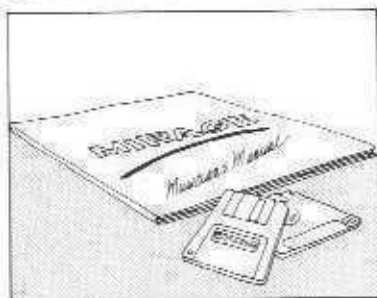


Mirage[®]

DIGITAL SAMPLING KEYBOARD

Musician's Manual

When All Else Fails, Read The Manual...



If you're like most of us, you've probably already hooked up your Mirage™ and reached some level of limited success in making it work. This manual is a simple and straightforward presentation of the Mirage that will take you to an *intermediate* level of sophistication. An **Advanced Sampler's Guide** is available from your authorized Ensoniq Dealer for those who wish to use the Mirage in technically and artistically complex situations.

We suggest that you read the manual from front to back covers, including the GLOSSARY and APPENDIX. The terminology may seem a bit unfamiliar to you at first, but as you use the Mirage you'll quickly adapt to the terms and their definitions. The Mirage is a very logical instrument and we've presented the information about it in a logical *building block* fashion.

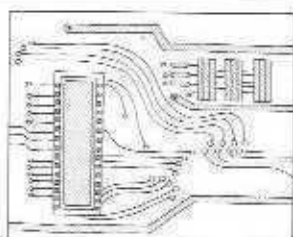
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Introduction

The Mirage is an eight-voice polyphonic digital sampling keyboard instrument—in many ways similar to and in just as many ways different from a synthesizer. The Mirage allows you to personally program sounds and also features an on-board sequencer, like many synthesizers. But in addition, the Mirage will permit you to sample just about any sound you hear and create music with it.

It's best described as a computer specially designed to reproduce and process sound. Like all computers, it is a system consisting of two main parts—hardware and software. And here's where it differs most from synthesizers.



Hardware

The hardware of the Mirage is everything that comes in the box with the exception of the information on the mini-diskettes. The hardware itself cannot make any sound. It's an engine without fuel. What the hardware *can* do is reproduce, process and modify the sound information included on the diskettes.

Software

The information contained on the mini-diskettes is called **software**. This information consists of all the data necessary for the Mirage hardware to reproduce a sound. When this information is transferred—or **loaded** into the memory of the Mirage, the hardware is ready to reproduce that sound or modify it in a nearly unlimited number of ways.

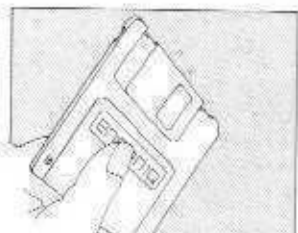
You, the user, can *create* your own software by taking sounds you have recorded with the Mirage hardware and transferring that information onto a specially formatted Mirage diskette for future use. This process is called **saving**.

Because all of the crucial sound information is included as software, your Mirage will never be obsolete. An ever-growing library of sounds and enhanced features is available from Ensoniq that will keep your Mirage fresh and new for years to come.

Digital Sampling

As it applies to music, digital sampling is a computer term that basically means "recording". In concept, it's very similar to tape recording—an electronic representation of a sound, or audio signal, is *written down* in some location where it can be *read* and changed back into a sound at some future time.

Tape recording uses audio tape to store the audio signal. Digital sampling uses sophisticated circuitry (and eventually computer diskettes) to store the signal. In digital sampling, the signal is stored as *bits* of computer information. While in this digital form, the signal can be modified in many ways, without deteriorating the audio quality and without the mechanical limitations of tape recording.

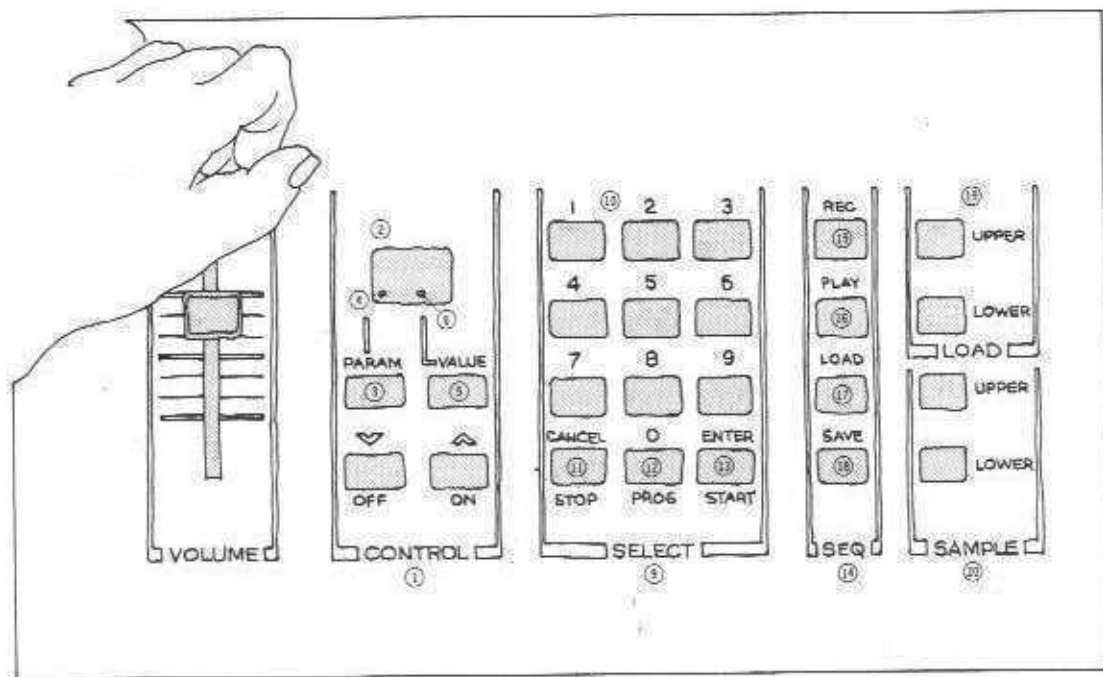


The Front Panel

The Mirage control panel contains a logical array of multi-function buttons and a status display that will show you all you need to know about what's going on inside the Mirage at any given time.

Many modern digital and digital/analog synthesizers utilize a multi-function control panel, so you may already be familiar with its use. If not, you'll find that you'll adapt to the concept rather quickly and you'll soon be breezing across the panel like an expert.

The following sections of the manual will give you detailed instructions on how to use the panel for specific functions. Here is a general description of the controls and their function.



① CONTROL

This section of the panel contains the display and controls parameter values, switching functions and commands.

② DISPLAY

The display is alpha-numeric, that is, capable of displaying letters as well as numbers. When sampling, the display also functions as a peak level indicator. The APPENDIX of the manual contains all the specific information about reading and interpreting the display. Any flashing display means that the Mirage is asking you a question or telling you that something is wrong.

③ PARAM

Pressing this button will show you which parameter is cued and ready to be worked with. Parameter numbers can be changed using the SELECT keypad.

④ PARAM INDICATOR

When this LED is lit, the display is showing a parameter number.

5 **VALUE**

Shows the value number of the parameter. Rather than knobs or switches, the Mirage uses a scale of numbers to describe the operating range of any of the parameters.

6 **VALUE INDICATOR**

When this LED is lit, the display is showing the value of the selected parameter.

7 **▼ —OFF**

Pressing this button will decrease the parameter value number. Pressing the button intermittently will decrease the value one digit at a time. Holding the button down will change the value at an accelerating rate. This is also the OFF button for switching functions.

8 **▲ —ON**

Pressing this button will increase the parameter value number. Pressing the button intermittently will increase the value one digit at a time. Holding the button down will increase the value at an accelerating rate. This is also the ON button for switching functions.

9 **SELECT**

The SELECT section gives you access to many Mirage functions from parameter selection to programming, sequencer, sampling and edit functions.

10 **NUMERIC KEYPAD**

The numeric keypad is used to select parameters, sounds, patches and determine which sounds and patches will be transferred to the diskette.

11 **CANCEL/STOP**

This button is used to abort commands and halt functions such as sequencing. It is also used to cancel editing functions before they are entered into the Mirage memory. Virtually any command or function can be cancelled with no harmful effect as long as CANCEL/STOP is pressed before the event occurs.

12 **O/PROG**

Each sound in the Mirage has four preset parameter programs numbered 1 through 4. This key will display the current program and keyboard half containing that program. Pressing the button repeatedly will alternately show the current program on the other keyboard half. Pressing the button and then any number between 1 and 4 will change the program to that number for that keyboard half.

13 **ENTER/START**

This button is used to begin the transfer of sounds between the Mirage memory and diskettes, to execute commands and to initiate sampling and sequencer functions. Any command or function which dramatically alters the Mirage memory or diskette information will require you to press ENTER/START for final confirmation.

14 **SEQ**

The buttons in the sequencer section are used in conjunction with the start and stop buttons in the select section to record sequences, playback sequences, load sequences from diskettes into the Mirage memory and save sequences on diskettes.

15 **REC**

This button is used to record and overdub sequences. Pressing the button twice will record a new sequence, while pressing the REC button followed by the PLAY button will permit overdubbing a previous sequence.

16 **PLAY**

To play back a sequence, press the PLAY button and the sequence will play back as recorded. The sequence can be interrupted at any time by pressing the CANCEL/STOP button.

17 **LOAD**

To load a sequence from a diskette into the Mirage memory, press the LOAD button and then the number of the sequence (1-8) you wish to load. Pressing the ENTER/START button will start the loading process.

18 **SAVE**

To save a sequence you have recorded by transferring it from the Mirage memory to diskette, first insert an Ensoniq Formatted Diskette into the drive. Then press the SAVE button and the location number (1-8 on SELECT keypad) where you wish to store the sequence on the diskette. Pressing the ENTER/START button will begin the saving process.

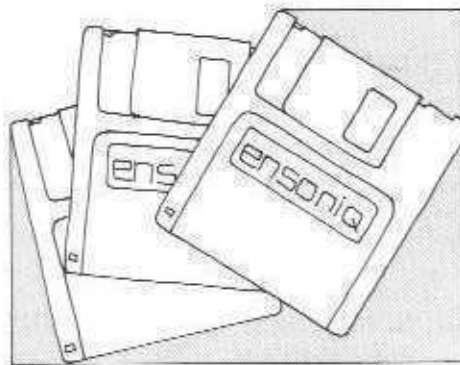
19 **LOAD UPPER/LOWER**

These buttons are used to load sounds from Ensoniq Sound Diskettes or your own sound library. Pressing either or both buttons will instruct the Mirage to load the sounds into the memory for the upper, lower or both halves of the keyboard. After pressing the load button(s), select the sound you wish to load (1, 2, or 3) and then press ENTER/START.

20 **SAMPLE UPPER/LOWER**

These buttons are used to set up the Mirage to sample sounds. Consult the SAMPLING section of the manual for detailed instructions.

