Musician's Manual

SQ-80

Cross Wave Synthesizer

R E A D T H I S F I R S T !

WARNING!

Grounding Instructions

This product must be grounded. If it should malfunction or break down. grounding provides a path of :east resistance for electric current to reduce the risk of electric shock. This product is equipped with a cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into an appropriate outlet that is properly installed and grounded in accordance with all local codes and ordinances.

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

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

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

SEE IMPORTANT SAFETY INSTRUCTIONS ON BACK COVER!

ENSONIQ™

SQ-80

CROSS WAVE SYNTHESIZER AND SEQUENCER

Musician's Manual
Version 1.0

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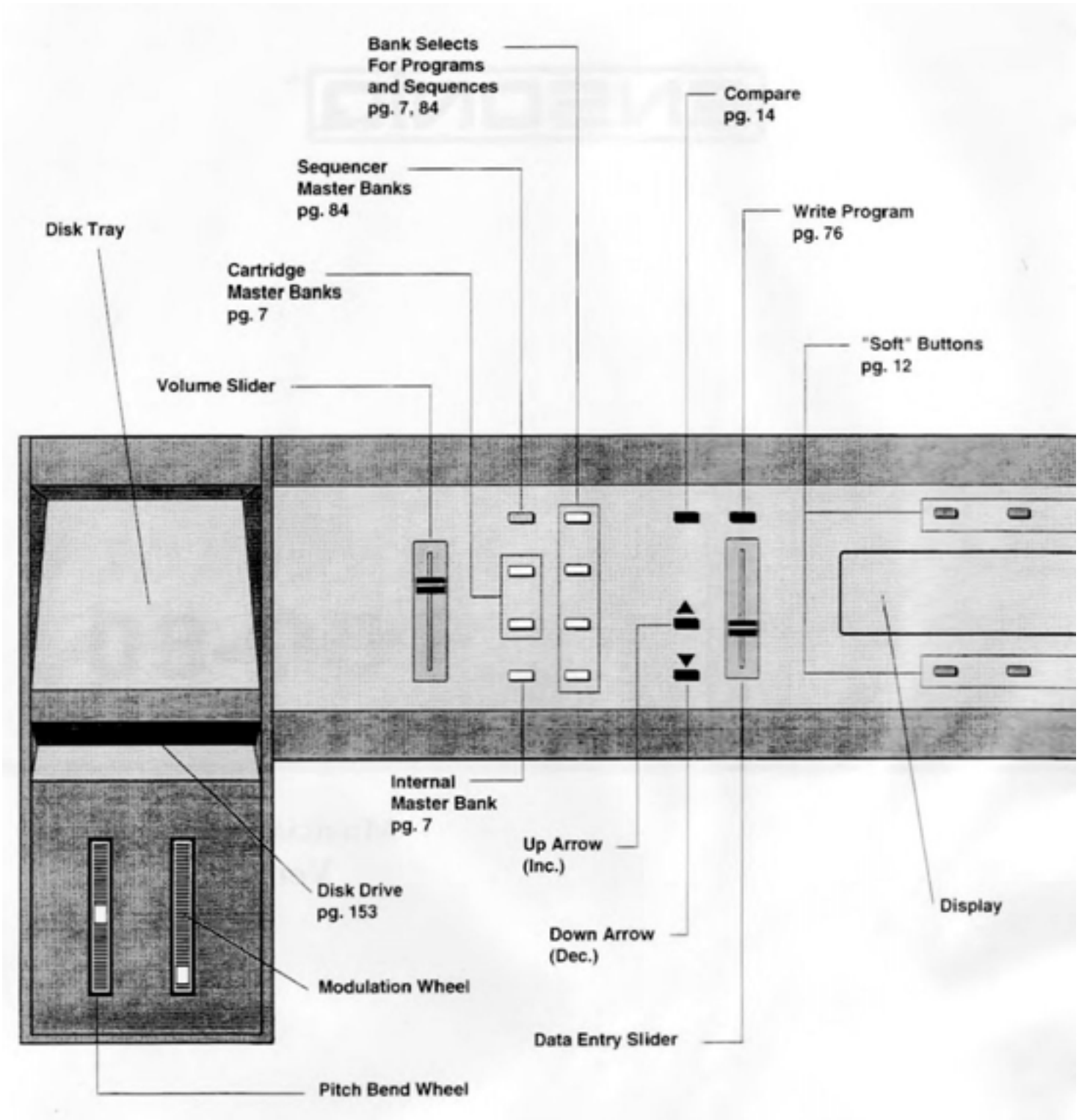
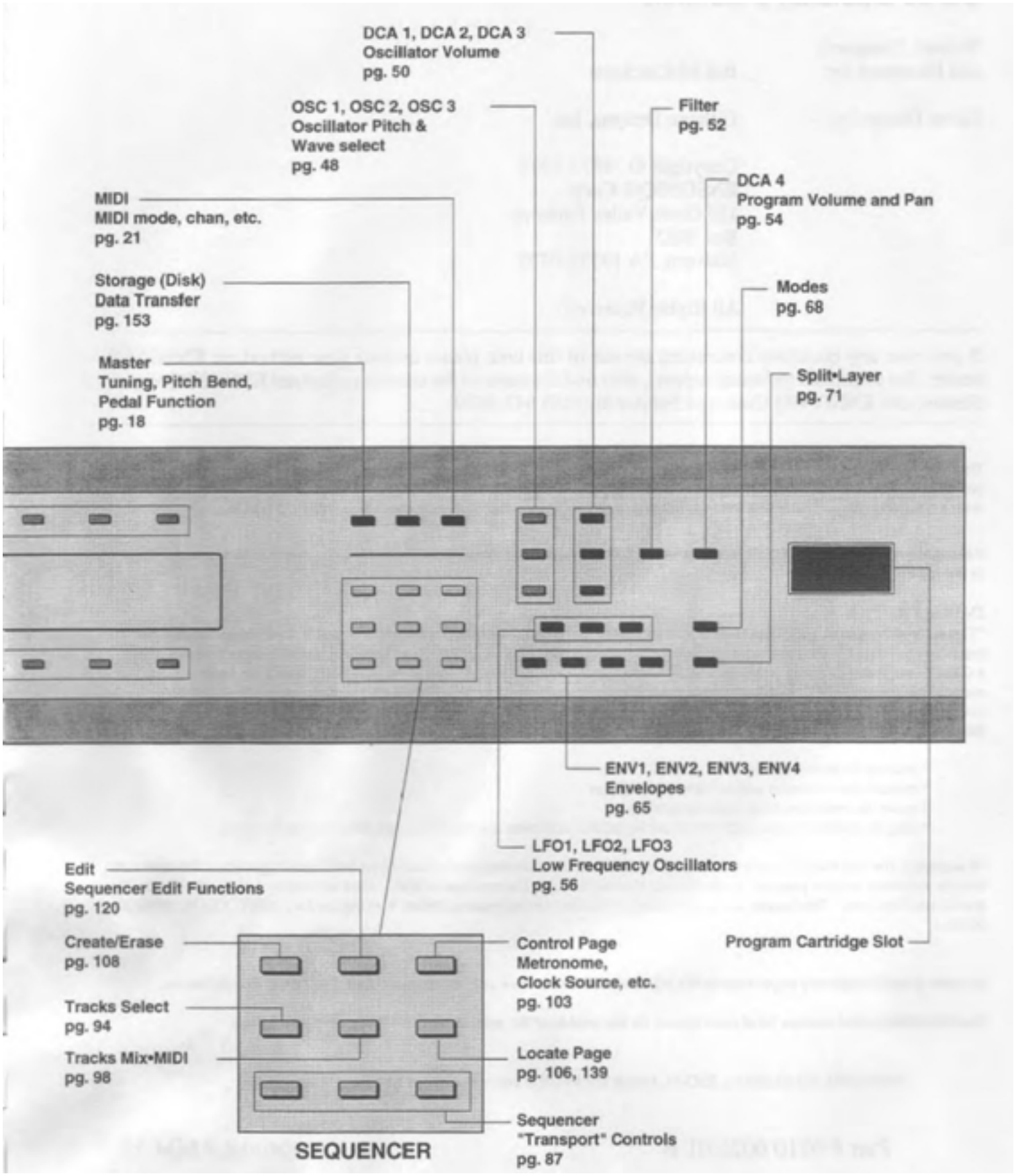
FRONT PANEL CONTROLS:




DCA 1, DCA 2, DCA 3
Oscillator Volume
pg. 50
OSC 1, OSC 2, OSC 3
Oscillator Pitch &
Wave select
pg. 48
Filter
pg. 52
DCA 4
Program Volume and Pan
pg. 54
MIDI
MIDI mode, chan, etc.
pg. 21
Storage (Disk)
Data Transfer
pg. 153
Modes
pg. 68
Master
Tuning, Pitch Bend,
Pedal Function
pg. 18
Split•Layer
pg. 71
ENV1, ENV2, ENV3, ENV4
Envelopes
pg. 65
LFO1, LFO2, LFO3
Low Frequency Oscillators
pg. 56
Edit
Sequencer Edit Functions
pg. 120
Create/Erase
pg. 108
Tracks Select
pg. 94
Tracks Mix•MIDI
pg. 98
Control Page
Metronome,
Clock Source, etc.
pg. 103
Locate Page
pg. 106, 139
Sequencer
"Transport" Controls
pg. 87
Program Cartridge Slot
SEQUENCER

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If you have any questions concerning, the use of this unit, please contact your authorized ENSONIQ dealer. For additional technical support, or to find the name of the nearest authorized ENSONIQ Repair Station, call ENSONIQ Customer Service at (610) 647-3930

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 designed to comply with the limits for a Class B computing device in accordance with the specifications in Subpart .1 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. D.C. 20402 Stock No. 004-000-00345-4."

In order **to fulfill** warranty requirements the **SQ-80 should be serviced** only by an authorized ENSONIQ Repair Station.

The ENSONIQ serial number label must appear **on the** outside of the unit or the ENSONIQ warranty is void.

Part # 9310 0025 01-B Model # MM-15

TABLE OF CONTENTS

SECTION 1 — First Things First

SECTION 2 — Global Functions and MIDI Configuration

SECTION 3 — Voice Programming

SECTION 4 — The Sequencer

SECTION 5 — Sequencer and Controller Applications

SECTION 6 — Data Storage

SECTION 7 — Appendices

SECTION 1

First Things First

A Word About the ENSONIQ SQ-80

Welcome to the **ENSONIQ SQ-80,** the first studio synthesizer designed 'for live performance. In a world of synthesizers, sequencers, MIDI controllers and MIDI disk drives, the SQ-80 is something different. It is all of those things and more, in one easy-to-use device. Here's what you get:

- An eight-voice, polyphonic, poly-timbral synthesizer, capable of playing eight different sounds at once, with dynamic stereo panning for each voice.
- Voice section employing state-of-the-art CrossWave™ synthesis techniques; combine different attack and sustain segments to create a rich variety of complex, dynamic sounds.
- 256k bytes of synthetic, sampled and multi-sampled wavedata **in** ROM — 75 different Waves.
- Dynamic Voice assignment — each Track/MIDI Channel has access to all eight voices.
- An integrated eight-track MIDI sequencer with 20.000 note capacity and features you would expect to find on stand-alone or computer-based Sequencers.
- A full-featured MIDI controller keyboard capable of sending eight MIDI Program and Volume changes at once.
- Key (Poly) Pressure keyboard — Polyphonic Pressure (or After-touch) affects *only* the note or notes you press down on, allowing a whole new level of expressiveness. Of course, for sending to instruments which only recognize Mono (or "Channel") Pressure, the SQ-80 can send that too.
- A 3.5" disk drive for fast and reliable storage of up to 600 Sequences and up to 1,728 Programs on a single disk.
- Disk storage for all your MIDI devices —the ability to receive and save to disk any System Exclusive message of up to 64k bytes from any device.
- An eighty-character fluorescent Display and user-friendly "Page-driven" programming scheme to help you keep track of it all.
- Stereo Headphone jack for private listening at home or in the studio.
- Program and Sequence formats which are upwardly compatible with the **ENSONIQ ESQ-1, so** sounds and sequences created for the ESQ-1 can be played on the SQ-80.

By combining all of this in a single integrated unit, the **ENSONIQ SQ-80** makes the perfect nerve center for any MIDI rig. You'll find that you can take most of your other MIDI Instruments, run MIDI cables to them and then stow them away in a closet somewhere — most of the time, you won't need to touch them. You can control everything right from the SQ-80's front panel.

Whether you plan to use the **SQ-80** by itself or as the master controller in your MIDI set-up. for composing pop tunes or performing as a one-person orchestra. we suspect that you'll soon wonder what you ever did without it.

A Word About the Manual

We realize that many people don't particularly care for reading manuals. You bought the **SQ-80** for its ability to make music, not for a graduate course in applied computer technology. Still, the fact remains that you have in your possession an extremely sophisticated computer device (disguised as a keyboard instrument) which is capable of performing an enormous number of tasks. It may be necessary. when all else fails, to look in the book to find out how to do something. But because of the SQ-80's friendly user interface and intuitive operation, you'll probably only have to look once.

The odds are that whatever you need to know to get the most out of your **SQ-80** is right here in the Musician's Manual. Every effort has been made to present the material in a way that is neither too technical nor too pedestrian. Take some time to look through it. and you'll find lots of hints and operational advice that will enhance both your enjoyment and your productivity. But enough of this serious stuff. Fire up your new SQ-80 and have some fun.

GETTING STARTED

Power

Insert the Power Cable into the receptacle on the back of the SQ-80, next to the On/Off switch. Plug the other end of the cable into a grounded AC outlet. (The proper voltage for your **SQ-80** is listed on the Serial Number Label on the Rear Panel.) Turn on the SQ-80 and make sure the Display lights up. If not, check your connections and power source.

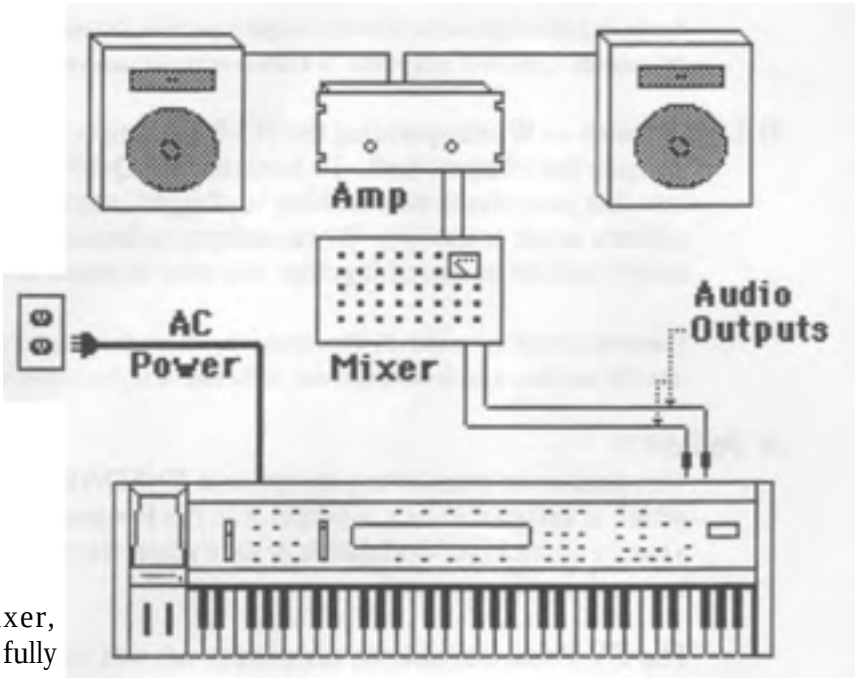
AC Line Conditioning

As is the case with any computer device, the SQ-80 is sensitive to abnormal peaks and drops in the AC line voltage. Lightning strikes, power drops or sudden and erratic surges in the AC line voltage can scramble the internal memory and, in some cases, damage the unit's hardware. How can you protect yourself against such occurrences? There are a couple of options:

- A Surge/Spike Suppressor. The cheaper of the options, a surge/spike suppressor absorbs, and protects your gear from, all but the most severe over-voltage conditions. You can get multi-outlet power strips with built-in surge/spike suppressors for little more than the cost of unprotected power strips, so using one is a good investment for all your electronic equipment.
- A Line Conditioner. This is a better, but far more expensive, way to protect your gear. In addition to protecting against surges and spikes, a line conditioner guards the equipment against excessively high or low line voltages. If you use the SQ-80 in lots of different locations with varying or unknown AC line conditions, you might consider investing in a line conditioner.

Amplification

Make sure your Audio system is turned off (or down) when making connections. to avoid damaging speakers or other components.



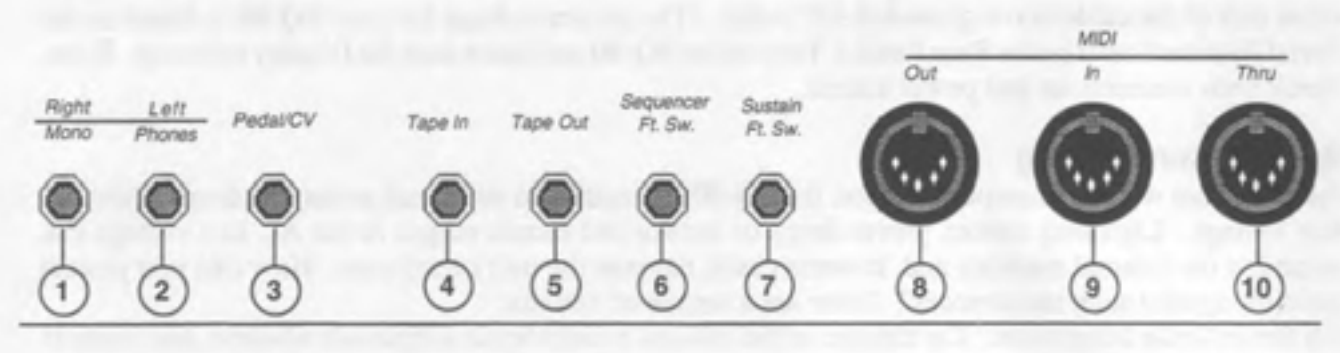
Connect the Audio Outputs of the SQ-80 to a mixer, instrument amplifier, stereo, or any other sound system, using 1/4 inch audio cables. If your system is stereo, connect the Left and Right Outputs to two channels of your mixer, stereo, etc. If not. use the **SQ-80'** s Right/Mono Output only. For listening through headphones. disconnect the Right/Mono jack and connect the phones to the Left/Phones jack.

If you're running the SQ-80 through a mixer, in stereo, be sure to pan the Left input fully left, and the Right input fully right.

Note: The **SQ-80's** outputs are line-level and are intended to be connected only to line-level inputs such as those on a mixer, stereo pre-amp, keyboard amp. etc. Connecting the SQ-80's audio outputs to a midlevel input. such as a guitar amp or the microphone jacks on a tape deck, is not recommended.

Move the **Volume Fader** of the SQ-80 up about half way. Switch the audio system On, and adjust the amplifier volume for normal listening levels. If you hear no sound while playing the keyboard, switch the audio system Off and check your connections.

REAR PANEL CONNECTIONS



AUDIO OUTPUTS:

1) Right/Mono — To operate the SQ-80 in Mono, use this jack only. To operate the **SQ-80** in Stereo. connect this Output to a channel of your Mixer and pan that channel Right. If nothing is connected to this jack, both channels of the SQ-80's output will be sent in stereo to the Left/ Phones Output for use with headphones.

Specs: In Left&Right mode: 680 Ohm output impedance. DC coupled. In Mono (summed) mode: 340 Ohm output impedance. DC coupled. Line level output into 10 KOhms or higher (one voice=1 Vp-p typical; all voices= 15 Vp-p)

2) Left/Phones —When operating the SQ-80 in Stereo, connect this Output to a channel of your Mixer and pan that channel Left. To listen to the **SQ-80** in stereo through headphones, plug the phones into this jack (make sure nothing is plugged into the **Right/Mono** jack, or the headphone output will not work properly). When nothing is connected to this jack, both channels of the SQ-80's output will be summed together and sent **in** mono to the **Right/Mono** Output.

Specs: In Left&Right mode: 51 Ohm output impedance. DC coupled. In Headphones mode: 51 Ohm output impedance. each side. DC coupled. Line level output into 10 KOhms or higher (one voice=1 Vp-p typical; all voices= 15 Vp-p)

3) Pedal/CV

This jack is for connecting an optional **ENSONIQ Model CVP-1** Control Voltage Foot Pedal, which is assignable as a Modulator in the **Program** Section of the SQ-80. The Pedal gives you a handy alternative Modulation source when, for example, you would want to use the Mod Wheel but both hands are busy.

The CV Pedal can also be assigned to act as a Volume Pedal (see Master Page. p. 20).

Specs: 3-conductor (Tip=control voltage input, Ring=2KOhm resistor to +12 Volts, Sleeve= ground). 500 Kohm input impedance. DC coupled. Input voltage range=0 to 10 volts DC. Scan rate=5mS (maximum recommended modulation input= 25 Hz). For use with an external control voltage, use a 2-conductor cable with the voltage on the tip and the sleeve grounded.

4) Tape In

This jack can be connected to the output of an audio tape recorder and used for one of three purposes:

> To Load and Verify Program or Sequencer Data which has been saved to Tape,
> To read an incoming Clock Signal (or sync track) which has been recorded to tape. for the purpose

of synchronizing the Sequencer to an audio tape recording, or

> To read an incoming Clock Signal from another sequencing device (a drum machine, or other sequencer) for the purpose of synchronizing the SQ-80 Sequencer to that device without MIDI connections. To do this simply connect the Tape Out or Clock Out jack of the other device to the Tape In jack of the SQ-80 and set the **SQ-80's** Clock Select for Tape Sync (see CONTROL Page).

Specs: 10 Kohm input impedance. AC coupled. Triggers from 500 mVp-p up to 5 Vp-p. AC or DC coupled. 500 Hz maximum response for sync.

5) Tape Out

Connect this Jack to the Input of a Tape Recorder to:

> Save Program or Sequence Data to Audio Tape, or

> Send out a Clock Signal (or sync track) to be recorded on audio tape so that you can synchronize the Sequencer to that track.

Or.

> Connect this Jack to the Tape In jack of another sequencing device. and set that device for Tape Sync. to sync it to the SQ-80's clock without MIDI connections.

Specs: 22 Kohm output i impedance. AC coupled. Drives I Vp-p into 10 KOhms (line level) and down to 100 mVp-p into 1 KOhm (mic level).

6) Sequencer Foot Switch

This jack is for use with an **ENSONIQ** Model SW-1 Foot Switch. A Foot Switch connected here can be used to start and stop the Sequencer.

7) Sustain Foot Switch

This jack also takes an **ENSONIQ** Model SW-1 Foot Switch. This switch acts as a **Sustain Pedal.** Holding it down will cause notes to continue to sustain after the key has been released.

Note: The **ENSONIQ** Model SW-1 Foot Switch is wired with the contact Normally Open. Some other manufacturers' footswitches are wired this way, and will work with the **SQ-80.** Some are wired the opposite way (Normally Closed) and will not work properly with the SQ-80.

8) MIDI Out

Sends out MIDI (Musical Instrument Digital Interface) information to other instruments and computers.

9) MIDI In Receives MIDI information from other MIDI instruments or computers.

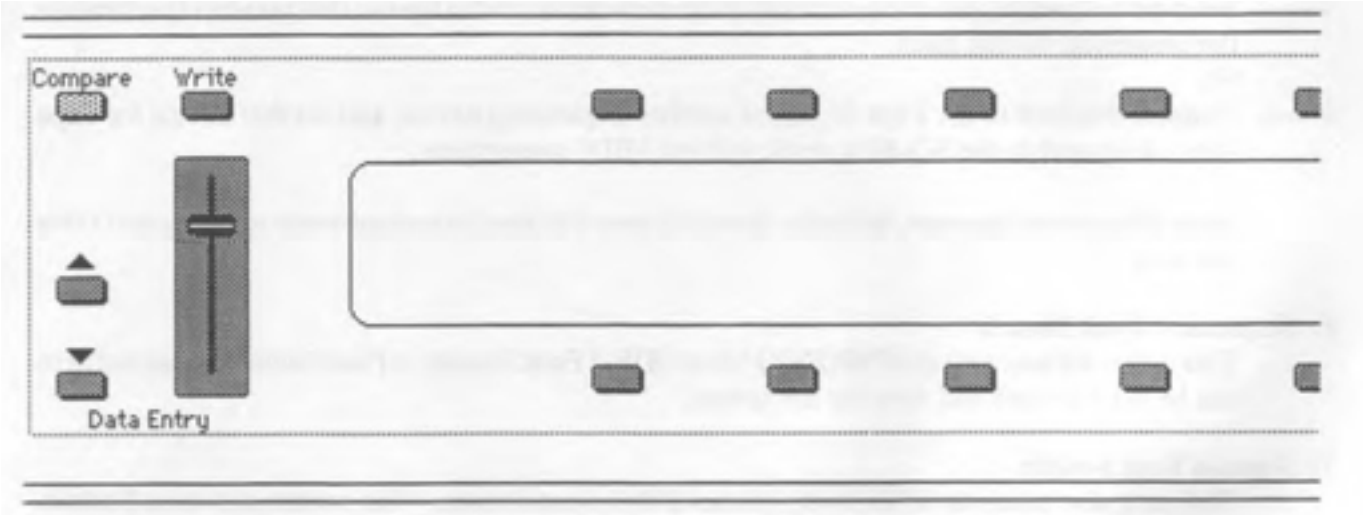
10) MIDI Thru

"Passes on" all MIDI information received by **SQ-80** to other devices. Information generated by the SQ-80 itself does not go to this jack — the Thru jack merely echoes what comes in at the MIDI In jack.

Communicating With the SQ-80

Almost everything you do on the SQ-80 — whether it's selecting a Sound, editing that Sound. adjusting the Master Tuning, or operating the Sequencer — is controlled from the the Front Panel using the following controls:

> **The 80 character fluorescent Display,**
>- **The ten Buttons directly above and below the Display,**
The Data Entry Slider to the left of the Display,
>- **The Up and Down Arrow Buttons** to the left of the Data Entry Slider,
– The **Compare** Button, and
– > The **Write** Button.



The Display and the Data Entry Controls are primarily used to Select and modify things — Sounds. Program Parameters, Tuning, Sequencer Control functions. etc. — all depending on which Front Panel Button you press. Try pressing a few of the other buttons — **MASTER. OSC 1, DCA 1,** or **FILTER.** for example — and watch the Display. Notice that for each button you press, the Display changes to show you information related to that function. Each of these different Display configurations is called a Page.

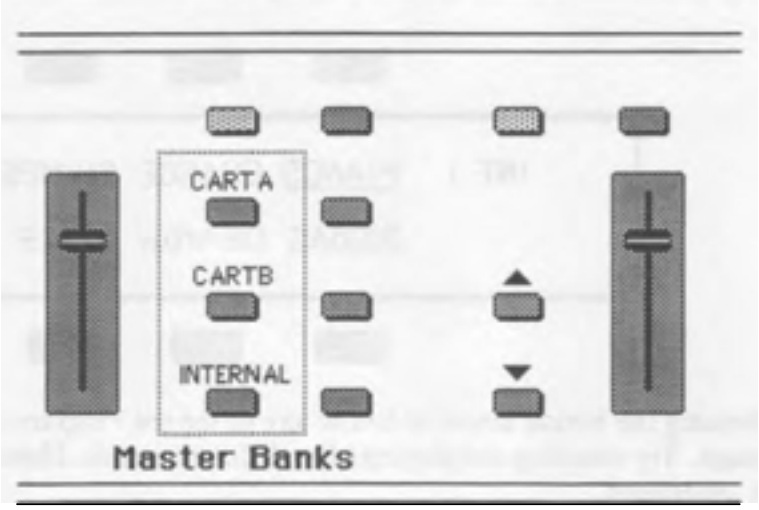
The ten Buttons above and below the Display have a new function each time you select a new Page — that is. each time you press one of the buttons outside the Data Entry section. Each of these ten buttons is used to select whatever is directly above or below it on the display. Whatever you select in this manner is immediately underlined, telling you that it is the current Program, Parameter, or Sequence, etc.

An in-depth description of the Data Entry functions of the SQ-80 follows in the Section entitled **PROGRAMMING THE SQ-80** (p. 12).

SELECTING SOUNDS

Master Banks

Each of the three **Master Banks,** (INTERNAL, CART A and CART B) designates a large area of memory which contains forty Programs. To play the Programs in the Internal Memory. press the INTERNAL Button.



Internal Memory

The SQ-80 holds 40 different Sounds, or "patches" in its Internal Memory. We refer to these Sounds as **Programs.** Programs can be selected using the **Master Bank** Button labeled INTERNAL, the four **Bank Select** Buttons, and the ten Buttons located directly above and below the Display. The Internal Memory retains its data even when the power is Off.

Cartridge Memory

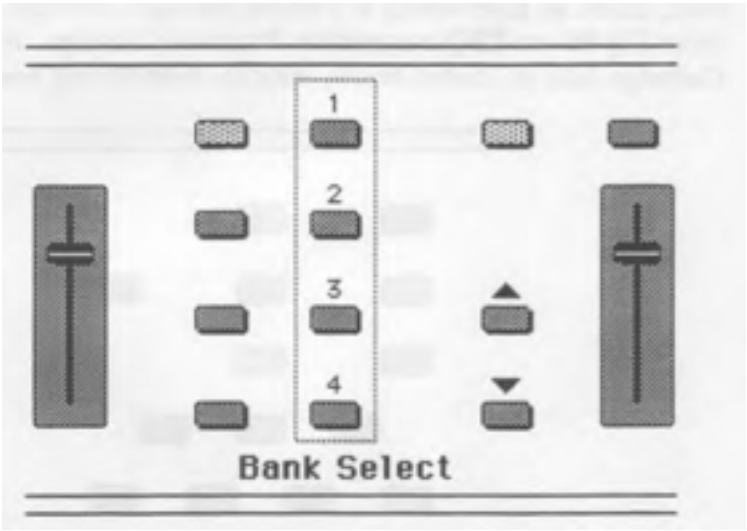
Before you can select the other two **Master Banks. CART A and CART B.** an **ENSONIQ EPROM** Storage Cartridge (or any other SQ-80- or ESQ-compatible Program cartridge) must be inserted in the Cartridge slot. The procedures for playing, editing and saving Cartridge sounds are identical to those for Internal sounds. When a Cartridge has been inserted, all three **Master Banks** are instantly available.

The **E**$^{=}$PROM Cartridge also retains its data when the power is Off, whether or not it is plugged into the SQ-80 Cartridge slot. When there is no Cartridge in the slot, pressing CART A or **CART B** will have no effect.

Bank Select Buttons

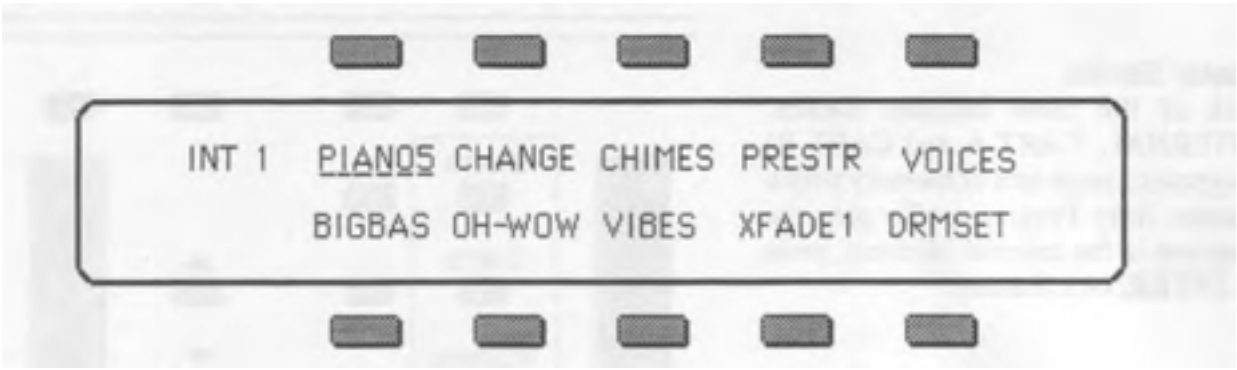
The four **Bank Select** Buttons, located to the right of the **Master Bank** Buttons, and labeled 1 through 4, are used to call up the Programs in Memory, ten at a time, allowing you to then select the one you want to play.

Press **Bank Select** Button #1. and the Display shows you the names of the ten Programs in **Bank 1.** This is the **Program Select Page** for **Bank 1.** Press **Bank Select** Button #2, and the Display shows you the names of the ten Programs in **Bank** 2. And so on.



Selecting a Program — Internal

Now that you've selected one of the four Banks, you can see the names of the ten **Programs** in that Bank. Say you selected **Bank 1.** The Display should look something like this:



Pressing the button above or below any of the ten Program names selects that Program as the current sound. Try selecting and playing a few different sounds. Notice that when you select a Program, its name is underlined.

The currently selected Program is always underlined.

Notice also that in the upper-left corner of the Display you will always find the **Page Name,** which corresponds to the name of the button (or buttons) you pressed to get to that Page. (In this case. **INT 1,** meaning **INTERNAL** Memory, Bank 1.)

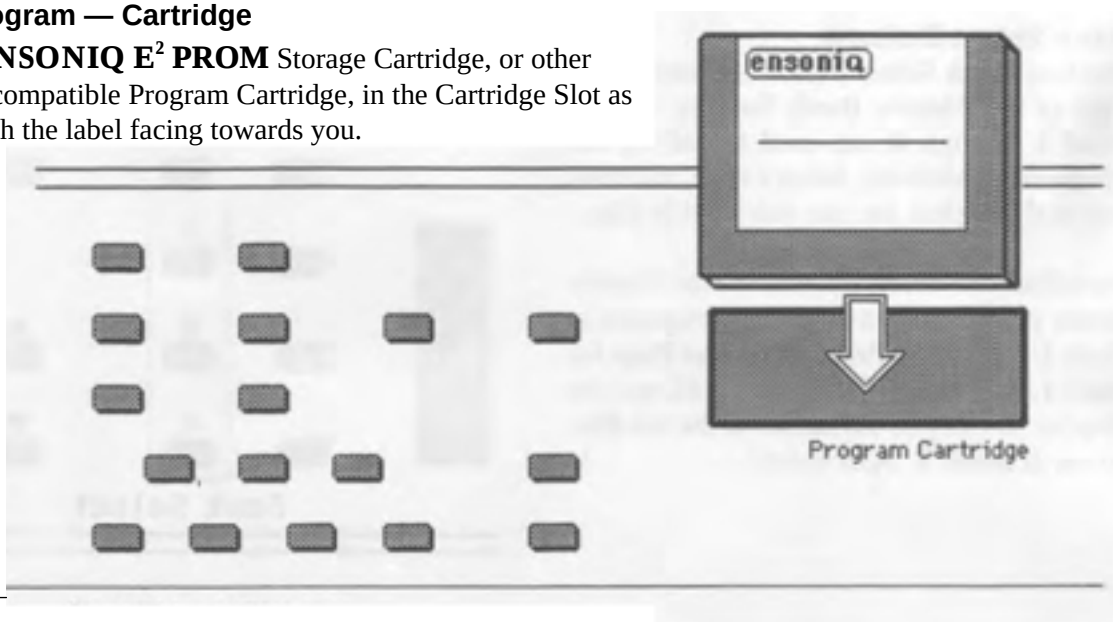
Press the other three **Bank Select** Buttons **#2, 3** and 4 to get to the other 30 Programs in the Internal Memory. and select them in the same way. Note that displaying a new Bank or Master Bank does not affect the selected Program. A new Program can only be selected by pressing one of the ten buttons above and below the Display.

To Select an Internal Sound:

– Press INTERNAL.
> Press **Bank Select #1,** 2, 3, or 4 .
– > Select a Program by pressing the Button above or below a Program Name.

Selecting a Program — Cartridge

First, insert an **ENSONIQ E² PROM** Storage Cartridge, or other **SQ-80-** or ESQ-compatible Program Cartridge, in the Cartridge Slot as shown below, with the label facing towards you.



Now follow the same procedure outlined earlier, except that instead of pressing INTERNAL, first press CART A or CART B.

To Select a Cartridge Sound:

> Press **CART A or CART B.**
> Press **Bank Select #1,** 2, 3, or 4 .
> Select a Program by pressing the Button above or below a Program Name.

Cartridge Insertion and Removal

The Program Cartridge can be inserted or removed at any time (except while you're Writing Programs to it), even when the SQ-80's power is On. without doing any harm to the SQ-80 or the Cartridge. If the Cartridge is removed while a Cartridge Program is selected. the Display instantly switches to Internal Bank #1. The Cartridge Sound will disappear, and will be replaced by the first sound in Bank 1, which becomes the selected Program.

ESQ Compatibility - Sounds and Sequences

The **SQ-80** will play Programs created for the **ENSONIQ ESQ-1** or ESQ-M. The reverse, however. is not always the case. The **SQ-80** has a great many Waves and a number of Program parameter values that the **ESQ-1** doesn't. Many Programs created on the **SQ-80** will produce unpredictable results on the ESQ-1 since it will not understand some of the parameters contained in them. Playing SQ-80 Programs on an ESQ-1 or ESQ-M will not harm the ESQ in any way. However, they probably won't sound right, particularly those that use Waves other than the 32 Waveforms contained in the ESQ.

With Sequences it's a similar story. You can send **ESQ-1** Sequences to the SQ-80 via MIDI, or load them into the **SQ-80** from Tape or from a Mirage. The **SQ-80** will convert the ESQ Sequences into its own format. Bear in mind that the proper Internal and/or Cartridge Programs must be in place for the Sequences to play properly on the SQ-80.

Going the other way , you can send one Sequence (Current Seq) via MIDI or Tape from the SQ-80 to an **ESQ-1,** but you cannot send the entire Sequencer memory (All Sequencer Data) from the SQ-80 to an **ESQ-1.** Thus if you have Sequences and Songs in the SQ-80 that you want to send to the ESQ-1, you will have to transfer the Sequences one at a time, and then reconstruct any Songs on the **ESQ-1.** Bear in mind that SQ-80 Programs that were used in any such Sequences will probably not play properly on the ESQ-1, so you will have to either assign new Programs to such Tracks, or assign the Tracks MIDI Status and play the **SQ-80** (if it's available) from the ESQ-1 Sequencer.

Pressure (After-touch)

One of the most exciting features of the SQ-80 is its keyboard, which, in addition to responding to the velocity with which you play. is capable of generating two types of Pressure — **Key Pressure** and **Channel Pressure.** Pressure (often called After-touch) is a modulator which allows you to change the sound in various ways by pressing down harder on a key or keys after the initial keystrike.

Like the MOD Wheel or Foot Pedal. Pressure is a Modulator, and can be chosen wherever a Modulator is selected in the Voice section of the **SQ-80.** Pressure can be assigned to alter the pitch or volume of Oscillators, the Filter Cutoff frequency, LFO depth, Pan location. etc.

There are two types of Pressure:

• **CHANNEL PRESSURE,** also called Mono Pressure, is "global." Channel Pressure affects all notes that are playing when you exert pressure on any of the keys. If, for example. you play a three-note chord. pressing down harder on any of the three notes of the chord will modulate *all three notes.* This type of

Pressure is the more common of the two types. Most MIDI instruments which currently implement Pressure send and receive only Channel Pressure. If you are playing or sequencing such an instrument. from the SQ-80, you should set the SQ-80 to send Channel Pressure.

- **KEY PRESSURE,** sometimes referred to as Polyphonic Pressure or Poly Pressure, is a more sophisticated and expressive type of Pressure. Key Pressure affects each key independently. If, for example, you play a three-note chord, pressing down harder on any of the three notes of the chord will modulate *only that note.* The other two notes will remain unaffected.

There is a control on the MIDI Page (PRESS=_) which determines which type of Pressure the SQ-80 will generate. This same control can be used to turn off Pressure entirely, which is particularly useful when sequencing, since Pressure eats up a lot of Sequencer memory and should not be enabled when it is not needed for a particular Track. See **Pressure Control,** p. 23, for more details.

Dynamic Voice Assignment Revealed

The **SQ-80** can play up to eight different sounds at once — each of its eight voices can play any Program at any time, no matter what the other seven are up to. This is, for example, how the Sequencer is able to play lots of different sounds at once. This is called Dynamic Voice Assignment. You can demonstrate this concept for yourself:

> Select a Program, preferably one with infinite sustain, such as an organ or strings
– Play one note and hold it down
– While holding the note down, select a new Program
– Still holding down the original note, play a note with the new sound and hold it down
– > While holding down both notes, select a third Program and play a note with it > You can keep this up until you run out of fingers or patience or both

Notice that when you selected new sounds, the old sounds kept right on playing. The **SQ-80** doesn't shut down all the voices when you select a new Program, nor does it force you to make arbitrary choices about how many voices will be assigned to play each sound. Each Sequencer Track, as well as the Straight Synthesizer section, has access to all eight voices at any given time. That is what is meant by Dynamic Voice Assignment, and it's what makes the SQ-80 a truly Multi-timbral instrument.

The Disk Drive

The **SQ-80's** built-in Disk Drive can be used to store SQ-80 sounds and Sequences, as well as MIDI information from other devices, using the SQ-80's System Exclusive Storage function. Each Double-Sided 3.5" micro-floppy disk will hold:

- 40 Program Banks, *plus*
- 128 individual Programs. *plus*
- 10 Sequencer/Sys-Ex blocks of up to 64k bytes each.

The Disk Drive in the SQ-80 is a precision instrument, and it will give you years of reliable service if cared for properly. Here are a few things to bear in mind when using the Disk Drive:

- Use only Double-Sided Double-Density (DSDD) 3.5" micro-floppy disks.
- Don't expose disks. or the drive, to temperature extremes or strong magnetic fields.
- Take care not to spill liquids or any other material into the drive.
- Don't subject the Disk Drive (or the SQ-80 itself) to excessive shock during handling.
- Never eject the disk while the drive is running (the drive light is on).
- Never put anything other than a disk into the Disk Drive.

You will find a full discussion of the disk functions **in** the section **Disk Storage.** p. 155.

Battery maintenance

The reason that the SQ-80 "remembers" Programs and other parameters, even when the power is OFF. is that all of its Internal RAM (Random Access Memory) is Battery-backed-up". (This includes the Sequencer Memory as well as Program and "Global" parameters.) The Battery that keeps the SQ-80's Memory intact is located inside the SQ-80, and when it becomes discharged, it must be replaced by an authorized ENSONIQ Repair Station.

The Battery that came in your **SQ-80** is good for up to six years of life. You will know when it needs replacing, because the SQ-80 will tell you so. One day you will switch the Power ON, and instead of its usual wake-up message, the Display will read:

WARNING — BATTERY VOLTAGE IS LOW

SAVE DATA AND CONSULT OWNERS MANUAL

When this message appears, you should make sure that all Programs and Sequencer Data are saved to disk or to Cartridge, and then take the SQ-80 to an authorized ENSONIQ Repair Station as soon as possible to have the Battery replaced.

Available Options

These optional accessories are available from your ENSONIQ dealer:

> **ENSONIQ Model SW-1 Foot Switch —** For Voice sustain or Starting and Stopping the Sequencer.

> **Model STC-8 EPROM Storage Cartridge —** For Storing the Programs you create, or for consolidating 80 of your most used Programs from disk and other sources. The 80 Programs in the Program Cartridge, combined with the forty Internal Programs, give you 120 sounds instantly available for performance and sequencing.

> **Model CVP-1** CV **PEDAL —** A Control Voltage Foot Pedal which can be assigned as a Modulator within the Voice section of the SQ-80 or used as a Volume Pedal.

Why You Should Fill Out and Mail Your Warranty Card

The **SQ-80** carries a one-year warranty covering all defects in material and workmanship. The Warranty Card which is included with your unit has complete details about the terms of the warranty.

By filling out and returning the Warranty Card, you can:

- help to expedite any warranty claims in the event that you need service.
- be registered to receive information about accessories and third party support for your **SQ-80** and receive timely information about new ENSONIQ products. and
- provide us with valuable feedback concerning features you would like to see on this and future ENSONIQ products.

Do it now.

PROGRAMMING THE SQ-80

The "human interface" used by the SQ-80 (the method by which you communicate with the device) was developed for the **ENSONIQ ESQ-1,** and is generally agreed to be one of the most intuitive and easy-to-use systems ever implemented on a synthesizer. Combining a large, readable Display with ten "Soft" buttons, the **SQ-80** literally puts everything you need to know right at your fingertips.

The method used to modify or "edit" programs and sequences is called **Page-driven parametric programming,** which is a mouthful. but don't worry. Once you've grasped a few basic concepts you'll find that operating the SQ-80 is quite simple, given its enormous flexibility. You˙11 soon appreciate the ease and clarity with which it allows you to modify, or just keep track of, a great many variables.

Parametric programming

It is likely that you have already encountered some form of **parametric programming** on other synthesizers. What this means is that instead of having a separate knob or Slider for each function, you have one master **Data Entry Slider.** and two buttons, which adjust the value of whichever parameter you select.

This approach has many advantages. the most obvious of which is that it greatly reduces the amount of hardware — knobs, switches, faders, etc.— needed to control a wide variety of functions. (If the **SQ-80** had a separate control for each function, it would literally have hundreds of knobs.) The disadvantage has often been that you were only able to see the value of one parameter at a time, making it hard to keep track of things. This is where the Page concept comes in.

Pages

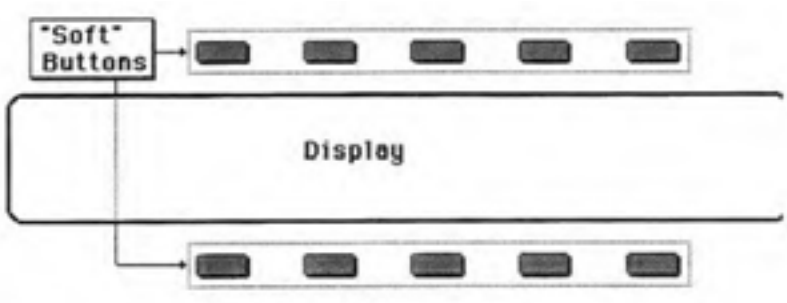
The **SQ-80's** 80-character fluorescent Display makes it possible to display information in **Pages.** For each function you select, the Display shows you its 'Page', which contains all the information (all the parameters) related to that function.

You can think of the SQ-80 in relation to a book — each time you press one of the Programming buttons on the front panel, you are in effect "turning to" that function's **Page.** Once you have turned to the Page you want, the Display shows you which parameters are controlled from that Page. To activate a control, press the button directly above or below its name on the Display.

"Soft" Buttons

The ten Buttons above and below the Display thus have multiple functions — what they select depends upon which Page is being displayed. Whenever you select a new Page, these ten Buttons serve to select whatever parameters are displayed on that Page.

