E-mu Systems Emulator Operating Instructions

(Preliminary)

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CONTENTS

1   INTRODUCTION

This is the preliminary operating manual for the E-mu Systems Emulator digital polyphonic keyboard instrument. Its purpose is to provide a concise description of the functions and user controls of the instrument along with some suggestions as to how to get the highest level of performance from the machine. We are currently at work on a more complete user's manual, which will be sent to you upon its completion.

2   FUNCTIONAL OVERVIEW

The Emulator is a computer based digital instrument that allows you to record any sound of up to two seconds in length and then to play that sound at any pitch over a two-octave range, with four or eight voice polyphonic capability. Its four octave split keyboard allows the simultaneous control of two independent sounds, while a unique sustain loop function allows any sound to be sustained indefinitely. Its integral mini-floppy disk drive is used for the storage and recall of a potentially unlimited sound library. Additionally, performance oriented effects wheels allow the real-time control of both pitch bend and vibrato depth.

To understand how the Emulator works, refer to the simplified flowchart in figure 1. During the recording process, sound is input from a microphone or line level source. In either case the signal is presented to the Emulator as an analog voltage, which is filtered, and then processed by an analog to digital converter (ADC). The ADC samples the incoming signal approximately 30,000 times a second and, for each sample, stores a number in the computer's memory that corresponds to the level of the analog voltage. Once in memory, the numbers representing the sampled sound can have various operations performed on them, including truncating the recording and defining a loop portion of the sound which will be repeated as long as a key is held down. The information in memory (including the truncation and loop definition) can be stored on a floppy diskette for reloading at any later time.

Once a sound is recorded in memory it can be played back by pressing a key on the keyboard. When a key is pressed the computer outputs the numbers stored in memory to a digital to analog converter (DAC), which decodes them back into the analog voltage originally recorded. Which key is pressed controls the speed at which the numbers are output. Output speeds faster than the original sampling rate result in higher pitches while slower speeds result in lower pitches. The output rate is also affected, in various ways, by the master tune controls, the vibrato controls, and the pitch bend wheel. When the output voltage is applied to an amplifier and speaker, the result is the recreation of the originally recorded sound at pitches corresponding to the keys pressed.
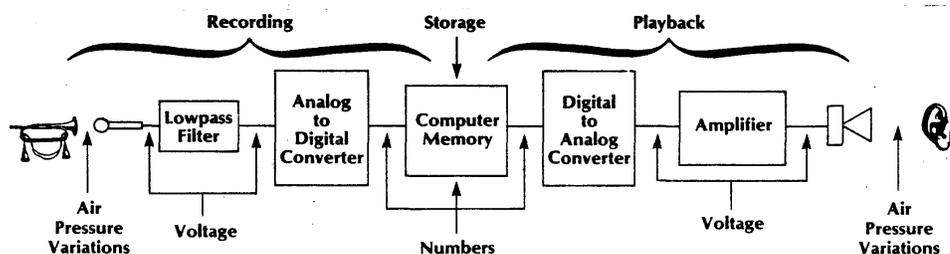

Figure 1: Emulator Functional Overview

3   SOFTWARE

Overview
Your Emulator is basically a special purpose digital computer and, like all computers, requires "software" in order to function. Software (as opposed to "hardware" - the actual physical parts of which the Emulator is made) consists of instructions to the computer telling it what to do (i.e. programs) and data for those programs to work with (in the case of the Emulator, digital representations of recorded sounds). Both types of Emulator software are stored on floppy diskettes.

Of the ten diskettes supplied with your Emulator, eight contain pre-programmed sounds and are shipped "write protected" (see section IV). The remaining two have been left blank for you to record sounds of your own. You can, of course, record over any of the other eight that you don't wish to save. Additional diskettes can be purchased from your E-mu Systems dealer.

In addition to sound storage, each diskette also contains the Emulator's complete operating program. This program is automatically loaded into the Emulator each time it is turned on. Consequently, as new and improved software is developed we can update your Emulator simply by sending you a diskette containing the new program. Using the Software Replicate function (see Section 5) this new software can be copied onto all your existing diskettes without disturbing any sounds recorded on them. For this reason it is important that you always keep us apprised of your current address so that we can notify you of any future software updates. All Emulator owners who return their warranty card will be placed on a permanent mailing list. If you should move, please send us one of the Change Of Address Notices, included at the back of this manual.

Software Update
Both the blank and pre-recorded diskettes are shipped with the most recent version of Emulator operating software. When you get a new diskette, check the software version number on the diskette label. If it is numerically higher than the number on the rest of your diskettes, it contains a more recent software version. Use the software replication procedure described in Section 5 to copy this software onto your other diskettes. Be sure to change the number on the labels to reflect this.

When a software update corrects a newly found error in current software, you will be sent a free diskette containing the new program. When an update adds a new operating feature, you can purchase the software for the cost of a blank diskette, or, if you send us one of your diskettes, we will copy the new software onto it and return it at no charge.

We are currently in the process of recording a wide range of additional instrumental sounds. Some of these sounds will be available for purchase and others will be included among those sent free with each new Emulator. These latter sounds will be available to current owners on the same basis described above for software updates, i.e. for the cost of a blank diskette, or free if you send us a diskette to copy it onto.

➢ **NOTE:**
Unless you've purchased the optional User's Formatting program, all Emulator diskettes must be purchased from E-mu Systems, or your Emulator dealer.

Other diskettes will NOT work.

4   DISKETTE USE AND STORAGE

Overview
The data representing recorded sounds are stored on mini-diskettes. To insure reliable storage and recall it is necessary to observe the following precautions:

1. When not in use, always store diskettes in their boxes.

2. When using your Emulator, place the diskettes, in their white envelopes, in the storage compartment on top of the instrument. The only time a diskette should be out of its envelope is when it is actually in the disk drive.

3. The diskette itself consists of a black jacket enclosing a thin disk of plastic on which the magnetic medium is deposited. NEVER touch the plastic disk where it is exposed through the jacket.

4. Never fold or bend a diskette.

5. Keep diskettes away from strong magnetic fields such as telephones or tape head demagnetizers.

6. When writing on diskette labels, use only felt tip pen. A ballpoint pen or pencil may damage the disk.

7. Diskettes should not be exposed to temperatures lower than 50 degrees F or higher than 125 degrees F.

8 As much as possible, keep diskettes away from dirt, dust and smoke. Never lay them down without their protective envelope. If someone holds a gun to your head and forces you to lay an unprotected diskette down on a less than sterile surface, keep in mind the fact that the data is recorded on the side of the diskette opposite the side with the label, so lay it label side down.

Diskette Loading
The Emulator's disk drive is located behind the slot to the left of the control panel. To insert a diskette, first open the square plastic door at the center of the drive by grasping its bottom edge and pulling out and up. Insert the diskette (label side up) with the edge with the label facing you. Insert it into the open drive until it stops. It should be completely inside the drive. The diskette should slip in easily.

If you encounter any resistance, withdraw the disk and try again. If it still doesn't go in easily, inspect the diskette for damage and check to be sure there isn't already a diskette in the drive.

Once the diskette is in the drive, close the plastic door. To remove the diskette, simply open the door and pull it out.

Write Protecting Diskettes
Near the lower right hand corner of the diskette label you will find a rectangular cutout. This is the "write protect" slot. When this slot is exposed the Emulator can write data onto the disk To "write protect" the disk peel one of the silver self-adhesive tabs from its backing sheet and press it around the edge of the diskette so it completely covers both sides of the slot. When this tab is in place the Emulator cannot write onto the disk. It is a good idea to keep all your sound disks write protected.

Backing Up Diskettes
It is also a good idea to keep backup disks of any sounds that would be difficult to replace. A backup disk is only used to load a sound into the Emulator for the purpose of rewriting it onto a working disk. The working disk is employed for everyday use. Should anything happen to the working disk the backup is always available to generate a replacement

New Diskette Initialization
Each of your Emulator diskettes must be initialized for use in your particular machine. The diskettes shipped with your instrument have already been initialized at the factory.

When you buy new diskettes, either blank or with pre-recorded sounds, you must initialize them before use. To do this, turn your Emulator off and then turn it back on again (unless, of course, it's already off, in which case merely turning it on will be sufficient). Place a diskette to be initialized, with NO write protect tab, into the drive and wait for the Emulator to finish loading. That diskette is now initialized. If you have more new diskettes, place each one in the drive (also with no write protect tab) and execute the software replication procedure as described in Section 5. The diskettes are now ready for use.

With proper handling, diskettes should last almost indefinitely. During testing we loaded sounds into an Emulator 56,000 times in succession from a single diskette with no noticeable diskette wear. In cases where data files have been lost, it has almost always been as the result of improper diskette handling. The slightest scratch to the surface of a diskette is enough to render it useless.

5   SOUND STORAGE AND RECALL

Controls

The sound storage section consists of the disk drive and the following four controls:

1   GET LOWER

With a sound diskette in the disk drive, pressing the GET LOWER button causes the Emulator to load the Lower sound from the diskette into memory for control by the lower two octaves of the keyboard This process takes approximately seven seconds, during which time the GET LOWER LED will flash. At the end of this time the LED will go out to signify a successful load. If a problem is encountered during the load procedure the Emulator will turn off the disk drive and light the GET LOWER LED. Possible problems include:

- There is no diskette in the drive
- The diskette has been improperly inserted into the drive
- There is damage to the diskette resulting in data errors

In the latter case, data up to the point of the error will have been loaded into memory, so attempting to play the lower keyboard after an unsuccessful load may bring unpredictable results. (On the other hand, if the sound you were attempting to load was a very short one and the data error happened after the truncation point (see Section 14) the sound may, in fact, be usable despite the error.)