About Diskettes



The Mirage uses 3 1/2" micro floppy diskettes to store information. The diskettes are enclosed in a protective plastic carrier with an automatic shutter to protect the diskette from physical damage. It is important not to alter this carrier in any way.

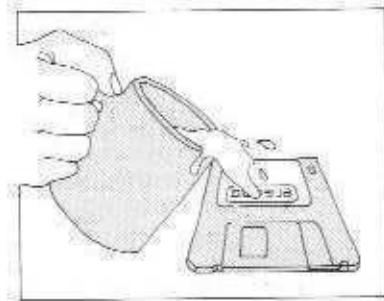
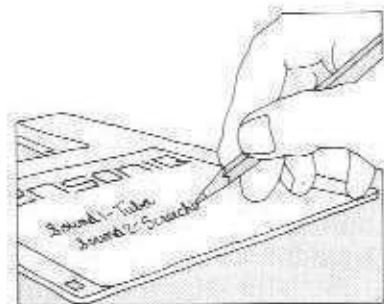
Ensoniq Sound Diskettes are shipped "write-protected", that is, protected against accidental erasure while in the Mirage disk drive. We recommend that you do not store sounds on a Sound Diskette without first making a backup copy of the Sound Diskette on an **Ensoniq Formatted Diskette**. Formatted diskettes contain the Mirage operating system data, but do not contain any sound information. They can store up to three sounds with four programs each, and up to eight 333-note sequences. Note: In order to save sounds and sequences and make backup copies of Sound Diskettes, you must use Ensoniq Formatted Diskettes. Blank, unformatted and diskettes formatted for other systems will not work in the Mirage.

Formatted diskettes have a sliding write-protection tab so that you can protect your own sounds and programs against accidental erasure. Sliding the red write-protection tab in the lower left corner of the diskette so that the window is closed will allow you to store information on the diskette. Sliding the red tab so that the window is open will protect the diskette against over-writing and erasure.

DO'S AND DON'TS

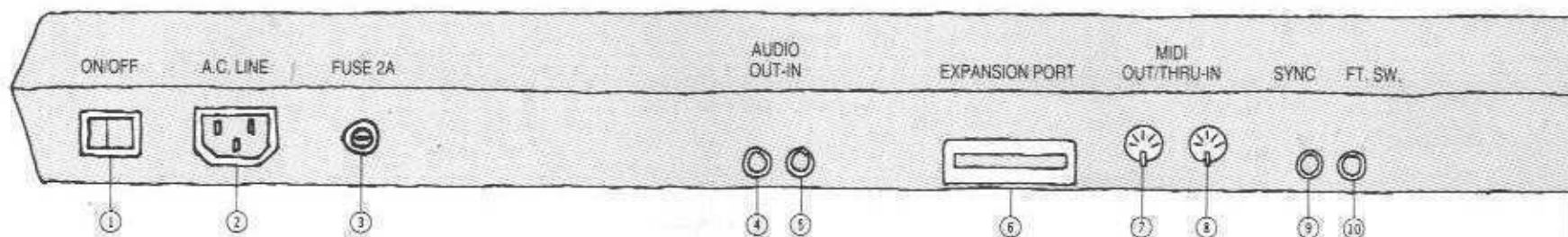
Diskettes are a magnetic storage medium and should be treated with the same care that you'd give important audio tapes. Here are a few specific do's and don'ts.

- Keep diskettes away from magnetic fields. Exposure to magnetic energy can permanently damage the information on the diskette. Keep them away from speaker cabinets, tape decks, power cables, airline x-ray equipment, power amplifiers, TV sets and any other source of magnetic energy.
- Avoid extremes of temperature. Temperatures below 50° F and above 140° F can damage the plastic carrier.
- Keep the carrier clean. Don't allow liquids to come in contact with the carrier or diskette and don't touch the diskette with your fingers.
- We strongly advise that you keep a written record of the sounds, programs and sequences stored on your diskettes to facilitate loading the right sounds and to avoid writing over sounds and sequences you want to save. For maximum protection, always make back-up copies of your diskettes on Ensoniq Formatted Diskettes, available from your authorized Ensoniq dealer.
- **Diskettes should not be left in the disk drive when the Mirage is switched on or switched off. Diskettes should not be inserted or removed while the red disk drive light is on.**



Inputs and Outputs

The back panel of the Mirage contains inputs and outputs for power, audio signal and interface connections. Several of these connections have multiple functions that are controlled by parameters from the front panel. Consult the Appendix for a complete description of the parameters.



① POWER

Rocker switch to turn power on and off.

② LINE

110 - 120VAC 60Hz - 10Amp Type SJT heavy duty detachable 2 meter cord with molded 3 prong plug.

③ EXTERNAL FUSE HOLDER

External holder for 2.5Amp Fast Blow fuse.

④ AUDIO OUT

Low impedance, high gain audio output. Nom. output 800mV. Impedance 600-ohms.

⑤ AUDIO IN

Audio input switchable between line and mic levels. Parameter 75 (LINE INPUT ON/OFF) controls the level select. The line level input will accept signals of up to 1V, impedance 10K ohms. The mic level input will accept signals of up to 100mV, impedance 20K ohms.

⑥ EXPANSION PORT

This is a connection for future Mirage expansion products and external computers. Filling out and mailing the warranty card will assure that you are notified of expansion modules as they become available. **DO NOT CONNECT ANY EQUIPMENT TO THIS PORT UNLESS IT HAS BEEN SPECIFICALLY DESIGNED FOR USE WITH THE MIRAGE. SERIOUS DAMAGE TO EITHER OR BOTH UNITS CAN RESULT.**

⑦ MIDI OUT/THRU

This jack sends out MIDI information from the Mirage to other instruments and computers. In the MIDI THRU MODE (parameter 83), it also echoes all MIDI inputs.

⑧ MIDI IN

The input for standard Musical Instrument Digital Interface (MIDI) information. The MIDI IN jack is controlled by parameter 81 (MIDI OMNI MODE ON/OFF), and parameter 82 (MIDI CHANNEL SELECT).

⑨ SEQUENCER SYNC IN

Input for external clock source (sequencer, drum machine rhythm unit). Input function is controlled by parameter 85 (EXTERNAL SEQUENCER CLOCK) and parameter 86 (EXTERNAL SEQUENCER CLOCK JACK). **NOTE:** Externally sync'd units may also be connected through the MIDI IN jack.

⑩ PEDAL/FOOTSWITCH

This connection is for the optional Pedal/footswitch and is controlled by parameter 89 (SUSTAIN PEDAL/FOOTSWITCH SELECT).

The great majority of problems with any electronic instrument are in the connections. It is only wise to use high quality cables and connectors and to keep them in good condition. We also recommend that you double check all connections every time you set the Mirage up to play.

Getting Ready to Play

The Mirage is a two-part instrument — hardware and software. By itself, the hardware won't make a sound. It needs the information on the diskettes to start doing its work. Getting this information into the right location in the hardware is known as **Loading**.

When you turn the Mirage on and insert a diskette, the hardware will automatically load sound #1 and its four programs into the memory. You will have to follow a certain procedure when you wish to change sounds or diskettes. The procedure is quite simple and only takes a few seconds. Here's the complete sequence:

WHEN TURNING ON THE MIRAGE

Do this . . .

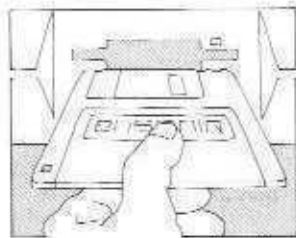
Here's what's happening . . .

Display will show . . .

Turn power switch ON

The electrical power that operates the hardware is ready.

nd (no diskette)
Flashing



Insert Sound Diskette

Push the diskette drive button in to open the slot. Hold the diskette with the arrow on top, facing forward, and insert it gently into the drive slot until it seats fully in and down.

Display blank
Drive light on



Wait about 15 seconds

The operational and sound information is now being transferred from the diskette to the hardware memory. Slight mechanical sounds will be heard coming from the drive.

.21 (MASTER
TUNE)
This parameter
will always show after the
first sound is loaded.



CHANGING SOUNDS

Once the Mirage is in this state, there is a slightly different procedure to change sounds, either loaded from the same diskette or from a different diskette.

Do this...

Here's what's happening...

Display will show...

Press LOAD button(s) either UPPER, LOWER or both

Before loading the actual sound information, you must select whether the sound will be available on the upper half of the keyboard, the lower half, or the entire keyboard.

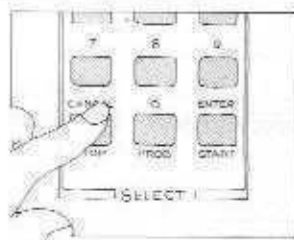
L1 (load upper)
or
L2 (load lower)
or LA (load all).
Flashing



Press 1, 2 or 3 on SELECT keypad

Each diskette has three sounds. Refer to the diskette label for a description of each.

L1 (load 1) or
L2 (load 2) or
L3 (load 3).
Flashing



CANCEL/STOP

—OR—

Press ENTER/START

If you change your mind about which sound you wish to load, press CANCEL/STOP and begin again.

Previous parameter before pressing load button.

This will initiate the transfer of information from the diskette to the Mirage memory.

Display blank
Drive light on



Wait a maximum of 15 seconds

Loading a sound into the memory of both halves of the keyboard will take a maximum of 15 seconds.

When the process has been completed, the number of the last used parameter will display.

NOTE

If there is no sound stored for the number you have selected, the display will flash.

NF (not found)



Press any key. Adjust volume

All the sound information is now in the hardware memory. You can now play the sound as loaded or proceed to modify it using any of the playback parameters.

The Mirage features a 333-note sequencer that will allow you to record and save patterns and songs. Operating very much like a sound-on-sound tape recorder, the sequencer enables you to build up patterns and songs by overdubbing previous sequences.

Ensoniq offers a Mirage Sequencer Expander Cartridge which increases the capacity of the sequencer by 1024 events. This cartridge plugs into the expansion port at the rear of the Mirage and is a simple way to upgrade your Mirage sequencer.

Sequences can be stored on Ensoniq Formatted Diskettes.

Before using the sequencer, we suggest you review the sequencer parameters in the APPENDIX. Take particular note of the following:

Param.	Function
85	EXTERNAL SEQUENCER CLOCK SWITCH
86	EXTERNAL CLOCK JACK SELECT
87	INTERNAL CLOCK RATE
88	SEQUENCER LOOP SWITCH
89	SUSTAIN PEDAL/FOOTSWITCH SELECT

The Sequencer

TO RECORD A NEW SEQUENCE

Do this...

Press REC. button

Press REC button
(2nd time)

Here's what's happening...

Turns the sequencer on to standby and is awaiting further instructions.

You're now telling the sequencer that this is a new sequence. Note that any sequence in the Mirage memory will be erased as the new sequence is entered.