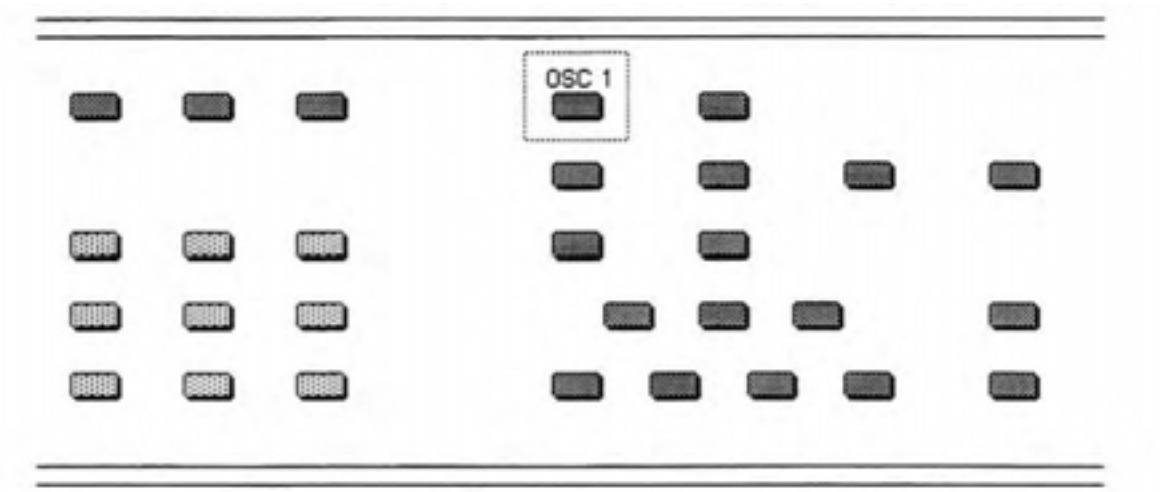
We call these "Soft" Buttons, to distinguish them from buttons which have fixed. "Hard," functions, such as the **Bank** Buttons.



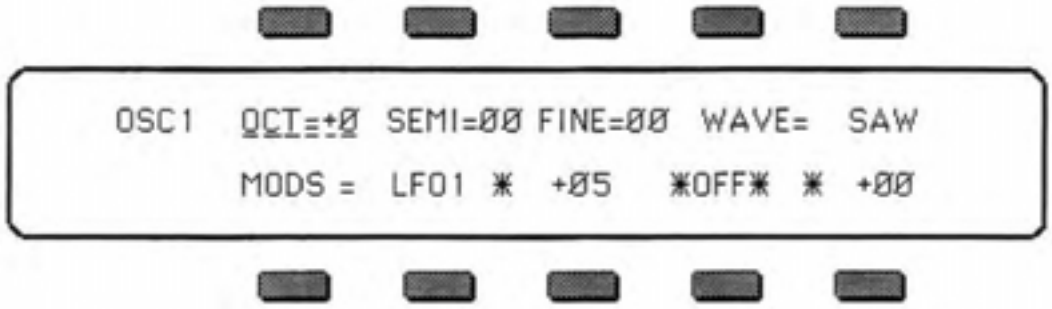
Not all "Soft" buttons are active on all Pages. Only those buttons related to a selectable parameter will be active on a given Page.

Changing **a Parameter**

Suppose you want to adjust the pitch of **Oscillator 1.** Press the front panel Button labeled **OSC 1:**



The Display now shows **Oscillator l's** Page. It should look something like this:



In the top left-hand corner of the Display you will always find the Name of the Page, which corresponds to that of the button you pressed. To the right of that are the various parameters which can be selected and modified from this page.

To raise or lower the pitch of Oscillator 1 by an octave, press the button directly above where it says OCT= . This segment of the Display will now be underlined, telling, you that it has been **selected.** and can be modified.

The currently selected parameter on a Page is always underlined.

Now that you have selected a parameter to be modified (OCT=), use the Data Entry Slider and/or the Up and Down Arrow buttons to the left of the Display to adjust its value. Moving the Slider will scroll quickly up and down through the available range of values. Pressing the Up and Down Arrow buttons will increase or decrease the value one step at a time.

To select and modify another parameter on the same Page, press the button above or below its name. That parameter will now be underlined, and its value can be adjusted as before, with the Data Entry Slider and the Up and Down Arrow buttons.

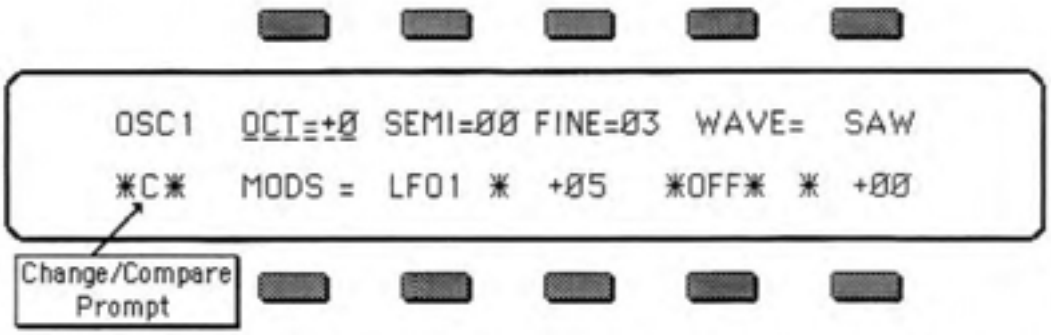
You'll notice that when changing Program parameters on the **SQ-80,** you must restrike a key in order to hear the change. If you are holding down a key (or keys) when you change a parameter, you won't hear any difference until you release the key and play it (or any other key) again.

If you select another Page **(DCA 1** for instance), change some parameter on that Page, and then return to the **OSC 1** Page, the parameter you had last selected will still be underlined. The **SQ-80** always "remembers" which parameter was last selected on a given Page, even when the power is turned off.

Be sure that the parameter you want to edit is selected before moving the Data Entry Slider or the Up and Down Arrow Buttons. Some parameter is alwa[y]s selected on any given Programming Page.

C — Change/Compare

As soon as you change any parameter in a program, a *C* will appear in the lower left-hand corner of the Display, below the Page Name. It will remain there until you select another Program or save (Write) the newly edited Program into memory.



Once a parameter change of any kind has been made, the *C* prompt will appear in the corner of **every** programming Page you select — not just on the Page that has been modified. This is a constant reminder that something in the Program has been changed.

To hear the original, unchanged, Program, press the button labeled COMPARE. The *C* will disappear; you will hear the original sound and see the Page with its original settings. Press COMPARE again to return to your edited sound. You can toggle back and forth between the original and the edited sound as often as you like.

Edit Buffer

You can edit a Program, while keeping the original Program intact, because the edited version is kept in a special area of Memory called the **Edit Buffer.** Whenever you change any parameter of a Program. the altered Program is put in the Edit Buffer, replacing whatever was previously there. Only one Program at a time can reside there — the Edit Buffer always contains the results of your last edit.

When you press the COMPARE Button. what you are doing is alternating between the Program in the original Memory Location and the Program in the Edit Buffer. We refer to the Program in the Edit Buffer as the **Edit Program.**

You can return to the Edit Program, even after selecting another Program (as long as you don't change any parameters there) by pressing the **Compare** Button. This puts you back in the Edit Buffer. and any changes you make will affect the Edit Program. Bear in mind that if you do make any changes to a newly selected Program, *that* Program will automatically be placed in the Edit Buffer, easing the previous Edit Program.

The rule of thumb is this: **Whatever Sound you hear, that's what you're editing.**

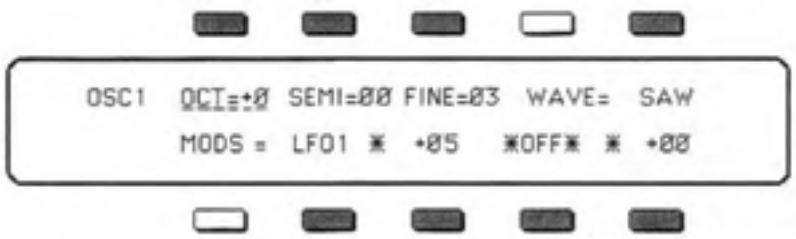
If you like the results of the changes you have made to a Program, you should rename it and save the new Program permanently to another Location (or save the new version back to the same location, replacing the original) using the **Write** Page. The procedure for this is covered in the Section **WRITE Page,** p.76.

Bailing Out

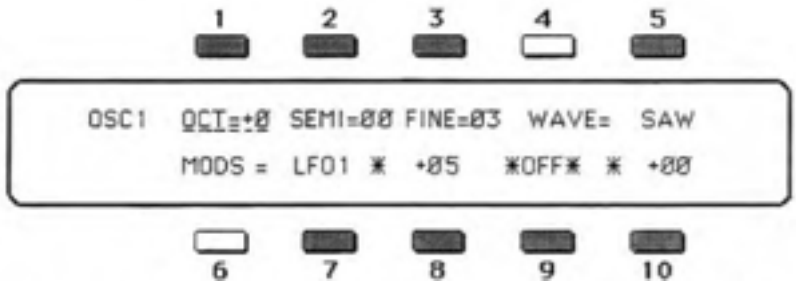
Should you decide, while editing a Program, that you're not happy with what you've done, and you want to start over with the original Program, just go to the proper **Program Select** Page and select the Program again. Then you can start editing the Program again from scratch. You will lose the one you were working on before.

Active and Inactive Buttons

Ac mentioned previously not all buttons are active in a given Page. Throughout this Manual whenever an SQ-80 Page is depicted, the active buttons will be shown in grey, the inactive ones in white. Taking the example used above, the **OSC 1** Page would appear like this:



Also, for consistency's sake, these buttons will always be referred to by location number — from upper left to lower right. 1 through 10 as shown to the right:



So we see that on the **OSC 1** Page, Buttons number 1, 2, 3, **5, 7, 8, 9,** and **10** are active — they can be pressed to select a parameter to be modified. Buttons 4 and 6 are inactive on this Page. Pressing them will have no effect.

REINITIALIZING THE SQ-80

What is Reinitialization?

The great power and flexibility of the SQ-80 lies in the fact that it is really a computer — a computer disguised as a keyboard instrument, but a computer nonetheless. The software that operates the SQ-80 is very sophisticated. In fact, there is a 64k computer program that runs inside the SQ-80 (the Operating System code). That's more than many personal computers. If you have ever used a computer, you should be familiar with the need to occasionally re-boot your system when you get an error message, etc. Well, reinitializing the SQ-80 is the equivalent of re-booting your computer.

Why **Reinitialize?**

There are a number of things that can happen to the SQ-80 (or any computer system) which might scramble the system software — voltage surges. power failures, static electricity. etc. And as with any computer, very infrequently some unforeseeable event or combination of events can cause the software to become confused, with strange and unpredictable results. Some units which appear to be broken have no hardware problem, just corrupted data in the internal RAM. In these cases, all that is needed is to reinitialize the unit.

When to Reinitialize

If your SQ-80 begins to behave in peculiar ways: if the Display shows words or lines that shouldn't be there; if you start getting unexplained System Error messages; if the Sequencer control and Edit functions start doing unpredictable things; try reinitializing the SQ-80 before you seek factory service.

Warning: When you reinitialize your SQ-80 all your current sounds and sequences will be lost (though the original 40 Factory sounds are automatically loaded back into the Internal memory after re-initializing). Therefore good backup habits should be an important part of your routine. Save any important data to disk or cartridge before reinitializing the SQ-80. Also, you should always tune the filters in your **SQ-80** after you reinitialize to reset the proper filter values.

To **Reinitialize the SQ-80:**

1. While holding down the **Record** button in the sequencer keypad, press the "Soft" button in the top left corner above the fluorescent display.
2. The following message will appear: **"ERASE ALL MEMORY AND REINITIALIZE"**
3. Select *YES* (Or press *NO* to cancel the procedure for any reason.). After selecting *YES* the wake-up screen appears, and initialization is complete. After you re-initialize the SQ-80 the 40 Factory Internal Programs are automatically placed in the Internal Memory. Press any button to continue. After reinitializing, you should tune the filters.

To Tune the Filters:

1. While holding down the **Record** button in the Sequencer keypad, press the Filter button in the voice section.
2. The following message will appear: **"Filters Tuning".** Filter tuning can take several seconds. The Filter Tuning is complete when values for all eight filters are displayed. Press any button to continue.

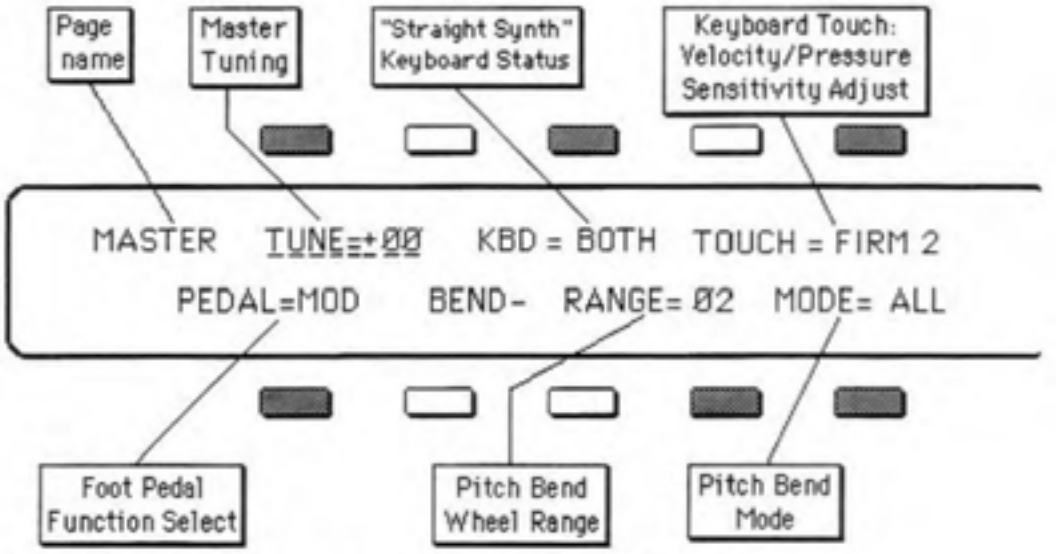
If reinitializing your **SQ-80** does not correct the problem, then contact an authorized factory service facility.

S E C T I O N 2

Global Functions and MIDI Configuration

[MASTER] MASTER PAGE

Controls "Straight Synth" Status, Master Tuning, Velocity Sensitivity, Pedal Function and Pitch Bend Range.



(Inactive Buttons appear White)

The parameters on this page are keyboard-wide, or "Global." The settings here will not change with different Programs selected, but will remain in effect for whatever Program you are playing.

Aside from Master Tuning and overall Keyboard Touch (Velocity and Pressure Sensitivity), this page also has a control for determining the Status of the "Straight Synth" — LOCAL, MIDI or BOTH. This lets you determine whether playing the keyboard when no Sequencer Track is selected ("Straight Synth" operation) will cause notes to play only on the **SQ-80,** only out MIDI, or both.

The **Master** Page contains a control for selecting between Pitch Bend Modes — normal operation, where the Bend Wheel affects all notes; and a special "Held" mode in which the Bend Wheel only affects those keys which are being held down. Also on this Page is a control for choosing whether a CV Pedal plugged into the SQ-80's rear panel will act as a Modulator or as a Volume Pedal.

These settings, like almost all SQ-80 parameters, will be "remembered" even when the SQ-80 is turned OFF.

Use this Page to:

1) Adjust the **Master Tuning** of the keyboard:
2) Set the **Status** (LOCAL. MIDI or BOTH) of the "Straight Synth" keyboard:
3) Adjust the overall **Velocity/Pressure Sensitivity** of the Instrument:
4) Set the optional **Control Voltage Foot Pedal** to be a Modulator or a Volume Pedal;
5) Set the **range** of the **Pitch Bend Wheel;** and
6) Select a **Pitch Bend Mode.**

ACTIVE CONTROLS:

1. TUNE

Master Tune Adjust. Tunes the Keyboard to the desired Pitch. A setting of **TUNE= +00** will

yield Concert A=440 tuning. The total range of this control is about a half step (semitone) up or down. Range: **-31** To **+31.**

3. **KBD**

"Straight Synth" Keyboard Status. This determines whether the "Straight Synth." (which is what we call normal keyboard operation. with no Sequencer Tracks selected) will play locally (only on the **SQ-80),** only over MIDI, or both. The "Straight Synth" is independent of the Sequencer, so depending on the setting of this parameter you can play along with a Sequence using only local voices, only a remote Instrument, or both. See the next section (MIDI Page) for more on "Straight Synth" operation.

The three available settings are:

– > **BOTH —** When BOTH is selected here, notes, controllers and Program Changes played from the keyboard when no Sequencer Track is selected will both play locally and be sent out MIDI. This is the most common state. When you select a Program from the SQ-80 front Panel, the corresponding Program Change will be sent out MIDI and you will hear the change locally.

_____> **MIDI —** Notes and controllers played from the keyboard when no Sequencer Track is selected will only be sent out MIDI and will not play any local **SQ-80** voices. It is comparable to "Local Off" on some Instruments. When you select a Program from the SQ-80 front Panel. the corresponding Program Change will be sent out **MIDI.**

– > **LOCAL—Notes** and controllers played from the keyboard when no Sequencer Track is selected will only play on the **SQ-80** and will not be sent out MIDI at all. When you select a Program from the SQ-80 front Panel. no Program Change will be sent out via MIDI.

5. TOUCH

Velocity and Pressure Sensitivity Adjust. This parameter determines the responsiveness of all Velocity-related parameters on the SQ-80 and lets you adjust the **Pressure** threshold. You can adjust it to suit your own touch — that is. how hard you play and how hard you must press before Pressure comes in. For each of the four velocity settings **(SOFT. MED, FIRM** and HARD) there are four selectable Pressure thresholds (1-4). In each case, settings ending in 1 will require the least force to bring in Pressure: settings ending in 4 will require the most force. One of these combinations will no doubt provide a feel that is just right for your style of playing. The sixteen

available Velocity/Pressure settings are:

> **SOFT 1, SOFT** 2, **SOFT 3, SOFT 4 —** This is for someone with a light touch. On any of these settings, a minimum of velocity is required to reach the maximum level of any Velocity-controlled parameter. The Pressure threshold can be varied between SOFT 1 (minimum force

required to bring in Pressure) and SOFT 4 (maximum force required to bring in Pressure).

_> **MED 1, MED** 2, **MED 3, MED 4 —** Slightly harder keystrikes are required to reach maximum

velocity levels. The Pressure threshold is adjusted from MED 1 to MED 4 as described above.

– > **FIRM 1, FIRM** 2, **FIRM 3, FIRM 4 —** These settings represent about average velocity sensitivity. One of these settings should be right for the player with an average touch. The

Pressure threshold is adjusted from FIRM 1 to FIRM 4 as described above.

– > **HARD 1, HARD** 2, **HARD 3, HARD 4 —** These settings are for the player who really digs in. It provides the widest possible range of velocity sensitivity. The Pressure threshold is adjusted from HARD 1 to HARD 4 as described above.

6. PEDAL

Foot Pedal Function Select. The setting of this parameter determines whether a CVP-1 Foot Pedal plugged into the **PEDAL/CV** jack on the SQ-80's rear panel will act as a Modulator (varying the "Manual" level wherever PEDAL is selected as a Modulation source) or as a Volume Pedal (changing the volume of the "Straight Synth" or any selected Track). Note that this only affects a Pedal plugged into the SQ-80 itself. The setting of this control has no effect whatever on incoming MIDI Foot Pedal (controller #4) or Volume (controller #7) information. There are two possible states:

> **PEDAL=MOD —** This is the default value. When PEDAL=MOD. the Foot Pedal will act as a Modulator in the Voice section of the SQ-80 and will have an effect on the sound when PEDAL is selected as a Modulator and assigned a depth other than zero. When PEDAL=MOD, moving the Foot Pedal will cause MIDI Foot Pedal (controller #4) information to be sent out over MIDI.

– **PEDAL=VOL —** When PEDAL=VOL the Foot Pedal will adjust the volume of the SQ-80. When no sequencer Track is selected, moving the Pedal will raise or lower the volume of the "Straight Synth." When a Track is selected, moving the Pedal will have the same effect as adjusting the MIX Level of that Track on the Mix˙MIDI Page. Only the "Straight synth" or one sequencer Track will be affected — only one Track's volume can be adjusted at a time. When this setting is selected, moving the Pedal will send MIDI Volume (controller #7) messages out over MIDI.

The **SQ-80** sequencer will record and play back Foot Pedal information. just as it does any other controller. However, the sequencer knows only that it is recording Foot Pedal data — it doesn't know which value the **Foot Pedal Function Select** parameter is set to at any given time. When the sequence is played back, any Foot Pedal information in the Tracks will be interpreted either as modulator or as volume information depending on the setting of this control at the time of playback. If a Track is recorded with this parameter set one way, and then played back with it set the other way, you will not get the desired result.

IMPORTANT NOTE: If you don't have a CV Pedal plugged into the **SQ-80,** you should NOT leave this parameter set to PEDAL=VOL when you turn the unit off. If you do. the next time you power it up, the **SQ-80** will set the "straight synth" volume to zero — it won't make any sound. To get the volume back to normal, just go to the MASTER Page, select this parameter and set it to PEDAL=MOD.

9. BEND RANGE

Pitch Bend Wheel Range. Adjusts how far the **Pitch Bend Wheel** will bend a note up or down when moved all the way in either direction. Each increment represents a Semitone. Range: 0 To **12.**

10. BEND MODE Pitch Bend Wheel Mode. Selects between two modes of operation for the Pitch Bend Wheel.

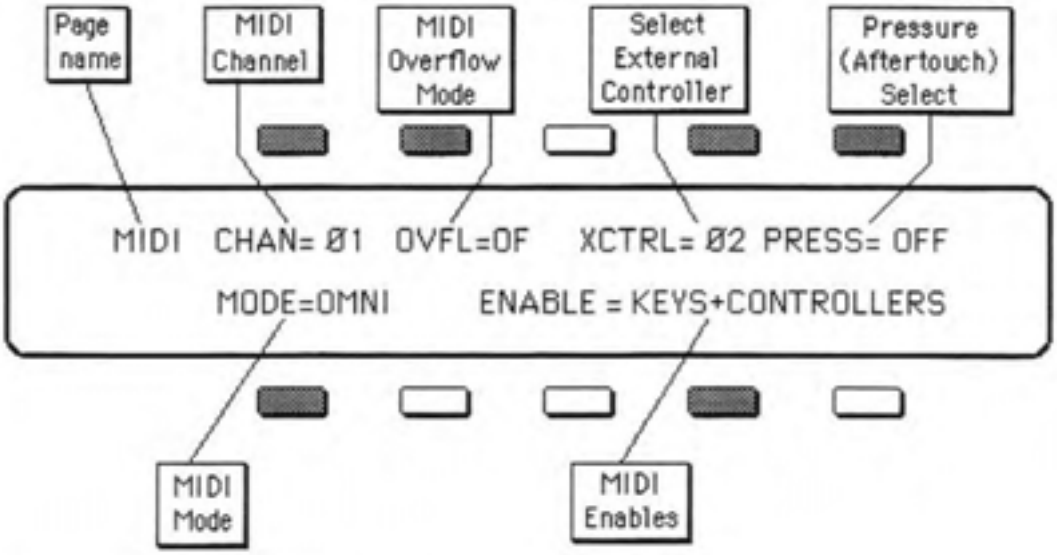
There are two Modes:

– ALL—Moving the Pitch Bend Wheel will affect the pitch of all notes that are being played. This is how most Pitch Wheels usually operate.

– **> HELD —** In this Mode, only those keys that are being held down when you move the Pitch Wheel will be affected by the wheel. Keys that have been released will not bend, even if they are being sustained by holding down the Sustain Foot Switch. This enables you to bend certain notes while others remain unchanged in pitch. With a little practice you can simulate guitar and pedal steel-type techniques, and many other interesting effects.

[MIDI] MIDI PAGE

Controls MIDI Functions



(Inactive Buttons appear in White)

From this Page you control the MIDI (Musical Instrument Digital Interface) configuration of the SQ-80 as well as determining which type of Pressure the **SQ-80** keyboard will generate locally and send out via MIDI. Because of its built-in Sequencer, its controller-oriented features and its ability to receive and store System Exclusive information from any MIDI instrument, the SQ-80's MIDI implementation is a bit more involved than most synthesizers.

In many ways. each Track of a Sequence acts like a separate little synthesizer. In fact we refer to the Tracks as "virtual synthesizers" because each is capable of independently playing Local voices and sending and receiving MIDI. There is a ninth "virtual synthesizer", independent of the eight Sequencer Tracks — the one you use when you are not using the Sequencer, when you just select a sound and play. We need some way to distinguish between this "Normal" Synth operation (which is what the first part of this Manual is Primarily concerned with) and what happens when one of the Tracks of a Sequence is selected.

Accordingly, when no Sequencer Track is selected, we call this the **"Straight Synth"** mode. In "Straight Synth" operation. the keyboard is entirely independent of the Sequencer. You are automatically put in this mode whenever you select a Program in the usual way. Most of the time you are in the "Straight Synth" section of the **SQ-80 —** you don't have to do anything special to get there. The only way to leave "Straight Synth" operation is to deliberately select one of the Tracks of a Sequence. When we speak of the "Straight Synth" we are referring to the SQ-80 as it would behave if it didn't have a sequencer built in.

Use this Page to:

1) Select the Base MIDI Channel;
2) Turn On or Off the **MIDI Overflow Mode;**
3) Select an External Controller to be used as a Modulator:
4) Enable the SQ-80 to send and receive **Pressure** (Aftertouch)
5) Select a MIDI Mode: and
6) Determine which types of information will be sent and received over MIDI by the SQ-80.

ACTIVE CONTROLS:

1. CHAN — Base MIDI Channel

We call this the **Base Channel.** It is the MIDI Channel that the "Straight Synth" section of the **SQ-80** will send and receive MIDI information on when no Sequencer Track is selected. When a Track is selected, that Track will receive on the Base Channel if the SQ-80 is in POLY Mode.

Any of the sixteen MIDI Channels may be selected (except when in MONO Mode: see below). Range: **01** To **16.**

The **SQ-80's** "Straight Synth" section will always send MIDI information on the Base Channel, and only on this channel. Which Channel (or Channels) it receives on depends upon this setting and which MIDI Mode is selected (see #6 below).

2. OVFL – MUM Overflow Mode

MIDI Overflow Mode is a feature that allows two SQ-80'S connected together by MIDI to act like a single 16 Voice synthesizer.

When OFF: The **SQ-80** will behave normally, sending out all enabled MIDI data.

When ON: The **SQ-80** will send out no MIDI key data until all eight Voices are playing, and another note is played, whether from the keyboard or by the Sequencer. At this point, instead of "stealing" an internal Voice to play the new note, it sends that note out over MIDI. It will continue sending notes out MIDI until there is an internal Voice available to play a note.

If a Sequence is playing when Overflow is on, each Track with LOCAL or BOTH status will overflow on its own designated MIDI Channel. The "Straight Synth" will Overflow on the Base Channel. Tracks with MIDI or SEQ Status are not affected by Overflow Mode.

Note: Overflow Mode will work exactly the same way with any other synth set up to receive MIDI Data from the SQ-80. However, the effect of a different synth with a different patch, picking up and playing whenever the SQ-80 runs out of voices will be unpredictable at best.

WARNING: If you inadvertently leave this parameter set to ON, you will find that the SQ-80 seems to be mysteriously "losing voices." Make sure Overflow is OFF when you are using the SQ-80 in normal operation.

4. XCTRL – Select External Controller

One of the Modulators that can be selected in the Programming section of the SQ-80 is XCTRL – External Controller. Each Controller on a Synthesizer (Breath Controller, MOD Wheel. or Pressure, for example) has a standardized MIDI number, which is the number you select here to make a particular Controller a Modulator in any of your Programs.

Suppose, for example, that you are driving the **SQ-80** from a keyboard with a Breath Controller (or want to use a Breath Controller as a Modulator when playing the **SQ-80** Keyboard). You can set up a Program on the SQ-80 where the **Filter Cutoff Frequency,** or some other Manual Level. is modulated by XCTRL. Then assign this parameter a value of **XCTRL= 02.** The Breath Controller will now modulate the **Filter,** or whatever, on this Program. The chart on the next page lists the accepted MIDI Controller numbers_

The following Controller Numbers have been agreed upon:

Number	Controller	Number	Controller
1	Modulation Wheel	**66**	Sostenuto Pedal
2	Breath Controller	**92**	Tremolo
4	Foot Pedal Controller	**93**	Chorus
6	Data Entry Slider	**94**	Celeste
7	Volume Pedal	**95**	Phaser

Though the range of this Control is from 01 to **95,** most of the values other than those listed above have no accepted function, as yet. They are there to accommodate future MIDI standards.

5. PRESS — Pressure (Aftertouch) Control

Pressure (also called Aftertouch) is available as a Modulator in your SQ-80 Programs and is generated by its keyboard. Pressure is generated by pressing down harder on a key or keys after the initial keystrike. The SQ-80 both sends and receives Pressure via MIDI, and its Sequencer will record and play back Pressure. There are two types of Pressure — **Channel Pressure** and **Key Pressure.**

This is an important control because it determines which type of Pressure. if any, will be in effect locally on the SQ-80 and what will be recorded by the Sequencer. as well as controlling what Pressure information will be sent and received via MIDI by the **SQ-80.** When Pressure has been selected as a modulator in an SQ-80 Program, the setting of this parameter determines whether the keyboard will send Key or Channel Pressure to the voice, or no Pressure at all.

This control has three possible states:

– **PRESS=OFF —** This setting turns off Pressure entirely, both Locally and over MIDI.
When PRESS=OFF:

- The **SQ-80** keyboard will not send or receive Pressure of either type over MIDI;
- Local voices played from the keyboard will not respond to Pressure:
- The Sequencer will not record Pressure into any Tracks you record, but will play back Pressure information that was previously recorded into any Tracks.

You should select PRESS=OFF whenever you don't want or need Pressure for a given application, particularly when sequencing. Pressure eats up Sequencer memory at an alarming rate, so whenever you record a Track, whether LOCAL or MIDI, with a patch that doesn't respond to Pressure. set this parameter to OFF. This will avoid wasting valuable Sequencer memory and also avoid clogging up the MIDI "airwaves" with a lot of unnecessary Pressure information.

– **PRESS=CHAN —** This enables the SQ-80 to generate and send via MIDI the most common type of Pressure — Channel Pressure. With Channel Pressure, after a note is played, pressing down harder on the key modulates every note currently playing. Like a MOD Wheel, Channel Pressure is "Global" — it affects the entire keyboard when activated. When PRESSURE=CHAN:

- Local Voices played from the SQ-80 keyboard will respond to Channel Pressure only;
- The Sequencer will record Channel Pressure into any Tracks you record:
- The **SQ-80** keyboard will send only Channel Pressure out via MIDI; however
- Either Channel Pressure or Key Pressure will be received via MIDI as it comes in.

At present, Channel Pressure is recognized by more MIDI instruments than Key Pressure. When you are playing or sequencing an external MIDI instrument from the SQ-80, and Pressure doesn't seem to be having an effect, it could be that the SQ-80 is set to send Key Pressure (see below) and the receiving instrument only recognizes Channel Pressure. In this case, set this parameter to PRESS=CHAN when playing or sequencing that instrument.

> PRESS=KEY — This enables the SQ-80 to generate and send via MIDI a second, more selective type of Pressure — Key Pressure. Key Pressure (also called Polyphonic Pressure) modulates each note independently. If you press down on any given key within a chord, only that note will be affected by Pressure — all others remain unmodulated. This type of Pressure allows for a whole new range of expression in your playing.
When PRESSURE=KEY:

- Local Voices played from the SQ-80 keyboard will respond to Key Pressure only:
- The Sequencer will record Key Pressure into any Tracks you record;
- The SQ-80 keyboard will send only Key Pressure out via MIDI; however
- Either Channel Pressure or Key Pressure will be received via MIDI as it comes in.

Sequencer Notes: This parameter determines which (if any) type of Pressure the Sequencer will record. Once a Track has been recorded, however, the Track "remembers" which type of Pressure was used. When the Sequence is played back, each Track will put out the type of Pressure that was recorded into it, no matter what the setting of this parameter. If there is unwanted Pressure information in a Track, use the REMOVE CONTROLLERS Edit function to get rid of it.
Note also that Key Pressure generates a lot of information, and recording it can use up the SQ-80's Sequencer Memory at an incredible rate. Turn this parameter OFF when recording Tracks which don't call for Pressure.
Try this: Select an Internal Program on the SQ-80 which responds to Pressure and play several notes with this parameter set to PRESS=KEY. Play a chord, and then exert some extra pressure on just one note at a time. Notice how each note responds independently to your pressing down on the keys. Now switch this parameter to PRESS=CHAN and do the same. See how the Pressure now affects all notes when any one key is pressed.
You can consult the MIDI Implementation Chart of the MIDI instrument(s) you will be using, in conjunction with the SQ-80 and its Sequencer, to see which, if any, type of Pressure it responds to. Then set this parameter to the appropriate value when playing or sequencing each instrument from the SQ-80.

6. MODE — Select MIDI Mode

The MIDI Mode determines how MIDI information will be received by the SQ-80 and its Sequencer. The MIDI Mode has no effect on what is sent — The "Straight Synth" Section and eight Tracks of the Sequencer will always send on their selected MIDI channels. There are four MIDI Modes that can be selected here:

---> **OMNI —** In OMNI Mode the "Straight Synth" section of the SQ-80 will receive on all of the sixteen MIDI channels, when no Track is selected. If one of the eight Tracks of a Sequence is selected, then the Track will receive any enabled MIDI data on any channel.

---> POLY — In POLY Mode the "Straight Synth" section of the SQ-80 will receive only on the Base MIDI channel (see #1 above). MIDI information on all other channels will be ignored. If any of the eight Tracks of a Sequence is selected, then the Track will receive incoming MIDI data. only on the Base channel.

> **MULTI — MULTI Mode** is an **ENSONIQ** innovation which was specially designed to make optimal use of the multi-timbral capabilities of its instruments. In MULTI Mode the "Straight Synth" section and each of the Sequencer's eight Tracks can each receive MIDI information independently on a different MIDI Channel.

The "Straight Synth" will send and receive on the Base Channel selected on this Page (#1 above). Each Track of a Sequence will send and receive on its selected Channel (selected on the **Mix•MIDI** Page in the Sequencer Section).

Different MIDI Channels should be selected for each Track! If the same MIDI Channel is selected twice, priority is given first to the "Straight Synth" and then to the lowest numbered Track that shares the Channel. For example:

- If MIDI Channel 1 is selected on this Page for the "Straight Synth", and Channel 1 is also selected for Tracks 1 and 3, the "Straight Synth" will receive on Channel 1. and Tracks 1 and 3 will receive nothing. Or:
- If MIDI Channel 6 is selected for Tracks 2, 4, and 7. then Track 2 will receive on Channel 6, and Tracks 4 and 7 will receive nothing. And so on.

MULTI Mode might be best thought of as "Multiple POLY" Mode. In MULTI Mode, each Track behaves as a "virtual synthesizer", receiving independently on its own MIDI Channel. but with access to all eight voices.

MONO — Before MULTI Mode was developed. **MONO Mode** was about the only way to have a poly-timbral synthesizer. It is particularly well suited for driving the **SQ-80** from a Guitar Controller, or any other application where having up to eight independent, monophonic, Channels is desirable. When **MONO Mode** is selected:

- The "Straight Synth" section becomes Monophonic — only one note will play at a time. Unlike the usual **Mono** Mode of the **SQ-80,** in this state there is no Note Memory — releasing one note does not retrigger another note which is being held.
- The "Straight Synth" Section does not receive any MIDI information at all.
- The Base **MIDI Channel** selected on this Page (#1 above) will be received by Track 1 of the Sequencer. Track 2 will receive on the next Channel, Track 3 on the next, and so on. Each Track receives monophonically (one note at a a time.) The Base Channel cannot have a value greater than nine. If you select the Mix•MIDI Page, you will see the MIDI Channel assigned each Track displayed properly, but you can't adjust them from there in MONO Mode. You can only adjust the Base Channel. Though MIDI Channels are automatically assigned to the Tracks of the current Sequence while you are in MONO Mode, the SQ-80 remembers which MIDI channel was previously assigned to each Track of each sequence, and when you select any of the other three MIDI Modes, those channel assignments will be restored.

The chart at the right shows the MIDI channels that will be received by the eight Tracks, in **MONO Mode,** for the possible Base Channels.

If Base Channel =	**1**	2	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Track 1 receives on	1	2	3	4	5	6	7	8	9
Track 2 ..	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Track 3 "	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
Track 4 " "	4	5	6	7	8	9	10	11	12
Tracks ," "	5	6	7	8	9	10	11	12	13
Track 6 "" "	6	7	8	9	10	11	12	13	14
Track 7 "	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Track 8 "	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**

• The Base Channel Minus One becomes the MIDI Channel for global Controllers . For example, if the Base Channel is Chan. 3, any Controllers (Pitch bend. Pressure, MOD Wheel, etc.) received on Chan 2 will affect all the Tracks. If the Base Channel is Chan. 1, Chan. 16 becomes the Channel for Global Controllers.

9. ENABLE — MIDI Enables

This parameter determines what kinds of MIDI information will be sent and received by the **SQ-80,** including the receiving of MIDI Song Selects (see p. 143). There are five possible states for this parameter:

> **KEY EVENTS ONLY —** In this state the **SQ-80** will send and receive only notes that are played on the Keyboard, along with Song Selects (Song Selects are always sent). Controllers (such as MOD Wheel. Pitch Bend, etc.). Program changes, and Parameter Changes will not be sent or received. Song Selects will not be received.

> **KEYS** + **CONTROLLERS —** Key Events and Controllers only will be received. Parameter Changes and Song Selects will be sent, but not received. Program changes will not be sent or received.

> **KEYS + CT** + **PROG CHNG —** Key Events, Controllers, and Program Changes will be sent and received in this Mode. This means that changing Programs on the **SQ-80** will instruct a slave unit to change to the same numbered Program: or. if the **SQ-80** is being driven by another keyboard. Program changes made on that keyboard will cause the SQ-80 to change to the same-numbered Program. Again, Parameter Changes and Song Selects are sent but not received.

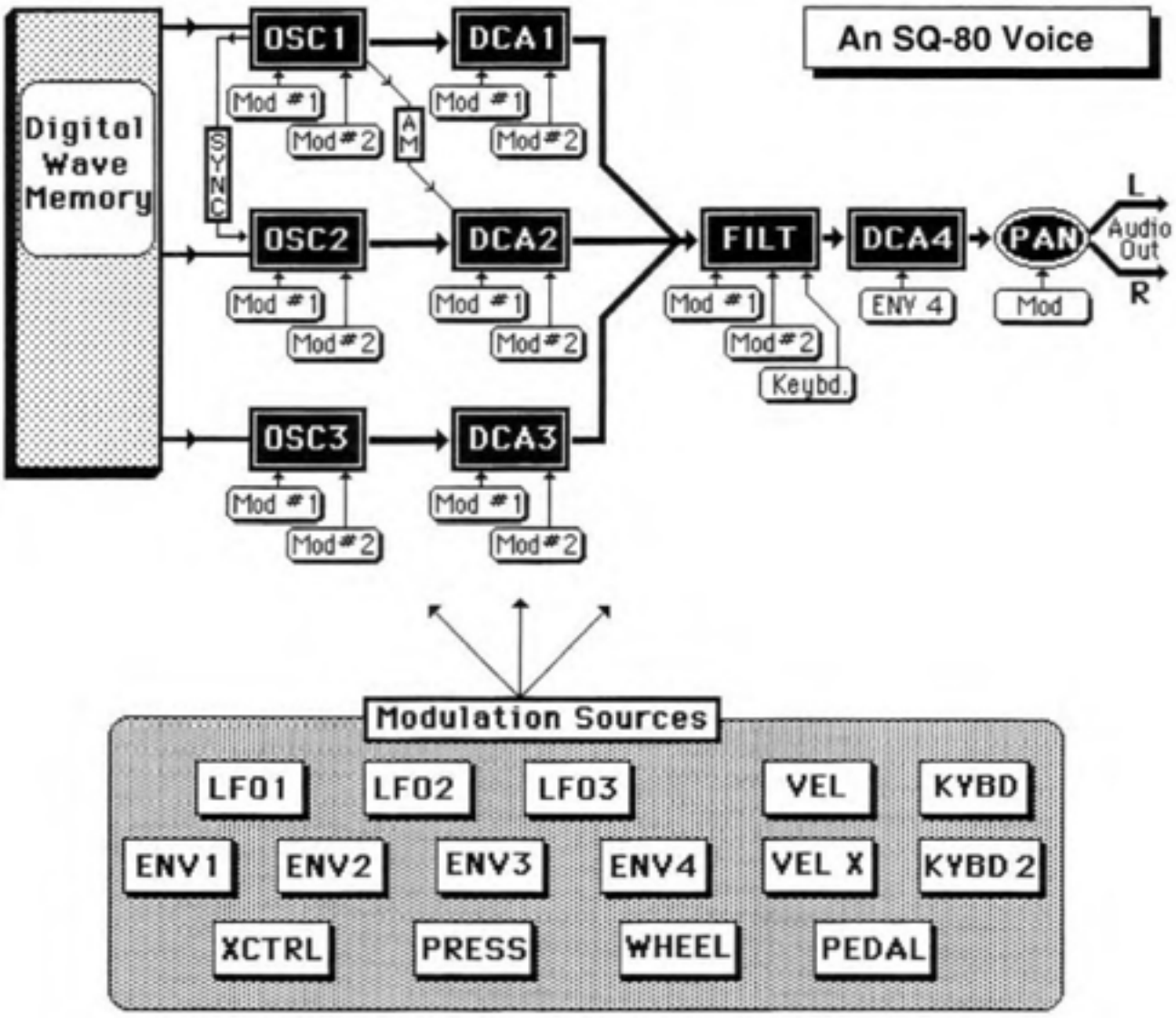
> **KEYS** + CT + PC + SNGSL — Same as KEYS + CT + PROG CHNG above, with the addition that MIDI Song Select messages will also be received. Key Events, Controllers, Program Changes and Song Selects will be sent and received in this Mode.

> **KEYS + CT + PC** + SS + SX — Key Events, Controllers, Program Changes, Song Selects and System Exclusive messages will all be received via MIDI in this Mode. This enables the **SQ-80** to receive System Exclusive messages, such as Parameter Changes, Program Dumps, Sequencer Data. etc. Any Parameter (Program or Global) that is changed on the **SQ-80** will also be changed on another SQ-80 connected to the first by MIDI.

Note: This is the only parameter on the SQ-80 whose setting is not always preserved when the unit is turned off and then on again. If the SQ-80 is enabled to receive System Exclusive messages (ENABLE=KEYS + CT + PC + SS + SX) and you turn the power off, when you turn it on again this parameter will be reset to ENABLE= KEYS + CT + PC + SNGSL. In other words, System Exclusive messages will no longer be enabled. This is to prevent accidentally leaving System Exclusive messages enabled, which can wreak havoc in some circumstances (notably while sequencing).

SECTION 3

Voice Programming



Any of 'these 15 Modulation Sources can be independently assigned wherever a MOD is indicated above.

For each of the SQ-80's 8 voices:

....Each Oscillator plays a Wave from the Digital Wave Memory;

-->The output of each Oscillator passes through the same-numbered DCA (Digitally Controlled Amplifier);

-->The output of the 3 DCA's passes through the Four-Pole Low Pass Filter;

-The output of the Filter goes to the final DCA - DCA 4.

-->The output of DCA 4 goes to the Panner, which pans the Program between the Left and Right Audio Outputs.

-->Wherever a "Mod" is indicated in the above diagram, any of the 15 available Modulators may be assigned to vary the "Manual" setting.

About Cross Wave™ Synthesis

The sound of most musical instruments can be separated into two basic parts:

- The **Attack —** the initial transient frequencies of the sound, which quickly die away. The scratch of a bow on a violin string, the sound of a mallet striking a vibraphone, the pluck of a guitar string — these are all examples of Transient Attacks.
- The **Sustain —** after the initial attack dies out, most sounds settle into a relatively stable pattern of repeating wavecycles.

Usually the most complex and interesting part of a sound, and the hardest part to synthesize. is the initial Attack. Ideally, we would like to be able to sample (digitally record) the Attack segments of various sounds, and then Crossfade those Attacks with other sampled or synthesized Sustain Waves. This would allow us to custom-build sounds with an endless variety of Attack and Sustain characteristics"

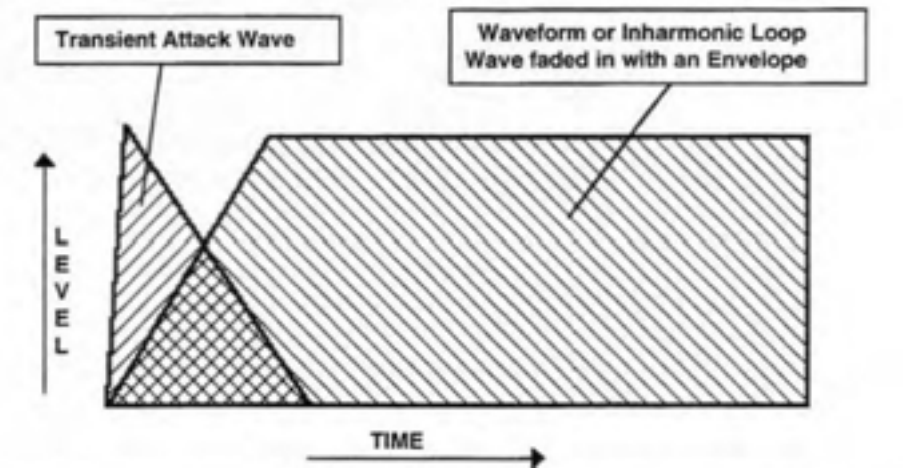
This is exactly what the SQ-80 is designed to do. Within each Program, each of the SQ-80's three Oscillators can play a different Wave. Among the available Waves are **Transient Attacks,** which are used for the initial Attack portion of the sound, and two types of Sustain Waves — **Waveforms,** which are single-cycle waves repeated over and over, and **Inharmonic Loops,** which are dynamic. multi-cycle waves.

You can assign one Oscillator to play a Transient Attack. and have the other two play Sustain Waves. Or you can assign two Oscillators to play different Transient Attacks simultaneously, and use one Sustain wave. Any Oscillator can be assigned to play any Wave. The best thing about CrossWave™ synthesis is that you can use it to recreate the sound of a real instrument, such as a cello or marimba. or you can create entirely new sounds by combining totally unrelated Attack and Sustain Waves. How about a Bowed Bell? Or a Plucked Vocal? The possibilities are limited only by the imagination of the programmer.

Crossfading Waves

The basic idea of Crossfading is that the volume (or amplitude) of one sound fades out over time as another sound fades in.

