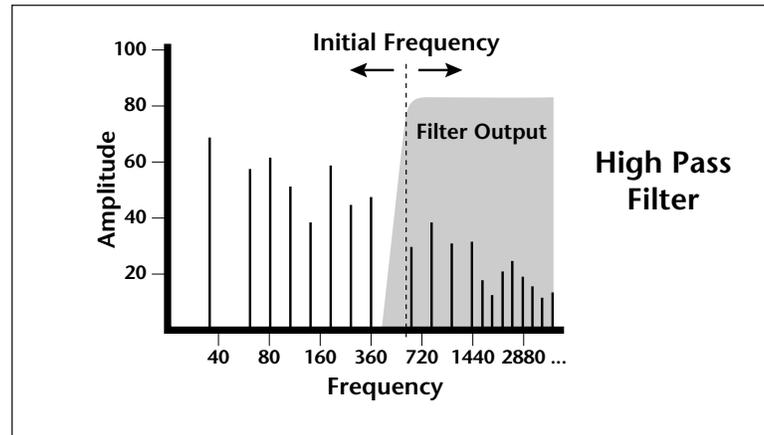


WHAT IS A FILTER?

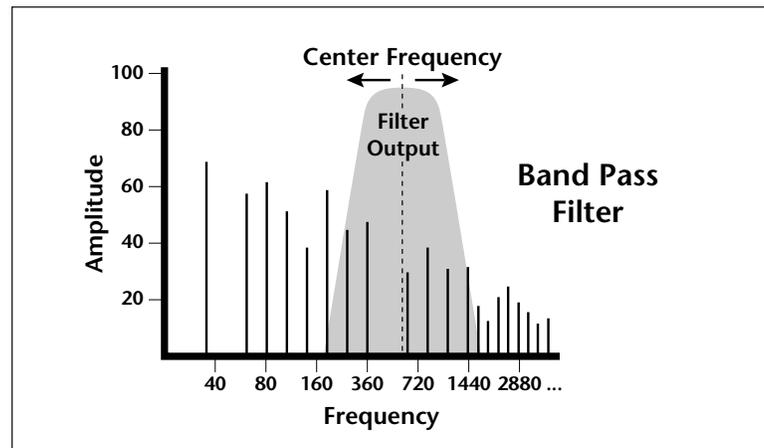
Most samples are complex waves containing many sine waves of various amplitudes and frequencies. A **filter** is a device which allows us to remove certain components of a sound depending on its frequency. For example, a *Low Pass Filter* lets the *low frequencies pass* and removes only the high frequencies.



A filter that lets only the high frequencies pass is called a *High Pass Filter*.



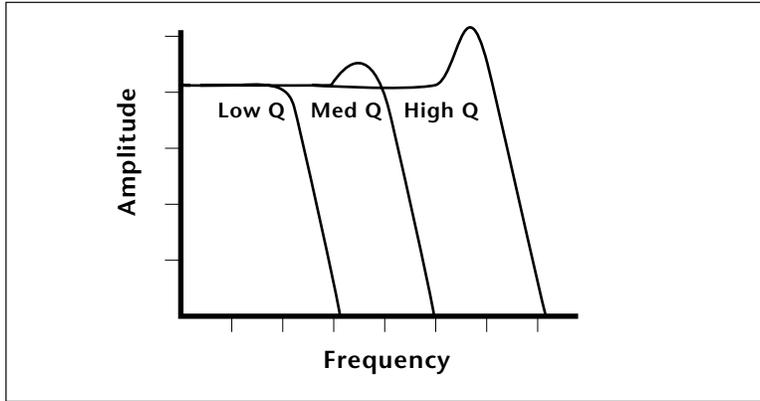
A filter which only lets a certain band of frequencies pass is called a *Bandpass Filter*.



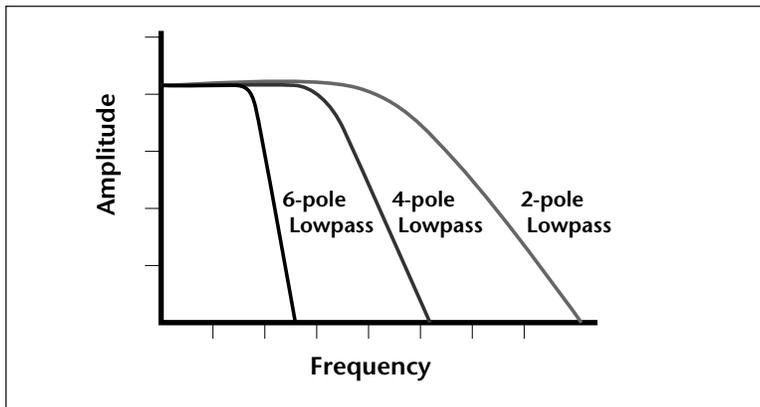
A *Notch Filter* is just the opposite of a bandpass filter and is used to eliminate a narrow band of frequencies.

Another control found on traditional filters is called Q or resonance. A lowpass filter with a high Q would emphasize the frequencies around the cutoff frequency. The chart below shows how different amounts of Q affect the low pass filter response. In terms of sound, frequencies around the

cutoff will tend to “ring” with high Q settings. If the filter is slowly swept back and forth, with a high Q, various overtones will be “picked out” of the sound and amplified as the resonant peak sweeps over them. Bells and gongs are real world examples of sounds which have a high Q.



Another characteristic of a filter is the number of poles it contains. Traditional synthesizer filters were usually either 2-pole or 4-pole filters. The E-IV has a selectable 2, 4 or 6-pole low pass filter. The number of poles in a filter describes the steepness of its slope. The more poles, the steeper the filter's slope and the stronger the filtering action. The tone controls on your home stereo are probably one-pole or two-pole filters. Parametric equalizers are usually either two-pole or three-pole filters. In terms of vintage synthesizers, Moog and ARP synthesizer filters used 4-pole filters, Oberheim synthesizers were famous for their 2-pole filter sound.



Using a filter, we now have a way to control the harmonic content of a sampled sound. As it turns out, even a simple low pass filter can simulate the response of many natural sounds.

For example, when a piano string is struck by its hammer, there are initially a lot of high frequencies present. If the same note is played softer, there will be fewer of the high frequencies generated by the string. We can simulate this effect by routing the velocity of the keyboard to control the amount of high frequencies that the low pass filter lets through. The result is expressive, natural control over the sound.

If an envelope generator is used to control the cutoff frequency of a low pass filter, the frequency content can be varied dynamically over the course of the note. This can add animation to the sound as well as simulate the response of many natural instruments.

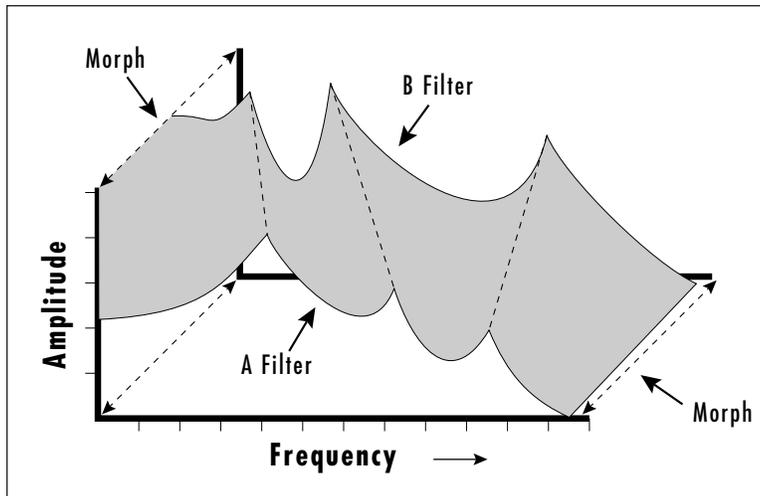
PARAMETRIC FILTERS

A more complex type of filter is called a parametric filter or **Swept EQ**. A parametric filter allows control over three basic *parameters* of the filter. The three parameters are: *Frequency*, *Bandwidth*, and *Boost/Cut*. The Frequency parameter allows you to select a range of frequencies to be boosted or cut, the Bandwidth parameter allows you to select the width of the range, and the Boost/Cut parameter either boosts or cuts the frequencies within the selected band by a specified amount. Frequencies not included in the selected band are left unaltered. This is different from a band pass filter which attenuates (reduces) frequencies outside the selected band.

The parametric filter is quite flexible. Any range of frequencies can be either amplified or attenuated. Often times, several parametric sections are cascaded (placed one after another) in order to create complex filter response curves.

THE Z-PLANE FILTER

The Z-plane filter can change its function over time. In a simple Z-plane filter, we start with two complex filter types and interpolate between them using a single parameter. Refer to the diagram on the following page.



The Z-plane filter has the unique ability to change its function over time.

Filters A and B represent two different complex filters. By changing a single parameter, the *Morph*, many complex filter parameters can now be changed simultaneously. Following along the Morph axis you can see that the filter response smoothly interpolates between the two filters. This is the essence of the Z-plane filter. Through the use of interpolation, many complex parameters are condensed down into one manageable entity.

Consider, as an example, the human vocal tract, which is a type of complex filter or resonator. There are dozens of different muscles controlling the shape of the vocal tract. When speaking, however, we don't think of the muscles, we just remember how it feels to form the vowels. A vowel is really a configuration of many muscles, but we consider it a single object. In changing from one vowel to another, we don't need to consider the frequencies of the resonant peaks! You remember the shape of your mouth for each sound and **interpolate** between them.

This Z-plane filter sweep can be controlled by an envelope generator, an LFO, modulation wheels or pedals, keyboard velocity, key pressure, etc. In fact, any of the modulation sources can control the Z-plane filter.

BACKGROUND: Groups

Uces-KyWin			low	fade	high	fade	C-2	C0	C2	C4	C6	C8
V1	G1	S003 Piano	C-2	0	a#2	0	[Piano Roll]					
V2	G1	S004 Piano	B2	0	C7	0	[Piano Roll]					
V3	G2	S007 Piano	C-2	0	a#2	0	[Piano Roll]					

Dealing with a number of voices arranged on the keyboard can sometimes be a bit overwhelming. You might find yourself wishing there was a way to organize similar voices, say a layer of piano voices and a layer of string voices, into unified entities or **Groups**. That's it, groups!

Tip: Get in the habit of grouping your voices. It makes selection of different layers so easy.

To place a voice into a group, you simply tag each voice you want to be in the group with the same group number. Then, whenever you select that group number in the voice selection screen, all voices with that group number will be selected. You can define up to 32 groups, but a voice can only be in one group at a time.

Groups are assigned in any of the voice windows. In the Key Window shown above, two voices (1 & 2) are assigned to the same key range or in other words, they are layered. Note that they are also in two different groups. If you wanted to select voices 1 and 2, you would simply select **Group 1** in the voice selection screen shown below. All voices in group 1 (1 & 2) will now be selected for processing.

Tip: To locate the Voice Selection window shown at right press: Edit, Utils, then VSelect from the main Preset Edit screen.

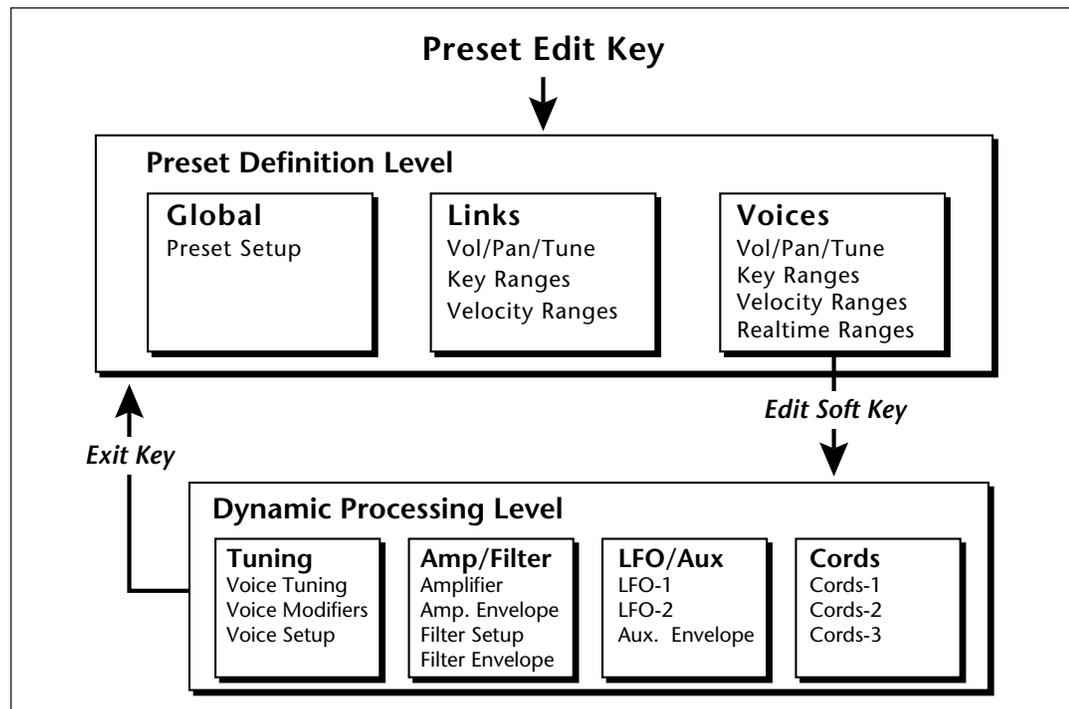
(from: Amplifier) CM1 EDITING 2 VOICES: C-2:a,a#2

Group: 1 Voice: all Low key: C-2 High key: a#2

BACKGROUND: Preset Editor

The Preset Edit module puts everything together to build complete presets. Samples can be arranged into single-sample or multi-sample voices with synthesizer processing applied. These complete voices can then be arranged on the keyboard.

The E-IV Preset Editor contains two levels. The top level, called **Preset Definition**, is used for editing global preset parameters, linking presets and for arranging voices and samples on the keyboard. The lower level, called **Dynamic Processing**, is used to perform more detailed editing of one or more preset voices such as envelope shaping of amplitude and filters as well as modulation parameters.



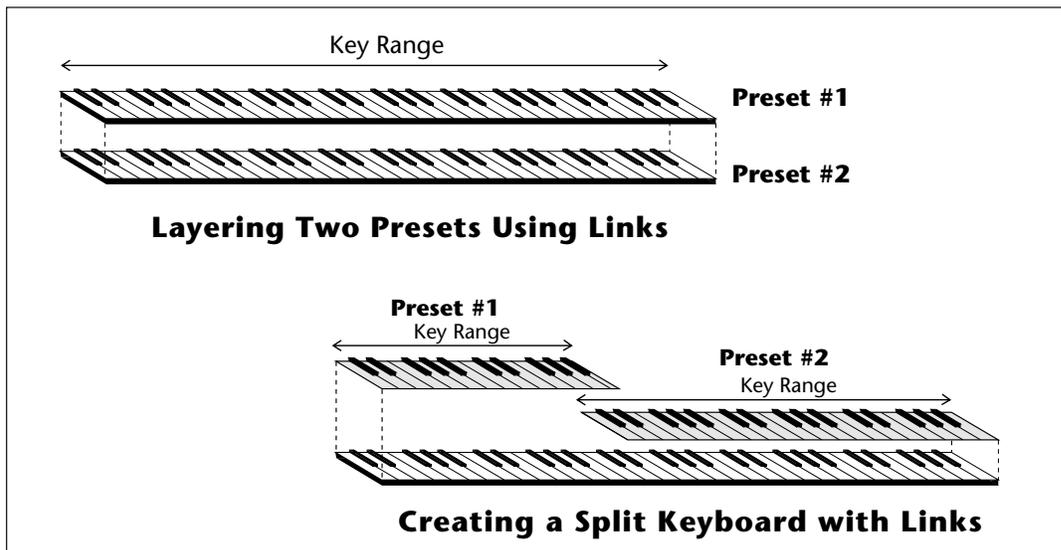
Preset Edit

The dynamic processing parameters are accessed by pressing the **Edit** soft key while in one of the Voice screens (or directly via an assignable key). Multiple voice selection is supported in any of the dynamic processing editing screens using a MIDI keyboard.

The Preset Definition level contains three main pages (Global, Links, Voices) which are selected using a soft key. Each page will be highlighted while it is selected.

Tip: The Preset Editor remembers which page was last displayed and returns to that same page when the Preset Edit key is again pressed. When the EXIT key is pressed, while in any Dynamic Processing editor screen, the last-displayed Preset Editor screen will reappear (unless the preset is changed).

- **Global Editor** - Contains the parameters Preset Transpose and Preset Volume which affect all voices in the preset.
- **Links** - Call up other presets in the bank which can be used to create layering or keyboard splits. Linked presets are not altered by linking. They are simply called up from memory and played. **An easy way to layer, crossfade or split sounds is to link presets in an empty preset.** See *New Link*. Each linked preset can have its own keyboard range, velocity range, volume, pan position, and tuning.
- **Voice Editing** - Allows you to place voices and samples on the keyboard and crossfade or switch between them according to key position, velocity range and realtime control range. This submodule also contains parameters to adjust the tuning, volume and pan position for the voices and samples.



If a voice contains more than one sample, it will be labeled as a multisample and the individual samples will be listed below it. Voices are shown graphically as solid black bars and samples are shown as empty bars. If a voice contains only one sample, then the sample will be the voice name.



PRESET EDIT - Global



GLOBAL EDITOR

Transpose & Volume. These are global parameters which affect the entire preset.

►To Change the Global Parameters:

1. Press the **Preset Edit** key. The LED will illuminate and the main preset edit screen will appear.
2. Press the **Global** function key (F3). The preset global page will appear.
3. Adjust the volume and transpose interval for the preset. Press the **Links** or **Voices** soft keys to continue in Preset Edit or press the **Preset Edit** key to exit the module.

►Edit All

The Edit All soft key selects all voices and jumps immediately into the dynamic processing level of the voice editor. This key is the fastest way into the editor when you want to work on all voices at once.

PRESET EDIT - Links

Link Field points to the **Links-Main** window.

Link Preset name & number points to the first column of the table.

Link Controls Volume, Pan, Coarse/Fine Tuning points to the numerical values in the table.

Link Preset name & number	volume	pan	xpost	ftune
L1 2008 Marcato Strings	+8	-13	+12	+0
L2 P011 Soft Flute	-4	-6	+0	+0
L3 P030 Ac. Guitar	+3	+3	+0	+0
L4 P006 Breathy Voices	-11	+11	+0	+0

Below the table are buttons: **Utils▲**, **[Global**, **Links**, **Voices]**.

Utils▲ Displays Global Editor Pages

Links Displays Voice Editor Pages

Links Button is highlighted while this page set is displayed.

NEW - adds link to preset
DELETE - deletes link from preset
COPY - copies link to any preset
SUBSUME - copies voices of the linked preset into the current preset.

PAGE

PREV NEXT

Use the Page keys to access the Key & Velocity windows.

MAIN CONTROLS

- **Link Field:** Link can be selected using the numeric keypad or data entry control.
- **Link Preset Name & Number:** The linked preset can be changed using the data entry control or inc/dec keys.
- **Link Controls:** These controls offset the volume, pan, transpose and fine tuning controls of the linked preset.
- **Utilities:** New, Delete, Copy, and Subsume.

Tip: See Voice Tuning in this chapter for detailed explanations of the Volume, Pan and Tuning controls.

Utilities

NEW LINK

Creates a new link field.

► **To Create a New Link:**

1. Press the **Preset Edit** key. The LED will illuminate and the last page selected will appear.
2. Press the **Links** soft key (F4) to select the link page of the editor. The link soft key will be highlighted.
3. Press the **Utils** function key (F1). A second row of soft keys will appear.
4. Press the **New...** function key (F1). A new link field will be added to the list of preset links.
5. Press **Exit** if you wish to cancel the operation.

► **Create a Huge Stacked Preset the Easy Way:**

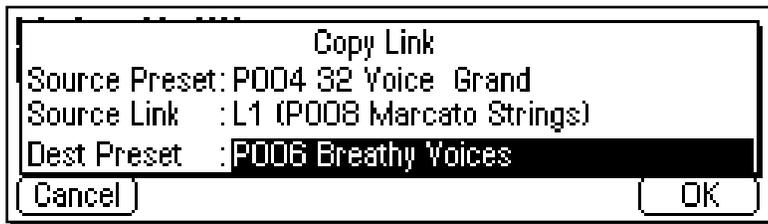
1. Load any bank of presets.
2. Press the **Preset Manage** key. Press the **New** key to create a new blank preset.
3. Select a location for the new blank preset and name it if desired. Press the **Preset Edit** key.
4. Press the **Links** soft key (F4) to select the link page of the editor. The link soft key will be highlighted.
5. Press the **Utils** function key (F1). A second row of soft keys will appear.
6. Press the **New...** function key (F2). A new link field will be added to the list of preset links.
7. Move the cursor to the preset field and select a preset.
8. Repeat steps 6 and 7 until the desired thickness has been achieved.
9. Press **Exit** to leave the Utilities menu.

COPY LINK

Copies a link and its parameters to and from any preset.

►To Copy a Link:

1. Press the **Preset Edit** key. The LED will illuminate and the last page selected will appear.
2. Press the **Links** soft key (F4) to select the link page of the editor. The link soft key will be highlighted.
3. Select the Link you wish to copy using the up/down cursor keys or the data entry control when the link field is selected.
4. Press the **Utils** function key (F1).
5. Press the **Copy** function key (F4). The pop up dialog box shown below will appear.



6. Select the source and destination presets as well as the source link to be copied.
7. Press **OK** to copy the link or **Cancel** to cancel the operation.

DELETE LINK

Removes the selected link field.

►To Delete a Link:

1. Press the **Preset Edit** key. The LED will illuminate and the last page selected will appear.
2. Press the **Links** soft key (F4) to select the link page of the editor. The link soft key will be highlighted.
3. Select the Link you wish to delete using the up/down cursor keys or the data entry control when the link field is selected.

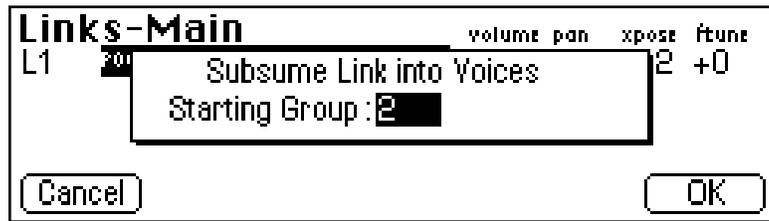
4. Press the **Utils** function key (F1). A second row of soft keys will appear.
5. Press the **Delete** function key (F3). A pop up dialog box will appear asking you to confirm the operation.
6. Press **OK** to delete the link or **Cancel** to cancel the operation.

SUBSUME LINK

Copies all the voices of the linked preset into the current preset.

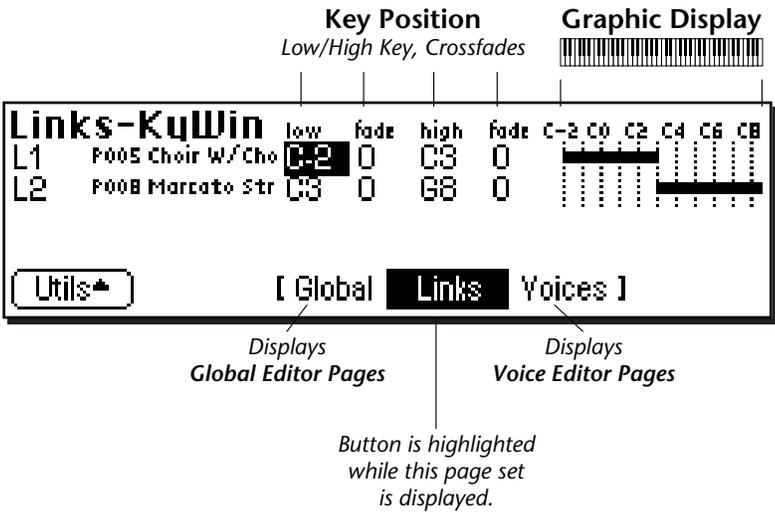
►To Subsume a Linked Preset:

1. Press the **Preset Edit** key. The LED will illuminate and the last page selected will appear.
2. Press the **Links** soft key (F4) to select the link page of the editor. The link soft key will be highlighted.
3. Select the Link you wish to subsume using the up/down cursor keys or the data entry control when the link field is selected.
4. Press the **Utils** function key (F1). A second row of soft keys will appear.
5. Press the **Subsume** function key (F5). The pop up dialog box shown below will appear.



6. Select the Starting Group number. This will place the voices from the linked preset in groups beginning with the starting group number. If the voices in the linked preset were not grouped, they will all be placed into the starting group number.
7. Press **OK** to subsume the link or **Cancel** to cancel the operation.

Links - Key Window



The Key Window of the Links screen is accessed by pressing the **Next Page** key on the front panel from the main Links screen. The screen shown above will appear. Note: If there are no links in the preset, the display will inform you of this fact. Press **Utilities**, then **New...** to create a new link.

KEY WINDOW CONTROLS

- **Link Field:** Link can be selected using the numeric keypad or data entry control.
- **Link Preset Name & Number:** The linked preset can be changed using the data entry control or inc/dec keys.
- **Key Position Controls:** These controls set the high and low key range and the crossfade range in keys for each linked preset.
- **Graphic Display:** Shows the keyboard positions of each link.
- **Utilities:** New, Delete, Copy, and Subsume.

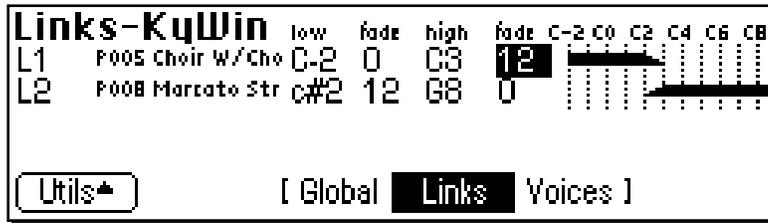
KEYBOARD & VELOCITY RANGES

When editing the keyboard and velocity ranges of preset links, an editing screen similar to the one shown on the previous page will appear.

The bars at the right side of the screen give a graphic display of how the presets are placed on the keyboard. The key position is edited by placing the cursor over the desired parameter and then playing the MIDI keyboard or adjusting the data entry control.

► To Positionally Crossfade

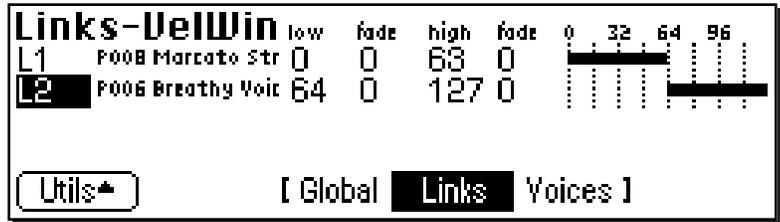
The Fade parameters allow the volume of the preset to be faded out as a function of key position. In the Link screen shown below, the two presets are being positionally crossfaded over a range of one octave.



As you play up the keyboard in the C2-C3 octave range, the Choir preset will gradually fade out as the Marcato Strings fade in. This is illustrated on the display by the range bars fading out and in.

This technique can help mask the point at which two sounds meet. The presets are assigned so that they overlap by a few keys, then the fades are programmed so that one sound fades out as the other fades in.

Links - Velocity Window



The Velocity Window of the Links screen is accessed by pressing the **Next Page** key on the front panel from the Key Window Links screen. A screen similar to the one shown above will appear. In the screen above, the two presets will be “velocity-switched” at a key velocity of 64.

Caution: *If the key ranges do not overlap, you will not hear the effects of the velocity controls.*

VELOCITY WINDOW CONTROLS

- **Link Field:** The link can be selected using the numeric keypad or data entry control.
- **Link Preset Name & Number:** The linked preset can be changed from this window using the data entry control or inc/dec keys.
- **Velocity Controls:** These controls set the high and low key range and the crossfade range (in keys) for each linked preset.
- **Graphic Display:** Shows the velocity ranges of each link.

Velocity Range

The Links - Velocity Range window allows you to control the volume of a preset using key velocity. You might want to switch or crossfade between a piano and string preset depending on the keyboard velocity, or switch between several percussion presets. Velocity switching between preset links makes it easy.

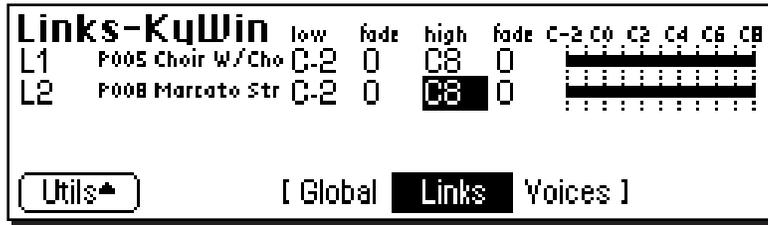
► **To Velocity-Switch Between Presets:**

To switch between two sounds according to velocity, their key ranges must first overlap. Normally you would set the *Key Ranges* so that they completely overlap one another, then set the *Velocity Ranges* so they are adjacent to each other.