Whenever the LED is lit as the result of an unsuccessful load, it will remain lit until a sound is successfully loaded into that half of' the keyboard If an improperly loaded sound is Swapped (see below) to the opposite side of the keyboard the lit LED indication will also move to the other Get button. For example, if you successfully load a sound into the Upper keyboard section and then attempt to load a sound into the Lower section from what turns out to be a damaged disk, you will end up with a good sound in the Upper section, a garbled sound in the Lower section, and a steadily lit GET LOWER LED. If you then hit the SWAP button, the two sounds will be exchanged, the GET LOWER LED will go out and the GET UPPER LED will light to indicate that the Upper section now contains an improperly loaded sound.

Both halves of the keyboard remain active during the load procedure. The results of playing on the half of the keyboard into which the load is happening, depends to a great extent on the relative lengths of the incoming and outgoing sounds. If they are both short sounds, it may be possible to play the new sound after only a second or two of the load cycle. However, if they are both fairly long or the outgoing sound is substantially longer than the incoming one, playing a key during load will result in a sound consisting of the first portion of the new sound followed by the end of the old one. This, of course, does not in any way affect the loading process, so feel free to experiment.

2   GET UPPER

This button functions exactly as GET LOWER except that it loads the Upper Sound from a diskette into memory for control by the upper two octaves of the keyboard.

3   SAVE

With an unprotected diskette in the drive, pressing this button causes the Emulator to store both sounds presently in memory along with the sequences in bins #1 and #2 (see Section 19) onto the diskette. The sound currently controlled by the lower half of the keyboard is stored as the Lower Sound and, appropriately enough, the sound controlled by the upper half is stored as the Upper Sound. This process takes approximately 20 seconds, during which time the SAVE LED will blink. At the end of this time the LED will go out to indicate a successful save. If a problem is encountered during the Save process the disk drive will be turned off and the SAVE LED will light.

If, when the SAVE button is pressed, the LED comes on immediately and does not blink, the possible problems include:

- There is no diskette in the drive
- The diskette is improperly inserted in the drive
- The diskette in the drive is write protected

If' the LED blinks for a while and then comes on steadily, the Emulator has been unable to successfully transfer the data to the diskette. This almost always indicates a damaged diskette. In either case the data in the Emulator's memory is still intact. To make another attempt to save, turn off the SAVE LED by hitting any key on the keyboard correct the problem and press SAVE again. The keyboard and all other front panel controls are inactive during the Save process

4   SWAP

Pressing the SWAP button causes control of the two sounds currently in memory to be exchanged between the two halves of the keyboard; i.e. the sound controlled by the lower half of the key board moves to the upper half and vice versa. This process takes about five seconds, during which time the SWAP LED remains lit. Both halves of' the keyboard and all panel controls remain active during the Swap process.

Power On Procedure

When the Emulator is first turned on, the disk drive motor will turn on and the disk drive LED, and all the panel LED's will light. Insert a sound diskette into the drive. The panel LED's that had lit will go out and the Emulator will automatically load both the Lower and Upper sounds into memory. Neither the keyboard nor the panel controls will become active until both sounds have been loaded.

It should be noted that the software (i.e. the computer program) that makes the Emulator work is not stored in the machine but on each diskette. It is automatically loaded into the Emulator during the power on procedure. If the diskette that you use in this procedure is a faulty one, the Emulator may refuse to work and give the appearance of being broken. In this case, turn the Emulator off, turn it back on again, and try the procedure with a different diskette.

If you do not insert a diskette into the disk drive within about five seconds of turning on the Emulator, or if the diskette is improperly inserted, the SAMPLE, OVERLOAD, and SWAP LED's will go out. This indicates a "Disk Not Ready" error. Either insert a diskette or remove and reinsert an improperly inserted diskette The Emulator should now load normally. If the Emulator encounters other problems in the process of initial loading, other combinations of LED's will go out. If you cannot get your Emulator to successfully execute the power on procedure, carefully note which LED's go out and when. Call your nearest service center or E-mu Systems with this information.

➢ **NOTE:**
E-mu Systems no longer formally support the Emulator.

Software Replication
The Software Replicate feature allows you to copy updated or special function software onto previously formatted diskettes without disturbing any sounds stored on them.

To update diskettes, start by powering up the Emulator with the diskette containing the new software. Next remove that diskette and insert a diskette to be updated (be sure it's not write protected). Press the 'B' button followed by the '8' button (see Section 20 for details of using the sequencer buttons as special function keys). The disk drive LED will come on and the software will be written onto the diskette. If a problem is encountered in the write process, the SAVE button LED will come on. This can indicate any of the problems described above in the Save section, but it is usually the result of forgetting to remove the write protection on the diskette that you are attempting to update.

Multi Button Commands
The Emulator will remember up to three presses of the GET, SWAP and GET SEQUENCE buttons and execute them in sequence. It is not necessary, for example, when getting both upper and lower sounds from a disk, to wait until the GET LOWER cycle is finished before pressing the GET UPPER button. Simply press the GET LOWER button followed immediately by the GET UPPER button.

Another example is GET LOWER, SWAP, GET LOWER. This sequence would put the same sound on both halves of the keyboard. The SAVE function can not be part of a multi-button command.

Sound Reorganization
Using the GET and SWAP functions, it is easy to combine sounds from different disks onto a single disk. Imagine that you need a diskette with a lower sound of cellos and an upper sound of flutes. Your cello sound is currently the lower sound on your diskette #1 and the flute sound is the lower sound on diskette #2. Simply place diskette #2 in the drive and load the flute sound into the lower section. Hit SWAP to move it to the upper section. Remove diskette #2 and insert #1. Load the cellos into the lower section. Now place a blank diskette in the drive and hit SAVE.

Voila!

6   RELEASE FOOT SWITCH

All Emulator sounds supplied by E-mu Systems are supplied in "short release" mode. (Exceptions are sound effects and percussion sounds, which are preset in natural release mode (see Section 7). Sounds recorded into the instrument using the Input section are also initially in short release mode. In this mode, releasing a key always results in the immediate termination of the sound, regardless of whether or not the recorded sample has come to its end. Alternatively, a sound may be put into "natural release" mode. In natural release mode, pressing a key always results in the complete sample being played, regardless of when the key is released. A sound may be put into natural release mode through use of the special sound mode function (see Section 7) or by use of the release foot switch.

To use the supplied foot switch to control the release mode, insert its phone plug into the Foot Switch jack on the Emulator's rear panel. The foot switch can be assigned to affect the sounds on either or both halves of the keyboard.

To assign the foot switch to the lower keyboard section only, press the 'A' button followed by the '6' button in the Sequencer section. (See section 20 for the details of using the sequencer buttons as special function keys).

To assign it to the upper section only press 'A 7'. To assign it to both sections press 'A 8'. If you don't want it to affect either section, don't step on it. Depressing the foot switch causes the sounds in affected keyboard sections to operate in natural release mode for as long as the switch is held down. Releasing the switch causes all sounds whose keys are not currently pressed to immediately terminate. The footswitch never affects sounds that have been put into natural release mode through the use of the special sound mode procedure described in Section 7.

7   DOUBLING MODE

Doubling mode allows you to play notes on the lower keyboard section and have those notes automatically doubled by the sound on the upper keyboard section. When playing in doubling mode, each key that you press uses up two of your available channels so you have only half the polyphonic capability that you usually have.

To use doubling mode, plug a foot switch into the Access. Switch jack on the rear of the Emulator. Pressing the foot switch puts you in doubling mode. Once in doubling mode you will remain in doubling mode until you press the switch again. It is not necessary to keep your foot on the switch.

8   SPECIAL SOUND MODES

Overview
Each sound in the Emulator carries with it an identification of its sound type. Sounds supplied by E-mu Systems on diskette are supplied in "normal" mode (sound type 1). Sounds recorded into the instrument using the Input section are also initially in normal mode. The current software has 4 modes:

- sound type 1 – normal
- sound type 2 – solo mode
- sound type 3 – non-transposition mode
- sound type 4 – natural release mode

Solo Mode (Sound Type 2)
Sounds in solo mode play on only one channel (i.e. monophonically). If a second key is pressed before the previous one is released, the pitch changes to that of the more recent key without any re-attack occurring. If a second key is pressed while a previous note is decaying, the decay is terminated and a new attack is begun. This latter effect works well with sounds having a percussive attack, but less well with sounds that begin gradually.

Non-transposition Mode (Sound Type 3)
In non-transposition mode all keys within the keyboard section play the sound at its recorded pitch. The vibrato and pitch wheels function normally.

Natural Release Mode (Sound Type 4)
Normally, when you release a pressed key, its sound will stop immediately, whether or not the recorded sample has reached its end. In natural release mode the complete sample will always be played, regardless of when the key is released. This is equivalent to playing a normal sound with the release footswitch always depressed. This mode is particularly useful for sound effects and percussion sounds when you want to be able to trigger the entire sound with just a quick press of a key. The release foot switch never affects a sound in natural release mode.

Setting Sound Type
To set the type of the lower sound, use the special function buttons as described in Section XVI.

- A 1 sets sound type 1 (normal)
- A 2 sets sound type 2 (solo)
- A 3 sets sound type 3 (non-transposition)
- A 4 sets sound type 4 (natural release)

It should be noted that sound type 4 functions somewhat differently from the other types. Unlike types 1, 2, or 3, when you press the 'A 4' for sound type 4, it toggles the sound in or out of natural release mode, depending on the sound's current state. If the sound is currently in short release mode it will be changed to natural release mode, and vice versa. No other characteristics of the sound are changed. If the sound is currently in another special sound mode, it remains in that mode. It is therefore possible for a sound to be simultaneously in both natural release mode, and either solo or non-transposition mode. This is not true of the other sound types. A sound cannot be in both solo and non-transposition modes at the same time.

To set the type of the upper sound you must first Swap sounds, wait for the swap to complete, set the lower sound type as described above, and then finally reswap the sounds. Once the type of a sound has been set, that sound will continue to play in the mode selected and can be stored and recalled from disk while retaining the mode. The sound can be changed to a different mode whenever desired.

9   BACKWARDS MODE

Overview
Backwards mode allows you to play any Emulator sound in reverse (i.e. as if it had been recorded on tape and then played backwards). To put the lower sound into backwards mode, press special function code 'B 3'. Pressing 'B 3' again will return the sound to normal mode. To place the upper sound into backwards mode you must first swap it to the lower keyboard section, press 'B 3', and then re-swap it. When you press 'B 3', it takes about one second to complete the reversing process.