- The **SQ-80's** Transient Attack Waves have their own built-in fade-out. That is, these Waves do not loop — they play through once at the beginning of the sound and stop.
- The Sustain Waves (the **Waveforms** and **Inharmonic Loops)** are faded in using the SQ-80's Envelopes. One of the four Envelopes is assigned to modulate the DCA (Digitally Controlled Amplifier) of the Oscillator playing the Sustain Wave (see **Modulators.** later in this Section). By setting the Envelope's TIME 1 to a value of around 10, we can cause that Oscillator's level to fade in as the Transient Attack Wave played by another Oscillator is fading out. Here's the net effect:



Throughout the rest of this Section you will learn about the Waves, Modulators. and Envelopes, and how to control the pitch and volume of each Oscillator. Once you are familiar with the basic operations, try examining some of the Factory Programs to see which Waves are played by the different Oscillators (OSC 1-3 Pages), and how the volume of each Oscillator has been programmed (DCA 1-3 Pages).

WAVES

Digital Wave Memory

The **SQ-80's** CrossWave™ synthesis technique is based on the ability of its three Digital Oscillators to "read" from memory whichever Waves they are instructed to play for each Program (rather than just producing simple sawtooth or square waves). The **SQ-80** has 256 kilobytes of wavedata in ROM to use in constructing sounds.

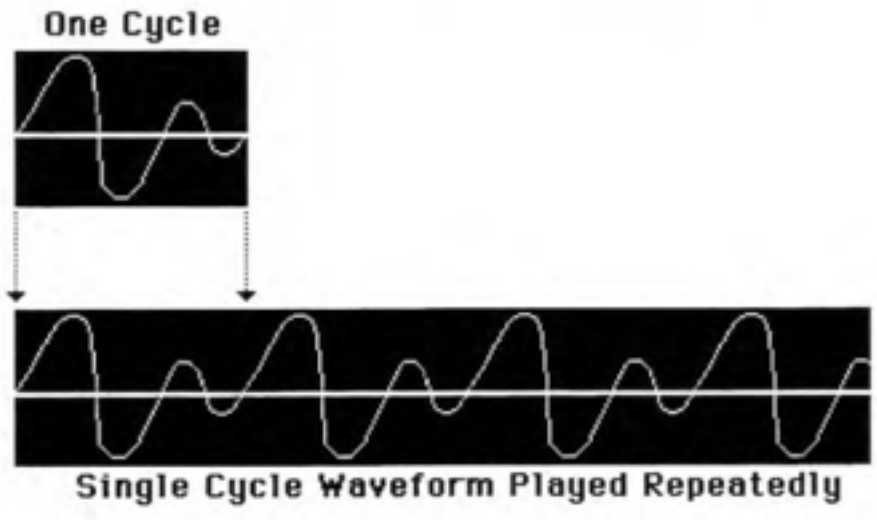
This wavedata is divided among 75 different Waves stored in the SQ-80's Digital Wave Memory. Many of these Waves have been sampled (digitally recorded) from real musical sources: others have been created synthetically. Some were sampled and then re-synthesized using various Digital Signal Processing techniques.

Waveforms, Inharmonic Loops and Transient Attacks

The Waves which form the "raw material" of the **SQ-80** sounds are divided into three basic categories — Waveforms, Inharmonic Loops and Transient Attacks. Though Waveforms, Inharmonic Loops and Transient Attacks are all forms of digitally encoded sound, they differ in fundamental ways.

• **A Waveform** is a single cycle of a sound wave. It is Digitized, or converted into a series of numbers, and stored in Memory. By rapidly repeating this single cycle over and over, an Oscillator can produce a pitched sound which becomes a continuous Sound wave:

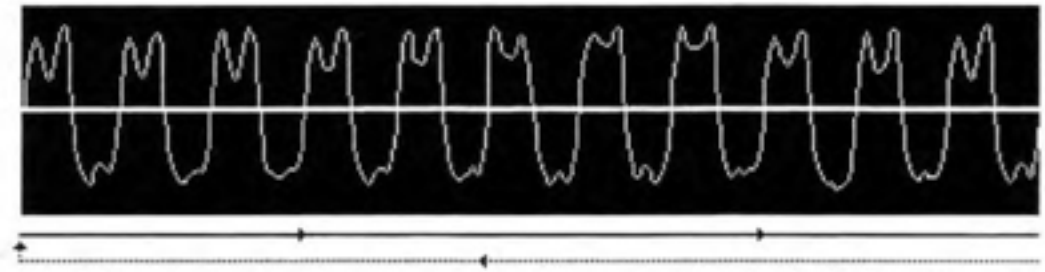
Unlike the sounds generated by analog oscillators, Digital Waveforms can be very complex. and can contain any combination of harmonics — frequencies that are multiples of the wave's fundamental frequency. Every Waveform has its own unique Spectrum, which is the number and amplitude of harmonics present in the Wave. It is this Spectrum which gives every sound its own identifiable characteristics.



The **SQ-80** has 49 Waveforms. The first 32 Waveforms are the same as those in the **ENSONIQ ESQ-1.** This means that ESQ-1 sounds can be played on the **SQ-80.** The reverse is partially true — **SQ-80** sounds which use *only* the bottom 32 Waveforms (none of the other Waveforms, Transient Attacks or Inharmonic Loops) will usually play properly on the ESQ-1. However, any SQ-80 sounds which use Transient Attack or Inharmonic Loop Waves will tend to produce unpredictable results when played on the ESQ-1 (until the Program is modified to use waveforms which are legal on the **ESQ-1.)**

- An **Inharmonic Loop** is a relatively long portion of a sampled sound which is "looped" or repeated over and over. It is similar to a Waveform, but where a Waveform is one wavecycle of a sound repeated endlessly, an Inharmonic Loop contains many wavecycles of the sound. A waveform can capture the basic timbral characteristics of a sound, but when a single cycle of a wave is played over and over you lose any sense of randomness or movement within the sound. A long, multi-cycle loop can contain frequencies which are inharmonics — not exact multiples of the fundamental frequency. A Waveform by definition cannot contain such frequencies. A Waveform is static; an Inharmonic Loop is dynamic. Inharmonic Loops can capture the subtle shifts in the character of a sound which occur over time. They account for the **SQ-80's** ability to create a certain class of "atmospheric" sounds not possible with Waveforms.

Multi-cycle Inharmonic Loop

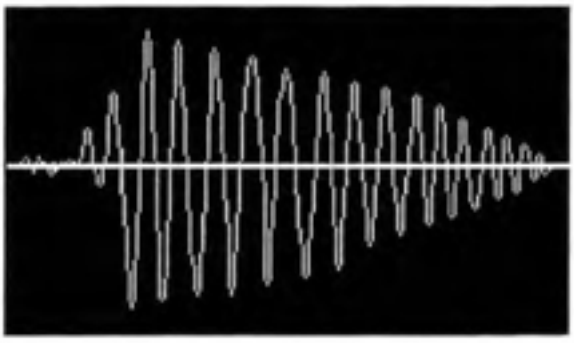


The only drawback of these types of Waves is that, being much longer pieces of sound, they take up an enormous amount of memory compared to waveforms. Thus you are limited to a smaller number of them.

The **SQ-80** has 5 Inharmonic Loops. These particular Waves have been optimized to add breath, movement and complexity to a sound — you can create all sorts of ear-grabbing textures by using different combinations of Inharmonic Loops and Waveforms for the sustain segments of your sounds.

- **A Transient Attack** is the very first portion of a sound — the scratch of a bow, the pluck of a string, the strike of a mallet, etc. A real sampled attack at the beginning of a sound tends to be more sonically interesting and "punchier" than a synthesized attack. The **SQ-80's** various Transient Attack Waves can be combined with the other types of waves (or with each other) to create a wide variety of or very unusual sounds. This is the essence of CrossWave™ synthesis — crossfading these sampled attacks with the various Waveforms and Inharmonic Loops to create new sounds.

Attack Wave



The Transient Attack Waves are not looped: unlike the other types of Waves in the SQ-80, they play through once and stop. They provide the attack transients of the sound, and then other Waves can be used for the sustain portion.

The **SQ-80** has 11 Transient Attack Waves (not counting the Drums).

- There is one more special category of Waves in the **SQ-80 — Drum/Attacks.** These Waves are actual sampled Drum sounds. They can be used as Drums or as Transient Attack Waves within other types of sounds. The last five Waves (DRUMS 1-5) combine the different Drum/Attack Waves in various configurations to give you an entire multisampled drum set just by selecting a single Wave.

Synthetic, Sampled and Multisampled Waves

Many of the Waves in SQ-80's Memory have been generated synthetically, using a number of different techniques, to create a variety of Waves which contain specific harmonics in specific amounts. By assigning different combinations of these synthetic Waves to two or more Oscillators, it is possible to create sounds with almost any timbral characteristics.

Some Waveforms, and virtually all of the Attacks and Inharmonic Loops, are sampled — digitized from some real musical source and stored in Memory. By crossfading and combining these Waves it is possible to synthesize sounds that capture the character of an instrument in a way that no ordinary synthesizer can.

Some of the SQ-80's Waves (such as the Piano Waveform) have been **Multisampled —** that is, different waves play in different ranges of the instrument. This is because many sounds lose their realism if they are transposed too far from their source. The lowest note on a piano, if transposed up three octaves, doesn't sound like a piano any more. Neither does the highest note transposed down three octaves. Or to use another example — take a recording of a human voice and play it back twice as fast. Does it sound like a human voice? No. What does it sound like? Chipmunks. (This is technically known as the Munchkin Effect.)

Multisampling means that the low notes of the Piano Waveform were sampled from a low note on the piano, the middle notes were sampled from a middle note, and so on. You don't have to do anything special to use these Multisampled Waves. The **SQ-80** treats each one as a single Wave, and they are selected just like the others.

The Synthetic Waves can be combined with the Sampled ones, to add harmonic content which enhances the sound in some way. Any combination of Waveforms is possible, and each will have its own unique sound.

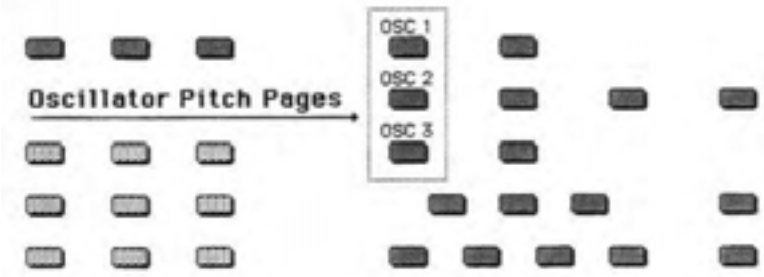
Names

The **SQ-80's** Waves are identified by their **Names.** You should neither take them too literally, nor let yourself be limited by those Names. Don't, for example, expect the VOICE Waves to always sound like Vocals —everything depends on the Program (the Envelopes. the Filter settings, etc.). On the other hand, don't let the Names alone limit what you try in terms of being creative. For example, if you find that within a certain Program the BASS Waveform sounds like a harpsichord. or a kazoo. or whatever, go with it. Your ears are the only valid judge of what works.

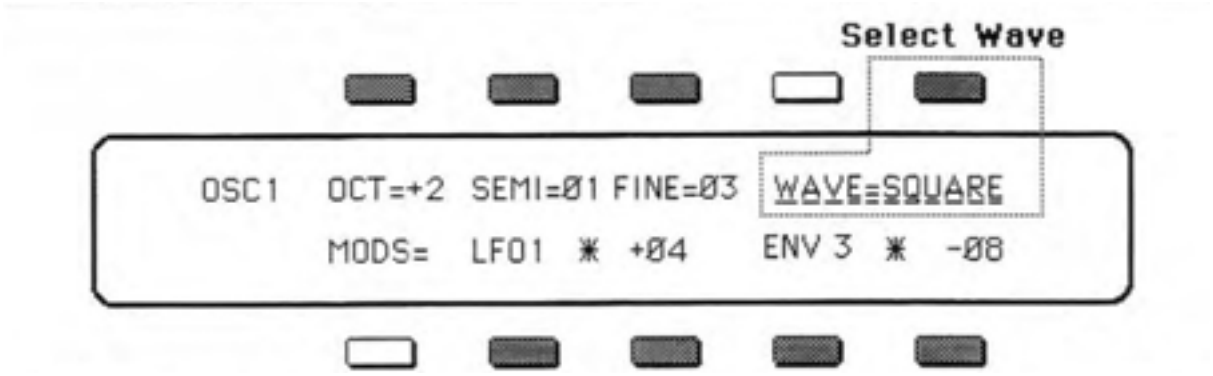
Selecting a Wave for each Oscillator

Each of the three Oscillators can play a different Wave within a Program. The Waves are selected from the **Oscillator Pitch** Pages **[OSC1, OSC2** and **OSC3].**

To select a Wave for **Oscillator 1,** press the Button labeled **OSC 1.**



The Display shows you **Oscillator l's** Page. In the upper right portion of the Page you find the **Wave** select parameter.



Press the "Soft" Button above the **WAVE NAME.** Now you can use the Data Entry Slider and the Up and Down Arrow Buttons to change the Wave that **OSC 1** will play. There are 75 available choices, each with its own Name. Follow the same procedure to select a Wave for OSC 2 and **OSC 3.** The following section details each Wave by Name.

Check Them Out

The best way to understand the **SQ-80's** Waves is not to read about them, but to hear them.

- Select an Internal Program. preferably one with infinite sustain such as an organ sound.
- Turn off the output of Oscillators 2 and 3 (Press the DCA2 button to select the Oscillator Volume Page for Oscillator 2. Select the parameter OUTPUT=ON and switch it to OFF. Do the same on the DCA3 Page).

Now select the **OSC 1** Page as shown above, and select WAVE. Move the Data Entry Slider all the way down so that the Sawtooth Waveform is selected **(WAVE= SAW).**

While repeatedly playing a note or chord. press the Up Arrow Button to step to the next Wave. Press it again to hear the next one, and so on. In this way you can listen to each Wave in succession. compare them to each other, and compare the timbral and percussive characteristics you hear in various ones to their text descriptions below. When you are looking for the right Wave for a particular application, let your ears be the guide.

THE WAVES

Note: The first 32 Waves (SAW through OCT+5) are the same as those contained in the **ENSONIQ ESQ-1.** The remaining 43 Waves (starting from SAW 2) are unique to the SQ-80.

1) CLASSIC SYNTH WAVEFORMS

These Waveforms collectively form the bases of almost all classic Analog synthesizer sounds. Their inclusion here gives the SQ-80 its ability to make those sounds with the best of them.

--> SAW — **SAWTOOTH.** The Sawtooth Wave needs no introduction. It contains all the harmonics, and is extremely bright. The Sawtooth is the basis for many Analog sounds. notably Strings and Brass.

---> **BELL.** The Bell Waveform contains many widely spaced harmonics, many of them odd harmonics. It makes bright. Bell sounds.

SINE. The Sine Wave contains only the Fundamental, with no higher harmonics. It has very pure tone, good for flutes, organs, etc.

____-> **SQUARE.** The Square Wave contains the Fundamental and all its odd-numbered harmonics at a fixed ratio. The level of the harmonics is the same as the Sawtooth, except that there are no even-numbered harmonics. The Square Wave has a hollow sound, and is also the basis for many classic synth sounds.

____> **PULSE.** This Pulse Wave contains the Fundamental and all its integral harmonics at equal amplitude. This is a very bright Waveform.

> **NOISE 1.** This is a Waveform taken from filtered Noise. It works best when tuned down low (OCT= -3). (Note that the Noise Waveforms here differ from analog Noise generators, in that Waveforms are by definition repeating patterns, and Noise is random.)

> **NOISE** 2. This is very close to White Noise. It has almost no pitch. but modulating the Oscillator playing this Waveform with a fast LFO or an Envelope, will eliminate what pitch tracking there is.

> **NOISE 3.** This Waveform is good for putting random frequency components into a sound (the attack "ping" of a mallet instrument, for example). It has a clangorous, metallic quality, and its pitch tends to be unpredictable.

2) SAMPLED WAVEFORMS

The **Sampled Waveforms** contain harmonics that simply cannot be generated by an ordinary synthesizer, since every musical source produces its own unique waveshapes and Frequency Spectrum.

– **> BASS.** This is a bright Bass Waveform, full of interesting harmonics, which, depending on the Program, makes a great regular or synth-type Bass. Higher up it takes on a Clav-like character.

– **> PIANO.** A multisampled acoustic Piano wave. Its best range is OCT= -1.

____> **EL PNO — ELECTRIC PIANO.** A Waveform taken from a popular Electric Piano — allows you to recreate this instrument with tremendous realism.

> **VOICE 1.** A multisampled Vocal waveform, saying "Ah".

– **> VOICE** 2. A multisampled Vocal waveform, using the same waveforms as VOICE 1. but with a higher split point for each Wave

____ > **KICK.** This Waveform is optimized for one application. Tuned to OCT= -3, properly enveloped, and played on the lowest key of the Keyboard, it reproduces a Kick drum.

____> **REED.** One cycle from an Alto saxophone wave. With different Programs it can sound like different Reed Instruments.

____> **ORGAN.** This Waveform contains the fundamental and four Octaves (2nd, 4th. 8th, 16th and 32nd harmonics). Instant Pipe Organ. Also good for Bells.

3) ADDITIVE SYNTHESIS WAVEFORMS

These three Waveforms were created through Digital Additive Synthesis. Each contains the Fundamental and certain specific harmonics in equal amounts.

____ > **SYNTH 1.** Contains the fundamental, and every third harmonic, starting from the 2nd, up to the 26th . in equal amounts:
Harmonics: 1, 2, 5, 8, 11, 14, 17, 20, 23, 26.

— > **SYNTH 2.** Contains the fundamental, and every third harmonic, starting from the 4th. up to the 25th in equal amounts:
Harmonics: 1, 4, 7, 10, 13, 16, 19, 22, 25.

> **SYNTH 3.** Contains the fundamental, and the prime-numbered harmonics, up to the 23rd. in equal amounts:
Harmonics: 1, 2, **3. 5,** 7, **11, 13, 17, 19, 23.**

4) FORMANTS

These five Waveforms were created through a process called Time-Domain Formant-Wave-Function Synthesis. Each one has a sharp peak in its frequency spectrum— like pushing one band of a graphic equalizer all the way up. These Waves are multisampled in such a way that the frequency peak remains relatively constant up and down the keyboard, rather than tracking the pitch of the note. Each has its peak centered around a different frequency. They tend to have a nasal quality, and make excellent component waveforms for Vocals, Strings etc.

____ > **FORMT 1.** Has a frequency peak centered around 750 Hz.

– **FORMT 2.** Has a frequency peak centered around 1 kHz.

FORMT 3. Has a frequency peak centered around 1.4 kHz.

– **FORMT 4.** Has a frequency peak centered around 1.75 kHz.

– **FORMT 5.** Has a frequency peak centered around 2.25 kHz

5) BAND LIMITED WAVEFORMS

These Waveforms are Band Limited — that is, their harmonic content has been restricted along certain specific lines. They are good for adding controlled harmonics to a sound. or for combining to achieve various timbres. Some are other Waves with some harmonics pulled out; some were built "from scratch" to contain only certain harmonics.

PULSE2. Originally a Pulse Wave, like the Pulse Wave above, but with only the first 11 harmonics left in.

SQR 2. Originally a Square Wave, but with only the first 7 harmonics left in.

> **4 OCTS.** Contains, in equal amounts, only four harmonics — 1st, 2nd. 4th, 8th. Fundamental and three Octaves; again, good for Organ sounds.

____ > **PRIME.** Contains, in equal amounts, only the first five prime-numbered harmonics: 1st, 3rd. 5th. 7th, and 1 1 th.

– **BASS** 2. Originally the Bass Wave, but with only the first eighteen harmonics left in.

– **E PNO2.** Originally an Electric Piano Wave, but with only the first nine harmonics left in. An Electric Piano without the "ping."

> **OCTAVE.** Contains only the 1st and 2nd harmonics in equal amounts — the Fundamental and one Octave.

– **OCT+5.** Contains only the 1st, 2nd. and 3rd harmonics in equal amounts — the Fundamental, one Octave and the Fifth above the octave.

Note: All Waves from this point on are unique to the SQ-80.

6) MORE WAVEFORMS

These Waveforms, some sampled, some synthetic, and some sampled and then resynthesized. give you yet another set of timbres from which to choose when deciding upon Sustain Waves for your sounds. They have been carefully selected for maximum usability.

–___ SAW 2. A band-limited sawtooth wave, containing only the first three harmonics.

____ > **TRIANG.** A triangle wave.

> **REED** 2. In addition to being good for reed and woodwind sounds, this is a good Waveform to use for the Sustain portion of string and guitar sounds.

> **REED 3.** This Wave has a nasal. oboe-like character. It is similar to the Formant Waves except that the frequency peak tracks up the keyboard along with the fundamental instead of remaining constant.

____ > **GRIT 1.** The three GRIT Waveforms give you a set of raw, harmonically dense Waves to use for giving a sharp, cutting edge to a sound. They are particularly effective when used as Sustain Waves which are only brought in at high velocities. They also make good component waves for ensemble string and brass sounds. Or use them to put some grit into the beginning of a sound.

GRIT 1 is somewhat band-limited, the least aggressive of the three.

– **GRIT** 2. Similar to GRIT 1 but with more high harmonics.

– **GRIT 3.** The brightest of the three GRIT Waveforms. Extremely raw-edged, not recommended for polite company. Good for adding bite to Clay, electric guitar, horn and other bright sounds.

____ -> **GLINT 1.** This Waveform contains a single very high harmonic which is multisampled in such a way that the high harmonic remains in more or less the same place as you play up the keyboard. Good for adding a high glassy shimmer to electric piano sounds, bells, etc. Changing the Octave of an Oscillator playing any of the GLINT Waveforms will have no effect.

– **> GLINT** 2. Same as GLINT 1 except that the high harmonic is lower.

–___ **> GLINT 3.** Same as GLINT 1 and 2 but the high harmonic is still lower.

> **CLAV.** A multisampled Waveform, taken from the sustain segment of a Clay.

> **BRASS.** This Wave consists of two samples. The lower half is a single cycle taken from a trombone; the upper half is a single cycle from a trumpet note. Mix with other Sustain Waveforms

(notably SAW or PULSE) to create full-bodied brass ensemble sounds.

– **> STRING.** A single cycle from a cello note. Full of rich harmonics characteristic of bowed instruments. Makes a good sustain Waveform for the BOWING attack.

____> **DIGIT 1.** This Waveform and the next were created using Frequency Modulation. This Waveform employs large amounts of modulator feedback within the FM algorithm to capture the typical gritty sound which is usually associated with high-velocity keystrikes.

> **DIGIT** 2. Another Waveform created through Frequency Modulation. This wave captures the characteristic sound of a digital piano.

> **BELL** 2. Another single-cycle Bell Waveform, with many widely spaced harmonics.

– **> ALIEN.** A single-cycle Waveform taken from a Vocal wave. It has a quality which sounds partly sampled. partly synthetic. Good for adding a different timbre to vocal patches. etc.

7) **INHARMONIC LOOPS**

These are complex, multi-cycle Sustain Waves. Composed of sampled segments of sound longer than a single wavecycle, these Inharmonic Loops have an element of movement. or "breath." and an an atmospheric quality not possible with conventional Waveforms.

> **BREATH.** A hollow, breathy sound with a bit of fundamental.

– **> VOICE 3.** Taken from a sample of female vocalists singing "Ooh."

– **> STEAM.** This wave is mostly "air" without a lot of fundamental. It lends an open, ethereal quality to any sound.

– **> METAL.** Extremely dense with harmonics and inharmonics, this Wave has a deliberately synthetic character.

– **> CHIME.** This Wave contains many widely spaced harmonics and inharmonics. A multi-cycle sample of a large tubular bell was used as the source of this loop.

8) TRANSIENT ATTACKS

These Waves contain only the initial attack transients of various sounds. The Transient Attack Waves do not repeat over and over like the other types of Waves — they play through once and stop. You could say that these Waves have their own built-in decay Envelopes. A Transient Attack Wave will play at the beginning of the sound and then fade out, allowing another Wave (or Waves) to play the Sustain portion of the sound.

– **BOWING.** A multisampled attack, from a cello in the lower, a violin in the upper, capturing the initial scratch of the bow on a string. This Wave adds a realistic bow-scrape to string patches.

> **PICK 1.** The multisampled attack portion of a steel string acoustic guitar, played with the fingernail. Depending on the Program this attack can be used to evoke the sound of a number of different picked instruments.

– **> PICK** 2. This is the multisampled initial attack of an electric guitar, played with a nylon pick.

– **MALLET.** The attack portion of a mallet instrument — specifically a vibraphone. This makes

an excellent attack for digital/FM-type piano sounds. Bright yet mellow.

> **SLAP.** The initial "pop" from a electric slap bass. This attack can be combined with the BASS Waveform to create some extremely punchy and realistic bass sounds.

– **PLINK.** Created through additive synthesis, then resynthesized using the Karplus-Strong Plucked String Algorithm. This and the next two Waves add a bright, hard attack to any sound, and can sound warm or metallic depending on the context.

> **PLUCK.** Also created using additive synthesis, and resynthesized with the Karplus-Strong Algorithm. It is similar in character to PLINK but higher and clearer.

– **> PLUNK.** This attack started life as the sound of two wine glasses being clinked together. The sample was then resynthesized using the Karplus-Strong Algorithm. Like PLINK and PLUCK, it gives a sound an edge which will cut through the mix.

– **> CLICK.** Just what it sounds like — a click. Use this Wave to give bite to keyboard-type sounds, to recreate the click caused by dirty contacts in electric organs. etc. For best results, eliminate the pitch tracking of the Oscillator playing this Wave (assign KBD2 to modulate the OSC pitch. with a modulation depth of -63, then tune the Octave and Semitone to taste).

____ > **CHIFF.** The breathy "chiff' from the attack of a flute. This Wave is good for putting a little "breath" into the attack of any sound.

____ > **THUMP.** This Attack Wave is sampled from the actual sound made by a piano's hammer hitting the string, but with all the strings muted so that you only hear the thump. Less aggressive than CLICK, it lets you put a realistic thump into the attack of piano. bell and other "hammered" sounds. As with CLICK, it works best if you eliminate the pitch tracking.

9) DRUM/ATTACKS

This unique group of Waves serves two purposes. All are actual samples of real Drum sounds. Their inclusion in the SQ-80 gives you realistic, punchy drum sounds to use, either individually or as an entire set (see #10 below). In addition, most of these Waves also make great Transient Attacks when used with other Waves within a Program. For example, the TOMTOM Wave, when played in the range at which it was sampled, sounds like a TomTom. But when used as an Attack Wave and transposed above its natural range, it takes on a whole new character. Experiment with using these Waves both as Drums and as Transient Attacks.

> **LOGDRM.** A Log Drum is a hollowed log with slits cut in the top. played with mallets. It has a nice, rounded sound. LOGDRM makes an excellent Attack Wave as well as a good drum sound. It makes a unique "percussion" attack on Organ sounds, for instance, when tuned up an octave plus a fifth from the fundamental.

– **> KICK** 2. A tight Kick Drum, with plenty of bottom, but with a nice "pop" to it. Unlike the KICK 1 Waveform, which is a single cycle, this is the entire sound of a Kick Drum and is not looped. Try adding this Kick Drum right into the attack of a Bass sound.

____ > **SNARE.** A bright, punchy Snare drum, with a good amount of room ambience.

TOMTOM. This is a sample of a rotary-type TomTom, played in a big reverberant room. It has a nice descending pitch component. As mentioned above, it makes an extremely interesting

Transient Attack Wave, especially in the upper octaves where it no longer sounds like a drum.

> **HI HAT.** A sampled closed hi hat sound.

10) MULTISAMPLED DRUM SETS

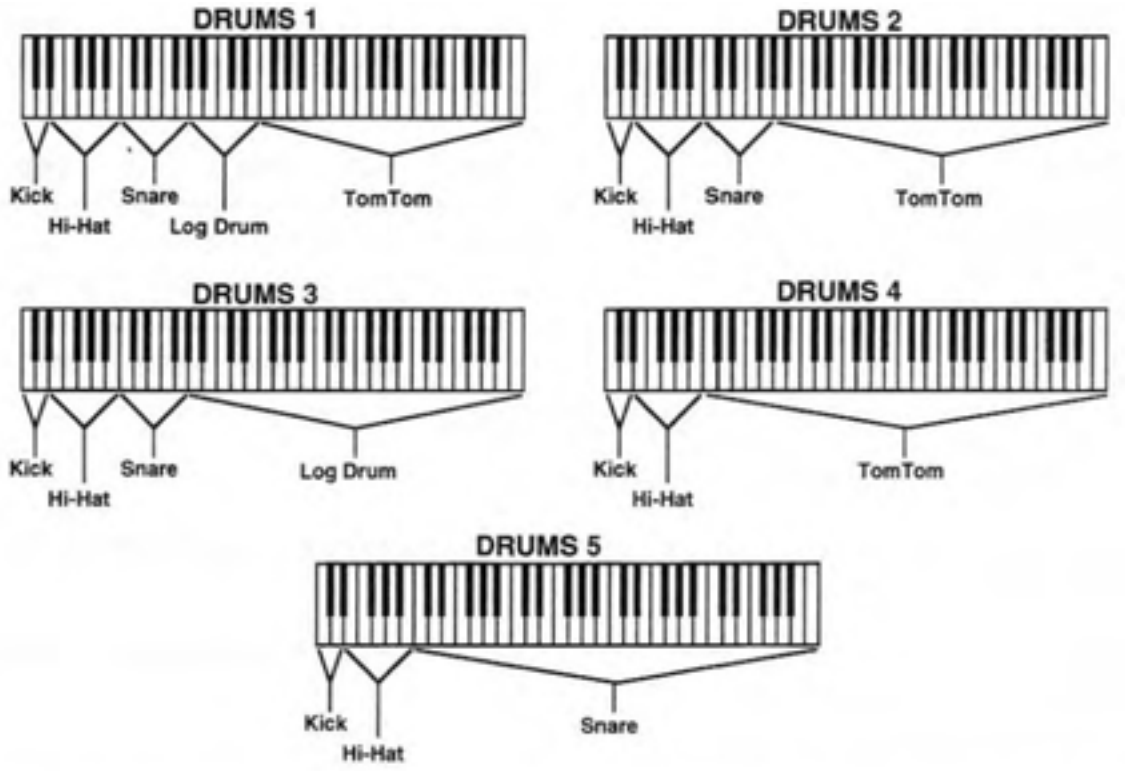
The last 5 Waves are special ones — they combine the individual Drum/Attack Waves into a number of complete multisampled Drum Sets, spread out across the SQ-80's 5-octave keyboard. By using the DRUMS 1-5 Waves you can have various combinations of drums together in one Wave. This is great when sequencing — it's like having a drum machine built into your synthesizer.

Due to their unique nature, the DRUM Waves are often best used alone in a Program, with the other two Oscillators turned OFF. You can, however, create special effects, such as assigning more than one Oscillator to play a DRUM Wave, slightly detuned, which would result in a flanged- or chorused-sounding set.

The various configurations of the five sets give you different ranges of TomTom, Snare and Log Drum to work with. One idea is to use a Wave like DRUMS 4, which contains only Kick, Hat and Toms, to make a lower Program, and then split that Program with one that uses the SNARE Wave. This approach allows you to create specialized set-ups by processing various drums through different Program parameters.

> **DRUMS 1.** The five Drum/Attack Waves described above are here arranged into a single "Wave" through multisampling.

> **DRUMS** 2-5. These Waves feature different combinations of drums across the keyboard, offering you 1) more range on some of the drums, and 2) the ability to create custom set-ups using, Split Programs as described above. The illustration below shows how the Drums are arranged on the keyboard for the five DRUM Waves when the Waves are tuned to OCT=+O.



MODULATORS

About Modulation

To **modulate** something is simply to cause it to change. Within the Voice architecture of the SQ-80 we begin by setting basic, or Manual, levels for Volume, Pitch. Brightness, etc., and we then modulate those levels in various ways in order to create movement and dynamics within the Sound.

Suppose you switch on your stereo, and turn the volume half way up. We can call this the Manual Volume setting. It will stay at that level until it's changed. Now suppose that you take the Volume knob and begin quickly turning it up and down, so the volume gets continuously louder and softer, louder and softer. What you would be doing is **modulating the volume** of your stereo. If you were to take the Treble control, and do the same to that knob, you would be **modulating the brightness** of your stereo.

In much the same way we modulate various levels within the **SQ-80** (though generally the approach is less haphazard). There are 15 different **Modulation Sources** available, and they can each be independently assigned to vary the Manual levels for:

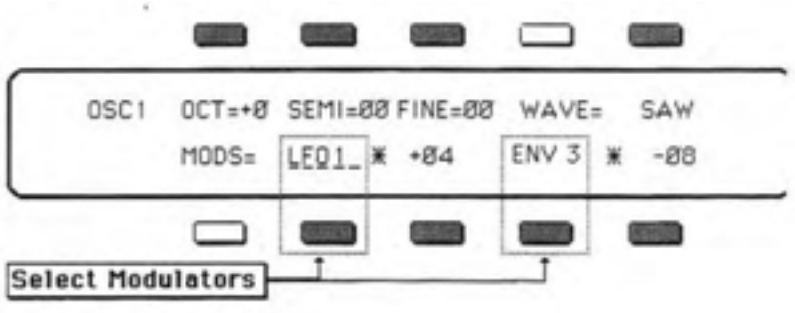
– > The Pitch of each Oscillator [OSC I, OSC 2 and OSC 3]
– __ > The Volume of each Oscillator [DCA 1. DCA 2 and DCA 3]
____ > The Filter Cutoff Frequency. or the Brightness of the Program [FILTER]
The Depth of the Low Frequency Oscillators [LFO UFO 2 and LFO 3]
and
– > Panning the Program within the stereo mix [DCA 4] Page

The Final Volume of the Program **[DCA 4]** is a special case — it is always controlled by **Envelope 4,** which is fixed as its Modulator.

Selecting a Modulator

On each of the **Oscillator Pitch** Pages. **[OSC 1, OSC** 2 and **OSC 3].** the **Oscillator Volume** Pages, **[DCA 1, DCA** 2 and **DCA 3],** and the **FILTER** Page, you can select two different Modulators. The format is similar for all these Pages — the controls on the bottom row of the Page are used to Modulate the Levels set on the top row. Take for example the **OSC 1** Page:

To select a Modulator (or Modulators) for the pitch of **Oscillator 1.** first press the **OSC 1** Button. then press either of the **Select Modulator** "Soft" Buttons on the Display, as pictured above. Use the Data Entry Slider and the Up and Down Arrow Buttons to select from among the 15 available Modulation Sources. Follow the same procedure



to select Modulators on the other Pages listed above.

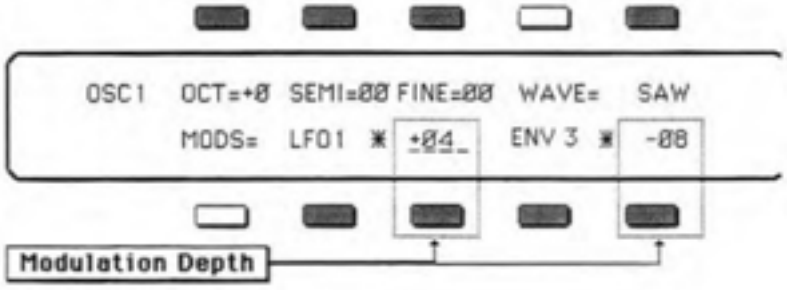
For Modulating Program **Pan [DCA** 4 Page] and LFO depth **[LFO UFO** 2 and LFO 3 Pages] only one Modulator can be selected.

Helpful Hint: Moving the Data Entry Slider all the way up selects *OFF*, which is handy if you don't want a Modulator applied in a particular location.

Modulation Depth

Once you have selected a Modulator, use the control immediately to its right to adjust the **Modulation Depth,** or the amount by which the Modulator will affect the Manual Level.

Press the appropriate "Soft" Button. as shown at the right, and use the Data Entry Slider and the Up and Down Arrow Buttons to adjust the Modulation Depth. Modulation Depth can be Positive or Negative. A Modulation Depth of **+00** has the same effect as turning the Modulator ***OFF*.**



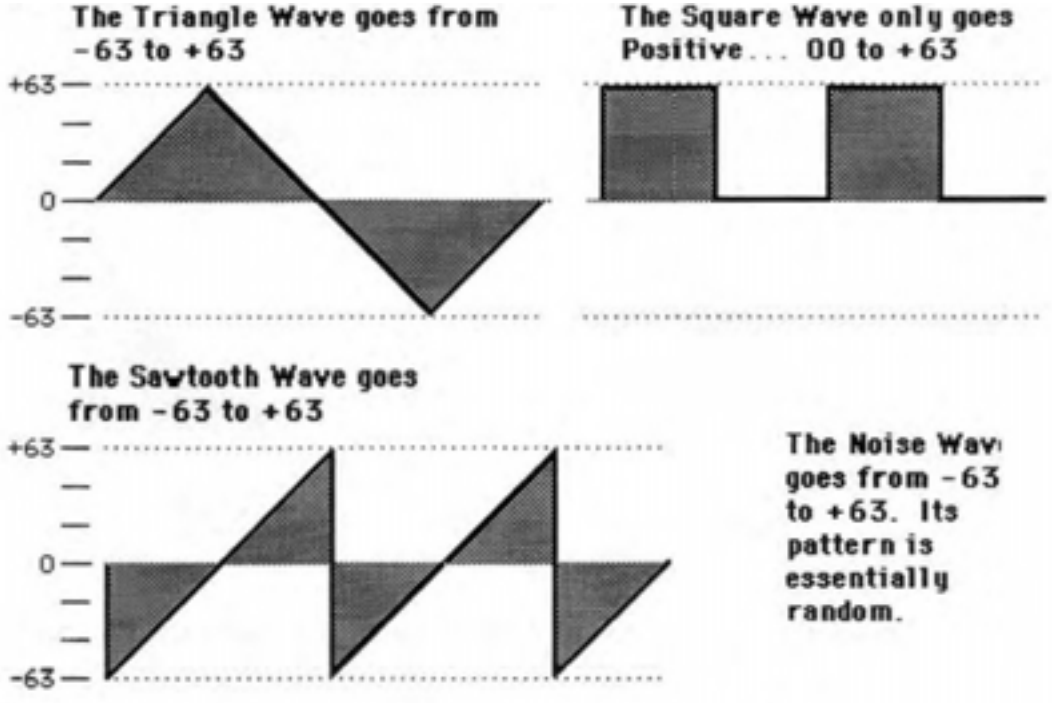
Helpful Hint: With Modulation Depth, as with all Parameter values that have a center value (in this case, **+00),** there is an easy way to reach that value. With the Modulation Depth selected, press the Down Arrow Button, and while holding it down, press the Up Arrow Button. This automatically sets the Modulation Depth to **+00.**

Modulation Sources

The 15 **Modulation Sources** available on the SQ-80 are as follows:

LFO 1, LFO 2 and LFO 3

The three **Low Frequency Oscillators** generate only very low frequency waves, which can produce Vibrato, Tremolo, and many other effects, depending on the LFO wave selected. and where it is applied as a Modulator. There are four possible waveshapes for each LFO. The Square wave only goes in a positive direction: the Triangle. Sawtooth and Noise Waves go positive and negative. (Though negative Modulation depth will reverse the effect.) The Diagrams below show the maximum levels for each LFO waveshape.

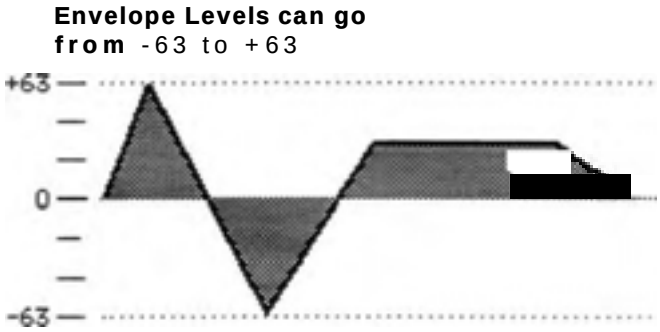


See the LFO Page (p. 56) for a complete discussion of the LFO's.

– **ENV 1, ENV 2, ENV 3 and ENV 4**

The **SQ-80** has four complex **Envelopes** which can be applied as Modulators. Envelope Levels can be positive or negative. The Envelopes are used to create changes, over time, in volume. brightness, pitch etc. An important use of Envelopes is to "fade in" the level of the Sustain Wave (or Waves) in a sound, so that it crossfades with the Transient Attack Wave. This is done by assigning one of the Envelopes as a modulator on the the DCA Page of the Oscillator in question. with a Modulation Depth of up to +63, setting the DCA's LEVEL to 00. and setting that Envelope's T1 to about 10.

A comprehensive discussion of the SQ-80 Envelopes follows in the Section entitled **Understanding the Envelopes,** p. 59.

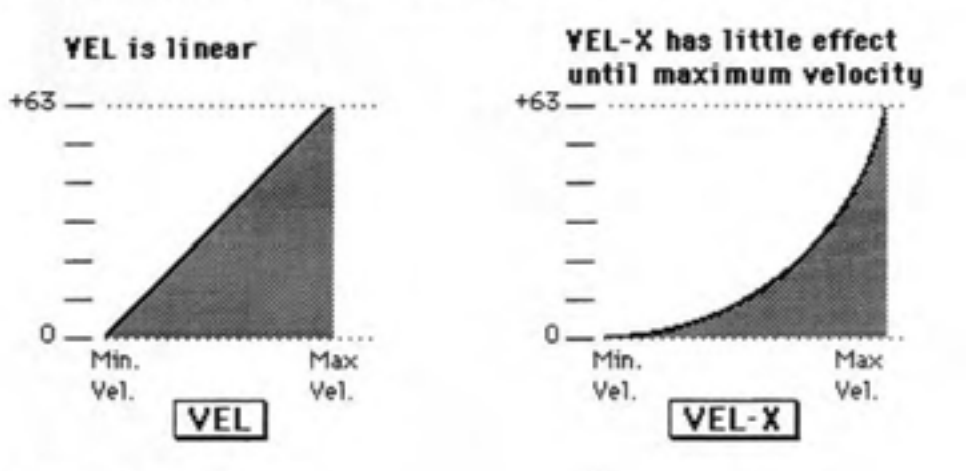


_____ > **VEL — Velocity**

Velocity means how hard you strike a key on the keyboard. Selecting VEL as a Modulator allows you to modulate any Manual Level with Velocity. Velocity as a Modulation Source only goes positive (though again, assigning a negative Modulation depth will make the net result a decrease in a Manual Level with Velocity). VEL is velocity with a straight linear curve, meaning that level increases evenly with greater velocity.

– **VEL -X**

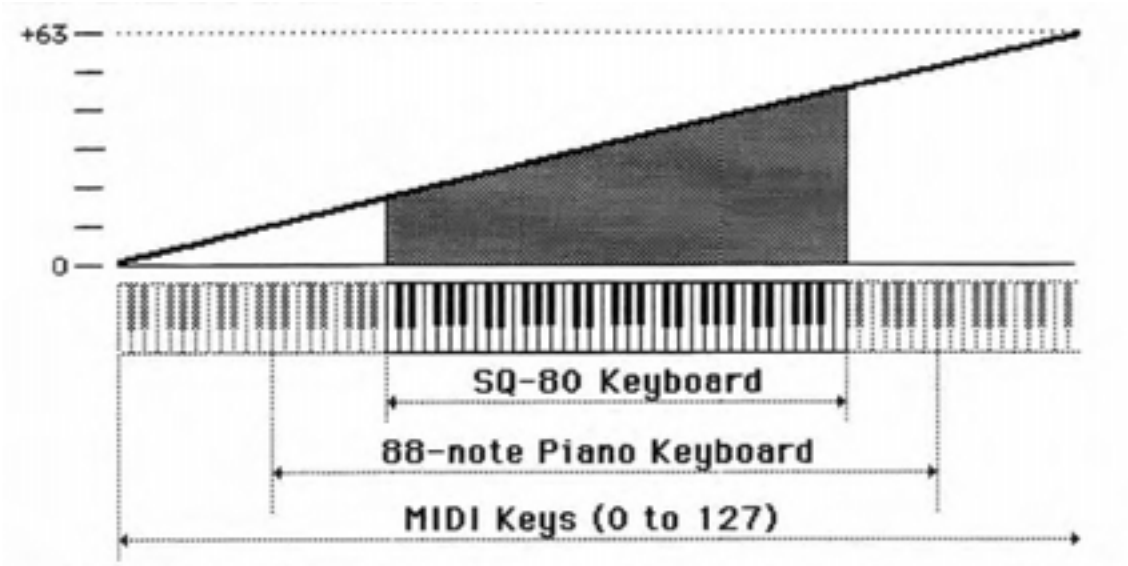
This is Velocity with a different Curve. Where the effect of VEL is linear, VEL-X is exponential. This means that VEL-X has hardly any effect when you play at low or medium velocity, but the level rises rapidly to maximum with very hard keystrikes. This is useful for programming dramatic changes into a sound which only occur when you really hit a key hard. The illustration below shows the difference between VEL and **VEL-X.**



– **KYBD — Keyboard Tracking**

Uses the position of a note on the Keyboard as a Modulator. The scaling effect of this Modulator is figured from MIDI key 0 to MIDI key 127.

As the illustration shows, the effect of **KYBD** is only positive-going (though a negative

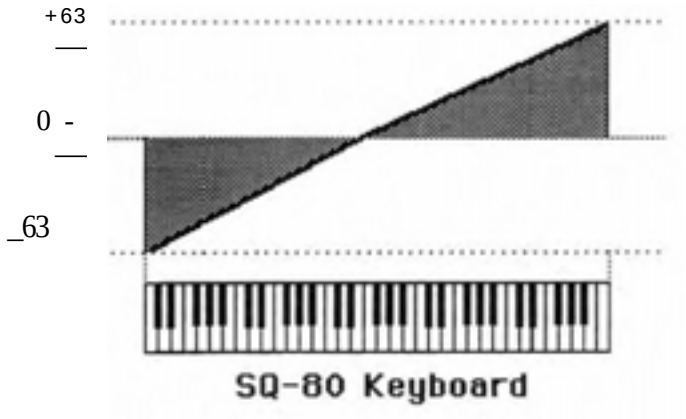


Modulation depth will reverse the effect) . Since scaling starts from MIDI key 0, there will always be some effect on the **SQ-80** keyboard, even on the lowest note. Manual Levels should be adjusted accordingly.

KYBD 2

Another way to modulate any Manual Level with the position of a note on the Keyboard. KYBD2 employs a different curve. KYBD 2 goes negative as well as positive and, unlike **KYBD,** has its full effect over the SQ-80's Keyboard.

As the illustration shows, the effect of **KYBD** 2 is to reduce the Manual Level on notes below the break point (E above Middle C), and increase levels above that point. Negative Modulation depths will do the opposite.



WHEEL — Modulation Wheel

The MOD Wheel to the left of the Keyboard is assignable wherever a Modulator is selected. To use the MOD Wheel for Vibrato (one common application) WHEEL must be assigned to modulate the LFO that is modulating Oscillator Pitch. The MOD Wheel's effect is positive-going only, from 0 (Wheel towards you) to +63 (Wheel away from you). Negative Modulation depths will reverse the effect.