Display will show...

rS (record sequence)
Flashing

rS
Not flashing



Play any key
Press START button
Move PITCH WHEEL
Move MOD WHEEL
Press FOOTSWITCH
(param. 89 "on")
External Clock

Any of these "events" will start the recording process. All notes, key velocity and PITCH and MOD WHEEL changes will be recorded. Any delay between the first "event" and the first key played will also be recorded.

Sr (sequence
recording)



Press STOP
—OR—
Press PLAY
—OR—
Footswitch (with Parameter
89 on)
Press ▲ or ▼

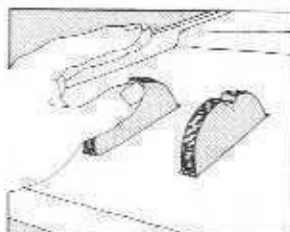
Sequencer will stop recording and end the sequence at this point.

The sequencer will stop recording and immediately begin to play the sequence from the beginning. You may now accompany the playback without recording further.

You can speed up or slow down the playback of the sequence by changing this parameter value. Increasing the number will increase the tempo, decreasing the number will slow down the tempo.

(last parameter
number used)
24 — The initial
value of param. 87
INTERNAL CLOCK
RATE

Display shows new
value of internal
clock rate.



TO OVERDUB A SEQUENCE

Do this...

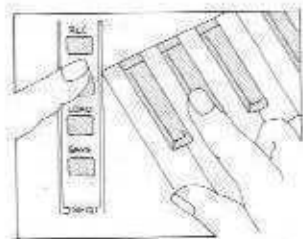
Here's what's happening...

Display will show...

Press REC

The sequencer is turned on to standby and is awaiting further instructions.

rs (record sequence)
Flashing



Press PLAY

The previously recorded sequence will begin to play back immediately and any notes you play will be overdubbed on top of the previous sequence. You can continue to add overdubs until the memory is filled. Note that adding pitch bend or modulation will affect all previously recorded tracks, and will use sequence memory as do notes. Also, Mirage is an eight voice instrument, so no more than 8 notes can sound at any one time.

od (overdub)



Overdubbing with the LOOP SWITCH "on"

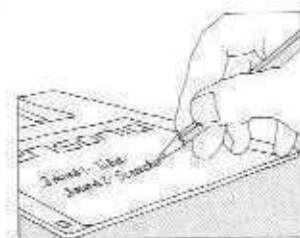
With the LOOP SWITCH "on", the sequence will continue to play again and again, with subsequent overdubs layering on top of the previously played notes. This will continue until the STOP button is pressed.

Overdubbing with the LOOP SWITCH "off"

With the LOOP SWITCH "off", the sequence will play through once while overdubbing and then stop automatically.

SAVING A SEQUENCE

Recorded sequences can be saved for posterity on Ensoniq Sound and Formatted Diskettes. Each diskette can store 8 short sequences (without Expander Cartridge) or three long sequences (with Expander Cartridge). We highly recommend that you keep a written record of sequence names and their locations to help you find them more easily in the future and to avoid inadvertently recording over them. When the Sequencer Expander Cartridge is used, each long sequence saved will erase two or more short sequences. Consult the Expander Cartridge instructions for details.



TO SAVE A SEQUENCE

Do this . . .

Here's what's happening . . .

Display will show . . .

Press SAVE

The sequencer is preparing to transfer all recorded sequence information to diskette.

SS (save sequence)
Flashing



Press any button
1—8 on
SELECT keypad

You are now choosing the location on the diskette that the sequence will be transferred to. NOTE: Keep a written record of sequences and their locations.

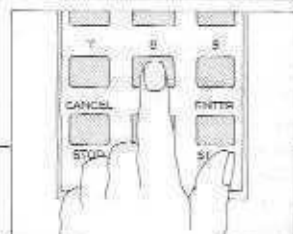
S (1 . . . 8)



Press ENTER

The sequence information is now being transferred to the assigned location on the diskette.
NOTE: Any sequence previously saved in that location will be erased.

Blank (disk drive
light on)



LOADING A SEQUENCE

A sequence stored on diskette can be loaded into the Mirage sequencer memory in much the same manner that it was saved. The sequence will play using whatever sound is currently loaded into the Mirage.

Note that any sequence in the Mirage internal sequencer memory will be erased when the new sequence is loaded from the diskette.

TO LOAD A SEQUENCE

Do this . . .

Here's what's happening . . .

Display will show . . .

Press LOAD

The Mirage is now prepared to receive sequence information from the diskette into the internal memory.

LS (load sequence)
Flashing



Press desired sequence
number 1 to 8 on
SELECT keypad

You are now telling the Mirage which sequence information from the diskette you wish to load.

L (1 . . . 8)



Press ENTER

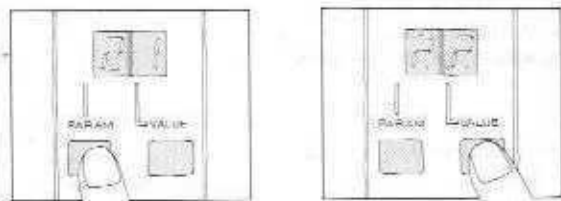
The sequence information is now being transferred from the diskette to the Mirage sequencer memory.

Blank (Disk
drive light on)



NOTE: If there is no sequence stored in the location you've chosen, the display will flash "nf" (not found).

Playback Parameters



HOW TO USE THE CONTROL PANEL

In order to work with the parameters, you'll need some familiarization with the control panel. Since all parameter changes are made using the same pushbuttons, you'll only have to learn the procedure once.

First, here are some Mirage parameter basics:

- Pressing the PARAM button will always display the current parameter number. Refer to the parameter list in the manual or the parameter card to find out what each parameter does.
- Parameter numbers can be changed only by keying the number on the SELECT keypad. All parameters are two-digit numbers. After you enter the first digit, the display will show a flashing "L" or "U", indicating which keyboard half the parameter applies to. The "L" or "U" will be replaced by the second parameter digit as you enter it.
- Pressing the VALUE button will show you the current numeric value or status of the current parameter.
- The value can be changed only by pressing the "▲" or "▼" buttons below the display. When the parameter is a switch function, these are the "ON-OFF" buttons.
- While in the **parameter** mode, the parameter LED will be lit. Pressing the "▲" or "▼" button will automatically switch to the **value** mode. While in the value mode, the value LED will be lit.

Rather than have knobs, faders and switches to control functions, the Mirage uses multi-function pushbuttons and a digital display to control the **parameters** of playing and sampling. Simply put, a parameter is a variable for a specific function. Tuning, keyboard balance, filter cutoff frequency and sampling time are examples of individual parameters.

The parameters of the Mirage are divided into two main categories—playback parameters and sampling parameters. The playback parameters have to do with modifying or enhancing a sound that's already in the Mirage memory. The sampling parameters deal with getting the sound from its source into the Mirage memory. We'll save the sampling parameters for later on in the manual and just talk about the playback parameters here.

Pressing any numeric button on the SELECT keypad will automatically switch to the parameter mode.

- Pressing the "▲" or "▼" buttons intermittently will change the value one digit at a time. Holding the button down will cause the value to change at an accelerating rate. This will give you both coarse and fine control.
- In order to hear the change in sound made by a parameter value, it is necessary to play a new note after each value change. A recommended procedure is to play one key repeatedly while changing the parameter value.
- A complete description of all playback parameters is found in the APPENDIX.
- Parameter values are not constant. The values will have a different meaning for nearly every parameter. For example, the MASTER TUNE parameter values are 100 steps (0-99) of 1/20 semitone each, while VELOCITY SENSITIVITY values are 32 steps (0-31) which merely describe the minimum and maximum sensitivity limits.
- Parameters 11-19 are **command parameters**. They tell the Mirage to perform specific functions, such as saving a particular program or sound, and have no numeric value. Command parameters will always require you to press ENTER/START to confirm the command, or CANCEL/STOP to abort it. After executing the command, the Mirage will display the parameter number.

SELECTING AND CHANGING A PARAMETER

Here's a quick rundown of the general procedure.

Do this . . .

Here's what's happening . . .

Display will show . . .

Press PARAM button

The Mirage is prepared to modify any one of the parameters.

The number of the last used parameter. PARAM LED lit.


Enter parameter number on SELECT keypad. Press 2 then 1.

You're now telling the Mirage which parameter you wish to work with.

Parameter number (20-99) 

Press VALUE button

The Mirage will show you the current value of the parameter.

Current value number. Value LED lit. 

For numeric values
Press ▲ or ▼

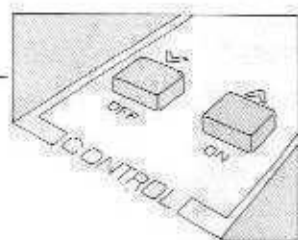
The Mirage will adjust the value of the parameter up or down as much as you wish.

The value number will increase or decrease.

For switch functions
Press ON or OFF

The Mirage will electronically and noiselessly switch the function.

on or of 



GENERAL PARAMETERS

There are four general playback parameters—MASTER TUNE, PITCH BEND RANGE, KEYBOARD VELOCITY SENSITIVITY and KEYBOARD BALANCE. These parameters will always apply to the entire keyboard. You needn't adjust them every time you turn the Mirage on—they will automatically come up as *default* values. For example, MASTER TUNE will be A440, PITCH BEND RANGE will be a minor 3rd up and down, KEYBOARD VELOCITY SENSITIVITY will be set for the average touch and KEYBOARD BALANCE will set equal levels for the upper and lower halves.

21/MASTER TUNE

The MASTER TUNE will automatically set itself (default) to A440 (VALUE 50). It is adjustable over a five semitone range in increments of 1/20 semitone.

22/PITCH BEND RANGE

The PITCH BEND RANGE will automatically set itself (default) to a minor 3rd (VALUE 8). It is adjustable over a two-octave range, (one octave up, one octave down) in increments of 1/20 semitone.

23/KEYBOARD VELOCITY SENSITIVITY

The KEYBOARD VELOCITY SENSITIVITY will automatically set itself (default) to the touch of the average player (VALUE 8). Players with a heavier than average touch should use the lower values and players with a light touch should use the higher values.

24/KEYBOARD BALANCE

The KEYBOARD BALANCE will automatically set equal levels for the upper and lower halves of the keyboard (VALUE 50). The parameter works very much like a pan pot with the higher numbers favoring the upper keyboard and lower numbers favoring the lower keyboard.

Saving Sounds and Programs

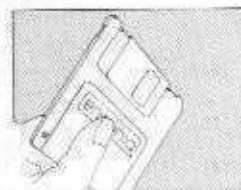
As with a synthesizer, any sound you load into the Mirage can be modified extensively using the playback parameters. Before too long (probably later this evening), you'll want to save the programs you've personally created. To do that, you'll need an Ensoniq Formatted Diskette.

Ensoniq Sound Diskettes are shipped **write protected** to eliminate the possibility of erasing any of the sound information. Also included with your Mirage is a **backup** of the Sound Diskette that is not write protected. We suggest that you use the backup and keep the Sound Diskette in a safe place. Additional backup copies can be made on Ensoniq Formatted Diskettes by following the procedures for saving sounds outlined in this section. Formatted diskettes can store up to three sounds, with four programs per sound.