For example, set one velocity range to 0-63 and the other to 64-127.

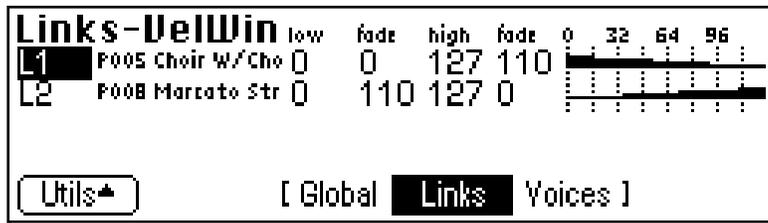
► **To Velocity Crossfade Between Presets:**

To crossfade between two presets, voices or samples according to velocity, their key ranges must overlap. Normally you will set the key ranges to the same range, as in the screen below.



The default velocity range is from 0-127 or full range. Both presets will sound regardless of what velocity is played. Set the velocity range of each sound. The next screen shows the velocity ranges set so that preset link 1 fades out the higher the key velocity, while preset link 2 fades in, the higher the key velocity. At a velocity of 64, the two sounds will be equal volume.

Adjust the fade-in and fade-out points to achieve a natural sounding crossfade. The actual crossfade points will vary depending on the sounds.



PRESET EDIT - Voices

Voice/Group Number	Voice/Sample Name <i>or Multisample</i>		Parameters <i>Volume, Pan, Coarse/Fine Tuning Transpose, Original Key</i>					
			volume	pan	ctune	ftune	xpose	orig
V1	G1	+multisample+	+0	+0	+0	+0	+0	
	S001	Piano E0	+0	+0		+0		E0
	S002	Piano A0	+0	+0		+0		A0
	S003	Piano D1	+0	+0		+0		D1

Utils*	SZone*	[Global	Links	Voices]	Edit
--------	--------	----------	-------	----------	------

New - adds a voice to the preset
Delete - deletes voice or sample zone from the preset
Copy - copies voice to any preset
Split - splits the voice into two

Displays Global Editor Pages

Displays Link Editor Pages

Button is highlighted while this page set is displayed.

New - Adds a new sample zone to the voice.
Get Multisample - Replaces only the multisamples in a voice.
Delete - Deletes a sample zone from the voice.
Combine - Creates one multisample from all the voices.
Expand - Creates individual voices from multisamples.

VOICES - MAIN CONTROLS

- **Voice/Group Number:** The voice can be selected using the numeric keypad, inc/dec keys, or data entry control. The group number can be *changed* in the same manner.
- **Samples:** The samples contained in the voice are displayed and can be edited.
- **Utilities**
- **Sample Zone Utilities**
- **Parameters:** Initial settings for volume, pan, coarse/fine tune, and transpose. The original key (where the actual sample is placed) can also be edited here.

Tip: See Voice Tuning in this chapter for detailed explanations of the Volume, Pan, Tuning and Transpose controls.

Utilities

Voices - Main		volume	pan	ctune	ftune	xpose	orig
V1	G1 *multisample*	+0	+0	+0	+0	+0	
	S0B0 GS Bass E1	+0	+0		+0		E1
	S0B1 GS Bass A1	+0	+0		+0		A1
	S0B2 GS Bass D2	+0	+0		+0		D2

New... Voices Delete... Copy... Split...

■ **Note:** The greyed out button over F2 is a place holder for future expansion.

NEW VOICE

This function creates a new voice.

► To Create a New Voice:

1. Press the **Preset Edit** key. The LED will illuminate and the main preset edit screen will appear.
2. Press the **Voices** soft key (F5) to select the voice edit page of the editor. The Voices soft key will be highlighted.
3. Press the **Utils** function key (F1). Another row of function keys will appear.
4. Press the **New...** function key (F1). A pop up window will inform you that a new voice is being added.

COPY VOICE

This function allows you to copy a voice from any preset to any other preset.

► To Copy a Voice:

1. Press the **Preset Edit** key. The LED will illuminate and the main preset edit screen will appear.
2. Press the **Voices** soft key (F5) to select the voice edit page of the editor. The Voices soft key will be highlighted.
3. Press the **Utils** function key (F1). Another row of function keys will appear.
4. Press the **Copy...** function key (F4). A pop up window will appear. Select the source preset, source voice and the destination preset.



5. Press **OK** to copy the selected voice or **Cancel** to cancel the operation.

DELETE VOICE

This function deletes the selected voice.

►To Delete a Voice:

1. Press the **Preset Edit** key. The LED will illuminate and the main preset edit screen will appear.
2. Press the **Voices** soft key (F5) to select the voice edit page of the editor. The **Voices** soft key will be highlighted.
3. Press the **Utils** function key (F1). Another row of function keys will appear.
4. Select the voice you wish to delete using the cursor keys or by keying in the voice number when the cursor is over the voice number field.
5. Press the **Delete** function key (F3). A pop up window will inquire if you really want to erase the selected voice.
6. Press **OK** to erase the selected voice or **Cancel** to cancel the operation.

■ **Note:** The Delete Voice function does not erase the samples.

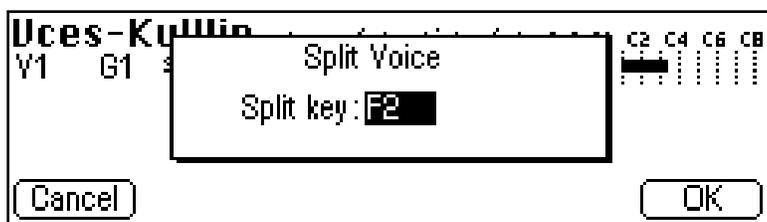
SPLIT VOICE

This function splits the selected voice into two voices. You can split a voice in order to separate and process two ranges of keyboard separately. The edit parameters of the two voices will be identical.

►To Split a Voice:

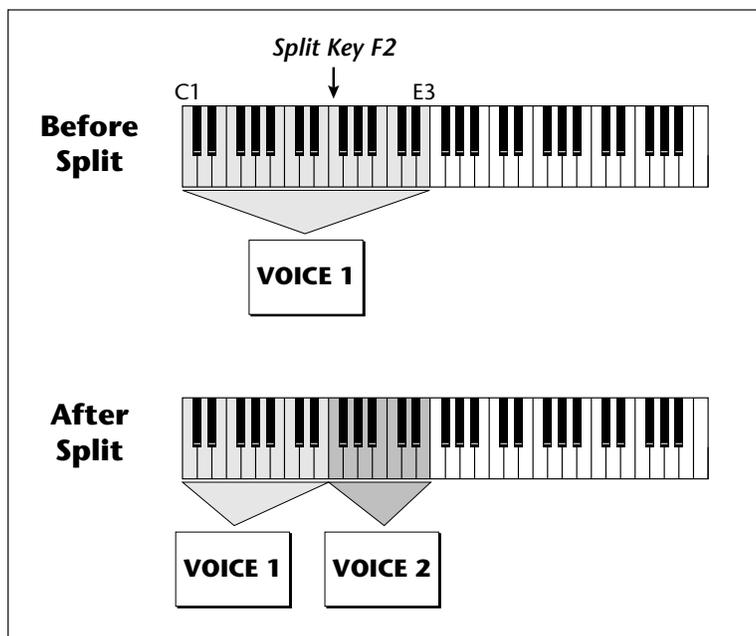
1. Press the **Preset Edit** key. The LED will illuminate and the main preset edit screen will appear.

2. Press the **Voices** soft key (F5) to select the voice edit page of the editor. The Voices soft key will be highlighted.
3. Select the voice you wish to split using the cursor keys or by keying in the voice number when the cursor is over the voice number field.
4. Press the **Utils** function key (F1). Another row of function keys will appear.
5. Press the **Split** function key (F5). A pop up window will appear with an option to set the split key. The voice will be split just below the split key.



6. Press the **Yes** to split the voice or **No** to cancel the operation.

❑ **Note:** When a voice is split, both voices contain the complete set of samples that were in the original voice.



Sample Zone

Preset
Edit

Voces-KyWin	low	fade	high	fade	C-2	C0	C2	C4	C6	CB
5007 Piano C ₂ #3	a#2	0	d#3	0						
5008 Piano G ₂ #3	E3	0	g#3	0						
5009 Piano C ₂ #4	A3	0	D4	0						
5010 Piano F ₂ #4	F4	0	f#4	0						

Buttons: NewSZ, GetMS, Delete..., Copy, Combine, Expand

This submodule contains several utility functions relating to Sample Zones.

■ **Note:** The “greyed out” button over F4 is a place holder for future expansion.

NEW SAMPLE ZONE

This function creates a new sample zone.

► To Create a New Sample Zone:

1. Press the **Preset Edit** key. The LED will illuminate and the main preset edit screen will appear.
2. Press the **Voices** soft key (F5) to select the voice edit page of the editor. The Voices soft key will be highlighted.
3. Select the voice to which the sample zone will be added using the cursor keys or by keying in the voice number when the cursor is over the voice number field. You may also select a sample in the case of a multisample.
4. Press the **SZone** function key (F2). Another row of function keys (shown above) will appear.
5. Press the **NewSZ...** function key (F1). A pop up window will inform you that a new sample zone is being added.

■ **Note:** Certain functions will be “greyed out” if their function is not applicable to the current voice or sample zone selection.

GET MULTISAMPLE

This utility allows you to replace the currently selected samples of a voice with those of any other voice in the bank. **This function does not replace the dynamic processing parameters of the voice. Only the samples are replaced.** This allows you to use existing voices as templates. You can simply drop in new multisamples to voices you have copied and create a new preset.

► **To Replace a Multisample:**

1. Press the **Preset Edit** key. The LED will illuminate and the main preset edit screen will appear.
2. Press the **Voices** soft key (F5) to select the voice edit page of the editor. The Voices soft key will be highlighted.
3. Select the voice you want to receive the new multisample.
4. Press the **SZone** function key (F2). Another row of function keys will appear.
5. Press the **GetMS** function key (F2). The following pop up window will appear.



6. Select the source preset for the multisample. The samples in this voice will replace those in the currently selected voice.
7. Select the source multisample.
8. Press **OK** to replace the multisample or **Cancel** to cancel the operation.

DELETE SAMPLE ZONE

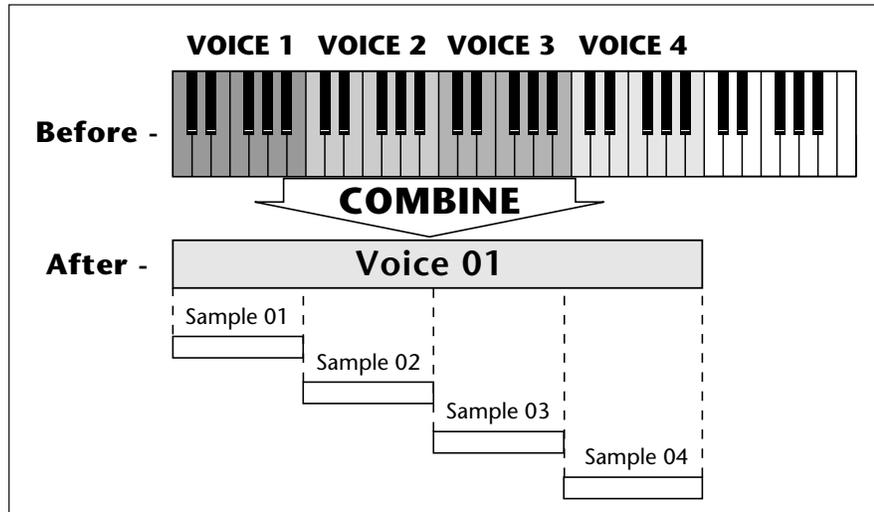
This function delete a sample zone from the voice.

► **To Delete a Sample Zone:**

1. Select the sample you wish to delete from one of the voice edit pages. Delete is disabled when you have a voice and not a sample selected.
2. Press the **SZone** function key (F2). Another row of function keys will appear.
3. Press the **Delete** key (F3). A pop up dialog box will ask you if you really want to delete the selected sample.
4. Press **OK** to delete the sample or **Cancel** to cancel the operation.

COMBINE

This function takes all voices in a group and combines them into one multisampled voice. The dynamic processing information of the first voice is used for the new voice. Any dynamic processing information associated with the other voices is lost.

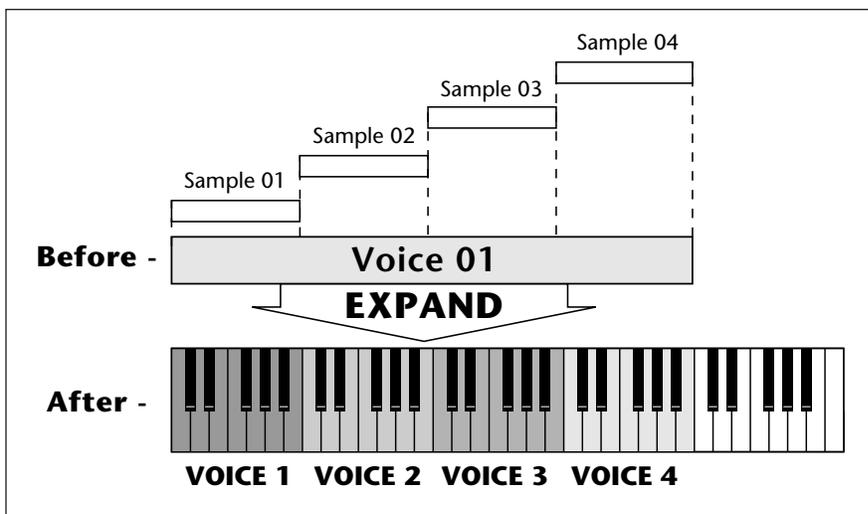


► To Combine Voices:

1. Press the **Preset Edit** key. The LED will illuminate and the main preset edit screen will appear.
2. Press the **Voices** soft key (F5) to select the voice edit page of the editor. The Voices soft key will be highlighted.
3. Press the **SZone** function key (F2). Another row of function keys will appear.
4. Press the **Combine** function key (F5). A pop up window will appear allowing you to select a group of voices to be combined.
5. Select the group containing the voices you want combined. Press **OK** to continue or **Cancel** to cancel the operation.
6. Another pop up window will appear warning you that by combining the voices you are discarding the voice data from all but the first voice. Press **OK** to combine the voices or **Cancel** to cancel the operation.

EXPAND...

This function takes apart the multisampled voices in a bank and makes an individual voice for each sample. The dynamic processing information of the “parent” voice is duplicated for each newly created voice.



► To Expand Multisampled Voices:

1. Press the **Preset Edit** key. The LED will illuminate and the main preset edit screen will appear.
2. Press the **Voices** soft key (F5) to select the voice edit page of the editor. The Voices soft key will be highlighted.
3. Press the **SZone** function key (F2). Another row of function keys will appear.
4. Press the **Expand..** function key (F6). A pop up window will appear allowing you to select a group of voices to be expanded.
5. Select the group containing the voices you want expanded. Press **OK** to expand the voices or **Cancel** to cancel the operation.

Voices - Key Window

		Key Position <i>Low/High Key, Crossfades</i>				Graphic Display					
		low	fade	high	fade	C-2	C0	C2	C4	C6	C8
Voces-KeyWin											
Y1	G1 +multisa	C-2	0	C7	0	[Keyboard Diagram]					
	S068 Flute A, #2	C-2	0	f#0	0	[Keyboard Diagram]					
	S069 Flute D, #3	G0	0	D2	0	[Keyboard Diagram]					
	S070 Flute G, #3	d#2	0	G2	0	[Keyboard Diagram]					
[Utils] [SZone] [Global		Links		Voices		Edit					

Displays Global Editor Pages (pointing to [Global)
Displays Link Editor Pages (pointing to Links)
Button is highlighted while this page set is displayed. (pointing to Voices |)

The Key Window of the Voices screen is accessed by pressing the Next Page key on the front panel from the main Voices screen. The screen shown above will appear.

KEY WINDOW CONTROLS

- **Voice Field:** Link can be selected using the numeric keypad or data entry control.
- **Group Field:** The group number of the voice can be changed using the numeric keypad or data entry control.
- **Sample Name & Number:** The voice's sample(s) can be changed using the data entry control or inc/dec keys.
- **Key Position Controls:** These controls set the high and low key range and the crossfade range in keys for each voice and sample.
- **Graphic Display:** Shows the keyboard positions of each voice and sample.
- **Utilities:** New, Copy, Delete, and Split.
- **Sample Zone:** New Sample Zone, Get Multisample, Delete Sample Zone, Combine and Expand.
- **Edit:** Voice Selection & Dynamic Processing parameters.

KEYBOARD RANGES

When a sample is recorded, it is automatically placed in a voice and assigned a keyboard range specified in the “Auto-Placement” parameters in the Sample Management module. The Key Range Window allows you to edit these assignments and place the voices and samples wherever you want.

❑ **Note:** Remember to SAVE the bank to disk or all your programming will be lost.

		Key Position <i>Low/High Key, Crossfades</i>				Graphic Display					
		low	fade	high	fade	C-2	C0	C2	C4	C6	CB
Uces-KyWin											
V1	G1	S036 Sax	C-2	0	C2	12	[Bar chart showing voice V1 range from C-2 to C2]				
V2	G2	◆multisa	C1	12	G8	0	[Bar chart showing voice V2 range from C1 to G8]				
		S018 Vox C3	C1	0	C3	0	[Bar chart showing sample S018 range from C1 to C3]				
		S019 Vox D...#3	C#3	0	G8	0	[Bar chart showing sample S019 range from C#3 to G8]				
[Utils▲]		[SZone▲]		[Global]	[Links]	[Voices]			[Edit]		

Displays Global Editor Pages

Button is highlighted while this page set is displayed.

Displays Link Editor Pages

A voice containing only one sample takes the name of the sample. If a voice contains more than one sample, it is called a “◆multisample◆” and the samples it contains are listed below it.

⚡ **Tip:** To create a really high quality voice, you might want to sample every third note or even every note.

More samples are usually better, but the playing technique used while sampling becomes critical the more samples are used!

The bars at the right side of the screen give a graphic display of how the voices and samples are assigned to the keyboard. **Voices** are shown as solid black bars, while **Samples** are displayed as hollow bars. Voice keyboard range assignments supersede the assignments of the samples they contain.

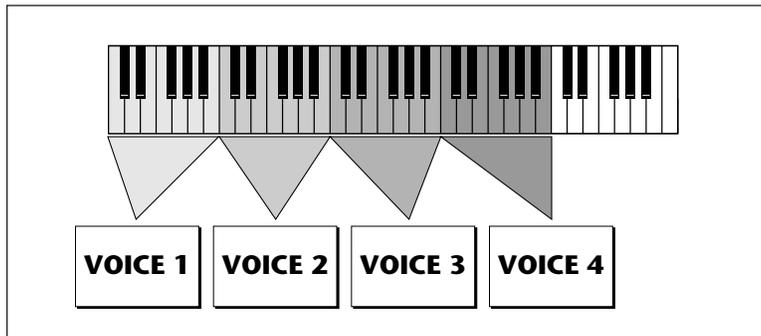
The key position is edited by placing the cursor over the desired parameter and then playing the MIDI keyboard or adjusting the data entry control. Voices and samples can be crossfaded according to key position by adjusting the low and high fade parameters. The fade is adjusted in “number of keys” and is graphically represented by a gradual decrease in the height of the bars.

► **To Switch Voices According to Position**

Assigning voices (samples or multisamples) adjacent to each other is the simplest and most common application of the Key Window. This is also the way samples are “Auto-Placed” in the Sample Manage module. The voices in the screen below are each assigned a one octave range.

Uces-KyWin				low	fade	high	fade	C-2	C0	C2	C4	C6	CB
V1	G4	S016	Vox F	C2	0	B2	0				■		
V2	G4	S017	Vox A	C3	0	B3	0				■		
V3	G1	S017	Vox A	C4	0	B4	0				■		
V4	G1	S023	Vox D	C5	0	B5	0					■	

Another way of visualizing this assignment is shown below.



Tip: Samples can be arranged in a voice in exactly the same way that voices are arranged on the keyboard. They can be arranged side by side on the keyboard to minimize the negative effects of pitch shifting or stacked on top of each other to create huge layered sounds, all within a single voice.

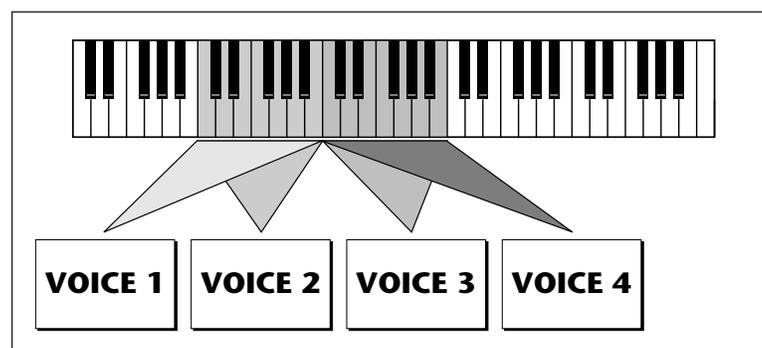
► To Layer Voices and Samples

The ranges of two or more voices may overlap, and all voices assigned to a key will sound.

1. Press the **Preset Edit** key. The LED will illuminate and the main preset edit screen will appear.
2. Press the **Voices** soft key (F5) to select the voice edit pages of the editor. The Voices soft key will be highlighted.
3. Press the **Next Page** key. The Voices - Key Window will appear.
4. Edit the high and low keys of the voice ranges so they overlap as shown in the screen below. Both voices will now sound when their key range is played.

Uces-KyWin				low	fade	high	fade	C-2	C0	C2	C4	C6	CB
V1	G4	S016	Vox F	C2	0	B2	0						
V2	G4	S016	Vox F	C2	0	B2	0						
V3	G1	S017	Vox A	C3	0	C4	0						
V4	G1	S023	Vox D	C3	0	C4	0						

Another way of visualizing this assignment is shown below.



You may wish to assign voices in different layers to different groups. This will allow you to select all the voices in each layer just by selecting the group number. You can edit the group number of a voice in any of the Voice screens.

► **To Positionally Crossfade**

This technique can help mask the point at which two sounds meet. The fade parameters allow the volume of the voice or sample to be faded out as a function of key position. In the screen shown below, voices 1 and 2 are being positionally crossfaded over a range of five notes.

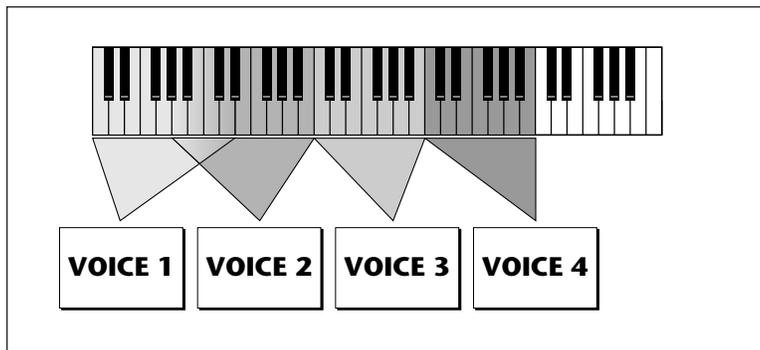
Uces-KeyWin			low	fade	high	fade	C-2	C0	C2	C4	C6	CB
V1	G4	S016 Vox F	C2	0	d#3	5				█		
V2	G4	S017 Vox A	g#2	5	B3	0				█		
V3	G1	S017 Vox A	C4	0	B4	0					█	
V4	G1	S023 Vox D	C5	0	B5	0						█

Utils SZone Global Links **Voices** Edit

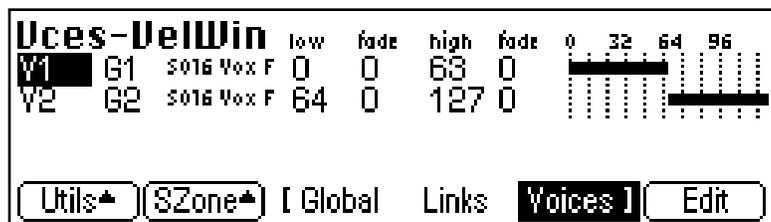
As the voice boundaries are crossed playing up the keyboard, the lower voice gradually fades out as the upper voice fades in.

1. Press the **Preset Edit** key. The LED will illuminate and the main preset edit screen will appear.
2. Press the **Voices** soft key (F5) to select the voice edit pages of the editor. The Voices soft key will be highlighted.
3. Press the **Next Page** key. The Voices - Key Window will appear.
4. Edit the high and low keys of the voice ranges so they overlap as shown in the screen below, then set the low and high fades for the two voices. In the center of the crossfade range, both voices will at equal volume.

▣ **Note:** These same techniques work when assigning samples within multisampled voices.



Voices - Velocity Window



The Velocity Window of the Voices screen is accessed by pressing the **Next Page** key on the front panel from the Voices - Key Window screen. A screen similar to the one shown above will appear. In the screen above, the two voices will be “velocity-switched” at a key velocity of 64. At key velocities below 64, voice 1 will play; at key velocities of 64 and above, voice 2 will play.

VELOCITY WINDOW CONTROLS

- **Voice Field:** The voice can be selected using the numeric keypad or data entry control.
- **Group Field:** The group number of the voice can be changed using the numeric keypad or data entry control.
- **Sample Name & Number:** The voice's sample(s) can be changed from this window using the data entry control or inc/dec keys.
- **Velocity Controls:** These controls set the high and low velocity range and the crossfade range for each voice and sample.
- **Graphic Display:** Shows the velocity ranges of each voice and sample.
- **Utilities:** New, Copy, Delete, and Split.
- **Sample Zone:** New Sample Zone, Get Multisample, Delete Sample Zone, Combine and Expand.
- **Edit:** Voice Selection & Dynamic Processing parameters.

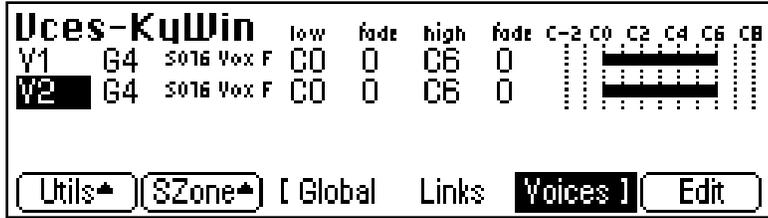
Velocity Range

The Velocity Range screen allows you to control the volume of a voice by the key velocity. Using this function, you can crossfade or cross-switch between voices by key velocity. Suppose you had several samples (voices) of the same piano note, one played soft, the next played medium hard, and the third played hard. Using this function, you could set the velocity at which each of the voices would sound, thus recreating the response of the actual instrument.

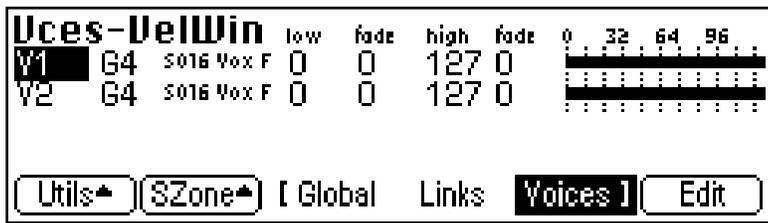
► To Velocity Switch Voices:

1. Press the **Preset Edit** key. The LED will illuminate and the main preset edit screen will appear.
2. Press the **Voices** soft key (F5) to select the voice edit page of the editor. The Voices soft key will be highlighted.
3. Press the **Next Page** key. The Voices - Key Window will appear.
4. Edit the high and low **Key Range** of the voices so they overlap as shown in the screen below. In order to velocity switch voices, they must first be assigned to the same keyboard range.

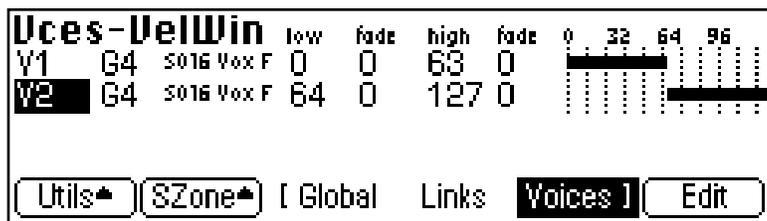
Note: Remember to *SAVE* the bank to disk or export the preset or all your programming will be lost.



5. Press the **Next Page** key. The Voices - Velocity Window will appear. The default velocity range is from 0-127 or full range. Both voices will sound regardless of what velocity is played.

