

EMAX OWNERS MANUAL

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READ THIS FIRST!! WARNING

Changing the voltage selector 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 to reduce the risk of electric shock. This product is equipped with a cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into an appropriate outlet that is properly installed and grounded in accordance with all local codes and ordinances.

DANGER - - Improper connection of equipment-grounding conductor can result in a 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.

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

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

User - Maintenance Instructions

1. The product should be kept clean and dust free. Periodically wipe unit with clean, lint free cloth. Do not use solvents or cleaners on the unit.
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

****Important Safety Instructions****

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

1. Read all instructions before using this product.
2. To reduce risk of injury, close supervision is necessary when a product is used near children.
3. Do not use this product near water -- for example near a bathtub, washbowl, kitchen sink, in a wet basement, on a wet bar while driving, or near or in a swimming pool, or the like.
4. This product, either alone or 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, you should consult an audiologist.
5. The product should be located so that its location or position does not interfere with its proper ventilation.
6. The product should be located away from heat sources such as radiators, heat registers, or other products that produce heat.
7. The product should be connected to a power supply only of the type described in the operating instructions or as marked on the product.
8. This product 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, contact an electrician to replace your obsolete outlet. Do not defeat the safety purpose of the plug.
9. The power supply cord of the product should be unplugged from the outlet when left unused for a long period of time.
10. Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.

11. The product should be serviced by qualified personnel when:
 - A. The power supply or cord or plug has been damaged; or
 - B. Objects have fallen, or liquid has been spilled into this product; or
 - C. The product has been exposed to rain; or
 - D. The product does not appear to operate normally or exhibits a marked change in performance.
12. Do not attempt to service the product beyond that described in the user-maintenance instructions. All other servicing should be referred to qualified service personnel.

SAVE THESE INSTRUCTIONS!

FOREWORD

WHAT IS AN EMAX?

Emax is a responsive, low cost, surprisingly easy-to-use musical instrument with staggering creative possibilities. It's also a composer's personal orchestra, a recording studio's chance to have hundreds of acoustic and electronic instruments "on call" at any one time, a university's research tool. But most of all, it provides the means for some truly special musical experiences. To give you a better idea of its capabilities, here are just a few of Emax's highlights:

Rather than synthesizing sounds, Emax digitally records ("samples") real-world sounds into its memory. If you want Emax to sound like a piano, sample a piano; if you want it to sound like a barking dog, sample a dog. Pre-sampled sounds can also be loaded into Emax's memory from disks.

These sounds may then be modified with Emax's analog synthesizer processors and/or state-of-the-art digital processors. The analog-type processors include:

- Low pass voltage-controlled filter (VCF) with AHDSR envelope generator
- Voltage-controlled amplifier (VCA) with AHDSR envelope generator
- LFO with adjustable rate, delay, and speed variation
- Two programmable wheels for real-time control over pitch, filter cutoff, AHDSR attack rate, level, LFO modulation index, etc.
- Two programmable footswitches for real-time control over sustain, release, sustenuto, "patch" change, and Sequencer start/stop
- Velocity-sensitive keyboard, where keyboard dynamics can control any or all of the following: VCA level, VCA attack, VCF cutoff, VCF attack, and VCF 0.

The keyboard can play up to eight notes simultaneously; however, in some cases each note can contain two different sounds. Note that like standard analog synthesizers, there is a complete set of modifiers for each note. Therefore, when we refer to the "filter" or "VCA," we are really talking about eight filters and VCA's.

Digital processing techniques include:

- Truncation (shortening the beginning and/or the end of the sample)
- Looping the sample (or any portion thereof)
- "Crossfade" looping for smooth, clean loops
- Digitally combining (mixing) two samples
- Sound reversal ("backwards tape" effects)
- Splicing two samples together (imagine a soprano voice changing into a guitar note...)
- Advanced split capabilities
- Easy doubling, plus velocity-controlled crossfading and switching between doubled samples
- Individual tuning and attenuation for each sample
- Ultra-flexible, programmable arpeggiation
- 16 track "scratchpad" sequencer

Sounds are stored on commonly available double-sided, double-density (DS/DD) 3.5" floppy diskettes (as used with many personal computers). Thanks to sophisticated disk management techniques, it's easy to save, organize, retrieve, rename, and catalog various sounds.

For outside world interfacing, the built-in sequencer can sync up to a 24, 48, or 96 pulses-per quarter note clock or MIDI sync; there's also a complete complement of MIDI functions.

Despite all this flexibility Emax is nonetheless not that hard to learn... as you will see during the course of this manual.

SEND IN YOUR WARRANTY CARD NOW!

It is vital that you send in your warranty card so that we can notify you of enhancements, new features, and (nobody's perfect) software bugs and cures. And of course, you want to be informed of our legendary user parties where (among other things) Emax owners swap disks, gossip, and tips. But none of these wonderful things will happen to you unless you send in your warranty card. Don't miss out: Send it in now!

INSTANT GRATIFICATION!

If you just can't wait another second before hearing Emax, we understand. Follow the directions below EXACTLY as given and get ready to hear some great sounds. (Incidentally, in case you make a mistake or run into problems, don't worry. This process is described in greater detail later.)

1. With Emax unplugged, patch the rear panel Right & Left, or Right Mono jack to the input of a high quality amplification system. You can also plug stereo headphones directly into the Left jack.
2. Raise the volume Slider to the up Position.
3. Check that the rear panel voltage selector is set for the correct voltage in your part of the world.
4. Plug the Emax line cord into an AC outlet.
5. If you are not familiar with how to handle computer disks, you will have to delay your Instant Gratification somewhat. Please turn to **GENERAL INSTRUCTIONS 2** on proper disk handling. If you already know how to treat disks with the proper loving care, then proceed.
6. Check that no disk is currently in the drive. If so, or if the disk drive contain cardboard packing materials, push in on the disk eject button towards the bottom of the drive (see Fig. **GENINS-2** in **GENERAL INSTRUCTIONS 2**), remove the disks or packing materials, and put them in a safe place.
7. Turn on power; Emax will do a self-test, then the display will say "Please Insert Disk."
8. Select one of Emax factory disks, and insert it label side up with the label going in last into the disk drive (see **GENERAL INSTRUCTIONS 2**). The display will say "Loading Software" and then advise you to "Wait A Moment."
9. When the drive LED turns off, the display will show the name of the Current Preset (we'll talk more about the Current Preset concept later). Turn up the volume control and start playing the keyboard. All right!! The display will show you the ID number (P followed by two digits) and name of the sound you are playing. These sounds are called Presets, for reasons that will become clear later.
10. Use the calculator-type purple numeric keypad underneath the display to call up different Presets. Press a two-digit number; start with 01 and play the keyboard for a while, then press 02 and play, 03, 04, etc. At some point you will run out of factory Presets, and the display will say "NOT FOUND."

If you want, vary the control wheels towards the left hand side of the keyboard. They may not be active with some Presets, as they perform different functions with different Presets.

11. To try out Presets from other factory disks, push in on the eject button, remove the existing disk, and insert another factory disk. Now, locate the **LOAD ALL** button (in the group of four buttons to the right of the numeric keypad) and press it, then press the flashing **ENTER** button right below it. The disk drive will start making noises, and you will be on your way to loading another bunch of sounds into Emax.

By now you should be pretty impressed, but there's much, much more to come... so keep reading, and you'll find out all about it.

HOW TO USE THIS MANUAL

Emax is an instrument that is surprisingly easy to use, but there are literally hundreds of features packed into its computer brain. Therefore, this manual is organized so that you can take “guided tours” of different sections of Emax and therefore learn at your own pace.

This manual is organized into four parts:

- Introduction
- Guided Tours
- Reference Section
- Advanced Applications

Read the **Introduction** carefully. Warning: The toughest part of an E-mu manual is the introduction. The reasoning is that you'll learn the most important stuff while you're still fresh and motivated to read the manual. While this section is not easy reading, it contains vitally important background information and definitions - so study it carefully.

The **Guided Tours** section describes several “guided tours” you can take through the manual's Reference Section to help learn the instrument's operation. Each tour gives any necessary background information, and then directs you to particular parts of the Reference Section where these concepts are further developed. By taking these guided tours in the order presented, subjects are introduced logically and build on previously introduced material.

The **Reference Section** is the heart of the manual. Here, each function is described in detail. Once you become familiar with Emax, this will be the main section to which you will refer.

Advanced Applications deals with advanced processing and sampling techniques that help you get the most out of Emax.

CAUTION: **Much of the manual presents material as a series of steps. Always read to the end of each numbered step before pushing any buttons! Sometimes a step presents several alternatives, and tells you which one to choose at the end.**

INTRODUCTION

EMAX BASICS

DEFINITIONS, BACKGROUND, and BASICS: HOW EMAX ORGANIZES SOUND

READ THIS SECTION CAREFULLY OR THE REST OF THE MANUAL WILL NOT MAKE SENSE!!

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, and refer to this section periodically as you read the manual until you know the meaning of all the following definitions.

SAMPLING BASICS

Emax is conceptually like a tape recorder in that it records sound. However, the recording process is very different since Emax records into its computer memory.

Computers can accept information only in the form of numbers, so first Emax converts audio signals into numbers. It does this by examining (sampling) the incoming signal level at a nominal rate of 28,000 (actual rate is 27,777.8) times a second, and sequentially records these different levels in computer memory. Fig. **INTRO-1** shows a one-second percussive sound being sampled. The magnified view shows how the samples define the instantaneous level of the signal. Once stored in Emax's memory bank, these samples may be played back (in the proper sequence, of course) to reconstruct the original signal. If a two-second sound was being sampled, it would require $2 \times 28,000$ or 56,000 samples at the nominal sampling rate. Shorter sounds require fewer samples. Note: The sampling rate can be altered for reasons, which we will get into later.

Just like tape, a sound can be manipulated once it has been recorded. Playing back the samples in the 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 pitch; playing back at a slower rate lowers pitch (like a tape recorder's variable speed control).

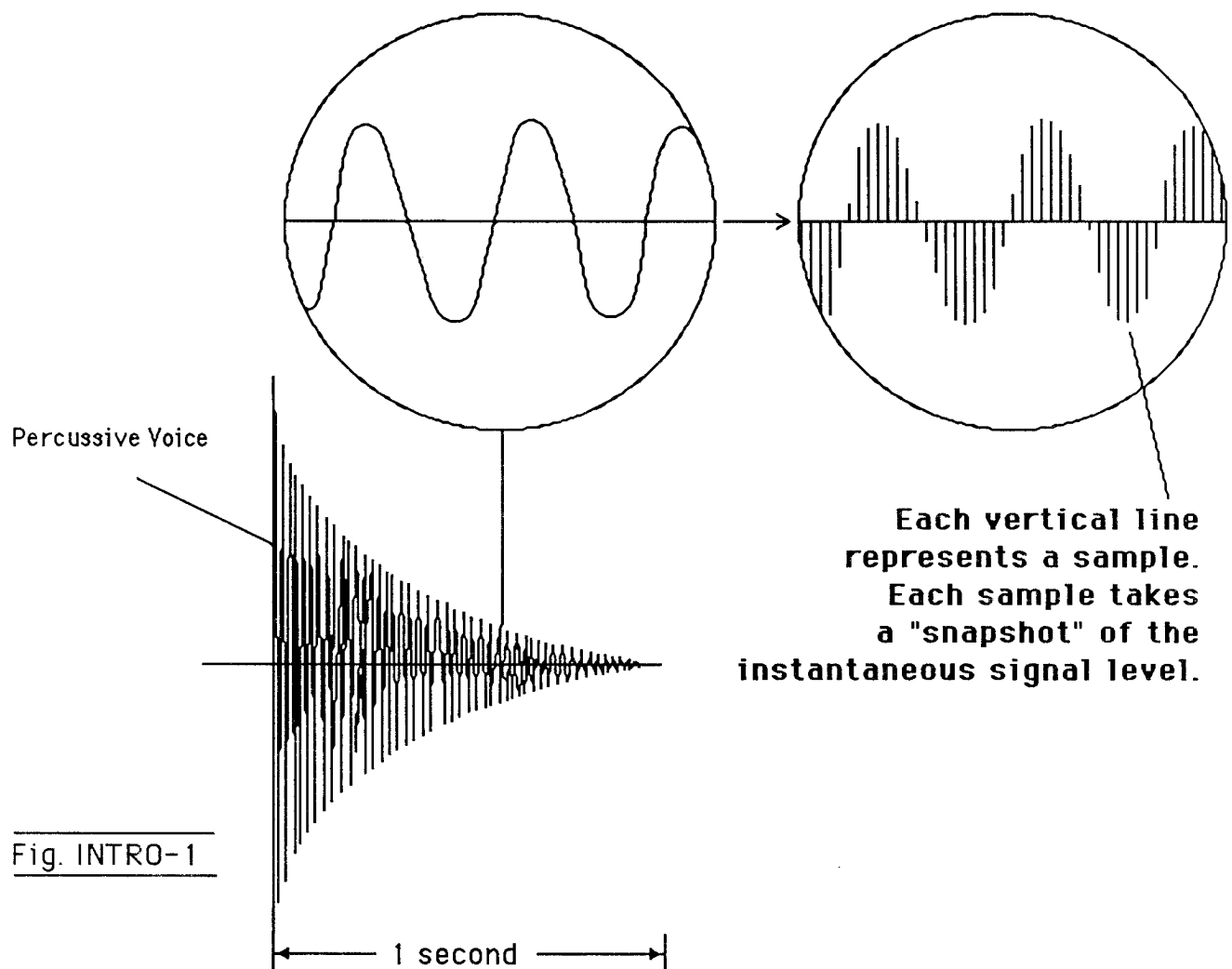
THE EMAX "MAP"

Sure, you're anxious to start coaxing wonderful sounds from the instrument - - but like ground school for pilots, the following is a necessary part of learning how to play Emax. It is important to understand how Emax organizes sounds in order to make best use of the instrument in the shortest possible time. Also, many terms will be introduced now that show up later in the manual.

You can think of Emax as resembling a collection of modules, linked by various pathways (see the Map in Fig. **INTRO-2**). These paths indicate how information flows within Emax; 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 BANK

The Bank contains all of Emax's memory, which includes Preset, Voice, Sample and Sequence data. Consider the Bank as the central storehouse for all of Emax's data. Although the memory is volatile, meaning that the data disappears when you turn off power, the Bank data can be saved permanently on disk to keep a record of your work. (This process is somewhat like saving the data in a regular polyphonic synthesizer to cassette, but using disks results in far more efficient operation.)



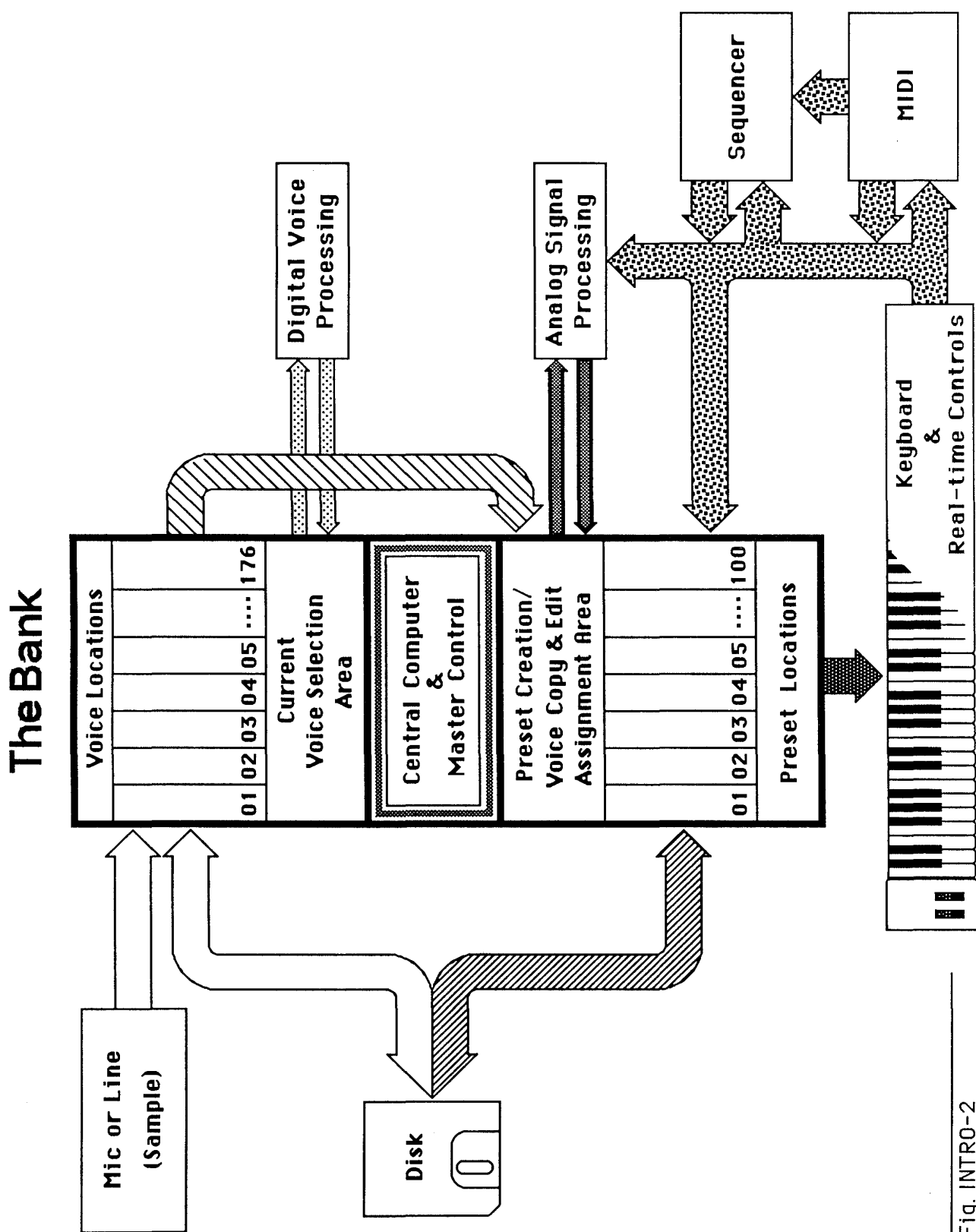
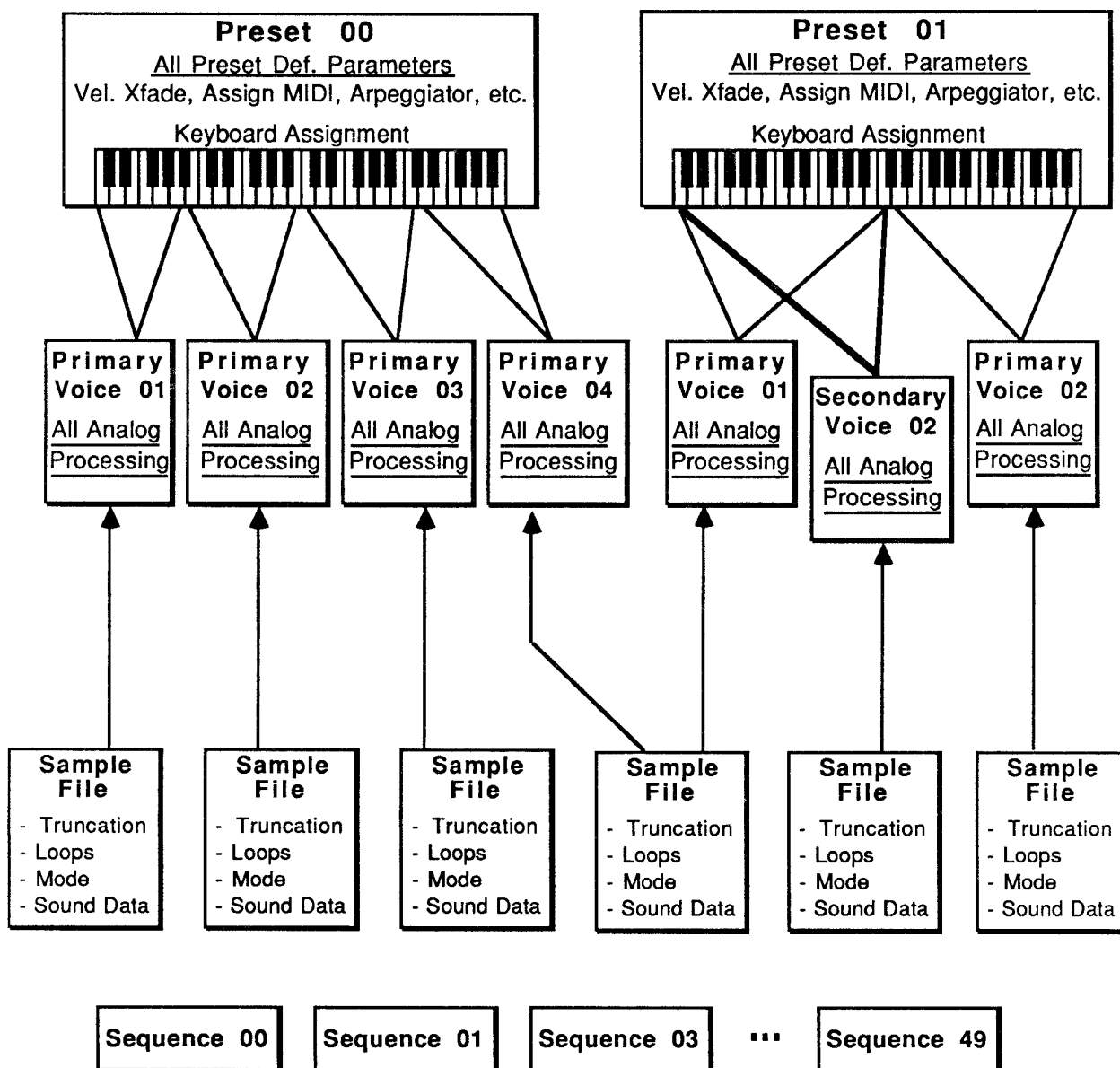


Fig. INTRO-2

EMAX BANK STRUCTURE



Total Number of Presets ----- 100
 Total Number of Sequences----- 50 } PER BANK

 Total Number of Pri. Voices --- 88
 Total Number of Sec. Voices --- 88 } PER PRESET

Also note that because the memory is volatile, when you first turn on Emax there's nothing in the Bank. Before you can make any sounds, data must be loaded into the Bank from disk or by sampling sounds. Since we now have a place to store information temporarily (the Bank), and a way to store information permanently (saving to disk), let's take a look at the different kinds of information being stored.

SAMPLES and VOICES

Sampling a sound (drum sound, oboe, zither, hamster sneeze, or whatever) using the instrument's "Recording Studio" capabilities creates a Sample, the "raw material" with which the instrument 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. Note that a "sample" is a digital recording of a complete sound, or each "snapshot" of the sound that makes up the recording (see Fig. **INTRO-1**, which depicts the "samples" that make up a "sample").

You may process this raw sample via filtering, truncation, and so on to create a Voice. Individual Voices can be saved to disk and loaded from disk as part of a Preset. The Preset can store up to two Voices per key, each identified by a two-digit Voice number and the Voice's original pitch.

MAKING A "PRESET"

A Voice can be assigned to a single note on the keyboard, or transposed polyphonically to cover a wider range of the keyboard. The process of assigning, and optionally transposing, Voices to specific ranges of the keyboard is called making a Preset. (Note: It is often necessary to use multiple Voices to make up a Preset, since wide-range transposition alters the Voice's timbre. Therefore, using multiple samples and transposing each over a small range usually gives the most realistic sound). Individual Presets, including their Voices and samples, can be loaded from disk.

Making a Preset is a three-step process:

1. Create the Preset and give it a number and name. The Bank can hold up to 100 Presets.
2. Assign Voices to different ranges of the keyboard (for example, with five Voices you could assign each Voice to cover one octave of the keyboard). This is represented in Fig. **INTRO-2** by the path connecting the Voice Locations to the Preset Creation/Voice Assignment Area. Note that the same Sample can be assigned to more than one range of the keyboard in a given Preset. Also, that Sample can be assigned to more than one Preset.
3. Choose from a number of options that further define the Preset, such as assigning Voices to partially or fully overlap other Voices (thus producing doubling effects), assigning dynamic control to individual Voices in a Preset, erasing Presets you don't like, cataloguing Presets, adding arpeggiation, setting up MIDI parameters, etc.

THE CURRENT PRESET

When you load a sound disk, a Preset will be ready to play and the display will show the Preset number. This is the Current Preset. If you select another Preset, or create a Preset, it will become the Current Preset.

THE CURRENT VOICE

Voices contained in a Preset can be sent to the Analog and Digital Processing modules for further alteration. However, since a Preset typically contains several Voices, we need to specify which Voice, or Voices, we want to process. This is called selecting the Current Voice, another three-step process.

1. Call up a Preset that contains the Voice(s) to be processed.
2. Select the range of the keyboard to be processed. This will automatically select the Voice, or Voices, that fall within the specified range (a group of Voices being processed simultaneously is still referred to as the "Current Voice").
3. You may send the Current Voice through the Analog and Digital Processing modules, whereupon they return back to the Bank in their modified form.

MORE ABOUT VOICES: THE PRIMARY AND SECONDARY VOICE

An Emax key can contain up to two “channels.” These two channels contain the Primary and Secondary Voices. For example, the Primary Voice might be a guitar note, and the Secondary Voice a detuned version of the same guitar note. When played together, you hear chorusing. Also, a Preset contains information about how the keyboard dynamics affect the Primary and Secondary Voices. For example, the Primary Voice could be that of a drum hit played softly, and the Secondary of a drum hit played loudly. You could then set up the keyboard so that playing the keyboard softly plays the Primary Voice, and playing the keyboard more forcefully plays the Secondary Voice.

MODULE

A module controls a particular section of the Emax. There are six main modules (see the labels to the right of the 12 main pushbuttons) and a sequencer module that has six sub-modules (see the labels to the left of the 12 main pushbuttons).

FUNCTION

Each module contains individual numbered functions. Example: function 2 in the MASTER module checks the amount of memory remaining.

ACTIVATING A MODULE

To work with a module, you must first activate it. Press the button associated with the desired module. The display will then show the Module Identifier.

THE MODULE IDENTIFIER

When you activate a module, the display identifies which module you have activated, and how many functions are available.

There are two ways to select a function within the module. Those just getting started can move the data slider until the display shows the desired function, then press ENTER. As you work with Emax, though, you will start to memorize the function numbers and will probably find it faster to simply key in the appropriate function number using the numeric keypad.

Example: if the manual says to “activate MASTER 2,” you would first press the MASTER main pushbutton. Then, either key in 2 using the numeric keypad, or move the slider until the display shows function 2 and press ENTER.

Note: If a module is already active, and you are finished with one function, you do not need to re activate the module - - just key in the new function number.

VELOCITY-SENSITIVE KEYBOARD

A velocity-sensitive keyboard measures how long it takes for a key to go from the key up to key down position, and uses this data to control dynamics. If it takes a long time for the key to reach the key down position, it is assumed you are playing that key less forcefully (minimum dynamics). If the key goes to the key down position almost instantaneously, it is assumed that you are playing the key more forcefully (maximum dynamics). In this manual, we will refer to playing the keyboard “harder” or “softer,” even though technically speaking the keyboard is reacting to speed of key position change, not force.

PRESSURE-SENSITIVE KEYBOARD

A pressure-sensitive (also called aftertouch) keyboard responds to pressure applied to a key after it is down. This pressure data is typically used to control vibrato amount, pitch-bending, and so on after the key is down. Emax can respond to pressure when an external keyboard with pressure sensitivity is controlling Emax via MIDI.

OTHER DEFINITIONS

The Disk Archives. So far, we've loaded a bunch of Voices into the Bank, created some Presets containing those Voices, and done some Voice processing. However, **remember that the Bank only retains this information for as long as Emax 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 on disks.

Commanding the Central Computer to "Save All" shuttles all the Bank data (Voices, Presets, and Sequences) to disk. This disk permanently (well, at least as long as the disk lasts) stores data so that even after turning off Emax, the disk will contain a record of your work.

IF YOU DO NOT DO A "SAVE ALL," ALL BANK DATA WILL BE LOST WHEN YOU TURN OFF EMAX. Do not wait until the end of a session to save--save your work (**PRESET MANAGEMENT 2**) periodically in case of power failure or some other unforeseen circumstance, which might erase the Bank's memory.

Since the disk contains a record of the Bank data, loading the disk back into the Bank transfers all the Voice, Preset, and Sequencer data into the Bank (this will replace the existing Bank data, if any). Therefore, you can work a Bank of sounds out at leisure, and save the results of your work on disk; when you go to a gig, simply take the disk with you and load all your hard work from disk into Emax in a few seconds.

The Keyboard. Note the two paths coming from the keyboard in Fig. INTRO-2; the LFO, VCA, VCF, and AHDSR Analog Signal Processors are tied to keyboard dynamics (for example, playing harder can alter the loudness, attack time, filter cutoff, etc.), as are some Preset assignment characteristics (i.e. playing louder assigns a different Voice to a particular key).

The Channel Outputs. The Central Computer assigns sounds to the output channels. For example, when you play a key, that key's sound is assigned to Output Channel 1. If you hold this key and play another key, the new key's sound will be assigned to Output Channel 2. Emax includes eight channels; therefore, you can play up to eight sounds simultaneously. Each channel has its own output jack, and there are also stereo output jacks (use one for mono), which mix the eight channels together.

Note: Channel assignments can be changed by the user (**PRESET DEFINITION 2**).