PEDAL — Voltage Control Foot Pedal

This selects the CVP-1 Foot Pedal, which can be plugged into the **CV/Pedal** Jack on the SQ-80's rear panel, as a Modulator. Its effect will be the same as that of the MOD Wheel. It can be applied wherever a Modulator is selected.

Foot Pedal *(not* Volume Pedal — that's a separate controller) is MIDI Controller #4. Note that if you play the **SQ-80** from an external keyboard equipped with a Foot Pedal, and wish to use the

Pedal as a Modulator in your **SQ-80** Programs. you should select PEDAL, *not* XCTRL.

Note also that the Foot Pedal will only act as a modulator when the **Foot Pedal Function Select** parameter is set to PEDAL=MOD on the **Master** Page. When that parameter is set to PEDAL=VOL the Foot Pedal will act as a Volume Pedal. not as a modulator (though this has no effect on incoming MIDI Foot Pedal data). See p. 20 for more details.

XCTRL — External Controller (MIDI only)
An External Controller such as a Breath Controller. Data Entry Slider. etc., which is received via MIDI from another synthesizer, can be assigned as a Modulator within your **SQ-80** Programs. On the MIDI Page, you select the number of the External Controller that will be received.

You don't have to be playing the **SQ-80** from an external instrument for this to work. For example. if you have a Keyboard with a Breath Controller; 1) Connect its MIDI Out to the **SQ-80's** MIDI In; 2) Make sure both instruments have Controllers Enabled (MIDI Page); 3) Select Breath Controller as the External Controller that will be received by the **SQ-80 (XCTRL=02,** also on the MIDI Page); 4) assign **XCTRL** as a Modulator for Oscillator Volume, Filter Cutoff Frequency, or some other Manual level within a Program, as shown in the following Section: and 5) Play the Sound from the **SQ-80** keyboard, while blowing into the Breath Controller connected to the sending instrument. The Modulation will have the same effect as if you were playing from the sending instrument.

_____> **PRESS — Pressure (Aftertouch)**
Pressure, also called Aftertouch. is a modulator which varies a manual level within a Program depending on how hard you press down on a key or keys. After you have struck a key, and while the note is sustaining, continuing to press down harder on the key brings in Pressure. The **SQ-80's** keyboard generates Pressure, and by using this modulator you can add a tremendous amount of expression to your Programs without ever taking your hands off the keyboard.

Pressure *comes* in two varieties — **Key Pressure** (or Poly Pressure), which affects each note individually, and **Channel Pressure** (or Mono Pressure) which affects all notes that are playing when you exert pressure on any key. Either type of Pressure is available on the SQ-80. and both types are received via MIDI. There is a Control on the MIDI Page (PRESS=_) which determines which of the two types of Pressure will be generated by the **SQ-80** keyboard at any given time. This control can also be set to PRESS=OFF. in which case the keyboard will not generate Pressure internally, nor will it send or receive it via MIDI. (See MIDI Page, p. 23, for more details.)

When you record a Sequencer Track from the SQ-80 keyboard, the Track will record (and its Program will respond to) whichever type of Pressure is selected on the MIDI Page. Once a Track has been recorded. it will play back the type of pressure that was recorded, no matter what the setting of the Pressure Control on the MIDI Page. Since Pressure uses up a lot of Sequencer memory. if you don't want Pressure on a given Track, set the Pressure Control on the MIDI Page to PRESS=OFF when recording that Track, and the Sequencer will not record Pressure.

Note that not all sounds are necessarily programmed to respond to Pressure. If Pressure seems to have no effect when you play certain sounds, it is likely that the programmer did not assign Pressure as a modulator anywhere within the Program.

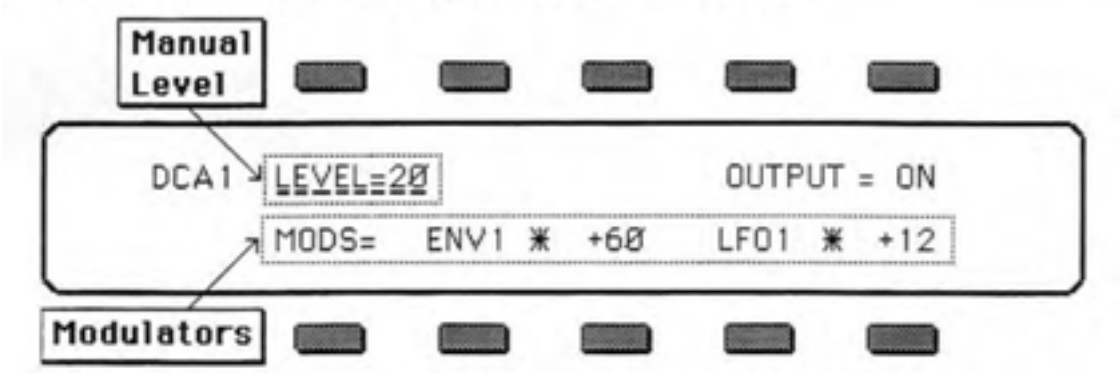
The effect of Pressure as a modulator is positive-going only. though assigning a negative modulation depth will cause increased Pressure to reduce Manual Levels.

USING MODULATORS

Modulating Oscillator Volume

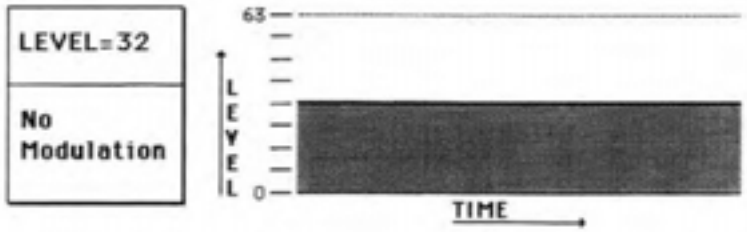
The Volume of each of the three Oscillators within a Program depends on a combination of two things:

1) the setting of the base, or Manual Level (the Control labeled LEVEL= on the **DCA 1, DCA** 2 and **DCA 3** Pages), and
2) the effect of any **Modulators** applied on any of those Pages.

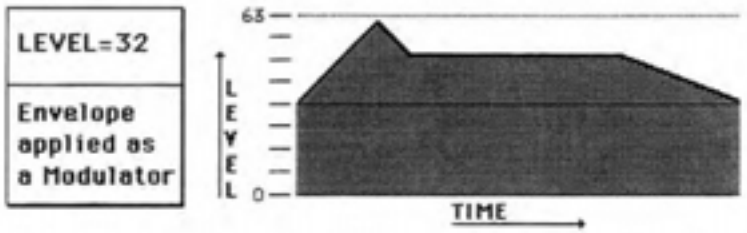


The Manual Level can be thought of as a **Volume Floor :**

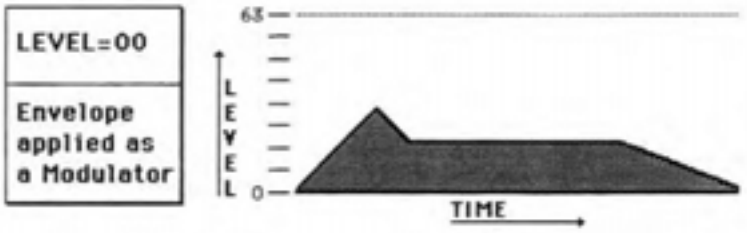
> If this Level is set to some value greater than Zero for a given DCA, and no Modulators are applied, the Oscillator will play at that level as long as a key is held down.



> If the Manual Level is set to some value greater than Zero. and a Modulator (in this case an Envelope) is selected and assigned a depth other than Zero, the effect of the Modulator will be added to (or subtracted from) the Manual Level.



___> If the Manual Level is set to Zero, and a Modulator (the same Envelope, in this case) is selected and assigned a depth other than Zero, the depth of the Modulator alone will determine the Volume of the Oscillator.

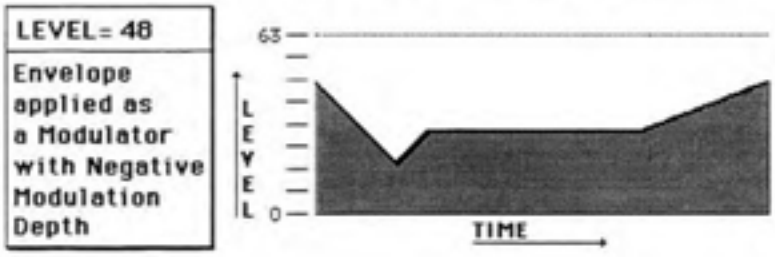


This last combination (LEVEL=00, Envelope selected as a modulator, modulation depth greater than Zero) is the best way to "fade in" the Oscillator(s) playing the Sustain portion of a sound when a Transient Attack Wave is being played by another Oscillator. Usually we use ENV 2 for this purpose. Set the Envelope's TIME 1 to a value around 10. This will cause the volume of the Sustain Wave to fade in as the Transient Attack Wave fades out.

Bear in mind that when you use an **Envelope** or an **LFO (Low Frequency Oscillator)** as a Modulator. the final effect will depend on the Modulation Depth and the Levels that are set for the Envelope or LFO on their respective Pages.

Negative Modulation

Modulation Depth can be Positive or Negative (ranging from -63 to +63), making a great many interesting effects possible. If, for example, the Manual Level is set to **48,** and the same Envelope used in the previous examples is selected and assigned a Negative Modulation depth, the resulting Volume curve looks like this:

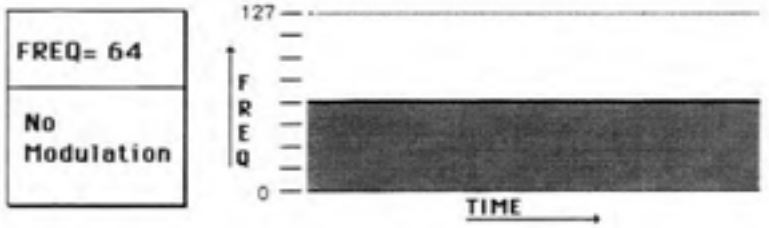


Modulating the Filter Cutoff Frequency

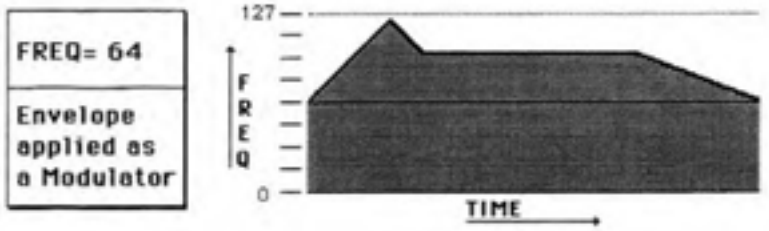
Like Oscillator Volume, the **Filter Cutoff Frequency,** or the Brightness contour of a Program. depends on a combination of two things:

1) the setting of the base, or Manual Level (the Control labeled **FREQ=** on the **FILTER** Page). and
2) the effect of any **Modulators** applied on that Page.

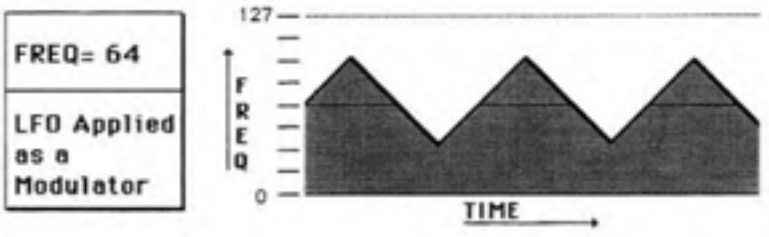
___-> If we set the Filter Cutoff Frequency manually (by adjusting the parameter FREQ = on the **FILTER** Page) to a level of 64, and turn all Modulators OFF. the Filter will open up to that level when a key is pressed, allowing frequencies below the Cutoff point to pass, and close down to Zero when the key is released.



> If we select an Envelope as a Modulator on the **FILTER** Page and assign it a value greater than Zero, its effect will be added to the the Manual Level.



> If, instead, we generate a Triangle-shape wave with one of the LFOs (Low Frequency Oscillators), and apply that LFO wave as a Modulator on the FILTER Page, its effect will be added to the Manual Level, and the Filter Cutoff Frequency will rise and fall with the cycles of the **LFO.**



Of course, since two Modulators can be selected, you could apply both of these Modulators (or any other combination) to the Filter Cutoff Frequency, and their effect would be added together. and then added to the Manual Level.

As with Oscillator Volume, If the Manual Level on the **FILTER** Page is set to FREQ. 00. the Filter Cutoff Frequency will depend entirely on the depth and settings of any Modulators applied there.

Limits of Modulation

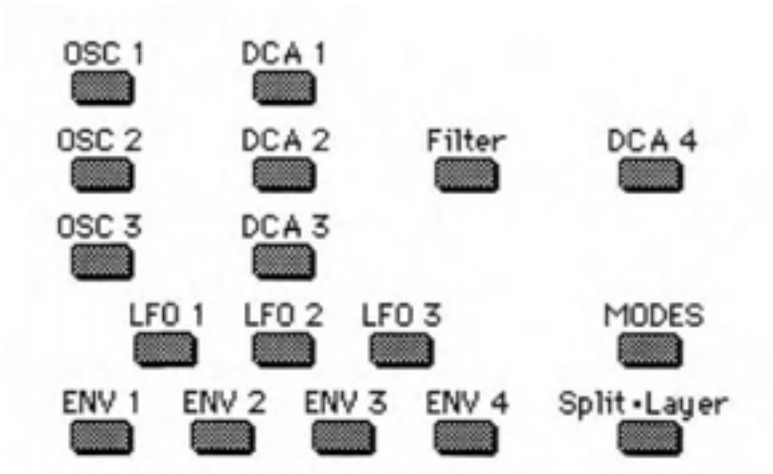
For all Modulation effects there is a maximum and a minimum range that cannot be exceeded. For example, if the **Filter Cutoff Frequency** is manually set to its maximum value [127], you will not be able to modulate the Frequency any higher, with an Envelope, LFO or other Modulator.

You cannot modulate an Oscillator's Output Level lower than Zero (silence). If a Modulator doesn't seem to be having any effect, check that the other Modulators and manual settings are at appropriate levels.

PROGRAMMING PAGES

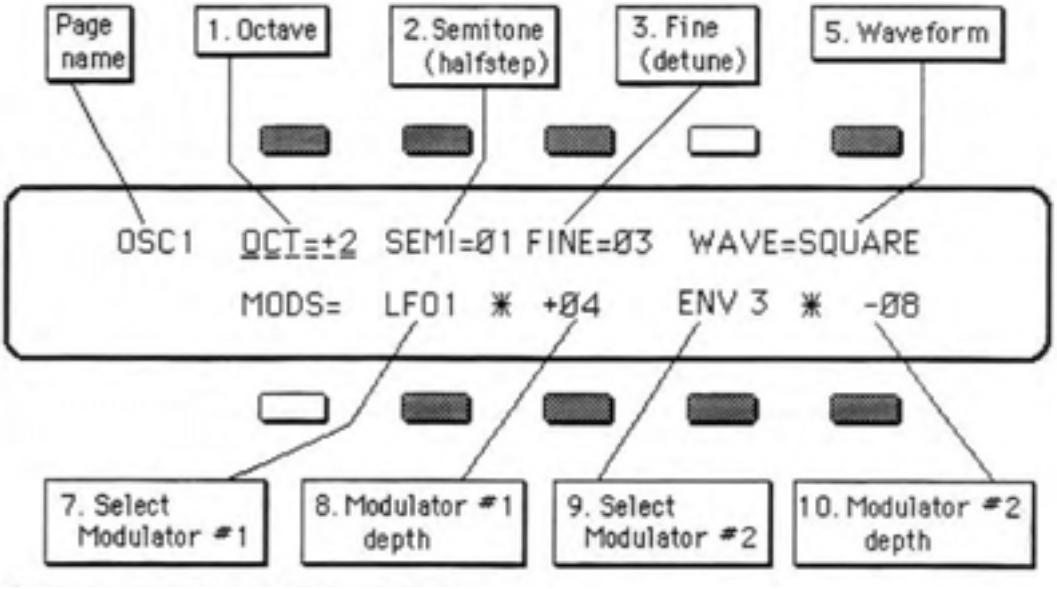
The Page descriptions that follow encompass all the **Program Parameters —** those Parameters which are saved with the individual Programs stored in the Memory of the **SQ-80.** To select any of these Pages, press the corresponding button in the Voice Section of the Front Panel.

In case you wish to make a written record of the settings for a particular Program, you will find a blank **Program Parameter Sheet** in the back of this Manual. Feel free to photocopy this sheet and use the copies to record the Parameter settings.



[OSC1] OSCILLATOR PITCH PAGE
[OSC2]
[OSC3]

Controls Oscillator pitch and selects the Wave to be played by each Oscillator.



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The format of the **Oscillator Pitch Page** is the same for **[OSC 1], [OSC** 2] and **[OSC 3],** although each of these Pages is entirely independent.

Use these pages to:

1) Adjust the pitch of each Oscillator by octave, semitone, and fine increments;
2) Modulate the pitch of each Oscillator using any of the 15 available Modulation sources: and
3) Select the Waveform to be played by each Oscillator.

ACTIVE CONTROLS:

1. OCT
Adjusts the pitch of the Oscillator by octaves.
Range: -3 To +5.

2. SEMI
Adjusts the pitch of the Oscillator up by semitones (halfstep). Adjusting this control upwards beyond 11 automatically increases the **OCTAVE** by one.
Range: 0 **To 11.**

3. FINE
Adjusts the pitch of the Oscillator up by fine steps (detunes). Each step here is about 3 Cents (hundredths of a semitone).
Range: 0 To **31.**

5. WAVE

Selects the Wave that the Oscillator will play from among the 75 available Waves. (See WAVES, p. 30)

7. MOD # 1

Selects the first source of Modulation. The Modulators selected on this page affect only the pitch of the Oscillator.

8. MOD # 1 DEPTH

Sets the depth, or amount, by which Modulator #1 will affect the pitch of the Oscillator. The Modulation amount can be positive or negative.

Range: **-63** To + **63.**

9. MOD # 2

Selects the second source of Modulation. The effects of Modulator #1 and Modulator #2 are added together. You can thus double the maximum Modulation depth of a given modulator by selecting the same source for Modulator #1 and Modulator #2. The Modulators selected on this page affect only the pitch of the Oscillator.

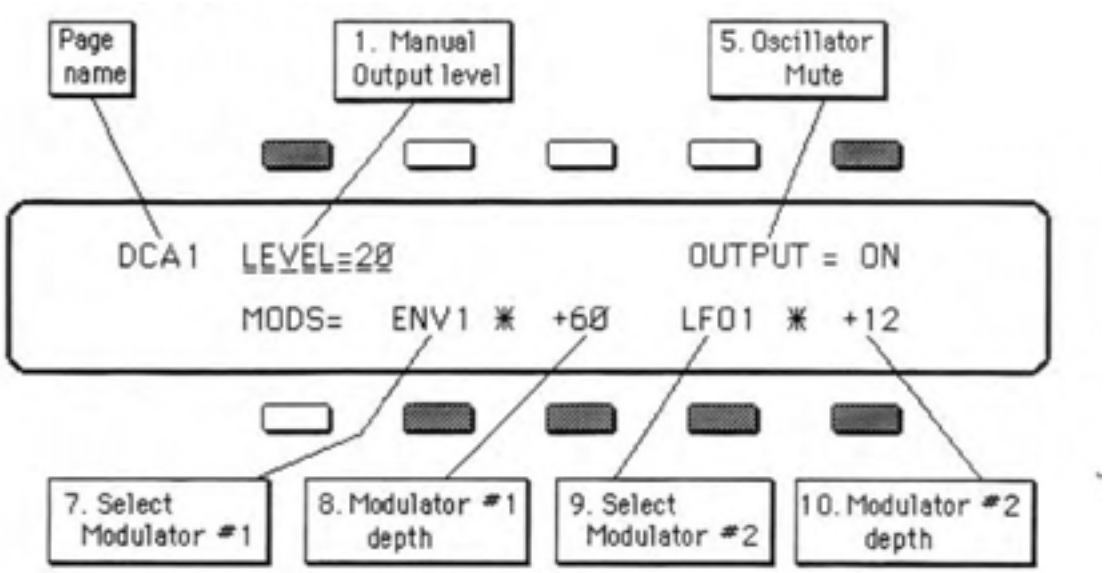
10. MOD # **2 DEPTH**

Sets the depth, or amount, by which Modulator #2 will affect the pitch of the Oscillator. The Modulation amount can be positive or negative.

Range: **-63** To + **63.**

[DCA1] OSCILLATOR VOLUME PAGE
[DCA2]
[DCA3]

Controls The Volume of Oscillators 1 through 3.



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The format of the **Oscillator Volume Page** is the same for **[DCA1], [DCA2]** and [DCA3], although each of these Pages is entirely independent.

Each of these three DCA's (Digitally Controlled Amplifiers) controls the Volume (or amplitude) of the same-numbered Oscillator (OSC). From the three DCA Pages you can adjust the relative balance of the three Oscillators. By setting the Manual Level to LEVEL=00, and assigning an Envelope as the modulator on the appropriate DCA Pages, you can Fade in the volume of the Sustain Wave(s) in a sound, or perform additive synthesis by bringing in different Oscillators over time.

Use these pages to:

1) Set the Manual Output levels of the three Oscillators;
2) Modulate those levels using any of the 15 available Modulation Sources: and
3) Turn each Oscillator ON or OFF.

ACTIVE CONTROLS:

1. LEVEL

Determines the Manual, or base, volume (amplitude) of the Oscillator. This Level can be thought of as a 'Volume floor' — the effect of any Modulator(s) is added to the Level set by this parameter. So even if **LEVEL=00,** the Oscillator will still have some amplitude if there is a Modulator (an **Envelope** for instance) selected and assigned a Depth greater than Zero. Negative modulation depths bring the volume lower than the LEVEL setting. Large amounts of negative Modulation can silence the Oscillator, regardless of the setting of this control.

If you want the volume of a particular Oscillator to be controlled entirely by an Envelope or other modulator, be sure to set this parameter to LEVEL=00.

DCA's 1, 2, and 3 have been set up so that it is possible to get full volume from just one Oscillator. This means, however, that it is possible to clip (overload) the output stage when all three Oscillators are at full level. Different Waveforms contain different amounts of fundamental energy, so the effect will vary. A conservative rule of thumb for Oscillator Volume is as follows:
With 1 Oscillator playing — set that Oscillator to **63.**
With 2 Oscillators playing — set both Oscillators to **56.**
With 3 **Oscillators playing —** set all three Oscillators to 52.
These are only guidelines, of course. In some cases, the clipping caused by all three Oscillators playing wide open can be a desirable part of the sound. As always, let your ears be your guide.

5. OUTPUT — Oscillator Mute

Turns the Output of the Oscillator ON or OFF. independent of any other settings. This control is very helpful when setting up complex Programs, as it allows you to silence any Oscillator, and listen to the others, without disturbing your settings.

7. MOD # 1

Selects the first source of modulation. The modulators selected on this page affect only the amplitude of the Oscillator. If LEVEL=00 (see #1 above) the modulators and their respective modulation depths will control the volume of the Oscillator.

8. MOD # 1 DEPTH

Sets the depth, or amount, by which Modulator #1 will affect the amplitude of the Oscillator. The Modulation amount can be positive or negative.
Range: **-63** To **+63.**

9. MOD # 2

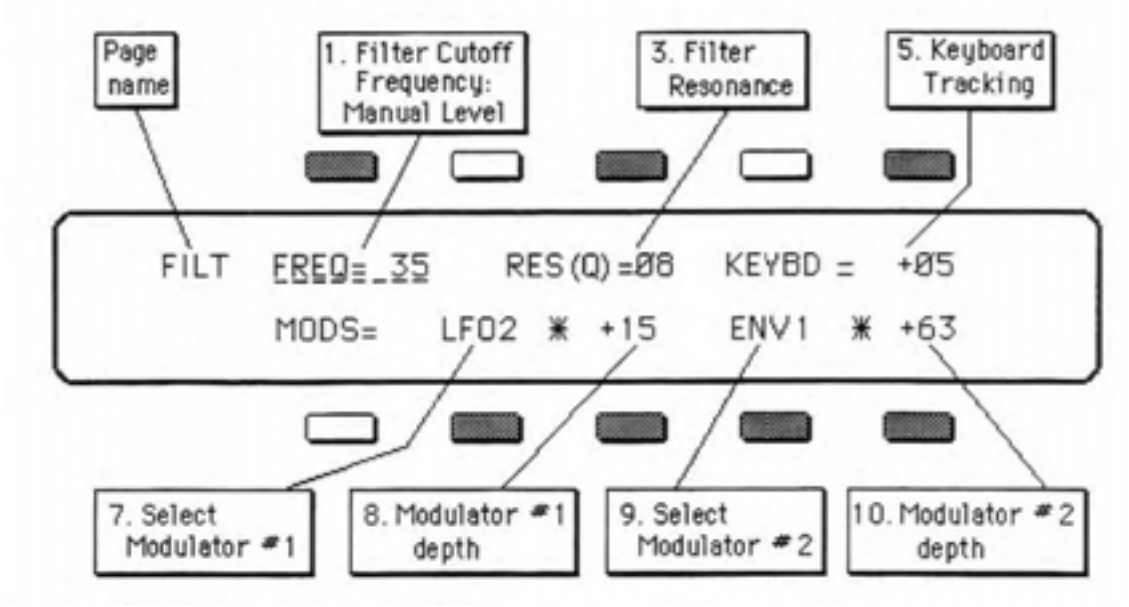
Selects the second source of modulation. Again, a Modulator's maximum depth can be doubled by assigning the same Modulator to **MOD #1** and MOD #2 . The Modulators selected on this page affect only the amplitude of the Oscillator.

10. MOD # 2 DEPTH

Sets the depth, or amount, by which Modulator #2 will affect the amplitude of the Oscillator. The Modulation amount can be positive or negative.
Range: **-63** To **+63.**

[FILT] FILTER PAGE

Controls the Four-Pole Low Pass Filter



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The outputs of the three Oscillators pass through the **Filter** before going to the Final Volume stage, **[DCA4].** The **Filter** settings determine what frequencies will be allowed to pass through to the output.

A Low Pass Filter allows only those frequencies below the **Filter Cutoff Frequency** to pass. Higher frequencies are filtered out. The Filter Cutoff Frequency is set to a certain level, and then it can be continually varied by modulating the Filter (with an **Envelope,** an **LFO, Velocity,** etc.).

Use this page to:

1) Set the Manual Level for the **Filter Cutoff Frequency;**
2) Set the amount of Filter Resonance (or Q); and
3) Modulate the **Filter Cutoff Frequency,** using the Keyboard "Control Voltage" and any of the 15 available Modulation Sources.

ACTIVE CONTROLS:

1. FREQ

Sets the initial, or Manual Level of the **Filter Cutoff Frequency.** A higher setting will result in a brighter sound. This setting represents the "Filter Floor" — the effect of any selected Modulators will be added to (or subtracted from) this level.
Range: 0 To 127.

3. RES (Q)

Sets the amount of **Filter Resonance,** or Q. This controls the amplitude of the resonant peak of the filter. When the Q is raised, the Filter Cutoff Frequency is emphasized over all other frequencies. By then modulating the Filter Cutoff Frequency with an Envelope, LFO, Mod

Wheel etc., you can create Filter Sweeps, Wah and Growl effects. Range:
0 To **31,**

5. KEYBD

Keyboard Filter Tracking. Sets the amount by which the location of a note on the keyboard will modulate the Filter Cutoff Frequency. This allows the relative brightness of a sound to remain constant over the keyboard. KEYBD is comparable to the **Keyboard Control Voltage** of most Analog synths.

Higher values of this parameter will cause the Filter to open up more (get brighter) as you play higher up the keyboard. The maximum value (63) will raise the Filter Cutoff Frequency roughly one octave for each octave you go up the Keyboard.
Range: 0 To **63.**

7 . M O D # 1 Selects the first source of Modulation for the Filter Cutoff Frequency.

8 . MOD # 1 DEPTH

Sets the depth, or amount, by which Modulator #1 will affect the Filter Cutoff Frequency. Modulation amounts can be positive or negative.
Range: **-63** To + **63.**

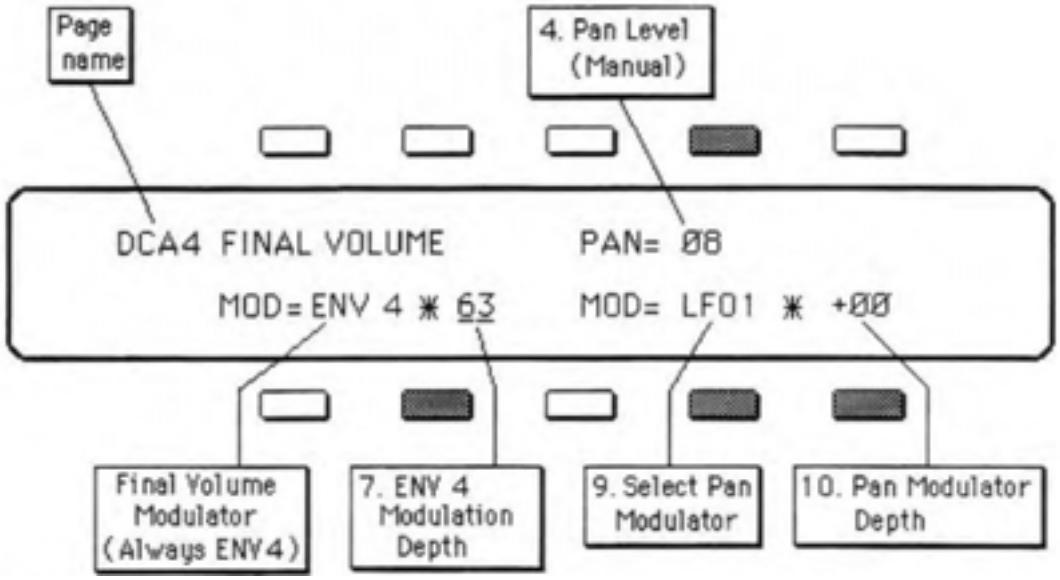
9 . M O D # 2 Selects the second source of Modulation for the Filter Cutoff Frequency.

1 0 . MOD # 2 DEPTH

Sets the depth, or amount, by which Modulator #2 will affect the Filter Cutoff Frequency. Modulation amounts can be positive or negative,
Rangy **-63** To + **63.**

[DCA 4] FINAL VOLUME PAGE

Controls Program Volume and Panning.



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Note: The Modulation Source for [DCA 4] is alwa^ys [ENV 4].

The outputs of the three Oscillators, after passing through the Filter, go to [DCA4]. This Final DCA (Digitally Controlled Amplifier), together with [ENV4], which is fixed as its Modulator, determines the overall volume envelope of the Program. You will always hear the effect of Envelope 4 on the Program — it is "hard wired" to DCA 4 and always controls the final volume of the Program.

Use this page to:

1) Adjust the amplitude of the entire Program;
2) **Pan** the Program left, right or center; and
3) Modulate the Program **Pan** using any of the 15 available Modulation Sources.

ACTIVE CONTROLS:

4. **PAN — Manual Level**

Pans the Program the between the Left and Right Outputs. Possible Values range from **00** (all the way to the Left), to 15 (all the way Right.) A value of **08** will pan the Program to Center. Note that the SQ-80's audio outputs must be connected in Stereo for this parameter to have any effect. Range: **00** to **15.**

7. **ENV 4 MOD. DEPTH — Final Volume**

Determines the amount by which **DCA 4** will be Modulated by **ENV 4,** which is fixed as its Modulator. The net effect of this parameter is to increase or decrease the Volume of the entire Program. This is useful for matching the levels of different Programs, to avoid radical volume

changes when switching between them. Also it is useful for balancing the relative levels of Split and/or Layered Programs (see **SPLIT/LAYER** Page, p.71).
Rance: **00** to **63.**

Bear in mind that the overall Volume curve of the Program will depend on the setting of this parameter and the settings on the ENV 4 Page.

9. Select PAN Modulator

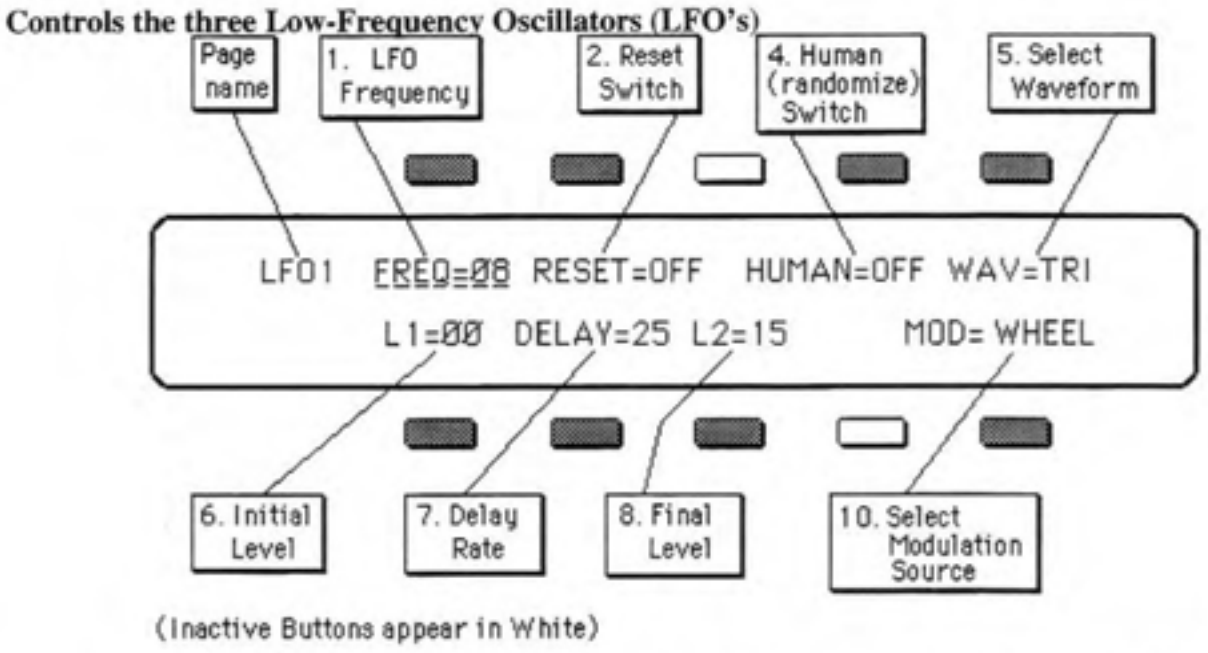
This control selects a Modulator for the PAN Setting. Modulators applied here will add to, or subtract from, the Manual Level, just as they do elsewhere. Thus an LFO used as a Modulator here will make the Program Pan back and forth with Time. Applying **Velocity [VEL]** here would make a note's placement in the stereo mix depend on how hard you strike a key. And so on.

Or you can apply the Keyboard **(KYBD** 2) as a Modulator to make the low keys play on the left side, the middle keys in the middle, and the high keys on the right side of the stereo mix,

10. PAN Modulator Depth

Sets the amount by which the **PAN Modulator** will affect the Manual Pan Setting. Higher values will cause more dramatic Pan Modulation. Negative Modulation Depths are particularly useful here. Any Negative value here (-32 for instance) will have exactly the opposite effect of the same. Positive, value (+32) in terms of how it affects the Pan of the Program (assuming a Manual Level of **08).**
Range: -63 to +63.

[LFO 1] LOW-FREQUENCY OSCILLATOR PAGE
[LFO 2]
[LFO 3]



The format of the **LFO Page** is the same for **[LFO 1], [LFO** 2], and **[LFO 3],** although each of these Pages is independent. The **Low Frequency Oscillators** are used as Modulators, and may be applied wherever a **Modulation Source** is to be selected.

Note that the **LFO Delay** (which normally allows the effect to enter gradually) is set using a **Ramp** which goes from **Level 1(L1)** to Level 2 (L2). Since L1 can have a higher value than L2, the Ramp can actually be a decreasing one, causing the effect of the LFO to diminish, or disappear, over the time the key is held down.

Use this page to:

1) Set the LFO Frequency (speed);
2) Determine whether the LFO resets each time a key is struck;
3) Select the waveform that the LFO will play;
4) Set **LFO Delay** parameters; and
5) Select a Modulator from any of the 15 available Sources to modulate the Output Level of the **LFO.**

ACTIVE CONTROLS:

1. L F O F R E Q . Determines the speed of the LFO.
Range: 0 To **63.**

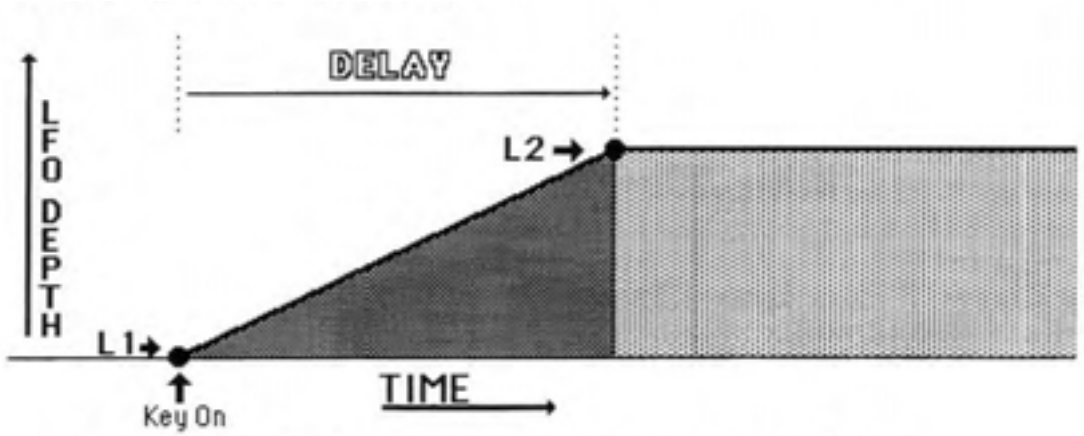
2. RESET
Turns **RESET** mode on or off.
When ON: The LFO Waveform will return to the beginning of its cycle each time a new key is

struck. This is good for synchronizing LFO sweeps with key hits.
When OFF: The LFO wave will cycle continuously, without Resetting.

4. HUMAN
When ON: This control will add a random element to the **LFO Frequency,** making the effect less "mechanical" sounding.
When OFF: The LFO Frequency will behave normally, with perfect repetition.

5. WAV
Selects the **Waveform** which the LFO will play. The choices are:
TRI — Triangle wave
SAW — Rising Sawtooth wave (Use negative modulation for a falling Sawtooth.)
SQR — Square wave (positive-going only)
NOISE — Random

NOTE: Controls # 6, 7, **and 8 combine to form a linear Ramp which defines the LFO Delay.** The Ramp goes from **LEVEL 1,** which is the starting Level, to LEVEL 2, which is the sustain Level, and it can be an increasing or a decreasing Ramp.



Example of LFO Modulation which 'fades in' over Time.

6. L1
This is **LEVEL 1,** the Level at which the LFO will play when the key is first struck.
Range: **0 To 63.**

7. DELAY
Determines the **Rate** at which the LFO's amplitude will go from **LEVEL 1** to LEVEL 2. Range: **0 To 63.**

Note that here it is the Rate of Change (or the Slope of the Ramp) which is set, not a fixed Time. Therefore, *lower* values of this parameter will cause a *longer* Delay; *higher* values will result in a *shorter* Delay. The amount of Time it takes for the LFO to reach LEVEL 2 thus depends on both the Rate and the Level.

A value of Zero will cause the LFO to remain at LEVEL 1,

8. L2

This is **LEVEL** 2, the Level that the LFO will reach at the end of the Ramp defined by the DELAY. It will remain at this Level until the key is released.
Range: **0 To 63.**

10. MOD

Selects the **Modulation Source** for LFO depth. The effect of this Modulator is added, to the amount of LFO depth provided by the Ramp defined by Controls # 6, 7 and 8.

Note that the LFO itself can be used to modulate its own Output, or that of another LFO, producing unusual LFO waveforms.

The final, modulated, LFO Output is then available as a Modulation Source, whose depth can be adjusted precisely using the Modulation Depth controls on the other Pages.

Note: To use the MOD Wheel for Vibrato within a Program (perhaps the most common application for an LFO):
1) assign **WHEEL** as the Modulator for an LFO,
2) set Ll and DELAY to Zero for that LFO, and
3) assign that LFO to modulate the Pitch of the Oscillators **(OSC 1-3** Pages), with a modulation depth of around +2 to +5)
Within the Factory Sounds that came with your **SQ-80, LFO 1** is always used for Wheel Vibrato (where it is applicable).

To use the Pressure for Vibrato within a Program, you follow almost the same procedure:
1) assign **PRESS** as the Modulator for an LFO,
2) set **L1** and DELAY to Zero for that LFO, and
3) assign that LFO to modulate the Pitch of the Oscillators **(OSC 1-3** Pages), with a modulation depth of around +2 to +5),
Make sure PRESS=KEY or PRESS=CHAN on the MIDI Page, depending on which type of Pressure you want.

UNDERSTANDING THE ENVELOPES

An **Envelope** is a shape, or "contour" that we apply to some signal source to make it change through time. Naturally occurring sounds have their own Envelopes. They don't just start and stop — they might start loud and fade to silence, or slowly swell from silence to a huge crescendo; they might start out very bright and grow duller; they might have subtle variations in pitch, and so on.

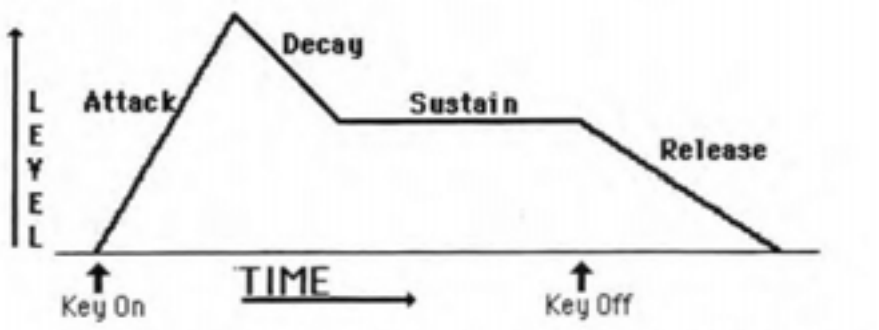
In a synthesizer we imitate these effects, and create wholely new ones, by generating Envelopes and then using them to modulate pitch. volume, brightness, etc. The SQ-80 has four **Envelopes** which can be independently assigned as modulation sources to the various **OSC's, DCA's, LFO's, PAN** and the **FILTER.**

The ADSR Connection

Let's start by taking a look at the commonly used ADSR (Attack, Decay, Sustain, Release) type Envelopes found on many synthesizers. With the ADSR Envelope, the name says it all. You have four parameters to control:

Attack — The Time it takes to go from zero, when a key is struck, to peak level
Decay — The Time it takes to go from the peak level to the Sustain Level
Sustain — The Level at which the signal remains as long as the key is held down
Release — The Time it takes to return to zero after the key is released

ADSR Envelope



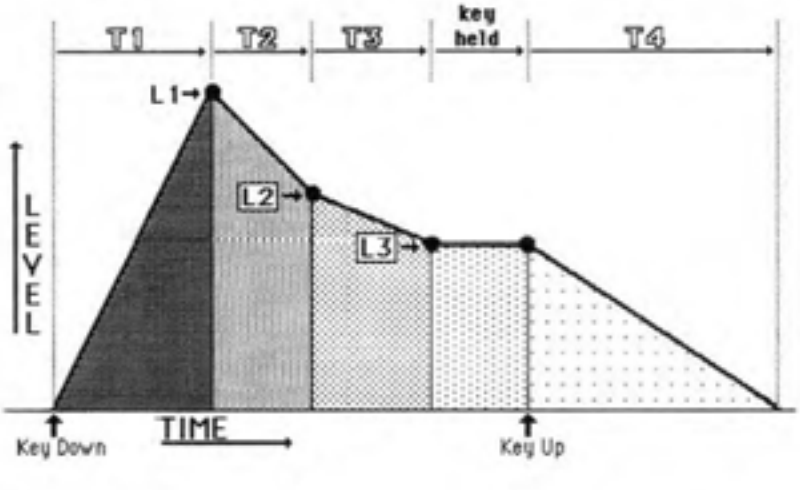
Notice that an Envelope is really just a series of Levels that change through Time. With the four parameters of the ADSR Envelope, we can control three Times (Attack, Decay and Release) and one Level (Sustain). This is fine for many basic volume and brightness Envelopes, but for more complex sounds — for subtle pitch Envelopes and other cool effects — it becomes necessary to have more specific control over more **Times** and **Levels.** Which brings us back to the SQ-80.

Times and Levels

The four Envelopes on the SQ-80 are defined in terms of **Time** and Level. For each Envelope, you have control over four **Time** segments **(TIME 1, TIME** 2, **TIME 3,** and TIME 4) and three **Levels (LEVEL 1, LEVEL** 2 and **LEVEL 3),**

When a key is struck the Envelope level, starting at Zero, takes a fixed amount of time defined by TIME 1 to reach LEVEL 1. It then takes TIME 2 to reach LEVEL 2. Next. at the end of TIME 3 it reaches LEVEL 3, where it will remain as long as the key is held down. After the key is released the signal takes TIME 4 to return to Zero (unless the value of **TIME 4** is followed by an "R." in which case a Second Release Time will follow TIME 4. See below).

The four TIME parameters appear on the **Envelope** Page as [T1], [T2], **[T3]** and [T4], the three LEVEL parameters as [L1], **[L2]** and [L3]. The figure below shows a typical Envelope as defined by the **SQ-80** Envelope parameters:



Notice that the Envelope shape depicted here resembles the ADSR Envelope discussed earlier. Though this is only one of many shapes that are possible with the SQ-80 Envelopes, it is one of the most useful for modulating the Volume and Brightness of a Sound.

If we now look at the SQ-80 Envelope parameters as they apply to this standard ADSR-type Envelope, we can see that TIME 1 represents the attack time: TIME 2 and TIME 3, a two-stage decay: and TIME 4 represents the release time. LEVEL 1 is the peak level: LEVEL 2 is an intermediate decay level; and LEVEL 3 is the sustain level.

Time, not Rate

It is very important to note that all of the Envelopes' Time components, [T1]. [T2], **[T3]** and [T4] are expressed in terms of **Time, not Rate**. Thus, for example, when a key is struck the signal will always travel from Zero to LEVEL 1 in the fixed amount of time defined by TIME 1. If the value of LEVEL 1 is raised, the signal will still reach the new, higher, LEVEL 1 in the same amount of time.