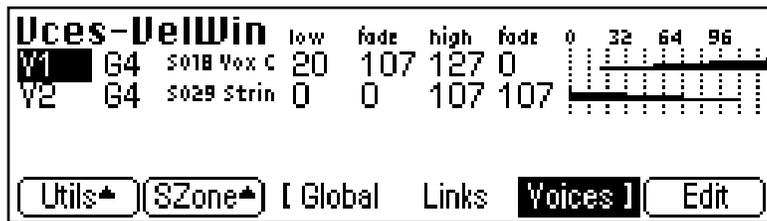


- Set the velocity range of each voice so that voice one sounds in the velocity range of 0-63, while voice two sounds in the velocity range of 64-127.



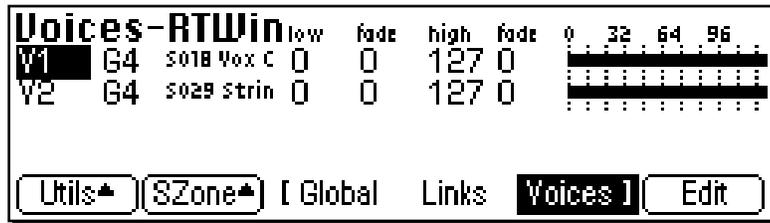
► **To Velocity Crossfade Voices:**

- Press the **Preset Edit** key. The LED will illuminate and the main preset edit screen will appear.
- Press the **Voices** soft key (F5) to select the voice edit page of the editor. The Voices soft key will be highlighted.
- Press the **Next Page** key. The Voices - Key Window will appear.
- Edit the high and low **Key Range** of the voices so they completely overlap each other. In order to velocity crossfade voices, they must first be assigned to the same keyboard range.
- Press the **Next Page** key. The Voices - Velocity Window will appear.
- The default velocity range is from 0-127 or full range. Set the velocity fades so that voice one fades out the higher the key velocity, while voice 2 fades in, the higher the key velocity. At a velocity of 64, the two sounds will be equal volume. Adjust the fade-in and fade-out points to achieve a natural sounding crossfade. The actual crossfades points will vary depending on the sounds.



Voices - Realtime Window

Preset
Edit



The Realtime Window allows you to control the volume of any number of voices using a realtime controller such as a modulation wheel, a pedal or an LFO or Envelope Generator. It works in a manner very similar to the velocity window except that a realtime controller is used to control the crossfade instead of velocity.

The Realtime Window of the Voices screen is accessed by pressing the **Next Page** key on the front panel three times from the Main Voices screen.

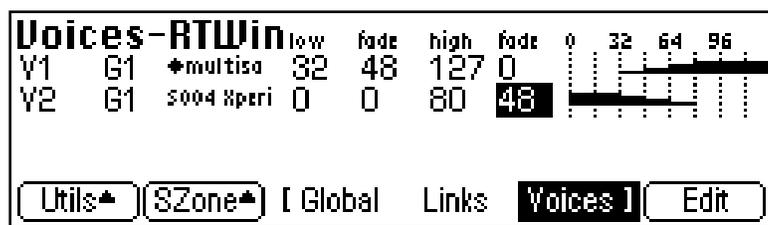
REALTIME WINDOW CONTROLS

- **Voice Field:** The voice can be selected using the numeric keypad or data entry control.
- **Group Field:** The group number of the voice can be changed using the numeric keypad or data entry control.
- **Sample Name & Number:** The voice's sample(s) can be changed from this window using the data entry control or inc/dec keys.
- **Realtime Crossfade Controls:** These controls set the high and low controller value range and the crossfade range for each voice and sample.
- **Graphic Display:** Shows the realtime control ranges of each voice and sample.
- **Utilities:** New, Copy, Delete, and Split.
- **Sample Zone:** New Sample Zone, Get Multisample, Combine and Expand.
- **Edit:** Voice Selection & Dynamic Processing parameters.

★ Caution:
Realtime Crossfading is one of the more "advanced" applications of the machine. Make sure you understand how to select voices and assign cords before attempting to perform realtime crossfades.

► **To Realtime Crossfade Voices:**

1. Press the **Preset Edit** key. The LED will illuminate and the main preset edit screen will appear.
2. Press the **Voices** soft key (F5) to select the voice edit page of the editor. The Voices soft key will be highlighted.
3. Press the **Next Page** key. The Voices - Key Window will appear.
4. Edit the high and low **Key Range** of the voices so they completely overlap each other. In order to velocity crossfade voices, they must first be assigned to the same keyboard range.
5. Press the **Next Page** key twice. The Voices - Realtime Window will appear.
6. Set the realtime range of each voice. The next screen shows the realtime ranges set so that voice one will begin fading in after the realtime controller reaches a value of 32. Voice two will begin fading out when the realtime control reaches 32 and fades completely out by a value of 80.

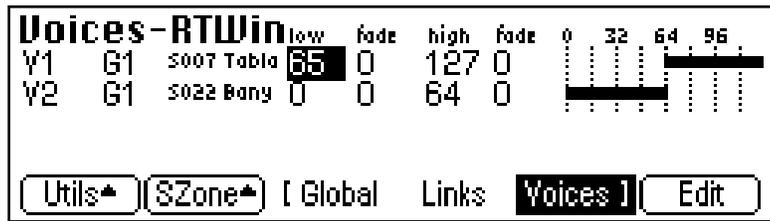


7. So far so good, but this is a Realtime Range. We have to assign a realtime *Controller* to control the crossfade. Press **EDIT** to enter the Dynamic Processing level.
8. Press the **Utils** function key (F1) and then the **VSelect** function key (F2) to bring up the voice selection screen. Select all voices you wish to realtime crossfade. Press **OK**.
9. Press the **Cords** function key (F5). The patchcord assign screen will appear.
10. Assign one of the realtime control sources such as the mod wheel or an LFO to **AmpXfd**. Turn up the Amount parameter to 100%. You should be able to hear the crossfade. Adjust the crossfade ranges and the **AmpXfd** amount until the crossfade responds correctly.

► **To Randomly Cross-Switch Between Voices:**

In certain situations, such as setting up drum kits, you may want to randomly switch between several voices. **Crossfade Random** is a modulation source specifically designed to handle this situation. Unlike the other random sources, Crossfade Random generates one random number for all voices that are assigned to the same key.

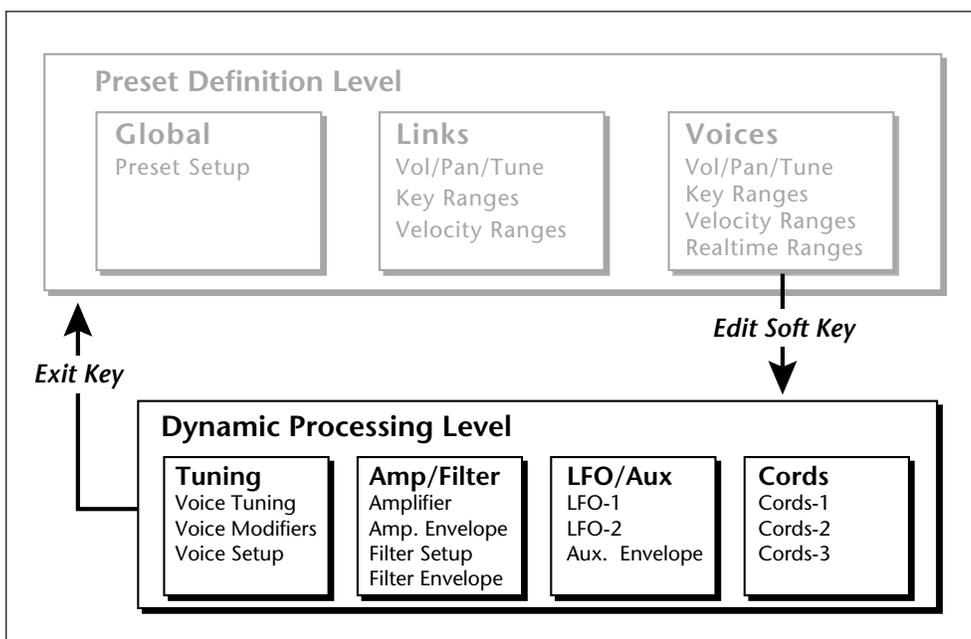
1. Press the **Preset Edit** key. The LED will illuminate and the main preset edit screen will appear.
2. Press the **Voices** soft key (F5) to select the voice edit page of the editor. The Voices soft key will be highlighted.
3. Press the **Next Page** key. The Voices - Key Window will appear.
4. Edit the high and low **Key Range** of the voices so they completely overlap each other. In order to randomly crossfade voices, they must first be assigned to the same keyboard range.
5. Press the **Next Page** key twice. The Voices - Realtime Window will appear.
6. Set the realtime range of each voice. The next screen shows the realtime ranges set so that voice 1 will sound whenever the random value is from 0 to 64. Voice 2 will sound whenever the random value is greater than 64.



7. Now you have to assign a realtime *Controller* to control the cross-switch. Press **EDIT** to enter the Dynamic Processing level.
8. Press the **Utils** function key (F1) and then the **VSelect** function key (F1) to bring up the voice selection screen. Select all voices you wish to realtime crossfade. Press **OK**.
9. Press the **Cords** function key (F5). The patchcord assign screen will appear.
10. Assign **XfdRnd** to **AmpXfd**. Turn up the Amount to 100%.

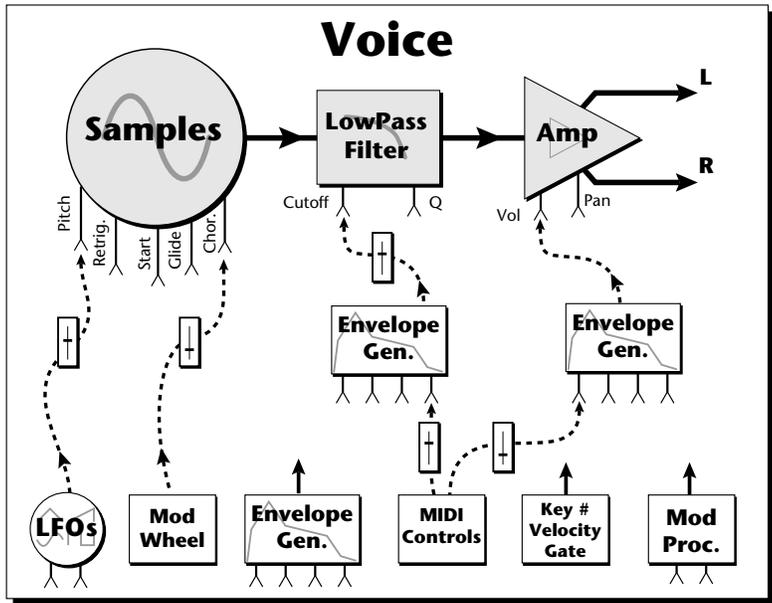
PRESET EDIT

Dynamic Processing Level



The **Dynamic Processing** level contains the traditional synthesizer controls such as envelope shaping of amplitude and filters as well as modulation parameters. Multiple voices can be selected in this level, unlike in Preset Definition where only one voice can be selected or edited at a time.

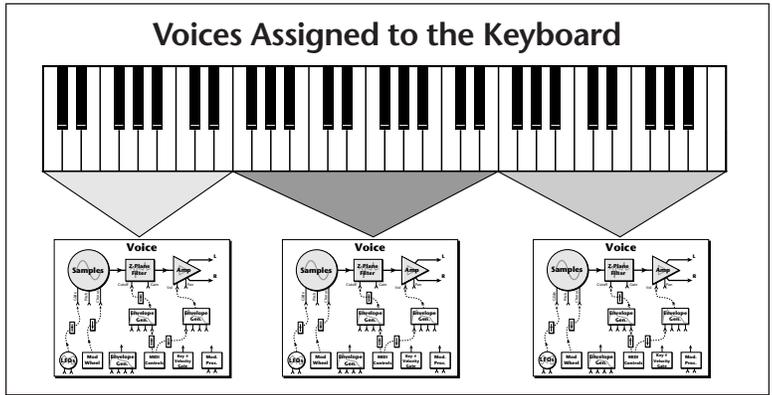
The dynamic processing parameters are accessed by pressing the **Edit** soft key while in one of the Voice screens (or directly via an assignable key). Multiple voice selection is supported in any of the dynamic processing editing screens using a MIDI keyboard.

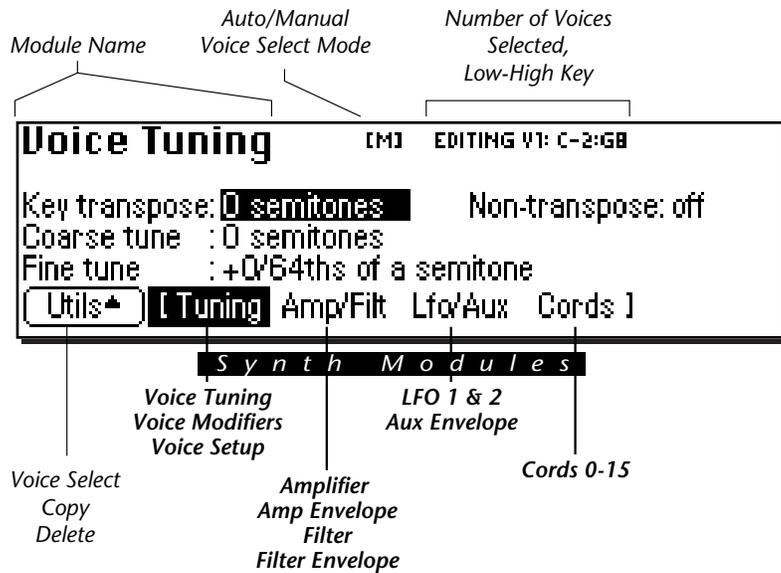


The signal path of the E-IV is actually very simple. You have one or more samples, a dynamically controlled filter, and a dynamically controlled amplifier with a panning network. Modulation parameters operate simultaneously on all samples contained in a voice.

Each voice can have its own complete set of synthesizer parameters and modulation routings, or you can select a range of keyboard and edit any parameters you wish for that range. The E-IV voice system is very flexible because you can work with multisampled voices or single sample voices.

Note: When several samples are simultaneously sounding, each one goes through its own filter and amplifier, even though the voice modulation parameters are the same.





The screen shown above is part of the Dynamic Processing level of the Preset Editor. The page name is shown in the upper left hand corner. The small [M] indicates that voice selection is in Manual Mode. A small diamond ♦ appears next to the Auto/Manual indicator if the range you selected on the keyboard does not correspond with the actual boundaries of the selected voices.

The number of selected voices and the low and high key of the voice range is indicated by the top right line of the display. The lower left soft key enables the Utilities menu. There are also four toggling soft keys which select the synthesizer modules.

Tip: The last selected screen in each of the four submodules is remembered by the E-IV.

- **Tuning:** Contains parameters which control the samples such as Transpose, Tuning, Nontranspose, Chorus, Delay, Start Offset, Glide, and Assign mode.
- **Amp/Filter:** Controls the Dynamic Filter and Amplifier including their dedicated six-part envelopes.
- **LFO/Aux:** Controls two low frequency oscillators and an auxiliary six-part envelope.
- **Cords:** Contains the 16 assignable patchcords which connect everything together.

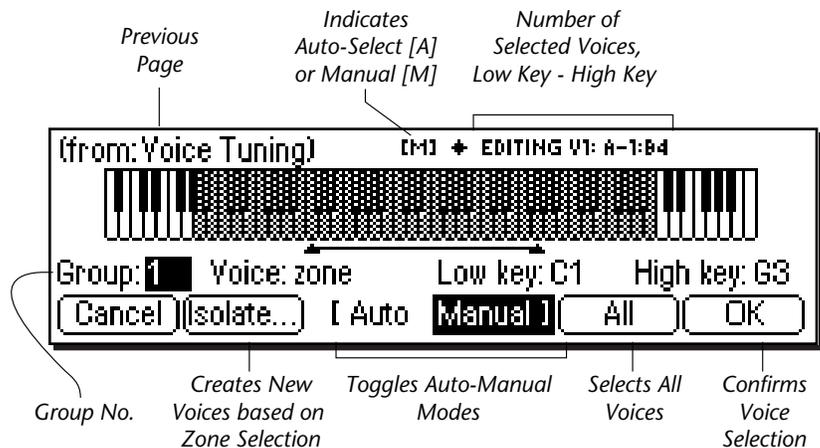
Utilities



The **Utilities** function in the Dynamic Processing level of the Preset Edit module contains the voice selection functions as well as utilities that allow you to perform operations on multiple voices at a time.

Pressing the Utils function key (F1) from the Dynamic Processing level enables a second row of soft keys.

- **Voice Select:** Invokes a graphic keyboard display with controls which provide you various ways of selecting voices.
- **Copy Voice(s):** Allows you to copy a group of selected voices to another preset.
- **Delete Voice(s):** Allows you to delete a group of selected voices from the preset.
- **Manual/Auto:** Toggles between Automatic and Manual voice selection modes (without having to go into the Voice Selection screen).
- **Set:** This function allows you to isolate a range of the keyboard and create a new voice from just that range.



VOICE SELECT

You might want to process one voice, one group, several voices, or the entire keyboard. This important function allows you to select which voice or voices will be processed by the dynamic processing parameters. If there is only one group in the preset, the group selection field will be faded out, indicating that it cannot be selected. Set a specific group number (rather than “all”) to select voices from a specific group.

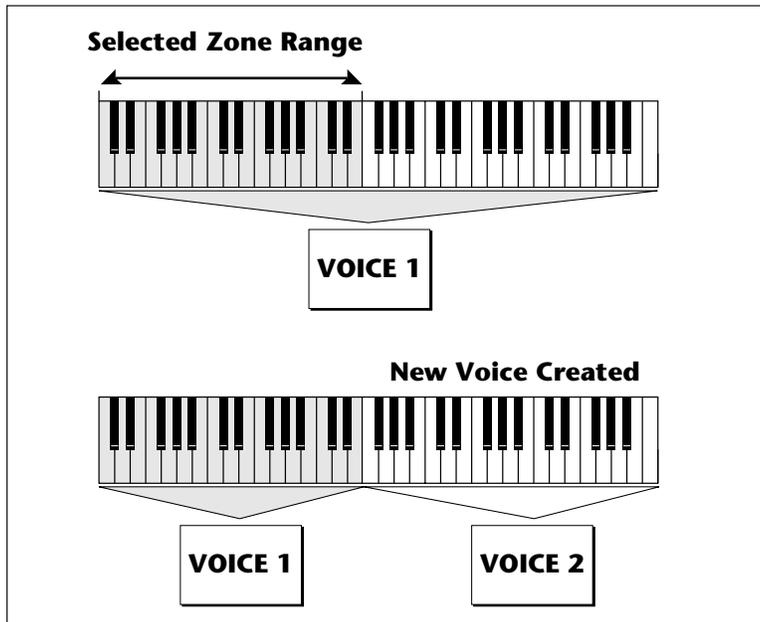
Soft Keys

- **Cancel:** Cancels the new voice selection.
- **Isolate:** Automatically creates new voices based on new zone selection.
- **Auto/Manual:** Toggles between Auto/Manual voice select modes. *See Automatic Voice Selection.*
- **All:** Selects all voices in the preset.
- **OK:** Confirms the new voice selection.

The Voice field contains several selections

- **All:** Selects all voices in the group.
- **Zone:** This type of selection allows you to select any arbitrary range by selecting low and high keys on the keyboard. The zone range can also be selected by moving the cursor to the low and high key fields and selecting low and high keys with the data entry control. Zone will be automatically selected if you play two different keys on the keyboard.

Pressing the **Isolate** soft key creates a new voice based on the zone selection. Pressing OK after defining a new zone, you will be asked if you wish to “Create new voices based on selection range?”. If you selected a subset of the current voice range, the voice will be split if you answer Yes. If you extend the range of the current voice, the range will be extended by answering Yes. Answering No simply selects the voices without changing them.



 **Tip:** *This is where having your voices grouped really comes in handy. Simply select the desired group and you're done!*

- **Includes:** If you play a single note the keyboard twice, the voice field will change to “includes”, and the graphic display will indicate the entire range of the voice or voices in which that key is included. The number of voices selected is shown in the upper right corner of the display.
- **Number:** allows you to pick out single voices using the inc/dec keys or the data entry control.

► **To Select a Voice:**

1. Press the **Preset Edit** key. The LED will illuminate and the main preset edit screen will appear.
2. Press the **Voices** soft key (F5) to select the voice edit page of the editor. The Voices soft key will be highlighted.
3. Press the **Edit** function key (F6). The most recently selected Preset Edit screen will appear.
4. Press the **Utils** function key (F1). Another row of function keys will appear.
5. Press the **VSelect** function key (F1). The Voice Select screen will appear.
6. Select the group containing the voices you wish to process. If there is only one group, the group field will be faded out, indicating that it cannot be selected. If the voices you want are not grouped, go on to the next step.
7. Select the voices you wish to process by playing a note on the keyboard or by selecting the voice number for the “Voice” field.
 - Playing a single note on the keyboard changes the voice selector field to “includes” and the voice range you have selected will be darkened on the keyboard display. The upper right corner of the display shows the number of voices you have selected.
 - Playing two different notes on the keyboard changes the voice selector field to “zone”. The voice range you have selected will be shown by the range bar below the display. If you press OK a pop up window will ask you if you want to create a new voice from the selected range. Choosing Yes creates a new voice. Choosing No simply selects the included voices.
8. Press **OK** to confirm the selected voice(s) or **Cancel** to cancel the operation.

► **The Isolate Key:**

Use this key when you want to make a new voice from a section of another voice in order to separately process it.

1. In the voice selection screen, set the Voice parameter to zone.
2. Move the cursor and set the low and high keys of the new voice range using the data entry control, inc/dec keys or the keyboard.
3. Press the **Isolate** soft key (F2). A new voice will instantly be created.
4. Select the new voice and process it.

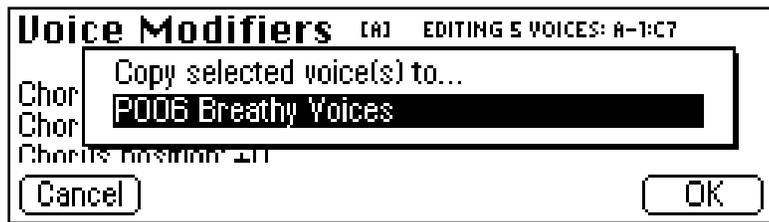
COPY VOICE(S)

In the Preset Definition level, only one voice could be selected and copied at a time. In this layer, the Dynamic Processing level, multiple voices can be selected. This copy function is different in that it allows multiple voices to be copied and pasted.

► **To Copy Multiple Voices:**

1. Press the **Preset Edit** key. The LED will illuminate and the main preset edit screen will appear.
2. Press the **Voices** soft key (F5) to select the voice edit pages of the editor. The Voices soft key will be highlighted.
3. Press the **Edit** soft key (F6) to select the dynamic processing level of the editor.
4. Press the **Utils** soft key (F1) and then **VSelect** (F1).
5. Select the voices you wish to copy, then press **OK**.
6. Press the **Utils** soft key (F1)
7. Press the **Copy...** soft key (F3).

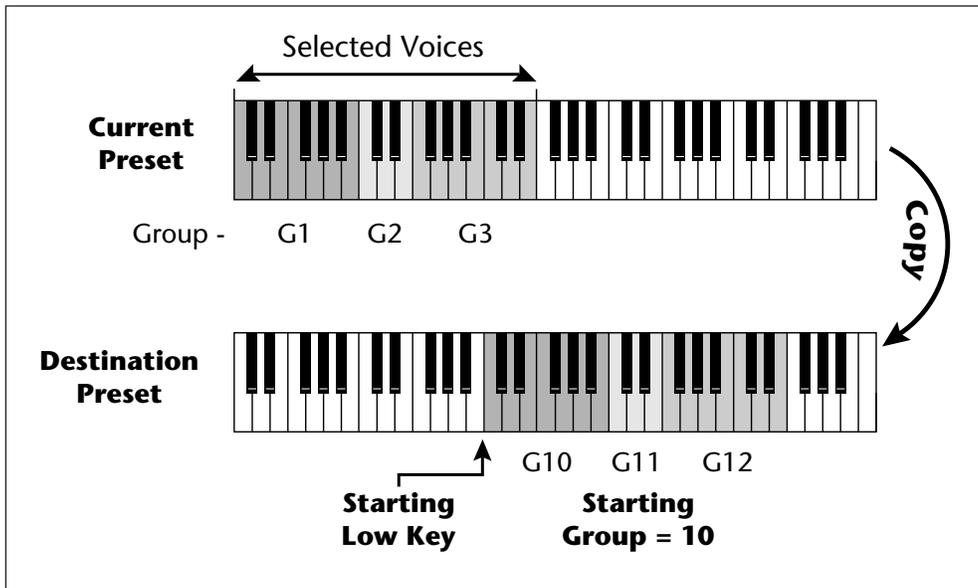
■ **Note:** For more information about Groups, see Background: Groups, at the beginning of this section.



8. Select the destination preset using the data entry control, the inc/dec keys, or the numeric keypad. Press OK when you have selected the destination preset or **Cancel** to cancel the operation. The following screen will appear.



9. Enter the starting key where the copied voices will be placed using the data entry control, the inc/dec keys or your MIDI keyboard. You also have the option to offset the group number of the copied voices. This feature can be used to keep the copied voices separate from voices already in the preset. Press **OK** to copy the voices or **Cancel** to cancel the operation.
10. If you copied the voice(s) to an empty preset, you will be asked to name the new preset.



Copied voices can be placed in the destination preset starting at any key number and starting at any group number.

DELETE VOICE(S)

Multiple voices can be deleted at a time using this function. The samples contained within the voices are not deleted.

► To Delete Multiple Voices:

1. Press the **Preset Edit** key. The LED will illuminate and the main preset edit screen will appear.
2. Press the **Voices** soft key (F5) to select the voice edit page of the editor. The Voices soft key will be highlighted.
3. Press the **Edit** soft key (F6) to select the dynamic processing level of the editor.
4. Press the **Utils** soft key (F1) and then **VSelect** (F1).
5. Select the voices you wish to delete, then press **OK**.
6. Press the **Utils** soft key (F1). A pop up window will appear asking you if you really do want to erase the selected voices.
7. Press **OK** to delete the selected voices or **Cancel** to cancel the operation.

AUTOMATIC VOICE SELECTION

Voices within the currently selected group (or All) may also be selected directly from any voice edit screen without having to go back to the voice select screen.

► To Select a Voice using the Auto Select feature:

1. Press the **Auto** soft key (F5) from the voice selection screen. (If “Manual” appears in the F5 position, Auto Voice Select is already enabled.)
 2. Select a group number (if desired) from the voice selection screen. Auto Select will only select voices from the group you choose (group number or all). Press **OK** to exit voice selection.
 3. Voices will now be selected by playing the keyboard in any voice edit screen (Tuning, Amp/Filt, LFO/Aux, Cords).
- **Selecting a single note will select all voices assigned to that key.**
 - **Selecting a keyboard range by pressing two notes at once will select all voices within that range.**

WARNING

Be careful when selecting a range of voices using Auto Select! When you play the keyboard to hear the results of your edit, you are changing the voice selection range. Be sure to re-key the voice selection range before resuming your editing.

SET

This button performs the same function as the Isolate key in the Voice Selection screen. If the selected key range does not exactly match the voice ranges, you will be asked if you want to isolate new voices from the existing range. Pressing Yes creates a new voice or voices based on your selected range. Pressing No simply selects the included voices.

Voice Tuning, Modifiers & Setup



The voice contains several tuning and setup parameters.

- Key Transpose
- Coarse Tuning
- Fine Tuning
- Non-Transpose Mode
- Chorus
- Delay
- Start Offset
- Glide
- Solo Modes
- Assignment Group

Tip: Transpose, coarse tune, and fine tune can also be edited at the preset definition level in the Voices-Main screen.

KEY TRANSPOSE

This function allows you to transpose the key of the selected voice(s) in semitone intervals by shifting the keyboard position relative to middle C. The transpose range is -24 to +24 semitones. You will normally use the transpose function to tune a voice to its keyboard location, or simply to transpose the voice.

► To Transpose a Voice:

1. From the Dynamic Processing level of the Preset Editor, select the voice(s) you wish to transpose using the voice selection screen, then press the **Tuning** soft key (F2).

2. Use the Previous and Next **Page** keys to locate the Voice Tuning screen shown on the previous page.
3. Select Key transpose, using the cursor keys.
4. Change the transpose parameter to the desired amount using the data entry control or the inc/dec keys.
5. Press the **Exit** key to return to the Preset Definition level of the Preset Editor or press any of the dynamic processing soft keys to move to another module.

COARSE TUNING

This function allows you to change the tuning of the voice in semitone intervals. The coarse tuning range is -72 to +24 semitones. Unlike the transpose function, coarse tuning stretches the pitch of the individual samples assigned to a key and may change the timbre of a voice.

 **Tip:** Use Transpose when you want the voice's timbre to remain constant.

Use Coarse Tuning when you want to change the timbre of the voice.