Bootting. Bootting Emax is not a repair technique; rather, it is a computer term that means "putting a disk in the disk drive after you first turn it on, and having the computer read software necessary for its operation from that disk". (It's easy to see why this was shortened to "booting".) To boot, insert a disk in the drive before, or just after, you turn on Emax. Once booted, the instrument is ready to go.

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, the arpeggiator defaults to off on creation of a new preset. Had it defaulted to the on position, new presets would all be arpeggiated!

Cursor. The cursor is a small line that shows up in the display, and flashes when it wants data from you about the number or letter under which it is located. Entering a new value will over-write the old one, whereupon the cursor moves on to the next number or letter (if applicable).

Note: If Emax 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 (called "leading zeroes"). For example, if Emax is expecting a three-digit number and you want to enter 8, you would enter 008. If it is expecting a single-digit number, entering 8 would be sufficient.

Data Slider & Increment / Decrement. On virtually all Emax menus where the data slider selects options, the Increment (**ON/YES**) and Decrement (**OFF/NO**) switches duplicate the slider function.

Saving. We can't emphasize this enough. Whenever you have done enough work on a Preset, Voice, Sample or Sequence, that you would hate to lose it, save it on at least one disk. Should you improve the Preset, Voice, Sample or Sequence 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 hassle of starting from scratch. Note that individual Presets, and the Voices they contain, can also be saved to disk.

THE BIG RE - CAP

One more time: A **Sample** is a raw sound that is recorded into the Bank. Upon being processed or otherwise modified, we call the Sample a **Voice**.

To create a new **Preset**, make sure you have all the Voices required for the Preset in the Bank, number and name a Preset, then assign combinations of Voices from the Bank to specific sections of the keyboard. By specifying one or more of these Voices as the **Current Voice**. The Current Voice may then be processed by Emax's analog and digital signal processors.

Since loading in a disk fills the Bank with Voices and Presets, you can group these Voices into new Presets, process the Voices, or alter the existing Presets.

THE REWARD

If you've assimilated this information, the rest of the manual should be fairly easy to understand. If not, re-read the previous information again, If it still doesn't make sense, plunge right into the Guided Tours - - as you actually work with Emax, all of the above definitions will make sense as you relate theory to practice.

GUIDED TOURS

GUIDED TOUR #1: MEET EMAX

Welcome to the Guided Tours! If you have just met Emax for the first time, follow these tours until you complete the Guided Tours section. This will get you “up and running” on Emax in the fastest possible time. Also, you’ll learn some tricks in this section that will come in handy as you play some more with Emax.

This tour covers how to...

- Get ready for the tours
 - Care for diskettes
 - Load a Bank from disk when first turning on power
 - Select different Presets within the Bank
 - Load additional disks
 - Tune Emax to other instruments
 - Transpose the keyboard
- and also discusses Emax’s “modular” design philosophy.

HOW TO USE THE GUIDED TOURS

Please follow all steps exactly as given. For example, if we ask you to load the Arco Strings disk, even if you would really rather hear something else load in the strings--several sections of the tour will refer to specific sounds on that disk.

Occasionally during a tour you will be told to refer to something like PRESET DEFINITION 4, SAMPLE 2, or some other name. This means that you will find more information in the specified section of the manual’s Reference Section. For example, PRESET DEFINITION 4 indicates that the information is in the Preset Definition chapter under section 4; SAMPLE 2 indicates that the information is in the Sample chapter under section 2.

Figures are referred to by a shorthand name for the chapter and a number. For example, Fig. **INTRO-1** would be the first figure in the Introduction chapter. page 8

GETTING READY FOR THE GUIDED TOURS

Have you sent in your warranty card yet? Listen, we’re not kidding! Send it in!!

Okay. Now you can proceed.

1. Set up Emax as described in the Introduction under Instant Gratification. After completing step 7, return to this section.

Remember--at this point playing the keyboard will not produce sound. In order to hear anything, you must “load” a sound into Emax from disk (which we’ll describe shortly).

2. Make sure you have about a half-dozen double-sided, double- density, 3.5” blank disks on hand, and a paper and pencil for taking notes.

DISK HANDLING

Disks are delicate and store valuable data. Before proceeding, carefully read **GENERAL**

INSTRUCTIONS 2 ("Disk Handling") for important information on how to care for your disks.

LOADING A PERFORMANCE DISK WHEN EMAX IS FIRST TURNED ON

1. After completing step 7 in **INSTANT GRATIFICATION**, the display will say "Please Insert Disk." Insert the Arco Strings disk into the drive according to the instructions given in the next to last section of **GENERAL INSTRUCTIONS 2** ("Disk Handling").
2. After about 25 seconds of loading time, the display will show the Current Preset number and name (the cursor will flash underneath the first digit). Start playing the keyboard and adjust the VOLUME slider for a comfortable listening level.

SELECTING DIFFERENT PRESETS

1. The Bank you just loaded contains several Presets. To call up a new Current Preset, use the keypad underneath the display. Note that "leading zeroes" must be entered for Preset numbers (i.e. type 0 and 2, not just 2, to call up Preset 02). Now type 0 then 2 on the keypad; these will replace the numbers indicated by the flashing cursor.
2. The display says P02 NarrowStereo. Play the keyboard . . . hey, check out those string sounds!
3. Now call up more Presets (refer to **GENERAL INSTRUCTIONS 1**, "Selecting the Current Preset,"). If you enter a number for which there is no Preset, the display will list the entered Preset number and say "Empty Preset"; try again.
4. To scroll through the Presets available in the bank, move the data slider. The various Preset names will scroll on the lower display line. When this line shows the desired Preset, press **ENTER** to make that the Current Preset. This is an alternative Preset selection method.
5. Increment or decrement the Current Preset (as displayed in the top line) with the **CURSOR** buttons. This method is useful for live performance--arrange your Presets in the desired order, and step through them as needed.

When you're ready to check out some more sounds, proceed.

THE EMAX “MODULAR” PHILOSOPHY

The left side of the Emax front panel includes the volume, data slider, **ON/YES** and **OFF/NO** (Inc and Dec) buttons, the Liquid Crystal Display, two cursor control buttons, and a numeric keypad. Once you select a module and function, this area is where you will specify parameters.

The **modules** start towards the right of the keypad. Each module will be discussed in detail later on; the following is intended mostly as background information. Each module affects a certain area of Emax's operation. Refer to the map (Fig. **INTRO-2**) to see how some of these modules fit into Emax's overall structure.

Function buttons. These are the buttons that get you going. Load All and Enter load disk data into Emax, Dynamic Allocation lets you override existing audio output assignments if they get in the way of what you are doing, and Transpose, as you probably suspect, transposes the keyboard.

Sequencer. This module is a 16-track solid state control data recorder. While optimized for downloading MIDI data from other sequencers, it has some very useful features such as Mono operation when driven via MIDI, ability to re-assign Presets, track bounce, and so on. It consists of the Sequencer Setup module (which sets up a Sequence for recording) and the Sequencer Manage module (which lets you load, erase, copy, and do other sequence “housekeeping”). The column of green buttons controls all sequencer functions.

Master. This module contains functions that affect the overall keyboard or Bank (memory remaining, keyboard velocity curve, master tune, erase all, format disk, and copy disk). This also contains the ever-popular Bird Run and Special commands, which are explained in the Reference section.

Sample. 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.

Digital Processing. With this powerful module, you may edit a Voice's length, loop (i.e. infinitely sustain) any portion of the Voice (with several different looping options), have Emax automatically find the best loop points (“Auto loop”), splice two different Voices together, mix two Voices, amplify or attenuate the Voice, and more.

Preset Management. This module handles the Preset “housekeeping”—load Presets from disk; save Presets to disk; create, copy, rename, or erase Presets; and check on how much memory space a Preset uses up.

Preset Definition. This module lets you change parameters within a given Preset. Set up the arpeggiator or MIDI options, assign the pitch bend and modulation wheels to control various parameters in real time, copy or erase Voices, edit the Voice assignment, choose Dual Voice mode (more on this later), and set some keyboard parameters (dynamics and crossfade between overlapping Voices).

Analog Processing. This module sets parameters that should be familiar to those who have worked with analog synthesizers. Set the dynamics by adjusting the VCA envelope; control timbre using the VCF (filter) and its associated AHDSR envelope generator; modulate the signal with the LFO; tie the keyboard velocity to various parameters; set the tuning, attenuation, and delay for each Voice; and more.

Remember: if you want to save modified Voices or Presets, save the altered Bank to disk. Otherwise, any changes will be lost as soon as power to Emax is interrupted.

ACTIVATING A MODULE, SELECTING FUNCTIONS, DE-ACTIVATING A MODULE

Here's important background information on how to access the various module functions. As the tours progress, we'll relate this information to practical examples.

Activating: Each module has an associated switch. Most of these are found in the right-most series of blue buttons, however, the Sequencer Setup and Sequencer Manage module buttons are found in the green column of Sequencer-related buttons. Pushing the associated switch "activates" the module, as indicated by an LED next to the switch lighting up. (Note: There must be a disk in the drive when you activate any module; the drive may run for a second or two before the LED lights up.) Upon activation, the display's top line will show the Module Identifier (such as "Master," "Preset Management," etc.). In some cases, upon activation the display will ask you to specify the Current Voice (as described in the next Guided Tour). Once the module is active, it's time to start...

Selecting functions: Each module includes a printed list of functions on the front panel; these functions are available when the module is active. Selecting a module function requires keying in its associated number with the keypad. We will shortly give an example of how this all works.

De-activating: When you're finished with the module, either press its button again to de activate, or simply activate a new module.

Hint: Any time you make a mistake, get confused, or otherwise get "lost in the module" and need to bail out, simply de-activate the module. Then, re-activate and try again.

LOADING OTHER DISKS

So far, so good. ...now it's time to move on from the Arco Strings.

1. Eject the previously inserted disk by pushing on the eject tab.
2. Select the next disk you want to audition, and insert it in the drive (**GENERAL INSTRUCTIONS 2**).
3. Refer to **FUNCTION, LOAD ALL**, follow the instructions, and then return to this section. Remember that loading in a new Bank will erase the currently loaded Bank, so always think twice before pressing Enter to load the Bank.
4. Play the sounds from the newly loaded disk. Feel free to check out the various Presets, or load new disks. When you've had enough, move on to the next section.

TUNING EMAX TO OTHER INSTRUMENTS

Refer to **MASTER 1**. This function demonstrates how Emax uses the data slider to adjust a parameter (in this case, overall tuning).

TRANSPOSING THE KEYBOARD

Refer to **FUNCTION, TRANSPOSE** and follow the instructions.

FORMATTING DISKS

Format at least half a dozen disks according to the instructions in **MASTER 5** in preparation for future Guided Tours.

GUIDED TOUR #2: SPECIFYING THE “CURRENT VOICE”

BACKGROUND

The Emax has two modules dedicated exclusively to processing Voices within a Preset:

DIGITAL PROCESSING and ANALOG PROCESSING.

Each Voice stored in a Bank can be processed independently (or groups of Voices may be processed simultaneously if desired). Therefore, we need a way to specify the Current Voice, which is the individual Voice (or collection of individual Voices) to be processed.

The concept of the Current Voice is important. To process one Voice out of a Preset, assign the Current Voice to be that one Voice, and process it. To process more than one Voice at a time, specify a group of Voices to be the Current Voice and process all Voices simultaneously

This section covers how to identify which keyboard keys belong to which Voice, and how to specify which Voices or Voices make up the Current Voice. For a short form version of this tour, see **ANALOG PROCESSING 00** and **DIGITAL PROCESSING 00**.

Begin this tour by write-protecting the Arco Strings disk (**GENERAL INSTRUCTIONS 2**) and loading it into the Bank. Write-protecting the disk means that should you hit the wrong function the wrong time, you don't have to worry about accidentally erasing or overwriting the disk. Also, read the section **FUNCTION, ENTER DATA** as the **ENTER** button will be used frequently during this and most subsequent tours.

Identifying which keyboard keys belong to which Voice

1. Once the Arco Strings disk is loaded, the display should show 01 as the Current Preset. Activate the Analog Processing Module; its LED will light after a few seconds. If a Current Voice has not been previously selected (it shouldn't have if you just loaded in the disk), the display will say:

Lo:C1
Select Lo Voice

If this is the case, move on to step 2. If a Current Voice has been previously assigned, the display's top line will give the Module Identifier. If this is the case, before proceeding to step 2 initiate the **CHANGE CURRENT VOICE** function by keying in 00.

Note: that if the Preset contains Primary and Secondary Voices, the display will ask whether you want to process the Primary, Secondary, or both Voices (**GENERAL INSTRUCTIONS 2**). With this Preset, however, there are only Primary Voices. Emax is a smart little critter, so it won't ask you to select between Primary and Secondary Voices unless both types of Voices are present.

2. Play the keyboard, starting at the lowest note. The upper display line will show the note you're playing, while the lower display line will show the Voice number and its original pitch (in this case, 01 and G1) The original pitch is the pitch of the sample itself.

See **GENERAL INSTRUCTIONS 4** for details on the keyboard numbering protocol.

This lower display line remains as is until you play the first A#1. From this, we can conclude that Voice 01's original pitch is G1, and that it was transposed to cover the range from C1 to A1.

Play ascending keys, one at a time, over the full range of the keyboard. The display will give the Voice number and the original pitch. Take a minute or two and note where the various Voices begin and end, and which Voices are at which locations on the keyboard. They should be as follows:

Voice#	Orig.Pitch	Lo Transposition	Hi Transposition
01	G1	C1	A1
02	E2	A#1	G2
03	C3	G#2	C#3
04	E3	D3	F3
05	G3	F#3	A3
06	C4	A#3	C#4
07	E4	D4	F4
08	G4	F#4	C#5
09	E5	D5	F5
10	G5	F#5	C6

Specifying the Analog Processing Module Current Voice

Now we know how many Voices there are in the Preset, and the range covered by each Voice, Let's specify a range of Voices to be altered by the Analog Processing Module, starting with the lowest Voice. This will become the lowest part of the Current Voice.

1. Press a key in the lowest Voice of the range you want to process. For this exercise, press E2. When the upper display line confirms your choice, press **ENTER**. Since E2 is located within Voice 02, that Voice becomes the lowest Voice of the Current Voice. Note that you could have pressed any key within Voice 02 to specify that Voice.
2. The display now shows the highest note of the Voice in which E2 resides. Don't press **ENTER** yet - - but if you did, this highest note would set the upper limit of the Current Voice. Instead, let's make the Current Voice cover a somewhat wider range. Press C4 (the display will show this as the new high note) and press **ENTER**. As with selecting the lowest Voice, selecting any key within the highest Voice makes that Voice the upper range of the Current Voice. Thus, the Current Voice now extends from V02 to V06, and covers the range from A#1 to C#4.
3. You will now see the Module identifier, which means you're ready to start modifying the sounds in the bank with the Analog Processing Module the subject of the next tour.
4. The assigned Current Voice will remain as is, until you change the Current Voice assignment, change Presets, or load another Bank. If you switch between modules, the Current Voice remains as assigned (unless you select the Digital Processing Module, which will be a subject of a later tour).
5. Before proceeding, look over **ANALOG PROCESSING 00** to help reinforce what you've learned. Now that you know what a Current Voice is and how to specify it, we've reached the end of this tour (although you may need to come back from time to time to refresh your memory). In the next tour, we'll see how to modify Voices with the Analog Processing section.

GUIDED TOUR #3: ANALOG PROCESSING

BACKGROUND

The Analog Processing module consists of several sound processing functions. Let's start with the Filter and VCA sections, as they are among the most important.

The VCA function contains eight VCA's that control a sound's amplitude envelope. The Filter function contains eight VCF's that control a sound's timbre.

Make sure you have loaded In the Arco Strings disk and selected the Current Voice as specified in Guided Tour #2 before proceeding. The display should show the Analog Processing Module Identifier. If not, repeat Guided Tour #2.

WORKING WITH THE FILTER

1. You could activate the Filter Setup function directly by keying in 13. However, let's investigate another way to select the Filter function. Move the data slider to catalog the various Analog Processing functions. When the display shows function 13, Filter Setup, press **ENTER**.

Changing Filter Cutoff Frequency

1. Refer to **ANALOG PROCESSING 13**. The display should look like the one in Step 1 of **ANALOG PROCESSING 13**.
2. Play with the Cursor buttons (the left and right arrow buttons directly below the display). Note how you can move the cursor under the various parameters to be adjusted. For now, move the cursor under Fc.
3. Vary the data slider. Note how the numbers under Fc change. Lower numbers mean a lower filter cutoff frequency (less high frequencies). Higher numbers mean a higher filter cutoff frequency (more high frequencies). Observe how only the notes within the Current Voice are affected by the slider setting. Note: You must re-trigger a note to hear any changes. Holding down a note and playing the slider will not change the sound; you must play a note after changing the slider to hear the results of changing the slider. This is true when making any changes to the sound, not just while you're in the Filter function or the Analog Processing module.

By the way, now might be a good time to mention that although we are changing the sounds in the Bank, the sounds on the disk remain unchanged. This is because 1) we haven't saved the Bank to disk and 2) even if we tried to, the disk is write-protected and cannot be overwritten. Thus, you can fool around with the Bank sounds as much as you want without having to worry about altering the original sounds on the disk.

Changing Filter Q

1. Move the cursor under Q on the display. Vary the slider to change the sharpness of the sound; higher numbers give a sharper sound. Again, this affects only the range of notes covered by the Current Voice. Leave the Q at about 90 and proceed.
2. Move the cursor back to Fc and vary the data slider. Note how this produces a sort of wa-wa effect (remember, you have to re-trigger the key to hear the results of changing the Q).
3. Now set Fc and Q to about 50. The range of notes covered by the Current Voice should sound muted.

Changing the Filter Cutoff Envelope

1. Let's investigate the effects of envelope control over the filter sound. Move the cursor under Env and use the slider to set a value of +40. This allows the envelope to control the filter cutoff frequency. For more information on envelope control, see **ANALOG PROCESSING 14**.
2. Now we need to change over to **ANALOG PROCESSING 14**. Press **ENTER** to exit from the current function (see **GENERAL INSTRUCTIONS 3**), and the display will show the Module Identifier.
3. Key in 14 to select the filter envelope parameters.
4. Move the cursor under A and vary the slider. With larger values, it will take more attack time for the filter frequency to go from lowest to highest cutoff frequency. Refer to **ANALOG PROCESSING 4**, vary the various envelope parameters, and observe the effect these changes have on the sound.
5. Now let's check out inverted envelopes. Set the envelope parameters as follows:

F: A H D S R
01 01 07 01 01

...and play and hold a chord. This is a non-inverting envelope in the sense that the envelope increases the filter cutoff frequency above the initial cutoff. To select an inverting envelope, where the cutoff decreases below the initial cutoff, exit Function 14 by pressing **ENTER** (this puts you back at the Module Identifier), then key in 13.

6. We're back at the familiar Filter Setup screen. Move the cursor under Env and select -40 to invert the envelope. Note that the envelope effect is not all that noticeable when you play a chord. This is because the envelope forces the cutoff frequency in a negative direction, and since the cutoff frequency is already fairly low, it can't go that much lower.
7. Now move the cursor under Fc and increase the cutoff frequency to around 90 or 100. The effect will be far more noticeable since there will be more range available for the negative-going envelope excursion.
8. If you feel like experimenting, play with the Trk control to affect the way the filter frequency tracks the keyboard pitch (see **ANALOG PROCESSING 13**).
9. Before proceeding with the Tour, set Fc=1 00, Q=00, Env=+00, and Trk=1 .00. Set the envelope to A=01, H=01, D=01, S=32, and R=05. After entering these values, press **ENTER** to return to the Module Identifier.

FUN WITH VCAS

1. In preparation for the following experiments, let's change the Current Voice to include the entire keyboard. Enter 00, then press enter twice. You have now selected the entire keyboard. Pressing the **ANALOG PROCESSING** button twice in succession will also select all voices.
2. Now key in 12 to select the VCA function. Referring to **ANALOG PROCESSING 12**, move the cursor under the various envelope parameters and see how different settings affect the sound.
3. Before moving on, make sure you have a sound that is fairly sustained with little or no envelope attack time.

OTHER ANALOG PROCESSING OPTIONS

1. Key in 11, refer to **ANALOG PROCESSING 11**, and note how the controls affect the sound.
2. Let's add some LFO effects. Key in 16 and position the cursor under each display option. Vary the data slider and observe how this affects the sound. Note that adding LFO to Fc might not sound all that noticeable; if you want a more obvious effect, bounce back to function 13 and set Fc to about 50 and Q to about 50. This should make the LFO's effect more noticeable.
3. If the LFO settings aren't to your liking, then key in 15 to change the LFO rate, delay, and variation (as explained in **ANALOG PROCESSING 15**).

UNDERSTANDING VELOCITY

1. By now you might have a pretty messy sound due to all those exercises. Let's start with a clean slate. Press Function button **LOAD ALL** and then **ENTER** to re-load the disk. The Current Preset should be Preset 01. Press the **ANALOG PROCESSING** button.
2. Let's make the entire keyboard the Current Voice. Press the **ANALOG PROCESSING** button again, which selects the entire keyboard.
2. Key in 17, and read over **ANALOG PROCESSING 17**. The velocity to level setting should be 06; move the slider to select different values, and note the effects. Emax plays softer as you play softer. In other words, Emax equates harder play with the nominal volume setting and goes down from there as you play softer.
4. Move the cursor under the other available parameters and vary the slider. Notice that the filter cutoff frequency lowers, as you play softer. The amount downward change is dependent on the value in the display.

Filter Q is affected differently than level or filter cutoff. It rises from the initial setting as you play harder. Also, note that velocity can be set to affect Q inversely - - in other words, if the filter is set to a high Q setting, playing harder on the keyboard will lower the Q.

5. After you've had enough of function 17, key in 18. Here the velocity affects the VCA and Filter envelope attacks, as well as panning. Refer to **ANALOG PROCESSING 18** as you experiment with different settings. Remember that the velocity-to-envelope attack setting interacts with the initial envelope attack settings; if you don't take our word for it, then by all means call up the envelope attack parameters for the Filter and VCA and see how different values interact with different velocity values. Note that Preset 06 makes use of velocity-controlled Filter and VCA attack times.

MORE ANALOG PROCESSING...

Read over **ANALOG PROCESSING** sections 19, 20, and 21. If any of these interest you, use the knowledge you've gained in this tour to try out these functions on various Presets.

GUIDED TOUR #4: REAL TIME CONTROL PROGRAMMING

BACKGROUND

Ever wanted to add vibrato to a grand piano? Or bend its pitch? The Real Time Control module can do this, and lots more. Begin this Tour by re-loading the Arco Strings disk, then select Preset 01.

PITCH-BENDING

First, let's check out pitch-bending. Play middle C and rotate the pitch bend wheel. Hmm. ..no pitch bend. Now play F4, and there will be pitch bend. Check further, and you'll see that pitch-bending affects only the range from 04 to F4. This is because pitch bend can be enabled for any Voice or Voices within a Preset. In this case, pitch bend was only enabled for the Voice that spans from D4 to F4.

Let's have pitch bend affect the entire keyboard. Key in **ANALOG PROCESSING 22** and select the entire keyboard as the Current Voice (surely you know how to do this by now, so we'll spare you the details). Move the slider, and you'll see a list of modulation destinations. Pitch will be set to NO. Press YES, and like magic, you can now pitch bend the entire Current Voice.

The important point of all this is that if modulation does not seem to affect a Voice, make sure that modulation is enabled. Now read **ANALOG PROCESSING 22** for more information.

Want to change the pitch bend range? De-activate the Analog Processing module, activate Preset Definition, and refer to **PRESET DEFINITION 8**.

CHANGING MODULATION WHEEL DESTINATIONS

Note: Emax offers two vibrato options: Pre-programmed (which adds a constant, selectable amount of vibrato), and real time (where the player adds in vibrato by using one of the wheels).

Each Emax wheel can be assigned to a particular destination. For example, if the left wheel is assigned to pitch, then rotating the wheel bends pitch. If assigned to the filter, rotating the wheel varies the cutoff frequency.

Let's set up for the next part of the Tour. Choose Preset 01 as the Current Preset if it is not already. Activate **ANALOG PROCESSING**, assign the entire keyboard as the Current Voice if necessary, then key in 22. Vary the slider and press **YES** for all the enable options. This will make it easier to hear the results of the next series of experiments.

Now activate **PRESET DEFINITION** and key in 9. To make "live" playing as simple as possible, the display works somewhat differently for this module. The display shows eight pairs of numbers:

1:1	2:4	3:0	4:0
5:0	6:0	7:3	8:6

The first number of each pair stands for one of the eight possible control sources (the left-hand column of functions printed on the top panel under Preset Definition 9), namely:

1. Left wheel (center detent, spring return type)
2. Right wheel (continuously variable type)
3. Pressure (keyboard aftertouch from external MIDI keyboard)
4. Control voltage pedal (plugs into rear panel PEDAL jack; also
5. Accepts any 0 to +1 0V control voltage source)
6. MIDI control A (can be assigned to any MIDI controller #)
7. MIDI control B (can be assigned to any MIDI controller #)
8. Footswitch 1 (plugs into rear panel FOOT SWITCH 1 jack)
9. Footswitch 2 (plugs into rear panel FOOT SWITCH 2 jack)

The second number of the pair represents a control destination (the right-hand column of functions printed in the module), which you assign to a control source.

Each of the destinations printed in the upper right-hand column (0-9) can be controlled by control source 1, 2, 3, or 4, or via data sent over MIDI. For more information on MIDI, see **PRESET DEFINITION 7** ("MIDI Setup") and the Advanced Applications section of this manual.

Each of the destinations printed in the lower right-hand column (0-6) can be controlled by sources 7 and 8.

You'll be happy to know that real time control settings are memorized for each individual Preset. Thus, if desired each Preset can react to the real time controls and MIDI controllers in different ways.

SELECTING A CONTROL SOURCE and CONTROL DESTINATION

1. With Arco Strings Preset 01 as the Current Preset, and **PRESET DEFINITION 9** activated, select the left wheel as a control source by keying in 1. The cursor will flash underneath the number to the right of the chosen control source number, thus indicating that Emax is ready for you to key in the control source's destination.
2. The left wheel should be assigned to 1 (pitch). Vary the wheel and check that the keyboard pitch is indeed affected. If sections of the keyboard are not affected, check that pitch control is enabled (**ANALOG PROCESSING 22**). Now press 2; this assigns the left wheel to Filter cutoff. Rotating the wheel towards you should produce a more muted sound. Key in 3, and the left wheel will affect overall volume. If you feel adventurous, check out the other control destinations. Note that if you select a destination that is already specified for one of the other control sources, the old assignment will be de-selected and that control source will be turned off (0).
3. Think about it for a bit...the left wheel can control a destination, the right wheel can control a different one (as can the pedal), and there are MIDI control possibilities too. These assignments can be different for each Preset, and particular controller destinations can be disabled for different Presets and Voices. We're talking versatile here, so if you feel like taking out the next couple of hours and checking out all the possibilities, be our guest!

Note: When assigning the footpedal, make sure it's plugged in to prevent unpredictable results.

4. Oh yes, and there are footswitches too. But before experimenting with the footswitches (sources 7 and 8), we need to understand the difference between looped and unlooped sound:

Looping is described more fully in **DIGITAL PROCESSING 2** and **DIGITAL PROCESSING 3**, but basically, a "sustain looped" sound is one where a portion of the sound is put into an "infinite repeat" loop for as long as you hold down the key. This is similar to the infinite repeat function on digital delay lines. Looping allows for sustaining a normally non-sustaining sound for as long as you like. An unlooped sound is not artificially sustained, and therefore lasts its normal length.

Keeping this in mind, refer to **PRESET DEFINITION 9**, Destinations 0 - 6. Assign various functions to the footswitches; note that some sounds lend themselves to the sustain function better than other sounds, so feel free to experiment.

GUIDED TOUR #5: BASIC SAMPLING

BACKGROUND

Sampling does not just involve sticking a microphone in front of something - - sampling is an art. So we've included information on the art of sampling in the Advanced Applications section of this manual. Meanwhile, this Guided Tour gives you the basics, and also lays the groundwork for the guided tour of the Digital Processing module.

SETUP

1. Plug a microphone into the rear panel **SAMPLE INPUT** jack (an instrument can also be used, but a microphone is easier to work with for now).
2. Format a disk (see **MASTER 5**). This clears out the memory, which gives us maximum sampling time.
3. Set the level (**SAMPLE 1**). The default placement will work for now, but if you want to change it, see **SAMPLE 2**. Also set the sampling rate (**SAMPLE 3**). This should be at 28 kHz; might as well leave it there for now. Check the available sampling time (**SAMPLE 4**), which should be 18 seconds.
4. Set the threshold (**SAMPLE 5**), arm the sampling process (**SAMPLE 6**), and you're ready 1 sample! Speak into the microphone; as soon as the level exceeds the threshold, the display will say "sampling." Feel free to talk away for 18.8 seconds, but if you lose patience, press 8 to stop sampling.
5. Play the keyboard in the assigned range (lower keyboard, C1 - B1) to hear the results of your sampling.
6. Now experiment with more sampling: Try setting a particular sample length (**SAMPLE 4**), using forced sampling instead of threshold-sensitive sampling (**SAMPLE 7**), assigning the sampled sound to other portions of the keyboard (**SAMPLE 2**), and also, practice terminating the sampling process (**SAMPLE 8**). As long as you do not de-activate the module, new samples will replace previous samples on the keyboard.
7. To save the sample as part of a Preset, de-activate the Sample module. Since memory was cleared prior to sampling, Emax created a preset (00) called "Untitled," and this is the Preset that holds your new sample. Had you sampled into a Bank with existing Presets, the sample would have been stored with the Current Preset. If you wanted to sample into a new Preset, you would have first had to create a Preset (**PRESET MANAGEMENT 3**) in which the sample could reside.
8. Let's try another sample. Activate **SAMPLE 2** to change the current voice. Notice that Emax, a very polite instrument, doesn't overwrite the existing sample without your express permission; thus, the new sample is automatically assigned to the next higher octave. This assignment can always be modified with **SAMPLE 2**. Also note that if you're ever in a position where you're going to overwrite an existing sample, Emax will notify you via the display.
9. Remember, this Guided Tour is intended simply as an overview to give you a "feel" for the sampling process. Good sampling requires skill and patience; practice!!