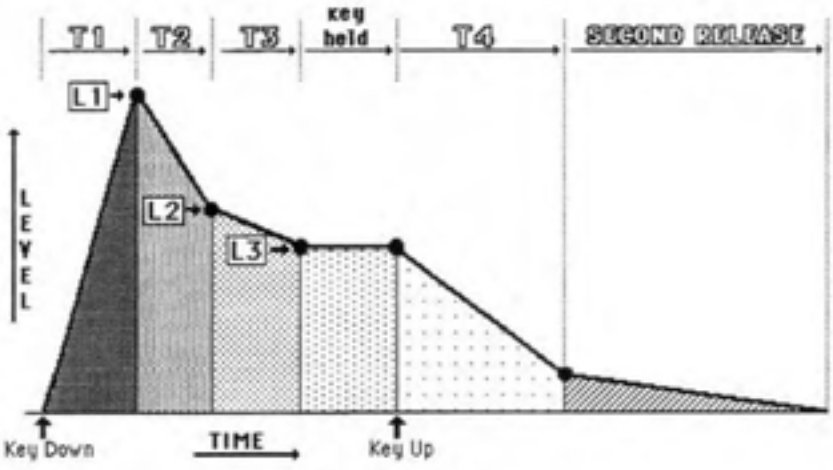
Second Release — Using T4 for Simulated Reverb

When the value of T4 is between **00** and **63,** **TIME 4** behaves just as expected — the Envelope level goes from the Release level to zero in the amount of time specified by T4. Above 63, there is another range of values for T4, which go from 00**R** to 63R. When the value of T4 is followed by "R", there is a Second Release, or simulated Reverb effect.

For values of T4 between 00R and 63R:

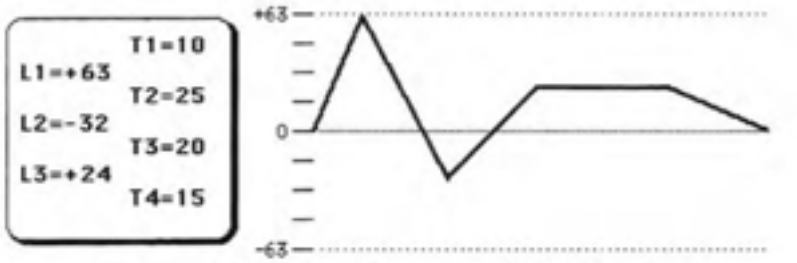
• During TIME 4, instead of going to zero, the Envelope drops to a low level, after which it fades to zero at a fixed rate.

This creates a simulated reverb effect which can enhance a great many types of sounds.



Negative Levels

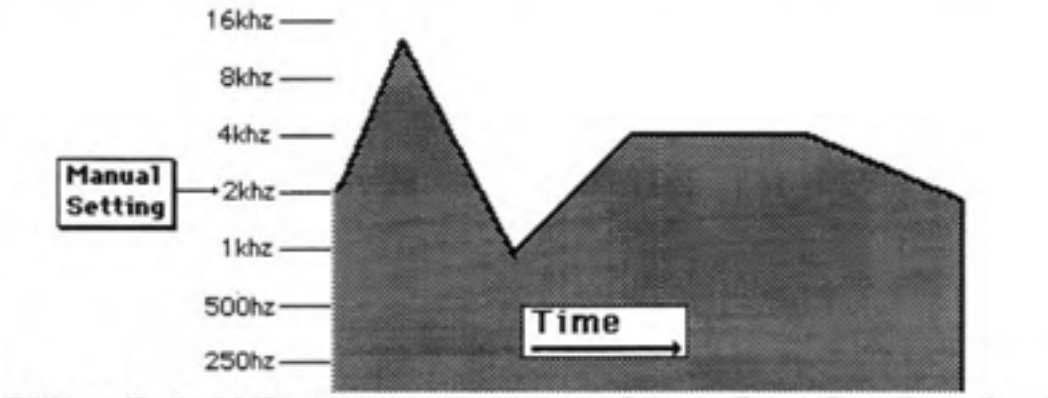
In the sample Envelope shown above, all of the Level values were positive. But the SQ-80 also allows you to assign a negative value to any of the Envelope Levels, making possible a wide variety of interesting shapes. In the Envelope to the right, for example, LEVEL 2 is given a value of **-32.**



Example of Envelope with LEVEL 2 Negative

Such an Envelope allows you to modulate a signal to levels below the Manual settings, as well as above them.

Say you apply such an Envelope as a modulator to the **Filter Cutoff Frequency.** If the Manual setting on the **FILTER** Page, (FREQ=) is set for about 2 kHz., modulating the Filter Cutoff Frequency with this Envelope would cause the Filter to behave like this:

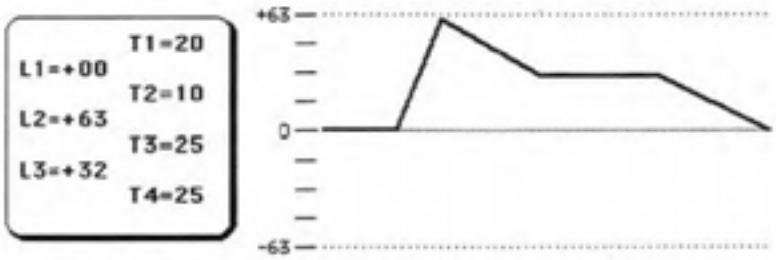


Filter Cutoff Frequency Modulated by a Complex Envelop

The extent of the effect in the example above would vary depending on the **Modulation depth.** Bear in mind that Modulation depth can also have a negative value. The combination of negative Envelope Levels and negative Modulation depths makes for almost infinite possibilities for controlling Pitch, Volume, Brightness, LFO depth, etc.

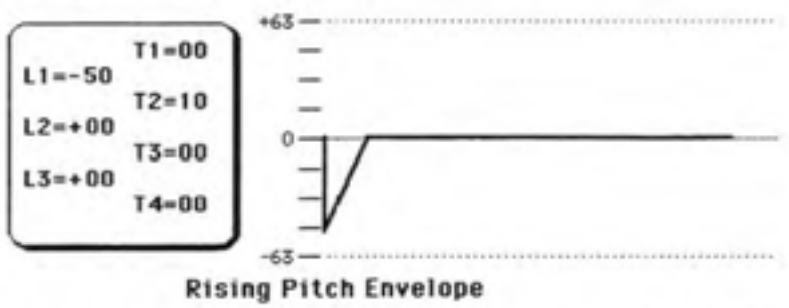
Other Envelope Shapes

There are many possibilities for creating interesting Envelopes — here are just a few. If LEVEL 1 is set to Zero, then TIME 1 becomes a delay, TIME 2 the attack time, LEVEL 2 the peak level, and so on. Such an Envelope, applied to one of the DCA's, would cause that Oscillator to "wait" before beginning to play.



If LEVEL 1=0, TIME 1 Acts as a Delay

Another useful shape is a simple pitch Envelope. You can, for example, imitate the way Horns often "slide" into a note, rather than beginning right on pitch. By setting TIME 1 to Zero, LEVEL 1 to some negative value, and LEVEL 2 and LEVEL 3 to Zero, you now have an Envelope which, when used to modulate Oscillator Pitch, will cause the pitch to "slide" up to the proper note in the amount of time defined by TIME 2.



Rising Pitch Envelope

This could be a rather long, dramatic "slide", or an almost imperceptibly short one, depending on the value you assign to TIME 2. How much the Pitch is altered will depend on the value of LEVEL 1 and the Modulation depth.

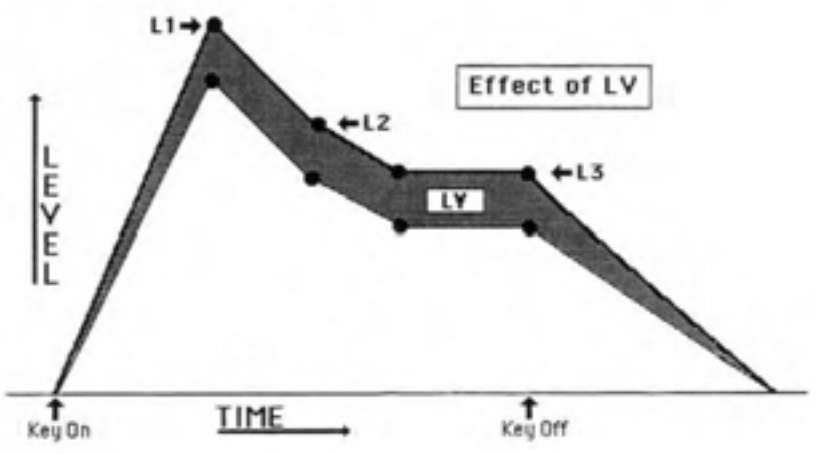
Velocity Control Of Envelopes

There are two parameters on the **Envelope** Page which allow you to alter an Envelope depending on keyboard velocity, or how hard you strike a key.

[LV] Velocity Level control

The first of these, LV or **Velocity Level Control,** will lower all three levels **(L1, L2** and L3) with a softer keystrike. This means that the settings you assign to LEVEL 1, LEVEL 1 and LEVEL 3 are maximum Levels, the Levels that will be reached with the hardest keystrike. The amount of LV determines how much those Levels will be reduced as you play softer. Two different velocity curves are available.

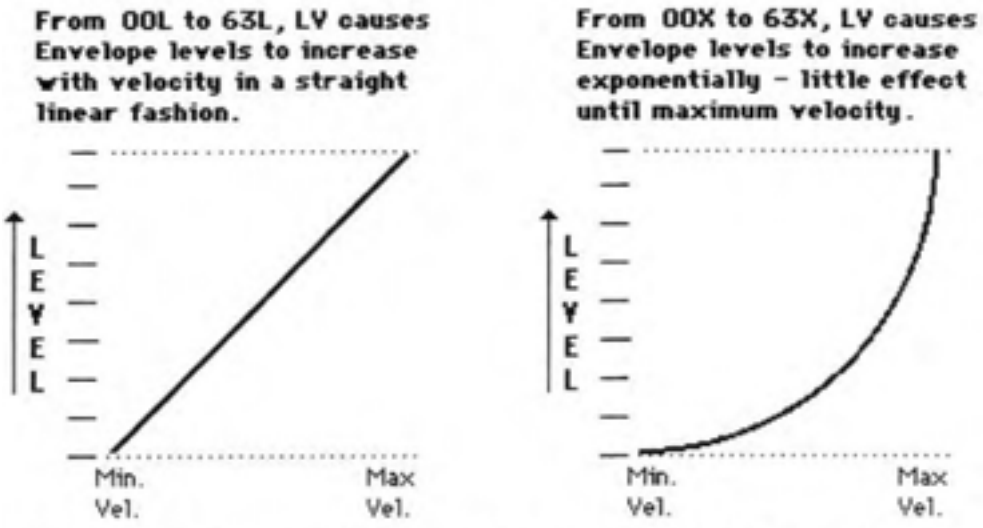
With this parameter you can have continuous dynamic control over the three levels by varying how hard you play. The most common uses of the **Velocity Level Control** have to do with varying, the volume and brightness of a Program, though in the previous example, (LV] could be used to alter the depth of the Pitch Envelope with velocity.



Linear or Exponential Velocity Response

As with **TIME 4,** The range of the parameter LV actually goes from 0 to 63 twice:

- Values from 00L to 63L will cause velocity to affect the level in a linear fashion — level increases proportionally with velocity.
- Values from **00X** to 63X will cause the Envelope's level to increase exponentially with velocity. That is, the Envelope will not increase to maximum level except at the very top of the velocity range. By assigning these exponential values to LV, you can create dramatic changes in pitch, timbre and Oscillator volume which occur only when you play a note really hard. The illustration on the next page shows the difference between the behavior of linear and exponential values of LV (the illustration assumes values of 63L and 63X respectively),

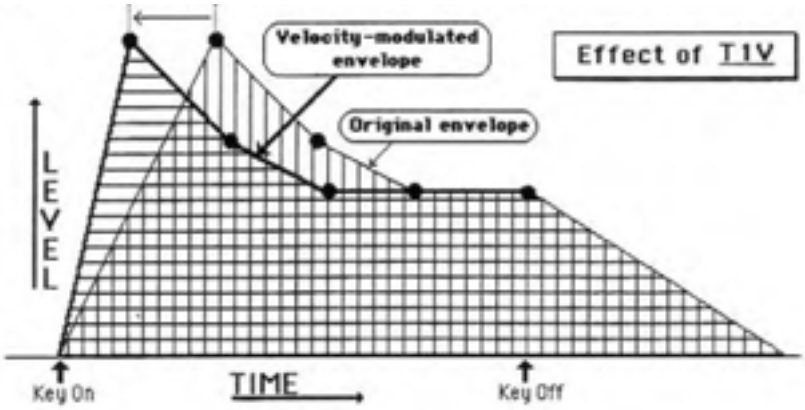


Linear and Exponential response curves of the Parameter LV

[T1V] Velocity Attack control

The second velocity-related parameter is **T1V — Velocity Attack Control.** As the name implies this parameter makes TIME 1, the Envelope attack time, respond to keyboard velocity. When the value of T1V is increased, a harder keystrike will decrease TIME 1, resulting in a faster attack.

This allows for great expression on String sounds and the like, making it possible to have a long, smooth Attack or a sharp, crisp Attack simply by varying how hard you play, The greater the value of T1V, the more TIME 1 will be decreased with velocity. If TIME 1 already equals Zero. this parameter will have no effect.



Keyboard Scaling of Decay Times

[TK] Keyboard Decay Scaling

The final Envelope parameter is **[TK] — Keyboard Decay Scaling.** Raising the value of TK has the effect of decreasing TIME 2 and TIME 3 as you play higher up the Keyboard. Higher notes will therefore decay faster than lower ones. The higher the value assigned to TK, the greater the difference in Decay Time between the highest and lowest notes. This is useful for simulating the Decay patterns of many acoustic instruments (piano, for instance) whose lower notes tend to ring much longer than the higher ones.

Note that if TIME 2 and TIME 3 both have a value of Zero, this parameter will have no effect.

Envelope Times

The chart below gives the approximate amount of Time, in seconds, that corresponds to each possible value of the Time components of the Envelopes **(T1, T2, T3** and T4). The numbers in **bold** type are the values that can be assigned to **T1, T2, T3** or T4; the numbers in plain type show how long a **Time** each of those values will yield.

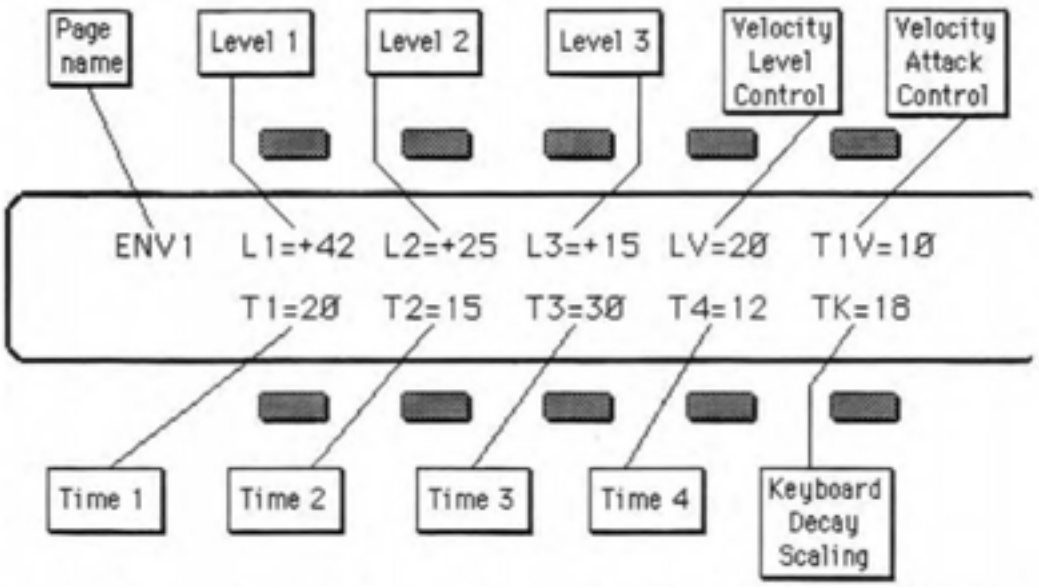
T=:	Time(sec,)	T=:	Time(sec,)	T=:	Time(sec.)	T=:	Time(sec.)
0	.00	**16**	.09	**32**	.57	**48**	3.62
1	.01	**17**	.10	**33**	.64	**49**	4.06
2	.01	**18**	.11	**34**	**.72,**	**50**	4.56
3	.02	**19**	.13	**35**	.81	**51**	5.12
4	.02	**20**	.14	**36**	.91	**52**	5.75
5	.03	**21**	.16	**37**	1,02	**53**	6.45
6	.03	**22**	.18	**38**	1.14	**54**	7.24
7	.03	**23**	.20	**39**	1.28	**55**	8.13
8	.04	**24**	.23	**40**	1.44	**56**	9.12
9	.04	**25**	.25	**41**	1.61	**57**	10.24
10	.04	**26**	.29	**42**	1.81	**58**	11.49
11	.05	**27**	.32	**43**	2.03	**59**	12.90
12	.06	**28**	.36	**44**	2.28	**60**	14.48
13	.06	**29**	.40	**45**	2.56	**61**	16.25
14	.07	**30**	.45	**46**	2.87	**62**	18.25
15	.08	**31**	.51	**47**	3.23	**63**	20.48

Note: Envelope Times will be as shown above only when TK=0, and T1V=0. These two parameters have the effect of decreasing Envelope Times (TK based a note's position on the keyboard, and T1V based on Velocity.) If either has a value greater than Zero, **T1, T2** or T3 could be shorter than indicated by the chart, depending on where and how hard you play.

Also, if T4 is between 00R and 63R, the Second Release stage is added onto T4.

[ENV 1] ENVELOPE PAGE
[ENV 2]
[ENV 3]
[ENV 4]

Controls the parameters of the four Envelopes.



The format of the **Envelope** Page is the same for **[ENV 1], [ENV** 2], [ENV 3] and **[ENV 4],** although each Page is independent. The Envelopes are used as Modulators, and may be applied wherever a Modulation Source is selected.

All Envelope parameters are expressed in terms of TIME and LEVEL. It is important to note that the Time components of the Envelopes ([T1], [T2], [T3], and [T4]) each define a fixed Time , not a Rate. Thus, if you raise the value of **LEVEL 1** but leave **TIME 1** the same, the Envelope will still take the same amount of Time to reach the new, higher, **LEVEL 1,**

Also note that the Level parameters can be positive or negative. This allows for a wide variety of Envelope shapes, especially useful for modulating the Filter Frequency, the pitch of an Oscillator, etc.

The **SQ-80's** four Envelopes feature a special **Second Release** mode, which can be used to create a Simulated Reverb effect within the Program, particularly when used on Envelope 4. Setting T4 to any value which is followed by an "R" calls the Second Release into play. (See **"Second Release"** in the previous Section for more details,)

ACTIVE CONTROLS:

1. Li - LEVEL 1

This is the LEVEL that the Envelope will reach at the end of the Time defined by TIME 1. All Envelopes start at a level of Zero and proceed toward LEVEL 1 when a key is pressed.
Range: **-63** To **+63.**

2. L2 - LEVEL 2

The LEVEL that the Envelope will reach at the end of TIME 2.
Range: **-63** To **+63.**

3. L3 - LEVEL3

The LEVEL that the Envelope will reach at the end of TIME 3. This is the **Sustain Level. The** Envelope will remain at this level until the key is released. After the Key is released, the Envelope will return to Zero.

Range: **-63** To **+63.**

4. LV — **Velocity Level Control.**

This parameter makes all three Levels, LEVEL 1. LEVEL 2 and LEVEL 3, respond to Keyboard Velocity, or how hard you strike the key. When the value of [LV] is raised, a **softer** keystrike will **decrease** all three Levels. The greater the value, the more the Levels will decrease as you play softer. Thus the Levels set by LEVEL 1, LEVEL 2 and LEVEL 3 define the **maximum** Levels, and parameter [LV] subtracts from those Levels.

- Values of LV between L and 63L cause the envelope levels to be affected by velocity in a linear fashion;
- Values of LV between 00**X** and 63X cause the effect of velocity to be exponential — little effect until maximum velocity is reached. The direction of the modulation is the same — only the curve is different. (See the diagram in the previous section which illustrates the difference between linear and exponential effects of LV.)

Range: **L** To 63L for Linear response, 00**X** To **63X** for Exponential response.

5. T1V — Velocity Attack Control.

This control makes TIME 1 respond to Keyboard Velocity. Raising its value will cause a decrease in the value of TIME 1 as a key is struck harder, shortening the Attack Time. The greater the value, the faster LEVEL 1 will be reached with a hard keystrike. (This Parameter will have no effect if TIME 1 = 0.)

Range: **00** To **63.**

6. T1 - TIME 1

The amount of Time between when the key is struck and when the Envelope reaches LEVEL 1. In most applications this is the **Attack Time.** The higher the value the longer the TIME. Range: **00** To **63.**

7. T2 - TIME 2

The Time it takes the Envelope to go from LEVEL 1 to LEVEL 2. In most applications this is the first of two Decay stages.

Range: **00** To **63.**

8. T3 - TIME 3

The Time it takes the Envelope to go from LEVEL 2 to LEVEL 3. In most applications this is a second **Decay** stage. At the end of TIME 3, the Envelope will remain at LEVEL 3 until the key is released.

Range: **00** To **63.**

9. T4 - TIME 4

Release Time, or Release plus Second Release (Simulated Reverb). For values of 00 to 63, T4 defines the amount of Time it will take the Envelope to return to Zero from LEVEL 3 (or from whatever it currently is, if LEVEL 3 has not yet been reached) after the key is released.

For values of R to 63R, when the key is Released, the Envelope will take TIME 4 to drop to a low level, and then will fade to zero at a fixed rate. This Second Release stage creates a Simulated Reverb effect, giving a sense of space to the sound. (See **"Second Release"** in the previous Section for an illustration of this effect.)
Range: **00** To **63** for Normal Release; **R** To **63R** for Release plus Second Release (Simulated Reverb).

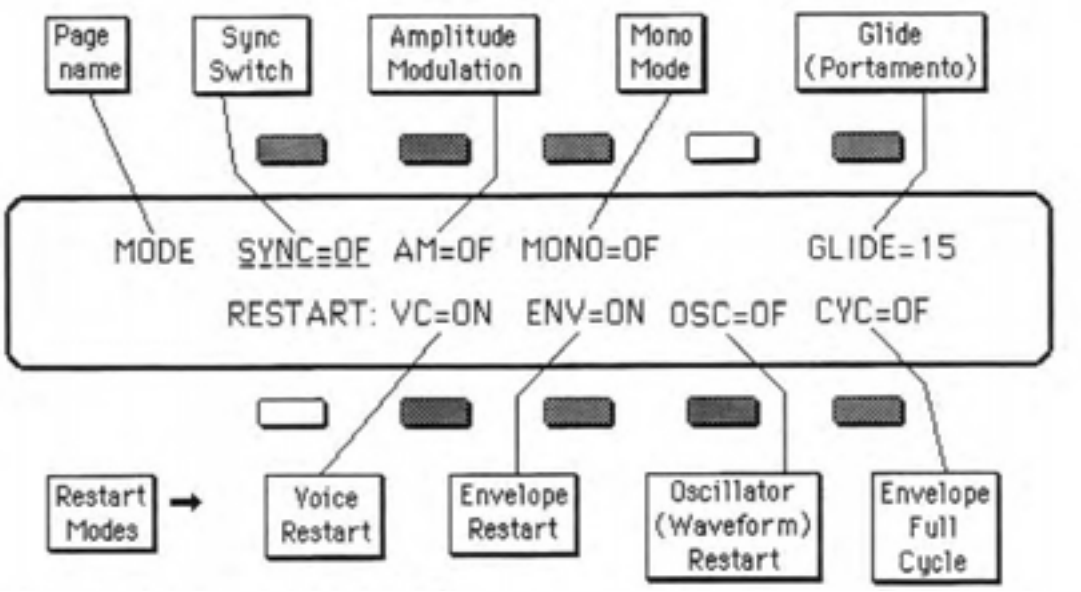
10. TK

Keyboard Decay Scaling. Raising the value of this parameter will cause the value of both TIME 2 and TIME 3 to **decrease** as you go higher up the keyboard. Thus higher notes will decay faster than lower ones. This is true of many acoustic instruments. The greater the value of [TK], the more the decay time will **decrease** as you play higher up the keyboard. [TK] will have no effect if TIME 2 and TIME 3 are Zero.

Range: **00** To **63.**

[MODES] MODES PAGE

Controls Glide, Sync, AM, and Mono Modes, as well as Voice, Envelope and Oscillator Restart Modes.



(Inactive Buttons appear in White)

All of the Parameters on this Page are part of the **Program** (or patch), and will apply only to the selected Program.

ACTIVE CONTROLS:

1. SYNC
   Syncs the phase of **Oscillator** 2 to that of **Oscillator 1,** In other words, whenever OSC1 finishes playing one complete cycle of its waveform and begins another, OSC 2 will reset to the beginning of its cycle, whether the previous cycle is complete or not.

   This produces the popular "Hard Sync" effect, which can be similar to a Filter sweep. The effect is most noticeable when the Frequency of **Oscillator** 2 is varied, or modulated. Sync will tend to produce unpredictable results when used with Transient Attack or Inharmonic Loop Waves.

2. AM — **Amplitude Modulation.**
   When ON, the Amplitude of **Oscillator 1** modulates the Amplitude of **Oscillator 2. OSC** 2's Amplitude Envelope will be ignored. This results in the creation of "Sideband" frequencies at the sum and difference of the frequencies being played by the two Oscillators.

   When **OSC 1** and OSC 2 are tuned to simple intervals of each other (such as octaves or fifths, etc.), AM **Mode** can produce FM-like enharmonics, for bell sounds, etc. When the Oscillators are tuned to more complex intervals, the effect is more extreme. Since the Amplitude of **Oscillator** 2 is no longer being controlled by DCA 2, you must use **DCA 4** and **ENV 4** to control the volume of the Sound.

3. **MONO**
   In **MONO mode** the SQ-80 behaves like a classic one-voice Monophonic synth. It is useful with lead-type sounds where chords are not necessary or desirable. With **MONO mode** ON, only one

note can be played at a time. Priority is given to the **last note** played — even if another note is being held down, the most recent note you play will sound. However, the envelope will not be re-triggered by striking a key as long as any other key is held down. **Mono mode** on the SQ-80 does not stack all eight voices on one key — only one voice plays.

5. GLIDE

Also called **Portamento.** This causes the pitch of the Oscillators to "glide" between notes instead of the usual abrupt transition. The higher the value, the longer it will take to get from the pitch of the first note played to that of the second. Range: 0 To **63.**

Note: The GLIDE function behaves in one of two ways, depending on whether or not **MONO mode** is engaged:

With **MONO mode** OFF: The pitch of any note played will 'glide' to its proper pitch from that of the note played by that voice immediately before it, at the rate that has been set. In this mode the GLIDE is **polyphonic,** and whole chords can be made to swoop up and down together. (Very dramatic.)

With **MONO mode** ON: You have what is called **Fingered Portamento.** If a key is pressed with no other keys held down, there is no GLIDE. If you then play a second key while holding down the first, the note will glide from the pitch of the first key to that of the second. Release the second key (still holding the first one down) and it glides back. In other words, **the effect is only present when a note is played while another key is held down.** You can thus play Staccato for runs without GLIDE, and Legato for runs with **GLIDE.**

Note: The next two Parameters (#7, [VC] **VOICE Restart,** and **#8, [ENV] ENVELOPE Restart) affect only what happens when you play the same note twice in succession.**

7. VC **—VOICE Restart**

When ON: If the same key is restruck before the note has died away, it will be assigned the same Voice that was previously playing it. That Voice will be 'stolen' to play the new note. This is fine for many sounds, such as piano, but it can be annoying with others, especially sounds with long Attack or Release times, like strings, where you don't necessarily want a note to abruptly disappear just because you have played the same note again.

When OFF: If a key is restruck before the note has died away, a new Voice will be assigned to it, and the first Voice will continue to play. If there are already two Voices playing that note, the older of the two is 'stolen'. (Two Voices will alternate playing the note if it is struck repeatedly.) As mentioned above, for sounds with long Attack or Release times (such as long filter sweeps, etc.) this is often better.

8. ENV —ENVELOPE Restart

When ON: If the same key is restruck, all four Envelopes will reset, and start their cycles at Zero level.

When OFF: Each Envelope will start its cycle at its present level, regardless of what that level is, when the same note is played again. It will then take **TIME 1** to reach **LEVEL 1,** whether the new ramp is in the same direction (up or down) as the original attack segment or not. In other words, each Envelope behaves normally, except that its **Starting Level,** normally Zero, becomes whatever Level it was at when the key was restruck.

9. OSC —Oscillator (Waveform) Restart

When ON: All three Oscillators are halted before the start of a sound, and are restarted together when a key is struck, so that they will start out playing in phase with each other. Any phasing, or "beating" between the oscillators (due to detuning, etc.) will be the same each time a key is struck.

When OFF: The Oscillators are not stopped before a new note is played, but continue to play. Therefore the relative phase of the Oscillators will be unpredictable. This will tend to randomly vary the phase shift and tonal characteristics of the sound.

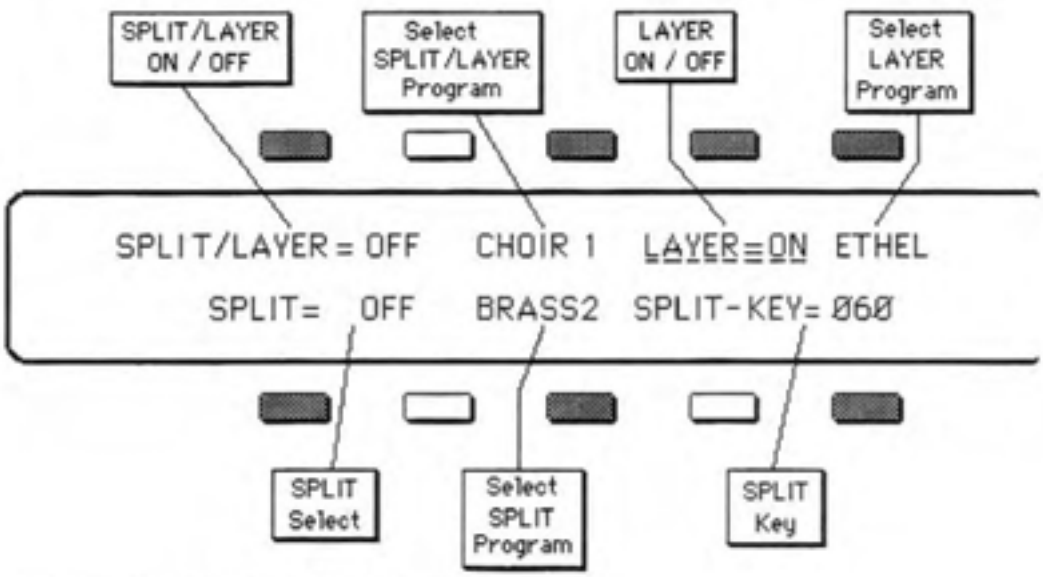
10. CYC —Envelope Full Cycle Mode

When ON: The Envelopes will pass through their full cycles every time a key is struck. In this Mode the SQ-80 pays no attention to whether you hold the key down or let it go immediately — each Envelope simply 'runs' through all its stages (ignoring the sustain stage after **TIME 3)** with each keystrike. This can be useful for many percussion-type sounds, bell sounds, filter sweeps and other sounds where you want consistently repeatable Envelopes that are not dependent on keyboard technique.

When OFF: This is the Normal Mode of operation. All Envelopes will go into the Release stage when the key goes up, whether LEVEL 3 has been reached or not.

[SPLIT•LAYER] Split•Layer PAGE

Controls Splitting the Keyboard and Layering Different Sounds together



(Inactive Buttons appear in White)

Programs on the SQ-80 can be Layered (so that two Programs play at once over the whole keyboard), **Split** (so that each half of the keyboard plays a different Program), and **Split/Layered** (so that the **Split** Program is layered with yet another Program).

It is important to note that the parameters on this Page are all **part of the Program —** that is, any **Split** and/or **Layer** configurations you set up here must be Saved as part of a new Program in order to be retained. For example, if you start with a Piano Program, and then Layer that with a String Program, you can now save the new Layered combination in a new Location — the original String_ and Piano Sounds will remain intact in their original locations.

Also bear in mind that wherever two Programs are Layered, the SQ-80 becomes a four-voice Synthesizer — it will start "stealing" voices after four have been played, rather than the usual eight. The number of voices is only reduced where a Layer is in effect, however. Splits cause no loss of voices.

Use this Page to:

1) Activate the Layer function;
2) Choose the **Layer Program;**
3) **Split** the Keyboard (Upper or Lower) between two different Programs;
4) Choose the **Split Program;**
5) Choose the **Split Key:**
6) Layer a second Sound with the Split Program **(Split/Layer** mode); and
7) Choose the **Split/Layer Program.**

ACTIVE CONTROLS:

1, SPLIT/LAYER ON/OFF

This activates the **Split/Layer** mode. In order for this control to have any effect, the Keyboard must first be Split, either Upper or Lower (see #6 below).

When ON: The **Split Program** will be Layered (will play simultaneously) with the Program whose name appears to the right of this control (#3). This will result in a reduction to four Voices only on the **SPLIT/LAYERED** half of the Keyboard.

3. Select SPLIT/LAYER Program

The Program whose name appears here will be Layered with the **Split Program** when an Upper or Lower Keyboard **Split** has been selected. It is possible to have a **Split/Layer** without **Layer** mode being on. The Program shown here is Layered only with the **Split Program.**

When this control is selected (Underlined), you can choose a new **SPLIT/LAYER** Program in one of two ways:

- Use the **Data Entry Slider** and the **Up and Down Arrow** Buttons to scroll through the various Programs in Memory until you find the one you want; or
- Press **Internal, CART** A, or **CART B** to select a Master Bank: then press one of the four **Bank Select** Buttons and, while holding it down, select the Program you want. You will he returned to the **Split/Layer** Page with the new Program selected as the **SPLIT/LAYER** Program. There will always be a Program name in this Location, whether the **SPLIT/LAYER** mode is engaged or not.

4. LAYER ON/OFF This acts as a switch to turn On or Off the Layer mode.

When ON: The Current Program (the one you are editing) will be Layered (combined) with the Program whose name appears immediately to the right (see #5 below), and both Programs will play simultaneously. Activating the Layer mode reduces the number of available Voices in the layered portion of the keyboard to four (from eight).

5. Select LAYER Program

The Program whose name appears here will be Layered with the Current Program when the Layer mode is switched On. When this control is selected (Underlined), you can choose a new LAYER Program in one of two ways:

- Use the **Data Entry Slider** and the **Up and Down** Arrow Buttons to scroll through the various Programs in Memory until you find the one you want: or
- Press **Internal, CART** A, or **CART B** to select a Master Bank, then press one of the four **Bank Select** Buttons and, while holding it down, select the Program you want. You will be returned to the **Split/Layer** Page with the new Program selected as the LAYER Program.

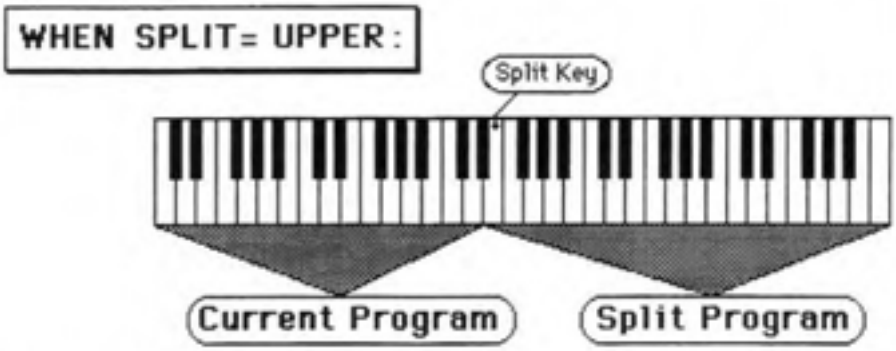
There will always be a Program name in this Location, whether the Layer mode is On or not.

6. SPLIT Select

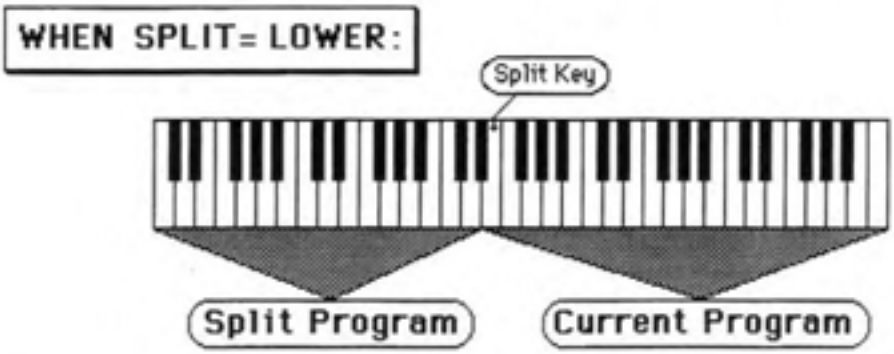
This control is used to **Split** the Keyboard between two Programs, as well as to determine which Keyboard half each will occupy. There are three possible states:

OFF — Normal Keyboard assignment: no Split.

> **UPPER —** When SPLIT=UPPER is selected, the Split Program (see #8) will play on the Upper Keyboard (that is, above the Split Key), and the Current Program will play on the Lower Keyboard (below the Split Key).



> **LOWER —** When SPLIT=LOWER is selected, the Split Program will play on the Lower Keyboard (that is, below the Split Key), and the Current Program will play on the Upper Keyboard (above the Split Key).



So when you select **UPPER** or **LOWER** here, you are selecting which area of the Keyboard the **Split Program** will occupy. The Current Program (the one you started from) will always occupy the the opposite Keyboard half.

8. Select SPLIT Program

The Program whose name appears here will occupy the half of the Keyboard as designated above (#6), if **SPLIT=UPPER** or **SPLIT=LOWER** has been selected.

When this control is selected (Underlined), you can choose a new **SPLIT** Program in one of two ways:

- Use the **Data Entry Slider** and the **Up and Down Arrow** Buttons to scroll through the various Programs in Memory until you find the one you want; or
- Press **Internal, CART** A, or **CART B** to select a Master Bank, then press one of the four **Bank Select** Buttons and, while holding it down, select the Program you want. You will be returned to the **Split/Layer** Page with the new Program selected as the **SPLIT** Program.

Note: Whenever you select a **Layer Program,** a **Split Program,** or a **Split/Layer Program,** the **SQ-80** only "remembers" the Location of that Program in Internal or Cartridge Memory — not the Program itself. If you move a Program, put another in its place, or transfer an entire Bank of Programs, the **Layer. Split,** or **Split/Layer** Program on this Page might still be "pointing to" a Location that no longer contains the sound you had in mind.

For example, if you create and save a Program where a Brass sound is Layered with a String sound, and you then Write over the String Program (or insert a different Cartridge in the case of Layering with a Cartridge Program,) a different Layer Program will play — whatever is now in the Location originally occupied by the String sound.

If your **Layer, Split,** or **Split/Layer** Program is a Cartridge Program, and you remove the Cartridge, the word *CART* will appear instead of the Program name, and the Program that will play will be the Internal Program with the same relative Memory Location (until you replace the Cartridge).

This also means that if you transfer an entire Bank of Programs from a Cartridge to the Internal Memory (or vice versa), any **Layer, Split,** and **Split/Layer** Programs will still be "pointing to" their previous Locations, and may not work once the Cartridge is removed, or you insert a different Cartridge. In this case, you should go through the transferred Programs and edit them so that the **Layer, Split,** and **Split/Layer** Programs are in the new Bank, and then Save (Write) the Programs back into their current Locations.

Also, if you select a Program for your **Layer, Split,** or **Split/Layer** Program that itself contains a Layer, or Split, only the main part of that Program will play — not any Layers or Splits that are programmed into it. It is only possible for one **Layer, Split,** or **Split/Layer** to be active at any time. So you can't, for example, make a Triple Layer by selecting an already-Layered Program as the Layer Program.

10. Select SPLIT Key

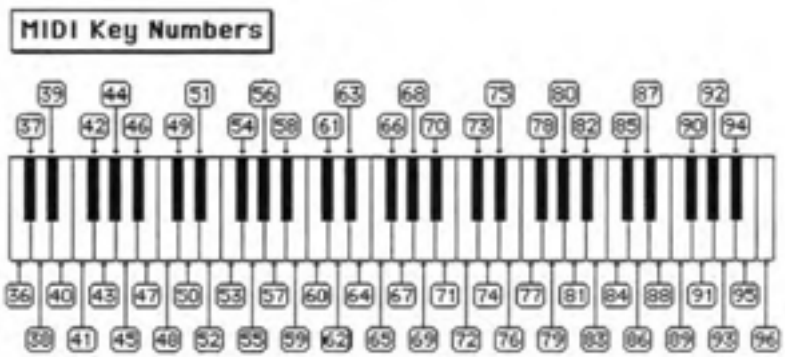
This designates the note on the keyboard at which the Programs will **Split,** if **SPLIT=UPPER** or **SPLIT=LOWER** has been selected (#8 above).
Range: 21 To **108.**

Key Numbers given here are **MIDI key** Numbers — they reflect the MIDI standard for numbering keys, rather than just counting up from the lowest note on the keyboard. Thus the Low C on the **SQ-80** Keyboard is MIDI Key # 36; Middle C is MIDI Key # 60: the High C is MIDI key # 96.

Helpful Hint: The value of this parameter can be adjusted using the Data Entry Slider and the Up and Down Arrow buttons, or by using the following short cut:

- With the SPLIT KEY parameter selected (underlined) press and hold down the **Record** button (in the Sequencer section).
- While holding down the **Record** button, play any key on the keyboard. That key will be set as the Split Key. The Split Key number showing on the Display will be updated accordingly.

The available range of values **(21 To 108)** corresponds to the the 88 key range of a grand piano. This allows the Split Key to actually be out of the range of the **SQ-80** keyboard — but such splits will only be effective if the SQ-80 is played via MIDI from an instrument with more than a 61-note keyboard. The **Split Key** itself always plays whichever Program is on the Upper half.



PROGRAMMING CONVENTIONS

There are a number of Programming conventions which we have tried to follow within all SQ-80 and ESQ factory Programs whenever possible. They will help you to know where to begin when editing factory Programs. You may also find them to be handy rules of thumb to follow when creating your own Programs.

LFO's

– > **LFO 1** is used for Wheel Vibrato, when it is part of the Program. > **LFO** 2 and **LFO 3** are available for other purposes.

Envelopes

> **ENV 1** is used for Pitch Envelopes (modulating **OSC 1,** 2 or **3).**

___ **> ENV** 2 is used for individual volume Envelopes (modulating **DCA 1,** 2 or **3).**

> ENV 3 is used for Filter Envelopes (modulating the **Filter Cutoff Frequency).**

– **ENV 4** is always fixed as the overall volume Envelope **(DCA 4).**

Of course these do not all apply for every Program. Any Envelope can be routed anywhere you want it to go (except to DCA 4), and some Programs will call for different applications. But where applicable, the factory Programs follow these conventions.

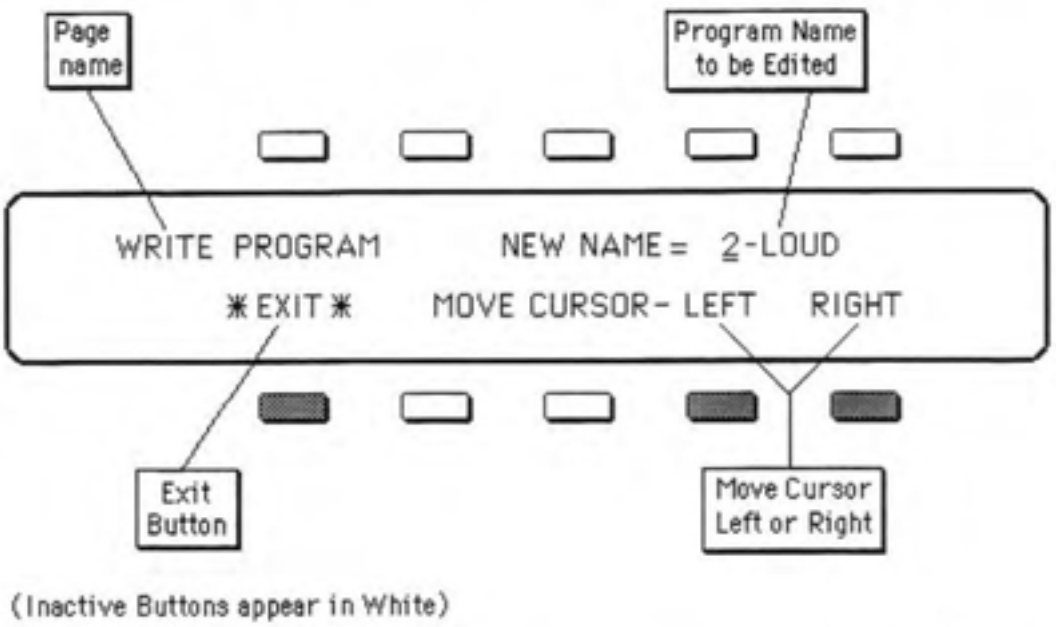
Program Names

– (/) Where a Program is Layered, a slash (/) is incorporated into the Name.

– > (+) Where a Program contains a Split, a plus sign (+) is incorporated into the Name.

[WRITE] WRITE PROGRAM PAGE

To Save a New or Edited Program into Memory, or Copy an Existing Program to another Location.



Saving a New Program Into Memory

Once you have modified an existing Program, or created an entirely new one, you can Write, or save, that Program to any Internal or Cartridge Memory Location using the **WRITE PROGRAM** Page. This Page is also used to **Rename** the Program with the name of your choice.

When you are ready to Write a Program into Memory, first decide on a Name of up to six letters for your new Program. Then:

1. **Select the WRITE Page** by pressing the button labeled WRITE on the front Panel. The Page will come up as shown above, with the current Program Name showing. You will see a **Cursor,** or underline, beneath the first letter of that Name.

2. **Edit the Program Name** using the Data Entry Slider and the two **Move Cursor** buttons on the Display, labeled LEFT and RIGHT" You can move the Data Entry Slider up and down to scroll through the available characters, or step through them one at a time with the Up and Down Arrow buttons. Experiment until you find the first letter you want. Then press the RIGHT button to move the Cursor :o the next location. Again, scroll through the characters until you find the correct one. Repeat this procedure until the display shows the name you have chosen.

   You can move the **Cursor** back and forth using the LEFT and RIGHT buttons, changing letters, as often as you like, until you're satisfied. There are some pretty weird characters in there, along with the usual letters and numbers, to choose from. Be creative.

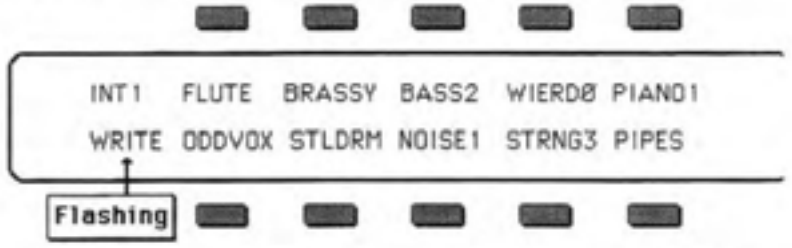
Helpful Hint: Moving the **Data Entry Slider** all the way down gives you a blank space.