 **Tip:** Use the Coarse Tuning control to change the tuning of multiple drum voices.

► To Coarse Tune a Voice:

1. From the Dynamic Processing level of the Preset Editor, select the voice(s) you wish to coarse tune using the voice selection screen, then press the **Tuning** soft key (F2).
2. Use the Previous and Next **Page** keys to locate the Voice Tuning screen.
3. Select Coarse tune, using the cursor keys.
4. Change the coarse tuning parameter to the desired amount using the data entry control or the inc/dec keys.
5. Press the **Exit** key to return to the Preset Definition level of the Preset Editor or press any of the dynamic processing soft keys to move to another module.

FINE TUNING

This function allows you to change the tuning of the voice in 1/64 semitone intervals (approx. 1.56 cents). The fine tuning range is ± 1 semitone. Fine tuning can be used to slightly detune a voice, creating a “fatter” sound when it is combined with another voice.

►To Fine Tune a Voice:

1. From the Dynamic Processing level of the Preset Editor, select the voice(s) you wish to fine tune using the voice selection screen, then press the **Tuning** soft key (F2).
2. Use the Previous and Next **Page** keys to locate the Voice Tuning screen.
3. Select Fine tuning, using the cursor keys.
4. Change the fine tuning parameter to the desired amount using the data entry control or the inc/dec keys.
5. Press the **Exit** key to return to the Preset Definition level of the Preset Editor or press any of the dynamic processing soft keys to move to another module.

NON-TRANSCOPE MODE

This function turns keyboard transposition On or Off for the voice. With Nontranspose On, the keyboard will not control the pitch of the voice. This is a useful function for drones or “chiffs”, which you may not want to track the keyboard.

►To Set a Voice to Non-Transpose:

1. From the Dynamic Processing level of the Preset Editor, select the voice(s) you wish to put in non-transpose mode using the voice selection screen, then press the **Tuning** soft key (F2).
2. Use the Previous and Next **Page** keys to locate the Voice Tuning screen.
3. Select nontranspose, using the cursor keys.
4. Turn non-transpose On or Off using the data entry control or the inc/dec keys.
5. Press the **Exit** key to return to the Preset Definition level of the Preset Editor or press any of the dynamic processing soft keys to move to another module.

⚡ **Tip #1** To avoid L/R pitch drift, use “~” type of modulation in the cords menu.

⚡ **Tip #2** Set chorus amount to 1% and use chorus width as a pan control which does not span the entire L/R spread.

⚡ **Tip #3** Set the chorus width to 0% and adjust the ITD to create a through-zero flange effect. With 100% width a panning chorus effect is obtained.

⚡ **Tip #4** Modulate the ITD to create “Hass Panning” effects.

⚡ **Tip #5** For a detuned oscillator sound, set stereo width to 100%. Route a free running LFO (~) to chorus position with the amount set to about 25%.

CHORUS AMOUNT

Chorus “thickens” the sound by doubling the sound in stereo and then detuning it.

Amount: is the amount of detuning and is variable from Off to 100%.

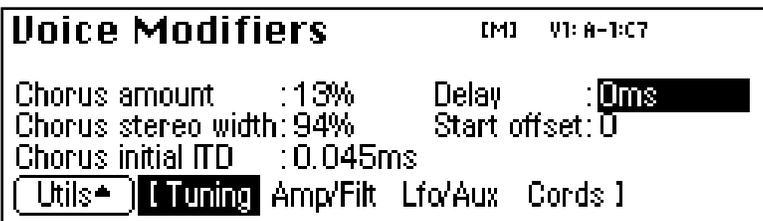
Stereo Width: controls the stereo spread. 0% reduces the chorus to mono and 100% gives the most stereo separation.

Inter-Aural Time Delay (ITD): adjusts the delay of the left and right sounds. Positive values start the right channel early and the left late.

Chorus amount and ITD can be modulated in the Cords screen, although ITD can only be changed at the time of the key depression. When Chorus is on, a mono voice will use twice as many channels.

► To Chorus a Voice:

1. From the Dynamic Processing level of the Preset Editor, select the voice(s) you wish to chorus using the voice selection screen, then press the **Tuning** soft key (F2).



2. Use the Previous and Next Page keys to locate the Voice Modifiers screen shown above.
3. Select Chorus Amount using the cursor keys. Adjust using the data entry control or inc/dec keys.
4. Select the Chorus Stereo Width using the cursor keys. Adjust using the data entry control or inc/dec keys.
5. Select the Inter-Aural Time Delay using the cursor keys. Adjust using the data entry control or inc/dec keys.
6. Press the **Exit** key to return to the Preset Definition level of the Preset Editor or press any of the dynamic processing soft keys to move to another module.

DELAY

Delay varies the time between the arrival of a MIDI Note-On message and the onset of a note. The delay time is adjustable from 0 to 10,000 milliseconds (0-10 seconds). Delay can be used to create echo effects or to thicken the sound when using layered voices.

►To Delay a Voice:

1. From the Dynamic Processing level of the Preset Editor, select the voice(s) you wish to delay using the voice selection screen, then press the **Tuning** soft key (F2).
2. Use the Previous and Next **Page** keys to locate the Voice Modifiers screen.
3. Select delay using the cursor keys.
4. Set the delay time using the data entry control or the inc/dec keys.
5. Press the **Exit** key to return to the Preset Definition level of the Preset Editor or press any of the dynamic processing soft keys to move to another module.

START OFFSET

This function allows you to set where the voice's sample begins playing when you hit a key. A setting of 0 plays a sample from the beginning, higher values move the sample start point toward the end of the sound.

►To Offset the Samples in a Voice:

1. From the Dynamic Processing level of the Preset Editor, select the voice(s) you wish to process using the voice selection screen, then press the **Tuning** soft key (F2).
2. Use the Previous and Next **Page** keys to locate the Voice Modifiers screen.
3. Select start offset using the cursor keys.
4. Adjust the start offset using the data entry control or the inc/dec keys.
5. Press the **Exit** key to return to the Preset Definition level of the Preset Editor or press any of the dynamic processing soft keys to move to another module.

GLIDE RATE

Glide is a smooth gliding between notes instead of the normal instantaneous change in pitch when a new key is pressed. The glide rate determines the time it takes to glide to the new pitch. The larger the value, the slower the glide rate. The rate is adjustable from 0 to 32.738 seconds. Zero seconds equals Off. A glide curve setting of 0 equals linear. Higher values make the curve more exponential. Glide is polyphonic, but can be monophonic when in Solo mode.

► To Change the Glide Rate of a Voice:

1. From the Dynamic Processing level of the Preset Editor, select the voice(s) you wish to glide using the voice selection screen, then press the **Tuning** soft key (F2).
2. Use the Previous and Next **Page** keys to locate the Voice Setup screen shown below.



3. Select glide rate using the cursor keys.
4. Select the rate of glide using the data entry control or the inc/dec keys.
5. Select the glide curve using the cursor keys.
6. Select curve number using the data entry control or the inc/dec keys.
7. Press the **Exit** key to return to the Preset Definition level of the Preset Editor or press any of the dynamic processing soft keys to move to another module.

SOLO MODES

Solo mode provides the playing action of a monophonic instrument. It can make wind and string instruments sound more realistic by preventing more than one note from sounding at once. There are eight different solo modes provided which can be used with monophonic synthesizer sounds or to create other performance effects.

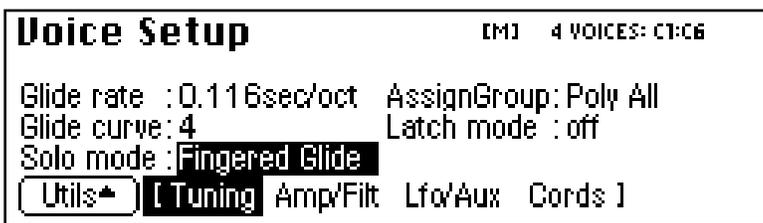
- **Multiple Trigger:** Last note priority. No key-up action. Retrigger envelopes and samples when a key is pressed.
- **Melody (last):** Last note priority. No key-up action.
 - First solo note:* Envelopes start at Attack segment from zero. Samples start at the beginning.
 - If previous note is releasing:* Envelopes start at Attack segment, but from current level. Samples start at the beginning.
 - When playing “Legato”:* Envelopes continue from current segment and level. Samples start at the loop or the beginning if unlooped.
- **Melody (low):** Same as Melody (last), but with low-note priority. Newly played keys which are higher than the lowest solo key held will not sound.
- **Melody (high):** Same as Melody (last), but with high-note priority. Newly played keys which are lower than the highest solo key held will not sound.
- **Synth (last):** Similar to Melody (last), but has key-up action. When the currently sounding solo key is released when other keys are still held, the highest held solo key will sound in a Legato fashion (envelopes not retriggered).
- **Synth (low):** Same as Synth (last), but with low note priority. When the currently sounding solo key is released when other keys are still held, the lowest held solo key will sound in a Legato fashion. (MiniMoog)
- **Synth (high):** Same as Synth (last), but with high-note priority. When the currently sounding solo key is released when other keys are still held, the highest held solo key will sound in a Legato fashion.
- **Fingered Glide:** Same as Synth (last), except that Glide is disabled when playing Staccato, enabled when playing Legato.

 **Tip #1:** Use Melody (high) for chord melody playing where you have a pad layered with a solo sound. Play block chords and have the melody in the outer voice.

 **Tip#2:** A Melody (low) voice overlaid with a Melody (high) voice works well for a “duet”.

► **To Put a Voice into Solo Mode:**

1. From the Dynamic Processing level of the Preset Editor, select the voice(s) you wish to place in solo mode using the voice selection screen, then press **Tuning** (F2).
2. Use the Previous and Next **Page** keys to locate the Voice Setup screen.
3. Select solo mode using the cursor keys.



4. Select one of the solo modes using the data entry control or the inc/dec keys.
5. Press the **Exit** key to return to the Preset Definition level of the Preset Editor or press any of the dynamic processing soft keys to move to another module.

LATCH MODE

When Latch mode is On, pressing a key once will latch the key on. Pressing the key again will unlatch the key. This mode was originally designed for doing sound effects work, but you can probably find many other uses for it, such as latching sampled grooves. Any voices assigned to the same key as a latched voice will also latch.

► **To Put a Voice into Latch Mode**

1. From the Dynamic Processing level of the Preset Editor, select the voice(s) you wish to place in solo mode using the voice selection screen, then press the **Tuning** soft key (F2).
2. Use the Previous and Next **Page** keys to locate the Voice Setup screen.
3. Select latch mode using the cursor keys.
4. Press the **Exit** key to return to the Preset Definition level of the Preset Editor or press any of the dynamic processing soft keys to move to another module.

ASSIGN GROUP

This function allows you to assign a certain number of output channels to each voice. By assigning all voices in the preset to assign groups, important parts can be protected from being “stolen” by more recently played keys. Or, a voice such as an open high hat can be assigned to a mono channel so it *will* be cancelled by a closed high hat. Voices will rotate within their assigned bin of channels not interfering with other bins. Poly All is the default mode.

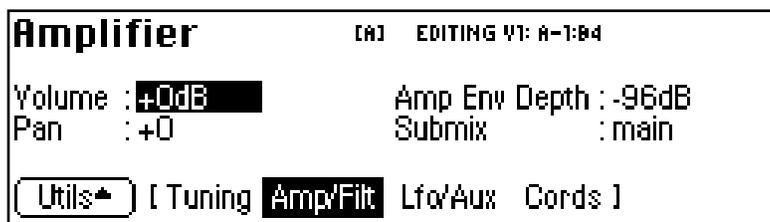
The modes are as follows.

- **Poly All:** Notes are played polyphonically with dynamic channel assignment, using all 128 channels.
- **Poly 16 A-B:** Two bins of 16 channels each. Notes are played polyphonically with dynamic channel assignment, but using no more than 16 channels.
- **Poly 8 A-D:** Four bins of 8 channels each. Notes are played polyphonically with dynamic channel assignment, but using no more than 8 channels.
- **Poly 4 A-D:** Four bins of 4 channels each. Notes are played polyphonically with dynamic channel assignment, but using no more than 4 channels.
- **Mono A-I:** Nine monophonic channels. Any voices assigned to the same letter interrupt each other, but does not affect other voices.

►To Assign Voices to a Group:

1. From the Dynamic Processing level of the Preset Editor, select the voice(s) you wish to group using the voice selection screen, then press the **Tuning** soft key (F2).
2. Use the Previous and Next **Page** keys to locate the Voice Setup screen.
3. Select assign group using the cursor keys.
4. Select the type of assign group using the data entry control or the inc/dec keys.
5. Press the **Exit** key to return to the Preset Definition level of the Preset Editor or press any of the dynamic processing soft keys to move to another module.

Amplifier/Filter



AMPLIFIER PARAMETERS

These parameters set the overall volume and pan settings, as well as the output channels for the selected voice(s).

- **Volume:** Sets the initial volume of the voice. Variable from -96 dB (off) to +10 dB. The default setting is 0 dB which allows a bit of headroom so that other modulators can be added in without clipping. Use this volume control to balance the voice output against others. If you hear clipping, reduce volume setting.
- **Pan:** Sets the initial stereo pan position of the voice. Subsequent modulation is added to or subtracted from this value.
- **Amp Envelope Depth:** Sets the maximum amount of attenuation from the amplifier envelope generator. Variable from -96 dB to -48 dB. With longer attack times, reducing the envelope depth (towards -48 dB) has the perceived effect of providing a more natural volume envelope.
- **Submix:** Allows you to route the selected voice(s) to a pair of output channels.

Note: The submix outputs on the E-IV incorporate an automatic “plug-sensing” scheme which ignores submix routings if plugs are not inserted into the appropriate submix output jacks.

► **To Set the Amplifier Parameters:**

1. From the Dynamic Processing level of the Preset Editor, select the voice(s) you wish to process using the voice selection screen, then press the **Amp/Filt** soft key (F3).
2. Use the Previous and Next **Page** keys to locate the Amplifier screen.
3. Adjust the amplifier parameters as desired.
4. Press the **Exit** key to return to the Preset Definition level of the Preset Editor or press any of the dynamic processing soft keys to move to another module.

AMPLIFIER ENVELOPE

The amplifier envelope generator is permanently connected to control the dynamic amplifier although it can also be patched to control any other modulation destination.

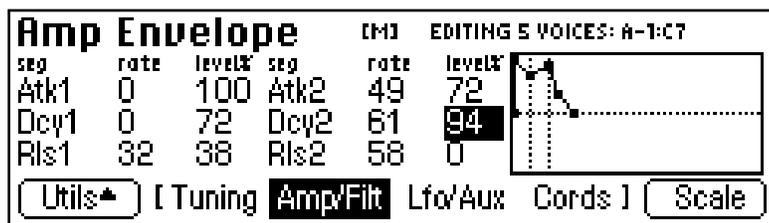
- The way the volume of a sound changes over time determines how we perceive that sound. A bell struck with a hammer is instantly at full volume, then slowly dies away. A bowed violin sound fades in more slowly and dies away slowly. Using the amplifier envelope, you can simulate different types of instrument volume envelopes.

Tip: The envelope rates can be modulated by any controller in the Cords page.

Attack Rates, Decay Rates, Release Rates or All Rates can be modulated.

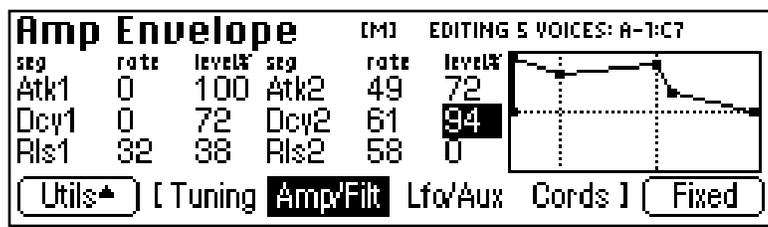
► **To Set the Amplifier Envelope:**

1. From the Dynamic Processing level of the Preset Editor, select the voice(s) you wish to process using the voice selection screen, then press the **Amp/Filt** soft key (F3).



2. Use the Previous and Next **Page** keys to locate the Amp Envelope screen.

Tip: For more information on the Amplifier Envelope see Background: Programming Basics at the beginning of this section.



3. Press the **Scale** function key. The graphic display of the filter envelope changes from a “fixed-rate” display to a “time-scaled” display.
4. Select and adjust the amplifier envelope parameters. Use the cursor keys to move the cursor around to the various parameters and the data entry control or inc/dec keys to change the time and level of each stage.
 - Unlike the filter envelope generator, the amplifier envelope does not allow you to set negative levels.
5. Press the **Exit** key to return to the Preset Definition level of the Preset Editor or press any of the dynamic processing soft keys to move to another module.

FILTER PARAMETERS

A low pass filter allows only the low frequencies to pass and can be used to simulate many natural sounds since it is common in the physical world for the high frequencies to die away first as the sound decays. Set the frequency of a lowpass filter at maximum if you do not want any filtering action. The various filter types are described at the beginning of this chapter.

- **Filter Type:** 17 filter types are currently implemented. Standard lowpass, bandpass, and highpass filters are included as well as swept parametrics, phasers, flangers and vocal formant filters.
- **Frequency (Morph):** Sets the initial frequency of the filter. In the case of a Morphing filter, this parameter sets the initial position between the two filters.
- **Resonance (Q, Gain, Resonance, Body Size):** High values of Q amplify frequencies near the cutoff or center frequency.

In a swept EQ, gain controls the amount of boost or cut. In a phaser or flanger, the resonance determines the depth of the effect. In the vocal filters, body size determines the apparent size of the mouth cavity. Gain is a “Note-on parameter, meaning that it is set at note-on time and cannot be continuously varied during the note.

►FILTER TYPES

2-Pole Lowpass

Lowpass filter with 12dB/octave rolloff and Q control.

4-Pole Lowpass

Lowpass filter with 24dB/octave rolloff and Q control.

6-Pole Lowpass

Lowpass filter with 36 dB/octave rolloff and Q control.

2nd Order Highpass

Highpass filter with 12 dB/octave rolloff and Q control.

4th Order Highpass

Highpass filter with 24 dB/octave rolloff and Q control.

2nd Order Bandpass

Bandpass filter with 6 dB/octave rolloff on either side of the passband and Q control.

4th Order Bandpass

Bandpass filter with 12 dB/octave rolloff on either side of the passband and Q control.

Contrary Bandpass

A novel bandpass filter where the poles and zeros cross midway in the frequency range.

Swept EQ, 1-octave

Parametric filter with 24 dB of boost or cut and a one octave bandwidth.

Swept EQ, 2->1-octave

Parametric filter with 24 dB of boost or cut. The bandwidth of the filter is two octaves wide at the low end of the audio spectrum, gradually changing to one octave wide at the upper end of the spectrum.

Swept EQ, 3->1-octave

Parametric filter with 24 dB of boost or cut. The bandwidth of the filter is three octaves wide at the low end of the audio spectrum, gradually changing to one octave wide at the upper end of the spectrum.

Phaser 1

Recreates a comb filter effect typical of phase shifters. Frequency moves position of notches. Resonance varies the depth of the notches.

Phaser 2

Comb filter with slightly different notch spacing than Phaser 1. Frequency moves position of notches. Resonance varies the depth of the notches.

Bat Phaser

Phase shift filter with peaks as well as notches.

Flanger Lite

Contains three notches. Frequency moves frequency and spacing of notches. Resonance increases flanging depth.

Vocal Ah-Ay-Ee

Vowel formant filter which sweeps from "Ah" sound, through "Ay" sound to "Ee" sound at maximum morph. Body size varies the apparent size of mouth cavity.

Vocal Oo-Ah

Vowel formant filter which sweeps from "Oo" sound, through "Oh" sound to "Ah" sound at maximum morph. Body size varies the apparent size of mouth cavity.

► To Set the Filter Parameters:

1. From the Dynamic Processing level of the Preset Editor, select the voice(s) you wish to process using the voice selection screen, then press the **Amp/Filt** soft key (F3).
2. Use the Previous and Next **Page** keys to locate the Filter screen.
3. Adjust the filter parameters as desired. The filter envelope, the filter envelope amount (adjusted in the Cords screen), and the initial filter parameters all interact.
4. Press the **Exit** key to return to the Preset Definition level of the Preset Editor or press any of the dynamic processing soft keys to move to another module.

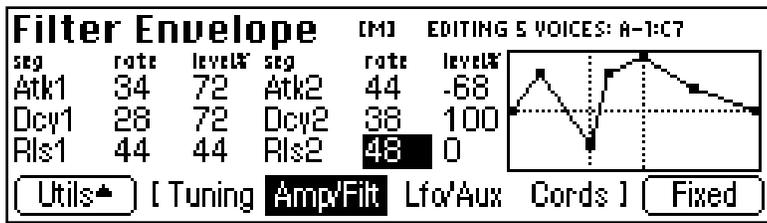
FILTER ENVELOPE

The Filter Envelope is usually assigned to control the filter cutoff parameter although it can be patched to any modulation destination.

► To Set the Filter Envelope:

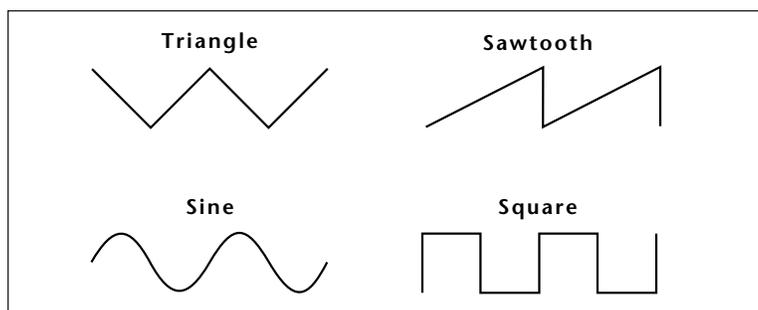
1. From the Dynamic Processing level of the Preset Editor, select the voice(s) you wish to process using the voice selection screen, then press the **Amp/Filt** soft key (F3).
2. Use the Previous and Next **Page** keys to locate the Filter Envelope screen.
3. Press the **Scale** function key. The graphic display of the filter envelope changes from a “fixed-rate” display to a “time-scaled” display. Use the display view that works best for the envelope you are using.

Tip: For more information on the Filter Envelope see Background: Programming Basics at the beginning of this section.



4. Select and adjust the filter envelope parameters. Use the cursor keys to move the cursor around to the various parameters and the data entry control or inc/dec keys to change the time and level of each stage.
- The filter envelope allows you to set negative levels. When patched to the filter cutoff frequency, this useful feature allows the envelope to lower the cutoff frequency below the initial setting.
5. Press the **Exit** key to return to the Preset Definition level of the Preset Editor or press any of the dynamic processing soft keys to move to another module.

LFO/Auxiliary Envelope



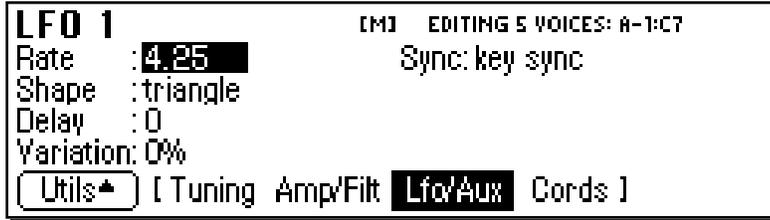
Tip: You must connect the LFO to a destination in the Cords screen in order for it to have any effect.

- **Delay:** Sets the amount of time between playing a key and the onset of modulation. This can be used to simulate an effect often used by acoustic instrument players, where the vibrato is brought in only after the initial note pitch has been established. The delay range is adjustable from 0 seconds to 20 seconds.
- **Variation:** Sets the amount of random variation on an LFO each time a key is pressed. This function is useful for ensemble effects, where each note played has a slightly different modulation rate. The higher the number, the greater the note to note variation in the LFOs.
- **Sync:** Key Sync or Free Running. With key sync selected the LFO wave starts at the beginning of its cycle at each key depression. In free run mode, the LFO wave begins at a random point in its cycle on each key depression.

► To Program an LFO:

1. From the Dynamic Processing level of the Preset Editor, select the voice(s) you wish to process using the voice selection screen, then press the **Lfo/Aux** soft key (F4).
2. Use the Previous and Next **Page** keys to locate the LFO 1 or LFO 2 screen.
3. Adjust the LFO parameters as desired.

4. Press the **Exit** key to return to the Preset Definition level of the Preset Editor or press any of the dynamic processing soft keys to move to another module.

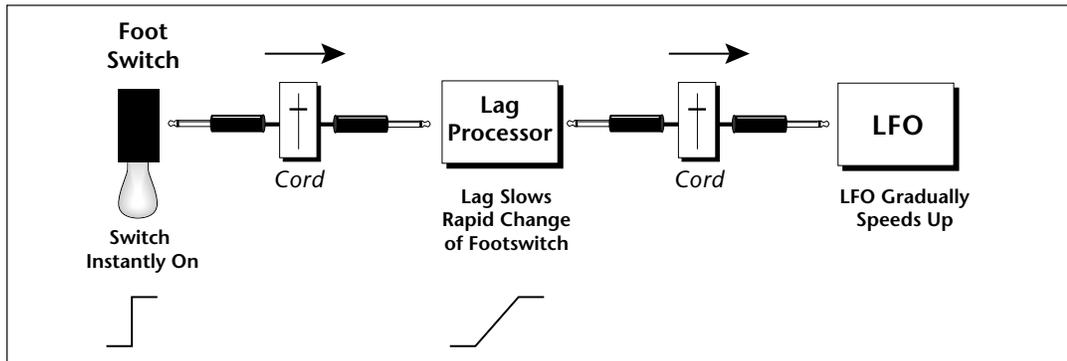


LAG PROCESSORS

The LFO 2 screen contains the two lag processors used in the modulation Cords screens. Lag processors can be inserted in a modulation patch to inhibit rapid changes in the modulation source or cause it to lag behind the input. The amount of lag is adjustable from 0 to 10. A setting of 0 will cause the least amount of lag. 10 is the slowest lag. The diagram below illustrates one way that a lag processor might be used.

► To Program the Lag Processors:

1. From the Dynamic Processing level of the Preset Editor, select the voice(s) you wish to modify using the voice selection screen, then press the **Lfo/Aux** soft key (F4).
2. Use the Previous and Next **Page** keys to locate the LFO 2 screen.
3. Use the cursor keys to select the lag processors.



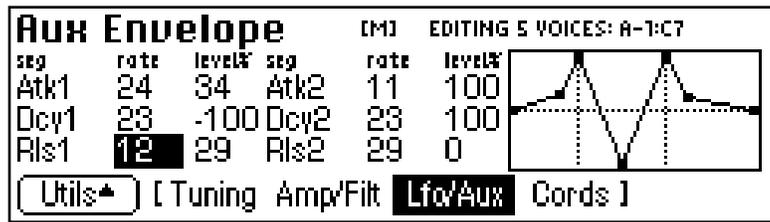
4. Adjust the lag time of processor 1 or 2.
5. Insert the lag processor after a modulation source in the Cords screen.
6. Press the **Exit** key to return to the Preset Definition level of the Preset Editor or press any of the dynamic processing soft keys to move to another module.

AUXILIARY ENVELOPE

The auxiliary envelope is a general purpose envelope generator that can be patched to any modulation destination.

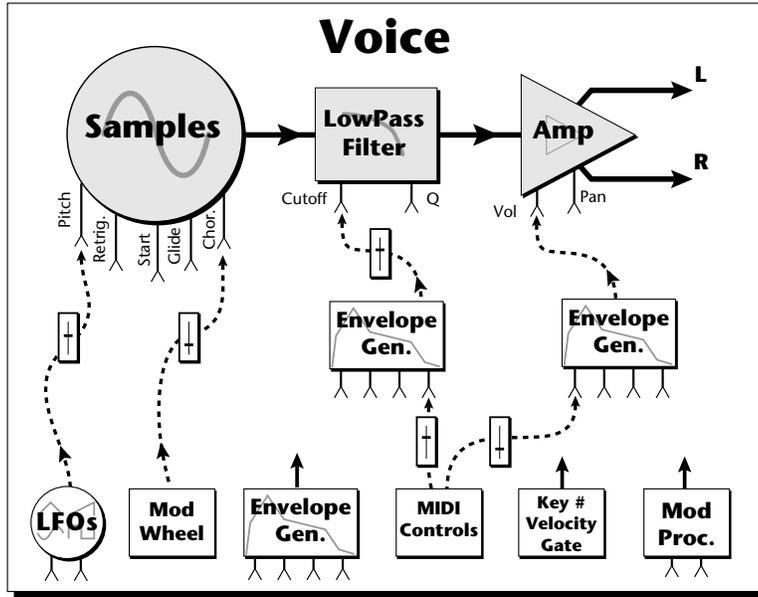
► To Set the Auxiliary Envelope:

1. From the Dynamic Processing level of the Preset Editor, select the voice(s) you wish to modify using the voice selection screen, then press the **Lfo/Aux** soft key (F4).
2. Use the Previous and Next **Page** keys to locate the Aux Envelope screen.
3. Select and adjust the auxiliary envelope parameters. Use the cursor keys to move the cursor around to the various parameters and the data entry control or inc/dec keys to change the time and level of each stage.



