EMAX II BASICS

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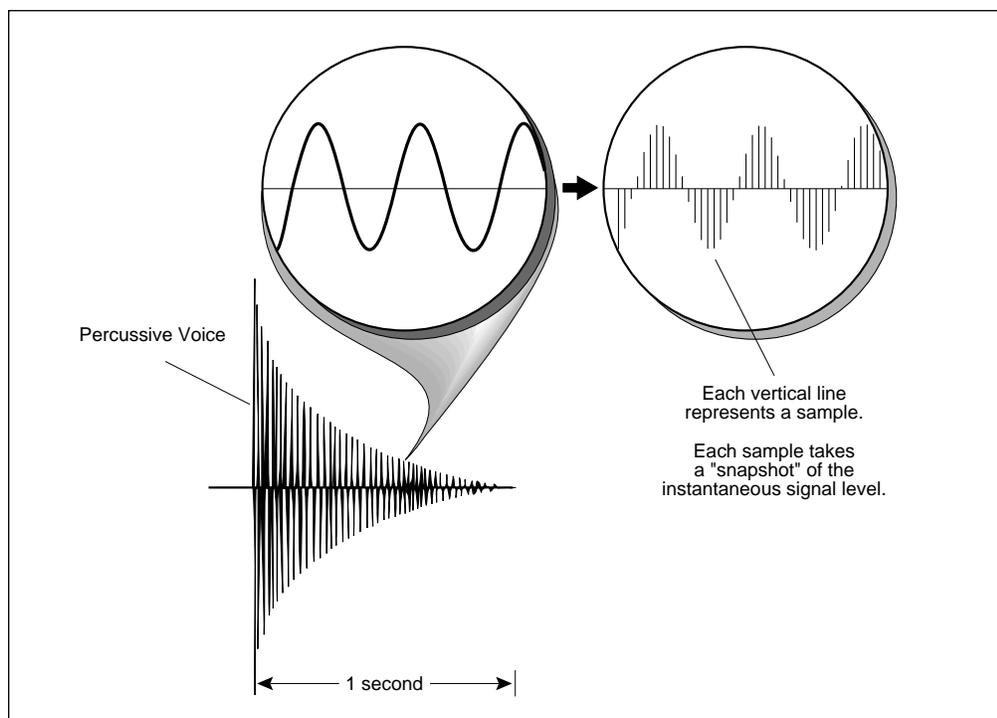
HOW EMAX II ORGANIZES SOUND

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

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

Computers can accept information only in the form of numbers, so first Emax II converts audio signals into numbers. It does this by examining (sampling) the incoming signal level at a maximum rate of 39,000 times a second, and sequentially records these different levels in computer memory. The diagram below 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 II'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 X 39,000 or 78,000 samples at the highest sampling rate. Shorter sounds require fewer samples. Note: The sampling rate can be altered for reasons which we will get into later.


Percussive Voice

Each vertical line represents a sample.

Each sample takes a "snapshot" of the instantaneous signal level.

1 second

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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 BANK

The bank contains all of Emax II's memory, which includes preset, voice, sample and sequence data. **Consider the bank as the central storehouse for all of Emax II's data**. Although the memory is *volatile*, meaning that the data disappears when you turn off power or load a new bank, the bank data can be saved permanently on disk to keep a record of your work. Since we now have a place to store information temporarily (the bank), and two ways to store information permanently (saving to disk), let's take a look at the different kinds of information being stored.
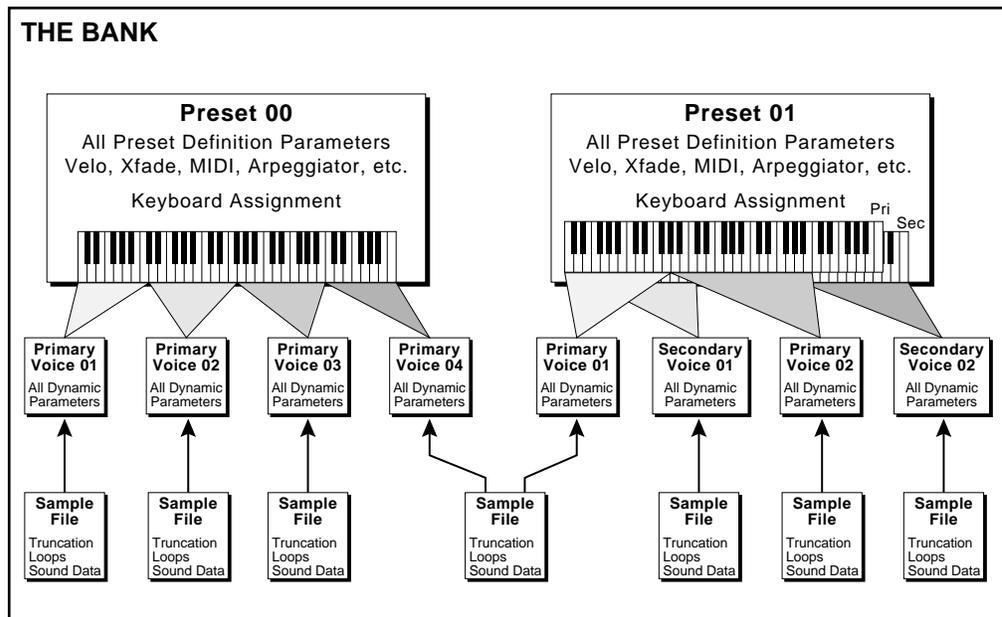
*An Emax II bank is **all** the data currently loaded into its memory.*
Each preset has its own set of voices which may share sample data with other voices.