GUIDED TOUR #6: DIGITALLY PROCESSING SAMPLES

BACKGROUND and SETUP

Digital processing allows for radically altering Voices stored in the Bank. In this Guided Tour, we'll learn - - among other topics - - how to truncate, loop, reverse, splice, and combine samples. First, though, we need to take a couple of samples with which we can practice.

1. Clear the Bank of memory (**MASTER 4**).
2. Follow the directions in Guided Tour #5 and make a sample of yourself speaking. However, select a 4 second sample rate (**SAMPLE 4**). After setting the threshold and such, arm sampling and start jabbering.
3. De-activate the Sample module, then re-activate and take another 4 second sample. You will not have to do any setup -- just hit **SAMPLE 6** and talk away. You now have two samples suitable for experimentation.

CHOOSING THE CURRENT VOICE

1. Activate **DIGITAL PROCESSING**. You will be asked to select a Voice, so press a key within the range of the Voice that you want to work on and press **ENTER**.

TRUNCATING A VOICE

1. Choose **DIGITAL PROCESSING 1** to truncate the ends off voices.
2. Vary the Data Slider as you play a key in the range assigned to the current Voice. Notice the start of the Voice will disappear. Use this technique to get rid of silence at the start of a Voice or for effects.
3. Move the cursor using the arrow keys to the End display. Use the Data Slider to truncate any undesired part off the end of the sample.
4. When you get tired of truncating, press **ENTER**. When Emax asks if you want to Make Truncation Permanent, enter **NO** so that the full sample is available for subsequent experiments in this tour.
5. If desired, change the Current Voice (**DIGITAL PROCESSING 0**) and experiment with truncating the other sample you took. Again, when asked if you want to Make Truncation Permanent, press **NO**.

LOOPING A VOICE

1. If you haven't yet done so, activate the **DIGITAL PROCESSING** module and assign the Current Voice. Select function 4 and turn the loop mode ON.
2. Refer to **DIGITAL PROCESSING 2** to graphically see how looping affects a sample. If you play and hold a key in the Current Voice, it will play indefinitely since the loop function is on.
3. Now try modifying the loop. Activate **DIGITAL PROCESSING 2** and adjust the Start and Length values. Note that if the length equals the full length of the sample, you will not be able to set a new start point. Reduce the length, and you should be able to adjust the start point. For practice, try looping individual words or sentence fragments.

Please remember that looping is a very complex process, which requires a great deal of practice for proficiency. The only way to fully understand looping is to experiment with a variety of signals. The purpose of this Guided Tour is to acquaint you with the concept of looping, but there is much more to the subject than simply fooling around with looping words from a spoken sample. For more information, refer to the Advanced Applications section of this manual.

SPLICING VOICES

Splicing marks an end point in one sample and a start point in a second sample; the first sample end and second sample start are then joined together. See **DIGITAL PROCESSING 6** to graphically see how this process works, then follow the instructions given to splice two samples together. (Make sure any loops are turned off in the samples for best results.)

COMBINING VOICES

Combining mixes two samples together digitally into a single sample whose length equals that of the longer sample. Assuming you still have two samples on the keyboard, follow the instructions in **DIGITAL PROCESSING 7** and combine them. If not, first clear the Bank memory and record two samples as instructed at the beginning of this section.

FURTHER INVESTIGATIONS

The Digital Processing module is very powerful, but this is one case where spending some time experimenting with the various options works much better than just reading about them. Fool around with Taper (**DIGITAL PROCESSING 5**), Crossfade Looping (**DIGITAL PROCESSING 8**), and Digital Effects (**DIGITAL PROCESSING 9**). The more you work with these functions, the more sense they will make, and the more easily you can get E-max to do your bidding.

TIME TO SAVE?

Maybe you haven't created any masterpieces during these experiments . . . but maybe you have. If you want to save a Preset to disk, take your blank formatted disk prepared in the last Guided Tour and Save All (**PRESET MANAGEMENT 2**). Moral of the story: Always have a blank formatted disk around; just in case you come up with something you want to save.

GUIDED TOUR #7: MANAGING THE BANK

BACKGROUND AND SETUP

The following functions don't necessarily do glamorous things, but they are very useful. This Guided Tour acquaints you with these utilities.

Begin by write-protecting (**GENERAL INSTRUCTIONS 2**), and then loading, the Arco Strings disk.

ERASING A PRESET

1. Refer to **PRESET MANAGEMENT 4** and erase Preset 01. Don't worry; this is just gone from the Bank, not the disk. And we can get it back anyway by...

LOADING A PRESET

1. See **PRESET MANAGEMENT 1** and load Preset 01. Now it's back in the Bank again.

OTHER BANK MANAGEMENT FUNCTIONS

1. The other functions--copy, rename, create, and Preset size-- are pretty much self-explanatory. Refer to **PRESET MANAGEMENT 5, 6, 3, and 7** respectively. Try these various functions to get a feel for how they work. **PRESET MANAGEMENT 2** lets you save the Bank to disk, but you probably don't want to do that right now and besides, the Arco Strings disk is write-protected anyway so you can't save to disk.

GUIDED TOUR #8: THE SEQUENCER

The Emax sequencer is a "scratchpad" for musical ideas, and is not intended to be a sophisticated do-all whiz-bang. However, you can create sequences on a fancy computer and, using Super Mode, download these sequences via MIDI into the sequencer (**SEQUENCER SETUP 6**).

For now, we'll check out how the sequencer works as a scratchpad, so load the Arco Strings disk, activate **SEQUENCER MANAGE**, and let's go.

1. Key in 1 to set the tempo. While you're at it, activate **SEQUENCER MANAGE 2** and make sure that the Emax clock is on Internal. The other Sequencer Manage options--Load, Erase, Copy, and Rename--are described under **SEQUENCER MANAGE 3** through 6.
2. Now press **SELECT**. There will only be one sequence, 00, which is untitled. Enter 01 and the display will show 01 as an "Empty Seq." This is the sequence into which we will record.
3. Press **RECORD**, then **PLAY**. Start playing the keyboard immediately when you press play. When you've played enough, press **STOP**.
4. To play back the sequence, press **PLAY**. Varying the data slider will change the tempo. The display will show this is an untitled sequence; practice renaming it with **SEQUENCER MANAGE 6**.
5. To stop the Sequence at its end, press **STOP** once. To stop it immediately, press **STOP** twice.
6. Now dig into the Sequencer portion of the manual and check out all the various functions if you so desire. Bouncing tracks is fun, as is overdubbing . . . and Super Mode . . . in fact; sequencers in general are a lot of fun.

GUIDED TOUR #9: MAKE YOUR OWN

These Guided Tours cover only the basics; to cover every possibility of how to use the instrument would

drown you in words. It's better that you just start playing! The best way to learn Emax is to dive right in. Remember, you can experiment as much as you want on stuff in the Bank; you have to actually save the Bank to disk in order to alter the contents of the disk, and in case you're nervous, you can even write-protect the disk.

Try to spend some time not playing with, but rather practicing with, the instrument. After you're a little more familiar with Emax, read through the Reference Section and delve deeply into a particular function or module. Emax is like an audio construction set, where sounds can be captured, held, processed, mutated, spliced, sped up, slowed down . . . and lots more, so take advantage of what it has to offer.

The more you practice with Emax, the more you'll be able to put your personal stamp on the music you play. And when you do play, you'll know the instrument well enough so that you are free to concentrate on the music.

REFERENCE SECTION

GENERAL INSTRUCTIONS

1 SELECTING THE CURRENT PRESET

This Function chooses one of the available Bank Presets.

1. With no modules active, the display will show the Current Preset name and number. The blinking cursor will appear under the Preset numbers first digit.
2. There are three ways to change the Current Preset:
 - A. Enter a two-digit number with the keypad. If you enter a number for which there is no Preset, the lower display line will show the illegal Preset number and say Empty Preset. Try again.
 - B. Move the data slider or the increment buttons. The top display line will continue to show the Current Preset, but the lower line will scroll through the available Presets as you move the data slider. When the lower line shows the Preset that you want as the Current Preset, press **ENTER**.
 - C. Increment or decrement the Current Preset (as displayed in the top line) with the **CURSOR** buttons. This method is useful for live performance - - arrange your Presets in the desired order, and step through them as needed.
 - D. Use a footswitch to advance through the presets.
3. To see the Current Preset number at any time, de-activate any active modules and look at the display.

2 EXITING A FUNCTION

After modifying a Current Voice or Preset by adjusting any of its parameters, you have three options on how to proceed.

1. If the Enter LED is lit steadily, pressing **ENTER** will return you to the Module Identifier.
2. De-activate the module (Emax returns to Current Preset).
3. Activate another function within the module or activate another module.

Remember: A modified Voice or Preset is saved in the Bank, which loses its memory when the power goes off. To permanently save modified individual Voices and complete Banks, save to disk.

3 KEYBOARD NUMBERING PROTOCOL

**Several functions reference particular keyboard keys.
Emax numbers the keyboard keys as follows.**

The left-most (lowest) C is C1. The next highest note is C#1, then D1, D#1, E1, etc. through to B1. After B1, the next higher C is C2. Notes proceed upwards from C2 (C#2, D2, D#2, E2, etc.) until the next higher C, which is C3 (middle C). Notes count upwards in a similar fashion until reaching the very highest C, which is C6. In summary:

The lowest octave spans the range C1 – B1.
The next octave higher spans the range of C2 - B2.
The next octave higher spans the range of C3 - B3.
The next octave higher spans the range of C4 - B4.
The next octave higher spans the range of C5 - B5.
The very highest note is C6.

Note: Emax is able to accommodate an 88-note keyboard over MIDI, from keys A-1 to C7.

4 DISK HANDLING

Disks represent the sum total of your experience with Emax, and should be handled with care.

Common courtesy for disks

Disks should never be:

- Bent or sat on
- Exposed to strong magnetic fields (TVs, speakers, etc.)
- Subjected to temperature extremes
- Left out in the sun
- Used for coasters or frisbees.

Disks should always be:

- Kept away from dust, dirt, and smoke
- Treated carefully and gently.

Disk type

Emax requires double-sided, double-density (DS/DD) 3.5-inch microfloppy disks. In some cases the less expensive single-density or single-sided disks will work with Emax, but we do not recommend using these except for non-critical applications.

The disk drive

Before transporting Emax (even if it's only across the room), always insert either the original packing material (see **INSTANT GRATIFICATION** in the introduction) or a "scrap" disk into each drive. This protects the drive from vibration. Do not use a good disk, as it could become damaged during transit.

When active, the drive's LED will light. Do not try to operate Emax when the LED is on. The mechanism will occasionally make "clunking" sounds; these are normal.

Labeling disks

Write on an adhesive label, which you then attach to the disk. Always label your disks so that you don't confuse blank and recorded disks.

Write-protecting disks

Write-protecting a disk turns off the disk drive's ability to record on to the disk, thus preventing accidental erasure. To write-protect a disk, open the write-protect "switch" in the corner of the disk. To write-enable the disk, close the "switch" so that there is no visible hole in the disk case. (Fig. **GENINS-1**).

If you try to write on a disk that is write-protected, the Emax display will say, "Disk is Write Protected".

Inserting the disk in the drive

Referring to Fig. **GENINS-2**, insert the disk into the drive label-side up, with the metal disk protector flap going in first. Gently push the disk in as far as it will go, until you hear a solid click that indicates the disk is seated in the drive.

Always have a disk in the drive!

Because Emax disks contain Operating System software, which is occasionally referenced by the computer, there must always be a disk in the drive.

**3.5" Micro-Disk
Write-Protect
Slide-Switch**

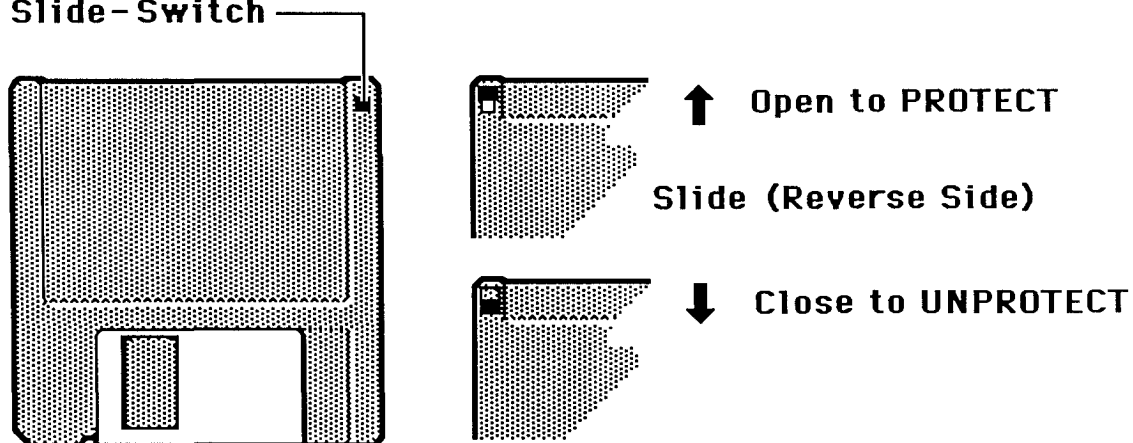
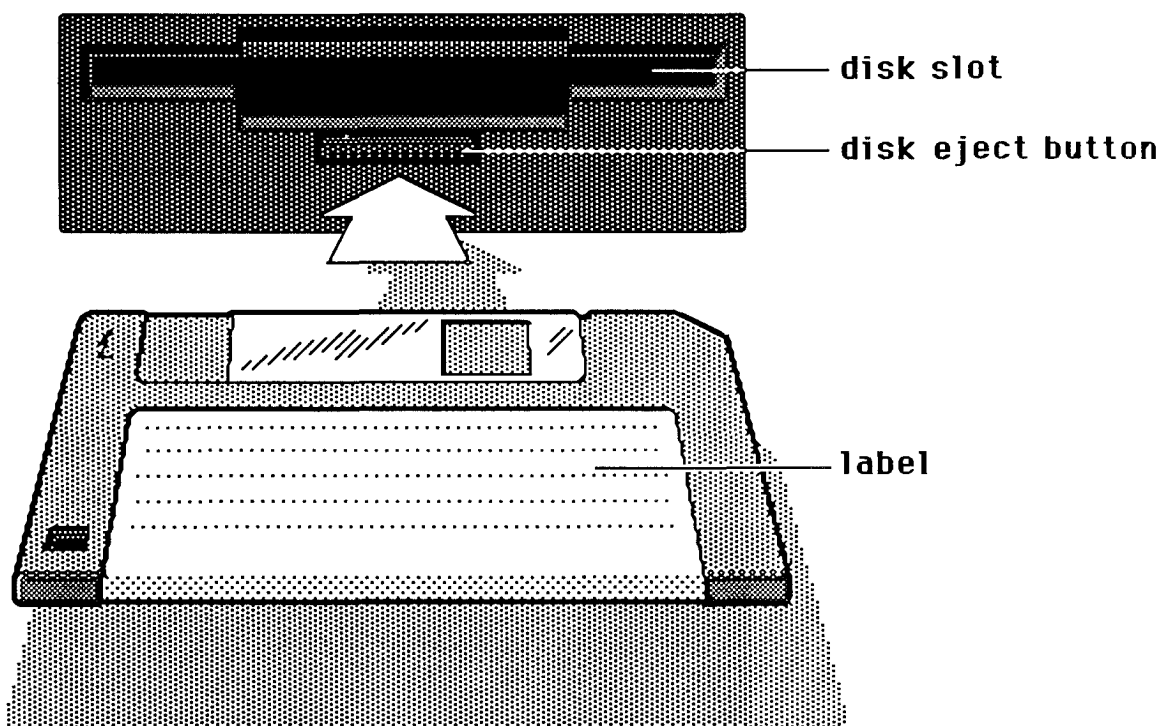


Fig. GENINS - 1

FLOPPY DISK DRIVE



3.5" MICRO FLOPPY DISK

Fig. GENINS - 2

FUNCTION BUTTONS

Module: FUNCTION**Function: TRANSPOSE**

This function transposes the keyboard in half-step intervals \pm one octave.

Applications: Use one key's fingerings in a different key. Modulate to a different key without having to use different fingerings.

1. Press and hold **TRANSPOSE**; its LED will flash. The display says:

Transpose
Play a Key

If the keyboard has already been transposed, the **TRANSPOSE** LED will be steadily lit. If you press and hold **TRANSPOSE**, not only will its LED flash, but also the display will show the amount of transposition referenced to C2 (**see GENERAL INSTRUCTIONS 6**), the second C from the left-hand side of the keyboard. For example, if Emax is one whole-step sharp, the display says:

Transpose +0
Play a Key

2. To transpose: Continue to press **TRANSPOSE** and press a key between C1 and C3. The display shows which keyboard key you have selected for the transposition ratio (compared to C2).
3. To retain the transposition: Release **TRANSPOSE** (its LED stays lit to remind you Emax is transposed).
4. To cancel the transposition: Press and hold **TRANSPOSE**, press C2, and then release **TRANSPOSE** (its LED should now be off).

Note: Transpose transposes the key number rather than the voice assignment. This means that selecting the current voice and any other use of the keyboard will show the transposed key number. In short, you should turn off transpose before selecting or modifying any voices. The note sent over MIDI is post-transposition. Notes from the sequencer or MIDI are also transposed.

Application: Use transpose to easily reach "hidden" voices that lie beyond the ends of the physical keyboard.

Module: FUNCTION**Function: DYNAMIC ALLOCATION**

This function bypasses existing Voice to Output Channel assignments, and makes all Voices available at all Channels (as if all Voices were assigned to Channels 1 - 8 - refer to PRESET DEFINITION 2, "Edit Assignment").

Application: Audition all Voice sounds without having to listen to specific Channels.

1. Press **DYNAMIC ALLOCATION** to override Voice Output Channel assignments; press again to deactivate.

Module: FUNCTION**Function: LOAD ALL**

A disk stores Presets, Voices, and Sequences. Load All loads all data on the disk into the Emax.

If a disk is in the drive when the machine is first turned on, Load All is invoked automatically. Similarly, inserting a disk into the drive right after the machine has been turned on will initiate the Load All function. At all other times use Load All to transfer disk data into the Emax.

1. Insert the disk to be loaded into the drive.
2. Press **LOAD ALL**. The display says:



Load All Presets
And Sequences

.and the **ENTER** light will flash.

3. To load all presets and sequences, press **ENTER**. The display says:



Just a Moment...

After several seconds, the disk will be loaded and the display will show the Current Preset. If there is a problem with the disk, **the ENTER** light will flash and the display will say...



Read Error

Press **ENTER** to give it another try. Otherwise, try a different disk.

4. To choose a different Preset enter its number with the keypad (see **GENERAL INSTRUCTIONS 1**, "Selecting the Current Preset").
5. To choose which Current Preset will be active when you load a Bank, select the desired Preset just before saving the Bank to disk (see **PRESET MANAGEMENT 2**, "Save All"). The Emax will default to that Preset whenever you load the Bank.

Module: FUNCTION**Function: ENTER DATA**

ENTER is a something that Emax, rather than you, activates. Just as you can activate a module to tell Emax something you want to do, Emax can activate this module to tell you something it wants you to do.

Sometimes the display will ask you for data (i.e., such as keying in a number to indicate a parameter you want to change). A flashing **ENTER** LED means that either data is needed to be entered, or another step is involved in completing a function. Under these conditions, Emax is in a "holding pattern" where you must enter the desired data, or de-activate the module, before Emax can move on to other functions (however, you can still play the keyboard).

After keying in the data, press **ENTER** to send the data into Emax's computer. If the **ENTER** LED is lit steadily, pressing **ENTER** is optional. Usually this exits you from the function, and kicks you back to the Module Identifier so that you can go directly to another function within the module.

MASTER MODULE

Module: MASTER 1

Function: MASTER TUNE

MASTER TUNE lets you tune Emax to other Instruments.

1. Activate **Master 1**. The display says:

Tuning YXX Cents
Use Data Slider

where XX is a two-digit number and Y indicates plus or minus.

2. Vary the data slider to change tuning. The display indicates, in cents, the amount sharp (+) or flat (-) compared to the normal keyboard pitch (+45 cents to -48 cents).

Note: The tunings of individual Voices can also be varied (see **ANALOG PROCESSING 11**).

3. Press **ENTER** to return to the module identifier, or de-activate the module to return to Select Preset.

Module: MASTER 2 -

Function: MEMORY REMAINING

How close are you to filling up the Emax memory with Samples and Presets? This command puts a dipstick in the memory to find out.

1. Activate **MASTER 2**. With an empty memory bank, the display says:

SampleMem:524288
PresetMem: 028144

These figures show the number of bytes of available memory.

2. Press **ENTER** to return to the module identifier, or de-activate the module to return to Select Preset.

Module: MASTER 3

Function: VELOCITY CURVE

Emax provides 14 different velocity curves (Fig. Master-1) to provide different types of dynamics in response to your playing. Note that curve 14 is not a curve. Instead, no matter how hard you play, all notes have the same dynamics.

1. Activate **MASTER 3**. The display says:

Velocity CurveXX
[01-14] / Slider

...where XX will be a number from 01 to 14. Use the data slider or the numeric keypad to Select the desired velocity curve.

2. As you play a key, the lower line will display the MIDI velocity value (with 127 being the highest possible value). This helps you see how each velocity curve reacts to the dynamics of your playing.
3. Press **ENTER** to return to the module identifier, or de-activate the module to return to Select Preset.

Note: The velocity curve is stored as part of the Preset.

Module: MASTER 4

Function: ERASE ALL MEMORY

This procedure clears out Emax's entire memory - Presets, Voices, Samples and Sequences.

Application: Provides maximum amount of memory for sampling.

1. Activate **MASTER 4**. The display says:



Erase ALL Memory
Are You Sure Y/N

2. Press **YES** to erase, **NO** to exit without erasing.

Module: MASTER 5

Function: FORMAT DISK

Before a new disk can record (store) any data, it first must be told how to record this data (called formatting the disk). Run the following formatting procedure on new disk, or on "recycled" disks previously used with other systems (such as home computers) since these will not be formatted correctly for the Emax. Formatting not only formats the disk, but also writes Emax's operating system (the software that tells the system how to operate).

Note: Formatting a disk that already contains data will "bulk erase" any data on the disk being formatted. Always check that disks are either blank, or contain nothing you want to save, before formatting. A disk need only be formatted once unless you want to use the "bulk erase" aspect of formatting.

Use only 3.5" double-sided, double-density (DS/DD) disks. Avoid bargain disks. To save money, get together with other Emax owners and purchase disks in large quantities.

1. With a formatted disk already in the drive, activate **MASTER 5**. The display says:



Format - Will
Erase Memory! OK?

If you don't want to lose what you have in the Bank, save it to disk first (see **PRESET MANAGEMENT 2**). Otherwise, press **YES**.

2. The display says:

Please Insert
Source Disk

Check that a formatted E-max disk is in the drive. If not, insert one. To prevent any embarrassing errors, write-protect the disk (**GENERAL INSTRUCTIONS 4**). Press ENTER, there will be a short wait while E-max loads the formatting software.

3. The display now says:

Pls Insert Disk
To Be Formatted

Remove the source disk and insert the disk to be formatted, then press **ENTER**. The display will say:

Formatting...

Formatting takes just enough time that you can get a drink of water or do a couple of sit-ups. (Or something less healthy... - Ed.) After formatting is complete, the display asks:

Format Another
Disk? Y/N

To format another disk, remove the newly formatted disk from the drive, insert the next disk to be formatted in the drive, then press **YES**. Otherwise, press **NO**, whereupon the display returns to the Module Identifier.

Module: MASTER 6

Function: COPY DISK

As you build up a collection of disks, remember that they are not indestructible. E-mu recommends copying ("backing up") any disk that contains material you don't want to lose. Preferably, keep additional backups at a separate location for maximum safety.

Note: Copying data to a disk will erase any data on the disk being copied to.

1. Insert the disk to be copied ("source" disk) into the drive. To prevent any embarrassing mistakes, make sure it's write-protected (see **GENERAL INSTRUCTIONS 4**).
2. Activate **MASTER 6**. The display says:

Copy Disk - Will
Erase Memory! OK?

Copying will erase whatever is in Emax's memory. If that's not okay, press **NO**, save what's in memory to another disk (**PRESET MANAGEMENT 2**), then try copying again. Otherwise, press **YES** and the display will say:

Please Insert
Source Disk

Check that the source disk is in the drive and press **ENTER**. The display will ask you to wait Just a Moment, then say...

Please Insert
Destination Disk

3. Insert a formatted destination disk, then press **ENTER**. Wait "Just A Moment...."
4. After several seconds, the display asks:

Copy to Another
Disk? Y/N

If you want another copy, insert another previously formatted disk and press **YES**. Otherwise, press **NO** to return to the Module Identifier.

Module: **MASTER 7**

Function: **BIRD RUN**

This function aligns Emax's internal stabilizers and prevents excessive gyrocosmic relativation.

1. Activate **MASTER 7**.
2. Carefully observe the display for any signs of destabilization (eg. gravitational warps, apparent speeding up or slowing down of time, objects in mirrors appearing closer than they really are). If Emax returns to the Module Identifier after a few seconds, all is well.

Note: Occasionally a small emu will get trapped within the Emax and run across the screen during the stabilization scan process. This does not affect Emax's normal functions.

Module: **MASTER 8**

Function: **SPECIAL**

This module holds some seldom-used, but extremely useful, functions.

1. Activate **MASTER 8**. The display says:

Special (1-6) / Slider

2. Select the desired special function. More functions may be added in the future, but here is what is currently available:

- 1 **Copy Software** The Emax operating system deals with such tasks as disk transfers, memory management, and so on. Occasionally E-mu enhances the operating system. Each version of the operating system is numbered, as indicated when you move the data slider all the way to the top while in Special. As newer versions are introduced, use this function to copy the new software on to disks containing the old software. Everything else on the old disk - Samples, Presets, Sequences, and so on - remained unchanged.

Upon selecting Copy Software, the display says:

Copy Sftw - Will
Erase Memory! OK?

If it's not okay to erase memory, press **NO** and copy the Bank contents to disk. Otherwise, press **YES**, then insert the Source disk (the one with the new software) in the drive. Next, press **ENTER**. This clears the Bank and loads the operating system software into Emax.

When prompted by the display, insert the Destination disk (the one that needs the new software) in the drive, then press **ENTER**. After the software is copied, you then have the option of copying the software on to another disk (insert the disk then press **YES**) or exit back to the Module Identifier (press **NO**).

- 2 **MIDI Overflow** With MIDI Overflow on, if you play more than eight notes on Emax, the extra notes will appear at the MIDI Out port. Thus, by connecting the MIDI Out to the MIDI In on another Emax "slave" (rack style or keyboard), you will end up with essentially a 16 note polyphonic Emax. Make sure that the "slave" Emax is set to MIDI Overflow Off, otherwise the 17th note will not be played.
- 3 **Disable Channel** If an Emax channel should fail, activate **MASTER 8** and select **SPECIAL 2**. Press the number(s) that correspond to the channel(s) to be disabled. The display will confirm your choice. After finding the bad channel, press **ENTER** to disable the channel and return to the Module Identifier.
- 4 **Recalibrate** With this function you can select minimum and maximum values for the left wheel, right wheel, keyboard pressure, foot pedal, data slider, and volume slider. You can also select a center value for the left wheel. With **SPECIAL 4** selected, select the controller to be re-calibrated with the data slider.

With the exception of the left wheel and the footswitch, you will first set the minimum value and press **ENTER**, then the maximum value and press **ENTER**. For the left wheel, you can also set the center value. After making your choices, the display will ask if you want to save results. If so, press **YES**; otherwise, press **NO**.

The recalibrate footswitch function allows EMAX to use either of two types of footswitches (normally open or normally closed), If your footswitch seems to work backwards, try changing the setting of the footswitch select from Footswitch on = Closed to Footswitch on = Open.

- 5 **Audition Note** This function was included for us on the EMAX rack where there might be times when a MIDI keyboard was not connected. This function allows you to play EMAX without a keyboard. Select **SPECIAL 5** and the display says:

Audition Note: C3
(0-9) / Slider

Moving the slider will select which note is played and buttons 0 - 9 plays the sound.

- 6 MIDI Analyzer** The MIDI Analyzer is a useful function designed to help you solve MIDI interconnection problems. Select Special 6 and the display says:

MIDI Data In
Use Data Slider

Moving the Data Slider changes the analyzer from analyzing MIDI IN to analyzing MIDI OUT. Press **ENTER** to select. The display now says:

Waiting for
MIDI Data

When MIDI data is received (or sent), the data will be displayed. The analyzer recognizes most MIDI messages, but does not display System Exclusive or Active Sensing messages.

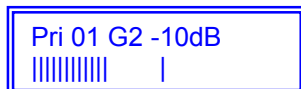
- 7 Software Revision** This shows the operating system version number in the display.

SAMPLE MODULE

Module: SAMPLE 1**Function: VU MODE/GAIN**

This function sets the proper level for sounds being recorded into Emax.