- Like the filter envelope generator, the auxiliary envelope allows you to set negative levels. This can be very useful to create attack “blips” when controlling the pitch of a voice.
4. Press the **Exit** key to return to the Preset Definition level of the Preset Editor or press any of the dynamic processing soft keys to move to another module.

Cords



Cords 00 to 05			[M] EDITING 5 VOICES: A-1-C7		
#	source	dest amount	#	source	dest amount
00:	Yek:	FilterFreq +28%	03:	ModWl	CO2Amt +13%
01:	PitWl	Pitch +8%	04:	Yek:	FilterFreq +38%
02:	Lfo1 ~	Pitch +0%	05:	FEnv+	FilterFreq +0%

Utils [Tuning Amp/Filt Lfo/Aux **Cords**] Zoom

+	0 ... 127
~	-64 ... +63
<	-127 ... 0

Several of the modulation sources use the designators shown at left to indicate their polarity. "+" modulation adds to the current value. "~" is useful when you want the modulation to center around zero. (As when controlling Filter Fc.) "<" would be useful for controlling volume, as it only subtracts from the initial value.

Modulation Sources

- Off
- Crossfade Random
- Key (+, ~), Velocity (+, ~, <)
- Release Velocity, Gate
- Pitch Wheel, Mod Wheel
- Pressure, Pedal
- MIDI A-H, Foot Switch 1 & 2
- Flip-Flop Foot Switch 1 & 2
- MIDI Volume (Contr. 7)
- MIDI Pan (Contr. 10)
- Key Glide
- Volume Envelope (+, ~, <)
- Filter Envelope (+, ~, <)
- Aux. Envelope (+, ~, <)
- LFO 1 & 2 (+, ~)
- White Noise, Pink Noise
- kRandom 1 & 2,
- Lag 1 in (summing amp out)
- Lag 2 in (summing amp out)
- Lag Processor 0 & 1
- DC Offset, Summing Amp
- Switch, Absolute Value
- Diode, Flip-Flop, Quantizer
- Gain 4x

Modulation Destinations

- Off
- Key Sustain, Fine Pitch, Pitch
- Glide, Chorus Amt
- Chorus Position ITD
- Sample Start, Sample Loop
- Sample Retrigger
- Filter Freq., Filter Resonance
- Amplifier Volume, Amp Pan
- Amplifier Crossfade
- Volume Envelope Rates (all)
- Vol. Env. Atk, Dcy, Release
- Filter Envelope Rates (all)
- Filt. Env. Atk, Dcy, Release
- Aux. Envelope Rates (all)
- Aux. Env. Atk, Dcy, Release
- LFO 1 & 2 Rates
- Lag Processor In 0 & 1
- Summing Amp, Switch
- Absolute Value
- Diode, Flip-Flop, Quantizer
- Gain 4x
- Cord 0-15 Amount

Tip: Realtime events happen first on lower numbered cords, so it is usually a good idea to put important functions on lower numbered cords and to place components of complex modulations patches in the proper order in the Cords screens. This also makes it easier to visualize your patch.

CORDS

The 16 “patchcords” allow you to route modulation sources to destinations and control the amount of modulation. The cords connect everything together in the voice. There are only two permanently connected cords: amp envelope to amplifier, and key to pitch. Any other connections must be connected with a cord. There are currently 56 modulation sources and 53 destinations for the patchcords. Some of the modulation sources, such as the lag processors and the diode, are control processors. They modify control signals. All these devices can be combined to create almost infinite patching possibilities.

► To Connect a Patch Cord:

1. From the Dynamic Processing level of the Preset Editor, select the voice(s) you wish to process using the voice selection screen, then press the **Lfo/Aux** soft key (F4).
2. Use the Previous and Next **Page** keys to locate one of the three Cords screens.

Cords 00 to 05			[M]	EDITING 5 VOICES: A-1-C7		
* source	dest	amount	* source	dest	amount	
00: Yek:	AmpVol	+28%	03: ModWl	CO2Annt	+13%	
01: PitWl	Pitch	+6%	04: Yek:	FilFreq	+36%	
02: Lfo1~	Pitch	+0%	05: FEnv+	FilFreq	+0%	

Utils* [Tuning Amp/Filt Lfo/Aux **Cords**] Zoom

3. Connect the modulation sources to destinations and set an amount. The possible sources and destinations are listed at left. Keep in mind that modulation amounts interact with the initial settings.
4. Press the **NEXT** page key to move on to the second page and third pages of modulation cords. There are a total of 16 cords.
5. The **Zoom** soft key immediately jumps you to the screen related to the currently selected patchcord destination.
6. Press the **Exit** key to return to the Preset Definition level of the Preset Editor or press any of the dynamic processing soft keys to move to another module.

SAMPLE RETRIGGER

This modulation destination allows you to retrigger a sample using a modulation source. A **negative going zero-crossing** triggers the sample from the sample start.

LFOs (~) and envelopes are obvious choices for trigger sources. By adjusting the envelope rates, you can time the onset of each sample retrigger. A continuous controller such as a mod wheel will retrigger the sample when it goes to zero. White and pink noise cause random retriggering. By adjusting the Amp Envelope to create an artificial decay, Sample Retrigger can be used to create echo effects.

► To Retrigger the Sample:

1. From the Dynamic Processing level of the Preset Editor, select the voice(s) you wish to process using the voice selection screen, then press the **Cords** soft key (F5).
2. Select a free patchcord and connect any negative going modulation source (such as an LFO ~) to SRetrig.

Tip: Use negative cord amounts with an LFO to create a more realistic echo effect.

Cords 06 to 11			[M] 4 VOICES: C1:C6				
#	source	dest	amount	#	source	dest	amount
06:	Lfo1~	SRetrig	-1%	09:	Off	Off	+0%
07:	Off	Off	+0%	10:	Off	Off	+0%
08:	Off	Off	+0%	11:	Off	Off	+0%

3. Set the Cord Amount to any value other than 0.
4. Press the LFO/Aux function key and use the page keys to locate the LFO 1 screen.
5. Adjust the LFO rate to the desired frequency. When a key is pressed, you should hear the sample retriggering.
6. Press the **Exit** key to return to the Preset Definition level of the Preset Editor or press any of the dynamic processing soft keys to move to another module.

**Preset
Edit**

Appendix

8

SCSI	8-3
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Memory Upgrade	8-12
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SCSI

SCSI (pronounced skuzzy) stands for Small Computer System Interface. SCSI is an industry standard hardware and software specification that allows high-speed data transfers between different pieces of equipment. SCSI devices can include hard disks, tape drives, optical disks and other types of digital equipment.

Why Use SCSI?

- **SCSI is fast!** SCSI is a parallel interface which transmits eight bits of information at a time at high speed over the SCSI cable. MIDI, in comparison, is a serial interface which can only send one bit of information at a time over its line.
- **Compatibility:** Since SCSI is an industry standard, equipment from many different manufacturers can be linked to work together.
- **Expandability:** Up to eight SCSI devices can be linked together (the E-IV counts as one SCSI device on the chain).

The SCSI Bus

You may have noticed that the rear panel of most external storage devices have two SCSI connectors. This is because SCSI devices are connected together in a chain arrangement. The wires that connect the different pieces of equipment are called the SCSI bus.

ID Numbers

Each device on the SCSI bus has its own ID number so that it can distinguish its data from data meant for another device. If data is being saved to a device with ID-2 for instance, all the other devices on the SCSI bus will ignore that

data. If two devices have the same ID number, the system **will not work**. Each device must have its own unique ID number.

The SCSI ID number of a Macintosh computer is fixed at ID-7 and cannot be changed. The SCSI ID numbers of most other devices can be changed.

Many SCSI devices have hardware defined ID numbers, which means that they have a switch on the front or the back of the unit which allows the ID number to be easily identified and changed.

The following is a list of the default SCSI ID numbers:

ID - 7 (fixed)	Macintosh
ID - 6	E-IV (this number can be changed)
ID - 5	Unassigned
ID - 4	Unassigned
ID - 3	Unassigned
ID - 2	Unassigned
ID - 1	Internal E-IV HD (if installed)
ID - 0	Internal Macintosh HD (if installed)

Types of SCSI Cables

There are two basic types of SCSI cables in use: DB25 and 50-pin Centronics. The two types of cable can be identified by their connectors, which are quite different. When buying SCSI extension cables, it is important to choose ones with the right type of connectors, since the two types will not interconnect without a special adapter. The type of SCSI connectors on the Macintosh are DB25 connectors. These are the type commonly found on the back of personal computers. The SCSI connectors on the E-IV SCSI ports are the 50-pin Centronics type. Use only high quality shielded cables that have all the pins connected. Many cables only have some of the pins wired.

Terminating SCSI Cables

The total length of the SCSI chain should not exceed 15 feet. A general rule for SCSI cables is: **The Shorter the Better!**

Terminating resistors or terminators are special resistor packs that are installed on the **first and last device in the SCSI chain**. Terminators are used to reduce line echoes or standing waves on the SCSI bus. An analogy in an audio system would be impedance matching.

Terminators can either be hidden inside a SCSI device or they can take the form of termination blocks which can simply be plugged into the SCSI port.

Terminators apply power to an array of resistors to ensure a full 5 volt swing between high and low levels on the SCSI line. The host system is required to provide Termination Power. Termination power has its own wire in the SCSI cable and supplies power to the termination block. On external hard disk drives, SCSI terminator power is almost always turned Off and the drives are left un-terminated.

The E-IV is shipped with termination power On and termination resistors On. This assumes that the E-IV will be placed at one end of the SCSI chain. **The E-IV has an automatic system which ONLY supplies terminator power when it is NOT being supplied by another device.** Therefore, you do not need to worry about terminator power when connecting the E-IV. The termination resistors in the E-IV can be turned On or Off under software control. This function is located under **Miscellaneous** in the **Master** menu. If you have an E-IV connected in the middle of a SCSI chain, you would want to turn SCSI termination Off. Normally, the E-IV will be at one end of the chain and will have termination On.

The more devices you have connected to SCSI and the longer your cables are, the more it becomes important to have the cables properly terminated.

 **Caution:** Turn all devices OFF whenever you change the SCSI cable. Serious damage to the E-IV may result from connecting and disconnecting SCSI cables with power applied.

SCSI Problems

In diagnosing SCSI problems the first rule is: Don't panic, experiment! If you have several SCSI devices hooked up, first check the SCSI ID numbers, then try disconnecting one of the devices and maybe change the order of the units on the line. There are quite a number of different SCSI drives on the market each with slightly different electrical characteristics. The following checklist may help you find the solution to your unique SCSI setup.

- 1. Make sure the drive is mounted.** Mount the drives using the Mount Drive utility (Disk, Utilities).
- 2. Check the SCSI ID numbers.** No two numbers on the bus can be the same.
- 3. Read the documentation again.** Learn all you can about your peripheral devices. The answer to your problem may be right in front of you.
- 4. Play with the order in which devices are powered up.** Normally the "Big Bang" method works best (turn everything on at once), but another order may work better in your unique system. Experiment!
- 5. Always suspect the cable when something doesn't work on the SCSI bus.** Remember: The shorter the cables are, the better.
- 6. Simplify the situation.** Disconnect one or more drives until you get the system to work.
- 7. Are the ends of the SCSI bus terminated?**
- 8. If all else fails, call us.** We're here if you need us.
(408) 438-1921 Telephone support hours are 9:00 to 5:00 PST, Monday through Friday.

Sample Transfers Via SMDI

The E-IV can now be connected to the SCSI along with another E-IV, an e-64, an EIII, or a personal computer. Multiple "Master" devices on the SCSI bus is not normally allowed by the standard SCSI protocol but is possible because of E-IV's advanced SCSI and SMDI (or SCSI Musical Data Interchange) implementation. Sample data can now be exchanged over the SCSI bus in a way similar to the MIDI Sample Dump Standard, except MUCH faster.

The computer should normally be positioned at one end of the chain and the E-IV at the other. The SCSI chain is properly terminated at each end by the computer and the E-IV. Devices in the middle of the chain should not have termination resistors installed.

- **PC Compatibles** - The E-IV has been tested with IBM PC compatible computers using the Adaptec model 1542C SCSI option card. Sound files can be transferred between a PC computer and the E-IV using Sound Forge™, Recycle™ or other sample editing software.

- **Macintosh** - Sound files can be transferred between a Macintosh computer and the E-IV using Recycle™, Alchemy™ or other digital sample editing software. The E-IV is able to access approved Macintosh internal CD-ROM drives with CD-ROMs containing E-IV compatible files. Similarly, a Macintosh can access an internal E-IV Syquest drive with a cartridge that has been formatted for the Macintosh.

- The E-IV is strictly a "Slave Device" when using SMDI, meaning that it CANNOT initiate SMDI transfers. This should not normally present a problem, since a computer based editor will always have a facility for initiating SMDI transfers.

 **Caution:** A sample transferred into the E-IV is automatically placed across the entire keyboard, overwriting the current preset's sample placement. Create a new empty preset before downloading via SMDI to avoid trashing the current preset.

 **Tip:** You can check the "Memory Statistics" screen when downloading samples via SMDI to keep track of how much RAM you have left.

 **Caution:** When using Alchemy, you must add one to the sample number you want transferred.

 **Caution:** You cannot transfer to or from sample 000 (the clipboard).

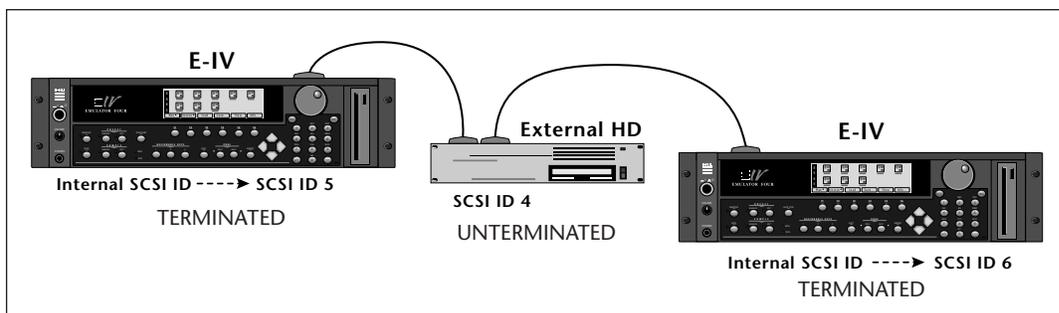
- Besides the raw sample data, additional information about the sample is included in a SMDI file.
 - Sample name and number (samples 1-999)
 - Multichannel/Stereo/Mono status
 - Sample length plus one set of loop begin/end points
 - Sample rate, pitch and bit resolution
 - Sample key placement (an E-mu extension to SMDI)

Using Multiple Samplers on the SCSI Bus

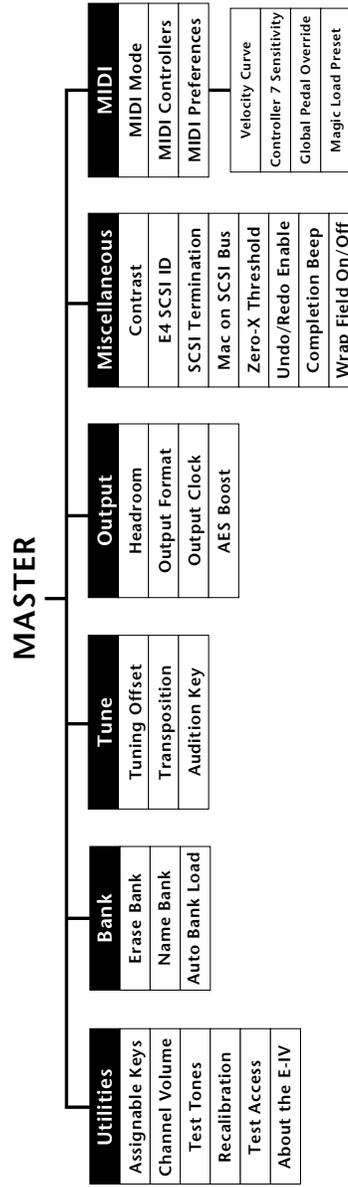
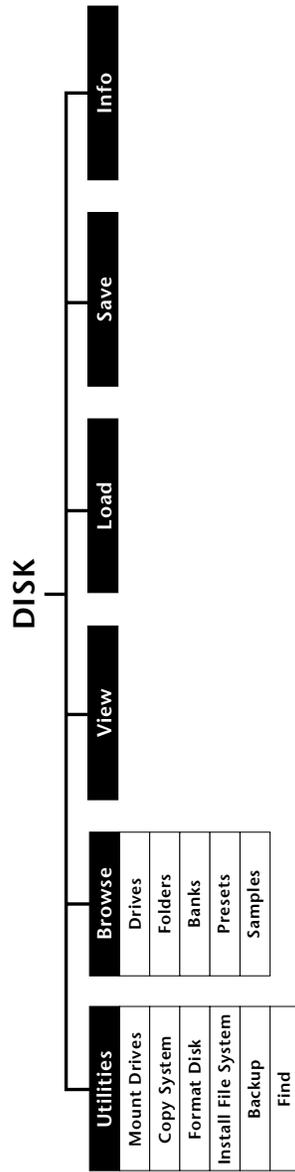
E-IV software contain SCSI bus arbitration so that multiple “Master” devices can share the bus without a system crash. Two E-IV's (an e-64, an EIIIIX or an ESI-32) can share the same sound library, without having to duplicate the storage media.

When connecting your system for use with multiple E-IV's, be sure to observe the following rules:

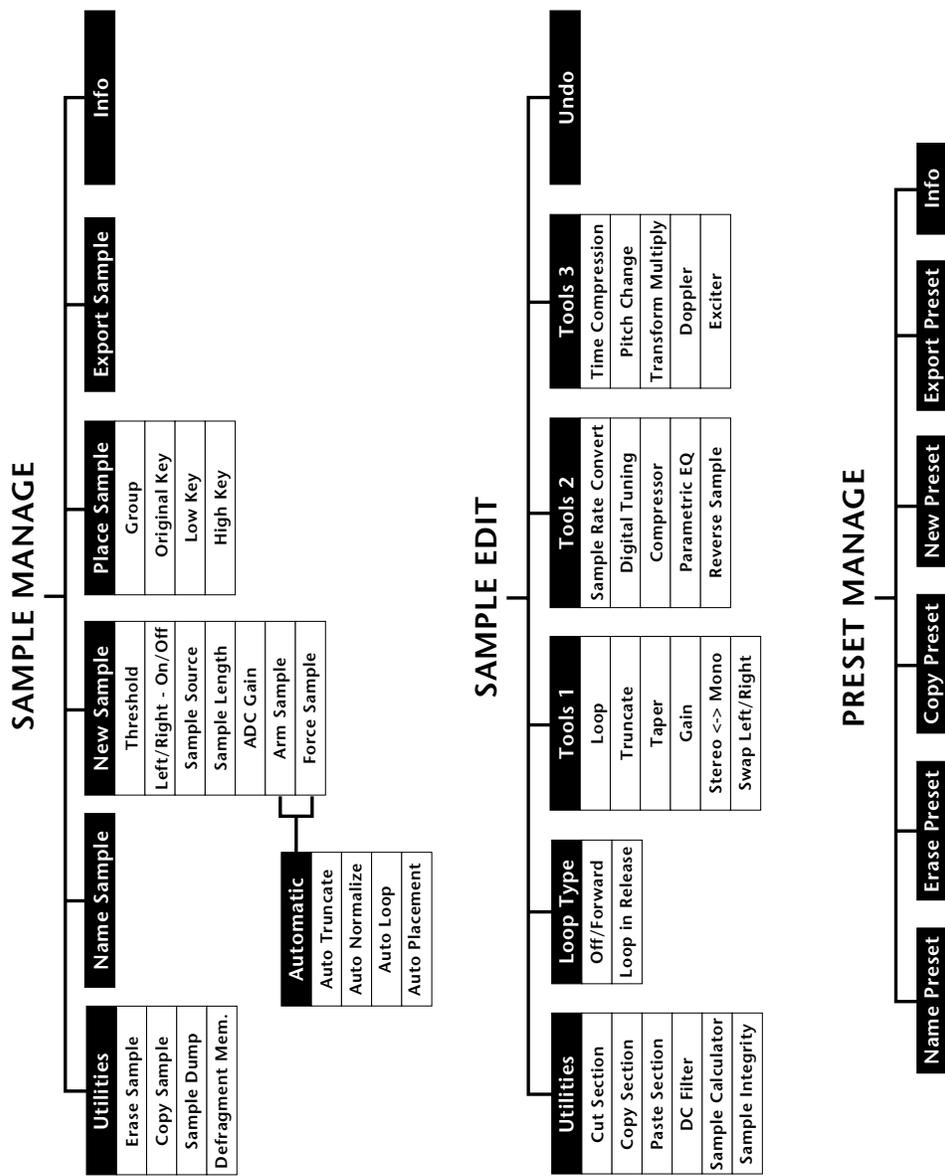
- **NEVER try to write to two devices at the same time or write to one device while loading from another.** Designate one unit as the Master which is the **ONLY** unit allowed to write. Turn Undo Off on all units except the Master. Simultaneous reads are OK.
- Keep SCSI cable lengths as short as possible (Under 12 feet total).
- Make sure that each SCSI device has its own unique ID number. (Remember that the E-IV and EIIIIX each use up an ID number in addition to their internal hard disks.)
- Make sure the system is correctly terminated - The E-IV's should normally be on the ends of the SCSI chain.



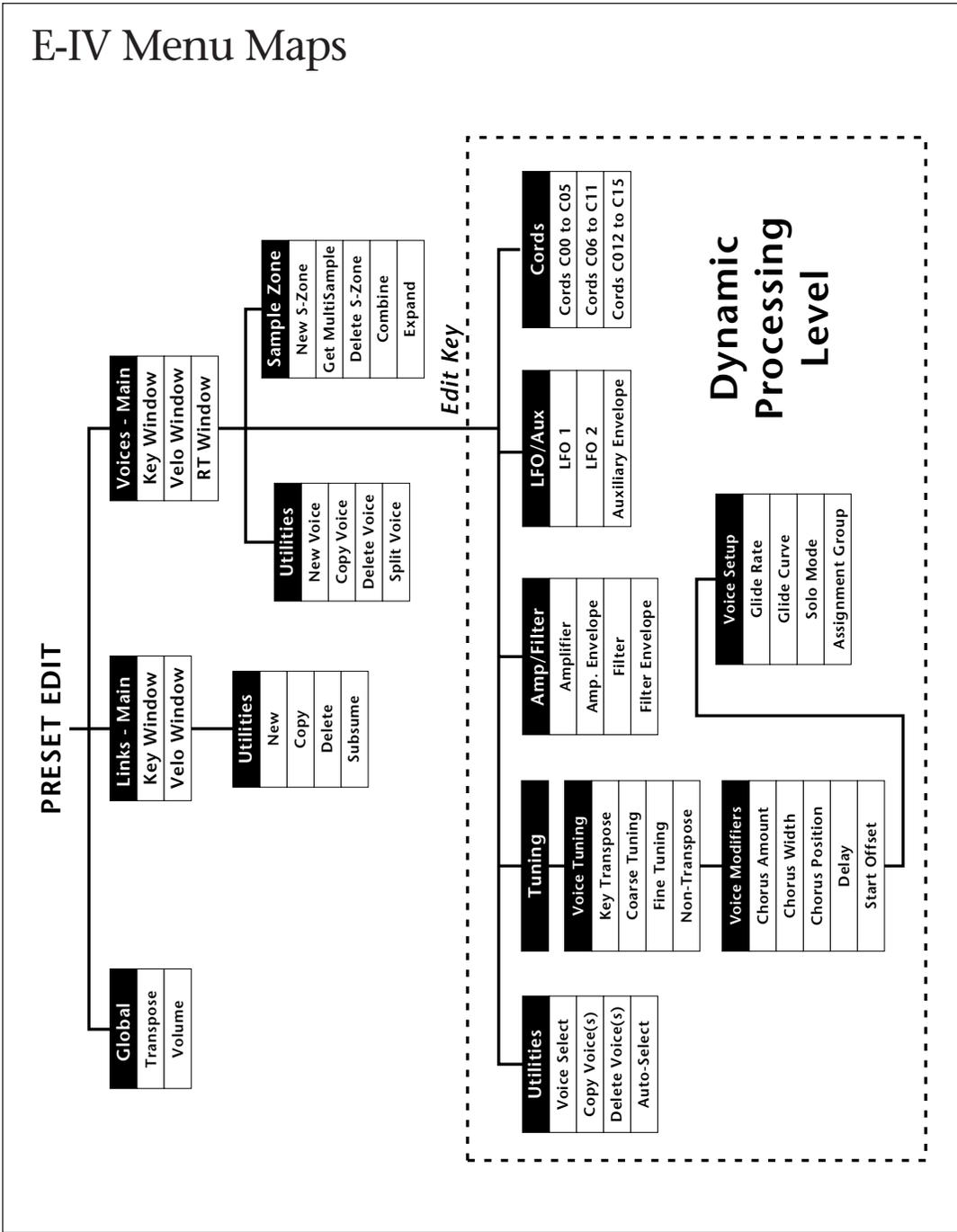
E-IV Menu Maps



E-IV Menu Maps



E-IV Menu Maps

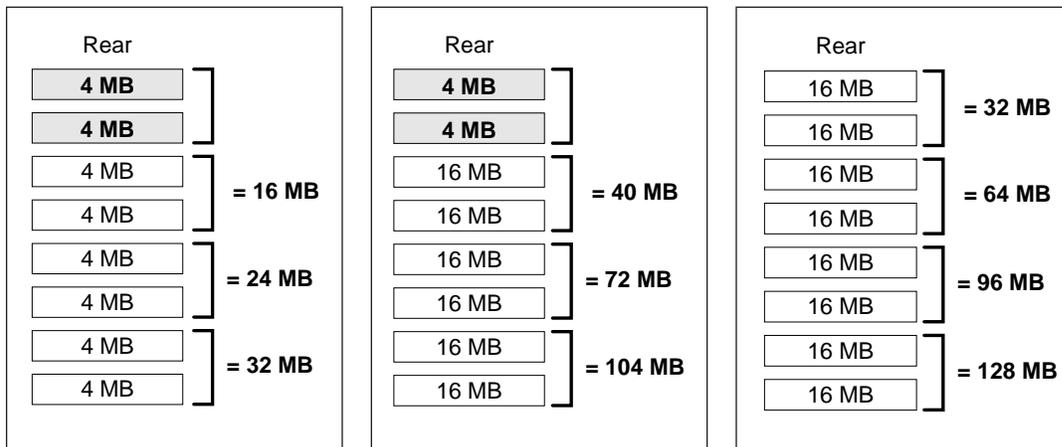


Memory Expansion

The memory of the Emulator IV is user-expandable and consists of up to (8) SIMM memory modules. The requirements for the SIMM modules are as follows:

- 30-pin SIMM (4 MB or 16 MB)
- 8 or 9 bits (Mac or IBM)
- 70 nS or faster
- The E-IV uses 16 bit Words, and it takes two 8-bit SIMMs to make a 16-bit word. **Therefore, the SIMMs must be installed in pairs.** Each pair of SIMMs must be the same size and preferably the same type. **No 8 MB SIMMs are allowed in the E-IV!**
- The charts below show all the allowable combinations of SIMMs. The standard Emulator IV comes with 8 MB (two 4 MB SIMMs in the sockets toward the rear of the unit). Either 4 MB or 16 MB SIMMs may be added to the other sockets. No combinations other than those shown below are allowed.

BEFORE YOU BEGIN, determine the proper locations of the SIMMs you plan to install.



Groundwork

Before you begin, find a clean, well lit place in which to work.

UNPLUG THE AC CORD BEFORE WORKING ON E-IV

This procedure requires that you periodically “Ground” yourself, by touching a grounded object such as a water pipe or a grounded piece of equipment. A good location might be your kitchen counter somewhat near the sink and the grounded water faucet. Grounding yourself prevents the static charge in your body from damaging the sensitive memory chips. When you are asked to “Ground” yourself, simply reach over and touch the metal on the water faucet. Do not walk across the room or across a rug, as this will defeat the purpose of grounding.

Disassembly

1. To gain access to the interior of E-IV, the top panel must first be removed. The top panel is attached to the main chassis by means of (7) Phillips head screws. There are three screws along the top back of the unit and two in the recesses on both sides.
2. When the screws are removed, lift the metal top FROM THE REAR and lift off. Set the top cover aside in a safe place and put the screws into a cup so they will not get lost. The switching power supply is covered by a metal box. Do not remove this metal cover!