Truncation
In addition to being able to play sounds backwards, this mode also gives you the ability to truncate the beginnings of samples. This is useful for fixing samples which for some reason triggered early during recording, resulting in a delay at the start of the sound (see Section 10). To do this, press 'B 3' to reverse the sound, use the truncation function to shorten what is now the end of the sound, and then press 'B 3' to reverse it back to normal.

Weird Stuff
Since backwards mode only reverses the un-truncated part of the sound and leaves any currently truncated portion unaffected, it is possible to create a sample that consists partially of forward sound and partially of backward sound.

One way to do this is to record a sample, truncate part of it, reverse it, and then un-truncate it. When you press a key you will hear the originally un-truncated part of the sound backwards followed by the part that had been truncated played forwards. Subsequent truncating, reversing, and un-truncating will give you a wide variety of bizarre results.

The Backwards Talking Game
Although it probably has limited practical usefulness, we've been having an awful lot of fun with the following:

Record a word or short phrase into your Emulator. Reverse it and listen carefully to the resulting sound. Try to speak this backwards version. This will take a bit of practice since reversing speech results in some vocal sounds that are difficult to reproduce. When you think you've got it, record this backward version into the Emulator. Now reverse it and listen to the result. You'll probably find that you've invented an entirely new foreign accent.

10   OUTPUTS

The Emulator has two sets of three outputs. One set uses ¼ inch phone jacks and the other uses Cannon connectors. The two sets are otherwise identical. The three outputs are Lower, Upper and Mix.

The Mix output contains an even mix of all channels of the instrument. The Mix Level knob in the Output section of the front panel controls the sound level of the Emulator.

The Lower and Upper outputs are full level. In an eight voice Emulator the Lower output contains channels one through five and the Upper contains six through eight. In a four voice, Lower is one through three and Upper is channel four. All outputs are line level.

11   KEYBOARD CHANNEL ALLOCATION

Fixed Allocation
There are two modes of allocating the available channels between the two keyboard sections. When the Dynamic Allocation pushbutton LED is not lit the Emulator is in Fixed Allocation mode. In Fixed Allocation mode, particular channels are permanently assigned to each half of the keyboard as follows:

	Lower Section Channels	Upper Section Channels
Eight Voice	1 – 5	6 – 8
Four Voice	1 – 3	4

Table 1: Channel Allocation

If these numbers seem vaguely familiar it may be because they are the same as the output channel allocations described in Section 10. Consequently, when in Fixed Allocation mode, the Lower Sound will always be present at the Lower Output and the Upper Sound at the Upper Output. Channels are assigned on a last key pressed priority basis. Therefore, if you are holding down five keys on the lower keyboard section of an eight voice Emulator in Fixed Allocation mode and then press a sixth key, it will steal the channel of one of the five previously pressed keys.

Dynamic Allocation
When the Dynamic Allocation LED is lit the Emulator is in Dynamic Allocation mode. In this mode all of the channels are available to be used in any combination between the two halves of the keyboard. One could, for example play eight notes on the lower half of the keyboard followed by eight on the upper half and then, while holding seven on the upper, play an eighth on the lower. As you play, available channels will continuously be reassigned to either half of the keyboard as needed. Because of this, sounds will often jump back and forth between the Upper and Lower outputs. This effect can sometimes be very useful, particularly when dealing with sound effects. If however, you find this unacceptable in a particular application you can either use the Mix output or return to the Fixed Allocation mode.

12   CHANNEL DISABLE

Overview
The channel disable feature allows you to "turn off" specific channels of your Emulator. This feature is primarily intended to allow you to continue using your Emulator when one or more channels malfunctions and, for some reason, you are unable to get it repaired immediately.

A malfunctioning channel will generally manifest itself in one of two ways. Either it will be completely dead (i.e., no output) or its output will be noisy or contain "garbage". If you occasionally hit a key and nothing happens, you are probably dealing with a dead channel. An occasional note that is garbled or noticeably noisier than normal is also an indication of a faulty channel.

Identification
The first step in dealing with a bad channel is to identify exactly which channel is at fault. To do this, load Into the Emulator a long sound with no loop (the electric grand piano is a good choice). Make sure the Emulator is in Fixed Allocation mode. In an eight voice Emulator, channels 1 - 5 will be on the lower keyboard section and channels 6 - 8 will be on the upper section.

To check the lower channels, play five notes on the lower keyboard section, release them, and wait ten seconds after they have stopped sounding. Now carefully press and hold a single key. Listen to the resulting sound. It is being played through channel 5. While continuing to hold this key (even though it. is no longer sounding), press and hold a second key. This is channel 4. Now, while continuing to hold these first two keys, press and hold a third. This is channel 3. Continue in this way to press a fourth key for channel 2 and a fifth for channel 1. Repeat the process on the upper keyboard section to hear, in order, channels 8, 7, and 6. Use the same technique on a four voice Emulator. The lower channels are 3, 2, and 1, and the upper section has only channel 4.

Checking and Repeating
If, in the above test, you press a key and get no output, or noisy or garbled output, you will know that that channel is bad. If this happens, do not press any more keys. Release all the keys currently held down, wait ten seconds, and then repeat the test to make sure that you get the same results. If you don't, you have either made an error in the test or the problem is not in a specific channel.

Assuming that the results match, you should disable the faulty channel using the procedure described below. Since there may be more than one bad channel, you should now repeat the test, keeping in mind that the disabled channel will be skipped over. If, for example, you were testing the lower keyboard section of an eight voice Emulator and found channel 3 to be bad, after disabling it the first key you pressed would be channel 5, the second would be channel 4, the third would be channel 2, and the fourth would be channel 1. (Since you've disabled one channel, there are now only four channels available on the lower section.)

Repeat the above procedure until all the faulty channels have been identified and disabled.

Disabling
To disable a channel, press and hold the SAMPLE button and, while continuing to hold it, press the GET UPPER button. Release both buttons in either order. Choose the channel to be disabled by pressing the key on the keyboard that corresponds to that channel (see the table below). Repeat the entire procedure for each channel that you want to disable. If, when executing this procedure, you press the key of a currently disabled channel, that channel will be re-enabled. Be sure to keep track of which channels you have disabled.

Once a channel has been disabled there is no easy way to tell exactly which channel it was. If you get confused, turn off your Emulator, turn it back on, and start over.

Key[1]	C	C#	D	D#	E	F	F#	G
Channel	1	2	3	4	5	6	7	8

Table 2: Channel Selection Keys

13   VIBRATO AND PITCH BEND

Vibrato and pitch bend are governed by the following controls:

- **LOWER ENABLE**
  When this button is pressed, vibrato will be applied to the sound currently controlled by the lower half of' the keyboard. The button's LED will light to indicate this condition. Pressing the button again will turn it off.

- **UPPER ENABLE**
  As above, but for the sound controlled by the upper half of the keyboard.

- **VIBRATO RATE**
  This knob controls the speed of the vibrato.

- **VIBRATO DEPTH**
  This wheel controls the depth of the modulation applied to sounds that have vibrato enabled. With the wheel rotated to its backstop no modulation is allowed. As you rotate the wheel forward the modulation will become progressively deeper.

- **VIBRATO DEPTH FOOR PEDAL**
  Plugging the supplied foot pedal into the Vibrato Depth jack on the Emulator's rear panel disables the Mod Depth wheel and allows you to control the vibrato depth with the pedal. Pressing down the toe end of the pedal increases the modulation depth, while pressing the heel end decreases it.

- **PITCH BEND**
  This wheel allows you to vary the pitch of any sound played by approximately a major second in either direction. Rotating the wheel forward results in raising the pitch while rotating it back results in lowering it. A center detent is provided to facilitate return to the proper pitch. If you are not planning to use the wheel for expressive purposes, it can be employed as a keyboard offset control.

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[1] These are the lowest eight keys on the lower keyboard section.

14   SUSTAIN LOOP, TRUNCATION AND FILTER

Controls
The Sustain/Filter Section consists of the following controls:

- **SET LOWER**
  When this button is pressed the two Sustain Section slide pots are activated for setting parameters of the sound currently controlled by the lower section of the keyboard. The button's LED will light to indicate this condition. When the button is pressed again, the two sliders will be deactivated and the current settings will be locked into the sound.

- **SET UPPER**
  As above, but for the sound controlled by the upper section of the keyboard. It is not possible to set parameters of both halves of the keyboard simultaneously. For example if you press SET UPPER, make some adjustments, and then press SET LOWER, SET UPPER will automatically be deactivated, locking in the current setting, the SET UPPER LED will go off, and you will be ready to set the Lower Sustain parameters.

- **TRUNCATE/FILTER**
  This button controls the function of the two Sustain Section slide pots. When its LED is not lit, the sliders will govern the setting of the sustain loop of a sound whose SET button LED is lit. When the Truncate/Filter LED is lit, the upper slider will set the truncation point of a sound while the lower slider will set the output filter cutoff frequency for that sound.

- **START POINT/TRUNCATE SLIDER**
   When the sustain section is in the Start Point/Loop mode (Truncate/Filter LED not lit), this slider adjusts the point in the sound where the sustain loop begins. When in the Truncate/Filter mode, this slider adjusts the truncation point of the sound, that is, the end point of the sound. When no Sustain section LED's are lit, this slider controls the speed of the sequencer playback.

- **LOOP LENGTH/FILTER SLIDER**
  When in the Start Point/Loop mode, this slider adjusts the size or duration of the sustain loop. When in the Truncate/Filter mode, the slider controls the cutoff point of the output filter.

Sustaining Sounds
When a sound has been input into the Emulator, it begins as an unsustained sound. Pressing a key activates the sound which will be played back exactly as it was recorded. Holding the key down has no effect on the sound. The Sustain Section controls allow you to tailor the sound to your application, and determine what will happen as you hold the key.