1. First, select the Preset in which you want the Sample to appear. Next, activate **Sample 1**. If the Preset already contains a Sample in the default range in which a new Sample would be recorded (C1 low note, G1 original note, B1 high note), Emax will look for the first available empty keyboard space to place the sample. If EMAX can't find an empty keyboard space, it chooses the standard default and goes to the place sample screen (see **SAMPLE 2**). After this is taken care of, the display shows:



There may or may not be some moving vertical bars in the display's lower line.

2. The data slider sets the sampling section gain from -10 to +40 dB in 2 dB steps. Play the sound to be sampled and observe the moving bar display; louder signals will kick the bars further over to the right. The object is to set the data slider for the loudest signal possible short of distortion. The Emax VU meter is a "peak hold" type, which briefly "holds" the highest level attained.
3. If the meter bar hits the extreme right hand side, the Emax headroom has been overloaded. Adjust the data slider, and possibly the output control of the device being sampled (if present), so that peaks are below this overload point.

Note: The optimum gain level setting for Emax is 0dB. While other gain settings produce good results, bear in mind that increasing gain tends to increase noise, while attenuation could cause distortion. In any case trust your ears.

Module: SAMPLE 2**Function: PLACE SAMPLE**

Emax defaults to placing the sampled sound on G1, transposed down to C1 and up to B1. However, this can be changed, either before or after sampling; the exact amount of transposition available depends on the sample rate (SAMPLE 3).

1. Activate **SAMPLE 2**. The display shows:



... where XXX indicates Primary or Secondary Voice, and YY indicate keyboard notes.

2. Use the cursor buttons to select the parameter to be changed:

P/S = Use the data slider to select primary or secondary Voice. Move the cursor to the next parameter to be changed or press **ENTER** to return to the Module Identifier.

Orig = Specifies the Voice's original pitch. Change this with the data slider, or play the desired keyboard key. Move the cursor to the next parameter to be changed or press **ENTER** to return to the Module Identifier.

Lo = Chooses the Voice's low transposition point. Change this with the data slider, or play the desired keyboard key. Move the cursor to the next parameter to be changed or press **ENTER** to return to the Module Identifier.

Hi = Chooses the Voice's high transposition point. Change this with the data slider, or play the desired keyboard key.

Note: If the display says "Illegal Assignment", you are either trying to place the low note higher than the high note, the high note lower than the low note, or transposing up more than the sample rate allows. It is not possible to create an illegal assignment if you use the data slider for this function.

If you want to change a previously selected parameter, move the cursor; otherwise, press **ENTER** to return to the Module identifier.

Module: **SAMPLE 3**

Function: **SAMPLE RATE**

The Emax has an adjustable sample rate. Lower sample rates use up less memory, but Increase distortion and reduce high frequency response. Higher sample rates give better fidelity but use up more memory.

1. Activate **Sample 3**. The display shows:

Sample Rate 28kHz

This represents a good compromise between memory use and fidelity; bandwidth is approximately 14kHz.

2. Use the data slider to choose from six different sample rates between 10 kHz (medium-quality DDL sound) to 42 kHz (almost the same rate used with Compact Disks). Press **ENTER** to return to the Module Identifier.

Module: **SAMPLE 4**

Function: **SAMPLE LENGTH**

Once sampling is Initiated, Emax will normally sample until it runs out of memory or is stopped (see **SAMPLE 8**, the "stop sampling" function). However, this function lets you program a particular sample time after which Emax will stop sampling.

1. Activate **Sample 4**. The display says:

Length XX.X secs
(YY.Y Available)

...where XX.X is the time in seconds and YY.Y is the maximum time available. Maximum time will depend on your sample rate.

The chart below shows sample rates versus time (this chart assumes that all of the EMAX's sample and sequence memory is empty).

Sample Rates	Time
10kHz	52.0 secs.
16kHz	33.5 secs.
20kHz	26.0 secs.
28kHz	18.8 secs.
31kHz	16.6 secs.
42kHz	12.4 secs.

2. Use the data slider to change the sample length (the increment length depends on the available memory). When the display shows the desired sample length, press **ENTER**. The sample length will remain as set until changed, or until you create a new Sample.

Module: SAMPLE 5

Function: THRESHOLD

There are two ways to initiate sampling: Threshold-sensitive sampling and forced sampling (SAMPLE 7). With threshold-sensitive sampling, once sampling is “armed” sampling begins whenever the signal to be sampled exceeds the programmable threshold level. This function sets the threshold level.

1. Activate **SAMPLE 5**. Once you move the data slider, the display will show a single bar on the top line that indicates the threshold level; the lower line will show the level of the signal to be sampled.
2. Set the desired threshold level with the data slider. Generally, you will set threshold just above the residual noise of the sound to be sampled. Therefore, any noise will not initiate sampling, but a signal that exceeds the threshold will.

Hint: Set the lowest possible threshold. If the beginning of a sound is cut off, the threshold is too high. If there's a delay before the beginning of a sound, the threshold is too low and was probably triggered by some noise prior to the actual signal.

Note: Once sampling has begun, Emax will continue sampling even if the signal falls below the threshold level.

To stop sampling, refer to **SAMPLE 8** or set a specific sample length (**SAMPLE 4**).

Module: SAMPLE 6

Function: ARM SAMPLING

Upon initiating this function, Emax will begin sampling as soon as the sound to be sampled exceeds the threshold set with SAMPLE 5, or when sampling is forced (see SAMPLE 7).

1. Activate **Sample 6**. The display's top line says “Sample Armed”, while the bottom line shows the moving-bar VU meter (see **SAMPLE 1**).
2. As soon as the sound to be sampled exceeds the threshold, the display will say “Sampling.” After reaching the end of the sample length (if set with **SAMPLE 4**), being stopped manually (**SAMPLE 8**), or when Emax runs out of memory, the display will return to the Module identifier.
3. Play the keyboard in the sample range. If you are not satisfied with the sample, repeat steps 1 - 2 before de-activating the module. Otherwise, de-activate the module.

Module: SAMPLE 7

Function: FORCE SAMPLING

Force sampling lets you initiate sampling manually as an alternative to threshold-sensitive sampling. This is useful for situations where the signal to be sampled is more or less continuous (continuous signals greatly complicate the threshold - setting process described in SAMPLE 5).

1. With the module active and levels properly set, as soon as you are ready to sample key in 7. Sampling will begin immediately, and the display will say "Sampling."
2. After reaching the end of the sample length (if set with **SAMPLE 4**), being stopped manually (**SAMPLE 8**), or when Emax runs out of memory, the display will return to the Module Identifier.
3. If you are satisfied with the sample, de-activate the module.

Module: SAMPLE 8

Function: STOP SAMPLING

You can end sampling at any time by keying in 8. After sampling, the display will return to the Module Identifier.

Module: SAMPLE 0

Function: CHANGE CURRENT SAMPLE

If you take consecutive samples without exiting the sample module, each sample will overwrite the previous sample. However, you can specify a new sample into which a sample will go -- even without exiting the sample module -- by keying in 0. Emax will default to the next empty sample number.

1. The display says:

New Sample
Pri XX YY

Where XX is the Voice number and YY is the keyboard placement of the sample.

DIGITAL PROCESSING MODULE

IMPORTANT

Note: The Digital Processing Module must be accessed before keying in any of the function numbers.
Also, the Voice to be processed must be selected (see **DIGITAL PROCESSING 0**).

Module: DIGITAL PROCESSING 0

Function:

CHANGE CURRENT VOICE

This function changes the Current Voice selection.

1. Activate **DIGITAL PROCESSING 0**. The display says:

Process Pri or Sec
Voice XXX

...where XXX is either Pri or Sec. Use the data slider to select whether you will edit the Primary or Secondary Voice, then press **ENTER**. If there are only Primary or Secondary Voices, EMAX will automatically go to step 2.

2. The display now says:

Key: XX YY KHZ
Select a Voice

... where XX defaults to the lowest note of the lowest Voice (whether Pri or Sec), and YY is the sample rate. Press a key in the range of the Voice that you want to edit, or to quickly select the voice, use the data slider or increment buttons. While selecting the Voice, the lower display line will show the Voice number and its original pitch. After selecting the Voice to be processed, press **ENTER**.

3. If the sample to be processed is used in other Presets, processing the sample will process the sample in those other Presets. Therefore, the display asks:

Used Elsewhere
Copy It First? Y/N

Press **NO**, and any processing will affect other Presets containing that sample. To avoid affecting other Presets containing the sample, press **YES** to copy the sample -- the Current Preset will contain the new copy in place of the original sample. Either response returns Emax to the Module Identifier. If there is "not enough memory" to duplicate the sample, the display will tell you.

If it is important to copy the sample, erase an unneeded voice (to gain memory space) (**PRESET DEFINITION 3**) and try again. Note that if a sample is used in other Presets, processing it will process the sample in those other Presets. Therefore, upon selecting the Voice, you will be asked if you want to copy the Sample.

Note that if two Voices in the same Preset use a single Sample, then you will not be asked to copy first, and any changes will affect both Voices in the Preset.

3. While you remain in the Digital Processing module, all Voices other than the Current Voice will be muted as you play the keyboard. The specified Current Voice will remain as is until you change the Voice assignment (**DIGITAL PROCESSING 0**), change Presets, or load another Bank. The Current Voice will need to be re-specified if you switch between modules.

Module: DIGITAL PROCESSING 1 Function 1: TRUNCATE (Set Sample Start/End)

Truncation shortens a Voice's length by trimming off parts of the beginning and/or end.

Applications: Cut off unneeded portions of a Voice to conserve memory.
Change instrument characteristics (i.e. remove the attack from a plucked string note).
Cut off long decay (i.e., simulate noise-gated reverb effect on drums).
Use to isolate a particular section of a sample.

1. Activate **DIGITAL PROCESSING 1**.
2. Use the arrow keys to move the cursor under either the Start or End point. The display will show these as:

Tr: Start End
XXXXXX XXXXXX

3. The six digits under Start indicate, in number of sample points, how much is being cut off the start of the Voice. The six digits under End indicate, in number of sample points, how much is being cut off the end of the Voice. Select the parameter to be adjusted with the cursor buttons. Adjust the coarse value with the data slider and fine value with the increment and decrement keys, or enter a six-digit number.

Example: Adjusting these sliders so that the bottom line indicates Trun Start 028000 cuts one second off the beginning of the sample (see Fig. DIGPROC-1) at the nominal sample rate.

4. After setting the desired truncation points, press ENTER. The display asks:

Make Truncation
Permanent? Y/N

To permanently erase the truncated sections, press **YES**. To retain the truncated information in memory (so that you can truncate the sample again later in a different way), press **NO**. Note that if you exit the Digital Processing module or change the Current Voice (**DIGITAL PROCESSING 0**), this temporary truncation will be lost.

5. If you invoke this function to try and truncate a sample that has already been truncated, but for which the truncation has not been made permanent, the display will first ask:

Make Truncation
Permanent? Y/N

If you press **NO**, Emax enters the truncation function. **YES** permanently truncates the Voice, the Voice will be truncated at the previously selected truncation point(s), and Emax will return to the Module Identifier.

Note: As you change the truncation points of a looped sample (see **DIGITAL PROCESSING 2**), the loop(s) may disappear and reappear depending on the exact location of the truncation points. If the sample is permanently truncated while the loop is inaudible, then the loop will be lost.

Module: DIGITAL PROCESSING 2 Function: SET LOOP START and LOOP LENGTH POINTS

“Looping” lets you mark off a section (called a loop) of a Voice with a Start point and loop Length (see Fig. DIGPROC-2). When you press a key, the Voice plays normally until it reaches the end of the loop. It then jumps back to the Start point and re-plays through the loop. Upon reaching the loop end, it again replays the loop. This looping process continues for as long as the key is pressed. Fig. DIGPROC-3 indicates a typical looping action.

Note: **DIGITAL PROCESSING 4** controls three aspects of looping: loop on/off, forwards/backwards, and loop in release. Refer to this section for specifics. Note also that Emax offers two loops (see Fig. DIGPROC-4), each of which can loop a different portion of the signal. The Sustain Loop is operative when the key is down, and the Release Loop is operative in the release phase, when the key is up.

Applications: Looping provides “infinite sustain” effects, extends short samples, and if the loop time is rhythmically related to a composition, produces interesting rhythmic effects.

1. Activate **DIGITAL PROCESSING 2**. The display shows:

Lp: Start Length
XXXXXX XXXXXX

The six digits under Start indicate, in number of sample points, the Start of the Loop in relation to the beginning of the Voice. A higher number moves the Start point closer to the end of the sample.

Example: If Start reads 028000, the Start point is located one second (at the nominal sample rate) into the sample (see Fig. DIGPROC-5). The six digits under Length indicate the Loop Length in number of sample points. A higher number increases the loop Length.

Example: If L reads L028000, the loop is one second long (see Fig. DIGPROC-6) at the nominal sample rate. Select the parameter to adjust with the cursor buttons. Adjust the coarse value with the data slider and fine value with the increment and decrement keys, or enter a six-digit number.

2. Remember -- L sets the Length, not the end point, of the loop.

Example: Consider the loop in Fig. DIGPROC-7. When S moves, the loop end point (as determined by the loop Length) moves in tandem with S.

After finding a good loop, press **ENTER**.

Hint: If the loop Length is at maximum (as occurs when you first call up a Voice for looping), you cannot set a new S point since that would force the loop to “run out of sample” (see Fig. DIGPROC-8). Shorten the Length before moving the S point.

Fig. DIGPROC-1

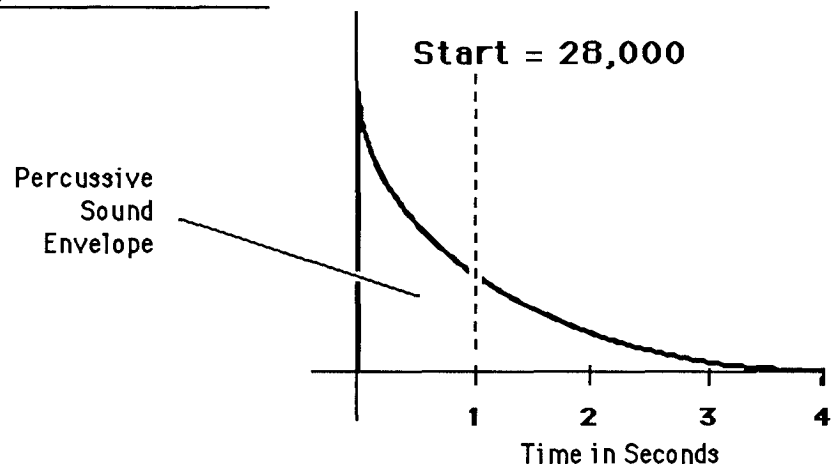


Fig. DIGPROC-2

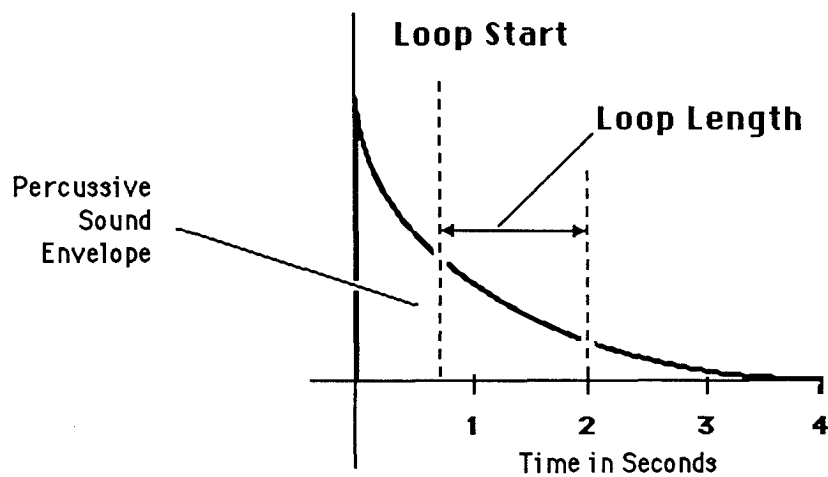


Fig. DIGPROC-3

First, the note
plays to the end
of the loop ...

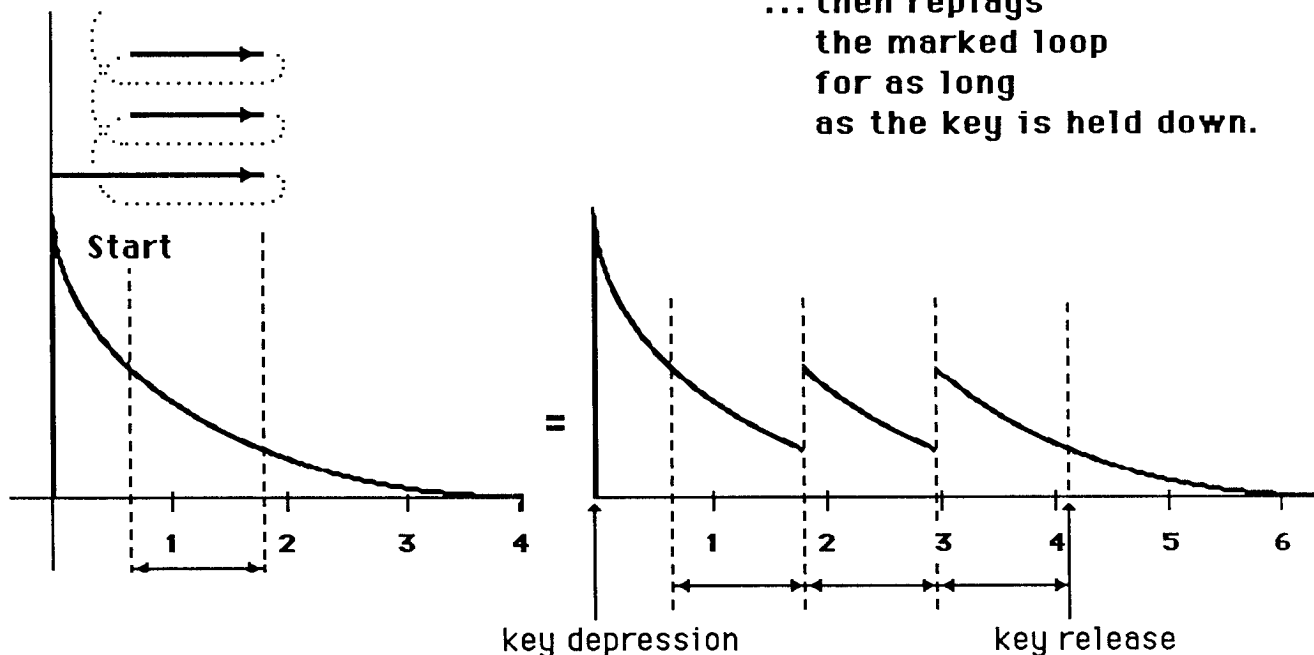


Fig. DIGPROC-4

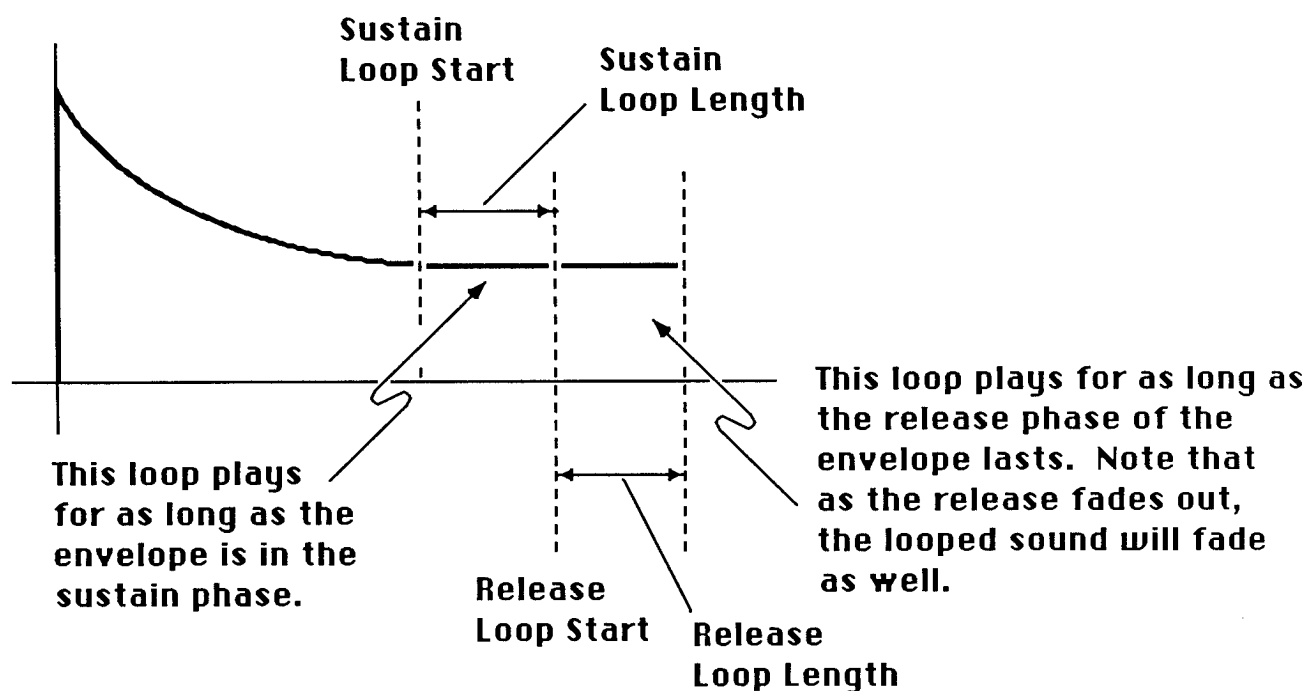


Fig. DIGPROC-5

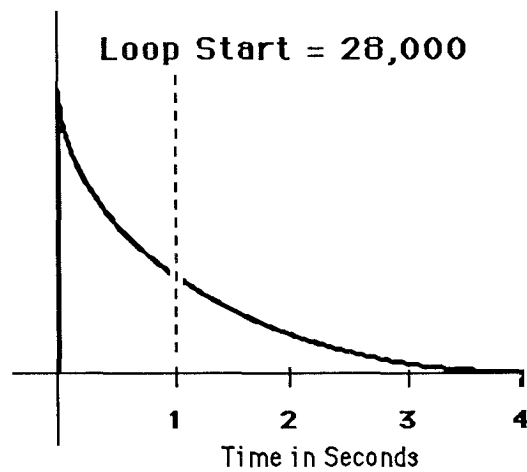


Fig. DIGPROC-6

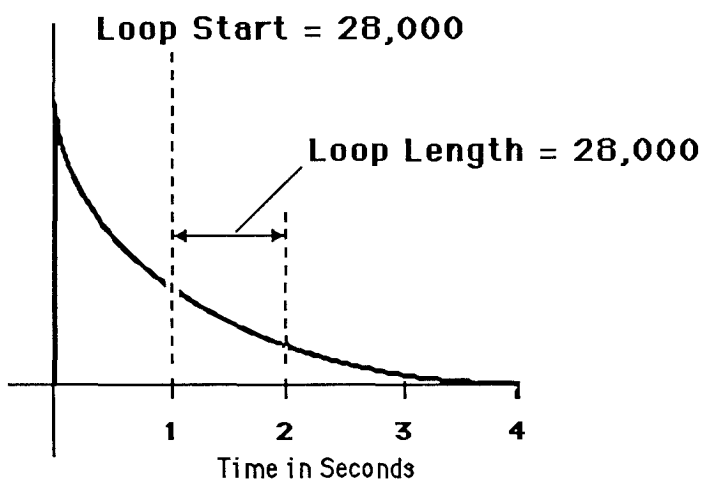


Fig. DIGPROC-7

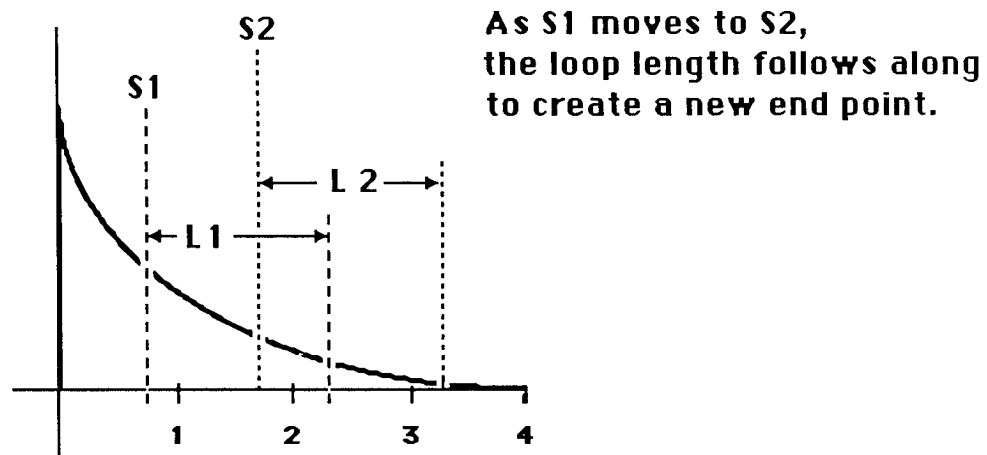
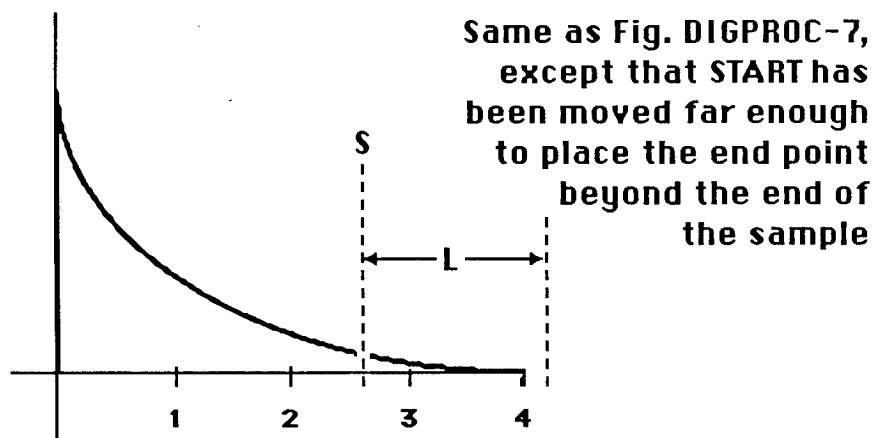


Fig. DIGPROC-8



Before proceeding, read the following background information about Autolooping.

About Autolooping

Looping performs an electronic “splice” which sometimes produces annoying glitches. Here's why.

Refer to Fig. DIGPROC-9, which shows the waveform where a sample is to be looped. As the signal loops, note the discontinuity at the “splice point.” This can produce an annoying ticking or popping sound.

Fortunately, Emax can help find the optimum splice point for you. Set loop points as best you can, then press YES to invoke Autoloop. The computer will look for nearby points that can be spliced together with minimum discontinuity. The display will update to reflect the computer chosen S and L points.

How well does Autolooping work? Incredibly well, once you get the hang of it. Getting the most out of this function does require practice. Autoloop can save you much time when doing looped samples and is remarkably effective with short, sustained samples.

3. The display now asks if you want to Autoloop...

Autoloop? Y/N

Press **YES** to autoloop, **NO** if you have a good loop and want to continue.

Note: Sometimes Emax will choose the correct splice point from a technical standpoint, not a musical one. Therefore, if you find a good splice point, write down the S and L numbers before invoking Autoloop. Should Autoloop produce an inferior splice point, you can regain your original settings.

4. If desired, repeat steps 2 to 4 until the best possible loop results.

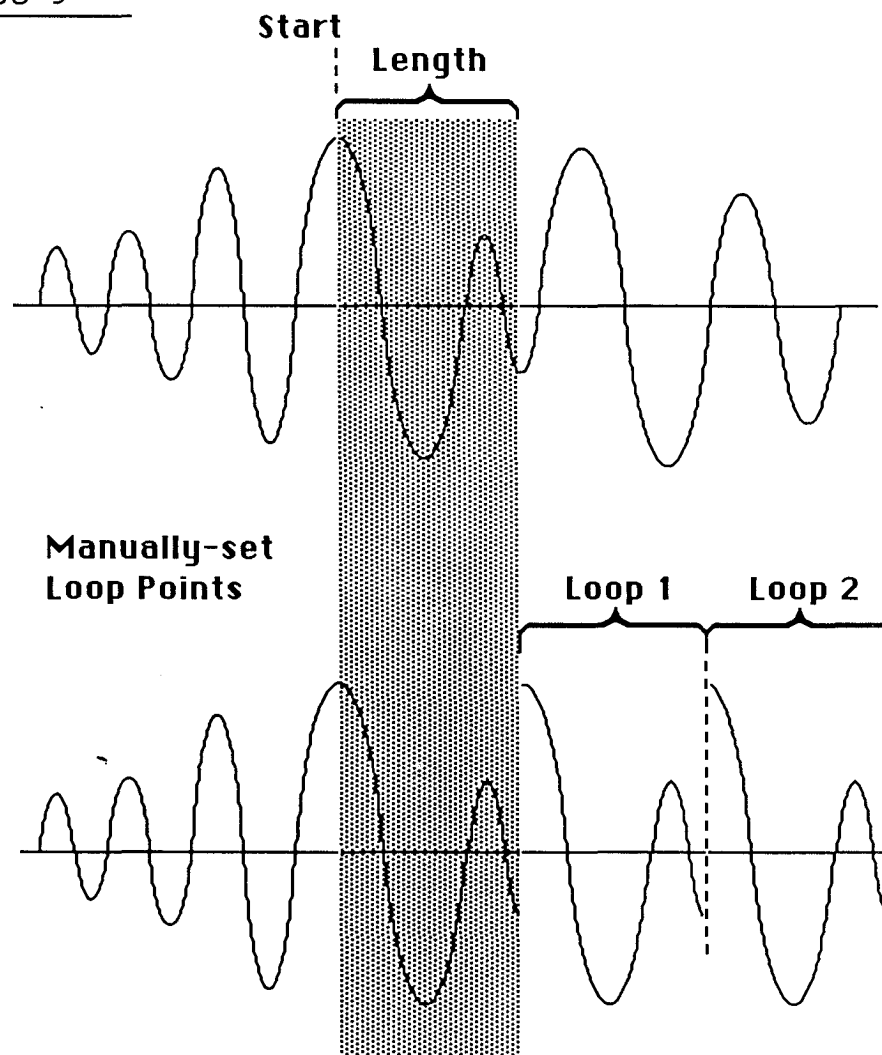
Note: Sometimes it will be impossible for you or the computer to find a perfect splice point. When you first try looping, you will probably think this is a common occurrence. However, you'll generally find that Autoloop, combined with practice and experimentation, can usually produce very smooth loops.