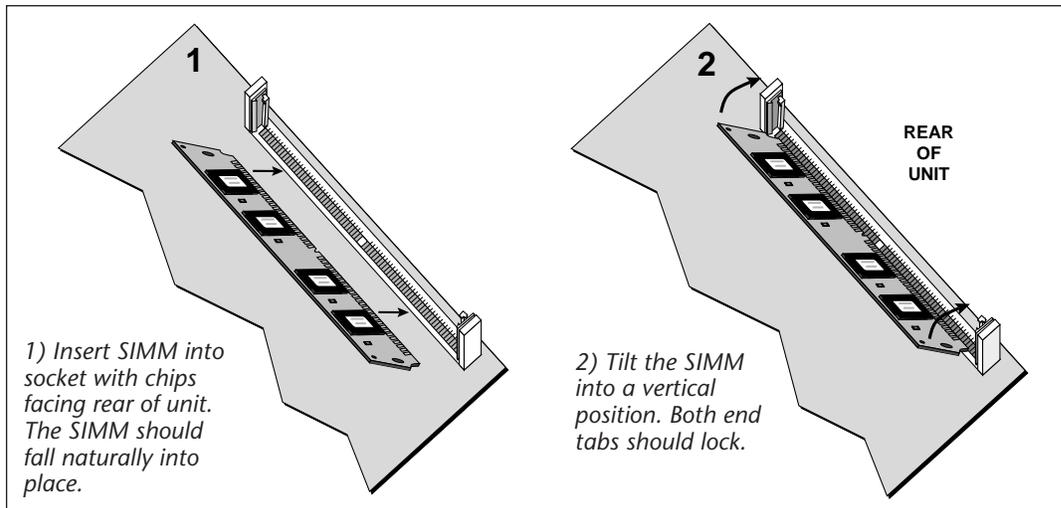
Remove the Old Memory SIMMs (if necessary)

The memory SIMMs are located near the left, front of the main board. The front of the E-IV should be facing you. To remove a SIMM:

1. Ground yourself by touching a grounded object.
2. On each end of the SIMM socket there is a silver tab. Use a screwdriver or a ball point pen to squeeze the tabs toward the outside of the socket while gently pushing the SIMM toward the rear of the unit. The old SIMM should “hinge” backward. It can now be removed.

Install the New Memory SIMMs

1. Ground yourself by touching a grounded object, then remove the memory SIMM modules from the static protected packaging. Install the SIMM closest to the front panel first.



2. Gently set the SIMM deep into the SIMM socket at a 45° angle. Without forcing the insertion, let the board rest in the socket **as deep as it will go**. The chips mounted on the board should face the rear of the unit. See the diagram above.
3. While applying a slight downward pressure on the top of the SIMM to keep it from popping out of the socket, tilt the SIMM board into a vertical position. You should hear an audible click. Make sure both sides of the silver tabs have latched.

Reassemble the Unit

1. Tilt the rear of the top cover up a little and slide the front of the top panel under the front panel lip. Lower the rear of the top panel into place.
2. Replace the seven screws. The screws are all identical.

Test It

At this point, the installation is almost finished. Plug in the power cord and turn on power to the E-IV. If the display shows the new memory size during boot up, everything is probably OK.

If the unit comes up without showing the proper memory size, you may have installed the SIMMs incorrectly.

To Test Memory:

1. Activate the **Master** module.
2. Select **Utilities**.
3. Select **Tests**. A pop up window will appear asking you to enter the Diagnostics Password. Ah, you've got us now. We'll have to reveal the secret password after all. Enter the secret password: **1-3-5-8**, then press **OK**. Another row of soft keys will appear.

A Word of Warning: Now that you know how to get into the hidden diagnostics, be careful not to erase your hard disk by running the Automatic or Hard Disk tests!

4. Press the **RAM** soft key to begin testing memory. The display will warn you that the test destroys any data currently residing in RAM. Don't worry, this test does **NOT** affect your hard disk data. Press **OK** to continue.
5. CPU memory will be tested first (cRAM). After four cycles, the sound memory (gRAM) will be tested. Allow this test to run through at least four complete cycles or longer if you want. (This time will vary with the amount of RAM installed.)
6. Press **EXIT** to abort the test. Any errors will be displayed. If the memory tests bad, you may have incorrectly installed the SIMMs.

Problems?

Disconnect power, open the unit, and try re-seating the SIMMs. Check that both SIMMs are of the same type. If all else fails, return the E-IV to its original configuration and call E-mu Customer Service at (408) 438-1921. Telephone support hours are 8:00-5:00 PST, Monday through Friday.

Specifications

Number of Voices	128 mono, 64 stereo
Sound Memory	8 MB standard, 128 MB maximum
Output Sample Rate	44.1 kHz, 48 kHz
Main Outputs	2 balanced XLR's, mirrored on 1/4" TRS jacks
Submix Outputs	6 balanced 1/4" TRS jacks
Output Level	+4 dBu nominal
Output Impedance	50 Ω , will drive 600 Ω load
Input Impedance	4 K Ω
Input Gain Scaling	-10 to +50 dB
Data Encoding	Input: 16 bit Sigma-Delta, 128x oversampling Output: 18 bit
Digital I/O	AES/EBU or S/PDIF format, XLR connectors
SCSI	(2) 50-pin connectors, active termination
Sample Rates	Analog: 48, 44.1, 24, 22.05 kHz; Digital: 48, 44.1, 32 kHz.
Pitch Shift Range	± 5 octaves, constant sample rate technology
Frequency Response	20 Hz to 20 kHz, +4/-1 dB
Quiescent Noise Floor.....	-91 dBu (A-weighting)
Silent Sample Playback ..	-84 dBu (A-weighting)
Output Level	2.8 dBu (1 kHz 16-bit sine wave, -3dBFS, A-weighting)
Output Level	-79 dBu (Playback of 5 silent samples, A-weighting)
Output Level	14 dBu (Playback of (5) 1 kHz sine waves, A-weighting)
Signal to Noise Ratio	93 dB
Signal/Quiescent Noise ..	105 dB
THD + Noise	Less than 0.01 (1 kHz sine wave, A-weighting)
Stereo Phase	Phase Coherent $\pm 1^\circ$ at 1 kHz
ASCII KYBD Interface.....	PC-AT style ASCII keyboard
Weight	17.75 lbs (8 kg)
Dimensions	W - 17.125" (43.5 cm), H - 5.25" (13.3 cm), L - 13.25" (33.6 cm)
Power	100-240 VAC, 50/60 Hz, auto-select, less than 50 watts

Warranty

Please read this warranty, as it gives you specific legal rights.

Length of Warranty

Your Emulator IV warranty covers all defects in materials and workmanship for a period of one year (90 days for disk drives) from the date of purchase by the original owner, provided that the Warranty Registration Card is filled out and returned to E-mu Systems within 14 days from the date of purchase. Cases may arise where E-mu's Service Department or one of E-mu's authorized service centers will ask for a copy of your sales receipt to facilitate warranty service. Please keep your purchase receipt in a safe place.

E-mu Systems does not cover:

- Damages due to improper or inadequate maintenance, accident, abuse, misuse, alteration, unauthorized repairs, tampering, or failure to follow normal operating procedures as outlined in the owner's manual.
- Deterioration or damage of the cabinet.
- Damages occurring during any shipment of the E-IV for any reason.
- An E-IV that has in any way been modified by anyone other than E-mu Systems, Inc.

Limitation of Implied Warranties

No warranty is expressed or implied. E-mu Systems specifically disclaims the implied warranties of merchantability and fitness for a particular purpose.

Exclusion of Certain Damages

E-mu Systems' liability for an E-IV found defective is limited to repair or replacement of the unit at E-mu's option. In no event shall E-mu Systems be liable for damages based on inconvenience, whether incidental or consequential, loss of use of the unit, loss of time, interrupted operation or commercial loss, or any other consequential damages.

Some states do not allow limitation of the duration of implied warranties or the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

How To Obtain Warranty Service

All E-mu products are manufactured with the highest standards of quality. If you find that your instrument does require service, it may be done by any authorized E-mu service center. If you are unable to locate a service center in your area, please contact E-mu Systems Service Department at (408) 438-1921. They will either refer you to an authorized service center or ask that you return your E-IV to the factory. When returning an E-IV to the factory, you will be issued a Return Merchandise Authorization number (RMA). Please label all cartons, shipping documents and correspondence with this number. E-mu suggests you carefully and securely pack your E-IV for return to the factory. (*Do not send the power cord or operation manual.*) Mark the outside of the shipping carton clearly with your RMA number. Send to E-mu Systems, Inc. 1600 Green Hills Road, Scotts Valley, California, 95066. You must pre-pay shipping charges to E-mu Systems. E-mu will pay return shipping fees. You will be responsible for any damage or loss sustained during shipment in any direction.

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EMULATOR FOUR

Addendum for Software Version 1.20

Enclosed is software version 1.20 for the E-IV. This new software adds many valuable new features to the unit and contains many other improvements.

New Features in Software Version 1.20

- SMDI - SCSI Musical Data Interchange for super-fast file transfers over SCSI..
- Six additional MIDI controller inputs have been added for greater expressivity.
- New Multimode List View mode displays MIDI controller values.
- Eight New Solo modes expand your real-time performance control.
- New Key Latch mode for sound effects work and sampled grooves.
- New modulation source, "XRandom", (Crossfade Random) allows alternate sticking for more realistic drums and other wild effects.
- New Modulation destination, "Sample Retrigger", allows cool new echo effects.
- New Modulation processors, "Flip-Flop", "Quantizer" and "Modulation Amplifier" multiply programming possibilities.
- Export samples in EIIX format is now supported.
- Sample Rate Conversion and Digital Tuning now have several choices of filtering.
- Audition from ASCII keyboard.

Other Improvements

- Improved Scrub Wheel operation.
- User interface responds faster, especially during heavy MIDI activity.
- SCSI drives larger than 4 Gigabytes now supported.
- Improved interfacing with multiple Emulator systems.
- Merge Bank speed improvement.
- Improved Voice allocation scheme when playing unlooped samples.
- 10-key pad selection in Preset and Sample number fields.
- Dot key (10-key pad) functions as Enter key for faster editing.

TO UPDATE YOUR SOFTWARE

1. Turn off power to the E-IV.
2. Insert the software floppy disk into the drive with the label side towards the center of the unit.
3. Turn on power to the E-IV.
4. Press **Enter** to update or **Exit** to cancel.
5. Wait for the E-IV to update its firmware.
6. When the E-IV is finished updating, it will boot up and appear normal.
7. Turn power Off. Remove the floppy disk. Wait a few seconds, then turn power back on again.

The EEPROM in the Emulator IV must now be "Initialized" to operate correctly with the new software. The EEPROM contains the default parameters of the E-IV such as LCD contrast and the E-IV SCSI ID. If you have changed the E-IV SCSI ID to something other than 6, you will want to change this parameter back as soon as you have reinitialized. If you have a complex SCSI setup, disconnect everything for initializing and set the Miscellaneous parameters before reconnecting the SCSI devices.

REINITIALIZE THE EEPROM

Plug the unit in again and turn it on. Follow the instructions to enter the hidden diagnostics menu.

1. Press **Master**.
2. Press **Utils** (F1) to enter the utilities submodule.
3. Press **Tests**. A dialog box will appear asking you for the password.
4. Enter the password **1-3-5-8**, using the numeric keypad, then press **OK** (F6). The Tests screen will appear.
5. Press **More** (F1). An additional row of soft-keys will appear.
6. Press **InitEE** (F6). A dialog box will appear asking you if you really want to initialize the EEPROM.
7. Press **OK** to initialize. A dialog box will read, "Saving System".
8. Turn the E-IV Off, wait a few seconds, then turn it back on.

TO UPDATE YOUR MANUAL

Replace the pages in your manual with the pages supplied. In the case where a page is marked with a letter (as in 7-50a), simply insert the page **AFTER** the page number shown.

Exit Button

The exit button allows you to back out of a module one menu at a time, each time the button is pressed. It can also be used anytime you do not want to execute a particular function. In the Sample Manage module, it can also be used to terminate the sampling process.

Function Keys

The lower line of the display will usually contain a row of up to six “soft-key” buttons. These soft-key buttons indicate the function of the function keys directly below them.

Assignable Keys

These are user-assigned keys which can cause a jump to any screen.

Audition Button

The audition button allows you to play notes on the E-IV directly from the front panel without having a MIDI keyboard connected. The note that will be played is selected under “Tune” in the Master module. The audition button also allows you to play samples directly from the hard disk before loading them when in the sample browser.

Page Select Keys

The previous and next page keys are primarily used to move back and forth between pages when multiple pages of options exist. Each button has an associated LED arrow which illuminates if there is more information on the previous or next page. Arrows in the top corners of the display also indicate if there are more available pages. In the preset selection screen, the page select keys can be used to select the previous or next preset.

Enter Button

The enter button is used to confirm a particular operation. Enter can be used in place of an affirmative function key response such as “OK” or “Go”. In the Disk Browser, pressing the Enter key will advance the selection from: Drives -> Folders -> Banks -> Presets -> Samples. (The Exit key reverses the progression.)

 **Tip:** Holding down the Enter key while turning the data entry control allows “fine tuning” of the value by one number per click.

Cursor Keys

The left, right, up, and down cursor keys are primarily used to move the cursor around in the display. The cursor is a reversed-out section in the display which indicates the currently selected parameter. In the preset selection screen the left and right cursor keys can be used to select the previous or next preset.

Data Entry Control

The data entry control is a stepped, variable control which is used to change parameter values. The control increments or decrements the current value one unit each click. This control incorporates acceleration (values advance faster if the control is quickly turned).

Inc/Dec Keys

The increment and decrement keys are used primarily to duplicate the function of the data entry control when a finer degree of control is required. In the preset selection screen the inc/dec keys can be used to select the previous or next preset.

Numeric Key Pad

The numeric keypad is used to enter data in precise amounts. For example, if you wanted to select preset 10, enter 010 on the keypad and the preset will be instantly selected. The numeric keypad can be used anytime the data to be entered is a number. The numeric keypad can be used to select samples and presets when you know the exact number. You could simply enter the number without the leading zero as in “10”. In this case, after entering the number, you will be asked to confirm the value by pressing “Go”. The +/- key can be used to indicate if the value is positive or negative. The keypad can also be used for naming as each key is labeled “telephone-style” with 3 characters above the key.

Floppy Disk Drive

The floppy disk drive is used primarily to update the software of the E-IV, but can also be used to store and transfer sound banks in a pinch. Due to the low capacity of floppy disks, they are not practical for backing up sound data.

MIDI Connection

E-IV provides a MIDI IN, a MIDI OUT and a MIDI THRU port.

- The **MIDI IN** port connects to the MIDI OUT port of an external MIDI controller which could be a keyboard, a sequencer, MIDI drum kit or whatever. Note that the E-IV can only respond to information that your controller transmits. (i.e. If your MIDI keyboard does not have velocity and pressure sensitivity, the E-IV will not respond to velocity and pressure.)
- **MIDI OUT** can be connected to another MIDI instrument or computer. The MIDI OUT jack is used to transmit preset change information, or for MIDI sample dump information (transfers sample data).
- **MIDI THRU** simply re-transmits any information received at the MIDI IN port.

Digital I/O

The digital interface allows the E-IV to transfer digital audio back and forth with other digital devices equipped with AES/EBU or S/PDIF digital I/O. Keeping the signal in the digital domain is desirable to keep the signal to noise level as high as possible.

The digital input allows you to sample directly from a DAT recorder or other digital device. The digital output reflects the data at the stereo outputs of the E-IV. See the Sample Manage module and Output Format (located under Output in the Master menu) for more information.

AC Power Connection

The E-IV may be used in either 110 volt or 220 volt environments at either 50 Hz or 60 Hz. No change of voltage settings is required. The E-IV automatically switches itself for 110 or 220 volt operation.

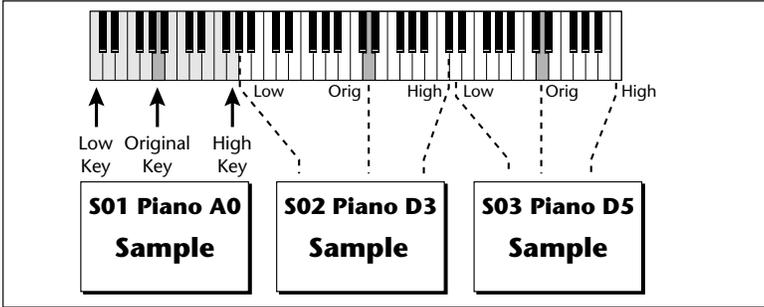
Expansion Ports

Three expansion ports allow for additional hardware upgrades such as an additional MIDI port (which adds another 16 MIDI channels) and other options to be announced.

ASCII Keyboard Interface

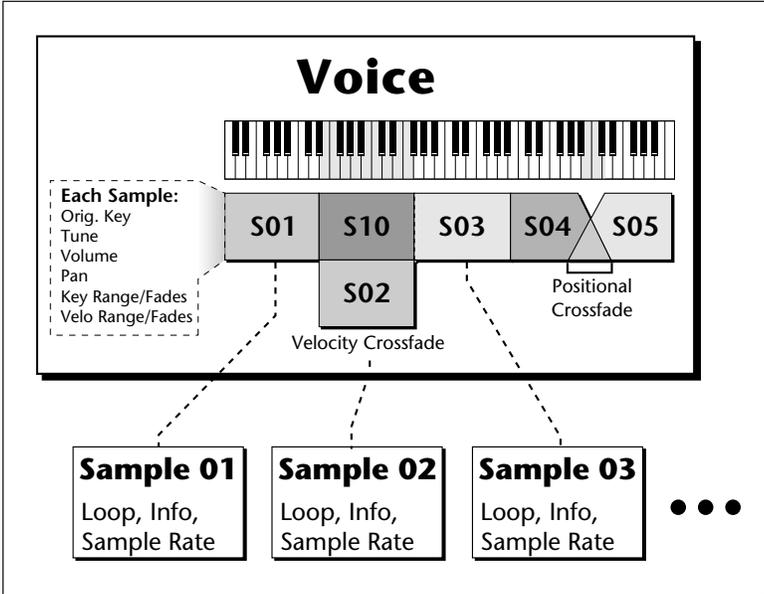
A standard IBM PC style ASCII keyboard can be connected to the rear panel ASCII Keyboard connector. The keyboard must be connected before power is applied in order for the E-IV to recognize it. All the front panel controls of the E-IV can be accessed via the keyboard. Having an ASCII keyboard is also a real time saver when naming samples, presets and banks. The keyboard functions are charted below.

E-IV	ASCII KEYBOARD
Exit	Esc
Ten Key Pad	Ten Key Pad
Cursor Keys	Cursor Keys, Ten Key Pad
Page Keys	Ten Key Pad 3, 9
Numeric Selection	[Num Lock, Ten Key Pad]
Inc/Dec	+/-
F1-F6	[F1-F6]
Preset Edit	[Alt, A], [Alt, F], [Ctrl, E]
Sample Manage	[Alt, S]
Sample Edit	[Alt, D], [Ctrl, G]
Preset Manage	[Alt, P]
Master	[Alt, M]
Multimode	[Alt, Z]
Disk	[Ctrl, D]
Load Bank	[Ctrl, L], [Alt,]]
Save Bank	[Ctrl, S], [Alt, []
Search Dialog	[Ctrl, F] <i>in Browser</i>
Rename Dialog	[Ctrl, R] <i>in Browser</i>
Audition Preset/Sample	[Ctrl, A] <i>Depending on module</i>



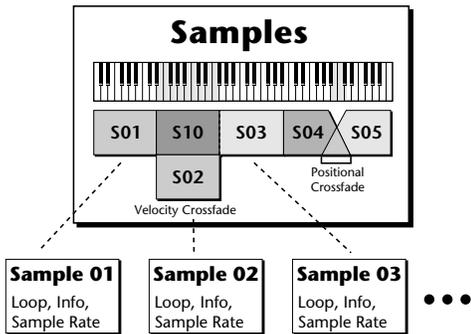
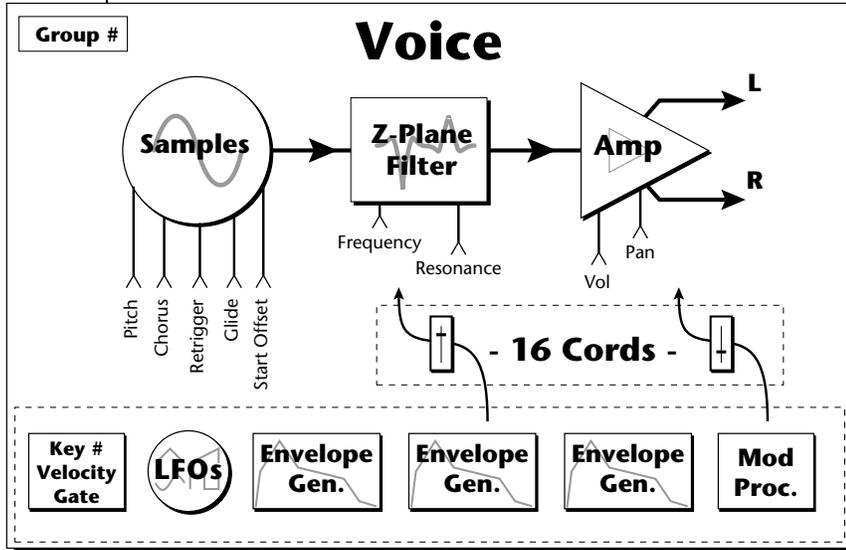
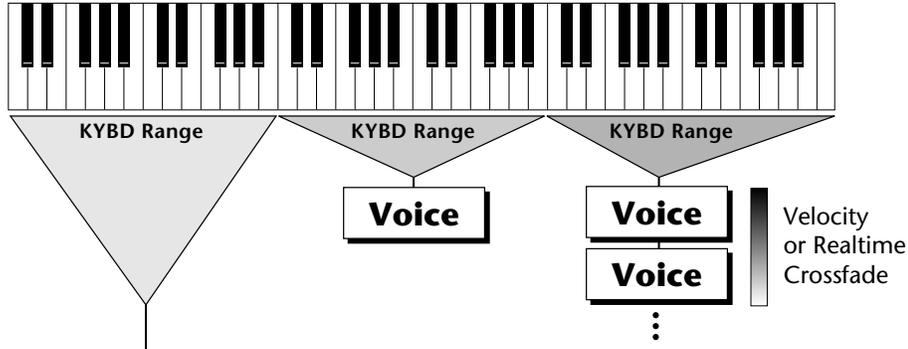
key, (which is usually the original pitch of the sample) a high key and a low key. The number of samples needed for a realistic emulation varies with the instrument, but in general, "More is better".

When a sample is taken, it is automatically placed into a voice with one sample. You can then place the voice (and its sample) on the keyboard.



If more than one voice is assigned to the same range, then pressing a key in that range will play all the voices assigned to that range. Voices assigned to the keyboard can be crossfaded by their position on the keyboard or the key velocity. Voices can also be switched or faded depending on the value of a realtime controller such as a modulation wheel, an LFO or an envelope generator.

Preset



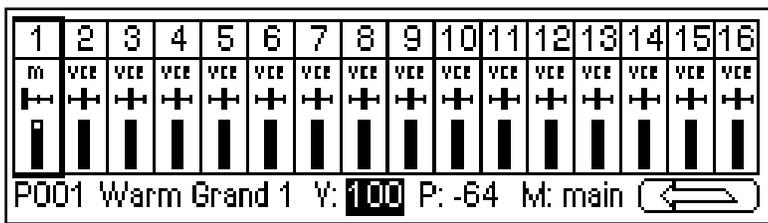
4. Choose a bank to load using the data entry control, the inc/dec keys or the numeric keypad. Press **OK** to load the bank or **Cancel** to cancel the operation. If you pressed "OK" the bank will be loaded and the first preset of the bank you selected will appear.

►Selecting Presets

1. The main preset selection screen is shown above. Presets can be selected using the data entry control, the cursor keys, the page keys, the inc/dec keys, the numeric keypad or from your MIDI controller. The previous and next presets are displayed in the upper corners of the display.
2. When using the numeric keypad to select presets, you may enter leading zeros (i.e. type 0, 0 and 2 to select preset 002) or simply type in 2, then press **Go**. If you do not enter the leading zeros a screen will appear to confirm your choice. Press **Go** to confirm your choice or **Cancel** to cancel the operation.

►Selecting Multimode

Multimode allows the Emulator IV to respond to multiple MIDI channels at once. Press the **Multi** function key (F6) to turn on Multimode and display the Multimode screen as the main screen. The Multimode (or MIDI Mix) screen is shown below.

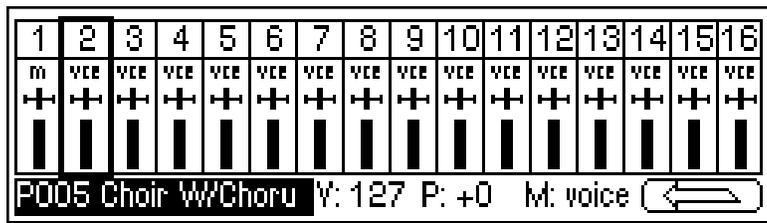


The MIDI Mix screen allows you to display and adjust the preset, volume, pan settings and output assignments for up to 16 MIDI channels (32 channels with the optional MIDI interface card). This is a useful feature to fine tune multi-timbral sequences. This screen also allows you to override the output channel programmed in the voice. Any volume pan and preset changes made over MIDI will be reflected in this display. (Volume = MIDI continuous controller channel #7, Pan = MIDI continuous controller channel #10).

❑ **Note:** MIDI channels 17-32 are not available unless you have the MIDI Interface Option Card installed, which adds 16 additional MIDI channels.

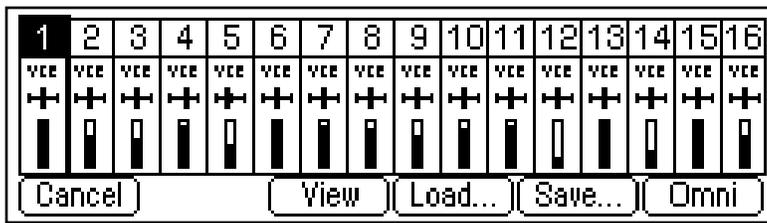
❑ **Note:** Pan ADDS to the pan setting made in the voice and is not an absolute pan setting.

⚡ **Tip:** Omni mode plays only the currently selected preset from any MIDI channel.

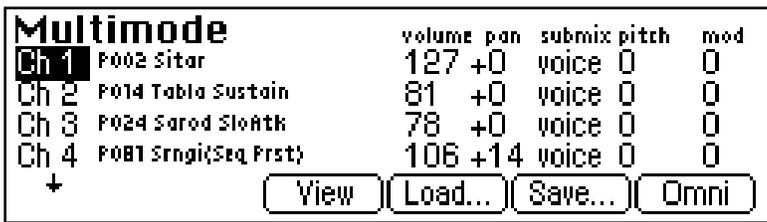


► **To Adjust the MIDI Mix**

1. Select the desired MIDI channel using the up/down cursor keys.
2. Select preset, volume, pan or the output assignments using the left/right cursor keys. Change the parameter values using the data entry control, the inc/dec keys, or the numeric keypad.
3. Press the NEXT page key to select MIDI channels 17-32.
4. Press the key to call up the Load, Save and Omni soft keys. Press **Omni** to return to normal mode.



5. Press the **View** key to change the display to list view mode. The list view screen displays the values of the pitch and modulation wheels. The amounts of the wheels can also be adjusted here, just as if you were moving the wheels on the controller.



6. Press the right arrow key to display (or change) the values of MIDI controllers A-H.
7. Press the **View** key to toggle the MIDI Mix back to graphic display mode.

► **To Set the Akai Import Options:**

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **Misc** function key (F5). The Miscellaneous menu will appear.
3. Press the **Next** page key. The AKAI Import Options menu will appear.
4. Move the cursor to the desired option using the cursor keys and change the parameter using the data entry control or the inc/dec keys.
5. Press the **Exit** key to return to the Memory Statistics screen.

A black rectangular button with rounded corners, oriented vertically. The word "Master" is printed in white, bold, sans-serif font, rotated 90 degrees counter-clockwise.

MIDI GLOBALS

Type	Total	Used	
Preset	521k	113k	21% 
Sample	8mb	4mb	50% 

Mode Cntrls1 Cntrls2 Prefs  



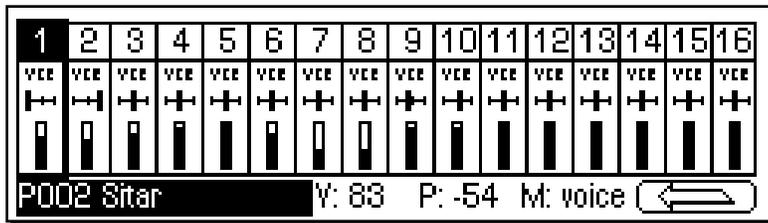
The MIDI Global Menu allows you to change the MIDI parameters which affect the overall MIDI operation. The MIDI Globals menu is accessed by pressing the MIDI key from the Memory Statistics screen.