3. **Select a Memory Location** for your new Program. You can "flip through" the various **Program Select Pages** in both the Internal Memory or the Cartridge to find a Program you want to write over.

(Remember that you will be replacing whatever is already there, so be careful!)

Press one of the **Bank Select** Buttons, 1 - 4. As long as you hold the button down, the Display will show the Program Select Page for that Bank, with two differences:

- None of the Program names are underlined, and
- the word "WRITE" is flashing in the lower left-hand corner, below the Page Name.



When you release the Bank Select Button, the Display will return to the **WRITE PROGRAM Page.** Press another Bank Select Button and the Display shows you the Programs for that Bank. To look at the Programs in a different Master Bank (CART A or **CART B** for instance), simply press the Button for that Master Bank, and then press and hold down any of the four Bank Select Buttons, as before.

4. **"But Wait, I need to hear them!"** You may find that it's not enough to look at all those Program Names — you want to audition a few before deciding which to erase. In this case, press the button beneath the word *EXIT* on the Display. This returns you to the Page you were on before entering the WRITE mode.

   Now use the **Bank Select** Buttons and the **Program Select** Pages in the usual way to select and listen to the Programs in memory. Your new Program is still safe in the SQ-80's Edit buffer.

   WARNING! — While you're doing this, **DO NOT** change any parameters in the Programs you audition, as this would instantly replace your hard-earned new Program in the Edit Buffer with something else entirely, and you might get upset.

   When you are through listening, return to the Program you want to save by pressing the COMPARE Button. The *C* prompt will appear in the lower-left corner of the Page. Now press the WRITE Button to return to the **WRITE PROGRAM** Page. Your new Sound, and its new Name should be just where you left them.

5. **Write the Program in Memory.** Once you have decided where you want to save the new Program. Press the appropriate Bank Select Button, and while holding it down, press the "Soft" Button which corresponds to the Program you wish to Write over. This Writes the new Program, with its new Name. into that Memory Location.

   The Display will show the message "WRITING PROGRAM" which will remain for about two seconds.

The **SQ-80** will then return to the Program Select Page of the Bank into which the new Program has just been saved. The new Program is underlined, and is thus selected as the Current Program:

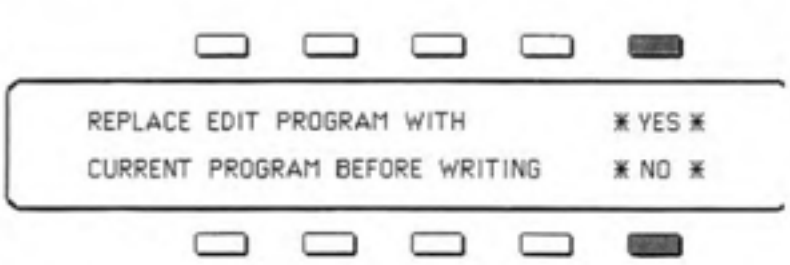
EXIT

The Button beneath the word *EXIT* can be pressed at any time to exit the WRITE Page and return to the Page you were on before entering it.

Copying an Existing Program to Another Location

Sometimes you'll want to take an existing Program, one that you haven't been editing, and simply copy it to another Memory Location. For example, you might want to put the ten most commonly used Programs in the same Bank, for easy access during performance. Normally, the WRITE Page "looks" at the Edit Buffer. But you have the option of Writing an existing, unedited Program.

First select the Program you want to copy. Then press the WRITE Button. Pressing the WRITE Button when the *C* **(Change/Compare)** is not showing in the lower-left corner of the Display causes the **SQ-80** to ask you the following question:



Answering *YES* places the Current Program onto the WRITE Page, and you can now use the WRITE Page exactly as before to copy that Program to any other Memory Location. Again, remember that you will erase whatever Program you write over — it's not a bad idea to save all Internal Programs to a Cartridge or to disk before doing any major Memory reshuffling, because once a Program is gone, it's gone.

Answering *NO* will put you on the WRITE Page with the Edit Program showing.

SECTION 4

The Sequencer

THE SEQUENCER

The Sequencer section of the SQ-80 is a integrated part of the design of the instrument, and an extremely powerful device in its own right. Building a Sequencer this sophisticated into the same box with a synthesizer creates many new possibilities for writing, recording and performing music. We think you will find the Sequencer extremely straightforward and easy to use — having both your Sequencer and your master keyboard controller right at your fingertips in one box is what makes the **ENSONIQ** approach to digital sequencing so unique.

At the same time, the great flexibility of this integrated synthesizer/sequencer design can make for a few complexities, Since the Synthesizer and the Sequencer are interrelated, what you do on one sometimes affects the other. There are a few possible routes to confusion here. However, if you pay close attention to the explanations in this Manual, use your common sense, and open your mind to a few new concepts, you will be happily sequencing in no time.

The eight-track **Sequencer** built into the SQ-80 is based upon the same data structure as that of the **ENSONIQ ESQ-1.** Since the two instruments share the same Sequencer file format, individual sequences recorded on the ESQ-1 can be transferred to and played on the SQ-80. and vice-versa (see p. 185 for more on ESQ-1 compatibility).

Note: If you can't wait to start sequencing, you can turn right to the chapter **"Recording a Sequence"** which begins on page 111. We recommend, however, that you eventually come back and familiarize yourself with the many other Sequencer controls and functions described in this Section. This is the only way to truly take advantage of the power of the SQ-80 Sequencer.

The MIDI Connection

Almost everyone is familiar by now with MIDI — that magical connection that lets you play one instrument (or a whole roomfull of them) from another. MIDI — Musical Instrument Digital Interface — is a standard that has been agreed upon by manufacturers for translating musical events into specific numbers.

When you strike the Middle C on the **SQ-80,** for instance, it instantly sends to its MIDI Out jack a series of numbers representing a Key Down, along with the location on the Keyboard, and how hard the key was struck. When you release the key the SQ-80 sends a number meaning Key Up. A MIDI instrument connected to the SQ-80 can read and translate those numbers to play the same middle C itself. The same thing happens whenever you move a controller, such as the Pitch or MOD Wheel. or when you select a new sound — each of these events is translated into a series of numbers which are transmitted out the MIDI Out jack.

Now imagine a recorder which, instead of recording the sounds of an instrument, records the same kind of Digital information that is sent and received over MIDI — Key Down, Key Up. Key Number and Velocity. Pitch Bend, MOD Wheel, and so on — and you have imagined a Digital Sequencer.

A Sequencer records and plays back the "control information" rather than the actual notes. This means that there is no degradation of the sound in the recording process no matter how many times you overdub or re-record a part. A Sequencer is sort of an electronic player piano.

Digital Sequencing

A general understanding of how a Digital Sequence Recorder like the SQ-80 does what it does, and how it differs from an eight-track audio tape recorder, will help you to get the most out of your instrument. The key thing to bear in mind is this — the Sequencer only records what you play. Sequencer Memory is used up on the basis of Events (Keys struck, Controllers, etc.), while a tape recorder's memory (the tape) is always used up by the same amount over a fixed period of time.

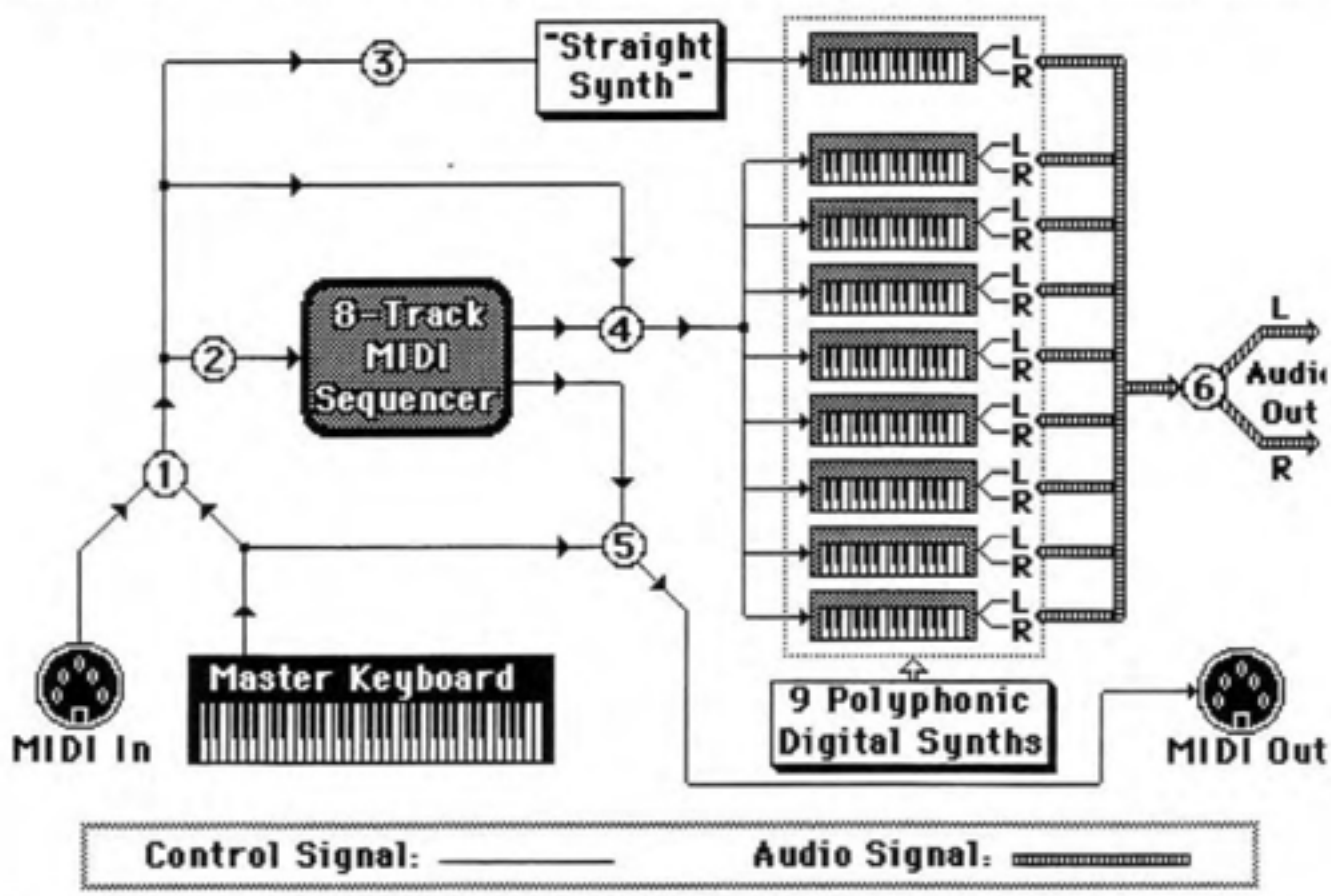
This means that a Sequencer will use virtually the same amount of Memory to record 100 notes, whether you play those notes over ten seconds or ten minutes. When you strike a key, the Sequencer records a Key Down. It then counts the Clock pulses until you release the key, when it records a Key Up. The amount of time between the Key Down and the Key Up doesn't really affect the amount of Memory required to record the note.

Compare this to an audio tape recorder. With tape, Time is the thing. A tape recorder will use the same amount of tape to record a minute of music, whether the signal contains one note or one hundred.

You might say that tape is linear — it is spent at a fixed rate — while Digital Sequencer Memory is dynamic — it is used only as needed. The difference is essential to learning how to manage the SQ-80's Sequencer Memory. For example, while Key Events (the notes you play) use up relatively little Memory each, Controllers such as MOD Wheel. Pitch Bend, Breath controller. etc., are recorded as a flood of numbers which can fill up the Memory in a hurry. Thus if you're trying to squeeze one more Track into a Sequence when there is not much Memory left, you know to go easy on the Controllers.

THE "SYSTEM"

The diagram below illustrates the signal paths and the "component parts" that make up the SQ-80 —the **SQ-80 System.** As you grow more familiar with the SQ-80 and its functions, you should refer back to this diagram, as it will answer many of your questions concerning which signals can be routed where.



As indicated by the above diagram:

1) There are two available Control Signal sources — incoming MIDI Data, and the SQ-80 Keyboard (shown above as Master Keyboard).
2) Both the **SQ-80** Keyboard and incoming MIDI can address any of the Tracks of the eight-track MIDI Sequencer.
3) Both the SQ-80 Keyboard and incoming MIDI can address the Straight Synth.
4) Each of the Tracks can be thought of as a "virtual synth" and can be addressed from the SQ-80 Keyboard, from MIDI, or from Data recorded on the Sequencer.
   (A "virtual synth" is defined here as something that has 1) its own Program, 2) its own MIDI Channel. and 3) eight voices available for it to play. Of course, since the **SQ-80** has only eight voices, the nine "synths" — the Straight Synth and the eight Tracks — cannot all play at any one instant in time. But the **SQ-80's** Dynamic Voice Assignment means that each Track has eight voices available at any time, if someone else is not using them.) Note that the SQ-80 must be in MULTI Mode for each Track to receive independently on its own MIDI Channel.
5) Both the SQ-80 Keyboard and the. Sequencer can send MIDI Out.
6) The stereo outputs of the Straight Synth and the eight Tracks combine to form the Left and Right Audio Outputs of the **SQ-80.**

Note: The diagram above is conceptual and somewhat simplified. It is intended primarily as an aid to understanding.

SEQUENCES AND SONGS

What is a Sequence?

A **Sequence** on the SQ-80 is comparable to a Pattern on a drum machine. Each Sequence has a defined length (though you can change it at any time). A Sequence can be as short or as long as you want (within the limitations of Memory). Within a given Sequence, each of the eight Tracks has its own Internal Program and MIDI configuration (MIDI Channel, Status. Program number. etc.), all of which is "remembered" by the SQ-80 for each Sequence.

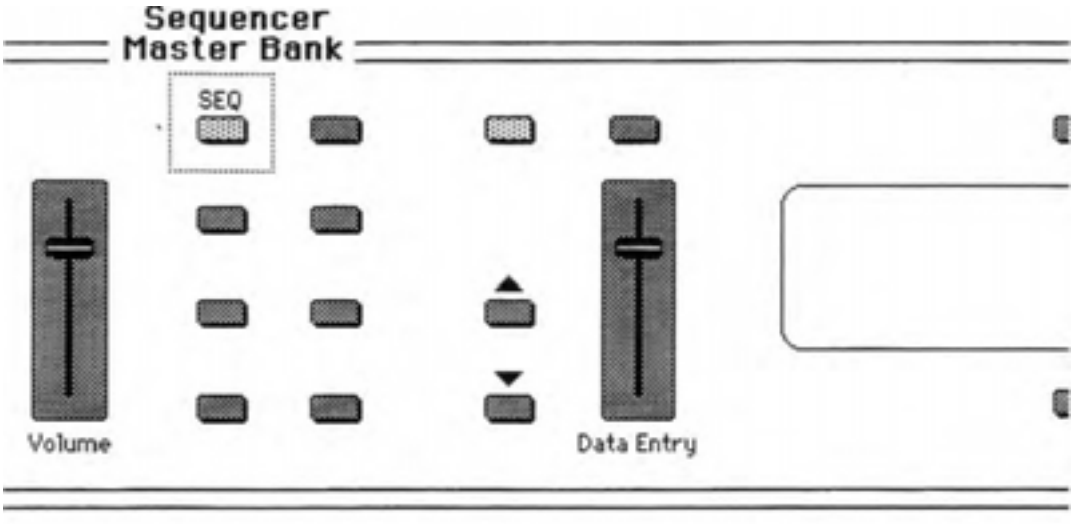
Each time you select a new Sequence, each Track used within a Sequence will send out a Program Change and MIDI Volume instructions on its designated MIDI Channel. unless the Track has been assigned LOCAL only Status — in which case you can have the new Track play a new Internal Program. Internal Program, MIDI Channel, MIDI Program, etc. for each Track do not change within a given Sequence — that is what the **SQ-80's Song** Mode is for.

In Song Mode, Sequences will play consecutively in any order, with up to 99 Steps, and up to 99 Repetitions of each Step. Whenever a new Sequence begins to play as a Step in a Song, the effect is the same as when you select the Sequence — each Track will send out a Program Change on its MIDI Channel, change its Internal Program, or whatever you have programmed that Track of that Sequence to do.

You'll find that you can control all your MIDI instruments — playing, recording, and changing Sounds — without ever leaving the **SQ-80** Keyboard.

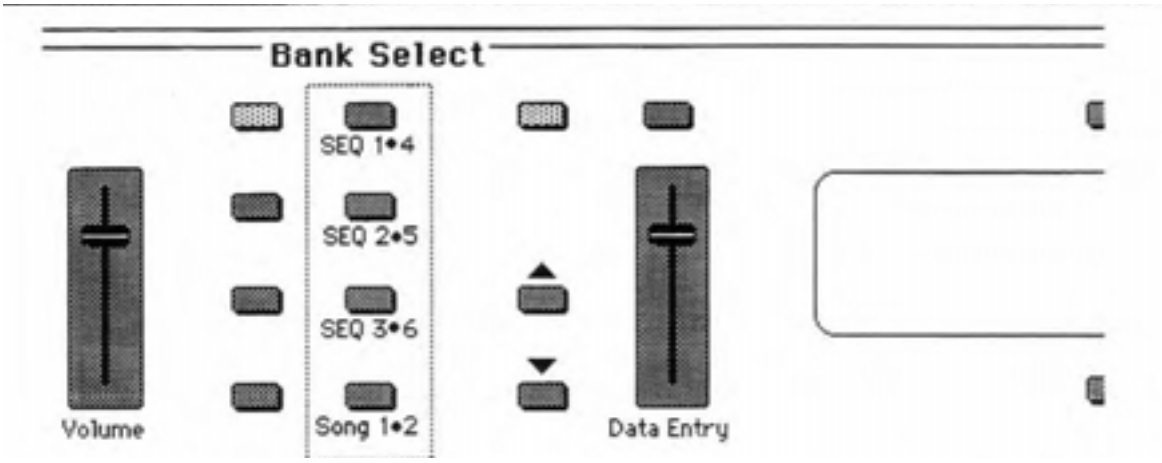
Sequencer Master Bank

The Button labeled SEQ. above the three Program Master Bank Buttons, selects the **Sequencer Master Bank.** The **Sequencer Master Bank** contains 60 Sequence Memory Locations, and 20 Song Memory Locations. Not all of these locations necessarily contain a Sequence or Song at a given time.



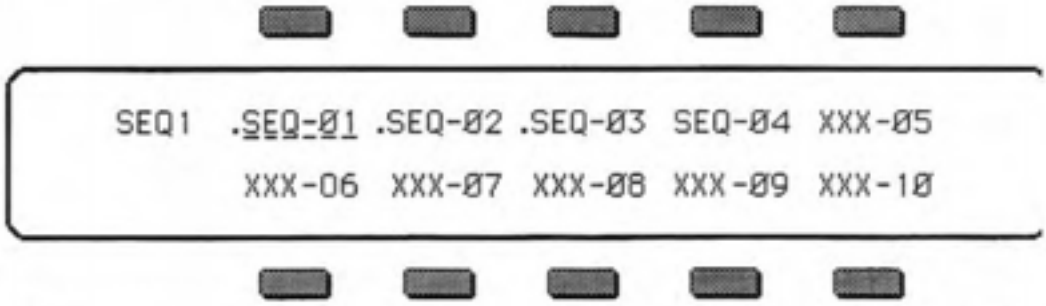
Sequencer Banks

Press the **Sequencer Master Bank** (SEQ) Button. The four **Bank Select** Buttons now access the Sequencer Memory rather than the Program Memory. There are six Banks of ten Sequences and two Banks of ten Songs.

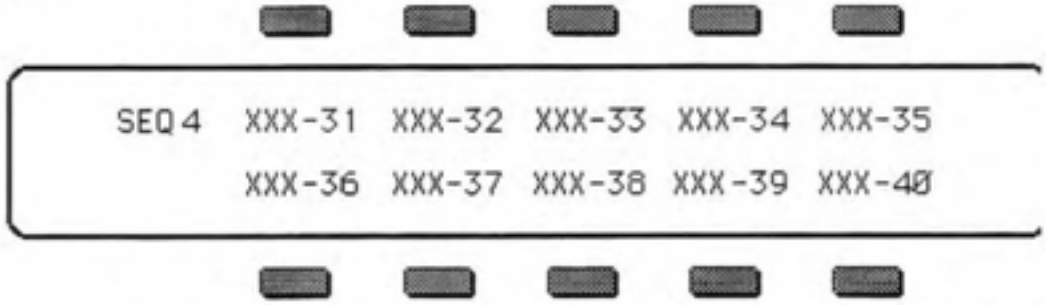


Selecting a Sequence

Press the buttons labeled **SEQ 1-4, SEQ 2**-5 or SEQ 3-6 to see the **Sequence Select Pages** for the first three Sequencer Banks numbered **SEQ 1, SEQ** 2 and **SEQ 3.** These Sequences are numbered **01** through 30. When you press **SEQ 1**-4, the Display shows:



Press the SEQ button again. Now pressing these same three Bank Select buttons will show you the **Sequence Select Pages** for the next three Sequencer Banks, numbered **SEQ 4, SEQ 5** and **SEQ 6.** These Sequences are numbered 31 through 60.



Press SEQ again to return to the first three Sequence Select Pages. Repeated pressing of the SEQ button will toggle the Display back and forth between **SEQ 1** and SEQ 4: between SEQ 2 and SEQ 5: between **SEQ 3** and **SEQ 6:** and between the two banks of Songs.

Pressing the "Soft" Button next to any of the ten Sequence Locations on a Page selects that as the current Sequence, Only those with (SEQ—) before the Sequence number can be selected. A location where (XXX—) appears represents a Sequence which hasn't been defined yet — it contains no Sequence Data and cannot be selected until you Create a Sequence in that Location. As with everything on the **SQ-80.** when you select a Sequence it becomes underlined.

The currently selected Sequence is always underlined.

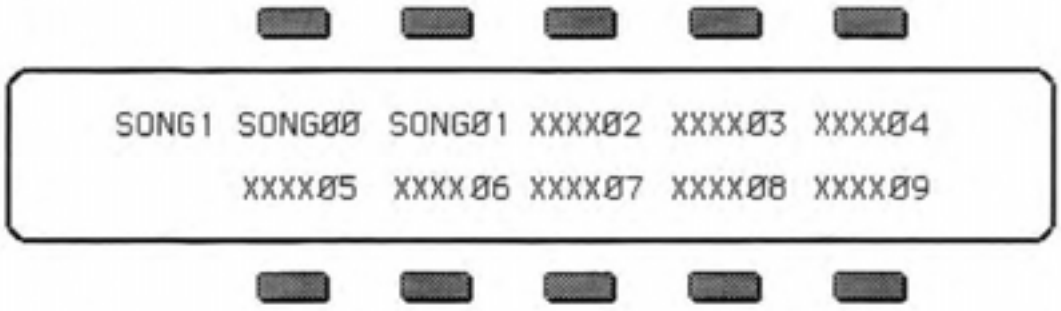
A **dot (.)** to the left of a Sequence location means there is data recorded in that Sequence. A Sequence Location with no dot means that the Sequence has been created, but that nothing has yet been recorded there.

Whenever you select a Sequence or a Song, the SQ-80 sends out a MIDI Song Select message. See p. 143 for more details on Song Selects.

Selecting a Song

With the SQ-80's Song Mode you can chain Sequences together to form up to twenty different Songs. Press **Song 1•2** to see the first **Song Select Page.** Then press the SEQ button again to see the second **Song Select Page.** Repeatedly pressing the SEQ button toggles between the two Song Banks.

Either a Sequence or a Song can be selected — never both. While the thirty Sequences are identified by number only, the ten **Songs** can have Names. When you press **Song,** the Display shows:



Pressing the "Soft" Button above or below any of the 20 Song Locations selects that as the current Song. Only those with a Name can be selected. A location where (XXXX) appears represents a Song which hasn't been created yet and cannot be selected.

The currently selected Song is always **underlined.**

Playing Sequences

Try selecting a Sequence, and pressing the Play Button in the Sequencer Section, to the right of the Display. The selected Sequence will begin to play.

While one Sequence is playing you can select another one. An underline will begin to flash beneath the new Sequence, but the original one will continue to play. When the first Sequence is finished, the underline will switch to the new Sequence, and it will play. In this fashion you can string Sequences together in real time, as they play. The Display always tells you which is Playing (underline) and which is selected to play next (flashing underline).

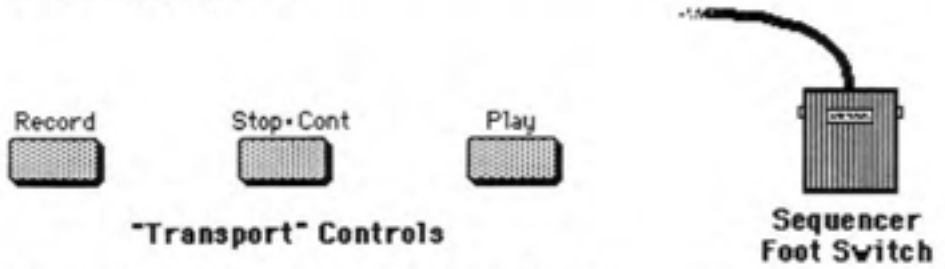
Press the Stop•Cont Button or the **Sequencer Foot Switch** to Stop the Sequence.

Playing Songs

To Play a Song, simply select one of the Songs in memory, as described above, and press the Play Button in the Sequencer Section. Unlike Sequences, you can't switch Songs while one is playing. The Sequencer must be stopped to select a new Song.

Press the Stop•Cont Button or the **Sequencer Foot Switch** to Stop the Song.

"TRANSPORT" CONTROLS



The bottom row of Buttons in the Sequencer section of the SQ-80 are used to start and stop the Sequencer, and to enter the various other Sequencer States. These buttons are similar to the Play, Stop and Record controls on a tape deck. Together with the **Sequencer Foot Switch** (which duplicates the **Stop•Cont** Button), and the Auto-Locate controls found on the LOCATE Page (which might be compared to the fast forward and rewind), they give you the ability to Play or Record from any Bar within a Sequence.

When the Sequencer is Stopped:

- Pressing Play starts the Sequencer playing from the beginning of the Sequence or Song. (Unless you have just used the **Auto-Locate** Controls, in which case the first press of the Play Button acts like **Stop•Cont.)**

- Pressing **Stop•Cont** starts the Sequencer playing from the point where it was last stopped, or from the location selected with the Auto-Locate Controls.

- Pressing **Play while holding down Record** starts the Sequencer Recording from the point where it was last stopped. or from the location selected with the **Auto-Locate** Controls.

When the Sequencer is in PLAY:

- Pressing **Stop•Cont** stops the Sequencer.

- Pressing Play starts the Sequence again from the beginning.

- Pressing **Record** puts the Sequencer into **Overdub.** It will wait for you to play before going into Record.

When the Sequencer is in RECORD:

- Pressing **Stop•Cont** stops the Sequencer.

- Pressing Play takes the Sequencer out of **Record** and puts it into **Audition Play.** (Except on the First Track. When recording the First Track, pressing Play has no effect.)

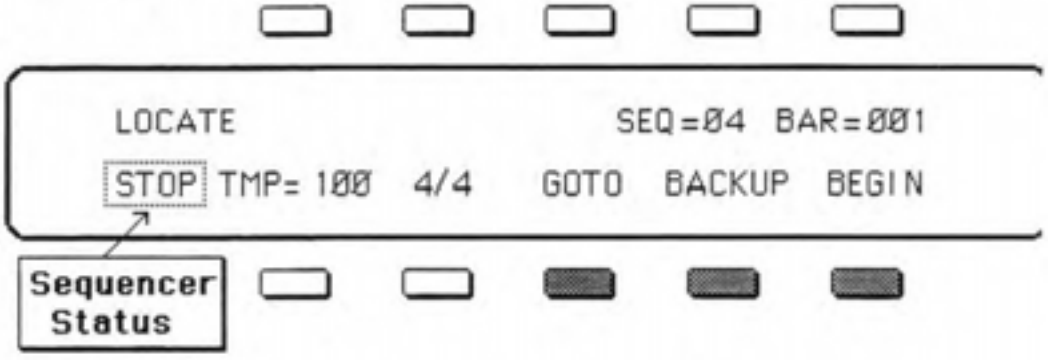
Sequencer Foot Switch

The Rear Panel jack labeled **Sequencer Ft. Sw.** accepts an **ENSONIQ SW-1** Foot Switch. When a Foot Switch is plugged into this jack, pressing it will have the same effect as pressing Stop•Cont, except when recording the first Track of a Sequence, or when in Overdub, when it can be used to put the Sequencer into Record without playing.

The Sequencer Foot Switch exactly duplicates the behavior of the Stop•Cont Button (except in the REC Standby or Overdub states).

SEQUENCER STATES

On all Sequencer Pages except the **CREATE/ERASE** Page and the EDIT Page. the **Status** of the Sequencer is always shown in the lower-left corner of the Display. This tells you which State the Sequencer is in at any given time.



When a Sequence is selected, the possible Sequencer States are:

STOP — Sequencer at rest.

PLAY — Sequencer Playing current Sequence. From **STOP, PLAY** is entered by pressing the Play Button, or pressing the Stop•Cont Button.

REC (flashing) — This is a Record "Standby" state that occurs only when recording the First Track of a Sequence. When **Record/Play** is pressed to record the First Track, REC flashes and the metronome starts (CLICK must be ON), allowing you to adjust the Tempo. Recording does not start until you begin to play. The point where you begin to play then becomes Bar # 1 of the new Sequence.

REC — Recording on the selected Track. **Record** is entered by:
1) Playing any note while REC is flashing (First Track only);
2) Pressing **Record/Play** (all .later Tracks): or
3) Playing any note while ODUB is flashing (see **Overdub Mode** below).

The **SQ-80** automatically exits the **Record** State at the end of a Sequence on all Tracks after the first — that is, after the length of the Sequence is defined. It will not Record past the end of a Sequence. At the end of the Sequence it will leave **Record** and (assuming **LOOP= ON)** enter the **Audition Play** State.

ODUB (flashing) — Overdub is another way of entering Record. It allows you to "Punch In" wherever you want on a Track, on any Track after the first.

To enter **Overdub:** While the Sequencer is in Play, press the **Record** Button. The **Status** indicator in the lower left corner of the Display will begin flashing **ODUB.** Nothing will be recorded until you play a note or press the **Sequencer Foot Switch.**

At the point you wish to punch in, just begin to play or press the Foot Switch. The Sequencer will record your new data from the point where you began to play up to the end of the Sequence, where it will leave Record and go into the **Audition Play** State.

AUDP —Audition Play. This State is entered automatically from **Record** when the end of the Sequence is reached (assuming LOOP=ON). After leaving **Record** and entering **Audition Play,** the Sequence will continue to play in this state, with the newly recorded Track, until you press the **Stop•Cont** Button. Pressing **Stop•Cont** from this State will put you on the **PLAY/KEEP** Page (see below).

AUDS — Audition Stop is entered when you stop the Sequencer from the **Audition Play** State. To exit **Audition Stop** and return to the normal **Stop** State, you must first instruct the SQ-80 to KEEP either the new or the original Track (see PLAY/KEEP Page below).

When a Song is selected, things are simpler. Since you can't record in **Song** mode, there are only two possible Sequencer States:

SNGS — **Song Stop.** Sequencer at rest.

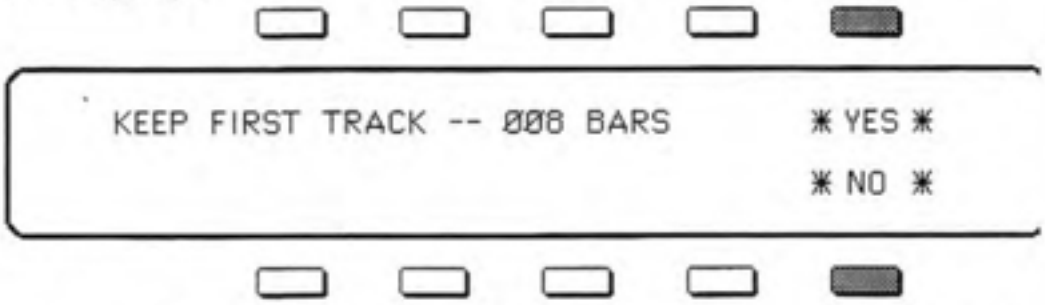
SNGP — Song Play. Sequencer playing currently selected Song.

UTILITY PAGES

There are a number of Utility and Dialogue Pages that you will encounter as you use the SQ-80 Sequencer. These Pages give you the choice of either keeping or rejecting changes you make to a Sequence and its Tracks.

KEEP FIRST TRACK

When you press **Stop** (or the Foot Switch) after recording the First Track of a Sequence, the Display shows the following Page:

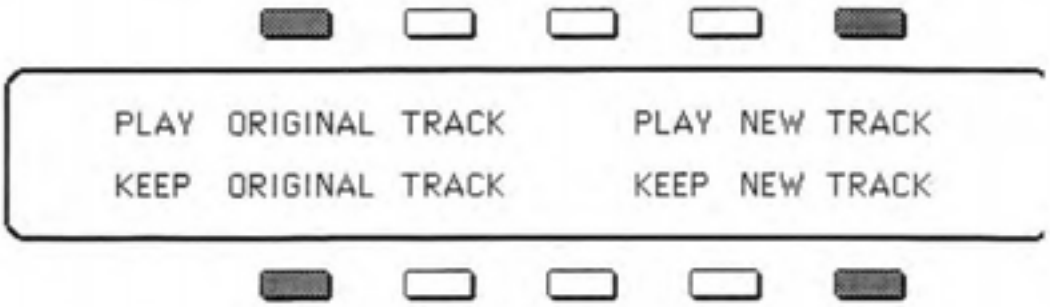


Pressing *YES* installs the Track in Memory as the First Track of the Sequence, and defines the length of the Sequence as the number of Bars shown.

Pressing *NO* returns the Track (and the Sequence) to an unrecorded state, so you can record the First Track again from scratch.

PLAY/KEEP PAGE

After accepting a First Track, everything you record (including recording over the First Track) will be followed by the PLAY/KEEP Page. From the **Record** or **Audition Play** States, pressing the Stop Button (or the Foot Switch) results in the Display shown on the following page:



Because all recording of Tracks is done into a Buffer Memory, no new Track is entered into the Sequencer Memory until you decide you want to keep it. The **PLAY/KEEP** Page lets you listen to either the New or the Original Track, and to Keep (enter into Sequencer Memory) whichever you want.

When you are on the **PLAY/KEEP** Page, most of the other SQ-80 Pages and functions are inactive. You will not be allowed to do much other than Audition the new and original Tracks, until you make a decision on which to keep. However, you can select the **Locate, Mix·MIDI** or **Control** Pages to adjust certain playback parameters while auditioning a Track (see below).

From the **PLAY/KEEP** Page:

Pressing PLAY ORIGINAL TRACK plays the Sequence from the beginning, with the selected Track as it was before you recorded over it.

Pressing PLAY NEW TRACK plays the Sequence from the beginning, with the new Track as you just recorded it.

Pressing the Stop·Cont Button Stops the Sequencer between plays.

Pressing the Sequencer Foot Switch from this Page will Stop and Continue the Sequencer — but will always Play **only the NEW TRACK.**

You can select the LOCATE Page and use the Auto-Locate Controls from the PLAY/KEEP Page. For long Sequences or Overdubs you might want to start listening from some Bar other than the first. Select the **LOCATE** Page and use any of the three **Auto-Locate** Controls to select a starting point. You will be returned to the **PLAY/KEEP** Page, where the **PLAY ORIGINAL TRACK** or the **PLAY NEW TRACK** Button will now start the Sequence from the selected Bar.

You can also select the Control Page (for turning the Click on or off while auditioning, Tracks) or the **Mix·MIDI Page** (for balancing the levels of Tracks while auditioning). Any time you press **Stop.** you will be returned to the **PLAY/KEEP** Page. Remember that you must keep either the original or the new Track before you can get out of **Audition Play** and return to normal operation.

Pressing KEEP ORIGINAL TRACK leaves the Track in the Sequencer Memory as it was before you recorded the New Track. If the Track was empty before recording, pressing **KEEP ORIGINAL TRACK** simply leaves the Track empty.

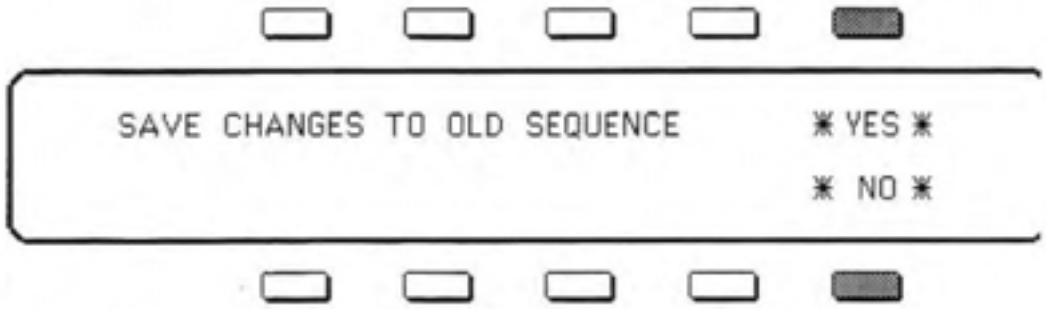
Pressing KEEP NEW TRACK enters the Track you just recorded into the Sequencer Memory. It will replace the original Track there.

SAVE CHANGES TO OLD SEQUENCE

Along with the **Track Data** (the Notes and Controllers that are recorded on each Track) there are several other parameters that are saved with each Sequence. These are:

- the **Tempo** of the Sequence
  > the setting of the **LOOP Switch,** ON or OFF **(CONTROL** Page)
- the **Program** assigned to each Track **('Tracks Select** Page)
- the **Mix Level** (volume) of each Track **(Mix˙MIDI Page)**
  > the **MIDI Channel** assigned to each Track **(Mix˙MIDI** Page)
- the **MIDI Program number** assigned to each Track **(Mix˙MIDI** Page)
- the **MIDI Status** of each Track **(Mix˙MIDI** Page)

Whenever you record any Track of a Sequence, all of these values are automatically saved — that is, they will be remembered by the **SQ-80** if you leave the Sequence (by selecting another one) and return to it later. However, if you change any of these parameters, and then select a new Sequence before you record any new Track Data, the following Page will appear:



Pressing *YES* saves the Sequence, with the current settings of all the parameters listed above, into Sequencer Memory.

Pressing *NO* leaves the settings of the parameters listed above as they were when you last Recorded a Track, or answered *YES* when exiting the same Sequence.

In either case, the **Track Data** (Notes and Controllers recorded) are always saved. Sometimes it's hard to remember, when you get this Page, exactly what you changed. As a general rule, if you are happy with the Sequence as it is, answer *YES*. If you have just been experimenting with different Tempos, Programs, MIDI configurations. etc., and want to keep the Sequence as it was before your experiments, answer ***NO*.**

Helpful Hint: There is one quick way to save any changes you make to a Sequence. After you have changed any of the values listed above and want to save them, press the SEQ button to return to the Sequence Select Page, and select the same Sequence again. The Display will ask "SAVE CHANGES TO OLD SEQUENCE" (even though you actually selected the same Sequence). Answer *YES* and the changes you made to the Sequence will be saved.

Altering a Sequence in SONG Mode

Another time you will get this Page is when you are in SONG Mode (a Song is selected rather than a Sequence), and you change one of the above parameters in a Sequence which is a Step in the selected Song. If the Song is playing, any changes you make on the fly will be "forgotten" as soon as the Step

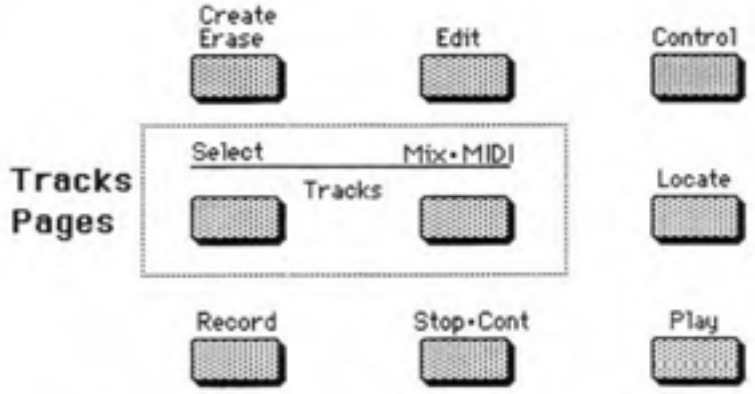
is over. If, however, the Song is stopped, and you change one of these parameters, when you next press **Play,** or select another Song or Sequence, the **SQ-80** will ask **"SAVE CHANGES TO OLD SEQUENCE?"**

Pressing *YES* installs the altered settings of any parameters you changed into Sequencer Memory.

Pressing *NO* leaves the Sequence as it was before you changed it.

After you answer, the **SQ-80** will immediately Play, change Sequences, or whatever you had instructed it to do.

TRACKS



ABOUT TRACKS

Because the Synthesizer and Sequencer sections of the **SQ-80** are interrelated in certain ways. it is important to understand that almost all Sequencer functions have some effect on the Synthesizer — especially those which deal with Tracks. Here are a few basic Truths about Tracks:

In General

– There are eight independent, polyphonic Tracks in each Sequence.

___ > A Track can be selected from the **Tracks Select** Page or the Mix•MIDI Page.

– Only one Track is ever selected at a time.

___ > The selected Track is always underlined.

> Each Track of each Sequence has its own:

Program (Local)
Mix Level (Local, and MIDI for instruments which receive MIDI volume)
MIDI Channel
Status (LOCAL, MIDI. BOTH. or SEQ)
MIDI Program Number (same as Internal Program Number)

___ > When you select a Track, that Track (its Program. MIDI Channel, MIDI Status etc.) "takes over" the Keyboard — when you play, the Track's Program is the one you will hear: the Track's MIDI channel is the one that is transmitted on.

___ > When the SQ-80 is in MULTI Mode (on the MIDI Page), each Track will receive key information, controllers and Program Changes independently on its own MIDI Channel. meaning that each Track acts as a "virtual synthesizer." Since the "Straight Synth" also sends and receives independently, the SQ-80 is actually nine virtual synthesizers sharing a "pool" of eight dynamically assigned voices.

___ > When No Track is selected. the Current Program plays on the Keyboard — normal, "Straight Synth" operation.

When Recording Tracks

> You can only record on one Track at a time.

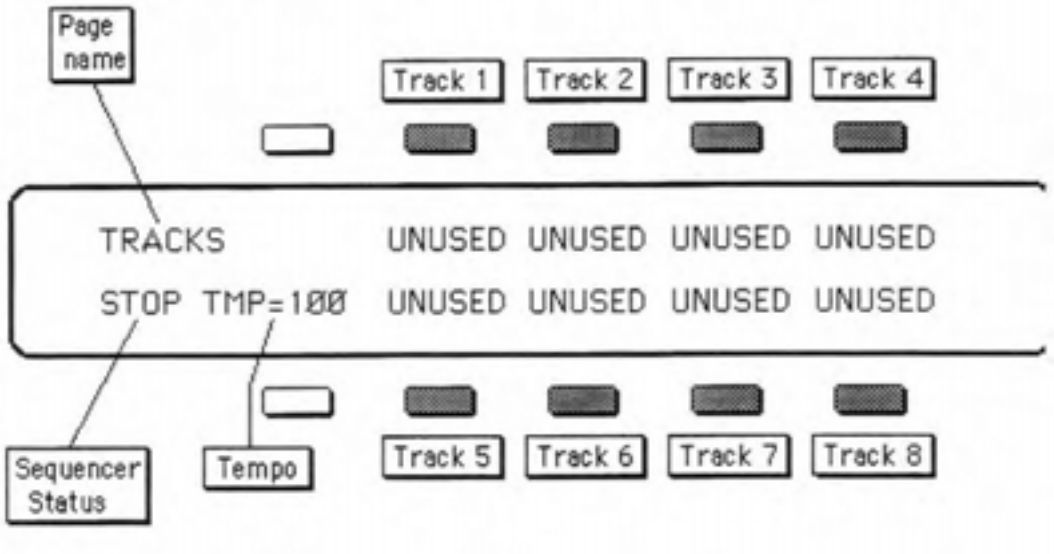
> When you enter Record, you will always record on the selected Track, and only on that Track. > When no Track is selected. going into Record automatically puts you on the Track that was last selected (or Track 1. in the case of a newly created Sequence).

– The length of the First Track you record determines the length of the Sequence (though you can add or delete bars later if you wish).

___ > Recording on a Track always replaces what was previously there. It is Sound Over Sound. not Sound On Sound. You can achieve Sound On Sound. in which new Track data is added to the old, by Merging two Tracks together. an EDIT function.

[SELECT] Tracks Select PAGE

For Selecting Tracks and Selecting a Program for each Track



(Inactive Buttons appear in White)

From the **Tracks Select** Page, along with its companion Page. **Mix•MIDI,** you control all the characteristics of the various Tracks within a Sequence. On both the **Tracks Select** and the **Mix•MIDI** Pages, the eight Tracks of each Sequence always occupy the same eight locations on the Display, and are selected with the same "Soft" Buttons, as shown above.

Each Track has a Local Program — an SQ-80 sound that will play what is recorded on the Track. and will play from the keyboard when that Track is selected (unless a MIDI only Status has been selected). From the **Tracks Select** Page you select a Track (to Record on, to Edit, etc.), as well as selecting the Local Program that will play on that Track.

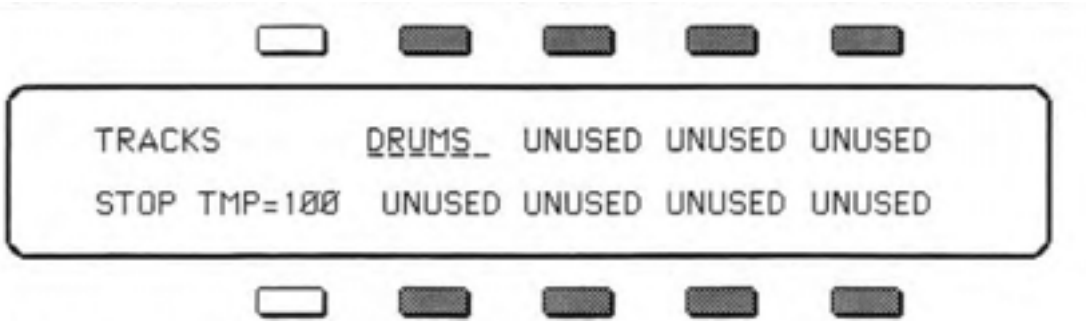
The illustration above shows the **Tracks Select** Page as it appears when a new Sequence is first created. When a Track location says "UNUSED," it simply means that that Track has not yet been defined. You define a Track by selecting it.