5. After establishing the desired loop points, press **ENTER**. The display asks:

Truncate After
Loop? Y/N

Press **YES** to discard all Voice data after the loop end point (this conserves memory). However, if you might want to use the same sample later with a different loop point, press **NO** to keep the entire sample intact, or save the Preset containing the original sample to disk.

Fig. DIGPROC-9



Module: DIGITAL PROCESSING 3**Function: SET RELEASE LOOP
START and LOOP LENGTH POINTS**

For an explanation of Looping and Autolooping, see DIGITAL PROCESSING 2 above. This function is the same, but affects the Release Loop (operational when the key is released) rather than the Sustain Loop (operational when the key is down).

1. Activate DIGITAL PROCESSING 3. The display asks:

Same As Sustain
Loop? Y/N

Press **YES** if you want to copy the Sustain Loop parameters to the Release Loop and then return to the Module Identifier, or **NO** if you want to set different parameters for the Sustain and Release Loops.

2. If you pressed **NO**, the display shows:

Lp:Start Length

The six digits under Start indicate, in number of sample points, the Start of the Loop in relation to the beginning of the Voice. A higher number moves the Start point closer to the end of the sample. The six digits under Length indicate the Loop Length in number of sample points. A higher number increases the loop Length. Select the parameter to adjust with the cursor buttons. Adjust the coarse value with the data slider and fine value with the increment and decrement keys, or enter a six-digit number.

3. Remember -- L sets the Length, not the end point, of the loop. When S moves, the loop end point (as determined by the loop Length) moves in tandem with S.

After finding a good loop, press **ENTER**.

Hint: If the loop Length is at maximum (as occurs when you first call up a Voice for looping), you cannot set a new S point since that would force the loop to "run out of sample" (see Fig. DIGPROC-8). Shorten the Length before moving the S point.

4. The display now asks if you want to Autoloop (for more information on Autolooping, see DIGITAL PROCESSING 2).

Autoloop? Y/N

Press **YES** to autoloop, **NO** if you have a good loop and want to continue.

Note: Sometimes Emax will choose the correct splice point from a technical standpoint, not a musical one. Therefore, if you find a good splice point, write down the S and L numbers before invoking Autoloop. Should Autoloop produce an inferior splice point, you can regain your original settings.

5. If desired, repeat steps 2 to 4 until you get the best possible loop.

Note: Sometimes it will be impossible for you or the computer to find a perfect splice point. When you first try looping, you will probably think this is a common occurrence. However, you'll generally find that Autoloop, combined with practice and experimentation, can usually produce smooth, glitch-free loops.

6. After establishing the desired loop points, press **ENTER**. The display asks:

Truncate After Loop?
Y/N

Press **YES** to discard all Voice data after the loop end point (this conserves memory). However, if you might want to use the same sample later with a different loop point, press **NO** to keep the entire sample intact, or save the Preset containing the original sample to disk.

Module: DIGITAL PROCESSING 4

Function: LOOP ON, LOOP IN RELEASE, and BACKWARDS modes

Loop on turns the loop on and off for a particular Voice.

Loop In Release turns on the Release Loop. Without Release Loop, the signal may cut off abruptly after you remove your fingers from the keys; with Release Loop, you can loop the final portion of the sample so that the loop will keep playing -- even after you lift your finger off the key--for as long as the VCA release lasts.

Backwards reads the Voice out of memory in the reverse order from which it was stored. Note that Backwards mode uses the Sustain Loop for its release, and the Release Loop for its sustain.

Applications: Backwards tape effects simulation. Reverse attack and decay characteristics of Voices.

1. Activate **DIGITAL PROCESSING 4**. Move the cursor under the parameter to be adjusted in the display. Turn the function on or off with the **ON** or **OFF** keys respectively. To adjust other parameters, move the cursor under the next parameter to be adjusted and again use the **ON** or **OFF** keys to make your selection.
2. After making your selection(s), press **ENTER**. Emax returns to the Module Identifier.

Module: DIGITAL PROCESSING 5

Function: TAPER

This adds a fade-in and/or fade-out to the sample, thus smoothing out samples with abrupt beginnings or endings.

Please note: You will not hear the effects of tapering until the taper is made permanent. Always make sure you have a backup of anything that you taper in case the taper does not turn out well.

1. Activate **DIGITAL PROCESSING 5**. The display shows:

Taper Start End
00ms 000ms

2. Start taper (fade-in) ranges from 00 milliseconds (ms) to 99 ms. End taper (fade-out) ranges from 000 ms to 999 ms. Use the arrow keys to position the cursor under the parameter to be adjusted. Set the value with the data slider.
3. After setting the desired taper point, press **ENTER**. The display will say "Tapering". When tapering is complete, Emax will return to the Module Identifier and your Voice will be tapered.

Module: DIGITAL PROCESSING 6

Function: SPLICE

Splicing marks an End point in one Sample and a Start point in a second Sample, then cross fades the end of the first Sample and the start of the second Sample over an adjustable length of time. Portion of the Samples not used in the spliced version are discarded, and any loops are Ignored. Fig. DIGPROC-10 summarizes how splicing works.

Please note: You will not hear the effects of splicing until the splice is made permanent. Always make sure you have a backup of anything that you splice in case the splice does not turn out well.

Applications: Splice an unusual attack to one Sample, or unusual decay on to another.

1. Activate **DIGITAL PROCESSING 6**. This Voice provides the first part of the spliced sound.
2. The display now says:

Splice From P XX
Select A Preset

..where XX is a Preset number. Since there are two Samples used in splicing, first the Preset containing the second Sample must be identified. Select the Preset, then press **ENTER**.

3. The display says:

Select Voice
Play A Key

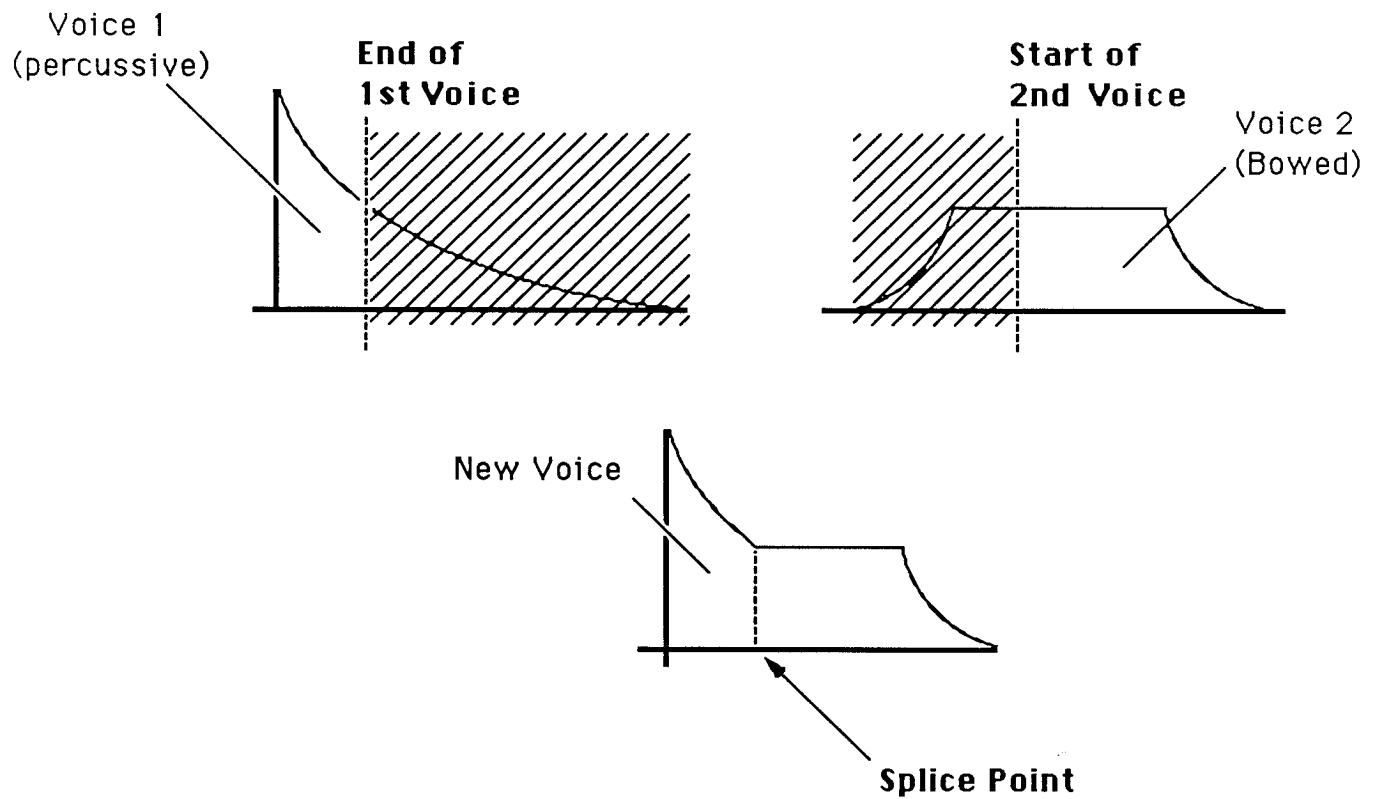
Play a note within the range of the desired Voice, then press **ENTER**. The Sample used by this Voice will be spliced after the Sample used by the first Voice.

4. The display shows:

Splice
XXXXXX SYYYYY

.... where XXXXXX is the initial End point of the first Sample and YYYYYY is the initial Start point of the second Sample.

Fig. DIGPROC-10



5. The six digits following the E indicate, in samples, the first Sample's End point. Adjust the coarse value with the Data Slider and fine value with the increment and decrement keys, or type in a six-digit number with the keypad.

Example: At the nominal sampling rate, E028000 means that the end point is located one second into the first Sample. The keyboard will be inactive and you will not hear anything if you play it.

6. The six digits following the S indicate, in samples, the second Voice's Start point. Adjust the coarse value with the Data Slider and fine value with the increment and decrement keys, or type in a six-digit number. Example: A reading of S028000 means that the Start point is one second into the second Voice. When the splice points are correct, press **ENTER**.
7. The display now says:

Crossfade Time:

Use the slider to specify a crossfade time, in 10 ms increments, between 000 and 990 ms. Crossfade provides a smooth transition between the sounds at the splice point. When set as desired, press **ENTER**.

8. Now comes the moment of decision, as the display asks...

Make Splice
Permanent? Y/N

Answer **NO** to forget about splicing, **YES** to permanently splice the two Samples together. When splicing is complete, the first Sample of the splice will be replaced with the spliced sound.

Hint: Before doing a splice, copy the first Voice of the splice during the Voice selection process. Thus, if you make the splice permanent but don't like the results, you can always retrieve the original Voices.

Note: Remember, splicing ignores all analog parameters. Take care that the original samples are compatible in terms of pitch, volume and sample rate. Level can be altered using (**DIGITAL EFFECTS 1**).

Module: DIGITAL PROCESSING 7

Function: COMBINE VOICES

Combining Voices mixes one Sample with another, thus producing a more complex Voice. The combined Voice ignores any looping, tuning, or level changes programmed in the Individual Voices; It works solely on the original digital Voice information. To loop the combined Voice, it is necessary to treat it as a single Voice and set loop points as described in **DIGITAL PROCESSING 2**.

Applications: Mix octave higher Voices in with a guitar's original Voices to create a 12 string guitar effect. Mix synthesized drum sounds in with acoustic drum sounds. Mix synthesized strings in with real strings to add "body." Combine two Voices into one Voice to conserve memory.

1. The Current Voice selected when entering the **DIGITAL PROCESSING** module will be the Voice that will be combined with the next selected Voice.

2. Activate **DIGITAL PROCESSING 7**. The display now says:

Combine From PXX
 Select A Preset

..where XX is a Preset number. Since there are two Samples used in combining, first the Preset containing the second Sample must be identified. Select the Preset, then press **ENTER**.

3. The display says:

Select Voice
 Play A Key

Play a note within the range of the desired Voice, then press **ENTER**. The Sample used by this Voice will be combined with the Sample used by the first Voice.

4. The display now asks:

Combine
 Permanently? Y/N

If you're having second thoughts, press **NO**. Otherwise, press **YES** to permanently combine the two Samples.

5. The display will say "Combining" for as long as it takes to combine the two Samples. Depending on the Sample length, this can be a very long process. ..if you need to catch up on your reading, now is a good time. Or, you can send out for pizza.

Module: DIGITAL PROCESSING 8

Function: CROSSFADE LOOP

This virtually eliminates a loop's splicing glitch by cross fading the end and beginning of the loop.

1. Activate **DIGITAL PROCESSING 8**. The display will say:

Crossfade Loop:
 Changes Data!OK?

If you don't mind changing the data, press **YES**. Otherwise, press **NO** to return to the Module Identifier.

2. The display now asks:

Linear or EqPwr?
 Linear

...where Linear is the default value. Use the data slider to select between Linear (a straight mathematical crossfade) and Equal Power (a weighted crossfade that produces no apparent level shift). After making your choice, press **ENTER**.

3. After taking a few seconds, Emax will ask "Truncate after Loop? Y/N. After you have made your choice, Emax will return to the Module Identifier.


Hints: Before doing a crossfade, copy the Voice whose loop is to be cross faded to another Preset. Since crossfading permanently alters the Voice, keeping a copy lets you retrieve the original Voice and try again.

Linear mode is useful for well-correlated data, such as a Sample, which has already been autolooped. Otherwise, use equal power. If distortion occurs, try reducing the sample's level (see **DIGITAL PROCESSING 9**) then crossfading it.

Module: DIGITAL PROCESSING 9**Function: DIGITAL EFFECTS**

The first currently implemented digital effect alters a Voice's level.

1. Activate **DIGITAL PROCESSING 9**. The display will say:

A rectangular display box with a blue border containing the text "Digital Effects" on the first line and "(1-2) / Slider" on the second line.

Use the data slider or increment buttons to catalog the various options. Select with the slider and press **ENTER**, or key in 1 from the keypad.

2. The display shows:

A rectangular display box with a blue border containing the text "±XXdB" on the first line and "Gain" on the second line.

...where XX is a two-digit number. Use the slider to select the desired amount of attenuation, (down to -40 dB) or gain (up to +40 dB), then press **ENTER**. Emax tells you this "Changes Data! OK?" If you can handle that, press **YES**. The display will say, "Computing during the time the level is changed."

3. Those who enjoy ugly, fuzz-tone, or noise-like sounds are welcome to boost the gain to absurd levels. The next digital effect reverses the sample.
4. Press **ENTER** to return to the Digital Processing menu, then 9 to return to Digital Effects. This time choose 2 from the menu. The display says:

A rectangular display box with a blue border containing the text "Reverse Sound" on the first line and "Changes Data! OK?" on the second line.

To reverse the sound permanently press **YES**, to return to the Digital Processing menu press **NO**. The reverse sound function reverses a sample with its loop points intact, however the loop is turned off.

Note: Reverse Sound requires memory space to perform its calculations. In some cases there may not be enough memory left to reverse the sound, in which case the display warns you.

PRESET MANAGEMENT MODULE

Module: PRESET MANAGEMENT 1

Function: LOAD PRESET

Use this to load an Individual Preset from disk Into the Emax memory Bank.

1. Insert the disk containing the Preset to be loaded into the disk drive.
2. Activate **PRESET MANAGEMENT 1**. The display says:

Load PXX
Select A Preset

...where XX is the number of the Preset to be loaded (source Preset). Use the data slider to catalog the Presets available for loading, as displayed on the lower line. When you find the desired Preset, press ENTER.

3. The display now says:

Load PXX To PYY
Select A Preset

..where XX is the number of the source Preset and YY the number of the destination Preset (this defaults to the first empty Preset). Select the desired destination Preset (use the data slider or numeric keypad) and press **ENTER**. If the Preset is not empty, a message will appear asking if you want to overwrite the existing Preset.

4. If the load was successful, the display will give you the chance to rename the Preset. Name the preset as described in **Preset Management 6** and then press **ENTER** to return to the Module Identifier.

Note: If you load a Preset that uses Samples already present in the bank, new copies of the Samples will not be loaded. This technique saves a great deal of memory space.

Hint: It is a good idea to check the size of the preset you wish to load (**PRESET MANAGEMENT 7**) to make sure there is enough sample memory in the Emax bank to accommodate the new preset.

Module: PRESET MANAGEMENT 2

Function: SAVE ALL

This function saves the entire Emax bank to disk.

1. Insert the disk to which you want to save the bank, into the drive.
2. Activate **PRESET MANAGEMENT 2**. The display says:

Save All Presets
& Sequences? Y/N

Press **YES** to save the bank to disk, or **NO** to return to the Module Identifier. While saving, the display will counsel patience. When the save is complete, Emax will return to the Module Identifier.

Module: PRESET MANAGEMENT 3**Function: CREATE PRESET**

Creating a Preset provides a home for all those great samples you have.

1. Activate **PRESET MANAGEMENT 3**. The display says:

Create Preset XX
Select A Preset

...where XX defaults to the first empty Preset. Select the desired Preset number (use the slider, or numeric keypad) and press **ENTER**.

Note: If you select a Preset, which already exists, the display will ask if you want to overwrite (that means erase, so think twice!) the existing Preset.

Press **YES** to overwrite, **NO** to return to the Module Identifier.

2. The display will now give you the chance to rename the Preset. Name the preset as described in **Preset Management 6** and then press **ENTER** to return to the Module Identifier.

Module: PRESET MANAGEMENT 4**Function: ERASE PRESET**

Here's how to erase an unneeded Preset.

1. Activate **PRESET MANAGEMENT 4**. The display says:

Erase Preset XX
Select A Preset

...where XX is the Preset to be erased (this defaults to the Current Preset). Select the Preset to be erased then press **ENTER**.

2. The display will ask...

Erase Preset XX
Are you Sure? Y/N

To erase Preset XX, press **YES**, or press **NO** to return to the Module Identifier.

Module: PRESET MANAGEMENT 5**Function: COPY PRESET**

Use this function to copy one Preset into another Preset.

1. Activate **PRESET MANAGEMENT 5**. The display says:

Copy PXX
Select A Preset

...where XX is the Preset to be copied (the source Preset; this defaults to the Current Preset). Select the Preset to be copied (use the data slider or numeric keypad) then press **ENTER**.

2. The display will ask...

Copy PXX
Select A Preset

...where XX is the number of the source Preset and YY the number of the destination Preset (this defaults to the first empty Preset). Select the desired destination Preset (use the slider or numeric keypad) and press **ENTER**. If the Preset is not empty, a message will appear asking if you want to overwrite the existing Preset.

3. The display will now give you the chance to rename the Preset so that the destination Preset has a different name from the source Preset. Name the preset as described in Preset Management 6 and then press **ENTER** to return to the Module identifier.

Module: PRESET MANAGEMENT 6**Function: RENAME PRESET**

Use this function to rename an existing Preset.

1. Activate **PRESET MANAGEMENT 6**. The display says:

Rename Preset XX
Select a Preset

...where XX (which defaults to Current Preset) is the Preset to be renamed. Select the Preset to be renamed (use the slider or numeric keypad) then press **ENTER**.

2. Use the cursor buttons to select the character to be changed. Select the character itself with either the data slider (moving the slider all the way to the bottom of its travel produces a space), or the keyboard keys. You can also use the numeric keypad to enter any numbers that are part of the name. When the naming process is complete, press **ENTER** to return to the Module Identifier.

Module: PRESET MANAGEMENT 7**Function: PRESET SIZE**

Memory space is precious, so you'll want to use this function to find out how much Sample memory and Preset memory each Preset takes up.

1. Activate **PRESET MANAGEMENT 7**. The display says:

Preset Size PXX
Use Data Slider

...where XX defaults to the Current Preset. Select the Preset whose size you want to check and then press **ENTER**.

2. The display now says...

PresMem SampMem
XXXXXXX YYYYYYY

...where XXXXXX is the Preset Memory in bytes (out of a possible maximum of 28,244 bytes) and YYYYYYY is the Sample Memory in bytes (out of a possible maximum of 524,288 bytes). After checking the memory, press **ENTER** to return to the Module Identifier.

Note1: Erasing a Preset won't necessarily reduce the amount of Sample memory if these Samples are used in other Presets that are not erased.

Note2 : Sequences and Samples share the same memory space. Therefore, eliminating unneeded Samples will allow more memory for Sequences and visa versa.

PRESET DEFINITION MODULE

Module: PRESET DEFINITION 1

Function: COPY VOICE(S)

This function copies Voice(s) from one Preset to another.

1. Activate **PRESET DEFINITION 1**.
2. The display says:

GetVoice From PXX
Select a Preset

....where XX defaults to the Current Preset. Select the Preset that contains the Voice(s) to be copied, then press **ENTER**.

3. The display now shows:

Get Pri, Sec, or
Both Voices :XXX

...where XXX is either Pri, Sec or Both. Use the data slider to select whether you will copy Primary, Secondary or Both Voices, then press **ENTER**.

Note: If you select Both, even though the source Preset contains no secondary Voices, you can overwrite double Voices during the copying process (step 7).

4. The display says:

Lo:XX
Seect Lo Key

...where XX defaults to the lowest note of the lowest Voice (whether Pri or Sec). Press the lowest key of the range you want to copy, or to quickly select the lowest note of the available Voices, use the data slider. While selecting the low key, the lower display line will show the Voice number and its original pitch. When the display shows the desired low key, press **ENTER**. The display now asks you to choose the Hi Key:

Lo:XX -> Hi:YY
Select Hi Key

...where YY defaults to the highest note of the previously selected voice. Press the highest key of the range you want to copy or to quickly select the highest note of the available Voices, use the data slider. After selecting the range to copy, press **ENTER**.

5. The display asks:

CopyVoiceTo PXX
Select A Preset

.where PXX defaults to the Current Preset. Select the destination Preset to which you want to copy the Voice(s), then press **ENTER**. If you select an empty Preset, upon pressing **ENTER** you will be given a chance to rename the Preset that which Emax just created for you. Rename as described in Preset Management 6. After renaming is complete, press **ENTER**.

6. The display now shows:



Copy Voice To
Pri or Sec:XXX

...where XXX defaults to your previous selection in step 2 (note: if in step 2 you selected Both, then EMAX will automatically go to step 7). This step allows you to copy Primary Voice(s) to Secondary locations and visa versa. Use the data slider to select whether you will copy the Voice(s) to a Primary or Secondary location, then press **ENTER**.

7. The display now says:



Lo:XX
Move Lo Key

....where XX defaults to the previously-selected low key. Press the low key of the desired range in the destination Preset. The lower display line will show the Voice number and original pitch in the destination Preset. Attempting to place the low note in such a way that the range cannot be assigned produces an "Illegal Asgnment" display.


8. After specifying the range's low note, press **ENTER**. The display will warn you if this assignment either modifies the existing assignment or erases (overwrites) any existing Voice(s). If this is okay, press **YES** to copy and return to the Module Identifier. Otherwise, press **NO** to interrupt the copying process and return to the Module Identifier.

Module: PRESET DEFINITION 2

Function: EDIT ASSIGNMENT

Use this function to change the assignment of a Voice within a Preset.

1. Activate **PRESET DEFINITION 2**. The display says:



Edit Pri or Sec
Voice: XXX

...where XXX is either Pri or Sec. Use the data slider to select whether you will edit the Primary or Secondary Voice, then press **ENTER**. If there are only Primary or Secondary Voices, EMAX will automatically go to step 2.

2. The display now says:

Key: XX
Select a Voice

....where XX defaults to the lowest note of the lowest Voice (whether Pri or Sec). Press a key in the range of the Voice that you want to edit, or to quickly select the voice, use the data slider. While selecting the Voice, the lower display line will show the Voice number and its original pitch. After selecting the Voice to edit, press **ENTER**.

3. The display now shows the complete assignment:

Orig Lo Hi Chs
XX XX XX YY

...where XX are notes and YY is a range of numbers from 1 to 8. Place the new Original note. If the display says "Illegal Asgnment," you are doing something like exceeding the transposition limits. Play a key to select notes, and the cursor buttons to select the desired parameter to be changed. Note: You can also use the data slider to show the available keys.

To select the output channels (Chs) over which the Voice will appear, move the cursor under the first Chs number and select the desired value. Then move the cursor over to the second Chs number and select the desired value. The Voice will appear over all channels between, and including, these two values. Press **ENTER**, and Emax will return to the Module Identifier.

Hint: The number of channels assigned = Polyphony of any given voice.

Module: PRESET DEFINITION 3

Function: ERASE VOICE(S)

Use this function to erase a Voice(s).

1. Activate **PRESET DEFINITION 3**. The display shows:

Erase Pri, Sec
or Both: XXX

...where XXX is either Pri, Sec or Both. Use the data slider to select whether you will erase the Primary, Secondary, Both Voice(s), then press **ENTER**. If there are only Primary or Secondary Voices, EMAX will automatically go to step 2.

2. The display says:

Lo:XX
Select Lo Key

...where XX defaults to the lowest note of the lowest Voice (whether Pri or Sec). Press the lowest key of the range you want to erase, or to quickly select the lowest note of the available Voices, use the data slider. While selecting the low key, the lower display line will show the Voice number and its original pitch. When the display shows the desired low key, press **ENTER**.

The display now asks you to choose the Hi Key:

Lo:XX Hi:YY
Select Hi Key

....where YY defaults to the highest note of the previously selected voice. Press the highest key of the range you want to erase or to quickly select the highest note of the available Voices, use the data slider. After selecting the range to erase, press **ENTER**.

3. The display will warn you if this assignment either modifies the existing assignment or erases (overwrites) any existing Voice(s). If this is okay, press **YES** to erase and return to the Module Identifier. Otherwise, press **NO** to interrupt the erasing process and return to the Module Identifier.

Module: PRESET DEFINITION 4

Function: DUAL VOICE

This one is going to take some study. Sit back, relax, be patient, and absorb the following.

Each Emax audio channel has the capability of playing back two samples at once if Primary and Secondary Voices are assigned and Dual Voice mode is selected. In Dual Voice mode, each sample can have independent pitch and level parameters -- however, they share a common output stage that controls the envelopes, LFO's, filter, and pan parameters. This mode allows eight-note polyphony.

With Dual Voice off, the Primary and Secondary Voice parameters are totally independent and no sharing of functions occurs. This mode allows only four-note polyphony when using a primary and secondary voice for each note.

In Dual Voice mode, you must decide whether the Primary Voice will share the Secondary Voice's parameters or vice-versa. This is done by copying one to the other, which will change some existing Voice parameters. You will be warned when this situation occurs; you may want to copy a Voice to prevent this problem.

1. Activate **PRESET DEFINITION 4**. The display asks whether you want the shared parameters to be from the Primary or Secondary Voice:

Use Pri or Sec
Parameters: Pri

Use the slider to select, then press **ENTER**.