The MIDI Globals menu contains three sub menus:

- **Mode** - Selects MIDI basic channel and mode.
- **Controls 1 & 2** - Sets the MIDI controller numbers received by the E-IV.
- **Preferences** - Miscellaneous MIDI functions.

MULTI MODE - MIDI MIX

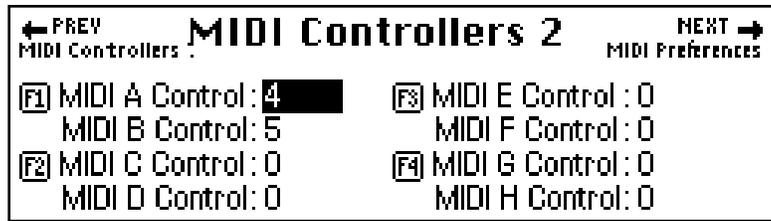
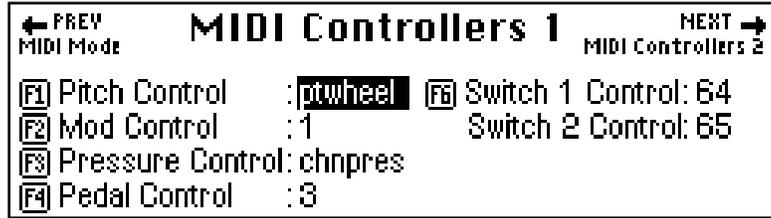
When Multimode is selected as the MIDI mode, the main display of the Emulator IV transforms from a single preset selection screen into a Midi Mix screen. The Midi Mix screen allows you to display and adjust the preset, volume, pan settings and output assignments for up to 32 MIDI channels. This is a useful feature to fine tune multi-timbral sequences. This screen also allows you to override the output channel programmed in the voice. Any volume, pan and preset changes made over MIDI will be reflected in this display. (Volume = MIDI continuous controller channel #7, Pan = MIDI continuous controller channel #10)



► To Change the MIDI Mix

1. Set the MIDI mode to **Multi** as described on the previous page, or simply select Multi after pressing the [NEXT] key on the main preset screen.
 2. Select the desired MIDI channel using the up/down cursor keys.
 3. Select preset, volume, pan or the output channel using the left/right cursor keys. Change the parameter values using the data entry control, the inc/dec keys, or the numeric keypad.
- Pan **ADDS** to the pan setting made in the voice and is not an absolute pan setting.
4. Press the **NEXT** page key to select MIDI channels 17-32. MIDI channels 17-32 are not valid unless you have the MIDI Interface Option Card installed, which adds 16 additional MIDI channels.
 5. Set MIDI mode to Poly or Omni to change the main screen back to a single preset display format.

MIDI Controllers



This menu is where you assign 8 MIDI continuous controllers which will be received by the Emulator IV. Match these numbers to the controllers transmitted by your MIDI keyboard. The 8 MIDI controllers will be used by all presets. (Note: the names attached to the controllers such as “Pitch Control” and “Mod Control” are arbitrary. They can be assigned to any destination in the Preset Edit menu.)

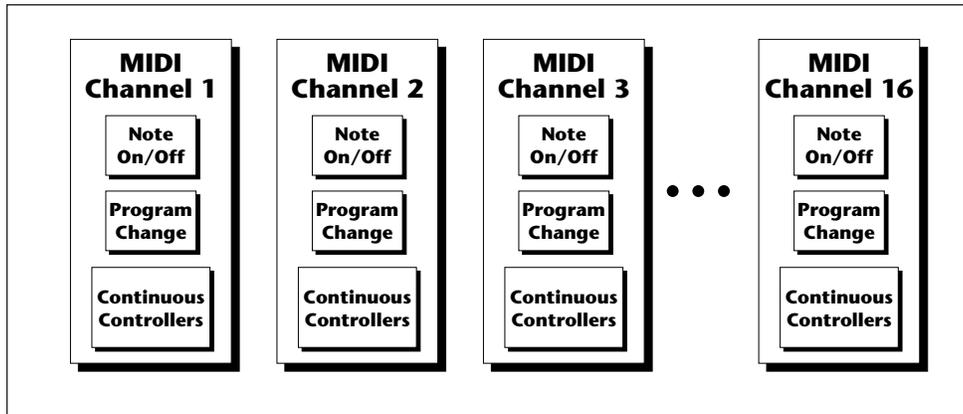
► To Setup the MIDI Controllers

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **MIDI** function key (F6). The MIDI Globals sub menu will appear.
3. Press the **Controls 1** or **2** function key (F2 or F3). The MIDI Controllers menus shown above will appear.
4. Move the cursor to desired controller name using the cursor keys or the indicated “F” keys.
5. Select the MIDI controller numbers using the data entry control, or inc/dec keys.
6. Press the **Exit** key twice to return to the memory statistics screen.

Master

ABOUT MIDI CONTROLLERS

You probably already know that there are 16 MIDI channels that can be used. Each of the 16 MIDI channels uses basically 3 types of messages; *note on/off*, *program changes*, and *continuous controller* messages.



Your MIDI keyboard, in addition to describing which note was played, also sends *realtime control* information. Realtime control sources include such things as pitch wheels or levers, modulation wheels or levers, control pedals, aftertouch, etc. and are used to add more expression or control.

Your MIDI keyboard sends out realtime controller information on separate channels called *continuous controller channels*. There is a set of 32 continuous controller channels for each of the 16 MIDI channels. Some of the controller channels, such as pitch wheel, volume, and pan have been standardized. For example, volume is usually sent on continuous controller channel #7.

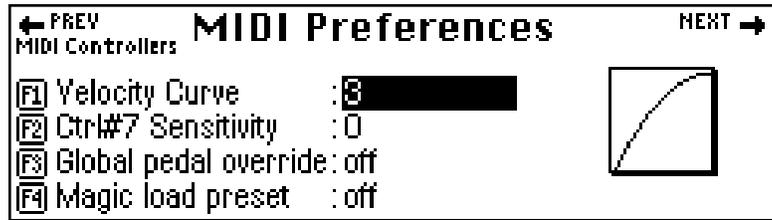
The E-IV allows you to route any continuous controller to any realtime modulation destination. The connections for a particular preset are completed in the Preset Edit menu.

Tip: A few of the standardized MIDI Controller numbers are listed below.

- 1 - Modulation Wheel or Lever
- 2 - Breath Controller
- 3 - Aftertouch: Rev 1 DX7
- 4 - Foot Pedal
- 5 - Portamento Time
- 6 - Data Entry
- 7 - Volume
- 8 - Balance
- 9 - Undefined
- 10 - Pan
- 11 - Expression

Master

MIDI Preferences



Master

This submenu contains several additional global MIDI functions.

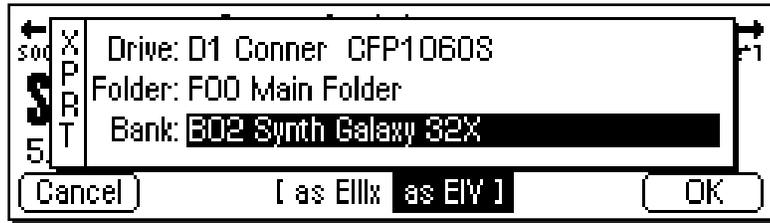
VELOCITY CURVE

Incoming velocity values can be scaled by one of eight curves to better adapt to your playing style or MIDI controller. Selecting “linear” leaves the velocity data unaltered. The shape of the selected curve is displayed in the window. Select the curve that works best for you.

► To Set the Velocity Curve:

1. Press the **Master** key. The LED will illuminate and the Memory Statistics screen will appear.
2. Press the **MIDI** function key (F6). The MIDI Globals submenu will appear.
3. Press the **Prefs** function key (F4). The MIDI Preferences submenu will appear.
4. Move the cursor to Velocity Curve using the cursor keys or the F1 key.
5. Set the Velocity Curve using the data entry control, or inc/dec keys.
6. Press the **Exit** key twice to return to the memory statistics screen.

Export Sample



This function allows you to export a single sample as a self-contained bank in either E-IV or EIIIx format.

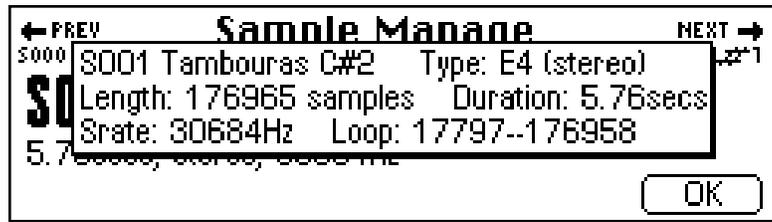
Suppose you were experimenting and modified a sample using the sample edit module. The sample data is permanently changed. You want to keep the modified sample, but if you save the bank, the original sample will be lost. Using this function, you can export the modified sample to a new bank and have both!

► To Export a Sample:

1. Press the **Sample Manage** key. The LED will illuminate and the main screen will appear.
2. Select the sample to be exported using the data entry control, inc/dec keys, or the numeric keypad.
3. Press the **Export** function key (F5). The screen shown above will appear.
4. Select the destination drive, folder and bank using the cursor keys and data entry control. You cannot write into an existing bank without erasing it. Usually you will choose an empty bank.
5. Select either E-IV or EIIIx format for the samples. Press F3 for EIIIx or F4 for E-IV format.
6. Press **OK** to export the sample or **Cancel** to cancel the operation.

Sample
Manage

Get Info



This function displays a sample's size in number of samples and duration in seconds. It also lists the amount of memory remaining.

► To Get Information about a Sample:

1. Press the **Sample Manage** key. The LED will illuminate and the main screen will appear.
2. Select the desired sample using the data entry control, inc/dec keys, or the numeric keypad.
3. Press the **Info...** function key (F6). A pop-up window appears with information about the sample.
4. Press the **OK** function key to return to the main Sample Manage screen.

Sample
Manage

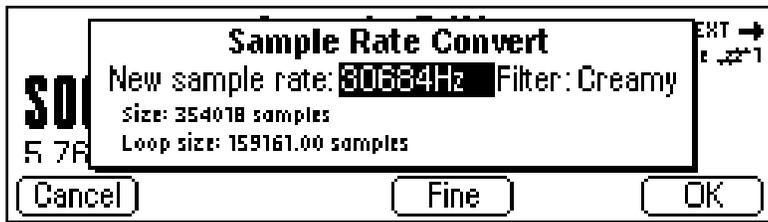
- **Filtering** - Sample rate converters contain a low pass filter to prevent aliasing in the output. While the amount of filtering is automatically applied depending on the amount of change, three ranges of low pass filtering are provided to allow you more control over the output.

Crunchy	- Least amount of filtering - High frequency content retained, but sample may contain audible artifacts.
Smooth	- A medium amount of low pass filtering.
Creamy	- Maximum amount of low pass filtering. Some high frequencies will be removed.

► **To Change the Sample Rate**

1. Press the **Sample Edit** key. The LED will illuminate and the main sample edit screen will appear.
2. Select the sample that you want to process using the data entry control, inc/dec keys, or the numeric keypad.
3. Press the **Tools 2** function key (F4). Another row of soft keys will appear.
4. Press the **SrCnv** function key (F1). The following screen will appear.

■ **Note:** *If you are not happy with the resulting conversion or want to compare before and after, press the Undo function key (F6).*



5. Enter the new sample rate using the data entry control, inc/dec keys, or the numeric keypad. The Emulator IV will calculate the new sample size and new loop size.
- **Coarse/Fine** - Fast forward through the values using Coarse, then switch to Fine for single digit editing.
6. Set the low pass filter to the desired range: Crunchy, Smooth or Creamy.
 7. Press **OK** to change the sample rate or **Cancel** to cancel the operation.



DIGITAL TUNING

Digital Tuning allows you to change the pitch of a sound in order to splice or combine it with another sound of a different pitch. Try offsetting the pitch of a copied sample by a few cents, then combine it with the original for flange and chorus effects. If a sample is slightly out of tune, it is usually better to fix the sample once and for all, rather than re-tuning the sample every time it is placed on the keyboard.

• **Filtering** - Digital Tuning utilizes a low pass filter to prevent aliasing in the output. Filtering is automatically applied depending on the amount of tuning, but the three ranges allow you to have more control over the output.

Crunchy - Least amount of filtering - High frequency content retained, but sample may contain audible artifacts.
Smooth - A medium amount of low pass filtering.
Creamy - Maximum amount of low pass filtering. Some high frequencies will be removed.

▣ **Note:** Re-tuning pitch downward increases the sample size. Re-tuning pitch upwards decreases the sample size.

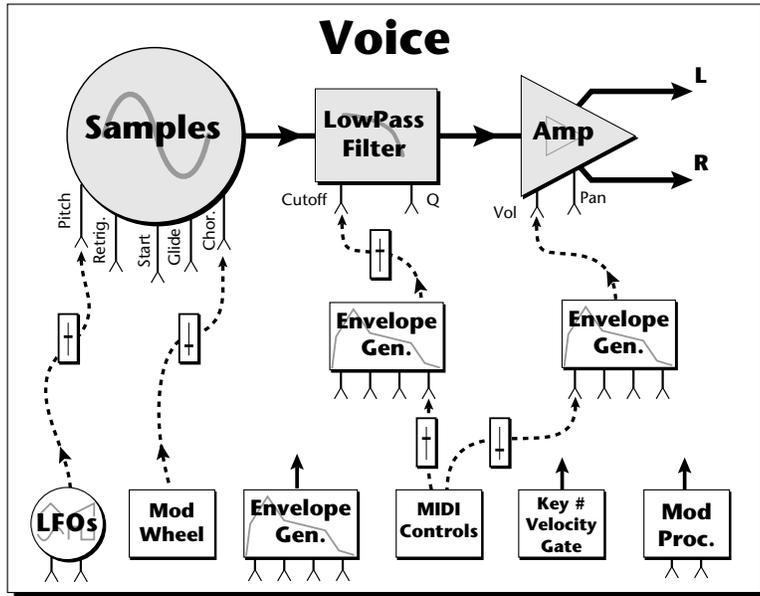
► To Retune a Sample

1. Press the **Sample Edit** key. The LED will illuminate and the main sample edit screen will appear.
2. Select the sample that you want to tune using the data entry control, inc/dec keys, or the numeric keypad.
3. Press the **Tools 2** function key (F4). Another row of soft keys will appear.
4. Press the **DigTune** function key (F2). The following screen will appear.



5. Enter the tuning amount in cents using the data entry control, or inc/dec keys. The Emulator IV will calculate the new sample size and new loop size.
6. Press **OK** to retune the sample or **Cancel** to cancel the operation.

Sample
Edit



The Cords screen on the previous page and the diagram above show how modulation sources are connected to destinations. The modulation sources can control any of the destinations in the voice.

- Note-on modulation sources, such as key, velocity and gate are only measured once at note-on time. Realtime modulation sources such as LFOs, envelope generators and modulation wheels can be varied continuously.

The possible modulation routings are completely flexible as shown in the diagram above. Multiple sources can control the same destination, or a single source can control multiple destinations.

+	0 ... 127
~	-64 ... +63
<	-127 ... 0

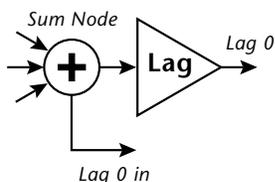
Several of the modulation sources use the designators shown at left to indicate their polarity. “+” modulation adds to the current value. “~” is useful when you want the modulation to center around zero. (As when controlling Filter Fc.) “<” would be useful for controlling volume, as it only subtracts from the initial value.

Modulation Sources

Off
 Crossfade Random
 Key (+, ~), Velocity (+, ~, <)
 Release Velocity, Gate
 Pitch Wheel, Mod Wheel
 Pressure, Pedal
 MIDI A-H, Foot Switch 1 & 2
 Flip-Flop Foot Switch 1 & 2
 MIDI Volume (Contr. 7)
 MIDI Pan (Contr. 10)
 Key Glide
 Volume Envelope (+, ~, <)
 Filter Envelope (+, ~, <)
 Aux. Envelope (+, ~, <)
 LFO 1 & 2 (+, ~)
 White Noise, Pink Noise
 kRandom 1 & 2,
 Lag 0 in (summing amp out)
 Lag 1 in (summing amp out)
 Lag Processor 0 & 1
 DC Offset, Summing Amp
 Switch, Absolute Value
 Diode, Flip-Flop, Quantizer
 Gain 4x

Modulation Destinations

Off
 Key Sustain, Fine Pitch, Pitch
 Glide, Chorus Amt
 `Chorus Position ITD
 `Sample Start, Sample Loop
 Sample Retrigger
 Filter Freq., `Filter Resonance
 Amplifier Volume, Amp Pan
 Amplifier Crossfade
 Volume Envelope Rates (all)
 Vol. Env. Atk, Dcy, Release
 Filter Envelope Rates (all)
 Fil. Env. Atk, Dcy, Release
 Aux. Envelope Rates (all)
 Aux. Env. Atk, Dcy, Release
 LFO 1 & 2 Rates
 Lag Processor In 0 & 1
 Summing Amp, Switch
 Absolute Value
 Diode, Flip-Flop, Quantizer
 Gain 4x
 Cord 0-15 Amount



Tip: The Lag Processors can also be used as 2 additional summing amps. Lag0in and Lag1in are available as modulation sources which are the sum of any cords connected to the Lag in destination. The summing amp is before the lag processor as shown above.

MODULATION PROCESSORS

Modulation processors are devices which can modify modulation sources such as LFOs and envelope generators before they are applied to a destination. The E-IV's modulation processors allow you to create patches and do tricks which would not be possible otherwise. The following modulation processors are currently implemented.

Switch Outputs a digital "1" when the input is greater than "0".

Summing Amp .. Allows you to mix several modulation signals together before applying them to a destination. This saves cords when the output is to be routed to multiple destinations.

Lag Processors ... Slows down rapid changes in the input signal. The output "lags" behind the input at a programmed rate (set in the LFO 2 screen).

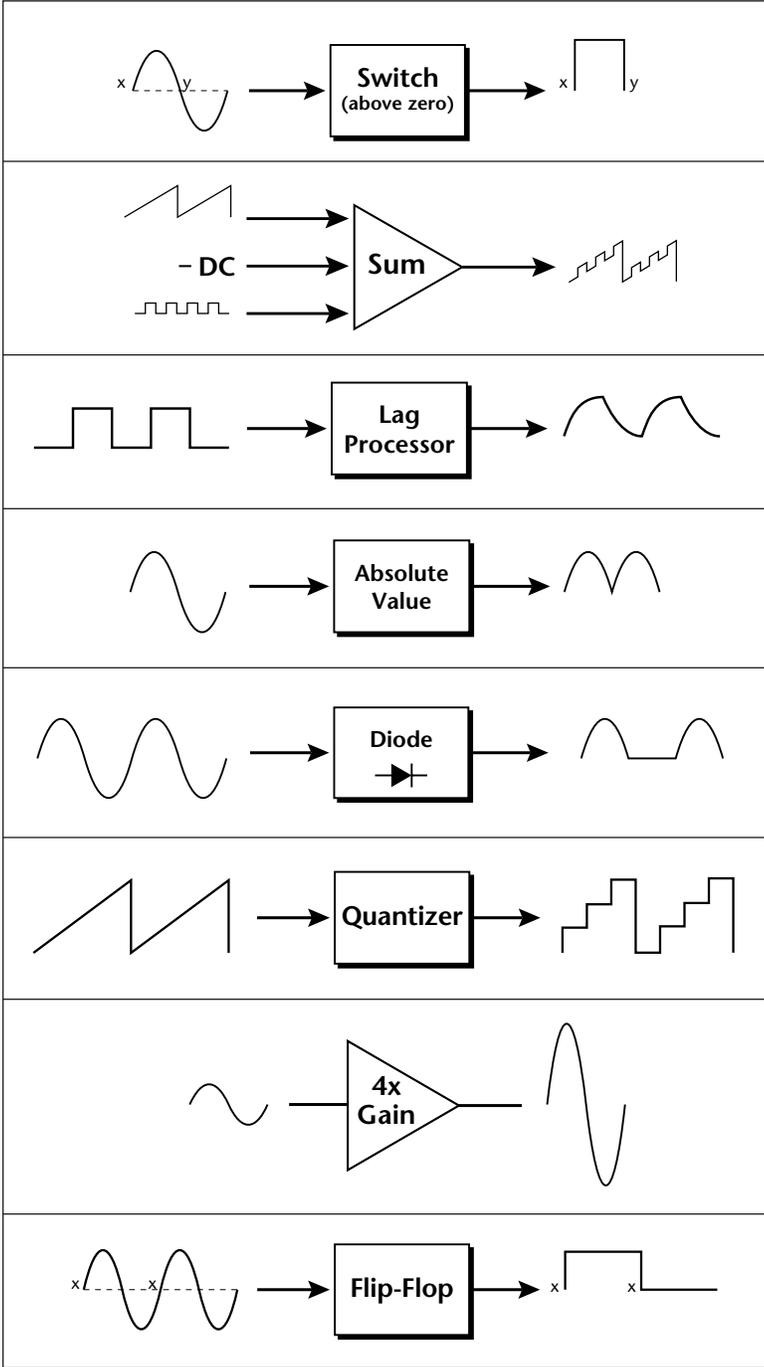
Absolute Value .. This function inverts negative values presented to it and leaves positive values alone. This device outputs only positive values.

Diode This function only allows positive values to pass and blocks negative values.

Flip-Flop The output of this processor alternates between a digital "1" and digital "0" each time the input goes positive from zero or a negative value. If an LFO wave were input, the output would be a square wave of half the input frequency.

Quantizer With the input cord set to 100%, the output value is limited to 16 discrete values (If input = sawtooth, then output = staircase). The value of the input cord controls the number of steps. The value of the output cord controls the size of the steps.

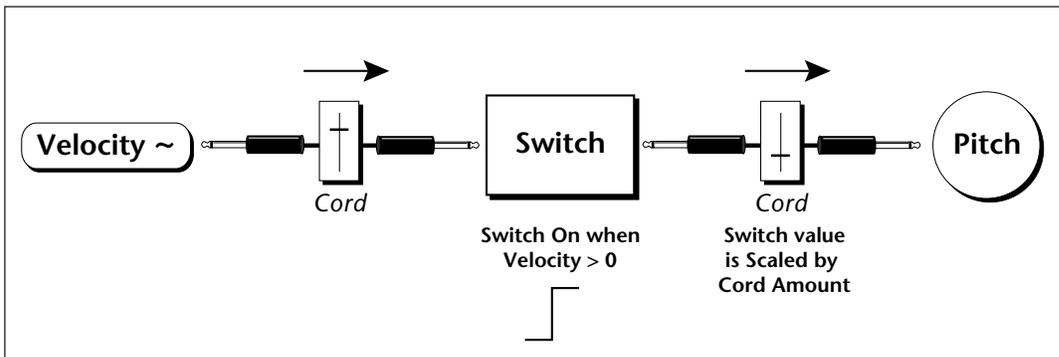
4x Gain This processor multiplies the input value by 4 to amplify modulation sources.



Modulation Processors

Modulation processors are inserted into a modulation routing as shown in the diagram below.

The modular analog synthesizers of yesteryear were incredibly flexible, partly because processing devices could be connected in any order. Modulation processors are designed according to this modular concept. They can be linked and used in a wide variety of ways limited only by your imagination. Consider the following example:



This patch would be programmed in the Cords screen as shown below.

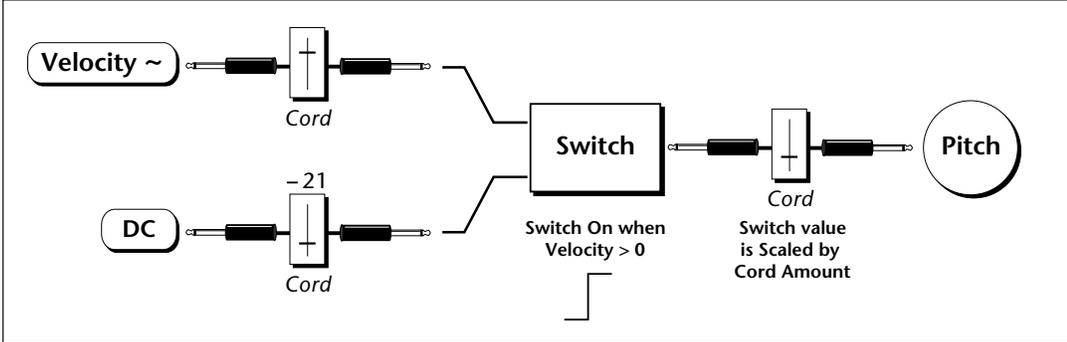
Cords 00 to 05			[A] EDITING 5 VOICES: A-1:C7		
source	dest	amount	source	dest	amount
00: Vel~	Switch	+100%	03: Off	Off	+13%
01: Switch	Pitch	+22%	04: Off	Off	+36%
02: Off	Off	+0%	05: Off	Off	+0%

[Utils] [Tuning Amp/Filt Lfo/Aux **Cords**] [Zoya]

This particular patch shifts the overall pitch up a fifth when the key velocity exceeds 64. Velocities below 64 will play at normal pitch and velocities of 64 and above will be raised a perfect fifth. The Velocity “~” source scales the played velocity around zero. In other words, low velocities (below 64) will have negative values and high velocities (64 and above) will be positive. A velocity of 64 would be zero. The **Switch** module only outputs a “1” if the input value is greater than zero. This digital “1” value can be scaled through the attenuator on the patchcord to raise or lower the pitch by any amount. In this case, a scaling value of +22

raises the pitch by a perfect fifth. The amount of the patchcord on the input to the switch is unimportant because ANY velocity value equal or greater than 64 will flip the switch. If the input cord amount were a negative value however, the action of the velocity would be reversed and velocities less than 64 would raise the pitch and velocities equal or greater than 64 would play the original pitch.

But what if you wanted the velocity switch point to be something other than 64? Thanks to the modulation processors, it can be done. Here's how.



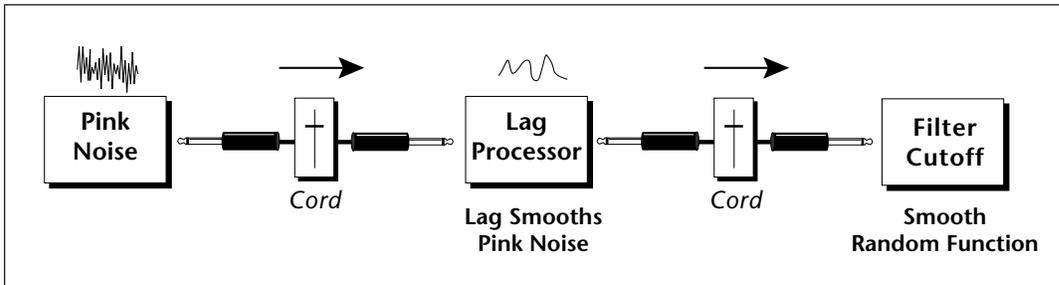
Connect the DC level to the input of the switch along with the velocity value. **Note that more than one modulation source can be applied to the input of a processor.**

The value of the DC offset determines the velocity switch point and is adjusted using the patchcord's attenuator. By setting the DC amount to a negative amount, higher velocity values are required to trip the switch. Setting the DC value to a positive value would bring the velocity switch point down.

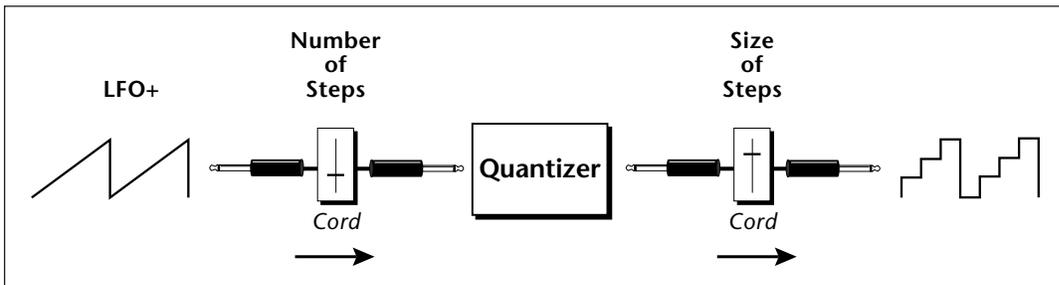
The Cords screen for this patch is shown below.

Cords 00 to 05			[A] EDITING 5 VOICES: A-1:C7		
source	dest	amount	source	dest	amount
00: Vel~	Sum	+100%	03: Switch	Pitch	+22%
01: DC	Sum	-21%	04: Off	Off	+0%
02: Sum	Switch	+100%	05: Off	Off	+0%

Another example routes the Pink Noise generator through one of the Lag Processors in order to derive a smooth random function. A smooth random wave is useful in small amounts to add a degree of natural variation to timbre when routed to filter cutoff. Normal pink noise is low pass filtered audio frequency noise with a 3 dB/octave slope to give equal energy per octave. Emulator IV pink noise is actually more like very low frequency filtered (mauve) noise, but it is perfect for use as a random control source.