Truncating Sounds
Truncating a sound cuts of the end of a recorded sample, shortening it to a length determined by the TRUNCATE slider. When sampling, the Emulator always records a full two seconds. If, for example, you record a ½ second sound, each time you press a key you will hear your sound followed by 1½ seconds of room tone or other background noise. By using the Truncate function you can eliminate this unwanted portion of' the recording. Truncating a sound also increases the resolution of the loop controls. In the above example if you do not truncate your ½ second sound, many of the possible loop start points will fall in the 1½ seconds of silence. When you truncate the recording all of the start points will lie within the sound.

To truncate a sound, press the TRUNCATE/FILTER button, then the appropriate SET button. Slide the truncate control slowly from right to left, stopping to press a key at various points. Keep sliding until you can hear the decay of the sound being clipped off, and then back off to the right until the decay is just complete.

Truncating a sound does not destroy the data from the end of the sound. At any time you can re-extend the sound to its full length.

Sustain Loop
When the user adds a sustain loop, the Emulator can continue making sound as long as a key is depressed. To accomplish this, the instrument divides the sound into three sections:

- Attack
- Sustain Loop
- Decay.

When a key is depressed, the attack portion is first played. Then the sustain loop sounds. If the key is still depressed at the end of the loop, the sustain loop is repeated until the key is released. Finally the decay portion is played after the key has been released.

Sustain Effects
You can use this feature for several different effects. For many purposes you will select a sustain loop that consists of a single waveform of the sustain portion of the instrumental sound recorded. For other sounds, a long loop of up to a second or so of sound may be repeated. For still other effects the entire sound including some un-truncated silence at the end may be looped.

Use the sliders in the Start Point/Loop mode to adjust the location in the sound of the sustain loop. With the Truncate/Filter LED off, press one of the sustain SET buttons. The START POINT slider will now adjust the point in the sound where the attack portion ends and the sustain loop begins. The leftmost settings will begin the loop right at the start of the sound. As you slide the control right, the loops will begin later and later in the sound, until at the rightmost setting the entire sound up to the truncate point will be the attack portion, and there will be no sustain loop or decay (unsustained sound).

The LOOP LENGTH slider will adjust the size of the sustain loop. For the leftmost settings, the loop will be very short, and will be perceived as high-pitched waveforms. As the slider is moved slowly to the right, the waveforms will drop in pitch and at some point a waveform will be found that matches the pitch of the attack and decay portions of the sound. (If you can not seem to find a loop that matches the pitch of the remainder of the sound, try re adjusting the start point slightly and try again.) As the LOOP LENGTH slider is moved further to the right, the sustain loop will progressively include more of the sound until at its extreme right setting it includes the entire sound to the truncate point.

Each time the sliders are moved, a new set of attack, sustain loop, and decay parameters are computed. However, these parameters only affect newly depressed keys, so a single key cannot be held while the sliders are adjusted. You must release and press a key each time you move the sliders.

Sustain Loops
Different types of sustain loops work well with different sounds and keyboard techniques. For most playing styles, short sounds with single waveform loops work best. A single waveform loop will sound natural only if the sound has a natural sustain portion in it, such as a held vowel in speech or a bowing without vibrato or tremolo on a string.

Sounds with natural modulation, such as a flute with breath noise, a violin with vibrato, or a voice with tremolo will sound "dead" as single waveform loops are entered. For these sounds, longer loops must be used.

New Timbres
The Sustain controls can be used to create new timbres as well. Many sounds, particularly short percussive ones, are never heard with natural sustains. By placing sustain loops in appropriate locations, a wide range of' completely new sounds can be created.

Quantization Distortion
Because of the digital nature of the Emulator, a peculiar type of distortion, called quantization distortion, occurs as the instrument records a sound. For most sounds, the effect is inaudible, but for certain pure sounds it can be heard as a "crackling" or buzzing in the sound. The sounds on which this occurs are low frequency pitched sounds with little harmonic content. The Emulator provides a tracking output filter to remove this distortion from these sounds.

While in the TRUNCATE/FILTER mode, slide the FILTER control to the right. When a note is played, the higher harmonics will be filtered away. The left most setting of the control provides no filtering. Adjust the filter control for the best tradeoff between distortion and sound quality.

The FILTER, TRUNCATE, and SUSTAIN LOOP parameters are all saved on the diskette when the sound is saved. If you retrieve a sound from the diskette, you can readjust its parameters at any time, and Save it again if desired. The sustain controls provide a tremendous variety in the sounds available from your Emulator. Practice and experimentation are the only ways to learn their capabilities.

15   MASTER TUNE

The Master Tune section consists of LOWER TUNE and UPPER TUNE knobs. Each knob can vary the pitch of its respective keyboard section by approximately one semitone. The primary purpose of these controls is to bring into tune two instruments that have been sampled at slightly different pitches. In addition, however, loading the identical sound into both halves of the keyboard and then using the master can create an interesting effect tune controls to detune them slightly. Playing the same notes on both halves of the keyboard results in a rich "ensemble" sound. This is particularly pronounced if you are using the Upper and Lower outputs in stereo.

16   SOUND INPUT (SAMPLING)

Sampling Controls

The Input section consists of two inputs on the back of the Emulator (one ¼ inch phone jack and one Cannon connector) and the following controls:

- **GAIN SWITCH**
  This three position switch selects the amount of' gain applicable to the signal to be sampled. The correct setting is usually found through experimentation, but as a rough guide, line level signals typically require the 0dB setting while microphones and other low level sources require the 40dB position.

- **ATTENUATION**
  This control is used in combination with the overload light to set the Emulator's recording level

- **OVERLOAD LED**
  This LED lights during the process of level setting to indicate a signal level that would result in clipping during the recording process. It will also light at the end of a sound recording if such clipping occurred.

- **SAMPLE**
  This button initiates the level setting procedure, sets the automatic threshold, and initiates the recording process as described below.

Sound Recording Procedure

In order to record a sound into the Emulator, first connect your sound source to whichever of the two inputs has a matching connector.

➢ **Note:**
The sound will not be audible through the Emulator during the level setting and recording process.

1 **Set the Recording Level**
To set the recording level, press the SAMPLE button once. Its LED will blink rapidly to indicate that it is in level setting mode. Now fool around with, the gain switch and the attenuator while making the sound you wish to record until the sound causes the overload LED to light. Back off on the attenuator to just below the lowest point at which the overload LED still lights. The recording level is now set.

2 **Set the Sample Threshold**
To set the automatic threshold level, press the SAMPLE button while it is blinking and hold it down for a few seconds. While you are holding it down the Emulator is sampling whatever signal is at the input. The loudest thing it hears during the time you hold it down becomes the recording threshold level.

3 **Sample the Sound**
When you release the SAMPLE button the LED will remain on to indicate that the recording process is "armed". As soon as the Emulator detects a signal at the input that is above the previously set threshold level it will begin the recording process. The SAMPLE button LED will blink slowly during the two seconds of recording and then go out. Once the LED goes out there will be a pause of approximately one second while the Emulator checks the recorded sound for an overload. If an overload occurred the overload LED will light.

4   Playing to Check the Sample
The newly recorded sound will now be playable on the lower section of the keyboard. (Sounds always record into the lower keyboard section.) Playing middle C of the keyboard section will play the sound at its original pitch and it will be transposed up and down from that point.

Illustration
To illustrate the above procedure, consider the following example:

Imagine that you wish to record your voice into the Emulator in a relatively noisy environment. Connect a microphone and press the SAMPLE button to enter level set mode. With the SAMPLE button LED flashing, sing the note you wish to record while setting the gain switch and attenuator as described above. Now press and hold the SAMPLE button. The Emulator will sample the ambient noise level in your environment and set its level as the threshold level. When you release the button, thus arming the instrument, the Emulator will ignore the ambient noise and wait for something louder (like your sung note) to trigger it.

Forced Sampling
Sometimes, in a noisy environment, you may find that the beginning of your recorded sound has been cut of f. This happens when the sound you wish to record starts at a level lower than the previously set threshold level. To overcome this problem you can force the recording to trigger by pressing the SAMPLE button while the instrument is armed. This causes the recording to start immediately, regardless of the threshold level. The idea here is to hit the button at the same instant that you start the sound. It usually takes a few tries to get it right.

Eliminating Sample Start Delays
Conversely, you may occasionally, after recording a sample, find that when you press a key there is a short delay before the sound starts. (This will be more noticeable at the lower end of the keyboard range.) This will happen when some spurious sound causes sampling to be triggered slightly before the start of the sound that you want to record. There are two possible solutions to this problem.

First, you can use backwards mode to truncate the delay from the beginning of the sample. This, however, wastes some recording time and if you are recording a long sound or using multisampling you will probably need every last millisecond.

The other option is to artificially raise the recording threshold level slightly so that any spurious sounds will be ignored. To do this, make some low level noise into the microphone while you are holding the SAMPLE button to set the threshold level. The loudness of this noise will depend on the level of any spurious sound in your recording environment. With a little practice you will be able to judge this level very accurately.

Saving Sounds
Recording a sound into the lower keyboard section naturally eliminates the sound that was previously there. If' you enter the level set mode and only then remember that you haven't yet saved that great sound currently in the lower keyboard section, it is still possible to change your mind. By pressing any of the three buttons in the Sustain section you will abort the recording process and leave the current lower sound intact. This will only work while in the level set mode. If you don't remember until you get to threshold set, you've blown it.

Helpful Hints on Sampling

Ensuring Sounds are of a High Quality

Recording a sound in the Emulator is no different from recording a sound on tape. Acoustic environment, microphone choice and placement, and any other factor that effects studio recording equally effects the Emulator. The Emulator's sound can never be better that the quality of your recording.

Extreme care should always be taken in setting the recording level. In order to get the maximum signal to noise ratio it is necessary to set the highest possible level short of overload. For this reason you should make a great effort to insure that the signal you record is at the same level as the signal you used to set the recording level. When a sound is recorded live it is of ten difficult for the musician to play a note at exactly to same loudness every time. If the note you record is at all lower in level than the note you used for level set, you are throwing away valuable signal to noise performance. One way to insure consistency is to record the sound to be sampled onto tape and feed it to the Emulator from the tape recorder. That way you can be certain that every time you roll the tape the signal will be at exactly the same level.