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.

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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). 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 Dynamic 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").

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3. You may send the current voice through the Dynamic 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 II 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 they are 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.

■ *On an Emax II with the Stereo Sampling option, the Left channel will correspond to the Primary Voice and the Right channel will correspond to the Secondary Voice.*

MODULE

A *Module* controls a particular section of the Emax II. 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 the Emax II, 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.

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FLOPPY DISK DRIVE

The floppy disk drive (mounted on the left-front of the unit), allows you to transfer sounds and sequences in and out of the Emax II and allows you to "back-up" your precious work permanently.

HARD DISK DRIVE

Why hard disks? There are two big advantages to using a hard disk over floppy disks.
■ Greater storage. The hard disk can hold many banks; the floppy, half a bank or less.
■ Faster access time. A 1 Megabyte bank can be saved from the Emax II to the hard disk in 12 seconds (as opposed to 2 minutes for saving to floppy), or loaded from the hard disk to the Emax in 6 seconds (as opposed to 50 seconds from a floppy). In most cases, you can treat the hard disk like a super-floppy; transferring data to and from the Emax II is straightforward.

SCSI

SCSI (pronounced skuzzy) stands for Small Computer System Interface. SCSI is an industry standard hardware and software specification that allows high-speed data transfers between different pieces of equipment. SCSI devices can include hard disks, tape drives, optical disks and other types of digital equipment. Why use SCSI? SCSI is *FAST!* SCSI is a parallel interface which transmits 8-bits of information at a time at high speed. MIDI in comparison, is a serial interface which can only transmit 1-bit at a time.

■ Each device on the SCSI bus has its own ID number so that it can distinguish its data from data meant for another device. *Each SCSI device must have its own unique ID number.* Most SCSI devices have hardware defined ID numbers. This means that there is a little switch somewhere on the device to change the ID number.

■ Keep SCSI cable lengths as short as possible. Data errors may occur with long cables.

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 II can respond to pressure when an external keyboard with pressure sensitivity is controlling the Emax II via MIDI.

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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 the Emax II 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 16-bit" (**PRESET MANAGEMENT 8**) 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 the Emax II, the disk will contain a record of your work.

■ Emax II also allows you to save your work in an Emax I format. This process uses a data compression process to squeeze more data onto a disk. A 1 megabyte Emax II bank, when compressed, may be stored on a single floppy disk. In many cases the compressed data will be audibly indistinguishable from the 16-bit version.

IF YOU DO NOT DO A "SAVE ALL", ALL BANK DATA WILL BE LOST WHEN YOU TURN OFF EMAX II.

Do not wait until the end of a session to save—save your work (**PRESET MANAGE-MENT 8**) periodically in case of power failure or some other unforeseen circumstance which might erase the bank's memory.

Since the disk (hard disk or floppy) 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 load all your hard work from disk into the Emax II in a few seconds.

■ *The Emax II will not boot up unless all devices on the SCSI bus are turned on.*

The Keyboard

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).

Booting

Booting Emax II is not a repair technique; rather, it is a computer term that means "having the computer read software necessary for its operation from the disk" (It's easy to see why this was shortened to "booting"). Emax II automatically "boots" itself when you turn it on. 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 when a new preset is created. Had it defaulted to the on position, new presets would all be arpeggiated!

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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 the Emax II 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 two-digit number and you want to enter 8, you would enter **08**. If it is expecting a single-digit number, entering **8** would be sufficient.

Data Slider & Increment/Decrement

On virtually all Emax II 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.** Hard disks are not infallible. All hard disk banks should be backed-up on floppy 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.

THE BIG RE-CAP

One more time: A *Sample* is a raw sound, that upon being recorded into the *Bank* immediately becomes 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 II's dynamic 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 the Emax II, all of the above definitions will make sense as you relate theory to practice.