The **Quantizer** can generate interesting whole-tone scales when envelope generators or LFOs are routed to the input. The quantizer turns a smoothly changing input signal into a series of steps. By routing the output of the quantizer to Pitch and adjusting the cord amounts, you can control both the number of steps and the pitch interval of each step.



The input cord amount controls how many steps will be generated. With a sawtooth wave (LFO+) feeding the input and the cord amount set to 100%, sixteen steps will be generated. The output cord amount controls the size (or interval) of the steps.

Try setting up the following patch exactly as shown below using your favorite preset as a starting point.

```

LFO 1 [M] V1: A-1-C7
Rate : 0.35 Sync: key sync
Shape : sawtooth
Delay : 0
Variation: 0%
[Utils] [Tuning Amp/Filt Lfo/Aux Cords ]
    
```

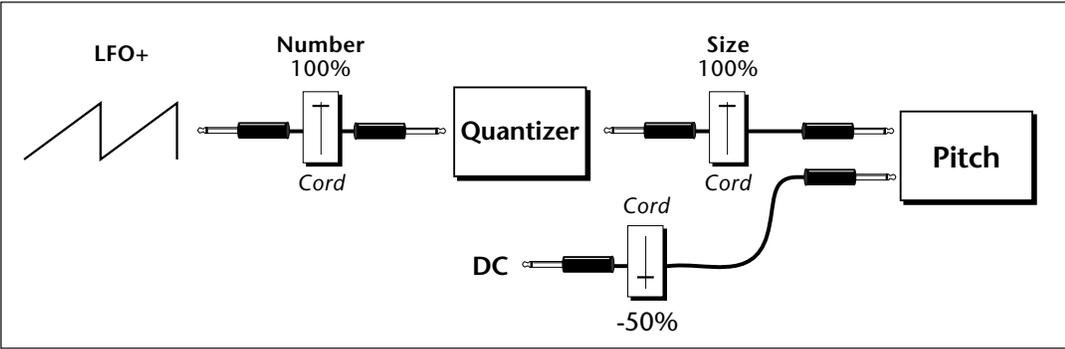
```

Cords 00 to 05 [M] V1: A-1-C7
* source dest amount * source dest amount
00: Lfo1+ Quantize +100% 03: Off Off +0%
01: Quantiz Pitch +100% 04: Off Off +0%
02: DC Pitch -50% 05: Off Off +0%
[Utils] [Tuning Amp/Filt Lfo/Aux Cords ] [Zero]
    
```

Tip: The 4x Amp can be used to get more steps or increase the interval of the quantizer.

This patch generates an ascending arpeggio every time a key is pressed. The block diagram of the patch is shown below. The patch is very straightforward except for the DC offset which was added in to bring the pitch down into tune. (Sometimes you have to fix a problem, but it's nice to know that there's a way around it to achieve the desired result.)

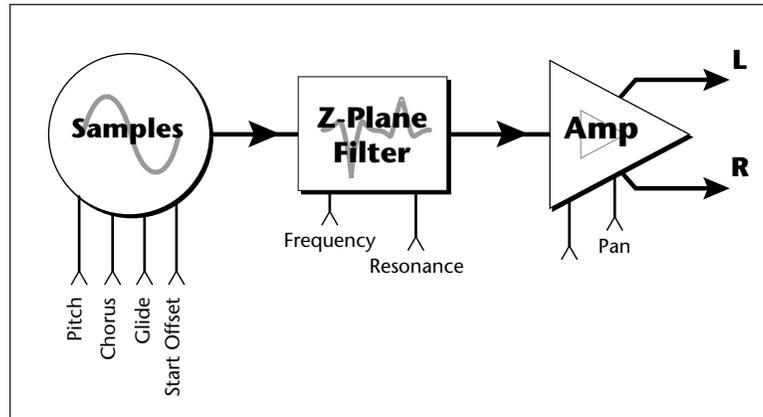
Tip: Experiment with this patch by connecting other sources and destinations to the quantizer.



You can probably start to see some of the possibilities (and there are many). Whenever you find yourself wishing for some esoteric type of control, take a minute and think if there is a way to achieve the desired result using the modulation processors.

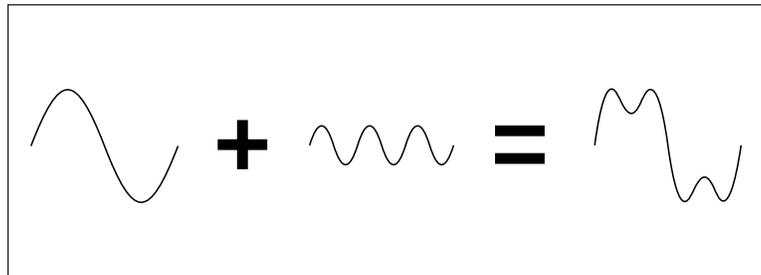
BACKGROUND: Dynamic Filter

The block diagram of the signal path is shown below.



A **Low Pass** filter is a powerful synthesizer filter which can dramatically alter the sound of a sample.

To understand how a filter works, we need to understand what makes up a sound wave. A sine wave is the simplest form of sound wave. Any waveform except a sine wave can be analyzed as a mix of sine waves at specific frequencies and amplitudes.

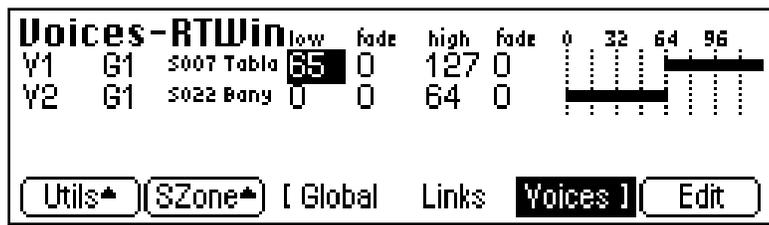


Any waveform can be analyzed as a mixture of sine waves.

► **To Randomly Cross-Switch Between Voices :**

In certain situations, such as setting up drum kits, you may want to randomly switch between several voices. **Crossfade Random** is a modulation source specifically designed to handle this situation. Unlike the other random sources, Crossfade Random generates one random number for all voices that are assigned to the same key.

1. Press the **Preset Edit** key. The LED will illuminate and the main preset edit screen will appear.
2. Press the **Voices** soft key (F5) to select the voice edit page of the editor. The Voices soft key will be highlighted.
3. Press the **Next Page** key. The Voices - Key Window will appear.
4. Edit the high and low **Key Range** of the voices so they completely overlap each other. In order to randomly crossfade voices, they must first be assigned to the same keyboard range.
5. Press the **Next Page** key twice. The Voices - Realtime Window will appear.
6. Set the realtime range of each voice. The next screen shows the realtime ranges set so that voice 1 will sound whenever the random value is from 0 to 64. Voice 2 will sound whenever the random value is greater than 64.



7. Now you have to assign a realtime *Controller* to control the crossswitch. Press **EDIT** to enter the Dynamic Processing level.
8. Press the **Utils** function key (F1) and then the **VSelect** function key (F2) to bring up the voice selection screen. Select all voices you wish to realtime crossfade. Press **OK**.
9. Press the **Cords** function key (F5). The patchcord assign screen will appear.
10. Assign **XfdRnd** to **AmpXfd**. Turn up the Amount to 100%.

**Preset
Edit**

CHORUS AMOUNT

Chorus “thickens” the sound by doubling the sound in stereo and then detuning it.

Amount: is the amount of detuning and is variable from Off to 100%.

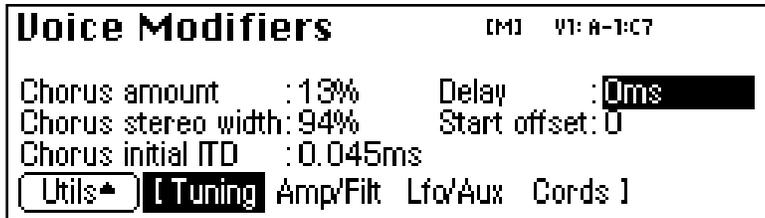
Stereo Width: controls the stereo spread. 0% reduces the chorus to mono and 100% gives the most stereo separation.

Inter-Aural Time Delay (ITD): adjusts the delay of the left and right sounds. Positive values start the right channel early and the left late.

Chorus amount and ITD can be modulated in the Cords screen, although ITD can only be changed at the time of the key depression. When Chorus is on, a mono voice will use twice as many channels.

► To Chorus a Voice:

1. From the Dynamic Processing level of the Preset Editor, select the voice(s) you wish to chorus using the voice selection screen, then press the **Tuning** soft key (F2).



2. Use the Previous and Next **Page** keys to locate the Voice Modifiers screen shown above.
3. Select Chorus Amount using the cursor keys. Adjust using the data entry control or inc/dec keys.
4. Select the Chorus Stereo Width using the cursor keys. Adjust using the data entry control or inc/dec keys.
5. Select the Inter-Aural Time Delay using the cursor keys. Adjust using the data entry control or inc/dec keys.
6. Press the **Exit** key to return to the Preset Definition level of the Preset Editor or press any of the dynamic processing soft keys to move to another module.

✦ **Tip #1** To avoid L/R pitch drift, use “~” type of modulation in the cords menu.

✦ **Tip #2** Set chorus amount to 1% and use chorus width as a pan control which does not span the entire L/R spread.

✦ **Tip #3** Set the chorus width to 0% and adjust the ITD to create a through-zero flange effect. With 100% width a panning chorus effect is obtained.

✦ **Tip #4** Modulate the ITD to create “Hass Panning” effects.

✦ **Tip #5** For a detuned oscillator sound, set stereo width to 100%. Route a free running LFO (~) to chorus position with the amount set to about 25%.

DELAY

Delay varies the time between the arrival of a MIDI Note-On message and the onset of a note. The delay time is adjustable from 0 to 10,000 milliseconds (0-10 seconds). Delay can be used to create echo effects or to thicken the sound when using layered voices.

►To Delay a Voice:

1. From the Dynamic Processing level of the Preset Editor, select the voice(s) you wish to delay using the voice selection screen, then press the **Tuning** soft key (F2).
2. Use the Previous and Next **Page** keys to locate the Voice Modifiers screen.
3. Select delay using the cursor keys.
4. Set the delay time using the data entry control or the inc/dec keys.
5. Press the **Exit** key to return to the Preset Definition level of the Preset Editor or press any of the dynamic processing soft keys to move to another module.

START OFFSET

This function allows you to set where the voice's sample begins playing when you hit a key. A setting of 0 plays a sample from the beginning, higher values move the sample start point toward the end of the sound.

►To Offset the Samples in a Voice:

1. From the Dynamic Processing level of the Preset Editor, select the voice(s) you wish to process using the voice selection screen, then press the **Tuning** soft key (F2).
2. Use the Previous and Next **Page** keys to locate the Voice Modifiers screen.
3. Select start offset using the cursor keys.
4. Adjust the start offset using the data entry control or the inc/dec keys.
5. Press the **Exit** key to return to the Preset Definition level of the Preset Editor or press any of the dynamic processing soft keys to move to another module.

GLIDE RATE

Glide is a smooth gliding between notes instead of the normal instantaneous change in pitch when a new key is pressed. The glide rate determines the time it takes to glide to the new pitch. The larger the value, the slower the glide rate. The rate is adjustable from 0 to 32.738 seconds. Zero seconds equals Off. A glide curve setting of 0 equals linear. Higher values make the curve more exponential. Glide is polyphonic, but can be monophonic when in Solo mode.

► To Change the Glide Rate of a Voice:

1. From the Dynamic Processing level of the Preset Editor, select the voice(s) you wish to glide using the voice selection screen, then press the **Tuning** soft key (F2).
2. Use the Previous and Next **Page** keys to locate the Voice Setup screen shown below.



3. Select glide rate using the cursor keys.
4. Select the rate of glide using the data entry control or the inc/dec keys.
5. Select the glide curve using the cursor keys.
6. Select curve number using the data entry control or the inc/dec keys.
7. Press the **Exit** key to return to the Preset Definition level of the Preset Editor or press any of the dynamic processing soft keys to move to another module.

SOLO MODES

Solo mode provides the playing action of a monophonic instrument. It can make wind and string instruments sound more realistic by preventing more than one note from sounding at once. There are eight different solo modes provided which can be used with monophonic synthesizer sounds or to create other performance effects.

- **Multiple Trigger:** Last note priority. No key-up action. Retrigger envelopes and samples when a key is pressed.
- **Melody (last):** Last note priority. No key-up action.
 - First solo note:* Envelopes start at Attack segment from zero. Samples start at the beginning.
 - If previous note is releasing:* Envelopes start at Attack segment, but from current level. Samples start at the beginning.
 - When playing "Legato":* Envelopes continue from current segment and level. Samples start at the loop or the beginning if unlooped.
- **Melody (low):** Same as Melody (last), but with low-note priority. Newly played keys which are higher than the lowest solo key held will not sound.
- **Melody (high):** Same as Melody (last), but with high-note priority. Newly played keys which are lower than the highest solo key held will not sound.
- **Synth (last):** Similar to Melody (last), but has key-up action. When the currently sounding solo key is released when other keys are still held, the highest held solo key will sound in a Legato fashion (envelopes not retriggered).
- **Synth (low):** Same as Synth (last), but with low note priority. When the currently sounding solo key is released when other keys are still held, the lowest held solo key will sound in a Legato fashion. (MiniMoog)
- **Synth (high):** Same as Synth (last), but with high-note priority. When the currently sounding solo key is released when other keys are still held, the highest held solo key will sound in a Legato fashion.
- **Fingered Glide:** Same as Synth (last), except that Glide is disabled when playing Staccato, enabled when playing Legato.

► **To Put a Voice into Solo Mode:**

1. From the Dynamic Processing level of the Preset Editor, select the voice(s) you wish to place in solo mode using the voice selection screen, then press the **Tuning** soft key (F2).
2. Use the Previous and Next **Page** keys to locate the Voice Setup screen.
3. Select solo mode using the cursor keys.



4. Select one of the solo modes using the data entry control or the inc/dec keys.
5. Press the **Exit** key to return to the Preset Definition level of the Preset Editor or press any of the dynamic processing soft keys to move to another module.

LATCH MODE

When Latch mode is On, pressing a key once will latch the key on. Pressing the key again will unlatch the key. This mode was originally designed for doing sound effects work, but you can probably find many other uses for it, such as latching sampled grooves. Any voices assigned to the same key as a latched voice will also latch.

► **To Put a Voice into Latch Mode**

1. From the Dynamic Processing level of the Preset Editor, select the voice(s) you wish to place in solo mode using the voice selection screen, then press the **Tuning** soft key (F2).
2. Use the Previous and Next **Page** keys to locate the Voice Setup screen.
3. Select latch mode using the cursor keys.
4. Press the **Exit** key to return to the Preset Definition level of the Preset Editor or press any of the dynamic processing soft keys to move to another module.

 **Caution:** Using Latch Mode together with the Solo Modes may cause unpredictable results.

Tip: Use negative cord amounts with an LFO to create a more realistic echo effect.

SAMPLE RETRIGGER

This modulation destination allows you to retrigger a sample using a modulation source. A **negative going zero-crossing** triggers the sample from the sample start.

LFOs (~) and envelopes are obvious choices for trigger sources. By adjusting the envelope rates, you can time the onset of each sample retrigger. A continuous controller such as a mod wheel will retrigger the sample when it goes to zero. White and pink noise cause random retriggering. By adjusting the Amp Envelope to create an artificial decay, Sample Retrigger can be used to create echo effects.

► To Retrigger the Sample:

1. From the Dynamic Processing level of the Preset Editor, select the voice(s) you wish to process using the voice selection screen, then press the **Cords** soft key (F5).
2. Select a free patchcord and connect any negative going modulation source (such as an LFO ~) to SRetrig.

Cords 06 to 11			[M] 4 VOICES: C1:C6				
#	source	dest	amount	#	source	dest	amount
06:	Lfo1~	SRetrig	-1%	09:	Off	Off	+0%
07:	Off	Off	+0%	10:	Off	Off	+0%
08:	Off	Off	+0%	11:	Off	Off	+0%

Utils [Tuning Amp/Filt Lfo/Aux **Cords**]

3. Set the Cord Amount to any value other than 0.
4. Press the LFO.Aux function key and use the page keys to locate the LFO 1 screen.
5. Adjust the LFO rate to the desired frequency. When a key is pressed, you should hear the sample retriggering.
6. Press the **Exit** key to return to the Preset Definition level of the Preset Editor or press any of the dynamic processing soft keys to move to another module.

► **To Set the Amplifier Parameters:**

1. From the Dynamic Processing level of the Preset Editor, select the voice(s) you wish to process using the voice selection screen, then press the **Amp/Filt** soft key (F3).
2. Use the Previous and Next **Page** keys to locate the Amplifier screen.
3. Adjust the amplifier parameters as desired.
4. Press the **Exit** key to return to the Preset Definition level of the Preset Editor or press any of the dynamic processing soft keys to move to another module.

AMPLIFIER ENVELOPE

The amplifier envelope generator is permanently connected to control the dynamic amplifier although it can also be patched to control any other modulation destination.

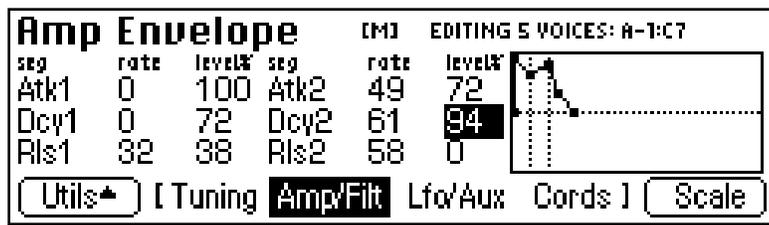
- The way the volume of a sound changes over time determines how we perceive that sound. A bell struck with a hammer is instantly at full volume, then slowly dies away. A bowed violin sound fades in more slowly and dies away slowly. Using the amplifier envelope, you can simulate different types of instrument volume envelopes.

Tip: *The envelope rates can be modulated by any controller in the Cords page.*

Attack Rates, Decay Rates, Release Rates or All Rates can be modulated.

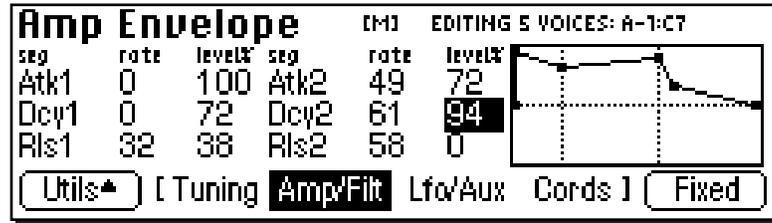
► **To Set the Amplifier Envelope:**

1. From the Dynamic Processing level of the Preset Editor, select the voice(s) you wish to process using the voice selection screen, then press the **Amp/Filt** soft key (F3).



2. Use the Previous and Next **Page** keys to locate the Amp Envelope screen.

Tip: For more information on the Amplifier Envelope see Background: Programming Basics at the beginning of this section.



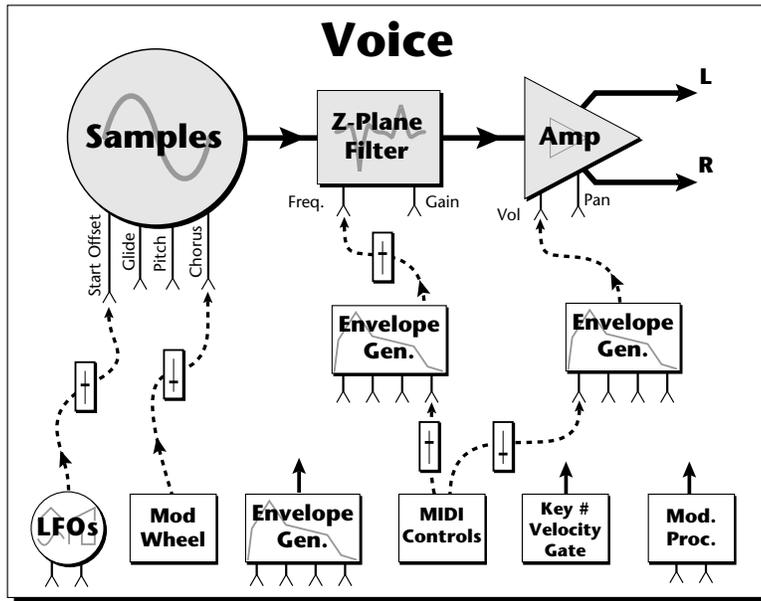
3. Press the **Scale** function key. The graphic display of the filter envelope changes from a “fixed-rate” display to a “time-scaled” display.
4. Select and adjust the amplifier envelope parameters. Use the cursor keys to move the cursor around to the various parameters and the data entry control or inc/dec keys to change the time and level of each stage.
 - Unlike the filter envelope generator, the amplifier envelope does not allow you to set negative levels.
5. Press the **Exit** key to return to the Preset Definition level of the Preset Editor or press any of the dynamic processing soft keys to move to another module.

FILTER PARAMETERS

A low pass filter allows only the low frequencies to pass and can be used to simulate many natural sounds since it is common in the physical world for the high frequencies to die away first as the sound decays. Set the frequency of a lowpass filter at maximum if you do not want any filtering action. The various filter types are described at the beginning of this chapter.

- **Filter Type:** 17 filter types are currently implemented. Standard lowpass, bandpass, and highpass filters are included as well as swept parametrics, phasers, flangers and vocal formant filters.
- **Frequency (Morph):** Sets the initial frequency of the filter. In the case of a Morphing filter, this parameter sets the initial position between the two filters.
- **Resonance (Q, Gain, Resonance, Body Size):** High values of Q amplify frequencies near the cutoff or center frequency. In

Cords



Cords 00 to 05			[M] EDITING 5 VOICES: A-1-C7		
source	dest	amount	source	dest	amount
00: Yek:	FilterFreq	+28%	03: Mod/Wl	CO2Amt	+13%
01: Pit/Wl	Pitch	+8%	04: Yek:	FilterFreq	+38%
02: Lfo1 ~	Pitch	+0%	05: FEnv+	FilterFreq	+0%

+	0 ... 127
~	-64 ... +63
<	-127 ... 0

Several of the modulation sources use the designators shown at left to indicate their polarity.

"+" modulation adds to the current value.

"~" is useful when you want the modulation to center around zero. (As when controlling Filter Fc.)

"<" would be useful for controlling volume, as it only subtracts from the initial value.

Modulation Sources

Off
 Crossfade Random
 Key (+, ~), Velocity (+, ~, <)
 Release Velocity, Gate
 Pitch Wheel, Mod Wheel
 Pressure, Pedal
 MIDI A-H, Foot Switch 1 & 2
 Flip-Flop Foot Switch 1 & 2
 MIDI Volume (Contr. 7)
 MIDI Pan (Contr. 10)
 Key Glide
 Volume Envelope (+, ~, <)
 Filter Envelope (+, ~, <)
 Aux. Envelope (+, ~, <)
 LFO 1 & 2 (+, ~)
 White Noise, Pink Noise
 kRandom 1 & 2,
 Lag 1 in (summing amp out)
 Lag 2 in (summing amp out)
 Lag Processor 0 & 1
 DC Offset, Summing Amp
 Switch, Absolute Value
 Diode, Flip-Flop, Quantizer
 Gain 4x

Modulation Destinations

Off
 Key Sustain, Fine Pitch, Pitch
 Glide, Chorus Amt
 ~Chorus Position ITD
 ~Sample Start, Sample Loop
 Sample Retrigger
 Filter Freq., Filter Resonance
 Amplifier Volume, Amp Pan
 Amplifier Crossfade
 Volume Envelope Rates (all)
 Vol. Env. Atk, Dcy, Release
 Filter Envelope Rates (all)
 Filt. Env. Atk, Dcy, Release
 Aux. Envelope Rates (all)
 Aux. Env. Atk, Dcy, Release
 LFO 1 & 2 Rates
 Lag Processor In 0 & 1
 Summing Amp, Switch
 Absolute Value
 Diode, Flip-Flop, Quantizer
 Gain 4x
 Cord 0-15 Amount

Tip: Realtime events happen first on lower numbered cords, so it is usually a good idea to put important functions on lower numbered cords and to place components of complex modulations patches in the proper order in the Cords screens. This also makes it easier to visualize your patch.

CORDS

The 16 “patchcords” allow you to route modulation sources to destinations and control the amount of modulation. The cords connect everything together in the voice. There are only two permanently connected cords: amp envelope to amplifier, and key to pitch. Any other connections must be connected with a cord. There are currently 46 modulation sources and 50 destinations for the patchcords. Some of the modulation sources, such as the lag processors and the diode, are control processors. They modify control signals. All these devices can be combined to create almost infinite patching possibilities.

► To Connect a Patch Cord:

1. From the Dynamic Processing level of the Preset Editor, select the voice(s) you wish to process using the voice selection screen, then press the **Lfo/Aux** soft key (F4).
2. Use the Previous and Next **Page** keys to locate one of the three Cords screens.

Cords 00 to 05			[M]	EDITING 5 VOICES: A-1-C7			
#	source	dest	amount	#	source	dest	amount
00:	Yek:	AmpVol	+28%	03:	ModWl	CO2Amt	+13%
01:	PitWl	Pitch	+6%	04:	Yek:	FltFreq	+36%
02:	Lfo1~	Pitch	+0%	05:	FEnv+	FltFreq	+0%

[Utils] [Tuning Amp/Flt Lfo/Aux **Cords**] [Zoom]

3. Connect the modulation sources to destinations and set an amount. The possible sources and destinations are listed at left. Keep in mind that modulation amounts interact with the initial settings.
4. Press the **NEXT** page key to move on to the second page and third pages of modulation cords. There are a total of 16 cords.
5. The **Zoom** soft key immediately jumps you to the screen related to the currently selected patchcord destination.
6. Press the **Exit** key to return to the Preset Definition level of the Preset Editor or press any of the dynamic processing soft keys to move to another module.

Sample Transfers Via SMDI

The E-IV can now be connected to the SCSI along with another E-IV, an e-64, an EIII, or a personal computer. Multiple "Master" devices on the SCSI bus is not normally allowed by the standard SCSI protocol but is possible because of E-IV's advanced SCSI and **SMDI** (or **SCSI Musical Data Interchange**) implementation. Sample data can now be exchanged over the SCSI bus in a way similar to the MIDI Sample Dump Standard, except MUCH faster.

The computer should normally be positioned at one end of the chain and the E-IV at the other. The SCSI chain is properly terminated at each end by the computer and the E-IV. Devices in the middle of the chain should not have termination resistors installed.

PC Compatibles - The E-IV has been tested with IBM PC™ compatible computers using the Adaptec™ model 1542C SCSI option card. Sound files can be transferred between a PC computer and the E-IV using Sound Forge™, Recycle™ or other sample editing software.

Macintosh - Sound files can be transferred between a Macintosh computer and the E-IV using Recycle™, Alchemy™ or other digital sample editing software. The E-IV is able to access approved Macintosh internal CD-ROM drives with CD-ROMs containing E-IV compatible files. Similarly, a Macintosh can access an internal E-IV Syquest drive with a cartridge that has been formatted for the Macintosh.

- The E-IV is strictly a "Slave Device" when using SMDI, meaning that it CANNOT initiate SMDI transfers. This should not normally present a problem, since a computer based editor will always have a facility for initiating SMDI transfers.

✦ **Caution:** A sample transferred into the E-IV is automatically placed across the entire keyboard, overwriting the current preset's sample placement. Create a new empty preset before downloading via SMDI to avoid trashing the current preset.

- Besides the raw sample data, additional information about the sample is included in a SMDI file.
 - Sample name and number (samples 1-999)
 - Multichannel/Stereo/Mono status
 - Sample length plus one set of loop begin/end points
 - Sample rate, pitch and bit resolution
 - Sample key placement (an E-mu extension to SMDI)

Using Multiple Samplers on the SCSI Bus

E-IV software contain SCSI bus arbitration so that multiple “Master” devices can share the bus without a system crash. Two E-IV's (an e-64, an EIIIX or an ESI-32) can share the same sound library, without having to duplicate the storage media.

When connecting your system for use with multiple E-IV's, be sure to observe the following rules:

- NEVER try to write to two devices at the same time or write to one device while loading from another. Designate one unit as the Master which is the *ONLY* unit allowed to write. Turn Undo Off on all units except the Master. Simultaneous reads are OK.
- Keep SCSI cable lengths as short as possible (Under 12 feet total).
- Make sure that each SCSI device has its own unique ID number. (Remember that the E-IV and EIIIX each use up an ID number in addition to their internal hard disks.)
- Make sure the system is correctly terminated. The E-IV's should normally be on the ends of the SCSI chain.