Pitch Shifting Implications

As you try recording various sounds you will soon discover that some sounds are less suitable to the Emulator's pitch shifting technique than others. This is generally true of musical sounds with very pronounced resonances. Saxophone and male voice are both prime examples. As their pitch is shifted, so are their resonant frequencies. Once they have been shifted more than a few notes from their originally recorded pitch, they lose their identifying characteristics. To overcome this problem we have introduced specially recorded diskettes, which use a special multi-sample technique. Since the disk contains many samples across the playable range, no single sample will ever be shifted more than a few semitones in either direction, thereby preserving the proper resonant frequencies.

Extreme Dynamic Range

Some sounds pose particular problems because of their extreme dynamic range. This is particularly true of percussive sounds. In order to keep a very percussive attack from overloading, it is often necessary to attenuate the sound to the point where any subsequent component of the sound is at a very low level. This results in an excessively noisy recording. There are two basic approaches to this problem. One is to use a compressor to reduce the overall dynamic range of the sound. The other is to set the level for the "sustain" portion of the sound and to simply let the attack overload. In many cases the attack is so short that clipping is inaudible. Your ears should always be the final judge in this matter. If you can't hear any clipping you have a successful recording, regardless of what the overload light says.

Four Octave Sounds

Since the Emulator's keyboard is always split, it is not possible to shift a single sample over the entire four-octave range. However, for sounds that are usable over a four octave range, one needs only to record one note into the lower keyboard section and then another note from the same instrument, two octaves higher, into the upper section. This is particularly useful for keyboard and synthesizer sounds. One should keep in mind, though, that while shifting the pitch of an instrument beyond the actual range of that instrument will probably give interesting results, it is unlikely to sound much like the original instrument.

Most of all, use your imagination and don't be afraid to experiment. The Emulator can be a very powerful tool for the creative artist. If enough people take advantage of its capabilities, we are going to make one hell of a lot of money.

17   MULTISAMPLE RECORDING

Overview

In normal sampling mode your Emulator requires one sound sample for each two-octave section of the keyboard. As previously mentioned, this technique does not work too well with sounds having pronounced stationary resonances. As you shift the pitch of these sounds the resonant frequencies also move, there by destroying the identifying characteristics of the sound. With voice, for example, as you play up and down the keyboard the effect is not that of a person singing different notes, but of bigger and smaller people. Very low notes sound like a record running too slow, while high notes sound like the Chipmunks. To overcome this problem we have developed the technique of multi-sample recording.

With multi-sample recording, each two-octave section of the keyboard is further divided into two, three, four, or six subsections (depending on the requirements of the particular sound(s) being recorded). A separate sample is recorded for each of these subsections. Consequently, no single sample is ever shifted beyond the range in which it sounds natural, thus preserving the proper resonant frequencies across the entire keyboard range. In addition, by recording a different sound into each subsection it is possible, for example, to have up to twelve entirely different percussion sounds or sound effects available on the keyboard at one time.

Pre-recorded Multi-samples

All Emulator operating software from version 0303 onwards is capable of playing pre-recorded multi-sample sounds. E-mu Systems supplied multi-sample sounds can be identified as such by the "M" suffix on the diskette label (e.g. O3-O11-1O1M).

These sounds are loaded and stored in exactly the same way as normally sampled sounds. Each two-octave group of multi-samples is treated as if it were a single sound. Pressing GET UPPER or GET LOWER loads the appropriate group of samples into the Emulator. Individual subsections cannot be recalled from the diskette separately.

Multi-sample Modification

Normal Emulator software does not allow modification of pre-recorded multi-sample sounds. Do not attempt to change the loop, filter, or truncation settings of such sounds. To do so requires the User's Multi-sample software described in Section 18.

18   USER'S MULTISAMPLE (OPTIONAL)

Overview
User's Multi-sample is a special program that allows you to record sounds using the multi-sample technique and to modify pre-recorded multi-sample sounds. The program is supplied on a standard diskette and must be initialized in the manner of any new diskette (see Section IV).

Backup
You should immediately make a backup copy in case the original is ever damaged. DO NOT copy this software onto your sound diskettes. This software is intended for recording and modifying only and lacks many of the features of regular Emulator operating soft ware.

Loading
To load the User's Multi-sample program into your Emulator, perform the power—on procedure as described in Section V using the User's Multi-sample diskette. Remove the User's Multi-sample diskette from the drive. The program is now ready for use.

Multi-sample Recording
In multi-sample recording, each two-octave keyboard section can be further split into two, three, four, or six subsections. A separate sample is recorded into each subsection. The available modes are listed below:

Mode	Samples per Two Octaves	Size of Subsection	Average Time per Sample	Selection Code
Single[2]	1	2 octaves	2 seconds	B1
Double	2	1 octave	1 second	B2
Triple	3	2/3 octave	2/3 second	B3
Quad	4	½ octave	½ second	B4
Hex	6	1/3 octave	1/3 second	B6

Table 3: Multi-sampling Modes

Note that the times per sample are averages. It is not necessary to make each sample the same length, as long as the total of each two-octave keyboard section does not exceed two seconds. You could, for example, use quad multi-sample to create a keyboard section consisting of one 1 second recording, one ½ second recording, and two ¼ second recordings.

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[2] Single Multi-sample (huh?) is identical to regular single sampling with the addition of the availability of the programmable tuning function described below. You should use this mode to correct the intonation of instruments over which you have no tuning control, e.g., an out of tune piano. Be sure to keep track of which sounds you record with single multi-sample to avoid confusing them with normal single sampled sounds.

Truncating to Free Memory
Each time you make a multi-sample recording, the Emulator will use all the currently available memory. Truncating that recording will free up the now un-used memory for use in the next multi-sample section. This will continue until you have made all your recordings or until you run out of memory, whichever comes first.

Individual Settings
Each multi-sample section can have its own individual loop and filter settings and, since it is often difficult for a musician to play many different notes in perfect tune, each section can be individually tuned to match the other sections. This tuning (unlike the Master Tune controls) becomes part of the sound and is stored with it on the diskette when the sound is saved. The loop and filter settings and the tuning of any sample may be changed at any time, but, because it controls the allocation of available memory, truncation must be the first thing done after each sound is recorded and may not be subsequently changed.

Deciding on Multi-sampling Mode
In deciding which multi-sample mode to use you will be making a compromise between accuracy of reproduction and length of recording. Sounds with substantial decay times and sounds that need long loops will require double or triple mode. Many keyboard sounds actually work better in single sample mode. Most acoustic keyboards don't suffer much from pitch shifting and the two second sample length is necessary to capture the characteristic decays.

Sounds with short final decays (like woodwinds, brass, and some sound effects and percussion sounds) can use the quad and hex modes. Because of the short sample times, short sustain loops are a necessity in these modes. In the case of multiple sound effects and percussion sounds, the number and length of the sounds to be recorded will define the mode to be used.

Occasionally you will find that a sound will require both long sampling time and many samples. For these cases, there is a way to double the average time per sample for each multi-sample mode if you are willing to limit yourself to only two octaves of range on the keyboard at one time. To do this, choose the appropriate multi-sample mode and record the lower octave of the selected instrument range into the TOP octave of the lower keyboard section. Use the entire two seconds of memory for this one octave. (The lower octave of the keyboard section will then have nothing recorded into it). Hit SWAP.

Now record the upper octave of the selected instrument range into the LOWER octave of what is now the lower keyboard section, again using all two seconds of memory. Hit SWAP again. You will now have your instrument on the middle two octaves of the keyboard with nothing in the top and bottom octaves. Using this technique gives you four seconds of recording for the two octave range as opposed to the usual two seconds, but at the cost of two octaves of range.

In recording musical instruments, you should not automatically assume that the more samples the better. Many sounds that are not quite acceptable with single sample, work very well in double or triple mode. There is no point in using more than the minimum number of samples necessary. Remember that the more samples you use, the more loops you will have to find and the harder it becomes to match all the samples across the keyboard range. Recording good multi-sample sounds is an exacting process and the more samples you use, the more difficult and tedious it becomes.

Recording Procedure

If you are going to make a new set of multi-sample recordings into the lower keyboard section (like normal samples, multi-samples are always made into the lower half of the keyboard), start by choosing the multi-sample mode you want to use. To do this, use the special function buttons to enter the appropriate selection code as listed in Table #1, i.e. 'B2' for double multi-sample, 'B3' for triple multi-sample, etc. Entering the code also erases the entire two seconds of memory and makes it available for your new recordings.

If you are going to replace one or more sections of an existing set of multi-sample recordings, DO NOT enter a selection code. The Emulator knows which mode was originally used to make a recording and each individual section will be automatically erased as you record each new sound.

The following table lists the subsection sizes and locations for each of the multi-sample modes along with the notes within these sections at which the originally recorded pitches will appear:

Mode	Subsection Ranges	Notes at Which Recorded Pitches Appear
Single	C - B'	C'
Double	C - B	G
	C' - B'	G'
Triple	C - G	E
	G# - D#'	C
	E' - B'	G#'
Quad	C - F,	D#
	F# - B,	A
	C' - F'	D#'
	F#' - B'	A'
Hex	C - D#	D
	E - G	F#
	G# - B	A#
	C' - D#'	D'
	E'- G'	F#'
	G#' - B'	A#'

Table 4: Multi-sampling Note Assignments

Multi-Sampling Recording

To initiate the recording process, press the SAMPLE button. The SAMPLE LED will blink rapidly to indicate multi-sample mode.

Now choose the subsection you wish to record into by pressing the key in that particular section of the keyboard at which the recorded pitch will appear (as listed in Table #2). For example, if you are using quad multi-sample and want to record into the lowest half octave subsection you would press the lowest D#. If you wanted to record into the next higher subsection you would press A.