Here's how to go about saving your sounds.

SAVING A SOUND ON AN ENSONIQ FORMATTED DISKETTE

Each sound on an Ensoniq Sound Diskette carries four programs with it. Once a sound is loaded into the Mirage memory, any or all of the programs can be modified. When you've modified the programs to your satisfaction, insert an Ensoniq Formatted Diskette and do the following:



Do this...

Here's what's happening...

Display will show...

Select parameter
11/SAVE LOWER
12/SAVE UPPER
13/SAVE BOTH

You're telling the Mirage which keyboard half (or both) to save.

SL (save lower sound)
SU (save upper sound)
SA (save both)



Enter 1, 2 or 3 on
SELECT keypad

You're telling the Mirage which location on the diskette you want the sound transferred to.

S1 (sound 1)
S2 (sound 2)
S3 (sound 3)



Press ENTER

All the information about the sound and programs will now transfer to the assigned location on the diskette.

Display blank
Drive light on



LABEL THE DISKETTE

When the drive light goes out and the display comes back on, the transfer of information has been completed. Remove and label the diskette.

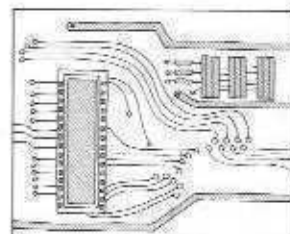
13 (save both)



COPYING PROGRAMS INTERNALLY

It's not unusual to want to modify a program, yet still retain the original. For example, let's say that you're not too fond of piano program #4 and would like to have a modified copy of piano program #1 in its place, while still retaining the original program #1.

The Mirage will allow you to copy from program #1 into the #4 location. You can then modify it, ending up with programs #1, 2 and 3 intact and #4 as your personal modification of #1. Here's how to do it.



Do this . . .

Here's what's happening . . .

Display will show . . .

Select parameter
15/COPY PROGRAM TO LOWER or
16/COPY PROGRAM TO UPPER

You are preparing the Mirage to copy the current program into another location. In our case we will be copying the lower program #1 into the lower program #4 location.

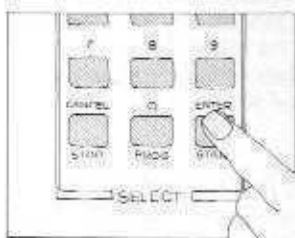
L4 (lower copy)
OR
U4 (upper copy)
Flashing



Press 4 on
SELECT KEYPAD

You are now telling the Mirage the location into which you will copy the current (#1) program.

L4 (to lower 4)
OR
U4 (to upper 4)



Press ENTER

The Mirage is now duplicating the program parameters of program #1 into the program #4 location.

15 or 16
(the copy
parameter)



You can now create a new program #4 by changing any or all of the playback parameters. When you've finished your programming session, you are ready to save the entire sound on diskette in the previously outlined manner.

Sampling

Sampling your own sounds with the Mirage is where the fun really begins. Just about any sound can be a source of inspiration for you, since just about any sound can be recorded and processed with the Mirage. Acoustic sounds can be sampled using a microphone while electronic or recorded sounds can be connected directly to the Mirage.

As you become more familiar with the Mirage and the sampling process, you'll begin to realize that your creative possibilities are limited only by your imagination. First, here's a little background to help you understand the process better.

DIGITAL RECORDING

As we hear them, sounds are energy patterns. In the air, this energy moves the parts of our ears, creating electrical impulses that our brains can decipher. In tape recording, this energy moves some part of a microphone, creating electrical impulses that are recorded electromagnetically on magnetic tape.

In digital recording, the electrical impulses that represent the sound are converted into information that is recorded in a computer memory.

The analog signal becomes a digital signal in the Analog/Digital Converter (ADC). The ADC is a sophisticated, high-speed "observer".

Imagine, if you will, standing at the seaside with a ruler, stopwatch, pad and pencil. Now think of measuring the height of the incoming waves with the ruler every time the stopwatch clicks off a second, then writing the measurement and the time down on the pad with your pencil.

This would give you a rough idea of how to recreate the action of the waves at some future time. This is essentially what an ADC does, except that it's done while looking at a sound wave at the rate of 30,000 measurements, or "samples" per second.

The ADC records this information in specific locations in the memory in the form of binary code numbers. The numbers and locations for one sample, which may be up to four seconds long, are called the WAVESAMPLE.

Playing the sound back is a matter of reversing the above process. This requires a Digital/Analog Converter (DAC) that takes the digital information and re-assembles the waveshape as voltage information that can be amplified and sent to the speakers.

Digital Recording as a Musical Instrument

If we record a sound at a sampling rate of 30,000 samples per second and then play the sound back at 60,000 samples per second, the note would be one octave higher than the original. By precisely adjusting this playback rate with a keyboard controller, we can begin to create music.

Like everything else, there are a few catches to digital sampling.

There's a limit to how much a sampled wave can be raised and lowered in pitch before it begins to sound like a squeak or a thud. Also, acoustic instruments have different dynamic and harmonic qualities at different pitch levels.

The solution then is to sample a sound at different pitch intervals and not raise or lower the pitch too far from the pitch of the original wavesample. The Mirage can accommodate up to 8 separate wavesamples per keyboard half, requiring a pitch shift of only about two semitones in either direction. Because of this feature, very accurate reproduction of acoustic instruments is possible with the Mirage.

Catch number two is the sampling time. There are a finite number of locations in the memory, and the greater the number of wavesamples, the less memory is

available for each. This reduces the actual time available for each wavesample — sometimes less than a half second.

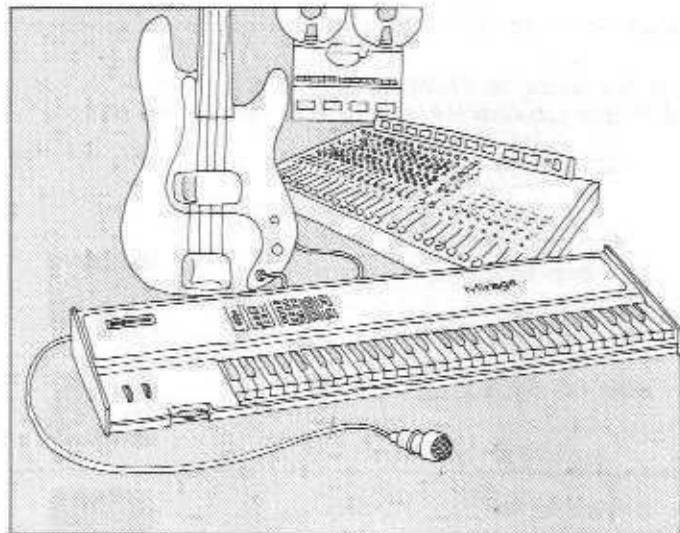
An effective solution to this situation is a process called LOOPING. Looping is the replaying — again and again without interruption — of a certain part of the wave-sample. In practice it's very much like creating a tape loop. A part of the note is *cut out* and the end is spliced to the beginning, resulting in an unending and uninterrupted sound.

The magic of the Mirage digital circuitry lets you choose the loop and place it electronically. Now you can preserve the attack and decay portions of a note and loop the sustain portion, giving you a high quality note of infinite duration. The playback envelope parameters can now tailor this looped sound so that it matches the original sound.

When to call in reinforcements.

There's more to the details of Mirage Sampling and programming than we'll address here. A very extensive **Advanced Sampler's Guide** is available from your authorized Ensoniq dealer that will examine the capabilities of the Mirage in great detail.

When you become familiar with the capabilities of the Mirage, we're sure you'll want to move into the advanced area. At that point, a personal computer will be a great help in showing you exactly what's going on inside the Mirage and how you can best release its musical power. And conversely, the Mirage will be a great help in understanding and mastering your personal computer.



HOW TO SAMPLE

The Mirage sampling process is not much more complicated than making a good quality audio tape copy. It involves making the proper connections, setting the right levels and checking the results.

The process is controlled by the sampling parameters and gives you a great deal of flexibility. To begin with, here is the recommended procedure to follow when sampling. Additional information and variations to the procedure are contained in the **Advanced Sampler's Guide** from your Authorized Ensoniq Dealer.

GETTING READY TO SAMPLE

The nature of the sound you will be sampling will have some effect on the results. Unfortunately there are no hard and fast rules governing different techniques for different sounds. As you use the Mirage you will quickly adapt to the procedure and develop your own methods for getting the best results.

As an example, let's use an electric guitar. We can connect the guitar directly to the input, use the "preamp out" jack of an amplifier connected directly to the input of the Mirage, or we can mike the speaker cabinet and plug the microphone into the Mirage. Let's use the latter case.

Do this . . .

Select parameter 75 —
LINE LEVEL INPUT

Press SAMPLE UPPER
or SAMPLE LOWER.

Play the sound to be
sampled

Press CANCEL/STOP

Here's what's happening . . .

This is a switching parameter that will tell the Mirage what type of signal will be coming in. Line level inputs are from preamps, tape decks and mixers. Mic level inputs are from microphones, unamplified electric guitars and other low level sources.

You are telling the Mirage which keyboard half you wish the sample to apply to. This will also place the Mirage in the **level detect** mode so that the strength of the incoming signal can be determined before the sample is actually taken.

Adjust the level of your source or change the distance from the microphone until the top light bar barely flickers.

This will exit the "level detect" mode.

Display will show . . .

on (line input)
of (mic input)



no signal



threshold

low signal







peak

Now you're ready to go. The next decision you'll have to make is the number of wavesamples there will be in your wavetable. Always use **0/PROG** to verify that you are working on the correct keyboard half.

SINGLE WAVESAMPLE WAVETABLES

If you only need to take one wavesample in the lower or upper keyboard wavetable, the sampling parameters are automatically set at the proper level (Param 77-off). No matter where the pitch of the sample is, the Mirage will play that pitch back at key #17E on the lower keyboard or key #46A on the

upper keyboard. You can use the RELATIVE COARSE TUNING parameter (67) or RELATIVE FINE TUNING parameter (68) to correct the sample to any pitch you desire.

<i>Do this...</i>	<i>Here's what's happening...</i>	<i>Display will show...</i>
Select parameter 77 USER MULTI-SAMPLING Press OFF	This will set the automatic parameter settings for a single wavesample wavetable.	oF 
Press SAMPLE LOWER	You are instructing the Mirage to assign this sample to the lower part of the keyboard.	SL (sample lower) 
Press ENTER/START	The Mirage is now waiting for a signal to cross the sampling threshold before it begins to sample.	Blank 
Play the sample	The Mirage is now sampling the sound. While it's sampling you'll see the middle bar and when the sample is completed you'll see...	SF (sampling finished) 



MULTIPLE WAVESAMPLE WAVETABLES







One wavetable can contain up to eight individual wavesamples. When more than one wavesample is used, you must select the location in the memory for each wavesample. The accompanying chart will suggest where to set the beginning and ending parameter values for each wavesample. In order to be able to display all 256 segments in the memory on the two-digit display, a hexa-

decimal system (base 16 to math buffs) of both numerals and alphabet characters is used. See the note at the bottom of the Memory Chart for an explanation of hexadecimal.