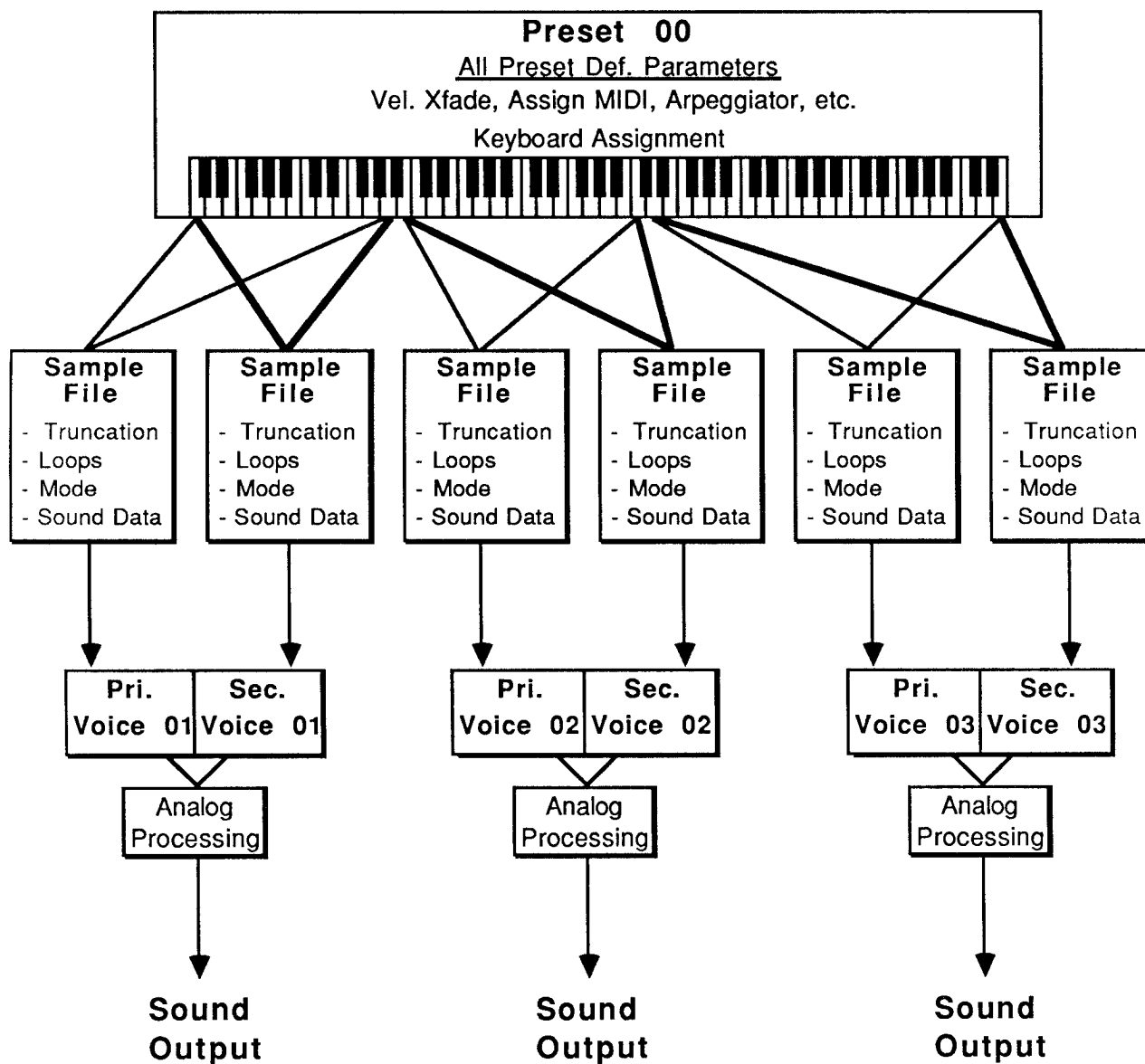
2. The next display shows:

Lo:XX Dual:off
Select Lo Voice

....where XX defaults to the lowest note of the lowest Voice. Press a key in the range of the low Voice that you want to put into or out of dual mode, or to quickly select the low voice, use the data slider. While selecting the low Voice, the display will show the Voice number, its original pitch and whether the voice has dual on or off. After selecting the low Voice, press **ENTER**.

Emax Dual Voice Mode

- 8 note polyphony
- Primary and Secondary Voices share Analog Parameters



3. Now the display shows:

Hi:XX Dual:off
Select Hi Voice

....where XX defaults to the highest note of the previously selected voice. Press a key in the range of the highest Voice that you want to put into or out of dual mode, or to quickly select the voice, use the data slider. After selecting the high Voice, press **ENTER**.

4. Now you see...

Dual Voice: XX
Select on/off

...where XX is either on or off. Use the **ON** and **OFF** buttons to select whether Dual Voice is on or off, then press **ENTER**. Emax will inform you that parameters will be altered if you select Dual Voice on. If that's okay, press **YES**; otherwise, press **NO** to abort and Emax will return to the Module Identifier.

Module: PRESET DEFINITION 5

Function: VELOCITY XFADE/SWITCH, POSITIONAL XFADE

Velocity Crossfade cross fades between the Primary and Secondary Voices according to how hard you play the keyboard. One Voice will become louder as you play harder and softer as you play softer, while the other Voice will become louder as you play softer and softer as you play harder (see Fig. PDEF-1). Velocity switch is similar, however, there is a threshold above which one Voice plays and below which the other Voice plays.

Where two Voice's keyboard assignments overlap, **Positional Crossfade** alters the level balance (mix) between the two Voices depending on where you play within the overlap range. Rather than spend a lot of time explaining this in words, please refer to Fig. PDEF-2.

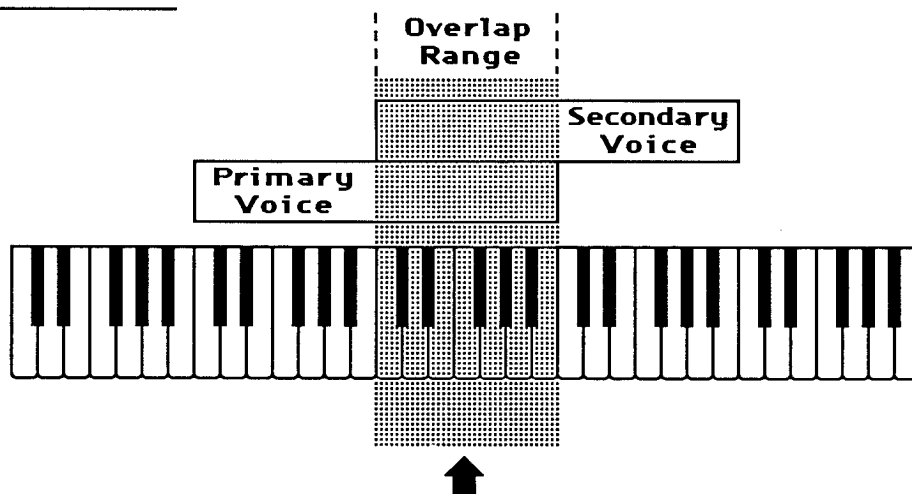
Velocity XFade Application: Fade between cellos and violins, depending on how hard you play a key. Have a fuzz guitar sound assigned so that playing softly plays the fundamental, and playing harder brings in a feedback note an octave above the fundamental.

Positional XFade Application: Transposing a sampled sound lower usually produces a more muffled sound than the original sample, and transposing upwards usually produces a thinner, brighter sound. Overlapping Voices and using Positional Crossfade can balance out the Voice timbres; as one Voice becomes progressively brighter, it can be fading out as the overly muffled part of the next Voice fades in. Combining the overly thin and overly muffled Voices in the correct proportion can produce an overall timbre that ends up sounding just right.

1. Activate **PRESET DEFINITION 5**. The display says:

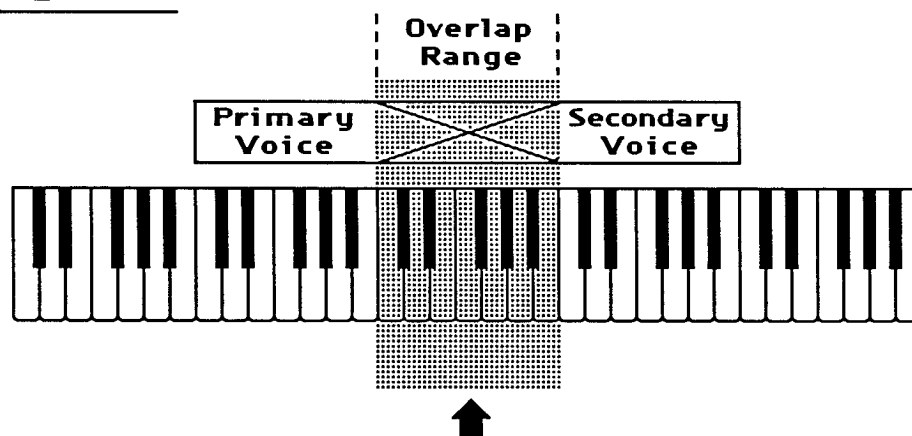
Lo:XX
Select Lo Key

Fig. PDEF-1



When playing in this range, if the Secondary Voice equals "Hard", then the Primary Voice becomes progressively softer and the Secondary Voice becomes progressively louder as you strike a key with increasing force.

Fig. PDEF-2



When playing from left to right across this range, Primary Voice fades out as Secondary Voice fades in.

...where XX defaults to the lowest note of the lowest Voice. Press a key in the range of the low Voice that is to be cross faded, or to quickly select the voice, use the data slider. While selecting the Voice, the lower display line will show the Voice's crossfade status. After selecting the low Voice, press **ENTER**.

2. Now the display shows:

Lo:XX Hi:YY
Select Hi Key

...where XX defaults to the highest note of the previously selected voice. Press a key in the range of the highest Voice that is to be cross faded, or to quickly select the voice, use the data slider. After selecting the high Voice, press **ENTER**.

3. The display now says:

Use Slider to
Select XFade

You now may select from the following choices:

- XFade Off** = There is no crossfading between the Primary and Secondary Voices.
- Velocity XFade** = One Voice will become louder as you play more forcefully; the other Voice will become softer.
- Velocity XSwitch** = If you strike a key with more force than the mid-point of the velocity range, one Voice will play; if you strike a key with less force than the mid-point of the velocity range, the other Voice will play.
- Positional XFade** = As you play from low to high over the Current Voice, one Voice will fade out as the other Voice fades in. This is a useful technique for maintaining an even tone quality over the keyboard when using multi-samples.
- Realtime XFade** = Crossfading occurs not according to keyboard velocity, but according to the real time controller that has been assigned. (See Preset Definition 9)
- Realtime XSwitch** = Crossfading occurs not according to keyboard velocity, but according to the real time footswitch.

4. If you choose any option except for Positional XFade, the display says:

Pri or Sec Voice
Equals Hard: Sec

Use the data slider to select whether the Primary or Secondary Voice will:

- | | |
|--|--------------------|
| • Fade in when the keyboard is played forcefully | (Velocity XFade) |
| • Switch in when the keyboard is played forcefully | (Velocity XSwitch) |
| • Fade in according to the real time control wheel | (Realtime XFade) |
| • Switch in according to the real time footswitch | (Realtime XSwitch) |

If you choose Positional Crossfade, the display will say:

Pri or Sec Voice
On Top: Sec

The selected Voice will become more prominent as you play higher on the keyboard, and the other Voice will become less prominent.

After making your selection, press **ENTER**.

Module: PRESET DEFINITION 6

Function: ARPEGGIATOR SETUP

You're going to love this arpeggiator: it does a lot and it's easy to set up. Best of all, arpeggiation settings are stored with the Preset so that different Presets can have totally different arpeggiation characteristics. Also, arpeggiation can be assigned to any range of the keyboard or the entire keyboard, and some arpeggiation parameters can be altered in real time for expressive arpeggiation.

1. Select the Current Preset; this Preset will contain the arpeggiation information.
2. Activate **PRESET DEFINITION 6**. The display says:

Arpeg Setup Menu
Use Cursor Keys

Use the cursor keys to select the various Arpeggiator options or press **ENTER** to jump back to the Module Identifier. The first arpeggiation option display says:

Arpeggiator: off
Select on/off

Select the desired arpeggiator status with the **ON** or **OFF** buttons. To jump back to the Module Identifier press **ENTER**, otherwise press the right arrow cursor key to continue the setup.

3. The next display says:

Tempo: ♩= 120.00
[040-240] Inc/Dec

Use the data slider or the numeric keypad to adjust the tempo through the range from 40 - 240 Beats Per Minute. Press the right cursor key to do fine adjustment to the tempo. Use the data slider or the numeric keypad to adjust the tempo through the range from .00 - .99 Beats Per Minute.

If you have selected a clock other than the internal clock (see next menu item), the arpeggiator will follow and display this clock rather than the internal clock.

4. The next menu item chooses the note value; the display says:

Note Value: 1/16
Use Data Slider

Use the data slider to select between the following arpeggiation note values: 1/2 note, 1/4 note, 1/4 triplet, 1/8, 1/8 triplet, 1/16 (default setting), 1/16 triplet, 1/32, 1/32 triplet, and (believe it or not) 1/96 note. The note value can be manipulated in real time. To jump back to the Module Identifier press **ENTER**, otherwise press the right arrow cursor button to continue the setup.

5. The next display is:

Mode: fwd assign
Use Data Slider

Use the data slider to catalog the various modes.

- up** = held notes arpeggiate continuously from lowest to highest pitch.
- down** = held notes arpeggiate continuously from highest to lowest pitch.
- up/down** = held notes first arpeggiate from lowest to highest pitch, then from highest to lowest, then repeat this cycle.
- fwd assign** = held notes arpeggiate continuously in the order in which the keys were pressed.
- bkwd assign** = held notes arpeggiate continuously in the reverse order in which the keys were pressed.
- random** = held notes arpeggiate continuously in a random fashion.

To jump back to the Module Identifier press **ENTER**, otherwise press the right arrow cursor key to continue the setup.

6. The next display says:

Latch: off
Use Data Slider

Use the data slider to catalog the various modes.

- off** = No latching of notes. When you release your fingers from the keys, arpeggiation stops.
- auto** = When you release your fingers from the keys, arpeggiation continues. When you press down new keys, the old notes stop arpeggiating and the new ones arpeggiate instead.
- extend** = Same as auto, except that new notes are added in with old notes, thus all played notes arpeggiate.

To jump back to the Module Identifier press **ENTER**, otherwise press the right arrow cursor key to continue the setup.

7. To understand the next two menu items, let's define a couple of terms:

An arpeggio interval specifies what additional intervals will be played if you play a key. For example, suppose you played C2 with an interval of 5 (a major fifth) and up mode arpeggiation. Emax would arpeggiate between C2 and G2.

An arpeggio extension specifies how many times the interval will be extended. For example, with an interval of M3 (major third) and an extension of 04 (four times), if you played a C2 with the arpeggiator in up mode the arpeggiated sequence would consist of C2, E2 (a major third above C2), G#2 (a major third above E2), C3 (a major third above G#2) and the fourth extension, E3.

8. The next menu item after velocity specifies the number of extensions in the arpeggio. The display says:

Number of Ext:00
Use Data Slider

Use the data slider or the numeric keypad to step through the number of extensions, from 00 to 15. To jump back to the Module Identifier press **ENTER**, otherwise press the right arrow cursor button to continue the setup.

9. The next menu item produces the following display:

Interval: Oct
Use Data Slider

Use the data slider to specify the arpeggiation interval, as listed below:

m2	= minor second
M2	= major second
m3	= minor third
M3	= major third
P4	= perfect fourth
m5	= minor fifth
P5	= perfect fifth
m6	= minor sixth
M6	= major sixth
m7	= minor seventh
m9	= minor ninth
M9	= major ninth
Oct	= octave
miD	= minor tenth
MiD	= major tenth

To jump back to the Module identifier press **ENTER**, otherwise press the right arrow cursor button to continue the setup. Note that you can change the interval in real time (hot dog!) for some really nifty arpeggiation effects.

10. But wait, there's more!! The next great option is Harmony 1. This option plays a second note at the chromatic interval from the base note specified on the display. The interval is adjustable from a minor second, up to a major tenth. The display says:

Harmony 1: off
Use Data Slider

Use the **ON** and **OFF** buttons, or the **DATA SLIDER** to adjust the interval or turn the function off.

11. The next arpeggiator option is Harmony 2, which plays another note, (making a total of three notes if Harmony 1 is also selected) at the chromatic interval from the base note specified on the display. The interval is adjustable from a minor second, up to a major tenth. The display says:

Harmony 2: off
Use Data Slider

Use the **ON** and **OFF** buttons, or the **DATA SLIDER** to adjust the interval or turn the function off.

12. The next setup menu is for external clock. Press the right arrow cursor button, and the display says:



Clock: internal
Use Data Slider

Use the data slider buttons to choose the desired clock option. Your choices are:

Internal = Emax's arpeggiator syncs to the internal clock at the tempo chosen in the previous step.

MIDI = Emax's arpeggiator syncs to MIDI clock signals coming in over the MIDI In port.

click 24 = Emax's arpeggiator syncs to 24 pulses-per-quarter-note signals appearing at the Clock Input jack.

click 48 = Emax's arpeggiator syncs to 48 pulses-per-quarter-note signals appearing at the Clock Input jack.

click 96 = Emax's arpeggiator syncs to 96 pulses-per-quarter-note signals appearing at the Clock Input jack.

To jump back to the Module Identifier press **ENTER**, otherwise press the right arrow cursor button to continue the setup.

13. Moving right along, the next option is:



Velocity: 127
Use Data Slider

Use the data slider or numeric keypad to set the arpeggiator velocity value. The lowest possible value (obtained by entering 000) gives the following display:



Velocity: Played
Use Data Slider

Each note will arpeggiate at a volume level determined by the velocity with which the note was played. Use the data slider to select the range of MIDI velocity values (1 - 127), with larger numbers giving louder levels if the dynamics are mapped to level; when mapped to other parameters, they are affected appropriately.

To jump back to the Module Identifier press **ENTER**, otherwise press the right arrow cursor key to continue the setup.

14. But wait, there's still more! Key Repeats sets the number of times that each note plays before moving on to the next note in the arpeggio. The display says:



Key Repeats: 1
Use Data Slider

Use the **ON** and **OFF** buttons or the **DATA SLIDER** to select the desired number of repeats on each note. (1-8)

15. The next arpeggiator option is Cruz Control, which fits the number of notes you're holding into the specified note value (if you can't picture this effect, then give it a try and you'll hear what it does). The display says:

Cruz Control:on
Select on/off

Use the **ON** and **OFF** buttons to select whether Cruz Control is on or off.

Note: Cruz Control cannot be used when either Key Repeats or Glissando are on. Turning on Cruz Control will simply turn off Key Repeats and Glissando.

16. The next arpeggiator option is Glissando. The display says:

Glissando: off
Select on/off

Use the **ON** and **OFF** buttons to select whether Glissando is on or off. Glissando will play every chromatic step between the notes played, including extensions.

17. Last but not least comes the range adjustment. The display says:

Range: A-1 to C7
Select Lo Key

This is the default setting and indicates that arpeggiation will occur in the range of A-1 to C7 (the full MIDI range of notes). Play the key that corresponds to the lowest note in the range you want arpeggiated (or use the data slider), and then press the **RIGHT ARROW** key. The cursor will move to the second note in the display, which now says:

Range:XX to C7
Select Hi Key

....where XX is the note you just selected. Now play the note that corresponds to the highest note in the range you want arpeggiated (or use the data slider). The display will confirm your choice; press **ENTER** to jump back to the Module Identifier, otherwise press the right arrow cursor button to continue the setup. Note: E-max will not let you choose a lower note higher than the currently selected upper note.

Now that the arpeggiation setup is complete, press **ENTER** to jump back to the Module Identifier. Or, you can use the cursor keys to go back and change previously selected parameters.

Module: PRESET DEFINITION 7

Function: MIDI SETUP

MIDI is a way of exchanging musical information between various electronic music instruments. If you are not familiar with MIDI, read the “MIDI Supplement” section before continuing.

1. With all modules de-activated, select the Current Preset. This Preset will contain the default MIDI parameters, which you may now proceed to change for your particular application. Note that different Presets can have different MIDI parameters.
2. Activate **PRESET DEFINITION 7**. The display says:

MIDI Setup Menu
Use Cursor Keys

Move the cursor keys to identify the various MIDI options. The first display says:

Basic Channel 01
[01 -16] /Slider

This is the default channel over which this particular E-max Preset will send and receive MIDI information. To change channels, use the data slider or the numeric keypad. To jump back to the Module Identifier press **ENTER**, otherwise press the right arrow cursor button to continue the setup.

3. The next display says:

MIDI Port: Out
Use Data Slider

The MIDI Out connector can be set to provide one of two functions, MIDI Out (i.e., data you play on the keyboard flows out the MIDI port) or MIDI Thru (i.e., the MIDI Out port echoes what's being received at the MIDI In port). To select, use the data slider. To jump back to the Module Identifier press **ENTER**, otherwise press the right arrow cursor button to continue the setup.

4. The next display says:

MIDI Mode: omni
Use Data Slider

Use the data slider to change MIDI mode as follows:

Omni = accepts MIDI information coming in on any channel.

Poly = accepts MIDI information only on the basic channel (specified in step 2 above).

After making your selection, press **ENTER** to jump back to the Module Identifier, otherwise press the right arrow cursor button to continue the setup.

5. The next display says:

Preset Chng: on
Select on/off

MIDI also carries program (Preset) change information from one synthesizer to another. Press **ON** if you want Emax to send and receive program changes, or **OFF** if you want to select Emax Presets independently of other MIDI instruments. To jump back to the Module Identifier press **ENTER**, otherwise press the right arrow cursor key to continue the setup.

Note: There is no specific standard between manufacturers regarding what program ("patch") will occur on "slave" synthesizers when a particular program is selected on the "master" synthesizer. Some instruments number programs sequentially, while others arrange programs in "banks" (e.g., A1, A2, A3, B1, B2, etc.).

6. The next display says:

Start/Stop: oft
Select on/off

When connected in a MIDI system, you may or may not want Emax to respond to "start and stop sequence" commands from other instruments, preferring instead to start and stop sequences from the Emax. Press **ON** if you want the Emax sequences to start and stop under control of another MIDI instrument; press **OFF** if you want to start and stop sequences exclusively from Emax. To jump back to the Module Identifier press **ENTER**, otherwise press the right arrow cursor button to continue the setup.

7. Moving right along we see:

Local Cntl: on
Select on/off

If you press **ON** (the default setting), the Emax keyboard controls the Emax sound generators and sends out MIDI data about which keys are being played. Pressing **OFF** "disconnects" Emax from its keyboard, but still sends out MIDI data about which notes are being played. To return to the Module Identifier press **ENTER**, otherwise press the right arrow cursor button to continue the setup.

8. The next screen says:

Notes, Wheels: on
Select on/off

Press **ON** if you want Emax to send and receive note and wheel MIDI data as well as MIDI clock signals. Press **OFF** if you want Emax to send and receive MIDI clock signals but not note and wheel signals. To return to the Module Identifier press **ENTER**, otherwise press the right arrow cursor button to continue the setup.

9. The next item of interest is...

Lt Wheel <-> pwh
[00-33] /Slider

Moving the data slider upwards increases the MIDI controller number assigned to the left wheel, while moving the data slider downwards decreases the controller number. Or, hold either button to “fast forward” or “fast backward” through the range of MIDI controller numbers (off, 00 to 33). You may also enter a two-digit value with the numeric keypad, however, this will not allow you to enter off. Note that 32 assigns the Left Wheel to the standardized controller number for pitch bend (pwh), and 33 assigns the Left Wheel to the standardized controller for monophonic pressure (aftertouch, or chp).

Note: MIDI controller assignments are bi-directional. Example: If the left wheel is assigned to controller number 12, then Emax will send out controller data over 12 when the left wheel is moved; when Emax receives MIDI data over controller number 12, it will interpret this as if the left wheel was being moved.

To return to the Module Identifier press **ENTER**, otherwise press the right arrow cursor button to continue the setup.

10. The next screen says:

Rt Wheel <-> 01
[00-33] / Slider

You may now assign a controller number to the Right Wheel in exactly the same manner as you assigned a controller number to the Left Wheel in step 9. To return to the Module identifier press **ENTER**, otherwise press the right arrow cursor button to continue the setup.

11. The next display shows:

Pedal <->off
[00-33] / Slider

You can now assign a controller number to the Pedal in exactly the same manner as you assigned a controller number to the Left Wheel in step 9. To return to the Module Identifier press **ENTER**, otherwise press the right arrow cursor button to continue the setup.

12. We're not done yet. The next displays says:

Pressure <-> chp
[00-33] / Slider

You may now assign a controller number (chp = the MIDI standard for monophonic pressure) to the keyboard's pressure (aftertouch) function in exactly the same manner as you assigned a controller number to the Left Wheel in step 9. To return to the Module Identifier press **ENTER**, otherwise press the right arrow cursor button to continue the setup.

13. The next display says:

MIDIA <-> pwh
[00-33] / Slider

Real-time parameters (pitch, filter cutoff, level, LFO to pitch modulation index, etc.) can be assigned to MIDI control source A (see Preset Definition 9 for more information about control sources). You may then assign each MIDI control source to correspond to specific MIDI controller on another synthesizer.

Example: Suppose a second MIDI unit's vibrato controller is assigned to MIDI control number 01, and that MIDI control source A on Emax controls the filter cutoff frequency. Selecting 01 for MIDI control source A would control Emax's filter cutoff frequency via the second MIDI unit's vibrato information. (Assuming, of course, that the Emax and the other MIDI unit are connected via MIDI.)

This step of the set-up procedure lets you assign a number to the MIDI control source that matches up with the number of the controller "transmitting" data from a MIDI unit into Emax. (For more information on controller numbers, see the MIDI supplement.) Controller numbers are assigned in exactly the same manner as you assigned a controller number to the Left Wheel in step 9. To jump back to the Module Identifier press **ENTER**, otherwise press the right arrow cursor key to continue the setup.

14. The next display shows:

MIDIB <-> 01
[00-33] / Slider

Assign a controller number to control source B in exactly the same manner as you assigned a controller number to control source A in step 13.

This completes MIDI setup for the Current Preset. To return to the Module Identifier press **ENTER**, or if you want to change some parameters, dial them in with the cursor buttons.

Module: PRESET DEFINITION 8

Function: PITCH BEND RANGE

This function adjusts the pitch wheel range from +0 (off) to ± 4 semitones.

1. Activate **PRESET DEFINITION 8**. The display says:

Pitchbend Range:
 $\pm X$ semitones

...where X is a number between 0 and 4.

2. Select the desired number with the data slider, numeric keypad. Press **ENTER** after making your choice, and Emax will return to the Module Identifier.

Module: PRESET DEFINITION 9**Function: REAL-TIME CONTROLS**

Real-time functions are designed for fast, easy selection while playing live. Each Voice can have its own unique set of pre-programmed real time functions.

Note: If you use a keyboard stand for Emax, it is recommended that two extra support bars be placed underneath.

1. Activate **PRESET DEFINITION 9**.
2. The display shows each control source as a pair of numbers. The first digit of each pair represents the control source (e.g., wheel, pedal, etc.), the second digit the control source's destination (filter cutoff, pitch, etc.). Select the control source to which you want to assign a destination by keying in the appropriate control source number:
 - 1: Left wheel (center detent, spring return type)
 - 2: Right wheel (continuously variable type)
 - 3: Pressure (incoming MIDI data from an external pressure sensitive keyboard)
 - 4: Pedal A/D (plugs into rear panel PEDAL jack).
 - 5: MIDI control A
 - 6: MIDI control B
 - 7: Footswitch 1 (plugs into rear panel Foot Switch 1 jack)
 - 8: Footswitch 2 (plugs into rear panel Foot Switch 2 jack)

Each of destinations 0 - 9 printed in the upper part of the right-hand column located in the Preset Definition module can be controlled by control sources 1 through 4. Each destination can be controlled by only one of the 4 Emax controllers.

In addition to being controlled via Emax's controllers, these destinations can alternatively be controlled via MIDI. These MIDI control sources are given controller numbers (see **PRESET DEFINITION 7**). These numbers match up with the numbers of the controllers "transmitting" data from a MIDI unit into Emax. For more information, see the MIDI supplement.

Each of destinations 0 - 6 printed in the lower right-hand column of the module can be controlled by sources 7 and 8 (footswitches). Each destination can be controlled only by a single source.

3. After keying in the source number, the cursor will flash under the second number of the pair, indicating that you may now select one of the destinations printed on the right-hand side of the module. These are described in more detail below.

Note: Real time functions usually control all Voices on the keyboard. However, when making up a Preset, it is possible to exempt Voices from real-time control. This is described fully in **ANALOG PROCESSING 22** ("Control Enable").

Note: For some Presets on factory disks, default destinations will already have been selected. For other Presets, all control sources will be turned **OFF** (0).

Following is a description of the control source destinations.

Destination number: 0

Function: OFF

1. To turn off (disable) the control source, first select the control source then select 0.

Destination number: 1

Function: PITCH

1. To assign pitch bend to the control source, first select the control source then select 1.

Application: Generally, this destination is assigned to the left-hand wheel, which has a center detent. When so assigned, the center position gives no pitch bend. Rotating the wheel away from you bends pitch up, while rotating the wheel towards you bends pitch down. Maximum pitch bend is ± 4 semitones, as set in **PRESET DEFINITION 8**.

Destination number: 2

Function: FILTER Fc

1. To assign filter cutoff frequency control to the control source, first select the control source then select

Application: This destination is normally assigned to the right wheel, pressure, or pedal to add expressiveness to your playing. Example: Brass sounds often increase in brightness towards the end of notes; simulate this by using the wheel to increase the filter cutoff frequency towards the end of a note. FILTER Fc can also be assigned to the Pedal for “wa-wa” effects; turn up the Q to simulate the most commonly used wa-wa sound.

Note: This function interacts with the filter module frequency and envelope settings. If the wheel does not seem to be working correctly, check these settings.

Example: If the filter cutoff is already at maximum, you will not be able to use the wheel to increase the cutoff frequency. Therefore, for the Right wheel to cover the greatest possible filter sweep, select **ANALOG PROCESSING 13** (“Filter Fc”) and set Env (envelope) to +00. Next, assuming that the Right wheel is assigned to Filter Fc, rotate it fully towards you and adjust Ec for the lowest desired filter cutoff frequency. Rotating the Right wheel away from you will increase the filter cutoff.

Destination number: 3

Function: LEVEL

1. To assign overall level to the control source, first select the control source then select 3.

Application: Probably the most common use is to assign **LEVEL** to the Pedal, thus giving Pedal-controlled volume. Or, assign this destination to the Right wheel when you need a manual volume control (such as during fadeouts) or to a MIDI control for pseudo-automated mix down effects when driving Emax from a sequencer.

Assigning **LEVEL** to the Left wheel can also be useful. At center position, the volume level is audible but can be increased by rotating the wheel away from you. Rotate the wheel towards you to fade out the sound completely.

Destination number: 4

Function: LFO to PITCH

1. This function controls the extent (i.e., modulation index) to which the LFO modulates pitch. To assign this destination to the control source, first select the control source then select 4. (To change the LFO rate and LFO variation, refer to **ANALOG PROCESSING 15.**)

Application: This destination is most often assigned to the Right wheel; rotating the wheel away from you increases the amount of vibrato. Assigning this destination to the Pedal provides foot-controlled vibrato.