Selecting a Track

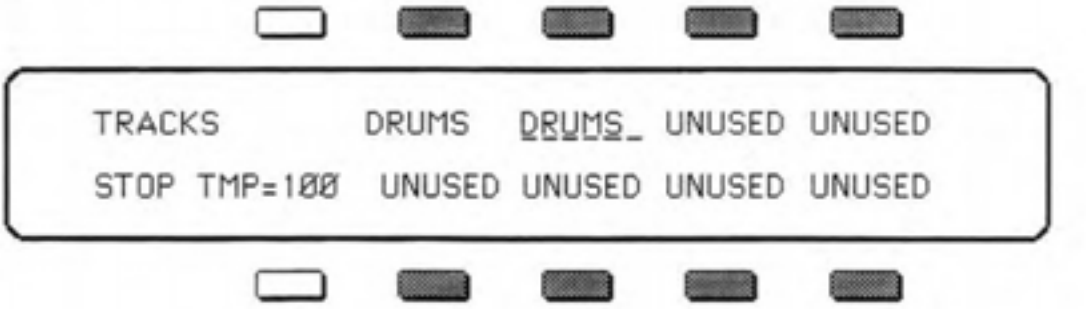
Any of the eight Tracks is selected by pressing the "Soft" Button corresponding to that Track. When you select a Track that was previously UNUSED, two things happen:

1) The word "UNUSED" is replaced by the name of the Current Program, and
2) The Track is now underlined, telling you that it is selected.

Take the above illustration. which shows the **Tracks Select** Page for a newly created Sequence. Say the current Program in the Synthesizer section is called **DRUMS.** If you select **Track 1.** the Page now looks like the illustration on the next page:



Now select **Track 2,** and the Page looks like this:



The Program from Track 1 was "carried over" and assigned to Track 2 when it was selected. **Selecting an UNUSED Track automatically assigns that Track the Program, and all the Mix MIDI Data, from the previously selected Track (or the "Straight Synth" Program and MIDI Channel. if no Track was selected).**

Whenever a Track is selected:

1) Its Program becomes the Current Program, the one that plays on the Keyboard;
2) Its MIDI Channel (Mix MIDI Page) will be transmitted on;
3) That Track (and only that Track) is the one that will be Recorded when Record is entered:
4) That Track is the one that will be Edited when any of the **Track EDIT** functions is selected from the EDIT Page.

Changing the Program on a Track

The procedure for choosing a Program for a Track is similar to that for choosing a WRITE location. or a LAYER Program. While you are on the **Track Select** Page. the Program **Master Bank** and **Bank Select** Buttons act as momentary switches — they only work as long as they are held down. Let them go and the Display springs back to the **Tracks Select** Page.

The procedure for selecting a Local Program for a Track is as follows:

____ > Select **Tracks Select** Page.
> Select one of the eight Tracks.
– Press **INTERNAL, CART** A **or CART B** to select a **Master Bank.**
– > Press **Bank Select** Button(s) # **1, 2, 3 or 4** to find the Program you want.
– While holding the Bank Select Button down, press the "Soft" Button above or below the Program.
– > Release the Bank Select Button. You will be returned to the Tracks Select Page, with the new Program Name showing in the selected Track's location.

"UNSELECTING" a Track — Straight Synth Mode

Pressing the "Soft" Button above or below any of the eight Track locations on the **Tracks Select** Page selects that Track. Pressing the same Button again "Unselects" the Track, so that no Track locations on the Page are underlined. When no Track is selected, you are in the **Straight Synth** Mode. This is a state in which the Keyboard and the current Program are independent of the Sequencer.

Like each of the eight Tracks. the **Straight Synth** has its own Program — the Current Program — which was the last one you selected before selecting a Track. The MIDI Channel selected on the MIDI Page in the Synth Section is its MIDI Channel. The **Straight Synth Mode** is another way of saying the Synthesizer Section of the SO-80 as it would behave if there were no Sequencer built in.

Straight Synth operation = No Track selected.

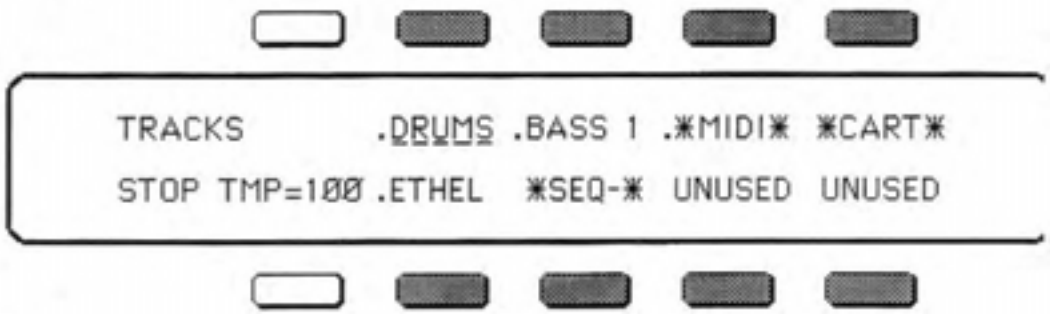
Whenever you call up a **Program Select** Page (from anywhere other than the **Tracks Select** Page) and select a Program in the usual fashion. the SQ-80 is automatically put into this **Straight Synth** Mode, to avoid inadvertently changing Sequencer settings from the Synthesizer.

Being in the **Straight Synth Mode** does not in any way disable the Sequencer. however. A Sequence or Song can be Played when no Track is selected, and you can play along, with the Current Program, which is independent of all eight Tracks. The elusive Ninth Track!

When no Track is selected. if you enter **Record.** the SQ-80 will automatically put you on the Track that was last selected, and will record on that Track.

TRACK DISPLAYS

On the **Tracks Select** Page. the Display tells you a number of things about each Track. The illustration below shows a typical **Tracks Select** Page for a Sequence that has been recorded:



DOT = DATA

Notice that there is a Dot to the left of Track Locations 1, 2. 3 and 5. The other four locations have no Dot. As with the Sequence Locations, **a Dot to the left of a Track Location means that there is Data recorded on that Track.** Absence of a Dot means that nothing has yet been recorded on the Track. This allows you to tell at a glance whether a given Track contains any recorded Track Data, or whether it has simply been defined, but not yet recorded.

CART

When a Cartridge Program has been selected for a particular Track, it will play that Program and display the Program's name as described earlier, for as long as the Cartridge remains inserted. If, however, the Cartridge is removed, that Track Location will display the word *CART* instead of the Program Name, as in the case of **Track 4** above. This is to remind you that the Track is "pointing

to" a Cartridge Program, but no Cartridge is inserted.

When this is the case. the Internal Program that is in the same relative Memory Location as the missing Cartridge Program will play on that Track until the Cartridge is re-inserted (or until another Program is selected for the Track). When the Cartridge is re-inserted. the proper Cartridge Program's Name will reappear. and that Program will play on the Track.

`MIDI"

On the Mix˙MIDI Page (which we will cover next), it is possible to assign **MIDI only** Status to a given Track. This means that whatever is recorded on the Track, or played from the Keyboard when the Track is selected, will be sent out over MIDI, but will not sound at all on the SQ-80. When **MIDI only** Status has been selected for a Track on the Mix˙MIDI Page, the word *MIDI* will replace the Program Name on the **Tracks Select** Page, as in the case of **Track 3** above.

SEQ-

When SEQ- Status has been selected for a Track on the Mix˙MIDI Page. the word *SEQ-* will replace the Program Name on the **Tracks Select** Page, as with **Track 6** in the previous illustration.

FLASHING UNDERLLNE — Playing the EDIT Program on a Track

When a Track is selected, you can hear the Sound that's in the Edit Buffer (the EDIT Program) on that Track by simply pressing the **COMPARE** Button. Two things happen:

1) The Name of the Edit Program appears in that Track's Location on the **Tracks Select** Page, and
2) The underline beneath the Track Location **flashes.** The flashing underline means that the Track is playing the EDIT Program.

Pressing the **COMPARE** Button again returns you to the Program that is really on the Track — the underline stops flashing, and the original Program Name reappears. This function is useful if you want to Edit the Program that is on a Track. and then hear the Track with the Edited Program.

Note: You cannot Record a Track with the Edit Program. Going into **Record** automatically puts the original Program back onto the Track. If you want to Record with the Edited Program on a Track you must first Write (save) it to a Program Location and then select the newly written Program for the Track, as described earlier. Also, if you leave the Track. by "unselecting" the Track or selecting another Track, the original Program will automatically be put back on the Track.

[Mix•MIDI] Tracks Mix•MIDI Page

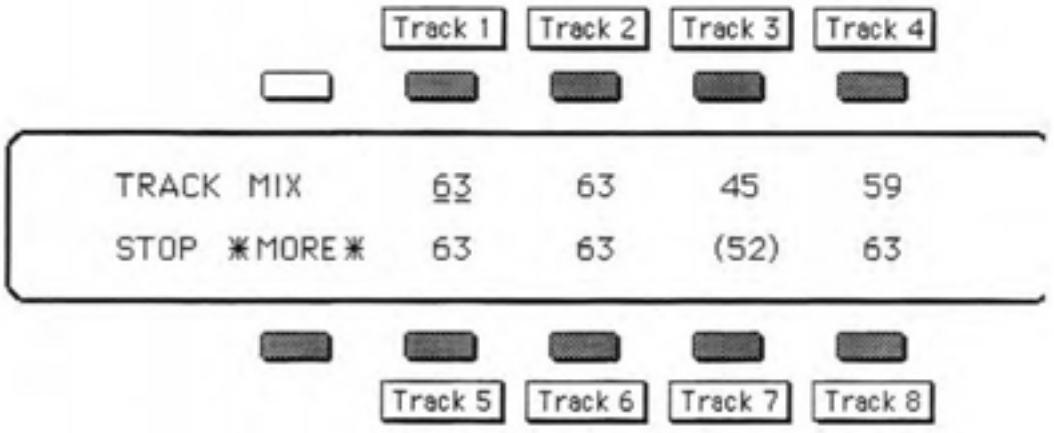
For setting the Mix Level, MIDI Channel, MIDI Status and Program Number of each Track.

When you are using the **SQ-80** by itself. Recording Tracks with only Internal sounds, you won't need to concern yourself with the Mix•MIDI Page too much, except to balance the output levels of the different Tracks (Mix down). But once you start serious MIDI Sequencing — driving numerous external instruments from the SQ-80 — this page becomes the control center for your entire MIDI rig. From here you can determine the **Status** of each Track, send **Program Changes** to external instruments, adjust the **Mix** Level, and select a **MIDI Channel** for each Track.

When you begin setting up the MIDI configuration of a new Sequence, the Mix•MIDI Page should be your first stop. When you select a previously UNUSED Track from this Page, the effect is the same as from the **Tracks Select** Page — the new Track takes on all the characteristics of whatever Track was selected before (or of the Straight Synth section, if no Track was selected). You will find that this allows you quickly to define the configuration of a new Track, by first selecting a defined Track with a similar setup, then selecting an UNUSED Track and changing only the settings you want to be different for the new Track.

Sub-pages

The Mix•MIDI Page is actually four different Sub-pages, all of which are reached by pressing the **Mix•MIDI** Button. On all of these Sub-pages, each Track occupies the same relative location on the Display as it does on the **Tracks Select** Page:



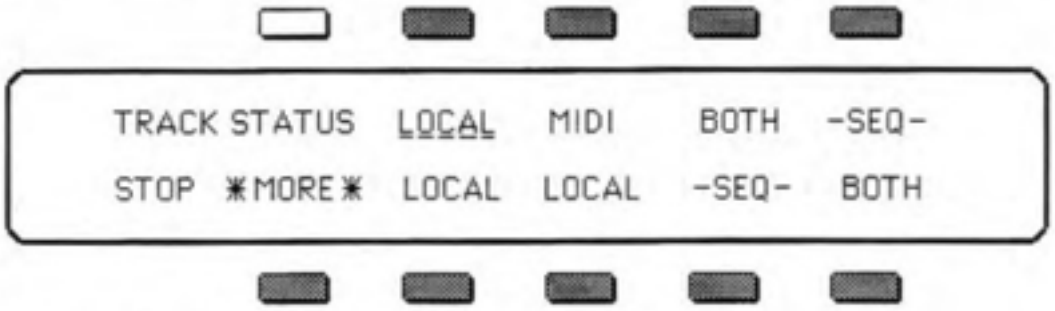
On each of these Sub-pages. the Display above "Soft" button #6 shows the word ***MORE*.** Pressing *MORE* advances the Display to the next Sub-page. Which of the four Sub-pages will appear when the Mix•MIDI Page is selected depends on which was last used. Here we will take them in order starting with the **Track Status** Sub-page.

Helpful Hint: Once you are on the Mix•MIDI Page, pressing the Mix•MIDI button again has the same effect as pressing *MORE*, advancing you to the next Sub-page.

Select the Mix•MIDI Page and press *MORE* (or press the Mix•MIDI button again) until the upper left segment of the Display says **TRACK STATUS.**

TRACK STATUS

The **Status** of a Track determines whether that Track will play only Locally (on the **SQ-80);** over MIDI only; or Locally and over MIDI. This applies to playing the **SQ-80** Keyboard with the Track selected, as well as playing back data Recorded on the Track,



> Select any of the eight Tracks — **it** becomes underlined.

> Use the Data Entry Slider and the Up and Down Arrow Buttons to step through the four possible Track States:

BOTH — The Track will play the SQ-80 Program showing on the **Tracks Select** Page and will be sent out over MIDI on its selected MIDI Channel.

MIDI — The Track will be sent out over MIDI on its selected MIDI Channel, but will not play on the SQ-80. When this Status is selected, the word ***MIDI*** will appear instead of the Program Name on the **Tracks Select** Page. Incoming MIDI Data will, however, play on the **SQ-80.**

LOCAL — The Track will play on the SQ-80 but will not be sent out over MIDI. SEQ — Same as MIDI Status, except that incoming MIDI data will not play locally on the **SQ80.** When SEQ is selected, the word *SEQ-* will appear instead of the Program Name on the **Tracks Select** Page.

The chart to the right details the behavior of a selected Track for each **Track Status:**

Track Status=	BOTH	LOCAL	MIDI	SEQ
Playing the SQ-80 keyboard plays locally on the SQ-80	**Yes**	**Yes**	No	**No**
Playing the SQ-80 keyboard sends out MIDI	**Yes**	No	**Yes**	**Yes**
Playing the Track (pressing Play) plays locally on the SQ-80	**Yes**	**Yes**	**No**	No
Playing the Track (pressing Play) sends out MIDI	**Yes**	**No**	**Yes**	**Yes**
Incoming MIDI data plays locally on the SQ-80	**Yes**	No	**Yes**	No
Incoming MIDI data will be recorded on the Track (if you enter Record)	**Yes**	No	**Yes**	**Yes**

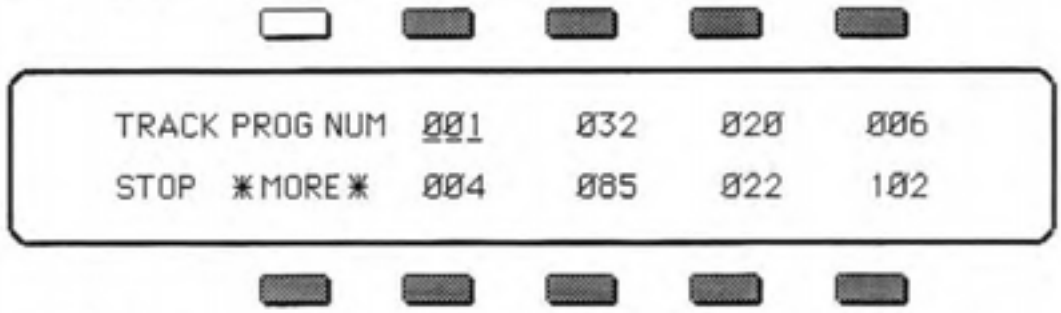
> Selecting a Track on the **Track Status** Sub-page, and then pressing its button again, causes the underline to disappear, "Unselecting" the Track and putting the SQ-80 into the Straight Synth mode (no Track Selected).

Note: If you select a Track and get no sound from the keyboard, check to see if the Track has been assigned **MIDI** or SEQ Status here or has been turned OFF on the **Track Mix** Sub-page. **Now Press *MORE*** (or press the Mix•MIDI button again).

TRACK PROG NUM — Track Program Number

From this Page you can adjust the Program a Track plays in terms of its MIDI Program Number. This is the number of the Program Change that will be sent out over MIDI when a Sequence is selected, or comes around in a Song.

It is also the MIDI number of the Internal **SQ-80** Program assigned to the Track. The Program you selected for the Track from the **Tracks Select** Page and the Program number selected here are linked to each other — changing either one will cause the other to change.



– Select any of the eight Tracks — it becomes underlined.

– > Use the Data Entry Slider and the Up and Down Arrow Buttons to change the MIDI Program Number. Range for each Track is 001 To 128 (the full range of MIDI Program Numbers) Changing this number will also change the Program for that Track on the **Tracks Select** Page to the Internal or Cartridge Program which corresponds to the new number. Program Numbers can be selected which are out of range for the SQ-80 (above 40 when no Cartridge is inserted, and above 120 when a Cartridge is inserted). This lets you send the full 128 Program Changes to external instruments which can receive them.

____ > Selecting a Track, and then pressing its button again, causes the underline to disappear, "Unselecting" the Track and putting the SQ-80 into the **Straight Synth** mode (no Track Selected.)

When a Track is sending to an external instrument via MIDI, you can use this Sub-page to change the Program (or patch) that instrument is playing, assuming it receives MIDI Program changes. This means that once you have assigned each external instrument a different MIDI Channel, you can control them all right from the SQ-80.

A NOTE ABOUT PROGRAM NUMBERS

MIDI Program Numbers can be a little confusing. On the SQ-80 (and the ESQ-1 & ESQ-M) you will find the Programs numbered from 1 to 120. Several other synths, including the DX-7, also begin numbering from Program Number 1.

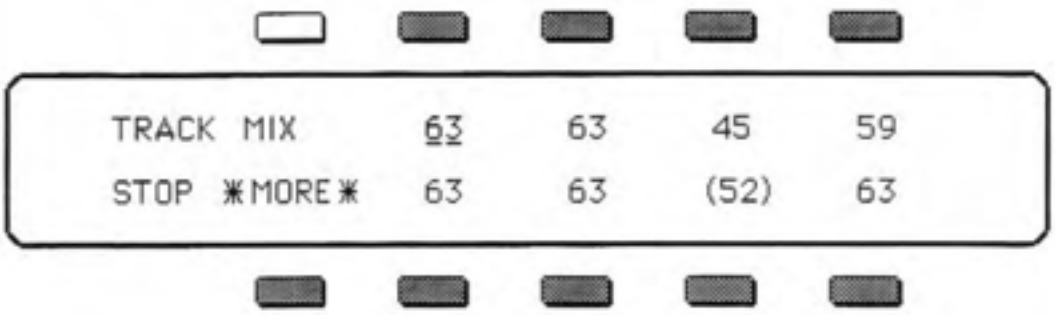
True MIDI Program Numbers, the numbers actually sent and received by MIDI instruments. begin at Program Number 0. (Computers, unlike people, tend to number things starting from zero instead of one.) So SQ-80 Program Number **001** actually corresponds to True MIDI Program Number **zero (0). SQ-80** Program Number **120** corresponds to True MIDI Program Number **119.** And so on. The Program Number shown on the **Track Mix** Sub-page is the True MIDI Program Number plus one. Some instruments reference their Programs starting from 0, some starting from 1. Hence the confusion.

The trick to keeping things straight is this: if an instrument you use with the SQ-80 lists Program Numbers beginning from 0, you will have to add 1 to the Program Numbers on that instrument to come up with the corresponding SQ-80 Program Number. If the instrument lists Program Numbers beginning from 1, any Program Number on that instrument will be the same as the corresponding SQ-80 Program Number.

Now press *MORE* (or press the Mix˙MIDI button again).

TRACK MIX

TRACK MIX determines the relative volume of each Track. This controls the LOCAL, or Internal, volume of a Track, as well as MIDI Volume (MIDI Controller #7). When a new Sequence is selected, each Track sends out MIDI Volume information on its selected MIDI Channel. (Not all instruments receive MIDI Volume, but the Sequencer Tracks send it to and receive it from those who do.)



> Select any of the eight Tracks — it becomes underlined.
> Use the Data Entry Slider and the Up and Down Arrow Buttons to adjust the Level of the Track. Range for each Track is **OFF** To **63.** The Level can be continuously adjusted, either while playing back recorded Track Data, or while playing the **SQ-80** Keyboard with the Track selected.
> Adjusting a Track all the way to OFF will silence the Track, Locally and on external instruments which receive MIDI Volume.

Muting a Track

Unlike the other three Sub-pages, selecting a Track on this Page. and then pressing its button again. **Mutes** the Track on the SQ-80 and over MIDI. (This works whether the Receiving Unit reads MIDI Volume or not.)

When a Track is Muted in this way, **Parentheses** appear around the Mix number. as in the case of **Track** 7 in the illustration above. Pressing the Button again removes the Parentheses and Unmutes the Track. This is a handy way to temporarily mute a Track without disturbing its **MIX Level.** This is a temporary state and is not saved with the Sequence. If you Mute Track 6, and then select another Sequence, Track 6 will still be Muted in the new Sequence.

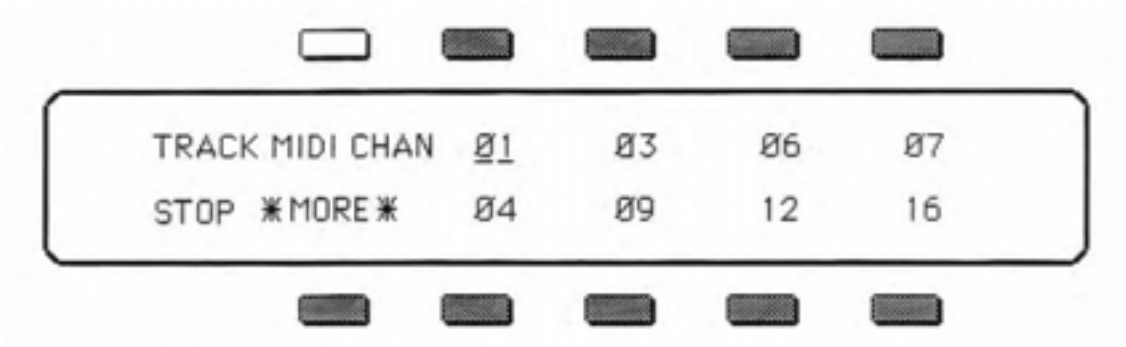
You can think of the **Track Mix** Sub-page as the "Mix down" section of the Sequencer. For each Sequence you can balance the Output Level of each Track that is playing Locally, and of each MIDI Track that is playing on an instrument which receives MIDI Volume. For external instruments which don't receive MIDI Volume, you will have to adjust their volume controls separately.

Now press *MORE* (or press the Mix˙MIDI button again).

TRACK MIDI CHANNEL

From this Sub-page, each Track of a Sequence is assigned its own **MIDI Channel.** The Track will always send information on that Channel, and only on that Channel. This applies to playing the **SQ-80** Keyboard when the Track is selected, as well as playing back recorded Track Data. (Of course, if the Track is assigned LOCAL Status, its MIDI Channel doesn't matter — it will not send on any Channel.)

What information a Track receives depends on which **Mode** is selected on the MIDI Page. When the SQ-80 is in MULTI Mode each Track will receive incoming MIDI information only on the Channel you select here. In OMNI Mode, a selected Track will receive on any Channel. In POLY Mode, a selected Track will receive only on the **Base Channel** (the Channel selected on the MIDI Page).



Select any of the eight Tracks — it becomes underlined.

____ > Use the Data Entry Slider and the Up and Down Arrow Buttons to assign a MIDI Channel to the Track. Range for each Track is **1 To 16.**
The **SQ-80** must be in **MULTI** Mode for each Track to receive MIDI information on its selected Channel. You should assign each Track to a different Channel. If two or more Tracks have the same MIDI Channel, the lowest-numbered Track will receive the information, and the higher-numbered one(s) will receive nothing. When you set the SQ-80 up to receive on multiple MIDI Channels, make sure none of the Tracks is set to the same MIDI Channel as the Base Channel (selected on the MIDI Page). If this is the case, the "Straight Synth will receive on that Channel and the Track will not receive anything at all.

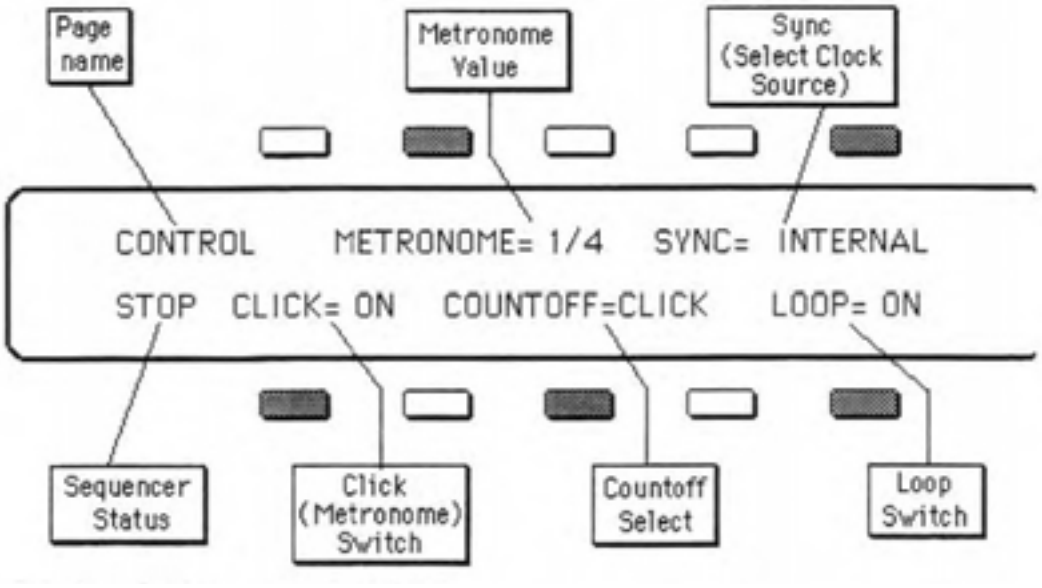
> Selecting a Track. and then pressing its button again, causes the underline to disappear, "Unselecting" the Track and putting the SQ-80 into the Straight Synth mode (no Track Selected).

Note: When you are playing an external instrument from a Track, don't change the MIDI Channel while you are holding down a key or pressing the Sustain Pedal. This can cause the receiving instrument to sustain notes forever, which can be annoying. If this happens, turn the receiving unit Off, and then turn it back On,

Pressing *MORE* (or pressing the Mix˙MIDI button again) again returns you to the Track Status Sub-page.

[CONTROL] SEQUENCER CONTROL PAGE

Controls Clock Source, Loop and Metronome Parameters



(Inactive Buttons appear in White)

Before recording or playing back a Sequence, you will want to select the **CONTROL** Page and adjust its parameters to suit your current needs. From this Page you control the CLICK track (or metronome), the COUNTOFF (a one measure count, with or without Click track, before the Sequence begins), the LOOP switch and the Clock Source.

Don't forget that the settings you select here (as with almost all **SQ-80** parameters) will be remembered by the SQ-80, even while it is OFF. It is a good idea, when starting to record or play Sequences, to check this Page first. (You don't, for example, want the Click Track ON while playing sequences in live performance.)

Use this Page to:

1) Select the Sequencer Clock Source:
2) Turn ON or OFF the CLICK (metronome):
3) Adjust which beats the Metronome plays on:
4) Choose whether or not you want a **COUNTOFF;** and
5) Turn ON or OFF the LOOP switch.

ACTIVE CONTROLS:

2. METRONOME

When **CLICK=ON** (see #6 below) a Click Track, or Metronome, will play throughout the Track. This Click Track will normally fall on each beat of the measure (on each 1/4 note in 4/ 4 Time, for instance), with the first beat of the measure accented. When you select a new Sequence, the Metronome is automatically set for one Click per beat. You don't have to adjust it unless you want something different.

You can, however, use this control to adjust which beats of the measure the Click will play on. If you are recording something with a shuffle feel. for example, you might want to set the **METRONOME** to 1/8th-note Triplets. Any value which is valid within the Sequence's Time Signature can be selected from the following:

1/4	(Quarter Notes)	**1/4T**	(Quarter-note Triplets)
1/8	(Eighth Notes)	**1/8T**	(Eighth-note Triplets)
1/16	(Sixteenth Notes)	**1/16T**	(Sixteenth-note Triplets)
1/32	(Thirty-second Notes)	**1/32T**	(Thirty-second-note Triplets)

5. SYNC

Selects Sequencer Clock source. The setting. of this control determines where the Sequencer gets its Clock signal — Internally, or from an external source. The three options are:

> **INTERNAL —** The **SQ-80** uses its own Clock.

> **MIDI CLOCK —** The **SQ-80** Sequencer will sync to the Clock of any MIDI device which sends MIDI Clocks (a Drum machine, other sequencer, etc.) and whose MIDI OUT is connected to the SQ-80's MIDI IN. (See p. 142 for more details.)

MIDI Clocks are transmitted and received regardless of which MIDI Channels the two devices are set to. Almost all current MIDI sequencing devices send **Start, Stop** and **Continue** messages, so you can use the sending device to Start. Stop and Continue the SQ-80 Sequencer as well as controlling its Clock rate. Note that the **SQ-80** only responds to incoming MIDI Start, Stop and Continue messages when it is set to this setting (SYNC=MIDI CLOCK).

TAPE SYNC — When **TAPE SYNC** is selected, the Sequencer will take its clock source from the **Tape In** jack on the rear panel. This jack can be connected to the output of a multitrack tape deck, where a Tape Sync track has previously been recorded. When put into Play or Record modes, the **SQ-80** will wait for the recorded sync signal before starting to play. (See p. 143 for more.)

The **Tape In** jack on the rear panel can also be connected to the **Tape Out** or **Clock Out** jack on many other sequencing devices, drum machines, etc. By setting SYNC to **TAPE SYNC,** you can then sync the SQ-80 to the other machine's clock without connecting them via MIDI. (This does not, however, send Start, Stop and Continue messages.)

Likewise, if the **Tape Out** jack of the SQ-80 is connected to the **Tape In** of another sequencing device, then that device can sync to the **SQ-80's** clock without connecting them via MIDI. (The other device must be set for Tape Sync.)

6. CLICK

This control turns On or Off the "Click" track, or metronome, during the Sequence. The Click is an electronic "Tick" which plays on each beat of the measure (or whatever value has been assigned at #3 above). The **first beat** of every Bar is accented.

The setting of this parameter affects only the body of the Sequence (or Song) itself, and has no effect on the **Countoff.** As a general rule, you will want the **Click** ON when recording Tracks, and OFF when playing them back.

The volume of the Click Track is fixed, and is not affected by the **Volume** Control of the SQ-**80.** With the Click ON, first adjust your mixer or amplifier so that the Click plays at an appropriate level. Then use the Volume Control to set the Synthesizer volume to the proper level relative to the Click.

8. COUNTOFF

The **Countoff** is a one-Bar count which precedes a Sequence or Song, when it is played from the beginning. This count can be with or without a Click track. The available options are:

NONE — The Sequence begins playing immediately after you press Play or Rec/Play.

> **QUIET —** There is one measure of silence before the Sequencer begins to Play or Record. This
is good when using the SQ-80 with a Drum Machine — you can use the Drums as a lead-in instead of the **SQ-80's** Click.

> **CLICK —** There is one measure of **Click track** before the Sequence begins to play. In many normal sequence recording situations. this setting. **COUNTOFF= CLICK,** is the most useful.

10. LOOP

Determines whether a Sequence or Song will repeat after playing through once.

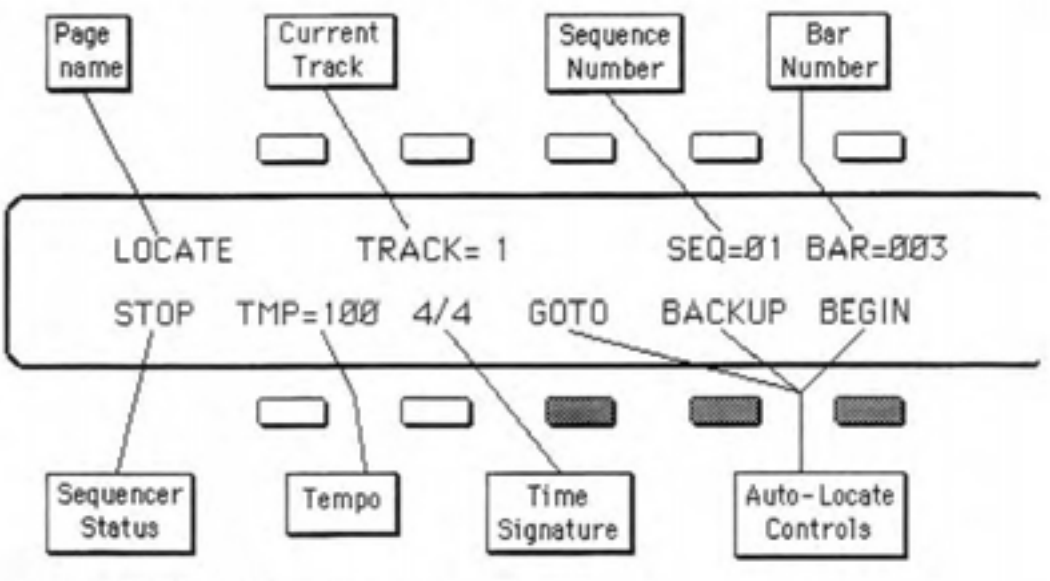
When ON: At the end of a Sequence, or Song, the Sequencer will return to the beginning and play it over again. It will continue to repeat until STOP is hit.

When OFF: The Sequence or Song will play once through and stop.

The setting of the LOOP Switch is saved independently for each Sequence and Song.

[LOCATE] SEQUENCE LOCATE PAGE

Provides information about location within a Sequence; Allows access to any Bar within a Sequence; Adjusts Tempo; Shows Time Signature and Selected Track.



(Inactive Buttons appear in White)

The LOCATE Page appears whenever the Sequencer is put into the Play mode from a non-sequencer Page, and when the LOCATE Button on the front panel is pressed. This Page provides valuable Sequencer information as well as control over **Tempo** and Auto-Locate functions.

The **Status** of the Sequencer (whether it is in **Play, Stop. Record,** etc.) is always shown in the lower left-hand corner of the Display on this Page. The currently selected Track is displayed on the top row. (You can't select a different Track from here: this Readout is just there to help you keep things straight.) If no Track is selected (Straight Synth operation), it will read TRACK=NONE.

'The **TEMPO** Control is always active. Unless you have pressed GOTO, the Data Entry Slider and the Up and Down Arrow Buttons will affect only the Tempo while you are on the LOCATE Page. TEMPO does not have to be selected.

The last three buttons on the LOCATE Page are the **Auto-Locate** Controls. They allow you to quickly go to any Measure within a Sequence, to back up one measure at a time, or to reset to the beginning of the Sequence.

This section describes the LOCATE Page as it appears when a Sequence is selected. When a Song is selected, the LOCATE Page is a little different (see **SONG LOCATE** Pau, p. 139).

READOUTS AND ACTIVE CONTROLS:

2. **TRACK=**

Tells you which of the eight **Tracks** is selected. If no Track is selected, it will read **TRACK=NONE.**

4. SEQ=

Tells you which Sequence is selected.

5. BAR=

Tells you which Bar of the Sequence is playing; or, if the Sequencer is in **Stop** Mode, which Bar it will play from if you press **Stop•Cont.**

6. TMP=

The **Tempo** of the Sequence, in Beats per minute, is displayed here, and is continuously controlled by the Data Entry Slider and the Up and Down Arrow Buttons. Tempo does not have to be selected.

When an External Clock Source is selected (see CONTROL Page) this readout will show **TMP=EXT.**

7. TIME **SIGNATURE**

The **Time Signature** of the Sequence is displayed here. The **Time Signature** is set when the Sequence is Created, and cannot be changed from here.

Auto-Locate Controls:

8. GOTO

GOTO allows you to start Playing or Recording the Sequence from any Bar within the Sequence. To reach a particular Bar:

> Press GOTO. The Display shows:

___ > Use Data Entry Slider and the Up and Down Arrow Buttons to adjust the GOTO Bar number to the Bar at which you want to start. You can choose any Bar within the current Sequence.

Press GOTO again. You are returned to the LOCATE Page, with the new Bar number showing in the upper-right corner of the Display. Or press *EXIT* to return to the LOCATE Page without changing your current location in the Sequence (handy if you pressed GOTO by accident).

Helpful Hint: The GOTO Bar you last selected is remembered by the **SQ-80.** This means that you can just press GOTO twice to quickly locate to the same Bar, when, for example you want to start from the same point in the middle of a Sequence for repeated takes of a Track.

9 .) B A C K U P Each press of this button backs the Sequence Location up One Bar from the current Location.

1 0 .) BEGIN

Pressing this button resets the Sequence to the beginning of Bar 1. It's a good idea to get in the habit of hitting BEGIN before recording any Track, since going into **Record** Mode does not automatically start the Sequence from the beginning.

[CREATE/ERASE] CREATE/ERASE PAGE

For Creating new Sequences or Songs, Erasing existing Sequences or Songs, and Erasing all Sequencer Memory.

Until a Sequence or Song has been created, it is just an empty, undefined slot in the SQ-80's Memory, and cannot be selected or played. An undefined Sequence will be shown on the **Sequence Select** Page as XXX - 05, instead of **SEQ - 05,** which is how a Sequence appears after it has been defined. The first step in recording a new Sequence is to **Create,** or define, a Sequence in one of the empty Sequence Locations.

When you press the **CREATE/ERASE** Button, the Page appears as shown below:

Available Memory
First notice the upper-right segment of the Display — **[FREE=__]**. This tells you the number of **Bytes** of Sequencer Memory available. A **Byte** is eight **Bits** of digital information. Each note you play uses a little over three Bytes, so when all the Internal Sequencer Memory (64k Bytes) is available, you can record about 20,000 notes.

These numbers reflect notes played (Key Events) only, and do not take into account Controllers such as Pitch Bend, MOD Wheel. Pressure, etc. Controller values are recorded by a digital sequencer as a steady stream of numbers, and thus use up available memory much faster than Key Events. When you record using a lot of Controllers, you will expend the available memory rather quickly.

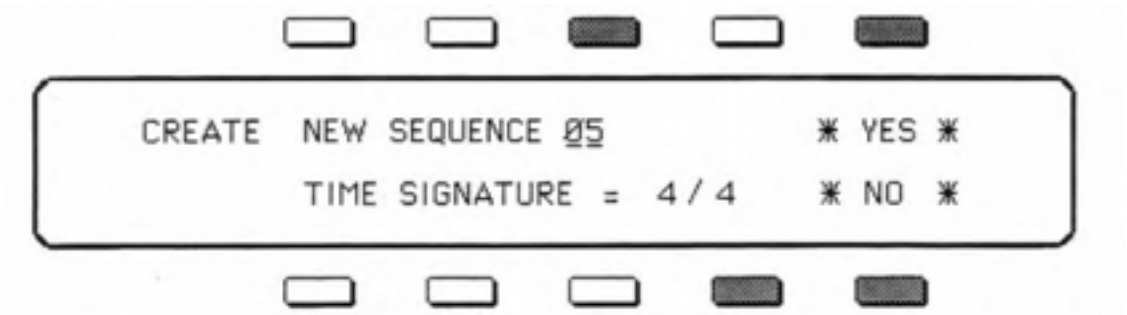
ACTIVE CONTROLS:

1, CREATE NEW SEQUENCE

A new Sequence can be Created in any of the sixty Sequence Memory Locations that doesn't contain a defined Sequence — where XXX appears instead of SEQ on the **Sequence Select** Pages. It is important to note that at the time a Sequence is created, you must define the **Time Signature** of that Sequence. The Time Signature cannot be changed after the Sequence has been created.

To CREATE a New Sequence

---> Select **CREATE/ERASE** Page
_____> Press **NEW SEQ.** The Display shows the following:



____ > **Select a Memory Location.** Use the Data Entry Slider and the Up and Down Arrow Buttons to select which Sequence Memory Location you wish to create the new Sequence in. Only the numbers of empty, or undefined, Locations are available for selection.

– **Adjust the Time Signature.** If you want the new Sequence to have a Time Signature other than 4/4, press the "Soft button below the Time Signature and then use the Data Entry Slider and the Up and Down Arrow Buttons to adjust it to the one you want. If you want 4/4 Time you don't have to adjust anything — the Page always appears with 4/4 Time selected.

– **> Press *YES*** to Create a Sequence, with the selected Time Signature. in the selected Sequence Memory Location. You will then be returned to the Sequence Select Page that the new Sequence is on, and the new Sequence will be selected. Or Press *NO* to cancel the procedure for any reason.

3. CREATE NEW SONG

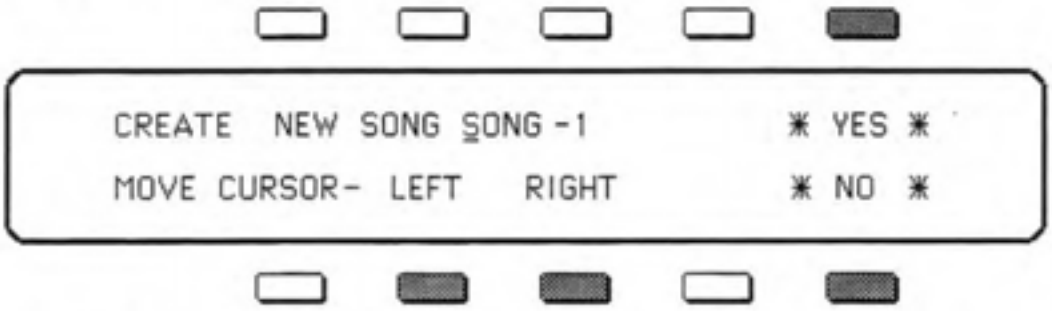
The **SQ-80's Song** Mode allows you to chain Sequences together in any order, with up to 99 Steps and up to 99 Repetitions of each Step per Song. There are 20 **Song Locations** which, unlike the 60 Sequence Locations, have Names instead of numbers. You name the Song when you create it. (You can change the name of a song later if you want to. from the **Song EDIT** Page.)

When you create a new Song, it is automatically put in the first empty Song Memory Location on one of the two **Song Select** Pages. If there are no empty Song Locations, you must Erase a Song (see below) before you can create a new one.

To CREATE a New Song

___ > Select CREATE/ERASE **Page**

> **Press NEW SONG.** The Display shows the following:



– **Select a Name for the New Song.** In the middle of the upper row of the Display is the six-letter **Song Name,** with a Cursor beneath the first letter. Use the Data Entry Slider and the Up and Down Arrow Buttons to change the first letter to the one you want. Press the "Soft" Button labeled RIGHT to move the Cursor to the next letter, and change that letter the same way.

Do the same for each space, using the Data Entry Slider and the Up and Down Arrow Buttons

to scroll the available characters and the LEFT and RIGHT Buttons to move the Cursor, until the Display shows the Song Name you want.

> Press *YES* to Create the Song. You will then be placed on the SONG EDIT Page from which you can combine Sequences to form a Song (see SONG EDIT Page, p. 136). Or Press *NO* to cancel the procedure for any reason.

Helpful Hint: There is a shortcut which lets you bypass the CREATE/ERASE Page when you want to create a new Sequence or Song. Press the blue SEQ button and go to any Sequence or Song Select Page. Press the "Soft" button which corresponds to any unused Sequence or Song location (one that reads XXX- instead of SEQ or a Song name). You will automatically be placed on the CREATE SEQUENCE or CREATE SONG screen shown previously, bypassing the CREATE/ERASE Page. The Sequence or Song location you pressed is the one that will be created if you press *YES*.

6. ERASE SEQUENCE

Erasing a Sequence returns that Sequence Memory Location to its undefined, or empty state. The Sequence you want to Erase must be selected before entering the CREATE/ERASE Page.

To ERASE a **Sequence**

____> Make sure the Sequence you want to Erase is selected.
____> Select CREATE/ERASE Page.
– Press ERASE SEQ. The Display asks "ERASE EXISTING SEQ
____> Press *YES* to Erase the Sequence. You will be returned to the **Sequence Select Page.** Or Press ***NO* to** cancel the procedure for any reason.

8. ERASE SONG

Erasing a Song returns that Song Memory Location to its undefined, or empty state. The Song you want to Erase must be selected before entering the CREATE/ERASE Page.

To ERASE a Song

– > Make sure the Song you want to Erase is selected.
Select CREATE/ERASE Page.
– Press ERASE SONG. The Display asks "ERASE EXISTING SONG SONG00" (where **SONG00** stands for whatever the name of the Song is).
> Press *YES* to Erase the Song. You will be returned to the **Song Select Page.** Or Press *NO* to cancel the procedure for any reason.

10. ERASE ALL

This procedure will erase all Sequences and Songs in the **SQ-80's** Memory. This is not something you want to do casually. Save any Sequencer data you value to Disk before you even think about doing an ERASE ALL.

ERASE ALL will return every Sequence except SEQ 01, and every Song except **SONG 00** to its undefined state. (You can't totally Erase the last Sequence. There will still be one Sequence and one Song. defined, though after an ERASE ALL they contain no Track or Song, Data.)

To ERASE ALL **Sequences and Songs**

– > Save any Sequences and Songs you want to keep (see **Storage Page,** p. 153).
– Select CREATE/ERASE Page.
____> Press ERASE ALL. The Display asks "ERASE ALL SEQUENCES AND SONGS".
– Press *YES* to Erase All Sequences and Songs in Memory. You will he returned to the Sequence Select Page. Or Press *NO* to cancel the procedure for any reason.

RECORDING A SEQUENCE

WARNING — Pressure (Aftertouch) vs. Sequencer Memory

When you enter Record, the Sequencer will always record **Pressure** (Aftertouch) into the Track, unless PRESS=OFF on the MIDI Page. Pressure is recorded by the Sequencer as a steady stream of numbers, and you will use up the Sequencer Memory much faster if Pressure is enabled. Even if the Program on the Track doesn't respond to it, Pressure will still be recorded, wasting memory.

For this reason you should always be aware of the setting of the Pressure control on the **MIDI** Page when you go to record or overdub a Track. If the Track doesn't call for Pressure set this control to PRESS=OFF. See p. 23 for complete details.

Sequencing on the SQ-80 alone

You may or may not own a roomful of other MIDI Instruments to sequence from the SQ-80 — either way you will find that the SQ-80 Sequencer allows you to create poly-timbral recordings with amazing ease. In this section we will deal first with Recording various Tracks of a Sequence on the SQ-80 alone (no MIDI connections).

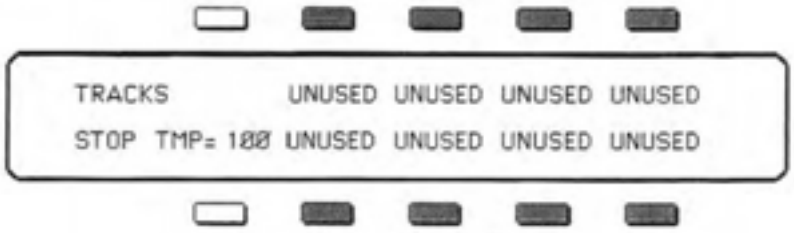
Recording the first Track

The length of the First Track defines the length of the Sequence. For this reason, there is a special procedure for recording the First Track of a new Sequence.