Once you decide how many wavesamples your wavetable will have, setting the parameters will follow the same procedure for each wavesample.

EXAMPLE: Creating a 2 wavesample wavetable on the lower keyboard half

<i>Do this...</i>	<i>Here's what's happening...</i>	<i>Display will show...</i>
Select parameter 77— USER MULTI-SAMPLING Press ON	This will defeat the automatic parameter settings for a single wavesample wavetable.	on 
Select parameter 27— INITIAL WAVESAMPLE Press ^ or v to set VALUE	Except in certain advanced cases, this parameter should always be set at 1.	0.1 

<i>Do this . . .</i>	<i>Here's what's happening . . .</i>	<i>Display will show . . .</i>
Select parameter 26 — WAVESAMPLE SELECT Press ▲ or ▼ to set VALUE	There are eight possible wavesamples to select. Select #1.	01 
Select parameter 60 — SAMPLE START Press ▲ or ▼ to set VALUE	Since this is a wavesample #1, it's best to begin at the beginning of the memory.	00 
Select parameter 61 — SAMPLE END Press ▲ or ▼ to set VALUE	Since there will be two wavesamples in this wave-table, you'll want to give half the memory to each. Looking on the Memory Chart across from "2 wavesamples" you'll find the value 7F.	7F 
Select parameter 72 — TOP KEY Press ▲ or ▼ to set VALUE	This will be the highest key assigned to this wave-sample. Each keyboard half has 30 keys, so select key 15 for wavesample #1.	15 
Press SAMPLE LOWER	You are instructing the Mirage to assign this sample to the lower part of the keyboard.	SL (sample lower) Flashing 
Press ENTER/START	The Mirage is now waiting for a signal to cross the sampling threshold before it begins to sample.	Blank 

You're now ready to begin to sample wavesample #1. If you've selected the lower keyboard half and checked the input level, all you'll have to do is play the sound to be sampled.

Wavesample #2 will be entered in the memory in exactly the same way wavesample #1 was with the following changes in parameter values:

WAVESAMPLE SELECT (26)	02
INITIAL WAVESAMPLE (27)	No change
SAMPLE START (60)	80
SAMPLE END (61)	FF
TOP KEY (72)	30

SAMPLING PARAMETERS

In order to better understand the sampling process, we recommend that you familiarize yourself with the Sampling Parameters listed in the PARAMETER APPENDIX beginning on page 26 of this manual. Understanding these parameters is your best help in obtaining good samples.

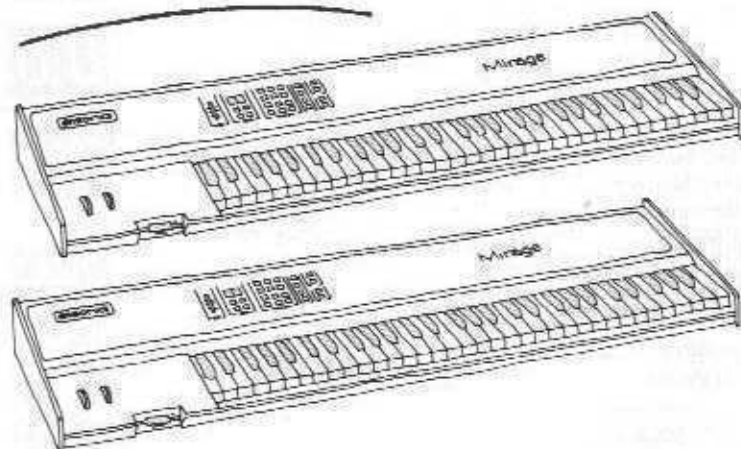
HEXADECIMAL NOTATION

The digits 0 through 9 represent themselves. However the numbers 10 through 15 are represented by letters in the following manner: A=10; b=11; C=12; d=13; E=14; F=15.

MEMORY/KEY CHART

Number of Wavesamples	Wavesample Number	Value of Para. 60	Value of Para. 61	Top Key Lower Para. 72	Top Key Upper Para. 72
1	1	00	FF	30	61
2	1	00	7F	15	16
	2	80	FF	30	61
4	1	00	3F	8	39
	2	40	7F	15	16
	3	80	BF	23	54
	4	C0	FF	30	61
8	1	00	1F	4	35
	2	20	3F	8	39
	3	40	5F	12	43
	4	60	7F	15	46
	5	80	9F	19	50
	6	A0	BF	23	54
	7	C0	DF	27	58
	8	E0	FF	30	61

Interfacing



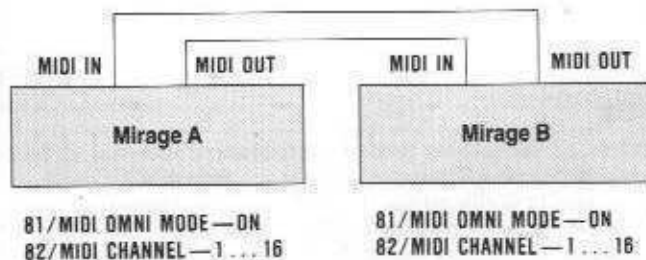
The Mirage can be connected to other keyboards and equipment through a system known as MIDI. MIDI, or Musical Instrument Digital Interface is an industry-wide set of computer communication standards that permits MIDI-equipped instruments to "talk" to each other. Some of the benefits of MIDI include the ability to "remote control" more than one instrument from the same keyboard and to sync multiple keyboard setups from a single sequencer.

In addition, non-MIDI sequencers and drum machines can be sync'd to the Mirage through the external sync jack. Before connecting several instruments together you should familiarize yourself with the MIDI codes in the APPENDIX and with the following parameters.

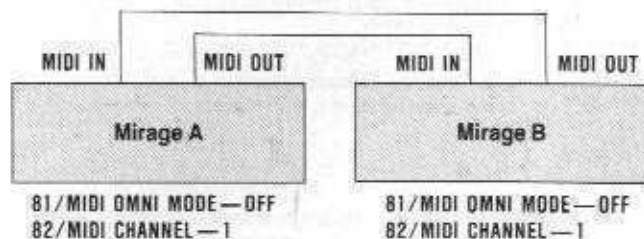
Parameter No.	Function
81	MIDI OMNI MODE ON/OFF
82	MIDI CHANNEL SELECT
83	MIDI THRU MODE
84	MIDI CONTROLLER ENABLE
85	SEQUENCER EXTERNAL CLOCK
86	EXTERNAL CLOCK JACK SELECT

TYPICAL MIDI CONNECTIONS

This configuration will permit notes played on Mirage A to also play on Mirage B. Conversely, notes played on Mirage B will also play on Mirage A.

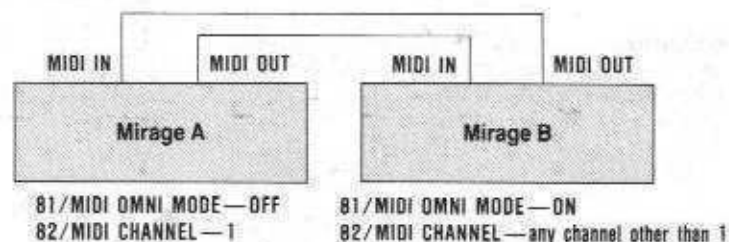


In the following configuration, the parameters are set differently, but the result is the same. Since both instruments are transmitting and receiving MIDI data on channel 1, they will both respond to each other. So notes played on Mirage A will also play on Mirage B and notes played on Mirage B will also play on Mirage A.

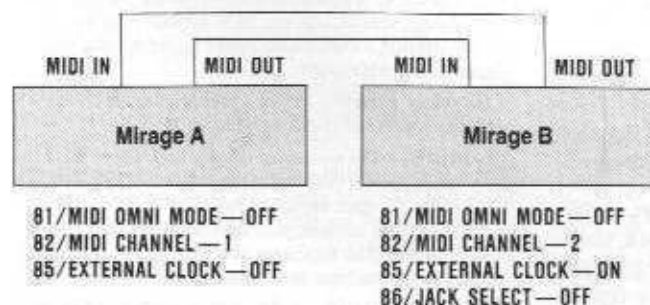


If the channels weren't set the same, the two Mirages would ignore each other.

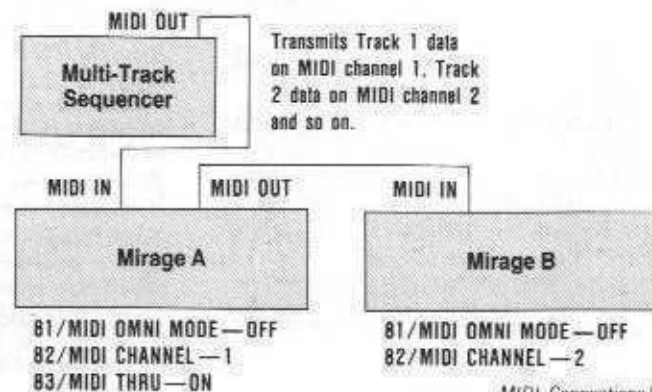
In this configuration, Mirage A will accept inputs only on channel one, where Mirage B will accept information on all channels. So notes played on Mirage A will also play on Mirage B, but notes played on Mirage B will be ignored by Mirage A.



Mirage sequencers can also be sync'd together via MIDI. A recorded sequence on Mirage A can be sync'd to an altogether different sequence recorded on Mirage B. Note that in this configuration notes played on either Mirage will be ignored by the other since the channels are different. MIDI clocks are transmitted on all channels, so the sequencers will sync.



MIDI allows multiple keyboards to be sync'd to multi track sequencers in such a way that different sequencer tracks drive different keyboards. In the following configuration, track 1 of the sequencer will only play on Mirage A and track 2 of the sequencer will only play on Mirage B.



Glossary

Amplitude—Expressed as sound pressure or voltage, amplitude is the measured amount of a signal. Sounds with greater amplitude are louder.

Attack—The first part of a note. In the Mirage envelope, it is a linear rate that starts as the key is depressed and ends at the PEAK level, and is adjustable from instantaneous to very gradual.

Attack Velocity—The Mirage gives you the option of controlling the steepness of the attack curve through keyboard velocity. Increased key velocity will increase the rate of the attack.

Bend—To gradually raise or lower the pitch by using the PITCH BEND WHEEL.

Boundary—The sampling parameters divide the Mirage memory into 256 SEGMENTS of 256 SAMPLES each. The beginning and ending points of each segment are called the boundaries.

Chorusing—A sound richening effect that simulates the sounds of several voices when one key is played. The Mirage allows you to shift the pitch of one of the two oscillators assigned to each voice to achieve this effect.