Note: Assigning this destination overrides the equivalent Analog Processing module function.

Destination number: 5

Function: LFO to FILTER Fc

1. This function controls the extent to which the LFO modulates the filter cutoff frequency. To assign this destination to the control source, first select the control source then select 5. (To change the LFO rate and LFO variation, refer to section **ANALOG PROCESSING 15.**)

Application: This destination is most often assigned to the Right wheel; rotating the wheel away from you increases the amount of filter modulation ("filtrato") which is a type of timbre modulation. Assigning this destination to the Pedal provides foot-controlled filtrato. Slow filtrato is useful for varying the timbre on long, sustaining sounds; fast filtrato gives a "bubbly" sound, which can resemble that of mechanical rotating speaker systems.

Note: Assigning this destination overrides the equivalent Analog Processing module function. Also, LFO to FILTER Ec interacts with the filter module frequency and envelope settings. If this function does not seem to work, check these settings. Example: If the filter cutoff is already at maximum, you will not be able to modulate it to any great degree.

Destination number: 6

Function: LFO to LEVEL

1. This function controls the extent to which the LFO modulates the overall level (this phenomenon is called tremolo). To assign this destination to the control source, first select the control source then select 6. (To change the LFO rate and LFO variation, refer to section **ANALOG PROCESSING 15.**)

Application: When assigned to the Right wheel, rotating the wheel away from you increases the amount of tremolo. Assigning this destination to the Pedal provides foot-controlled tremolo. Tremolo is useful for "Bo Diddley" and surf music guitar sounds, as well as for simulating some electric piano sounds.

Note: Assigning this destination overrides the equivalent Analog Processing module function.

Destination number: 7

Function: ATTACK RATE

1. ATK RATE controls the VCA and VCF attack rate. To assign this destination to the control source, first select the control source then select 7.

Application: When assigned to the Right wheel, rotating the wheel away from you increases the attack time. This effect is useful when changing from legato to percussive effects, especially with sustained sounds such as strings.

Note: With ATK RATE assigned to a wheel, Analog Processing module function 12, VCA Attack (A) and module function 14, Filter attack (A) are disabled. Therefore, Filter and VCA attack rates are determined solely by the wheel setting.

Destination number: 8

Function: PANNING

1. **PANNING** controls the spatial placement of the sound in the stereo field. To assign this destination to the control source, first select the control source then select 8.

Application: When assigned to the Left wheel, rotating the wheel away from you places the sound in one channel, rotating the wheel towards you places the sound in the other channel, and center wheel position places the sound in the center of the stereo field. You can also use the Pedal for foot-controlled panning.

Note: Assigning this destination overrides the equivalent Analog Processing module function.

Destination number: 9

Function: XFADE

1. XFADE allows you to crossfade between the primary and secondary Voices in a Preset. To assign this destination to the control source, first select the control source then select 9.

Application: When assigned to the left wheel, this function also provides for real time changes in mix between two separate sounds (e.g., strings can fade out while brass fades in, or vice-versa).

Note: This function must also be enabled under Preset Definition function 5 (Velocity XFade).

Following is a description of the footswitch destinations.

Destination: (Footswitch) 0

Function: OFF

1. To turn off the footswitch, first select the footswitch then select 0.

Destination: (Footswitch) 1

Function: ARP CTRL

1. To start and stop arpeggiation via the footswitch, first select the footswitch then select 1.

Destination: (Footswitch) 2

Function: SEQ CTRL

1. To start and stop the Sequencer via footswitch, first select the footswitch then select 2.

Destination: (Footswitch) 3

Function: SUSTAIN

1. For footswitch controlled sustain, first select the footswitch then select 3.

Note: If you play a looped sound while the footswitch is pressed, as soon as the looped portion begins it will sustain (even after lifting your fingers off the keys) until the footswitch is released. Holding down the footswitch continuously provides a hold function for looped notes, where the last eight notes played will sustain for as long as the footswitch is pressed.

If you play an unlooped sound while the footswitch is pressed, it will play through its entire length (whether or not you are holding down a key), then stop.

Destination: (Footswitch) 4

Function: RELEASE

1. For footswitch-controlled release, first select the footswitch then select 4. Any note played while the footswitch is pressed will play through its entire length, whether or not you continue to hold down a key. Looped sections are not repeated unless you hold down the key. Releasing the footswitch cancels release.

Application: If you have a Voice with a short release but where there are sounds after the end of the loop, playing the sound normally will play through to the end of the loop and you will not hear the sounds that occur after the loop. However, if you press down on the release footswitch during the loop and remove your finger from the key, the Voice will play through to the end--including the "after-loop" sounds.

Destination: (Footswitch) 5

Function: XSWITCH

1. For footswitch controlled switching between the primary and secondary Preset Voices, first select the footswitch then select 5. Pressing the footswitch will alternate between the two samples.

Note: This function must also be enabled under Preset Definition function 5 (Velocity XFade).

Destination: (Footswitch) 6

Function: ADVANCE PRESET

1. To advance via footswitch from one Preset to the next higher numbered Preset (i.e., from Preset 01 to Preset 02), first select the footswitch then select 6. Press the footswitch momentarily to advance to the next Preset. Advancing past the highest-numbered Preset resets Emax to the lowest numbered Preset.

Note: If you advance to a Preset which does not have this destination assigned to one of the footswitches, you will not be able to advance out of that Preset.

Hint: Use this function to return the display to the Preset Identifier mode when the sequencer is playing, enabling you to play different presets while listening to the sequencer.

Note2: Emax is designed to work with two types of footswitches. If your footswitch seems to work backwards, refer to Recalibrate located under Special in the Master module.

ANALOG PROCESSING MODULE

IMPORTANT

Note: The Analog Processing Module must be accessed before keying in any of the function numbers. Also, the Voice(s) to be processed must be selected (see **ANALOG PROCESSING 00**).

Module: ANALOG PROCESSING 00

Function: CHANGE CURRENT VOICE(S)

This function lets you change the Current Voice assignment.

1. Activate **ANALOG PROCESSING 00**. The display will say:

Edit pri, sec, or
both voices: XXX

2. ...where XXX is either Pri, Sec or Both. Use the data slider to select whether the primary, secondary, or both Voices are to be included in the Current Voice group, then press **ENTER**.
3. If the Preset contains only Primary or Secondary Voices, Emax is smart enough to bypass the first screen and say:

Lo:XX
Select Lo Voice

...where XX defaults to the lowest note of the lowest Voice. Press a key in the range of the low Voice that you want to process, or to quickly select the low voice, use the data slider. While selecting the low Voice, the lower display line will show the Voice number, its original pitch. After selecting the low Voice, press **ENTER**.

4. The display now says:

Lo: XX ->Hi: HH
Select Hi Voice

Where XX is the previously selected low note and HH is the highest note of the Voice that contains the lowest note. Press a key in the range of the high Voice that you want to process, or to quickly select the high voice, use the data slider. After selecting the high Voice, press **ENTER** to complete the Current Voice selection and return to the Module Identifier.

Note: If the range includes part of a Voice; the entire Voice will be processed. This is desirable as a quick method of processing an entire voice without having to determine the true high and low note limits of the voice assignment. If, however, you wish to process just a portion of the voice assignment, simply copy the desired range (**PRESET DEFINITION 1**) back into the current preset. Emax will now consider this a whole new voice for independent processing.

5. You may select the entire keyboard by pressing the **ANALOG PROCESSING** or the **ENTER** button twice in succession.
6. The Current Voice will remain as is until you either change the Voice assignment (**ANALOG PROCESSING 00**), change Presets, or load another Bank. If you switch between modules, the Current Voice remains as assigned unless you activate the Digital Processing module.

Module: ANALOG PROCESSING 11**Function: VOICE ATTENUATION,
TUNING, and DELAY**

This function varies the attenuation, tuning, and delay for the Current Voice.

1. Activate **ANALOG PROCESSING 11**. The display will say:

Attn Tune Delay
00dB +00ct 00

2. Select the desired parameter for adjustment with the cursor (left arrow/right arrow) buttons, then vary the parameter as needed:

Attn: Use the data slider to attenuate the Voice up to 46 dB.

Tune: Use the data slider to tune the Voice pitch between +45 and -48 cents.

Delay: Use the data slider to vary the delay between the time a key is first pressed (or MIDI data received at the MIDI input) to the onset of the note. The range is 0 to 63.

3. After making your selections, press **ENTER** to return to the Module Identifier.

Module: ANALOG PROCESSING 12**Function: VCA ENVELOPE**

This function sets the attack, hold, decay, sustain, and release characteristics of the VCA's AHDSR envelope generator.

Application: Change a Voice's dynamics with respect to time.

1. Activate **ANALOG PROCESSING 12**. The display will say:

A: A H D S R
XX XX XX XX XX

...where XX is a two-digit numeral between 01 and 32.

Hint: Filter and VCA settings interact. For example, if the VCA is set for an extremely short decay and sustain level is near 0, then you won't hear the effects of setting a long filter decay.

2. Select the desired parameter for adjustment with the cursor buttons, then use the data slider to change the parameter value. Fig. ANALOG-1 shows the effect and timing of the various envelope parameters; refer to these as you read the following descriptions of the five parameters.

Figure: ANALOG - 1

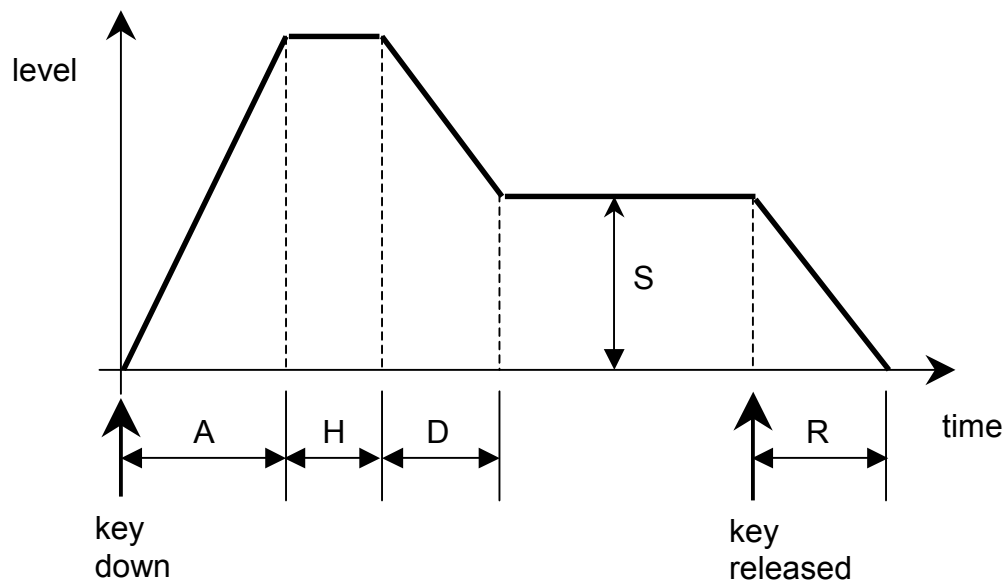
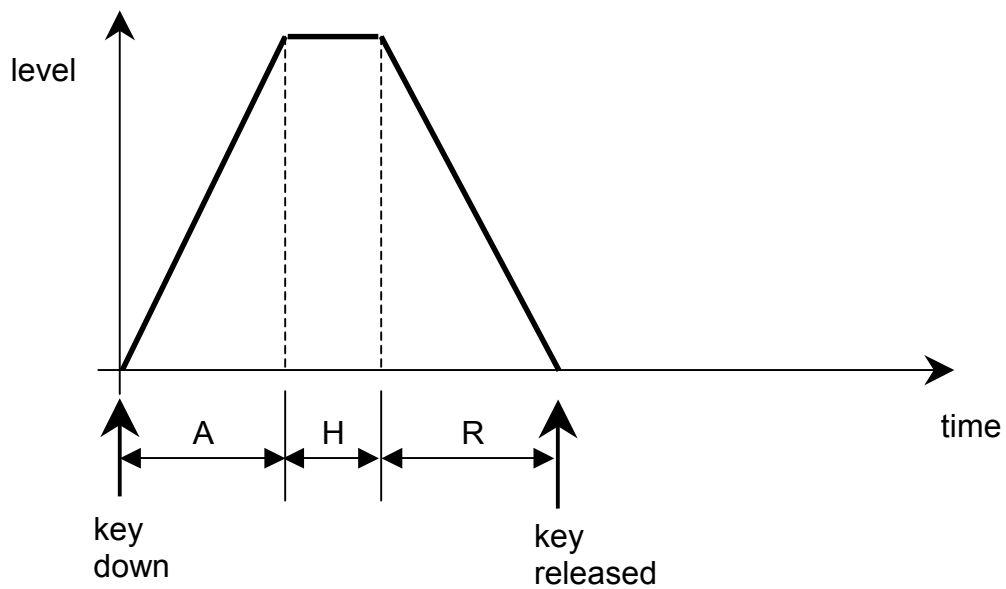


Figure: ANALOG - 2



If key is released during the Hold (H) phase, the Release (R) phase begins.

- A (Attack):** Varies the VCA envelope attack time from 01 to 32 (higher values increase the attack time).
- H (Hold):** Sets the duration of the peak. If a key is held down longer than the hold duration, the decay phase will begin. If a key is released during the hold duration, the release phase will begin.
- D (Decay):** Varies the initial decay time from 01 to 32 (higher values increase the initial decay time). A value of 32 gives "infinite decay" – the envelope stays at maximum amplitude for as long as you hold down keys.
- S (Sustain):** Varies the envelope sustain level from 01 to 32 (higher values give higher sustain levels).
- R (Release):** Varies the release time from 01 to 32 (higher values increase the release time). A setting of 32 inhibits the release phase of the envelope, thus keeping the VCA open at the previously selected Sustain level. This is useful if you want to trigger a long sound by simply tapping a key.

3. After making your selections, press **ENTER** to return to the Module Identifier.

Note: If the filter and VCA release are both at 32 (also see **ANALOG PROCESSING 14**), a key will sustain at the sustain level even after you take your fingers off the keys. This is like the HOLD function found on standard synthesizers. The sound will continue to sustain unless you play more notes than there are available channels, in which case previously assigned channels will be assigned to newly played notes.

Module: ANALOG PROCESSING 13

Function: FREQUENCY, 0,
ENVELOPE AMOUNT, TRACKING

This function determines the filter's initial cutoff frequency and 0 (sharpness), the extent to which the associated AHDSR envelope affects the filter cutoff frequency, and the effect of keyboard position on cutoff frequency.

Application: Change the timbral quality of a sound.

1. Activate **ANALOG PROCESSING 13**. The display will say:

Fc	Q	Env	Trk
XXX XX	±XX	XXX	

...where X is a numeral.

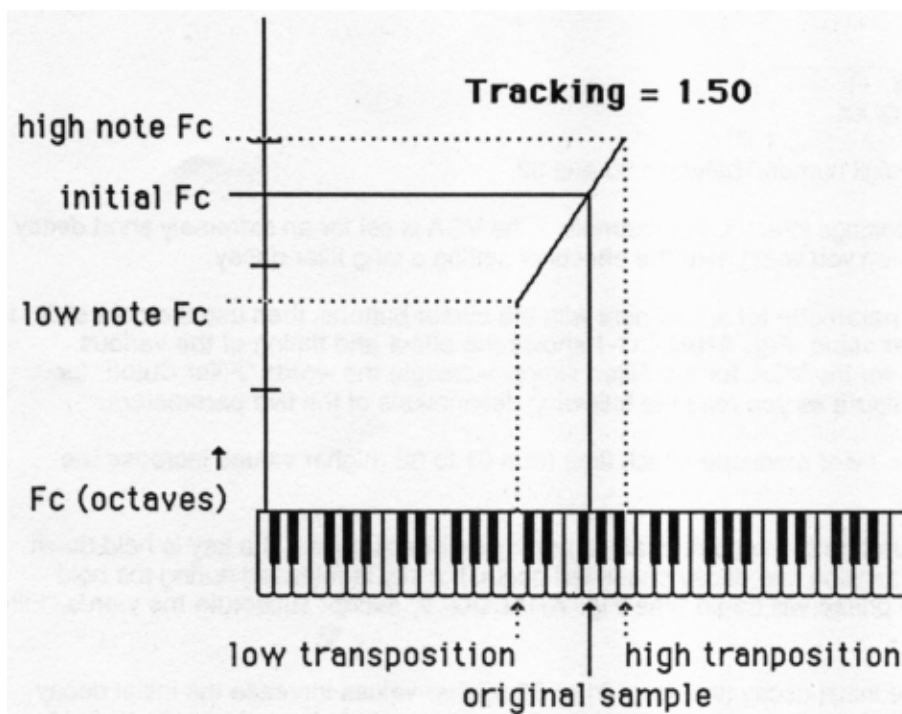
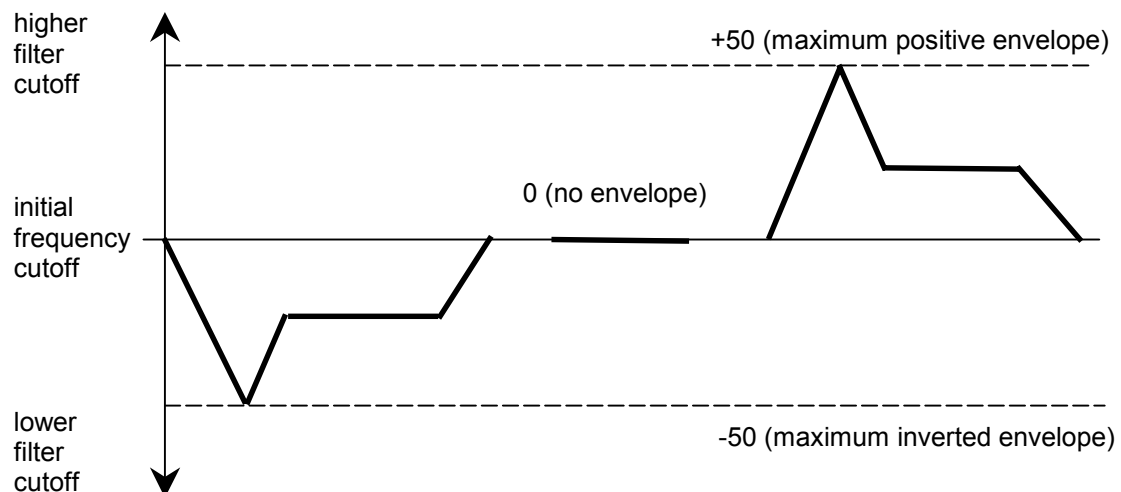
Hint: Filter and VCA settings interact. For example, if the VCA is set for an extremely short decay, then you won't hear the effects of setting a long filter decay.

2. Select the desired parameter for adjustment with the cursor buttons, then use the data slider to change the parameter value. These are the parameters:

Freq: Varies the low pass filter cutoff from 0 to 120. Higher values correspond to higher filter cutoff frequencies, hence a sound with more treble. The maximum filter sweep range is most obvious with Env set to +00.

Q: Varies the Q (resonance) from 00 to 99. Higher values correspond to increased resonance, accentuating the filter cutoff frequency, which gives a purer, more whistling sound.

Figure: ANALOG - 3



- Env:** Varies the effect of the filter envelope (see **ANALOG PROCESSING 14**) on the filter cutoff frequency from -50 (maximum inverted envelope) to +00 (no envelope) to +50 (maximum positive envelope). It is usually necessary to raise the filter cutoff value when using inverted envelopes (Fig. ANALOG-3).
- Trk:** Varies the filter cutoff with respect to the note(s) being played on the keyboard from 0.00 (no tracking) to 1.87 (over tracking) filter-oct/keyboard-oct. With 0.00 tracking, the keyboard pitch will not affect the filter cutoff. With 1.00 tracking, the filter cutoff will track the keyboard pitch. With 1.87 tracking, the filter cutoff will change at almost twice as fast a rate as keyboard pitch changes (Fig. ANALOG-4).

Keyboard tracking application: With no tracking, a voice will become progressively less bright as you play higher on the keyboard. This is useful with some bass sounds, where you don't want the high notes to sound too trebly. With normal tracking (keyboard amount 1.00), the timbre of a voice remains constant as you play up the keyboard. This generally gives the most realistic synthesizer and instrument sounds. With over tracking (keyboard amount greater than 1.00), the overall timbre of the voice becomes brighter as you play higher up on the keyboard. This is useful for playing upper keyboard register leads that really "cut" while also playing a more sedate, muted line in the lower registers.

2. After making your selections, press **ENTER** to return to the Module Identifier.

Module: ANALOG PROCESSING 14

Function: FILTER ENVELOPE

This function sets the attack, decay, sustain, and release characteristics of the filter AHDSR envelope generator.

Application: Change the filter cutoff frequency dynamically with respect to time.

1. Activate **ANALOG PROCESSING 14**. The display will say:



F: A H D S R
XX XX XX XX XX

..where XX is a two-digit numeral between 00 and 32.

Hint: Filter and VCA settings interact. For example, if the VCA is set for an extremely short decay and 0 sustain level, then you won't hear the effects of setting a long filter decay.

2. Select the desired parameter for adjustment with the cursor buttons, then use the data slider to change the parameter value. Fig. ANALOG-1 shows the effect and timing of the various envelope parameters for the VCA; for the Filter, simply substitute the words "Filter Cutoff" for "Level". Refer to this figure as you read the following descriptions of the five parameters.

- A (Attack):** Varies the Filter envelope attack time from 01 to 32 (higher values increase the attack time).
- H (Hold):** Sets the duration of the peak attained during the attack phase. If a key is held down longer than the hold duration, the decay phase will begin. If a key is released during the hold duration, the release phase will begin (see Fig. ANALOG - 2, except substitute the words "Filter Cutoff" for "Level").
- D (Decay):** Varies the initial decay time from 01 to 32 (higher values increase the initial decay time). A value of 32 gives "infinite decay" - the envelope stays at maximum amplitude for as long as you hold down keys.

S (Sustain): Varies the envelope sustain level from 01 to 32 (higher values give higher sustain levels).

R (Release): Varies the release time from 01 to 32 (higher values increase the release time). A setting of 32 inhibits the release phase of the envelope, thus keeping the Filter open at the previously selected Sustain level. This is useful if you want to trigger a long sound by simply tapping a key.

3. After making your selections, press **ENTER** to return to the Module Identifier.

Note: If the filter and VCA release are both at 32 (also see **ANALOG PROCESSING 12**), a key will sustain at the sustain level even after you take your fingers off the keys. This is like the HOLD function found on standard synthesizers. The sound will continue to sustain unless you play more notes that there are available channels, in which case previously assigned channels will be assigned to newly played notes.

Module: ANALOG PROCESSING 15

Function: LFO SETUP (RATE, DELAY, VARIATION)

This function sets three LFO parameters (initial rate, delay before onset of LFO modulation, and LFO variation).

Application: After pressing a key(s), LFO delay delays the onset of vibrato by an adjustable amount. This simulates an effect often used by string players, where the vibrato is brought in only after the initial note pitch has been clearly established.

Application: LFO variation adds a randomized quality to ensemble sounds by providing slightly different vibrato rates for each key being held down. This can make orchestral Voices sound truly polyphonic.

1. Activate **ANALOG PROCESSING 15**. The display will say:

Rate	Delay	Vari
XXX	XX	XX

...where X is a numeral.

2. Select the desired parameter for adjustment with the cursor buttons, then use the data slider to change the parameter value. These are the available parameters:

LFO Rate: Varies from 1 to 120; higher values give a faster modulation rate.

LFO Delay: Sets the amount of time between hilling a key and the onset of modulation. Range is from 00 to 99, with higher values giving longer delays.

LFO Variation: In addition to having true, one-LFO-per-Voice polyphonic modulation, Emax also has a great feature called variation. With 00 variation, each key will have the same vibrato rate. Increasing variation (to a maximum of 15) alters the LFO rate every time you hit a key; the higher the number, the greater the variation in LFO frequency. For effects such as ensemble playing, the variation feature is invaluable as it creates the illusion of multiple players, each having their own vibrato rate.

3. After making your selections, press **ENTER** to return to the Module Identifier.

Module: ANALOG PROCESSING 16**Function: LFO TO (VIBRATO, TREMOLO, FILTER Fc, PANNING)**

The LFO can modulate four different parameters - - pitch, amplitude, filter cutoff frequency, and stereo placement. The modulation depth (index) is variable from 00 to 15.

Application: LFO modulating the pitch provides vibrato effects; LFO modulating VCA provides tremolo effects (as used for years in guitar amplifiers--attention surf music fans); LFO modulating filter provides timbre modulation effects; LFO modulating panning sweeps the sound back and forth between the left and right channels (i.e., spatial modulation).

1. Activate **ANALOG PROCESSING 16**. The display will say:

Vib Trem Fc Pan
XX XX XX XX

2. Select the desired parameter for adjustment with the cursor buttons, then use the data slider or increment buttons to change the parameter value as desired:

Vibrato:	Determines the extent to which the LFO modulates pitch. Range is from 00 to 15, with higher values giving more modulation.
Tremolo:	Determines the extent to which the LFO modulates the VCA. Range is from 00 to 15, with higher values giving more modulation.
Fc (filter cutoff):	Determines the extent to which the LFO modulates the filter cutoff frequency. Range is from 00 to 15, with higher values giving more modulation.
Pan:	Determines the extent to which the LFO modulates the stereo placement. Range is from 00 to 15, with higher values giving more drastic motion between the left and right channels.

3. After making your selections, press **ENTER** to return to the Module Identifier.

Module: ANALOG PROCESSING 17**Function: VELOCITY TO (LEVEL, FILTER Fc, FILTER 0, PITCH)**

This function ties dynamics (level), filter cutoff, filter 0, and pitch to how forcefully you play the keyboard.

Application: Sample sounds from an instrument (i.e. older synthesizers) without dynamics, and assign dynamics.

Application: Acoustic instruments often sound brighter when played forcefully. Emax can simulate this effect by tying filter cutoff to keyboard dynamics.

Application: Increasing 0 with increasing velocity thins out a sound, yet also increases its sharpness. This can work well with percussive Voices when you want a more intense, but not necessarily louder, sound.

Application: Since each Voice in a Preset can have its own keyboard dynamics settings, lower register bass sounds can have minimum dynamics to provide a constant bottom, while upper register lead sounds can be played more dynamically.

1. Activate **ANALOG PROCESSING 17**. The display will say:

Vel: Lv Fc Q Pit
XX XX +XX XX

...where XX is a two digit number between 00 and 15.

2. Select the desired parameter for adjustment with the cursor buttons, then use the data slider to change the parameter value. Here are your choices:

Level: Determines the extent to which keyboard velocity controls dynamics. When set to 00, the overall level is at maximum (loudest possible dynamics) no matter how forcefully or softly you play the keyboard. Progressively higher values give a progressively wider dynamic range by making soft sounds softer (see Fig. ANALOG-5). Example: When set to 05, softly played notes sound somewhat quieter than forcefully played notes; when set to 15, softly played notes sound drastically quieter than forcefully played notes.

Fc: Determines the extent to which keyboard velocity controls filter cutoff frequency. When set to 00, the filter cutoff frequency remains constant no matter how forcefully or softly you play the keyboard. Progressively higher values give a wider cutoff frequency range by lowering the cutoff frequency for softer playing (see Fig. ANALOG-6). Example: When set to 05, softly played notes have a somewhat lower cutoff frequency than forcefully played notes; when set to 15, softly played notes have a drastically lower cutoff frequency.

Q: Determines the extent to which keyboard velocity controls filter Q. When set to 00, no matter how hard or soft you play the Q stays constant. With positive values (up to +15), playing more forcefully increases the Q. With negative values (down to -16), playing more forcefully decreases Q. Note that overall volume levels can change with changes in Q; this is normal.

Note: The Fc and Q settings interact with the Filter controls (**ANALOG PROCESSING 13**). You will probably need to “tweak” the Filter module settings for optimum results.

Pitch: Determines where pitch will be held relative to keyboard dynamics. When set to 00, the pitch remains constant no matter how forcefully or softly you play the keyboard. Progressively higher values give higher-pitched notes as you play more forcefully. Example: When set to 05, softly played notes are fairly close to (if not the same as) concert pitch and are somewhat lower in pitch than forcefully played notes; when set to 15, forcefully played notes are much higher in pitch than softly played notes. This can be useful for percussive sounds.