If you press an inappropriate key (any key other than the ones listed for the mode you are using) the SAMPLE LED will remain lit steadily while the key is pressed and then return to blinking when it is released to indicate that the Emulator is still waiting for a correct key to be pressed.

> ➢ **NOTE:**
> If the SAMPLE button does not blink, it is an indication that the memory contains some non-multi-sample compatible data.
>
> If this happens it will be because you forgot to enter a selection code or you are attempting to modify a normal single sample sound. Correct the error and press SAMPLE again.

Aborting Sampling
If you wish to abort the recording process before you've actually chosen a section, press the lowest C on the keyboard. Once you press a key to choose a section, any existing data in that section is erased and you are committed to making a recording. If, when you press a key to choose a section, there is no memory available for recording (because you failed to truncate the immediately proceeding recording) the OVERLOAD LED will light and the SAMPLE LED will go out. If this happens, you will have to replace one or more of the previously recorded sounds with shorter samples in order to make some memory available.

Assuming memory is available, when you choose a section to record into, the blinking of the SAMPLE LED will slow to indicate level set mode, exactly as in single sample recording. At this point simply record your sound as you normally would, i.e. set the level, press and hold the SAMPLE button to set the recording threshold, release the button and record. Although the LED will blink for two full seconds, just as in normal sampling, the actual recording time will depend on the length of previous recordings.

Truncation
Each multi-sample sound must be truncated immediately after sampling. After any multi-sample recording, the Emulator automatically goes into truncation mode. All three Sustain section LED's will light to indicate this state. Set the truncation as you normally would, using the Truncation slider and making certain that you are playing a key in the section into which you just recorded. Set the truncation point as close as you can to the end of your sound, as this will maximize the amount of memory available for any sub sequent samples. When you are sure you have the truncation point where you want it, press the Truncate/Filter button to exit truncation mode and lock in your setting. Remember that this is the only chance you have to truncate the recording. Once the setting is locked in it can't be changed. The Filter slider is inoperative in multi-sample truncation mode.

Loop and Filter Setting
Once your Emulator is out of truncation mode, the loop and filter sliders work exactly as they do with normal samples. To set a loop, press SET UPPER or SET LOWER, depending upon which keyboard section contains the multi-sample subsection whose loop you wish to set. Press a key in the appropriate sub-section.

The loop sliders will now affect the sample in that section. Keep in mind the fact that the sliders will always affect the subsection, which contains the most recently pressed key. If you are setting the loop in one section and inadvertently press a key in another section, the sliders will stop affecting the first section and start affecting the second section. This can be very disconcerting, particularly if' you had previously spent considerable time setting the loop in the second section and had not yet saved it on diskette.

Consequently, you should be very careful when setting loops to only press keys in the section you are setting. There is a natural tendency, when making loop settings, to want to compare them to nearby samples. If you do this with the loop controls active you will find that you are accidentally changing loop settings all over the keyboard (we know this from painful experience). It is advisable to try to get into the habit of making a loop setting, deactivating the sliders, comparing the loop to adjacent samples, and then reactivating the sliders to make any further changes.

➢ **NOTE:**
Remember that for each multi-sample mode the recorded pitches appear at the keys listed in Table 4.

These are the notes that should be recorded to obtain a continuous scale from section to section.

In triple mode, for example, you would record an E for the lowest section, a C for the middle section, and a G# for the highest section.

Filter Settings

Each individual sample can also have its own filter setting. This can be useful not only to eliminate quantization error distortion, but also to help match an instrument's timbre from subsection to subsection.

To make a filter setting, press the TRUNCATE/FILTER button, then the appropriate SET button, and then a key in the subsection to be set. Use the FILTER slider in the normal way. The above precautions about playing keys while making settings also apply to the filter.

Tuning

The tuning function allows you to correct the intonation of samples that are slightly out of tune. When the TRUNCATE/FILTER LED is lit, the upper slider will control individual section tuning. Press the appropriate SET button and then a key in the section to be tuned. If you are tuning to an external reference, repeatedly play the desired note while moving the upper slider until the proper pitch is reached.

If you are tuning one section to another, use the following procedure (the section affected by the tune slider is controlled by the last key pressed, exactly as described above for the loop and filter settings). With the sliders deactivated, play and hold the note that will be serving as reference pitch. While continuing to hold it, activate the tuning control and then play the appropriate note in the section to be tuned. Repeatedly play this note while moving the upper slider until the note is in tune with the reference. Release both notes and deactivate the controls. Repeat this procedure until all the sections are in tune.

When recording multi-sample sounds, it is not necessary to use the same mode on both halves of the keyboard. You could, for instance, select quad multi-sample, record four samples, hit SWAP, and then hit B3 to change to triple mode for the next set of samples. Both the quad and triple samples can be saved on the same diskette.

When you are working on a set of multi-samples, you should save the partially completed section to a diskette each time you record and truncate a sound and each time you set a loop and filter. In this way, should you accidentally destroy a previously completed sample while working on a subsequent one, you can always get it back by reloading it from the diskette.

When a set of multi-samples has been completed, it should be saved to diskette as an upper or lower sound as desired. It should be saved on a diskette containing normal operating software, NOT the User's Multi-sample diskette.

Modifying Pre-recorded Sounds

To modify pre-recorded sounds, load the User's Multi-sample program as previously described and then load the desired sounds. Individual multi-sample sections can be replaced using the recording procedure described above (remember, don't clear the memory or you will erase all the sections). Loop and filter settings and tuning can be changed for any section. Truncation settings can't. When you have made all the changes that you wish to, resave the sounds to a diskette containing normal software.

Finished Recording

When you have finished recording and/or modifying multi-sample sounds, turn off your Emulator. If you wish to continue playing, repeat the power on procedure using a diskette containing standard operating software.

19   SEQUENCER

Overview
The Sequencer section is located to the right of the Mod and Depth wheels and contains eight buttons. Two of these, the "A" and "B" buttons are used for special functions, as discussed later in this section. The remaining six buttons control the sequencer.

Simple Storing and Recalling
The Sequencer allows you to store the notes you play on the keyboard and then recall them. You can store the notes in either of two sequence bins:

- Seq. # 1
- Seq. # 2

To store a sequence press the STORE button, followed by the bin number, e.g. SEQ # 1. The STORE and SEQ # 1 LED's will light and the sequencer will be ready to begin memorizing notes.

The sequence will actually begin with the first note you play on the keyboard. It will memorize both the notes and their rhythm, and continue memorizing until you press STOP. You can then recall the sequence you stored by pressing RECALL followed by the sequence number, e.g. SEQ # 1. The notes will be recalled in the sequence and rhythm that you played them.

Looping
At the end of the sequence (at the point that you pressed STOP during the store process) the sequence will loop back to the beginning and play again. You'll notice that when it loops, the first note falls exactly at the point you pressed STOP. If you hit STOP on the proper beat when you store the sequence it will loop in correct rhythm when it is recalled.

Silence at the Start of a Recording
It is also possible to begin a sequence with a period of silence. To do this, press a key on the keyboard and, while continuing to hold it, press STORE and SEQ # 1 (or 2). Now release the key. The sequence will start recording at the instant you release it and you can then begin playing when the appropriate amount of time has passed.

Stopping a Sequence
To stop a recalling sequence, press the STOP button. Its LED will light and the sequence will stop the next time it reaches its end. If' you press the STOP button again before the sequence reaches its end the sequence will stop immediately.

Playing Sequences in Succession
You can store sequences in both bin # 1 and bin # 2, and play them back in succession. To recall sequence # 2, press RECALL SEQ # 2. While it is recalling, press RECALL SEQ # 1. When sequence # 2 ends, sequence # 1 will immediately start. You can then press STOP to stop at the end of # 1, or you could even press RECALL SEQ # 2 to go back to recalling # 2 at the end of # 1.

Alternatively, if you press RECALL SEQ # 1, STOP, RECALL SEQ # 2, when you press the SEQ # 2 key sequence # 1 will stop immediately and sequence # 2 will start at that point.

Altering, Saving and Recalling

Altering the Tempo
You can alter the tempo of the recalling sequence using the START POINT/ TRUNCATE slider when the SUSTAIN section buttons are all off. Sliding the slider to the left will slow the recall down, sliding it to the right will speed it up. When you are storing, you should leave the slider in the middle in most cases. This will enable you to either increase or decrease the recalling tempo. If you should wish to drastically increase the tempo during recall, you would store with the slider at the extreme left, and recall with it at the extreme right.

Storing Sequences to Diskette
The Emulator sequencer allows you to save your sequences on diskette for more permanent storage. Whenever you press the SAVE button the sequences in bins # 1 and # 2 are automatically stored on the diskette along with the sounds currently in the Emulator.

Each diskette will hold one set of two sequences. You should remember that the SAVE process always writes both the sounds and sequences onto the diskette. If, for example, a diskette contains both sounds and a set of sequences and you GET the sounds, modify them, and then hit SAVE, the new sounds will be stored onto the diskette but the sequences on the diskette will be erased and replaced with whatever happened to be in the sequencer at the time you hit SAVE.

If you wish to change the sounds on a diskette but leave the sequences intact, before hitting SAVE hit GET SEQUENCE. This loads the stored sequences into the Emulator's sequencer so that when you then hit SAVE they will be restored back onto the diskette. The same precaution applies to the reverse situation, i.e. when you want to change a stored sequence but leave the sounds on the diskette intact. In this case hit GET UPPER and GET LOWER after changing the sequence but before hitting SAVE.

Recalling Sequences from Diskette
To reload sequences from a diskette into the sequencer, press GET SEQUENCE. If the sequencer is running, it will stop, and the new sequences will be loaded from the disk. If a disk error occurs (for example there is no disk in the drive) the GET SEQUENCE light will remain lit when the disk turns off, and the sequence bins will be left empty. GET SEQUENCE, like GET LOWER, GET UPPER, and SWAP can be part of a multi-button command (see Section V). Up to three depressions of these buttons will be remembered and executed in sequence. If you press a fourth button the Emulator will stop playing until it completes the first operation that you requested.