Clock—A timing control device used to sync digitally controlled units. Clock pulses are used to control the Mirage sequencer.

Coarse Tune—A parameter used to make large and rapid tuning changes.

Cutoff Frequency—The frequency point at which a filter begins to attenuate an audio signal.

Dead Band—The area of travel near the center of rotation of the PITCH BEND WHEEL where there is no effect on the sound so that it can be more easily returned to its mid position.

Decay—In the Mirage envelope, it is the exponential rate that the amplitude of a sound (or cutoff frequency of a filter) falls from the PEAK level to the SUSTAIN level.

Default—A value or condition that the Mirage automatically sets itself to. When a diskette is inserted into the disk drive, Sound #1 is automatically loaded to both keyboard halves with program #1 being current. The Mirage has many default values for programming, sampling and sequencing. While these values are automatic, they can be changed at any time you desire.

Detune—In normal playing, the Mirage uses two oscillators per key. By using the detune parameter (33), one of the oscillators can be tuned slightly off pitch from the other. Slight pitch changes will result in a CHORUSING sound.

Digital—In audio, the digital system uses information in the form of binary numbers rather than waveforms and voltages when recording, processing and playing back sound. The digital playback is processed through a digital-to-analog converter where it is changed into voltage values that can then be treated like any other analog signal.

Digital Oscillator—A waveform generator where the output is a series of numbers rather than a voltage. Digital oscillators can generate complex waveforms with much more accuracy than analog oscillators.

Digital Sampling—A system of sound recording where an analog sound is converted into digital information and stored in computer memory or on a disk. In the Mirage, sampled sounds are given pitch control via the keyboard permitting any recorded sound to be played back as music.

Digital Sequencer—A sequencer that records and plays back notes based on information about key strikes, key velocity, and pitch and mod wheel positions rather than recording sound output.

Envelope—A term used to describe the amplitude contour or filter cutoff frequency contour as a function of time. Acoustic sounds have natural envelopes as vibrations attenuate over time. Electronic instruments have envelope generators to create this effect.

fc—The symbol for cutoff frequency, or that frequency at which the sound begins to be attenuated.

Fine Tune—A control used to make small adjustments in pitch. The Mirage fine tune parameter permits pitch changes as small as $1/8$ semitone.

Formatted Diskette—A Mirage diskette that contains a framework for sound information, but no actual information. Used to store sampled sounds, programs and sequences.

Hexadecimal—A form of mathematical notation called "base 16". As used in the Mirage display, it permits the display of all 256 "pages" of wavetable storage using only two digits in the display. Numbers 0 through 9 are represented by themselves while numbers 10 through 15 are represented by the letters "A" through "F".

Input—A signal entering an instrument. Also the point at which it enters.

Interface—Literally, the place where any two things come together. In musicianspeak it is commonly understood to be the linking of two pieces of electronic equipment together.

Keyboard—A controller used to give pitch and dynamic control of a musical instrument to the player.

Keyboard Tracking—Assigning a different value to a parameter based on which key of the keyboard is depressed. For example, the cutoff frequency of a filter can move up as higher keys are played.

LFO—Low frequency oscillator. These oscillators usually operate in the sub-audio range and control the frequency of effects such as vibrato.

Line Level—An audio signal whose strength is at least 800mV. Also an audio input that requires a level of at least 800mV to operate at a specified signal-to-noise ratio.

Load—In the Mirage, a term used to describe the transfer of information from diskette to the internal memory.

Loop—A term used to describe the connecting of the end of a signal or sequence to the beginning point or some intermediate point along its duration. As it applies to a sequencer, it means that the sequence will start over immediately after it finishes. As it applies to sampling, it means creating a continuous sound by connecting two points in the wavesample.

Lowpass Filter—A filter that attenuates the frequencies above the cutoff frequency.

Memory—The sum total of locations where information can be stored. The Mirage has 64K (65,536 locations) of memory for each keyboard half. The sampling parameters divide the memory into 256 SEGMENTS of 256 SAMPLES each. The beginning and ending points of each segment are called the BOUNDARIES.

Mic Level—Audio signals with a strength below 50mV.

MIDI—Musical Instrument Digital Interface. An industry-wide set of computer communications standards that enables instruments and other equipment to "talk" to each other and issue and obey commands.

Mix Mode—In the Mirage, a parameter that assigns two consecutive wavesamples to each key on the keyboard. The balance between the two sounds can be controlled by a balance parameter, the velocity sensitivity of the keyboard or the modulation wheel.

Modulation—The process of introducing a periodic alteration to a sound source such as vibrato, so as to change the character of the audio signal.

Monophonic Mode—In the Mirage it is a control mode that assigns one voice to each half of the keyboard. If a second key is depressed while the first key is still down the voice is "stolen" from the first key, but the envelope is not re-triggered. Useful for duplicating the sound of monophonic instruments such as saxophone.

Omni Mode—A MIDI operational mode where an instrument responds to information received over any of MIDI's 16 channels.

Oscillator—A device that creates a repeating electrical wave. Mirage oscillators are digital oscillators that use a wavetable based on actual acoustic sounds rather than basic waves.

Parameter—Any changeable setting, switch or command of the Mirage is called a parameter. The Mirage uses a multi-function control panel through which parameters can be selected and controlled. Tuning, filter frequency, cutoff, sample time, velocity sensitivity and LFO frequency are all examples of parameters.

Pitch Bend—To change the pitch in a continuous manner using the pitch bend wheel.

Poly Mode—A MIDI operating mode where an instrument responds to information received only on a specific MIDI channel.

Polyphonic—Capable of producing more than one pitch or voice simultaneously. The Mirage can play up to eight different voices at the same time.

Program—A set of playback parameter values applied to a particular wavetable that results in a particular sound. The Mirage has four available programs for each sound.

Q—Filter resonance. It is possible to adjust the lowpass filter in the Mirage to introduce a narrow resonant peak just before rolloff occurs. The resultant sound shows a noticeable emphasis of a narrow frequency band.

Release—The final portion of an envelope that begins when the key is lifted. It is an exponential rate that drops the amplitude or filter fc from the sustain level to zero in the case of amplitude or to the original fc setting in the case of the filter.

Release Velocity—The speed with which the key is lifted. Release velocity can be used to control the release rate, with high velocities shortening the release and low velocities extending the release.

Resonance—See Q.

Rolloff Slope—The sharpness of the cutoff frequency expressed in dB per octave. The higher the ratio (dB) number, the sharper the attenuation. The Mirage filters have a rolloff slope of 24dB per octave.

Sample—In the Mirage memory, each location is referred to as a sample. 256 samples make up one SEGMENT.

Sampling Rate—The number of times per second that a digital record is made of an audio wave form. The Mirage samples at 30,000 samples per second.

Save—The process of transferring information from the internal memory of the Mirage to a Formatted Diskette for permanent storage. The opposite of **loading**.

Segment—The Mirage memory has 64k memory locations divided into 256 segments of 256 SAMPLES each. The beginning and ending points of each segment are called the BOUNDARIES.

Sequence—A set of keystroke commands stored in a sequencer.

Sequencer—The Mirage uses a 353-note digital sequencer. See Digital Sequencer.

Sequence Loop—A function of a sequencer where the recorded sequence is played over and over until instructed to stop.

Sound—In the Mirage, a sound is defined as a WAVE-TABLE (comprised of up to 8 WAVESAMPLES) plus a PROGRAM (the collection of all the program parameter values).

Sound Diskettes—Ensoniq makes available pre-programmed sampled sounds on mini-diskettes. Each of these Sound Diskettes contains three distinct sampled sounds, with each sound having four programs.

Split Keyboard—The Mirage features what is called a split keyboard. The keyboard is divided into two sections (usually, 31 keys lower, 30 keys upper). Different sounds or different programs of the same sound can be loaded into each keyboard half.

Sustain—The amplitude or filter level held from the end of the decay slope to key release.

Sync—Connecting two or more units together so that clock pulses permit them to play together in a synchronized fashion. The most common sync connections involve sequencers and drum machines connected to keyboards.

Touch Sensitive—(See Velocity Sensitive)

Value—Rather than have knobs, sliders and switches, the Mirage uses a system of parameters and values to change and modify sounds. Expressed in numbers (either decimal or hexadecimal), values represent amplitudes, frequencies, balances and other conditions, depending on the parameter selected.

Velocity Sensitivity—A system of sensors that can determine how hard and fast a key is played. This information can be applied to control amplitude, filter frequency, envelope functions and oscillator balance.

Voice—A complete sound controlled by a single key. The Mirage features eight distinct voices with two oscillators for each voice.

Volatile Memory—An internal memory that will not retain any information if the power to the unit is turned off. The Mirage has a volatile memory, so we recommend that you save sounds and programs you create to diskette as soon as your sampling or programming session is completed.

Waveform—The shape of a sound wave shown as a function of amplitude and time. Synthesizer oscillators generate simple waveforms (sine, triangle, etc.) and combine them to create sound. Digital sampling keyboards such as the Mirage generate complex waveforms based on actual sounds that have been recorded (sampled) into memory.

Wavesample—A waveform that has been sampled into the Mirage memory. Once in memory, the keyboard controls the pitch of the wavesample. The Mirage can accommodate up to eight separate wavesamples per keyboard half. Since acoustic instruments change dynamic and harmonic character with pitch, the Mirage is capable of very accurate reproduction.

Wavesample Interval—The number of keys on the keyboard assigned to each wavesample.

Wavetable—The sum of all the wavesamples on a keyboard half.

Parameters

PROGRAM PARAMETERS

(01, 02, 03, 04)

These parameters are used to select one of the four programs assigned to each sound on each keyboard half. You must first press the O/PROG button which will display the current program number and the keyboard half it is assigned to. Pressing the O/PROG button again will display the program number on the other keyboard half. When sounds are loaded, Program 1 is automatically assigned.

11/SAVE LOWER KEYBOARD SOUND

(SL)

12/SAVE UPPER KEYBOARD SOUND

(SU)

13/SAVE BOTH KEYBOARD SOUNDS

(SA)

Command parameters that will tell the Mirage that you wish to save the current keyboard sounds on diskette. The saving process will require you to press 1, 2, or 3 on the SELECT keypad to indicate the location on the diskette that you wish the sound transferred to. Pressing ENTER/START will initiate the saving process. Pressing CANCEL/STOP will abort the procedure and return the Mirage to its previous status, with the SAVE command parameter selected.

14/SAVE CONFIGURATION PARAMETERS

(SP)

This command parameter will permit you to save your own configuration parameters in place of the default values. The values saved on diskette will be those of parameter #'s 21 through 25, 73 through 77, 81 through 89 and 91 and 92. In order to reload these parameters into the Mirage memory will require you to turn the Mirage off for a few seconds, then turn it back on and load the diskette on which the configuration parameters have been saved.