3. After making your selections, press **ENTER** to return to the Module Identifier.

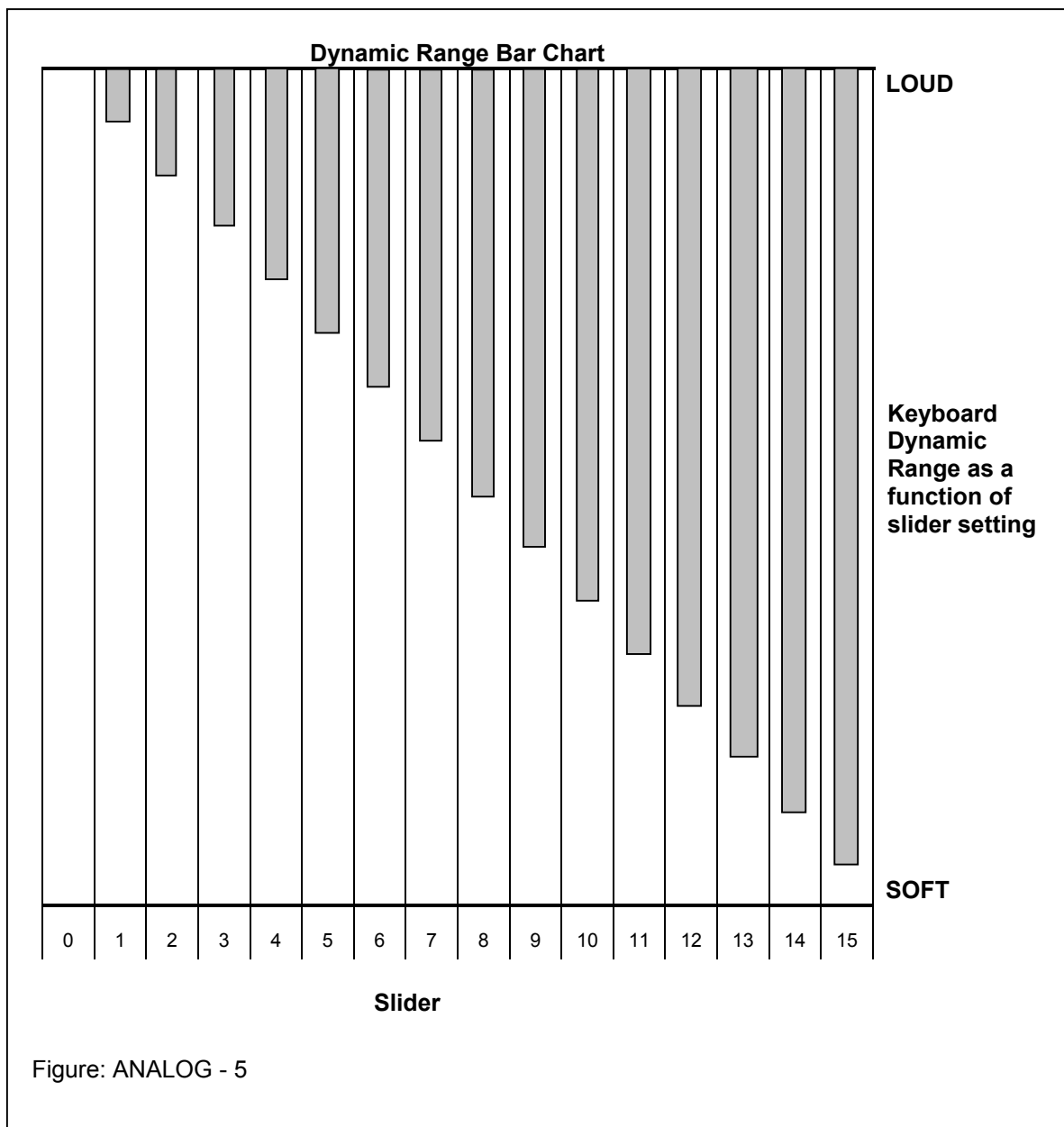
Module: ANALOG PROCESSING 18

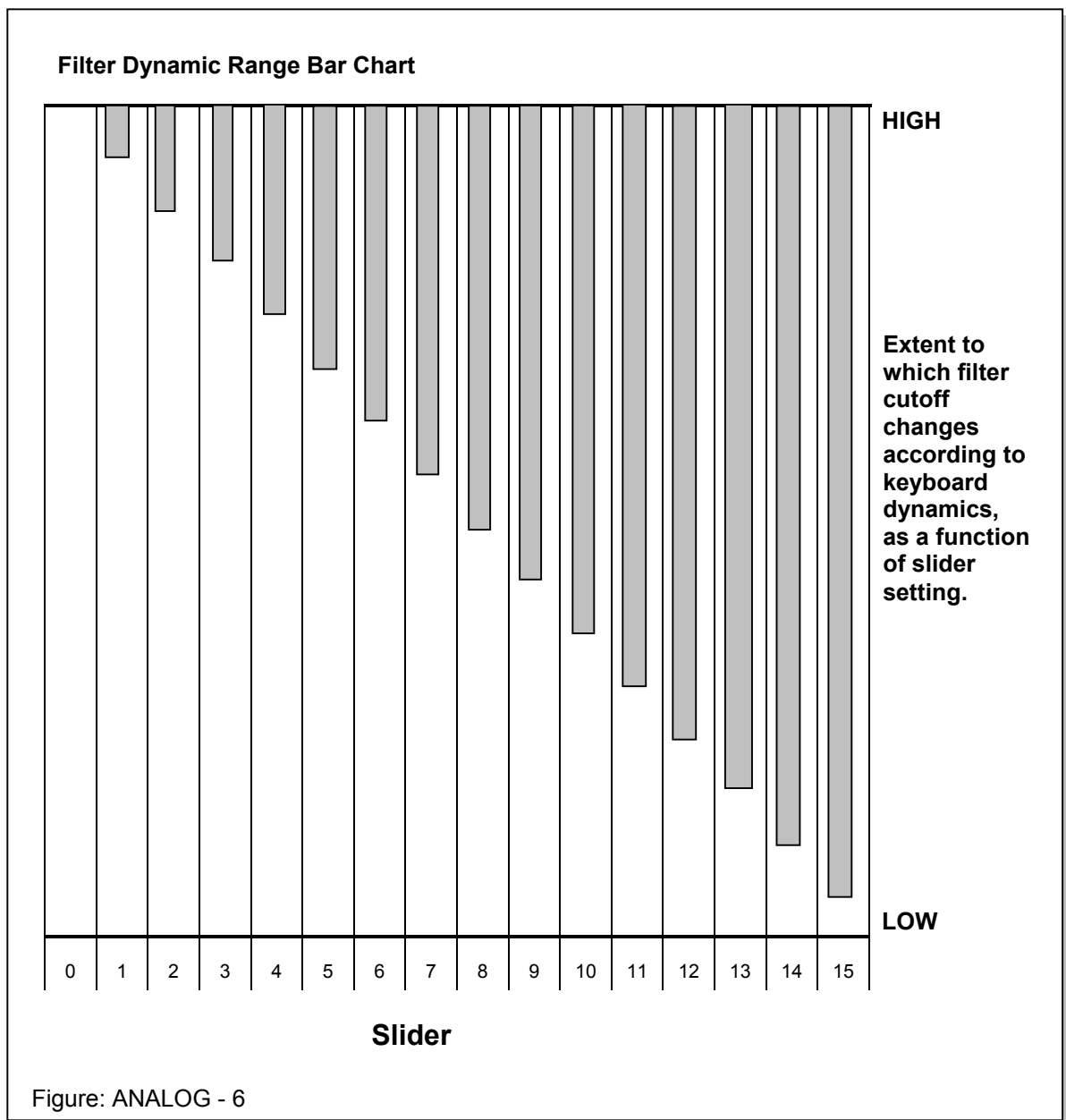
**Function: VELOCITY TO (VCA
ATTACK, FILTER ATTACK, PANNING**

This function ties the VCA attack time, Filter envelope attack time, and panning to how forcefully you play the keyboard.

Application: Keyboard-controlled VCA attack is excellent for string and horn sounds, where bowing or blowing softly produces a slower attack than rapid bowing or blowing, which produces a much faster attack.

Application: Tying keyboard dynamics to filter attack is very useful with string parts when you want legato sections to sound more timbrally muted than staccato sections.





1. Activate **ANALOG PROCESSING 18**. The display will say:



Vel: Atk FAtk Pan
XX XX XX

...where XX is a two-digit number between 00 and 15.

2. Select the desired parameter for adjustment with the cursor buttons, then use the data slider to change the parameter value. These are the available parameters:

Atk: Determines the extent to which keyboard velocity controls VCA attack time. When set to 00, no matter how hard or soft you play the attack time will remain as set in **ANALOG PROCESSING 12**, VCA Attack. Increasing the value causes the attack time to increase as you play more softly. A setting of 15 gives the greatest variation in attack times between hard and soft playing.

FAtk (Filter Attack): Determines the extent to which keyboard velocity controls filter attack time. When set to 00, no matter how hard or soft you play, the filter attack time will remain as set in **ANALOG PROCESSING 14**, Filter Attack. Increasing the value causes the filter attack time to increase as you play more softly. A setting of 15 gives the greatest variation in attack times between hard and soft playing.

Pan: Determines the extent to which keyboard velocity controls stereo placement. When set to 00, no matter how hard or soft you play, the panning will remain as set in **ANALOG PROCESSING 19**, Panning. Increasing the value causes the signal to pan in the opposite direction of the current spatial placement; the higher the value, the greater the difference in stereo spread between soft and forceful keyboard playing. Example: With the Voice panned slightly to the left and a high pan velocity value, playing softly leaves the Voice slightly to the left, which playing forcefully pans the Voice towards the right extreme. In-between dynamics produce placement in-between the two extremes.

3. After making your selections, press **ENTER** to return to the Module Identifier.

Module: ANALOG PROCESSING 19

Function: PANNING

This function controls the static stereo placement of a Voice or Voices. The stereo placement may additionally be modulated via the LFO (ANALOG PROCESSING 16), keyboard dynamics (ANALOG PROCESSING 18) or real-time controls (PRESET DEFINITION 9).

1. Activate **ANALOG PROCESSING 19**. The display will say:



Panning: +00
L >< R

...and a marker will appear somewhere in the lower line of the display to indicate current position in the stereo field. The number in the upper display correlates to stereo position, where -07 is all the way left and +07 is all the way to the right. +00 indicates center.

2. Use the data slider to vary the stereo placement; moving the marker to the left shifts the sound to the left, and moving the marker to the right shifts the sound to the right.
3. After making your selections, press **ENTER** to return to the Module Identifier.

Module: ANALOG PROCESSING 20**Function: CHORUS**

This function provides a thicker, richer sound by doubling the primary Voice and slightly detuning this double sound.

1. Activate **ANALOG PROCESSING 20**. The display will say:

Chorus:	off
Select	on/off

...where off is the default position. Use the **ON** and **OFF** buttons to choose chorus status.

2. After making your selections, press **ENTER** to return to the Module Identifier.

Note: Chorus uses both halves of one channel, as in Dual Mode (**PRESET DEFINITION 4**). Therefore, you can still play eight-note polyphony while in Chorus mode. Chorus does not use up two channels unless you double Voices.

Module: ANALOG PROCESSING 21**Function: KEYBOARD MODE
(SOLO, NONTRANPOSE)**

Solo mode provides the playing action of a monophonic synthesizer with single triggering and last-note priority. With single triggering, you must lift your finger off a key to initiate a new envelope.

Non transpose lets a Voice play throughout its assigned keyboard range but at its original pitch only - - there will be no transposition.

Solo application: Produce more realistic effects when working with monophonic instrument sounds (i.e. solo trumpet, flute, sax, etc.) since this mode does not allow you to play a chord. Simulate the keying action of monophonic synthesizers.

Non-transpose application: Determine the original note at which a Voice was recorded. Or, if you're playing drum parts on the keyboard, you might want to assign the bass drum to the entire left-most octave of the keyboard so that it makes an easy target compared to hitting one key. In this case, put the bass drum into Non-transpose mode so that no matter where you hit, the sound is consistent. Or, if you have an environmental ocean sound layered beyond a melodic line, but don't want the ocean to transpose as you play the melody, Non-transpose the ocean sound.

One more application... assign a non-transposed sound and play several keys at almost the same time; you'll hear some pretty neat phasing/flanging effects.

1. Activate **ANALOG PROCESSING 21**. The display will say:

Solo	Nontrans
off	off

...where "off" is the default setting for both options.

Module: ANALOG PROCESSING 22

Function: CONTROL ENABLE

This unique function allows you to exempt specific Voices from certain Real Time control functions.

Application: Exempt bass notes with long release times from pitch bending by disabling pitch bend for the bass Voices. You may then bend pitch in the upper range without affecting the bass notes.

1. Activate **ANALOG PROCESSING 22**. The display will say:

Control Enable
Use Cursor Keys

2. Press the right cursor key. The cursor keys scan through the various real time control destinations (see **PRESET DEFINITION 9**) in the following order: Pitch, LFO to Pitch, LFO to Filter, LFO to VCA, Filter cutoff frequency, Level, Attack, and Pan.
3. The default setting for all destinations is **ON**. To exempt the Current Voice from a particular control destination, press **OFF**. Example: To exempt the Current Voice from being pitch-bent, press **OFF** when the display shows Pitch.
4. After disabling the unwanted control destinations, press **ENTER** to return to the Module identifier.

SEQUENCER

Sequencer Background

To activate the sequencer module, press **SEQUENCER SELECT**. The green LED above the word Sequencer and below the Emax logo should light to indicate you are ready to sequence.

The Sequencer Setup module handles chores as you create a sequence. **Sequencer Manage** covers more general sequencer functions. After using the Setup or Manage modules, make sure you press **SELECT** before you attempt recording.

Here's how **Record**, **Play**, and **Stop** work:

Play starts the sequence playing. The sequence will repeat (loop) until you press Stop (see below). The lower display line will show the playback tempo; this may be varied in real time with the data slider. You may also change track status or the Current Preset while playing. If you don't change the track status, you can re-record the same track over and over again. The actual erase of the current track occurs when you press **Record**, which neatly segues us into...

Record then Play puts the sequencer in record ready mode; Play a key to actually start the recording process (it is not necessary to hold down record as you press play). The lower display line will show the tempo at which are recording. This may be varied in real time with the data slider. Yes, you can slow down tempo for the hard parts, and speed up for the easy ones! If you wish to start recording before any notes are played (For example: To begin with a rest) press **Enter**.

Stop has two options. If you press it once while the sequence is playing, the sequence will stop at its end. if you press **Stop** twice while the sequence is playing, it will stop immediately.

SEQUENCER MANAGE

Module: SEQUENCER SELECT

Function: SELECT SEQUENCE

SELECT activates the Sequencer module and also allows you to choose a sequence for recording or playback.

1. To enter the Sequencer module press **SELECT**.
2. Move the slider or use the cursor keys to catalog the already-recorded sequences. To select an empty sequence for recording, key in a number with the numeric keypad. The chosen sequence becomes the Current Sequence.

Note: Pressing Select Sequence while a sequence is playing will return the display to the preset select mode allowing you to change presets while a sequence is playing. Pressing play returns to tempo display.

Module: SEQUENCER MANAGE 1**Function: TEMPO**

This sets the tempo for Emax's Internal clock.

1. With the Sequence module active, press **MANAGE** then select **1**. The display says:

Tempo: ♩ = 120.00
(040/240)/Slider

Use the data slider or the numeric keypad to adjust the tempo through the range from 40 - 240 Beats Per Minute. Press the right cursor key to do fine adjustment to the tempo. Use the data slider or the numeric keypad to adjust the tempo through the range from 0.00 - 0.99 Beats Per Minute.

If you have selected a clock other than the internal clock (see **SEQUENCER MANAGE 2**), the Sequencer will follow and display this clock rather than the internal clock.

Module: SEQUENCER MANAGE 2**Function: CLOCK SOURCE**

You can drive the Emax sequencer from the Internal clock, MIDI, or three different flavors of pulse signals.

1. With the Sequencer Module active, select **2**. The display says:

Clock: internal
Use Data Slider

2. Use the data slider to choose the desired clock option. Your choices are:

internal = Emax's sequencer syncs to the internal clock at the tempo chosen in **SEQUENCER MANAGE 1**.

MIDI = Emax's sequencer syncs to MIDI clock signals coming in over the MIDI IN port

click 24 = Emax's sequencer syncs to 24 pulses-per-quarter-note signals appearing at the Clock Input jack.

click 48 = Emax's sequencer syncs to 48 pulses-per-quarter-note signals appearing at the Clock Input jack.

click 96 = Emax's sequencer syncs to 96 pulses-per-quarter-note signals appearing at the Clock Input jack.

3. Press **ENTER** when you've made your selection; Emax returns to the Module Identifier.

Module: SEQUENCER MANAGE 3**Function: LOAD SEQUENCE**

Use this function to load a sequence from disk Into Emax's memory.

1. Insert the disk containing the Sequence you want to load into the Bank. With the Sequencer Manage module active, select **3**. The display says:

Load SXX
Select Sequence

...where XX is a two-digit number. Use the data slider or numeric keypad to select the sequence you want to load, then press **ENTER**.

2. The display now says:

Load SXX To SYY
Select Sequence

...where XX is the sequence number selected in the previous step (source sequence), and YY is the sequence number the loaded sequence will have in Emax's bank (destination sequence; this defaults to the first available empty sequence). Use the slider or numeric keypad to select one of the 50 sequences in Emax.

3. Press **ENTER** after choosing the desired sequence, and the sequence will be loaded. If you haven't chosen to load into a non-empty sequence, the display will prompt you with:

Load SXX to SYY
Overwrite Y/N

Press **YES** to overwrite, **NO** to select a different destination sequence.

4. Once the sequence has been loaded, you have the option to rename it:

Rename Sequence
SXX sequencename

Press **ENTER** if you don't want to rename; this returns you to the Module Identifier. Otherwise, name the sequence as described in **SEQUENCER MANAGE 6**.

Module: SEQUENCER MANAGE 4

Function: ERASE SEQUENCE

This function erases a sequence in the Emax memory. It does not erase a sequence from disk. To erase a sequence from disk, you must first load the disk, erase the sequence, and then save the bank to disk (PRESET MANAGEMENT 2).

1. With the Sequencer Manage module active, select **4**.
2. The display says:

Erase SXX
Select Sequence

...where XX is a two-digit sequence number. Use the slider, or numeric keypad to select the sequences in memory. After selecting the sequence to be erased, press **ENTER**. The display says:

Erase SXX
Are you Sure? Y/N

3. Press **YES** to erase and return to the Module identifier, or if you change your mind, press **NO** (Emax still returns to the Module Identifier).

Module: SEQUENCER MANAGE 5**Function: Copy Sequence**

This function copies one sequence to another in the Emax memory.

1. With the Sequencer Manage module active, select **5**.
2. The display says:

Copy SXX
Select Sequence

...where XX is a two-digit sequence number. Use the slider, or numeric keypad to select the sequences in memory available for copying. After selecting the sequence to be copied, press **ENTER**. The display says:

Copy SXX to SYY
Select Sequence

...where XX is the sequence number selected in the previous step (source sequence), and 'A' is the sequence number the copied sequence will have in Emax's bank (destination sequence; this defaults to the first available empty sequence). Use the slider, or numeric keypad to select one of the 50 sequences in Emax.

3. Press **ENTER** after choosing the desired sequence, and the sequence will be copied. If you have chosen to copy into a non-empty sequence, the display will prompt you with:

Append SXX to SYY
Select Sequence

Press **ENTER** to append SXX to the end of SYY. SYY now = SYY+SXX. SXX remains unchanged.

4. Once the sequence has been copied or appended, you have the option to rename it:

Rename Sequence
SXX sequence name

Press **ENTER** if you don't want to rename; this returns you to the Module Identifier. Otherwise, name the sequence as described in **SEQUENCER MANAGE 6**.

Module: SEQUENCER MANAGE 6**Function: Rename Sequence**

This function lets you rename a sequence in the Emax memory.

1. With the Sequencer Manage module active, select **6**.
2. The display says:

Rename SXX
Select Sequence

...where XX is a two-digit sequence number. Use the slider, increment buttons, or numeric keypad to select the sequences in memory available for naming.

3. After selecting the sequence to be renamed, press **ENTER**. The display says:

Rename Sequence
SXX sequence name

Use the cursor buttons to select the character to be changed. Select the character itself with either the data slider, (moving the slider all the way to the bottom of its travel produces a space), the increment buttons, or the keyboard keys. You can also use the numeric keypad to enter any numbers that are part of the name.

4. Press **ENTER** after naming the sequence; Emax returns to the Module Identifier.

SEQUENCER SETUP

Module: SEQUENCER SETUP 1**Function: TRACK STATUS**

Emax's sequencer has 16 tracks. If the track is unrecorded, its status can be set to Record. If it is recorded, its status can be set to Play, Mute, or Record (to re record).

1. Select the Current Sequence (see **SEQUENCER SELECT**).
2. With the Sequencer Setup module active, select 1. If the sequence is unrecorded, the display shows:

:

TXX R-----
Status -----

...where XX is the track number whose status can be changed, and the dashes represent the 16 available tracks. The cursor will flash under the selected track; use the cursor buttons to select a different track.

With an already-recorded sequence, tracks that have been recorded will show.

3. Use the **ON/YES** and **OFF/NO** buttons to select the track status - "R" (record), "p" (playback), or "m" (mute).
4. Track status mode can also be entered while a sequence is playing by pressing the **SEQUENCER SETUP** button while in play mode. This is convenient for muting tracks on playback. Please note that record is not active in the play mode. Pressing the play button returns Emax to the tempo display.

Module: SEQUENCER SETUP 2**Function: TRACK PRESET**

You can re-assign any track to any Preset using this function.

1. With the Sequencer Setup module active, select 2. The display says:

Track XX
Select Track

...where XX is the track number to be re-assigned. Use the slider or numeric keypad to select the track number, then press **ENTER**. If you select an unrecorded track, the lower display line will say "Empty Track."

2. The display now says:

Track XX → PYY
Select A Preset

...where XX is the track number to be re-assigned and VY is the Preset number currently assigned to the track.

3. Select the new Preset number with the data slider, increment buttons, or numeric keypad, then press **ENTER**.
4. Exit the setup module to exit this mode.

Module: SEQUENCER SETUP 3**Function: AUTO EXTEND**

Auto Extend lets you extend the length of a previously recorded sequence. Care should be used with this function to prevent confusion!

1. Select the Current Sequence you want to extend.
2. With the Sequencer Setup module active, select 3. The display shows:

Auto Extend: off
Select on/off

Use **ON** to select Auto Extend, **OFF** to de-select. After making your choice, press **ENTER**.

3. Assuming that you have selected Auto Extend, you are now ready to extend your sequence. Press **Record** then **Play** to put the sequencer into record mode. Let the sequence play for as long as desired; to end the sequence, then press **Stop**.
4. Once you have extended the sequence, remember to turn Auto Extend off! Otherwise, next time you go into record you will extend the sequence even further unless you remember to hit **Stop** at the exact right moment.
5. If you want to record a track as you extend the sequence, no problem. Just put a track into record mode before you start.

Module: SEQUENCER SETUP 4**Function: ERASE TRACK**

Okay, so that 32nd note bass track wasn't so cool after all. Here's how to get rid of it.

1. Select the Current Sequence whose track you want to erase.
2. With the Sequencer Setup module active, select 4. The display shows:

Erase Track XX
Select Track

...where XX is the track number that's about to be erased. Select the track to be erased with the data slider or keypad; the display's lower line will show its associated Preset. Press **ENTER**. Emax, which always does what it can to help you prevent embarrassing mistakes, asks "Are You Sure YIN." If yes, press **YES**, otherwise press **NO**.

Module: SEQUENCER SETUP 5**Function: BOUNCE TRACK**

You may bounce a track to any other sequencer track, or even bounce several tracks, one at a time, into a composite track.

1. Select the Current Sequence whose track you want to bounce.
2. With the Sequencer Setup module active, select 5. The display shows:

Bnce TXX
Select Track

...where XX is the track number that's about to be bounced (source track). Select the source track (data slider, increment buttons, or keypad), then press **ENTER**.

3. The display now shows:

Bnce TXX To TYY
Select Track

...where XX is the source track number and VY is the destination track number. Select the destination track number (data slider or keypad) and press **ENTER**. The source track will be erased, its data will now be in the destination track, and Emax will return to the Module Identifier.

4. To mix several tracks to one track, repeat steps 2 and 3 and specify the same destination track for each bounce.

Module: SEQUENCER SETUP 6**Function: SUPER MODE**

The Emax sequencer does not include some of the features of fancy sequencers (step editing, auto correction, etc.). However, you can work out sequences on a full-function sequencer and download the tracks en masse using the Super Mode function. Super Mode also allows Emax to read all sixteen MIDI channels at once and to route each channel to a different preset. This is called Super Mode Mapping. These are advanced techniques.

It is important to remember that each Emax Track corresponds to a particular MIDI channel. In other words, Emax Track 5 downloads on MIDI channel 5.

SUPER MODE DOWNLOAD

1. Check that the Emax MIDI IN connects to the external sequencers **MIDI OUT**.
2. Activate **SEQUENCER MANAGE 2** and select MIDI as the clock source.
3. Activate **SEQUENCER SELECT** and select the Current Sequence into which you will download the tracks.
4. Activate the **SEQUENCER SETUP** module and select 6. The display shows:



Super Mode: off
Select on/off

Press **ON** to enable Super Mode. Remember to make sure Super Mode is off (press **OFF** button) when you've finished downloading!

5. Select the tracks you want to download and put them in record mode according to the instructions in **SEQUENCER SETUP 1**. For example, if you want to download five tracks (MIDI channels), place the five Emax tracks corresponding to each of the MIDI channels into record.
4. Press **RECORD** then **PLAY** on Emax, then put your fancy sequencer into Play mode. In theory, the sequencer will start Emax and send its MIDI data through the MIDI OUT into the Emax MIDI IN. Emax should be set for MIDI clock in. Either stop Emax manually to terminate the downloading process, or stop the sequencer.
5. Assign the tracks to Presets as desired - Preset MIDI channel information is Ignored - (**SEQUENCER SETUP 2**), change to Internal Clock (**SEQUENCER MANAGE 2**), and play the sequence to make sure all is well. If it is, call up **SEQUENCER SETUP 6**, turn off Super Mode, press **ENTER**, and Emax will return to the Module Identifier.

SUPER MODE MAPPING

Create the SUPER MODE MAP. (This may already be done for you. Check your sequences.)

1. Select a new sequence and record a short blank sequence of any length (Don't play any notes). Since each track listens on the corresponding MIDI channel, repeat this process on all tracks you wish to use.
2. Assign each track to the desired preset using **SEQUENCER SETUP 2** (Track Preset). Assign unneeded tracks to a blank preset, which is created, by not assigning any voices to a new preset. This will prevent these unneeded tracks from sounding. That's it! You now have a Super Mode Map that you can copy to other sequencer locations and disks. By simply changing sequences, you can call up a new map!

Using the SUPER MODE MAP

3. Check that the Emax MIDI IN connects to the external sequencers MIDI OUT.
4. Activate the **SEQUENCER SETUP** module and select 6. The display shows:

Super Mode: off
Select on/off

Press **ON** to enable Super Mode. Remember to make sure Super Mode is off (press **OFF** button) when you've finished with Super Mode.

Emax will now respond to multiple MIDI channels and route them to the preset specified in the map.

Emax MIDI Implementation Chart

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12/16/86

X = item implemented
- = item not implemented

MIDI command	Transmitted?	Received?	Comments
Note off	X	X	keys# 21 thru 108 (A1 thru C7)
Note on	X	X	keys# 21 thru 108 (A1 thru C7)
Poly key pressure	-	-	
Control change	X	X	controllers # 0 thru 31
Program change	X	X	program # (preset#) 0 thru 99
Channel pressure	X	X	
Pitch wheel	X	X	
Sustain footswitch	X	X	controller #64
Local control on/off	-	X	
All notes off	-	X	
Omni mode off/on	-	-	ignores mode, turn all notes off
Mono mode	-	-	ignores mode, turn all notes off
Poly mode	-	-	ignores mode, turn all notes off
Song position pointer	-	-	
Song select	X	X	
Tune request	-	-	
Timing clock	X	X	
Start sequence	X	X	
Continue sequence	-	-	
Stop sequence	X	X	
Active sensing	-	-	
System reset	-	-	
System exclusives	X	X	Call for documentation

Supermode

"Supermode" is an Emax MIDI mode designed to enhance the Sequencer/MIDI interface. It is basically equivalent to "Poly Mode On" for all 16 MIDI channels simultaneously. When Supermode is on, the OMNI/POLY setting is ignored, but the MIDI Notes/Wheels flag of the current preset is still checked by Emax to determine whether to accept or ignore incoming MIDI performance data.

Emax's sequencer has 16 tracks, and each track has an independent preset assigned to it. These presets are referred to as "Sequencer Presets".

The chart on the following page shows the Emax sound mapping.

WITH SUPERMODE ON			
Source	What you Hear	What the Sequencer Records	What is Transmitted over MIDI
MIDI Channel 1	Sequencer Preset 1	Sequencer Track 1	Nothing
MIDI Channel 2	Sequencer Preset 2	Sequencer Track 2	Nothing
etc.			
MIDI channel 16	Sequencer Preset 16	Sequencer Track 16	Nothing
Emax Keyboard	Current Preset	Nothing	Nothing
Sequencer Track 1	Sequencer Preset 1	Nothing	Each track transmits over basic channel defined in it's sequencer preset
Sequencer Track 2	Sequencer Preset 2	Nothing	
etc.			
Sequencer Track 16	Sequencer Preset 16	Nothing	

WITH SUPERMODE OFF			
Source	What you Hear	What the Sequencer Records	What is Transmitted over MIDI
MIDI Channels 1-16	Current Preset	Single Enabled Track	Nothing
Emax Keyboard	Current Preset	Single Enabled Track	Current Preset's Basic Channel
Sequencer Track 1	Sequencer Preset 1	Nothing	Each track transmits over the basic channel that is defined in its sequencer preset
Sequencer Track 2	Sequencer Preset 2	Nothing	
etc.			
Sequencer Track 16	Sequencer Track 16	Nothing	

Real-time Controllers

Emax has 6 real-time sources: left wheel, right wheel, pressure, pedal, MIDI A, and MIDI B. These sources may be the on board controls, or coming in over MIDI, or both. Each real-time control source can be assigned to any MIDI continuous controller channel from 0 to 31.

Emax has 9 real-time destinations: pitch, filter, level, LFO to pitch, LFO to filter, LFO to level, attack, pan, and crossfade.

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