When you SAVE a sequence, the setting of the tempo slider is also saved. This setting is restored when you GET SEQUENCE. You can set a particular recall tempo and be sure the tempo is correct when you GET SEQUENCE during performance. To change this tempo with the TRUNCATE slider, you must first move the slider to the position that corresponds to the preset tempo. Only then will the slider affect the playback speed in the normal way. (This prevents an inadvertent bump of the slider from causing a drastic and unexpected change in tempo.)

The 'Extra' Sequence
When you store a sequence into a bin, and there was already a sequence in the bin, the old sequence is transferred to a special sequence bin called the 'extra' sequence. This can be particularly useful when you inadvertently store over a sequence you wanted to keep or when you make an error during sequence overdubbing (see below).

To recall the sequence in the extra bin, press RECALL then RECALL again. Recalling the extra sequence is just like recalling either of the other two sequences - it will loop, stop, and succeed the others by pressing the appropriate buttons as above.

Exchanging the Extra Sequence
Often you will want to exchange the 'extra' sequence with one of the other two sequences to allow you to SAVE it on disk (the 'extra' sequence is not saved on the disk). To do this, press STORE, then RECALL, then the sequence number you wish to exchange with the extra sequence (i.e. SEQ # 1 or SEQ # 2).

A sequence in the 'extra' bin remains intact when additional sequences are recalled from a diskette. Consequently it is possible to get a set of sequences from a diskette, swap one of them to the 'extra' bin, and then get another set from another diskette, thereby ending up with three independent sequences available simultaneously.

Sequencer Footswitch
The Accessory Footswitch (the one that usually controls doubling mode) can also be used to start and stop the sequencer. Pressing special function code 'B1' enables the footswitch for sequencer control. Pressing 'B1' again returns it to normal doubling mode control.

When the footswitch is enabled for sequencer control it will function exactly like the STOP button. This is very useful, when recording a sequence, for stopping the sequencer precisely on the right beat without having to make a mad lunge for the STOP button. When pressing the footswitch during recall, the STOP button LED will light exactly as if the button itself had been pressed.

Additionally, the footswitch will start initial sequence recall. For example, if you press RECALL SEQ # 1 with the footswitch enabled, the RECALL LED will light and the SEQ # 1 LED will BLINK to indicate that the Emulator is waiting for the footswitch to be pressed to start the sequence. When you then press the footswitch the SEQ # 1 LED will light steadily, the sequence will start and the footswitch will return to acting as the STOP button. (The STOP button itself will always remain active, regardless of whether or not the footswitch is enabled.)

This is particularly useful when overdubbing as it allows you to get your hands to the keyboard, ready to start, before initiating play back with the footswitch.
It is possible to start a sequence with the footswitch and then also control doubling mode. Press 'B1' to enable the footswitch. Press RECALL SEQ # 1 and then 'B1' again. The SEQ # 1 LED will continue blinking. When you press the footswitch the sequence will start and the footswitch will revert back to controlling doubling mode. (It will not, of course, then act as the STOP button.) Pressing 'B1' does not affect the doubling mode state; it can be left enabled or disabled as you wish.

Sequencer Errors
The Emulator Sequencer has a total memory of almost 900 notes for bins # 1 and # 2 combined (the 'extra' sequence has its own separate memory). If while storing you exceed the memory capacity, the store will stop immediately and the STOP light will remain lit. You can extinguish the STOP light by pressing STOP.

If you try to exchange the 'extra' sequence with one of the bins, and the result would exceed the 900 note total for the two bins, the exchange will not take place and instead the STOP light will remain lit as above.

Storing During Performance
The Emulator Sequencer has a special mode that is particularly useful while using the sequencer during performance. If RECALL is pressed twice in succession during STORE, the STORE is immediately stopped and the sequence that was storing begins recalling instantly. To use this feature, press STORE #1, then RECALL (to be ready), and then play a brief keyboard line. On the downbeat, press RECALL a second time. The line will be repeated continuously in rhythm!

Overdubbing
Your Emulator Sequencer can both store and recall sequences at the same time. This is particularly useful for overdubbing tracks of sequence using techniques similar to those used with multi-track tape.

To overdub a second pass onto a sequence stored in SEQ # 1 press STORE SEQ # 1 and then RECALL SEQ # 1. The previously stored sequence will begin recalling at the instant that you press SEQ # 1 after RECALL and you can play your second pass along with the recalling sequence. Pressing the STOP button will cause both the store and recall to stop the next time the recalling sequence reaches its end. Pressing STOP a second time will cause both to stop immediately. The overdubbed sequence is now stored in bin #1, and can be recalled by pressing RECALL SEQ # 1. The sequence as it existed prior to the current over dub is now stored in the 'extra' bin, so if you made a mistake during the over dub, simply exchange the 'extra' sequence with Sequence # 1 and try again.

You can overdub sounds as many times as you like, limited only by the number of simultaneously sounding notes on the Emulator and the sequencer memory 900 note limit.

You can also recall bin # 2 while storing in bin # 1, or chain both # 1 and # 2 together just as in normal recall mode. You cannot, however; recall the 'extra' sequence while storing.

Complicated Stuff

Once you get used to all of the above features of the sequencer, there are a few additional features that you may find useful. These are involved with STORE during RECALL in more complicated situations.

Adding Notes to the Beginning

You can add some notes to the beginning of an existing sequence; say in bin # 1. To do this, press STORE SEQ # 1, then RECALL, and play the notes you wish to add. When it's time for the existing sequence to begin, press SEQ # 1. Press STOP to end the storage at the end of the existing recalling sequence.

You can add some notes to the end of an existing sequence too. Press STORE # 1 RECALL # 1 just like you would to overdub a track. Then press RECALL STOP. When the end of the recalling sequence comes around, recall will stop but you will continue in store mode. Play the notes you wish to add and press STOP on the downbeat to end the now extended sequence.

Truncate an Existing Sequence

You can also truncate an existing sequence. To do so, press STORE # 1, then RECALL # 1 to recall and save the sequence. Press STOP twice. On the second press both the RECALL and STORE will end to truncate the sequence. You could have instead pressed RECALL STOP STOP to immediately end recall but continue store mode to replace the old ending with a new one.

The Sequencer and Other Emulator Functions

Certain functions of the Emulator will not work properly with the sequencer running, so they turn it off as soon as they are pressed. These are SAMPLE, SAVE, and GET SEQUENCE.

Special Functions with the Sequencer

Because of the new 'A' and 'B' prefix buttons, we've been able to move the special sound modes and special functions to the sequencer buttons for easier access. To activate any of these modes, press the prefix button ('A' or 'B') which will light the LED on that button, followed by the numbered button (the number is the small one at the upper right of the button) corresponding to the function you wish to perform. For example, to set the lower sound to SOLO Mode, press 'A' '2' ('2' is also labeled GET SEQUENCE).

Buttons	Command
A 1	Set Lower sound to normal mode
A 2	Set Lower sound to solo mode
A 3	Set Lower sound to non-transposition mode
A4	Toggle Lower sound natural release mode
A 5	Cancel 'A' prefix
A 6	Release pedal affects the Lower sound only
A 7	Release pedal affects the Upper sound only
A 8	Release pedal affects both sounds
B 1	Toggle sequencer footswitch
B 2	Cancel 'B' prefix
B 3	Toggle backwards mode
B 4 - 7	Cancel 'B' prefix
B 8	Replicate Software

Table 5: Sequencer Button Alternate Commands

Use the CANCEL PREFIX commands if you inadvertently press the A or B pushbutton.

20   USER DISKETTE FORMATTING SOFTWARE (OPTIONAL)

Overview
The optional User Diskette Formatting Software allows you to purchase diskettes at your local computer store and use them in your Emulator. To do this, the program 'formats' the diskette, that is, it puts information on the diskette that the Emulator needs in order to read from and write to the diskette.

Use Only Quality Diskettes
E-mu has determined that only the finest quality diskettes are of adequate reliability for use in the Emulator. Use ONLY DYSAN or MAXELL brand diskettes. Don't accept another brand because a salesman tells you they are 'the same thing' or 'just as good.' The Emulator requires diskettes that are 'Certified for Double Density' usage. Do not use 'Single Density' diskettes.

NEVER use both sides of a 'Single Sided' diskette. While the disk drive in the Emulator is not specified for use with 'Double Sided' diskettes, tests at E-mu Systems have concluded that you may use both sides of certified 'Double Sided' diskettes with little risk of data loss.

For maximum safety, however, use 'Single Sided' diskettes. In conclusion, purchase only MAXELL or DYSAN Double Density Soft Sectored diskettes. The Dysan part number is 104/1D (801187). The Maxell part number is MD1.

Initializing the Program
The USER FORMAT program, like any software received from E-mu Systems, may need to be initialized to your instrument before use. If the program has not been initialized, when you attempt to load it, the disk drive will stop and the SAVE light will come on. In this case, simply remove the write protect sticker from the diskette and try again. Once you have initialized the diskette, you may write protect it again.

Formatting Diskettes
To format diskettes that have been purchased from a source other than E-mu Systems, begin with your Emulator turned off. Turn on the instrument and insert the USER FORMAT diskette. The instrument will read for a short time from the disk, and then turn the disk drive off. Remove the USER FORMAT diskette.

The instrument is now ready to format your diskettes. Note that it will not load or play sounds - it is only useful for formatting diskettes in this state. To format a diskette, insert the diskette to be formatted into the drive and press SAVE. The disk drive will format the diskette. Remove the formatted diskette from the drive. It will have software already on it, and will be initialized to your instrument. It will not have any sounds or sequences stored on it.

You can format as many diskettes as you like using this procedure. If you choose to use double sided diskettes, you will have to format both sides of the diskette.

When you are done formatting diskettes, turn off the instrument's power. You can then power the instrument up using and normal diskette (including the ones you have formatted) to play music with your Emulator.