15/COPY PROGRAM TO LOWER

(CL)

16/COPY PROGRAM TO UPPER

(CU)

These are command parameters that will tell the Mirage that you wish to copy current program parameter values into another program location. This will allow you to duplicate a program parameter configuration you've personally created into another program location on either the upper or lower keyboard half. It will also permit you to apply current parameter values to another sound.

21/MASTER TUNE

(00-99)

The MASTER TUNE will automatically set itself to A440 (VALUE 50). It is adjustable over a five semitone range in increments of 1/20 semitone.

22/PITCH BEND RANGE

(00-34)

The PITCH BEND RANGE will automatically set itself (default) to a minor 3rd (VALUE 8). It is adjustable over a wide range in increments of 1/20 semitone.

23/KEYBOARD VELOCITY SENSITIVITY

(00-63)

The KEYBOARD VELOCITY SENSITIVITY will automatically set itself (default) to the touch of the average player (VALUE 30). Players with a heavier than average touch should use the lower values and players with a light touch should use the higher values.

24/KEYBOARD BALANCE

(00-63)

The KEYBOARD BALANCE will automatically set equal levels for the upper and lower halves of the keyboard (VALUE 50). The parameter works very much like a pan pot with the higher numbers favoring the upper keyboard and lower numbers favoring the lower keyboard.

25/UPPER/LOWER PROGRAM LINK

A switching parameter that will allow you to connect the O/PROG button to both keyboard halves simultaneously. With the parameter ON, a program change made on one keyboard half will also take place on the other keyboard half. When OFF, you will be able to choose different programs for the upper and lower halves.

28/MIX MODE

(ON-OFF)

Each Mirage key is assigned two oscillators. When this switching parameter is OFF, the two oscillators will use the same wave-sample. When this switch is ON, the oscillators will use consecutive wavesamples—one to each oscillator. For the MIX MODE to work effectively, odd numbered wavesamples (1, 3, 5, 7) should be from a different sound source than the even numbered wavesamples. The balance between the two oscillators can be controlled by parameters 34 and 35.

A typical use of the MIX MODE is to have a soft sound on the odd wavesamples and a loud sound on the even wavesamples. This is particularly effective with piano sounds. By using key velocity to control the balance, (VALUE 1, PARAM 35), a realistic soft piano sound will be heard when keys are depressed slowly and a true loud piano sound will be heard when keys are depressed firmly.

29/MONOPHONIC MODE**[ON-OFF]**

A switching parameter to choose between polyphonic keyboard and monophonic keyboard functions. With the switch OFF, the Mirage will play in its usual eight-voice polyphonic splendor. With the switch ON, one voice will be assigned to each keyboard half. If a key is played while another is still down, the voice will be "stolen" from the first key, but the envelope will not be re-triggered.

31/LFO SPEED**[00-99]**

The LOW FREQUENCY OSCILLATOR SPEED parameter will change the frequency of the LFO. It is adjustable from 5Hz (VALUE 0) to 40Hz (VALUE 99). The LFO affects pitch only.

32/LFO DEPTH**[00-99]**

The LOW FREQUENCY OSCILLATOR DEPTH parameter controls the amplitude of the LFO or can assign the control to the MODULATION WHEEL (VALUE 0).

33/D.O. DETUNE**[00-99]**

The DIGITAL OSCILLATOR DETUNE parameter controls the frequency difference between two oscillators used on the same key (see param. 28). It will cause the second oscillator to play sharp in 1Hz increments. The VALUE display will show the exact pitch offset in Hertz.

34/D.O. BALANCE**[00-63]**

The DIGITAL OSCILLATOR BALANCE controls the relative volume level of the two oscillators in the MIX MODE or for chorusing (param. 28). This parameter automatically sets itself to equal balance (VALUE 31) and can be adjusted to any proportional balance desired.

35/D.O. BALANCE VS**[00-31]**

The VELOCITY SENSITIVE BALANCE parameter makes the digital oscillator balance dependent on key velocity. A soft touch on the keyboard will favor oscillator 1, a medium touch will balance the oscillators equally and a hard touch will favor oscillator 2. The D.O. BALANCE (param. 34) will set the initial balance for a soft touch. Parameter 35 controls how much the balance changes with velocity, with one exception. When the value is '0' the balance is controlled by the MODULATION WHEEL instead. Since each oscillator can play a different wavetable, it is possible to mix between two totally different sounds.

36/FILTER Fc**[00-99]**

The FILTER CUTOFF FREQUENCY parameter adjusts the initial cutoff frequency of the low pass filter. The filter is adjustable from 50Hz (VALUE 0) to 15KHz (VALUE 99) and features a 24db/octave rolloff slope.

37/FILTER Q**[00-40]**

The FILTER RESONANCE (Q) controls the amplitude of the resonant peak of the filter. It is adjustable from no peak (VALUE 0) to just below oscillation (VALUE 40).

38/FILTER TRACKING**[00-04]**

The FILTER KEYBOARD TRACKING parameter allows the note played on the keyboard to determine the frequency cutoff of the filter—lower notes will have a lower cutoff, higher notes a higher cutoff. It is adjustable from no tracking (VALUE 0) to one octave in filter cutoff per octave on keyboard (VALUE 4).

ENVELOPE PARAMETERS

The Mirage offers you a wide range of control over the amplitude and filter envelopes of a sound. In addition to being able to create fixed envelopes, you can use the keyboard velocity sensitivity feature to control any or all of the parameters of an envelope. Note that many of the envelope parameters interact. The velocity sensitive parameters are particularly dependent on the fixed envelope parameters.

Filter Envelope Parameters**40/FILTER ATTACK****[00-31]**

The FILTER ATTACK parameter controls the rate at which the filter frequency will increase from the initial FREQUENCY CUTOFF (param. 36). It is adjustable from instantaneous (VALUE 0) to 30 seconds (VALUE 31).

41/FILTER PEAK**[00-31]**

Controls the maximum cutoff frequency the filter will reach at the top of the attack slope. It is adjustable from zero (VALUE 0) to a maximum of 15KHz (VALUE 31). Note that the peak has no effect on the rate of the attack.

42/FILTER DECAY**[00-31]**

Controls the rate at which the filter cutoff frequency will descend from the PEAK value to the SUSTAIN value. At VALUE 31, it will take 30 seconds to reach the sustain level. At VALUE 0 it will drop instantly to the SUSTAIN level.

43/FILTER SUSTAIN (00-31)

Controls the cutoff frequency that the filter will hold as long as the key is depressed. At VALUE 0 it will be the same as the initial cutoff frequency (param. 36). At VALUE 31 it will be maximum.

44/FILTER RELEASE (00-31)

Controls the rate at which the filter frequency will descend from the sustain value to the initial cutoff frequency (param. 36). At VALUE 31 it will take 30 seconds to reach the minimum level and at VALUE 0 it will release instantly.

45/FILTER ATTACK vs (00-31)

The VELOCITY SENSITIVE FILTER ATTACK parameter makes the filter attack rate dependent on key velocity. At VALUE 0, key velocity will not effect the attack rate. Increasing the value will make the attack rate more sensitive to keyboard velocity (increased key velocity will increase the attack rate).

46/FILTER PEAK vs (00-31)

The VELOCITY SENSITIVE FILTER PEAK parameter makes the maximum filter frequency peak level dependent on the key velocity. At VALUE 0, key velocity will not effect the peak. Increasing the value will make the peak level more sensitive to key velocity (increased key velocity will raise the peak frequency).

47/FILTER DECAY—KEYBOARD SCALED (00-31)

A parameter that makes the decay rate of the filter envelope dependent on key number. This permits the filter to have a longer decay rate on lower notes than on higher notes. At VALUE 0, it will have no effect on the decay setting. Increasing the value number will both lengthen the decay rate of lower notes and shorten the decay rate of higher notes.

48/FILTER SUSTAIN vs (00-31)

The VELOCITY SENSITIVE FILTER SUSTAIN parameter makes the sustain level dependent on key velocity. At VALUE 0, key velocity will have no effect on filter frequency sustain. Increasing the value will make the frequency sustain more sensitive to key velocity (increased key velocity will raise the sustain frequency).

49/FILTER RELEASE vs (00-31)

The VELOCITY SENSITIVE FILTER RELEASE parameter makes the release rate of the filter frequency dependent on key-up velocity. Increasing the value will make the release rate more sensitive to key-up velocity (increased key-up velocity will shorten the release rate).

Amplitude Envelope Parameters**50/ATTACK RATE (00-31)**

Controls the rate at which the volume will rise to the peak when a key is played. At VALUE 0 it is instant and at VALUE 31 the amplitude will take 30 seconds to reach the peak.

51/PEAK LEVEL (00-31)

Controls the maximum amplitude that will be reached at the top of the attack slope. It is adjustable from no sound at VALUE 0 to maximum output at VALUE 31.

52/DECAY RATE (00-31)

Controls the rate at which the amplitude descends from the peak level to the sustain level. At VALUE 31 it will take 30 seconds for the amplitude to fall to the sustain level. At VALUE 0 it will drop instantly to the SUSTAIN level.

53/SUSTAIN LEVEL (00-31)

Sets the amplitude level between the decay slope and key release. At VALUE 0 there will be no output after the decay and at VALUE 31 the sustain will be at the maximum level.

54/RELEASE RATE (00-31)

Controls the rate at which the amplitude descends to 0 after the key is released. At VALUE 31 it will take 30 seconds to reach 0 and at VALUE 0 the amplitude will fall instantly to 0.

55/ATTACK vs (00-31)

Makes the ATTACK RATE dependent on key velocity. At VALUE 0 key velocity will not effect the attack rate. Increasing the value will make the attack rate more sensitive to keyboard velocity (increased key velocity will increase the attack rate).

56/PEAK LEVEL vs (00-31)

The VELOCITY SENSITIVE PEAK LEVEL parameter makes the maximum peak level dependent on key velocity. At VALUE 0, key velocity will not effect the peak level. Increasing the value will make the peak level more sensitive to key velocity (increased velocity will raise the peak level.)

57/DECAY—KEYBOARD SCALED (00-31)

A parameter that will alter the decay rate inversely to key number. This parameter permits the envelope to have a long decay on lower notes and shorter decay on higher notes. At VALUE 0 it will have no effect on the decay setting. Increasing the value will both lengthen the decay rate of low notes and shorten the decay rate of higher notes.

58/SUSTAIN LEVEL vs (00-31)

The VELOCITY SENSITIVE SUSTAIN LEVEL parameter makes the sustain level dependent on key velocity. At VALUE 0, key velocity will have no effect on sustain level. Increasing the value will make the sustain level more sensitive to key velocity (increased velocity will raise the sustain level).

59/RELEASE RATE vs (00-31)

The VELOCITY SENSITIVE RELEASE RATE parameter makes the release rate dependent on key velocity. At VALUE 0 key velocity will have no effect on release rate. Increasing the value will make the release rate more sensitive to key-up velocity (increased key-up velocity will shorten the release rate).

SAMPLING PARAMETERS

The sampling parameters (60 through 77) will control the entry and manipulation of the wavesample selected by parameter 26. Since Mirage sampling is a computer driven function, very specific directions must be given to the Mirage to obtain the best samples. Yet sampling is an art as much as it is a science. At Ensoniq, many hours of effort and many dollars worth of sophisticated equipment are used to create sounds provided on Ensoniq Sound Diskettes. Don't be disappointed if your initial samples aren't quite up to snuff. The Advanced Sampler's Guide, available from your authorized Ensoniq dealer, combined with your increasing experience, will help you get better sounds.

26/WAVESAMPLE SELECT (1-8)

A sampling parameter that will select one of eight possible wave samples for each keyboard half. Once selected, this wavesample will be controlled by parameters 60 through 75 until the next wavesample is selected.

27/INITIAL WAVESAMPLE (1-8)

This parameter will select the wavesample number used by the lowest key of a keyboard half. Except in certain advanced sampling situations, this parameter should remain set to "1".

60/WAVESAMPLE START (00-FF)

Sampling parameter to select the starting segment in the Mirage memory for the current wavesample. If the wavesample is #1, the start value will usually be 00. Subsequent wavesamples (2, 3, etc.) will usually start one segment (one digit) after the end of the previous wavesample. The WAVESAMPLE START values are in hexadecimal (00-FF).

61/WAVESAMPLE END (00-FF)

Sampling parameter to select the ending segment in the Mirage memory for the current wavesample. The value will be determined by the number of wavesamples in the wavetable. The value table in the sampling section will give you suggested ending and starting values.

LOOPING

Rather than assign valuable memory space to a portion of a wavesample that simply repeats, the Mirage uses a technique called "looping" to extend the decay and sustain portions of a sound.

Most acoustic sounds stabilize in character rather quickly. In less than 1/4 second, an acoustic guitar note has settled down to something resembling a sine wave. By looping the last portion of a 1/2 second acoustic guitar sample, a very true guitar sound with long sustain can be created while using a minimum amount of memory.

62/LOOP START (00-FF)

A sampling parameter to select the segment at which the looping process will begin. To create an effective loop, the LOOP START should be a point sometime after the initial attack portion of the wavesample has been completed. Like other starting and ending parameters, LOOP START is a memory segment number expressed in hexadecimal.

63/LOOP END (00-FF)

A sampling parameter to select the segment where a loop will end and recycle to connect with the LOOP START. The LOOP END may or may not coincide with the WAVESAMPLE END. LOOP END is a memory segment expressed in hexadecimal.

64/LOOP END FINE ADJUST (00-FF)

This parameter will allow you to adjust the LOOP END in individual samples within the chosen loop end segment. This fine adjustment will help you match the loop end to the loop start as smoothly as possible. (See MEMORY in GLOSSARY).

65/LOOP SWITCH (ON-OFF)

Turns the looping function on and off. When OFF, the wavesample will play back from beginning to end and then stop. When ON, the wavesample will play back from beginning to LOOP END and then continue immediately from LOOP START, looping as long as the key is depressed. Note that amplitude envelope parameters will control the decay, sustain and release functions of the note.

66/WAVESAMPLE ROTATE (00-FF)

This parameter will "move" or "rotate" the current wavesample within the Mirage memory one sample at a time. It is used to eliminate "dead space" at the beginning of a wavesample or to align an appropriate LOOP START point with a segment boundary. Pressing the ▲ value button will move the wavesample one sample to the right in memory. Pressing the ▼ button will move the wavesample one sample to the left. This parameter is called ROTATE because rather than becoming "lost", values at the wavesample boundary will shift to the opposite end of the wavesample as they are moved.

67/RELATIVE TUNING—COARSE (00-07)

Alters the pitch of the current wavesample in octave increments.

68/RELATIVE TUNING—FINE (00-FF)

Alters the pitch of the current wavesample in 1/20 semitone increments. There are 256 increments expressed in hexadecimal.

69/RELATIVE AMPLITUDE (00-63)

Adjusts the amplitude of the current wavesample only. This allows you to match the volume levels of several different wavesamples.

70/RELATIVE FILTER FREQUENCY (00-99)

Adjusts the cutoff frequency of the filter for the current wavesample, relative to the other wavesamples in the wavetable.

71/MAXIMUM FILTER FREQUENCY (00-99)

Sets the upper limit of the cutoff frequency for the current wavesample, regardless of any other filter value (program, envelope, velocity).

72/TOP KEY (01-61)

Selects the highest key that will use the current wavesample. The TOP KEY values will determine how many keys will use the wavesample. The highest TOP KEY of the lower keyboard will determine the split point.

73/SAMPLE TIME ADJUST (30-99)

Sets the time between individual samples for the current wavesample. Combined with the SAMPLE START and SAMPLE END parameters, it will determine the duration of the current wavesample. The value is expressed in microseconds with VALUE 34 corresponding to the maximum sample rate of 29kHz and VALUE 99 corresponding to the minimum sample rate of 10kHz.

74/INPUT FILTER FREQUENCY (00-99)

Filter cutoff frequency adjustment that will determine the maximum frequency that the Mirage will sample for the current wavesample. It is adjustable from 50Hz at VALUE 0 to 15kHz at VALUE 99.

75/LINE LEVEL INPUT (ON-OFF)

Switching parameter to match the Mirage input to the sound source to be sampled in the current wavesample. At VALUE OFF the input will accept mic level signals. At VALUE ON the input will accept line level inputs.

76/SAMPLING THRESHOLD (00-63)

Adjusts the threshold level for the current wavesample. Pressing the SAMPLE UPPER or SAMPLE LOWER switch will put the Mirage in the "level detect" mode. Playing the sound to be sampled should light the middle bar in the display. If the middle bar does not light, pressing CANCEL/STOP and then lowering the value number of this parameter will lower the sampling threshold. After ENTER/START has been pressed, the first signal above this threshold will automatically begin the sampling process.

77/USER MULTISAMPLING (ON-OFF)

Switching parameter to choose between user-selected sampling parameters and Mirage default values. If this parameter is set to OFF, when sampling is selected, the Mirage will automatically set up all the parameters necessary to create a wavetable made up of a single wavesample. When more than one wavesample will make up a wavetable, you will have to set your own set of parameters, after setting this switch to ON.

MIDI PARAMETERS**81/MIDI OMNI MODE/ON-OFF (ON-OFF)**

Switch parameter to choose between MIDI Omni and Poly modes of operation. When the switch is ON, the Mirage will operate in the MIDI Omni Mode. When the switch is OFF, the Mirage will operate in the MIDI Poly Mode. In the Omni Mode, the Mirage will receive MIDI data on all 16 MIDI channels. In the Poly Mode, the Mirage will transmit and receive MIDI data on only the channel selected by parameter 82.

82/MIDI CHANNEL SELECT (01-16)

In the MIDI Poly Mode, you must select one of 16 MIDI channels on which to receive MIDI data. When a channel is selected, the Mirage will accept and transmit data on only that channel. Any MIDI data received on any other channel will be ignored.

83/MIDI THRU MODE (ON-OFF)

Switching parameter to determine whether or not the Mirage will "pass along" MIDI data it receives. When ON, the Mirage will echo all MIDI data it receives regardless of channel. When OFF, the Mirage will not echo any data it receives, except clocks, but will send data it creates.

84/MIDI CONTROLLER ENABLE (ON-OFF)

Selects whether or not the Mirage will send and receive PITCH BEND and MODULATION WHEEL data via MIDI.

ON—Pitch and Mod Wheel data sent and received.
OFF—Pitch and Mod Wheel data not sent or received.

SEQUENCER PARAMETERS**85/EXTERNAL SEQUENCER CLOCK** (ON-OFF)

To connect the Mirage sequencer with the clock of an external unit such as a drum machine or other sequencer.

On—External Clock Off—Internal Clock

86/EXTERNAL CLOCK JACK SELECT (ON-OFF)

Selects which input jack will be used to connect to the external clock.

ON—Sync Jack OFF—MIDI In Jack

NOTE: The sequencer will always put out a MIDI clock to the MIDI OUT jack regardless of clock input.

87/INTERNAL CLOCK RATE (00-99)

Changing the internal clock rate will speed up or slow down the playback of a recorded sequence without changing the pitch of the notes. The real time recording speed is always "25" on the parameter value. Increasing the value number will increase the speed up to 4 times.

88/SEQUENCER LOOP SWITCH (ON-OFF)

Tells the sequencer whether to play a recorded sequence once or to keep repeating it indefinitely.

ON—Sequence will keep playing until STOP is pressed.
OFF—Sequence will play through once then stop automatically.

89/SUSTAIN PEDAL/FOOTSWITCH SELECT (ON-OFF)

Changes the function of the footswitch between sustain pedal and remote sequencer switch.

ON—In the record function, the footswitch operates the same as the sequencer PLAY switch. In the play function it operates as a remote START/STOP switch. In neither case does it disable the PLAY button.

OFF—As a sustain pedal the switch holds the sustain value of the notes played—same as keeping keys depressed.

98/DISK ERROR CODE (01-08)

This parameter will display information about problems that may be occurring in the disk system. The value of this parameter corresponds to error messages or codes which will often appear automatically when you ask the Mirage to do something that is not possible or reflects a problem with the disk drive or diskettes themselves.

Disk Error Codes

- 01 dE—Disk Drive Error—This usually indicates a serious mechanical problem.
- 02-05 nF—Not Found—The information you have requested is not in the requested location on the diskette.
- 06 ud—Unformatted Disk—Information cannot be saved on the current diskette because it is not formatted for the Mirage.
- 07 nd—No Diskette—The Mirage can't save or load because there is no diskette in the drive.
- 08 Pd—Protected Disk—Information cannot be saved on the current diskette because the write-protect tab is set.

99/DISK CONTROLLER STATUS CODE

This parameter is used by service personnel to diagnose disk drive related problems should they occur.

91/EXTERNAL COMPUTER PORT ENABLE (ON-OFF)

With certain special equipment and instructions, you will be able to connect a personal computer to the Mirage. This switching parameter will permit information to pass in and out of the Mirage EXTERNAL COMPUTER PORT.

92/SERIAL PORT BAUD RATE SWITCH (ON-OFF)

Switching parameter to change the baud rate of the SERIAL (MIDI) PORT. When the switch is ON the baud rate will be RS 232 compatible (4800). When the switch is OFF the baud rate will be MIDI compatible (31.25k Baud).

97/SOFTWARE VERSION NUMBER (00-99)

The "value" of this parameter is the version number of the software currently loaded into the Mirage. Ensoniq Sound Diskettes will be updated from time to time and the version number will be your way of determining the exact software you have.

IMPORTANT

"This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- reorient the receiving antenna
- relocate the instrument with respect to the receiver
- move the instrument away from the receiver
- plug the instrument into a different outlet so that the instrument and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: "How to Identify and Resolve Radio-TV Interference Problems". This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4"

In order to fulfill warranty requirements, the Mirage Digital Sampling Keyboard should be serviced only by an Authorized Ensoniq Repair Station.

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