If, when you press SAVE, nothing happens but the SAVE light comes on, it means that the diskette is write protected. Simply remove the tab if you really want to format the diskette.

Making Additional Copies of the Program
There are two other functions the USER FORMAT can perform. The first is to copy itself to another diskette, enabling you to back up the USER FORMAT program itself. To accomplish this, load the USER FORMAT program as above. Place a formatted diskette into the drive, and press DYNAMIC. The diskette will be written with the USER FORMAT program. Label it accordingly!

If you attempt to copy the USER FORMAT program onto a write protected diskette, the disk drive won't turn on and the DYNAMIC light will come on. If there is an error during the write, the DYNAMIC light will come on and stay on.

Updating the Software Written to Formatted Diskettes
The USER FORMAT program can also update the software it writes onto the diskette while it is formatting the diskette. You need not use this function, because you can always rewrite the software onto a formatted diskette using the 'Software Replicate' function in any Emulator software. If, however, you would like to eliminate that step, you can load new software into the USER FORMAT program. Place a diskette containing the software you wish to read into the USER FORMAT program in the drive, and press GET LOWER. The Emulator will read the software from the diskette into the USER FORMAT program in memory. This software will be duplicated onto any diskettes formatted after this time.

Of course, if you turn off the instrument after loading new software the software will be forgotten. However, if you copy the USER FORMAT program back to its diskette after reading new software, you will permanently save the USER FORMAT program with the new software

If the instrument is unable to read the software from the diskette because of a bad diskette, the GET LOWER light will stay on after the read. In this case, try another copy of the software. If you attempt to load software from a diskette that has not yet been initialized to your instrument, the GET UPPER light will come on. Start over after initializing the diskette that has the software on it.
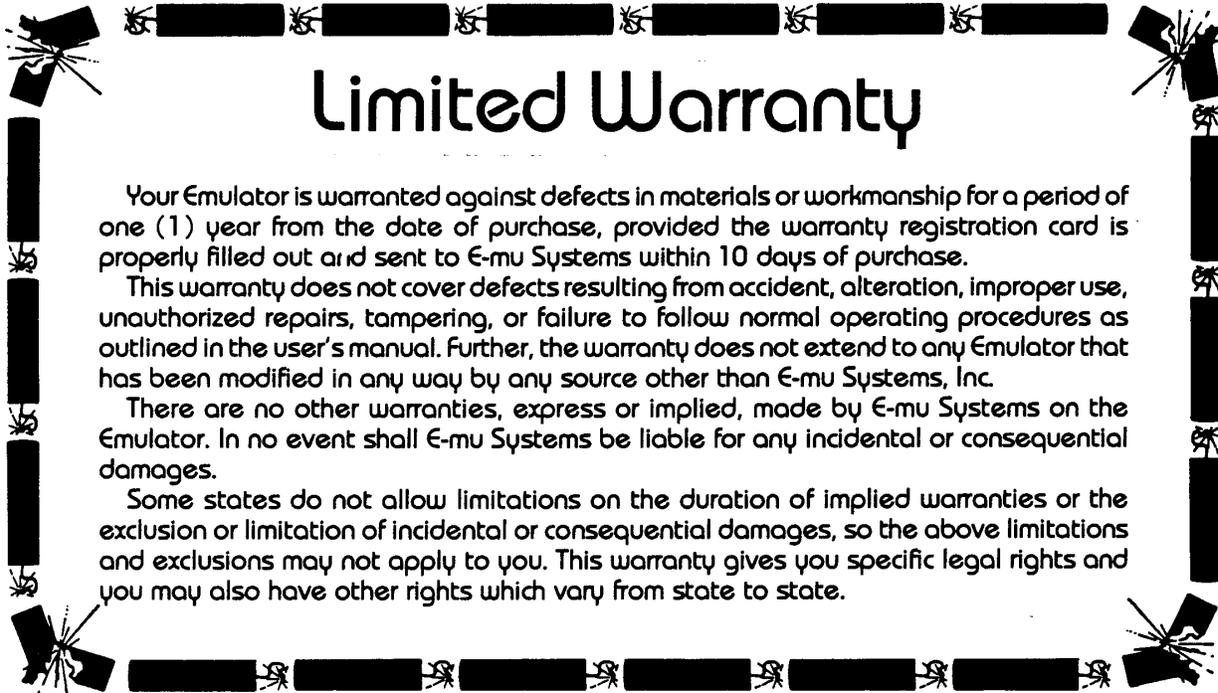
The USER FORMAT software may seem a bit confusing at first, but it is actually very simple in practice If you like, phone E-mu Systems during your first attempt at formatting to receive additional instructions

21   IN CASE OF DIFFICULTY

If you have problems with your Emulator, contact the dealer from whom you purchased it and describe to him what it is or isn't doing. In many cases he will be able to solve the problem on the spot. If he is unable to, he will direct you to call the nearest E-mu Service Center or the factory. Be prepared to describe the problem in detail. The clearer the picture we have of your Emulator's behavior, the more likely we are to be able to figure out what's wrong. If it is necessary to return the instrument for service you will be given a return authorization number and the address to which it should be sent. Under no circumstances should you return your Emulator to us without getting prior authorization.

> ➢ **NOTE:**
E-mu Systems no longer formally support the Emulator.

22   WARRANTY

Limited Warranty

Your Emulator is warranted against defects in materials or workmanship for a period of one (1) year from the date of purchase, provided the warranty registration card is properly filled out and sent to E-mu Systems within 10 days of purchase.

This warranty does not cover defects resulting from accident, alteration, improper use, unauthorized repairs, tampering, or failure to follow normal operating procedures as outlined in the user's manual. Further, the warranty does not extend to any Emulator that has been modified in any way by any source other than E-mu Systems, Inc.

There are no other warranties, express or implied, made by E-mu Systems on the Emulator. In no event shall E-mu Systems be liable for any incidental or consequential damages.

Some states do not allow limitations on the duration of implied warranties or the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

Change of Address Notice

Name_____Date_____

Old Address_____

City_____State_____Zip_____

New Address_____

City_____State_____Zip_____

Change of Address Notice

Name_____Date_____

Old Address_____

City_____State_____Zip_____

New Address_____

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Change of Address Notice

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Instant Emulator Simplified
Set Up and Operating Instructions

Since you are probably more interested in playing your new Emulator thon in reading a long boring owner's manual, we have compiled the following instructions to help you make noise fast. We suggest that you set up your Emulator, confirm that it is working correctly, and try out the enclosed prerecorded sounds. When you get tired of that, read the owner's manual. Although the Emulator is extremely simple to use, getting the maximum level of performance from it requires a thorough understanding of its various functions.

Set Up

1. Carefully unpack your Emulator. In addition to the instrument itself you should have an AC line cord, a box of ten diskettes, a foot pedal, two foot switches, on owner's manual, and a warranty registration card.

2. Check the AC line voltage switch on the rear of the Emulator to make sure that it is set to the correct voltage for your country. Be sure the power switch is in the "OFF" position. Attach the AC line cord and plug it into an AC outlet.

3. Connect a patch cord from the "MIX" output on the rear of your Emulator to your amplifier (use either the phone or cannon output). The volume of this output can be controlled by the Mix Level knob on the Emulator's front panel.

4. Turn the Emulator on. The disk drive motor (which is behind the slot at the left end of the control panel) should begin to run, and all the panel LED's should come on. After about five seconds the Overload, Sample, and Swap LED's should go out. If this happens, your Emulator is working correctly (so far).

Playing Prerecorded Sounds

WARNING: If you are not familiar with the use and handling of floppy diskettes, read Section 5 of the owner's manual before proceeding.

1. Select a diskette containing prerecorded sounds. Open the disk drive door and insert the diskette (label side up) with the edge with the label facing you. Close the door. All of the panel LED's will go off and the Emulator will automatically load both the Lower and Upper sounds. The Get Lower and Get Upper LED's will blink during loading. When both sounds have finished loading you can, play on the keyboard.

2. Press the Dynamic Allocation button. (See the owner's manual for an explanation of this function.)

3. Use the Master Tune controls to adjust the tuning of the Lower and Upper keyboard sections.

4. To apply vibrato to a keyboard section, press the appropriate Enable button, move the Mod Depth wheel forward and adjust the vibrato speed with the Rate knob. Plugging in the vibrato foot pedal will disable the Mod wheel and allow you to use the pedal to control vibrato depth.

5. Plug in the Release Foot Switch. Normally a sound stops when you release its key. When you hold down the Release Foot Switch, pressing a key always results in the entire sound being played, regardless of when you release the key. Experiment with the piano.

6. Press the Swap button to move the Lower sound to the upper keyboard section and vice versa.

7. To load another prerecorded sound, place the desired diskette in the drive and press the Get Lower and/or Get Upper buttons. You can play on the keyboard while the sounds are loading.

Sound Recording

Reading the owner's manual is a definite requirement for recording your own high quality sounds. The following instructions will, however, allow you to gain some familiarity with the basic technique.

1. Plug a microphone into either of the inputs on the rear of the Emulator.

2. Set the Gain switch to the 40dB position.

3. Press the Sample button. Its LED will blink rapidly.

4. Set the recording level: Adjust the Attenuation knob until the Overload LED lights when you make the sound that you wish to record. Now back off on the attenuator to just below the lowest setting at which the LED still lights.

5. Press the Sample button again and hold it for a few seconds (don't make any noise during this time). Release the button. The LED should remain on. (See the owner's manual for on explanation of this step.)

6. Make the sound you wish to record. The sound will trigger the Emulator into recording (the Sample LED will blink slowly). You hove two seconds of recording time. At the end of that time the Sample LED will go out. If there was an overload during recording, the Overload LED will come on.

7. Play the sound on the lower half of the keyboard. (Sounds always record into the lower keyboard section.)

8. To save your sound onto diskette, place a diskette with no write protect label into the disk drive and press the Save button. The Save LED will blink for about 20 seconds and then go out to indicate a successful save.

9. If you have any problems, refer to section 16 of the owner's manual for a complete description of the sampling process.

Have fun !

E-mu Systems