To Record the First Track of a Sequence:

Create a New Sequence. (See **CREATE/ERASE** Page, p. 108.)

___ > **Select a First Track.** Go to the **TRACKS SELECT** Page. All the Track locations of a newly created Sequence will say **"UNUSED":**



Pressing any of the eight active "Soft" Buttons will select that Track and put the current Program on it. The first Track does not have to be Track 1— any of the eight Tracks can be selected and recorded first, and will be considered the First Track.

Select a Program. While on the **Tracks SELECT** Page, press **INTERNAL. CART** A or **CART B.** Then press any of the **Bank Select** Buttons to locate the Program you want. While holding a Bank Select Button down, press the "Soft" Button that corresponds to the Program you wan:. Release the **Bank Select** Button. The Program you chose is now on the selected Track.

_____ **Turn the CLICK Track ON.** Select the **CONTROL** Page and make sure that CLICK= ON.

> **Press Record/Play.** While holding down the **Record** Button. Press the Play Button. The Metronome starts, and "REC" flashes in the lower left corner of the Display. Don't play anything yet — the Sequencer is in a special Record "Standby" mode that only applies to recording the First Track. Nothing will be recorded until you begin to play.

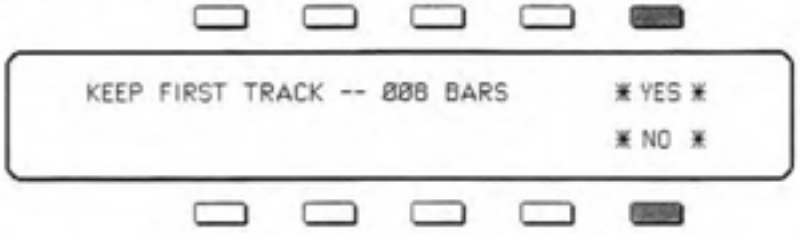
> **Adjust the TEMPO.** Use the Data Entry Slider and the Up and Down Arrow Buttons to set the Tempo you want. Tempo does not have to be selected.

> **Start Playing.** As soon as you strike any key, the Sequencer will begin recording the Track. The

TMP=, Tempo readout on the Display will now change to show the Bar Number. The Bar in which you first began playing becomes Bar 001. You can also press the **Sequencer Foot Switch**

Press STOP to halt recording. When you get to the end of what you want to record, press the STOP Button, or the Footswitch. to stop the Sequencer.

After recording the First Track, the Display shows the Following:



Press *YES* to accept the First Track. If the length and Performance of your First Track are acceptable, you can answer *YES* to enter it into Memory as the First Track. It's length will now define the length of the Sequence. After you answer *YES*, the First Track is treated like any other, and Recording over the First Track proceeds as shown below, in **"Recording Other Tracks."** Or,

> **Press *NO* to leave the First Track blank, and try again.** If the length and/or the performance of the Track you just recorded is way off, answering *NO* will return the Track to its unrecorded state. Press **Record/Play** and repeat the procedure, as many times as needed to get a First Track that you want to keep.

Note: Even after you press *YES* to accept a First Track, neither the length nor the performance of that Track is chiseled in stone. After answering *YES*, you can, for instance, use the ADD or **DELETE** EDIT functions to alter the Length of the Sequence, and then Record over the First Track, replacing it entirely. So don't worry that you have to get the First Track perfect before accepting it. You don't.

Using the Foot Switch to Define Sequence Length

You can use the Sequencer Foot Switch to simply define the length of the Sequence without Recording any Track Data on the First Track. With the Sequencer in the Record "Standby" mode (REC flashing), press the Foot Switch. This puts the Sequencer into **Record.** and the Bar Count begins. Near the end of the Bar you want to be the Last Bar, press the Foot Switch again to Stop the Sequencer. The Display will ask **KEEP FIRST TRACK,** as above. If the length is right, answer *YES*. Now you can Record over the first Track as you would any other, as explained below.

Recording Other Tracks

After you have answered *YES* to the question **"KEEP FIRST TRACK?,"** all other Recording, including re-recording the First Track, will follow the same basic routine. The length of the Sequence is now defined (by the length of the First Track). The rest of the Tracks will automatically have the same length.

There are two methods of entering **Record —** going straight into **Record** by pressing **Record/Play,** or using the **Overdub** Mode, which waits for you to play before recording anything.

Recording From the Beginning of A Track:

Select Tracks SELECT Page.

> **Select another Track.** (Or leave the First Track selected if you want to Record over it.) All the Track locations except for the First Track will still say "UNUSED". To Record a different Track,

press the "Soft" Button above or below another Track Location to select another Track. The name of the Program, and all the Mix˙MIDI Page information, from the previous Track is copied onto to the new Track.

– **> Select a Program.** As shown earlier, from the **Tracks SELECT** Page, press **INTERNAL, CART** A or **CART B.** Then press any of the Bank Select Buttons to locate the Program you want. While holding a Bank Select Button down, press the "Soft" Button that corresponds to the Program you want. Release the Bank Select Button. The Program you chose is now on the selected Track.

____ > **Check the CONTROL Parameters.** Select the CONTROL Page and see that the Click, Countoff and Loop switches are set according to your needs. For most recording, the recommended settings are:

LOOP= ON, CLICK= ON, COUNTOFF= CLICK.

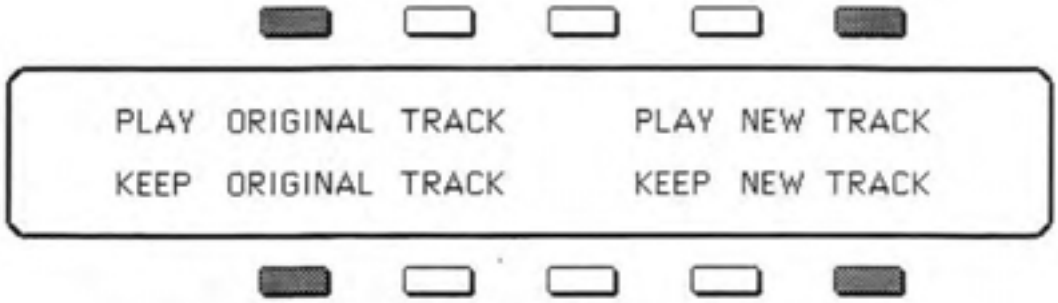
> **Select the LOCATE Page, and press BEGIN.** This resets the Sequence to the beginning. It is a good idea to get in the habit of doing this each time you Record a Track. (Pressing **Record/Play** doesn't reset the Sequencer to the beginning of the Sequence.)

– **> Press Record/Play to begin recording.** The Click will play for one measure (assuming COUNTOFF= CLICK) and then the Sequencer will enter **Record** mode. It will record whatever you play on the new Track until:

- The end of the Sequence is reached, or
- You press STOP (or hit the Sequencer Foot Switch).

At the end of the Sequence. the SQ-80 will leave **Record** Mode and (assuming LOOP=ON) enter **Audition Play** Mode — the lower-left corner of the display reads **"AUDP."**

– **Press Stop or the Foot Switch to Stop the Sequencer.** This puts you onto the **PLAY/KEEP** Page:



____ > Press **PLAY ORIGINAL TRACK** to hear the Track as it was before you recorded the new Track. The first time you Record a particular Track, this isn't much use. but it is invaluable when you begin to do second and third takes, since it allows you to compare the Tracks before deciding which to Keep.

> Press **PLAY NEW TRACK** to hear what you just recorded.

> Press **KEEP ORIGINAL TRACK** to leave the Track as it was in Memory, and "Burn" the one you just recorded. If the Track was empty before Recording, pressing this Button will leave it Empty.

> Press **KEEP NEW TRACK** to save the New Track into Memory, replacing whatever was on the Track before.

Note: While on the **PLAY/KEEP** Page you can press LOCATE and use the Auto-Locate controls to start the playback from anywhere within the Sequence. You can also select the **Control** and **Mix˙MIDI** Pages while in **Audition Play,** to change the Click and Countoff settings or to adjust the Track Mix.

OVERDUB Mode — "Punching In"

The second method of entering Record is to "Punch in" using the **Overdub** Mode. Whenever the **SQ-80** is in Play, pressing the **Record** Button puts it into **Overdub.** The message ODUB flashes in the lower-left corner. The moment you play a note, or press the **Sequencer Foot Switch,** the ODUB message changes to REC. and the Sequencer begins Recording on the selected Track. It will record from :hat point to the end of the Sequence, unless you press Stop first.

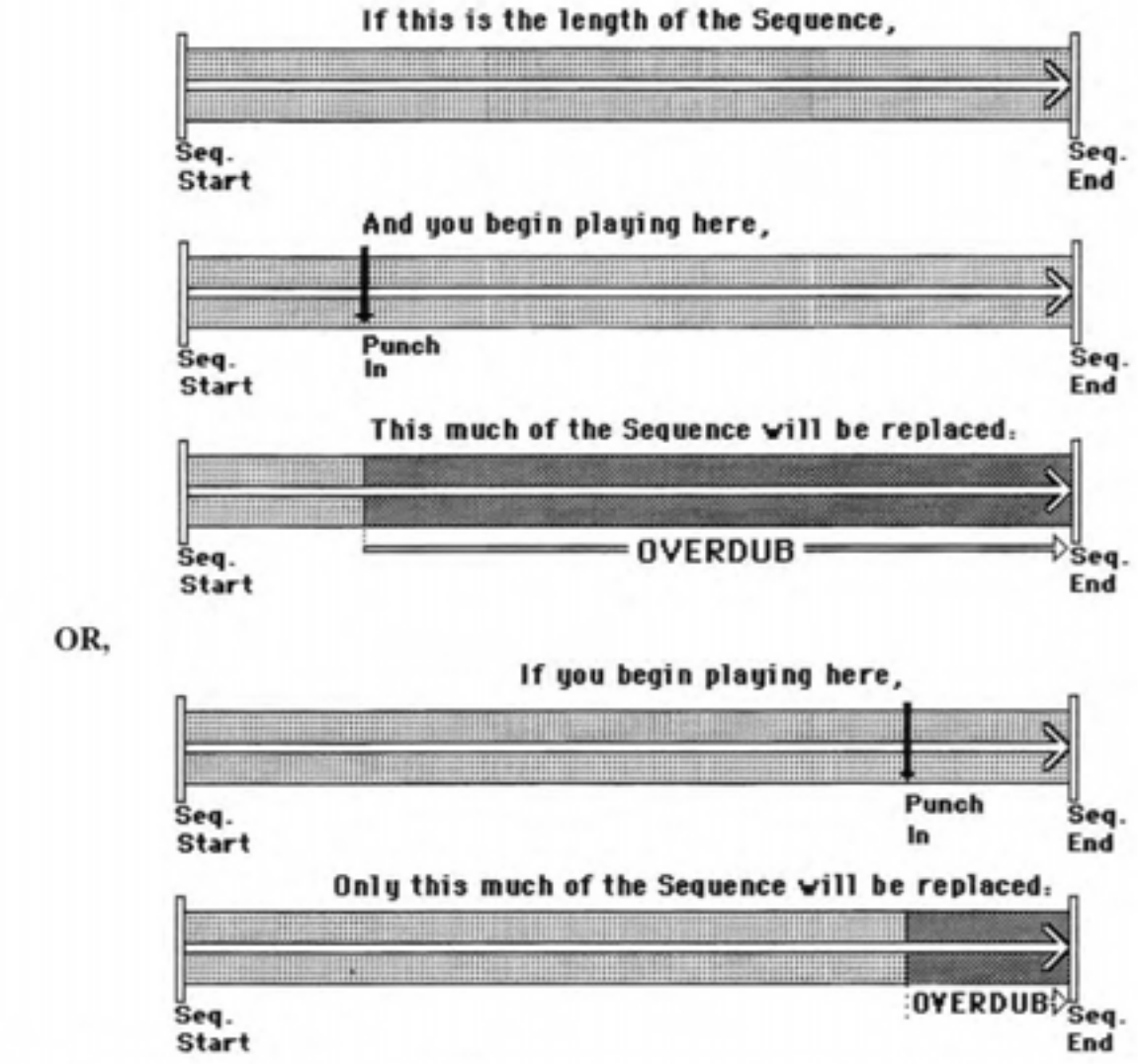
To "Punch In" on a Track:

> **Make sure the Track on which you want to Punch In is Selected.** (Or, for a new Track, select a Track, and a Program for it as shown above.)

– **> Press the Play Button.** The Sequence begins to play.

– **Press the Record Button. ODUB** will flash on the Display. Now the **SQ-80** will wait for you to play before Recording anything. You can (assuming that the LOOP is ON) let the Sequence play through as many times as you want before Punching in.

– **Begin to Play.** As soon as you play a note, or press the Sequencer Foot Switch, Recording begins. Unless you then press Stop or the Foot Switch, new Track Data will be Recorded from the point where you Punched in to the end of the Sequence, where the Sequencer will leave Record and enter Audition Play. How much of the Track you record over depends on where you Punch in:



Press Stop. You will then get the **PLAY/KEEP** Page where you can audition the New and the Original Tracks before deciding which to keep.

The **Overdub** Mode is often a desirable way to enter **Record** even if you plan to record from the beginning of the Track — just press the **Record** Button while playing a Sequence, wait for the beginning to come around again, and then play, to start Recording. This method lets you get a feel for the Sequence. while listening to it one time through (or more), before Recording. For many players this may work better than having just a one measure Countoff in which to get ready to Record.

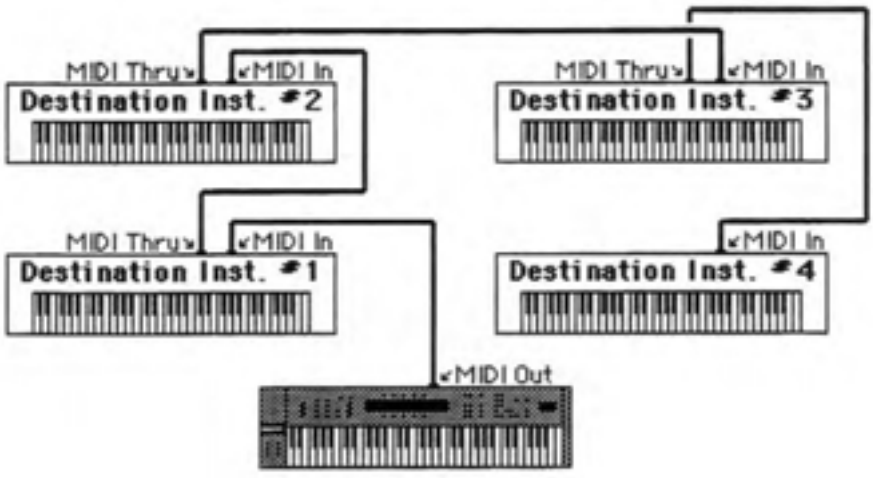
"Punching Out"

As mentioned previously, pressing the Stop Button, or the **Sequencer Foot Switch** while recording not only stops the Sequencer, but takes it out of **Record.** Pressing **Play** will also take you out of Record. putting you into **Audition Play.** So if, for example, you want to replace the first part of a Track but leave the rest intact, you can do so by simply pressing **Stop, Play** or :he Sequencer Foot Switch at the point where you wish to Punch Out.

MIDI SEQUENCING ON THE SQ-80

Basic MIDI Connections

When using the SQ-80 to sequence multiple MIDI devices, first connect the various Destination instruments to the SQ-80, and to each other, as shown below. Connect the **MIDI Out** jack of the **SQ-80** to the **MIDI In** jack of the first instrument. Then connect the **MIDI Thru** jack of the first instrument to the **MIDI In** jack of the second instrument. Connect the **MIDI Thru** jack of the second instrument to the **MIDI In** jack of the third instrument. And so on, for as many devices as you will be using.



If one (or more) of the receiving devices has a single MIDI Jack which is switchable between **MIDI Out** and **MIDI Thru,** be sure to set that instrument for **MIDI Thru.** Or make it the last one in the chain.

With this arrangement, once you set up the proper MIDI Channels, etc, (see below), each device will receive and play only the data that is intended for it, and will "pass along" all other Data. Also, each can be played from its own keyboard (as well as from the SQ-80's) without affecting the others, because **MIDI Thru** jacks only pass along incoming MIDI data, and do not transmit what is played on the instrument. Of course, the above connections will work the same for a MIDI device which doesn't have a keyboard, such as a rack mount unit, a drum machine, etc.

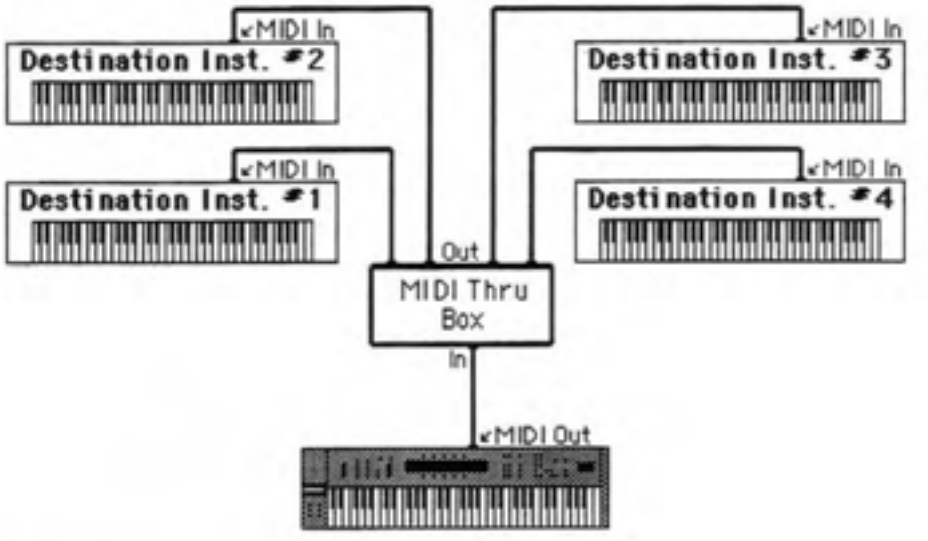
This set up is ideal for controlling everything right from the **SQ-80.** Simply by selecting the Track which is set to the same MIDI Channel as to a particular instrument, you can:

1) Play that instrument from the SQ-80 Keyboard;
2) Record a Track that will play back on that instrument when you Play the Sequence; and
3) Send the Destination device Program Changes and adjust its Volume (for those devices that receive MIDI Volume — not all do.)

In other words, once you have made the appropriate connections. and set up the MIDI Configuration of the Tracks and all Destination devices, you can use the SQ-80's Keyboard and its front panel to control and Record all the instruments in your rig.

Using a MIDI Thru Box

Coming out the **MIDI Thru** jack of some instruments, particularly those with a switchable **MIDI Out/ Thru** jack, can cause a certain amount of delay in the MIDI signal, causing those devices further down the chain to lag behind. In most cases, the delay is negligible (a few milliseconds.) But it can vary from instrument to instrument, depending on the circuitry used, and could conceivably pose a problem. One solution is to figure out which device has the worst delay, and put that device last in the chain. The other alternative is to connect the SQ-80's MIDI Out to a **MIDI Thru Box,** or MIDI Splitter, which will feed all the receiving devices simultaneously. In this case you would make your MIDI connections as shown below:



MIDI Mode and Channel — Destination Instruments

The next step is to set up each Destination Instrument to receive only the MIDI information that is intended for it. When each of the receiving units is set to receive on a different MIDI Channel. you can control them all right from the SQ-80.

For <u>each</u> Destination Instrument:

> **Select a MIDI Channel.** The best idea is to assign each Destination Instrument its own MIDI Channel and always set it to that Channel. If you know, for instance, that a certain synth is always set to receive on MIDI Channel 4, you can quickly set up a Track to drive that synth by simply selecting an Unused Track, then assigning that Track MIDI Status and MIDI Channel 4 on the **Mix˙MIDI** Page.

When each Destination Instrument is always set to its own distinct MIDI Channel, it also means that different Sequences recorded at different times will always play the right instrument on the right Track.

____ > **Set to OMNI OFF.** Each Destination synth must be in a mode where it receives only on its selected MIDI Channel. On some instruments this is referred to as POLY Mode; some call it OMNI OFF; some are always in this mode. Consult the owner's manual if there is any question about a particular instrument.

Helpful Hint: Once you have assigned MIDI Channels to each instrument in your rig, **Write them down.** and keep the paper handy for quick reference. Or better yet, photocopy the **Track Sheet** at the back of this Manual and fill it out it for each Sequence (or group of related Sequences) you record.

Track Configuration

After you have made the MIDI connections, and set up your Destination Instruments as described above. you now configure the Tracks of a Sequence to send to those instruments. Let's suppose that you are sequencing several external instruments, as depicted in the illustration on p. 115.

– **Create a New Sequence.** Select the **CREATE/ERASE** Page and Create a new Sequence, as explained on p. 108.

– **Select a Track.** Go to the Tracks Select Page. All the Track Locations will read UNUSED. Press one of the "Soft" Buttons corresponding to a Track Location to select and define a Track. The name of the current Program will appear there.

– **Assign the Track MIDI Status.** Select the Mix˙MIDI Page. Press *MORE* until the **TRACK STATUS** Sub-page appears. The selected Track is underlined. Use the Data Entry Slider or the Up and Down Arrow Buttons to set the Track to **MIDI Status.** You will notice that when you play the keyboard now, it doesn't sound on the **SQ-80.**

Assign the Track a MIDI Channel. Press *MORE* until the **TRACK MIDI CHAN** Sub-page appears. Your Track is still selected (underlined). Use the Data Entry Slider or the Up and Down Arrow Buttons to set the Track to the MIDI Channel of the Instrument you want to sequence from that Track. Playing the SQ-80 keyboard should now play the Receiving Instrument.

– **Set the Program Number.** Still on the Mix˙MIDI Page, press *MORE* until the **TRACK PROG** NUM Sub-page appears. Now you can use the Data Entry Slider or the Up and Down Arrow Buttons to change the Program, or Patch, that the Receiving Unit is playing. While playing the **SQ-80** Keyboard, adjust the Program Number until the External Instrument is playing the sound you want.

From now on. whenever you select that Sequence, or when it plays as a Step in a Song, this Track will send out a Program Change, to this Prog. Number, on its selected MIDI Channel.

Note: You should always select the Program for external instruments from the **SQ-80,** and not from the external instrument itself. This assures that the Track has the proper Program Number for that instrument in each Sequence.

Recording the First Track

Once everything is set up, you can proceed with Recording the first Track exactly as you would for an Track with LOCAL Status.

-> Select CONTROL Page, and make sure the CLICK is ON.
-> While holding down the **Record** Button, press **Play. REC** flashes on the Display. -
> Adjust the Tempo.
-> Start playing. The Bar in which you begin playing becomes Bar 1.
-> Press Stop or the Sequencer Foot Switch to halt recording. The Display will ask **"KEEP FIRST TRACK",**
-> Answer *YES* to keep the first Track (and define the length of the Sequence) or *NO* to scrap it, and try again from scratch.

Other Tracks

Tracks that are sent out MIDI are treated the same as Internal Tracks in terms of Recording, Rerecording, Punching In, Editing, etc. For each successive Track you Record, the procedure will follow the same lines:

1) Define the Mix•MIDI configuration of the Track,
2) Record the Track, and
3) Either KEEP or reject the new Track from the **PLAY/KEEP** Page.

To Record the next Track, select one of the **UNUSED** Tracks. This can be done from the **Mix•MIDI** Page as well as from the **Tracks Select** Page. Remember that when you select an **UNUSED** Track, it "takes on" all the settings of the Track that was previously selected (or of the Straight Synth, if no Track was selected).

-> Select an UNUSED Track.
-> Select the **Mix•MIDI** Page.
-> On the **TRACK STATUS** Sub-page, set the Track to MIDI (it should be already).
-> On the **TRACK MIDI CHAN** Sub-page, set the Track to send on the MIDI Channel of the the device you will be sequencing with this Track.
-> On the **TRACK PROG NUM** Sub-page, adjust the Program, or Patch, of the Receiving Unit to the one you want.

Playing the SQ-80 Keyboard should now play the appropriate synth (or whatever) with the appropriate sound. You now Record a Track, with that instrument, just as you would an Internal Track, as described in **Recording Other Tracks.** p. 112.

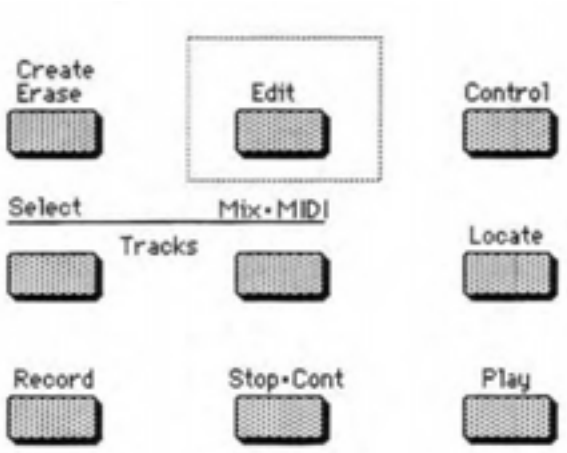
-> Select **CONTROL** Page, and make sure the CLICK is ON, and COUNTOFF= CLICK.
-> While holding down the Record Button, press Play. After the one-Bar Countoff, Recording begins.
-> Start playing. At the end of the Sequence the SQ-80 will leave **Record** and enter **Audition Play.** -
> Press Stop or the Sequencer Foot Switch to halt recording. The Display will show the PLAY/KEEP Page.
-> Audition the New Track or the Original Track (which in this case is empty) before deciding which to keep.
-> Press **KEEP NEW TRACK** or **KEEP ORIGINAL TRACK.**

You can Re-record the Track, Punch In or Punch Out, as described earlier, just as you would for Tracks that play Internally.

Note: Most often you will be recording Sequences which contain some MIDI Tracks and some LOCAL Tracks. When this is the case, be sure that you assign LOCAL Status (as opposed to BOTH) to the Tracks that you want to play only on the **SQ-80.** This will avoid 1) accidentally sending unintended MIDI Data to an external instrument, and 2) sending out a lot of unnecessary information, which tends to slow things down.

Note also that when a Track is assigned BOTH Status, the Internal Program it will play and the Program on the external instrument must have the same Program Number. This may require rearranging some of the Program locations within the **SQ-80** and/or your other instruments.

SEQUENCER EDIT FUNCTIONS

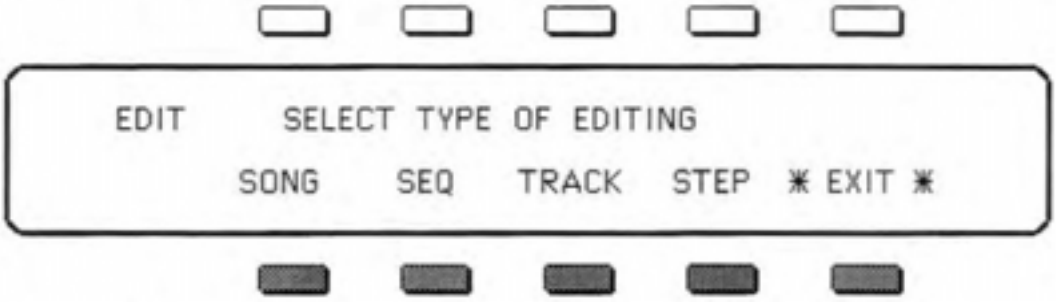


[EDIT] EDIT PAGE

For Editing Tracks, Sequences, Songs and Step Editing

The EDIT Page is actually many pages in one. Unlike most of the Programming Pages, which are self-contained, the EDIT Page is really just the starting point for all the EDIT functions. Though there are many different tasks that are performed from this Page, the Display always leads you logically to the one you want, with a series of Menus and Dialogue Pages.

You select the EDIT Page (by pressing the EDIT Button) to edit a **Song. a Sequence,** an individual Track, or to enter the **Step Edit** Mode. When you press the EDIT Button, the Page appears as shown below:



From the Menu on this Page you choose which you want to EDIT

6) **SONG —** The **SQ-80's SONG** Mode allows you to chain any of the 60 Sequences together to create 20 different **Songs** of up to 99 Steps, with up to 99 Repetitions of each Step.

7) SEQUENCE — There are four EDIT functions available when you choose SEQ:

-> **APPEND —** To Append one Sequence to the end of another (or to itself, to double the length of a basic track, for instance).
-> **ADD —** To Add up to 99 measures starting from any bar within the Sequence. -
> **DELETE —** To remove up to 99 measures starting from any bar the Sequence. -
> **COPY —** To Copy one entire Sequence to another Location.

8) TRACK — Five EDIT functions are available for editing an individual **TRACK:**

- **TRANSPOSE —** This function allows you to transpose a Track up or down in pitch by as much as a full octave in either direction.
- **REMOVE CONTROLLERS —** Removes any Controller data (such as Pitch Bend, MOD Wheel, Breath Controller, etc). and leaves only Key Events.
- **> QUANTIZE —** Quantization, or Auto-correct, takes the notes played and moves them to the nearest 1/4, 1/8th, 1/16th, or 1/32nd note, or 1/4, 1/8th, 1/16th or 32nd-note Triplet.
- **> ERASE —** Erases the track.
- **MERGE —** Takes all the Key and controller data from one Track and adds it in to another Track. This is good for conserving Tracks, and for achieving "Sound-on-Sound" which the SQ-80 Sequencer does not otherwise do — you can record two Tracks separately with the same sound, then MERGE them together.

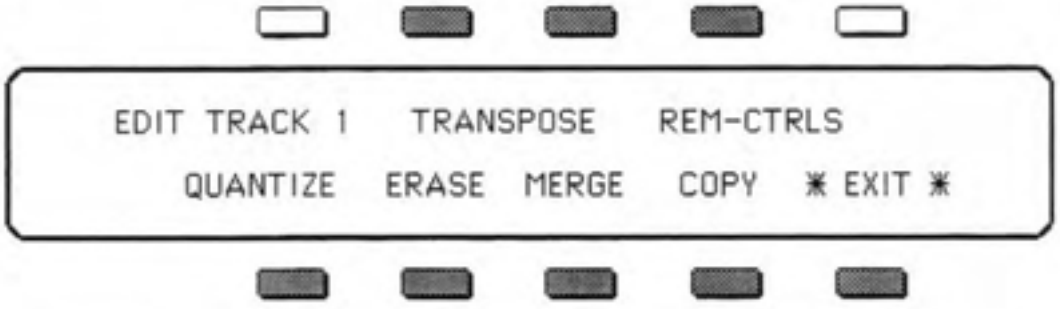
9) STEP — Step Editing. This EDIT function allows you to make minute changes in Track Data, by recording, erasing, punching in or punching out while manually stepping through the Sequence one beat, or one clock pulse, at a time.

10) *EXIT* — The EXIT Button gets you off the EDIT Page any time you change your mind, select the wrong function, or want to go back and make sure that the proper Track, Sequence or Song is Selected.

Note: All EDIT functions affect only the currently selected Track, Sequence or Song. Before selecting any EDIT function you must make sure that the Track, Sequence or Song you want to Edit is selected. You cannot change the Track, Sequence or Song to be edited from the EDIT Page.

EDITING A TRACK

When you select TRACK from the menu on the EDIT Page, the Display in turn gives you another menu, from which you select which **TRACK EDIT** function you want:



The upper-left segment of the Display tells you which Track you are editing — remember you can't change Tracks from here. If you have the wrong Track, or you just aren't sure, press *EXIT* , then go to the **TRACKS SELECT** Page and make sure that the right Track is selected.

TRACK EDIT FUNCTIONS:

2 or 3) TRANSPOSE

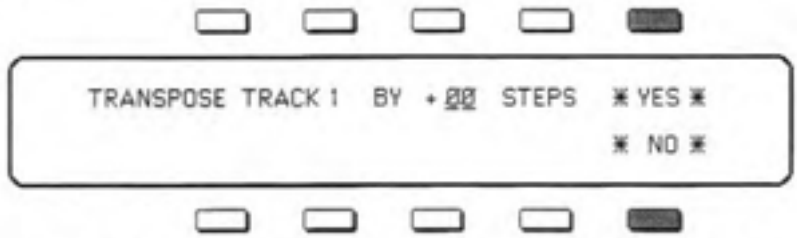
(Pressing either the #2 or #3 "Soft" Button will select Transpose.)

This function Transposes (raises or lowers the the pitch of) all the notes in a Track, by as much as one octave up or down.

To TRANSPOSE a Track:

— > Make sure the Track you want to Transpose is selected.
— > Select EDIT Page. and press TRACK.
— > Press **TRANSPOSE —** the Display shows the following:

—> Use the Data Entry Slider and the Up and Down Arrow Buttons to adjust by how many semitone Steps the selected Track will Transposed up or down in pitch.



One Step is a half-tone (up or down by one key); four Steps, a major third; seven Steps, a fifth, and so on. Range is from -12 (Down one Octave) To **+12** (Up one Octave).

> Press *YES* to Transpose the Track. You will then be returned to the **EDIT TRACK** Page. Or Press *NO* to cancel the procedure for any reason.

---

4) REM CTRLS — Remove Controllers

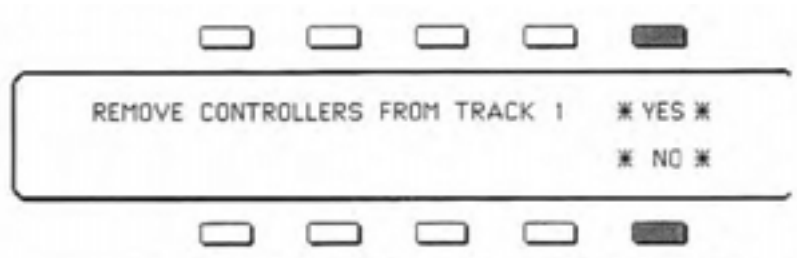
This EDIT function will leave all Key Events intact, but remove any Controller Data (Pitch Bend, MOD Wheel, Breath Controller, Pressure — in short, anything that isn't a Key Event) from the Track.

Because a Digital Sequencer records every event as a separate number stored in Memory, Controllers tend to eat up an enormous amount of Memory, compared to Key Events. A MOD Wheel used extensively, for example, spews out a constant stream of numbers, which are dutifully recorded by the Sequencer. Sometimes you might want to trade off some vibrato for some extra Memory. Sometimes you might just want to remove an obnoxious Pitch Bend or other Controller. In either case, this can be a handy function.

To REMOVE CONTROLLERS From a Track:

-> Make sure the Track you want to Remove Controllers from is selected. -
> Select EDIT Page, and press TRACK.
-> Press **REM CTRLS —** the Display shows the following:

-> Press *YES* to Remove all Controller Data from the Track. You will then be returned to the **EDIT TRACK** Page. Or Press *NO* to cancel the procedure for any reason.



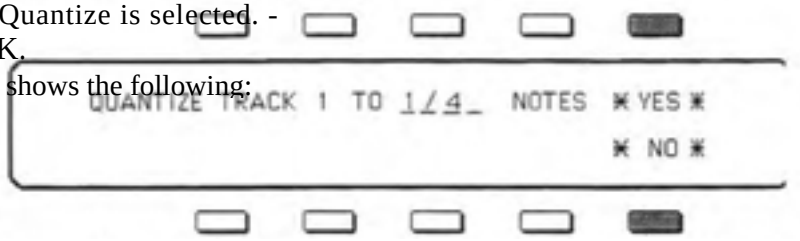
6) QUANTIZE — Auto-Correct

The **Quantize** or Auto-Correct function can take a less than perfect Track and put it right on the beat. The **SQ-80** uses post-quantization — that is, you first record a Track, then apply the Auto-Correct later as an Editing option. This has two advantages over quantizing a Track on the way in.

First, you are less likely to accidentally Quantize a Track to sixteenth-note triplets, or some other value that's not what you had in mind. Second, by putting up the **PLAY/KEEP** Page after each Quantize procedure, the **SQ-80** gives you the chance to hear the effect of a given quantization before deciding whether to keep it.

To QUANTIZE a Track:

-> Make sure the Track you want to Quantize is selected. -
> Select EDIT Page, and press TRACK.
-> Press **QUANTIZE —** the Display shows the following:

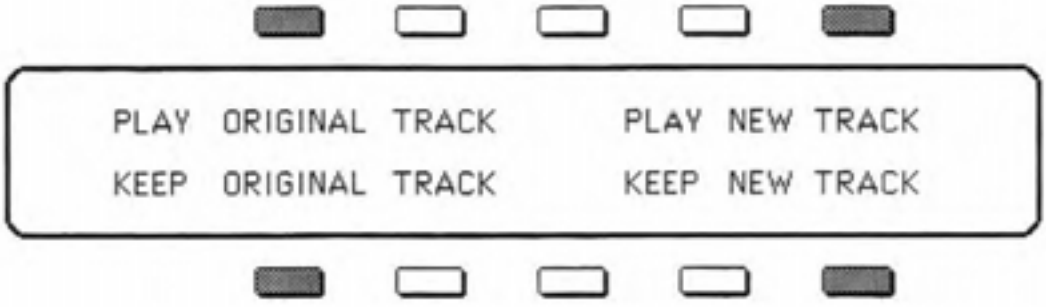


-> Use the Data Entry Slider and the Up and Down Arrow Buttons to select the Quantization value you want. For whatever value is *selected*. the beginning of each note played is moved to the nearest note of

that value. The length of a note is not changed — each entire event will he moved so that its beginning (or Key Down) falls on the nearest Quarter note, Eighth note. Sixteenth note. etc. Quantization values that can be selected here are:

1/4 —	**Quarter Notes**
1/4T —	Quarter Note Triplets
1/8 —	Eighth Notes
1/8'1' —	Eighth Note Triplets
1/16 —	Sixteenth Notes
1/16T —	Sixteenth Note Triplets
1/32 —	Thirty-second Notes
1/32T —	**Thirty-second Note Triplets**

-> After selecting a Quantization value, press *YES* to Quantize the Track to that value. Press *NO* to return to the **EDIT TRACK** Page.
-> Pressing *YES* Quantizes the Track to the desired value, then puts you on the **PLAY/KEEP** Page:



You can now audition the Quantized Track, to see if the effect was what you wanted. Play the new (Quantized) Track, or the Original (Unquantized) Track, pressing Stop•Cont to halt the Sequencer between plays. The **Auto-Locate** Controls on the LOCATE Page can be used before either PLAY command, to start from somewhere other than the beginning of the Sequence.

– > Press **KEEP NEW TRACK** to accept the Quantized Track. This will replace the Original Track in the Sequence, and you will be returned to the LOCATE Page. Or,

– > Press **KEEP ORIGINAL TRACK to** return to the LOCATE Page, with the Track unchanged (no Quantization). In this case you can repeat the procedure, trying other Quantization values, until you find the one that works for a particular Track.

Note: When you Quantize a Track, each note recorded on the Track will be moved to the nearest beat of the selected value — it will be moved ahead or back in time, depending on which beat it is closer to. Sometimes, especially when using small Quantization values such as 1 / 16th or 1/32nd Notes, a given note might get Quantized to the beat just before or just after the one you wanted it on. In this case you might try a different value, and if that doesn't work, record the Track again.

---

7) ERASE

This Erases the selected Track entirely — puts it back into its original UNUSED state. This is a good thing to do after you have Merged a Track into another, or if you accidentally selected (and thus defined) an UNUSED Track, or if you just really don't like a Track, and want it to go away.

If you want to Erase only the Track Data but leave the Program and MIDI Configuration of the Track intact, you should simply Record over the Track, as described earlier, but without playing anything.

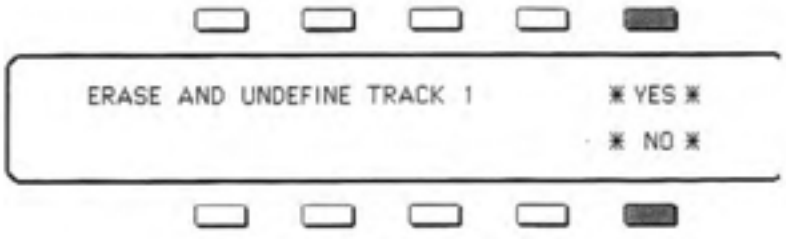
To ERASE a Track:

4 Make sure the Track you want to Erase is selected.

– > Select EDIT Page, and press TRACK.

– > Press ERASE — the Display shows the following:

-> Press *YES* to Erase the Track. You will then be returned to the **EDIT TRACK** Page. Or Press *NO* to cancel the procedure for any reason.



Note: After you Erase a Track you are returned to the **Tracks Select** Page. The **SQ-80** will be in the Straight Synth mode — no Track selected. The Track you just Erased will read UNUSED on the **Tracks Select** Page.

8) MERGE

This EDIT Function takes all the Key and Controller Data from one Track and adds, or Merges it together with another Track. This allows you to record several different Tracks, all with the same Program and MIDI Configuration, and then Merge them into one. The effect is a kind of Sound-on-Sound — the ability to add to Track Data rather than replacing it.

This also allows you to Quantize the two Tracks to different Quantization values before Merging them together. When sequencing a drum part, for instance. you could record the Kick and Snare on one Track, and Quantize that Track to 1/4 or 1/8th Notes. Then record the Toms on another Track, and Quantize that Track to 1/8th-note Triplets, or whatever. Then merge the two Tracks together.

After Merging Tracks together, you should Erase the Source Track, to avoid confusion. and to conserve your Tracks and your available Memory.

To MERGE a Track Into Another Track:

-> **Make sure the Track you want to Merge Into another (the Source Track) is selected.** -
> **Select EDIT Page, and press TRACK.**
-> Press MERGE — the Display shows the following:

-> Use the Data Entry Slider and the Up and Down Arrow Buttons to choose which Track the selected Track will be Merged with (the Destination Track). When the procedure has been done, all the Key and Controller Data from both Tracks will be on this Track.

Note: The Program, Mix Level, MIDI Channel. Status, and Program Number of the Source Track are not copied in this procedure — the settings of the Destination Track remain in effect for the new, Merged, Track,

-> Press *YES* to Merge the Source Track with the Destination Track. You will then be returned to the **EDIT TRACK** Page. Or Press *NO* to cancel the procedure for any reason.

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9) COPY

This is one of the most useful Track EDIT functions. It simply makes a Copy of a Track onto another Track within the Sequence. You can, for instance, easily double a Track with another Sound, by Copying it to another Track Location, then assigning the new Track a new Program, MIDI Channel. etc. Or Copy a Track to another Track Location, then Transpose the new Track up an octave (see **Transpose,** p. 122), for doubling an octave up. Along with the recorded Track Data, the Source Track's Internal Program, MIDI Channel, Status, Program Number and Mix Level will be copied to the Destination Track.

You can't Copy a Track onto a Track Location that has been recorded already. The Destination Track must be blank — free from recorded Track Data.

To COPY a Track to Another Track:

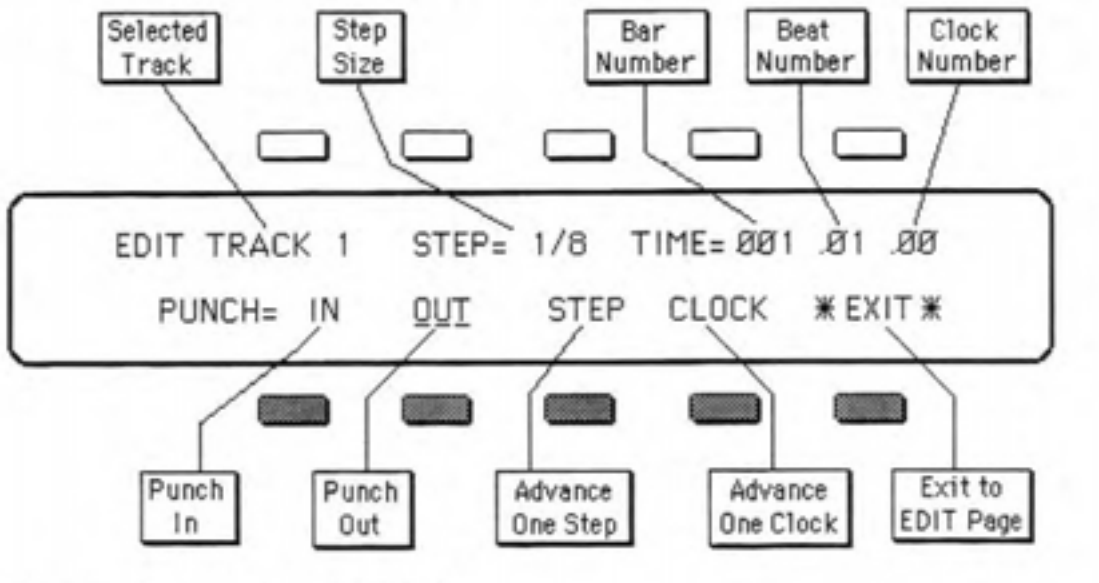
-> Make sure the Track you want to make a Copy of (the Source Track) is selected. -
> Select EDIT Page, and press TRACK.
-> Press COPY — the Display shows the following.:

Use the Data Entry Slider and the lip and Down Arrow Buttons to choose which Track the selected Track will be Copied into (the Destination Track). This must be a Track that hasn't yet been defined.

-> Press *YES* to Copy the Source Track onto the Destination Track. You will then be returned to the **EDIT TRACK** Page. Or Press *NO* to cancel the procedure for any reason.

STEP - TRACK STEP EDITING

The **Step** Editing function of the SQ-80 is a way of getting into a Track to make minute changes. It is important to understand that the **STEP EDIT** Mode is an extension of **TRACK EDIT,** and of the Recording process itself. Whatever you do here affects ONLY the selected Track. Pressing, STEP from the EDIT Page puts you on the **STEP EDIT** Page, which looks like this:



(Inactive Buttons appear in White)

Step Editing is really just a method of Recording or Playing back a Sequence in which you are the Clock. In normal Sequencer operation, The **SQ-80's** internal Clock controls the playback rate of a Sequence. The **STEP EDIT** Page is specially set up so that you can **Punch In** (enter Record) or **Punch Out** (leave Record and enter Play) while "Stepping through" the Sequence one **Step.** or one Clock pulse at a time.

On the **STEP EDIT** Page, shown above, the top row of the Display contains the **Step Size,** which you can adjust using the Data Entry Slider and the Up and Down Arrow Buttons, and a three-part Time Readout which tells you exactly where you are in the Sequence.

On the Bottom row of the Display are the Buttons for **Punching In** and **Punching Out** of Record, and two Buttons which allow you to advance the Sequence by one **Step,** or by one Clock pulse at a Time.

This Function allows you to **Punch In** at any point within the Sequence, and play the keyboard (to Record new Track Data) or not play (to simply erase Track Data) while advancing, the Clock manually, by pressing STEP or CLOCK.

READOUTS AND ACTIVE CONTROLS:

STEP= — STEP SIZE

This is the amount by which the Sequence will be advanced when the STEP Button is pressed (see #8 below). On this Page, **Step Size** is continuously controlled by the Data Entry Slider and the Up and Down Arrow Buttons, and does not have to be selected.

The available **Step** values are the same as the **Quantize** values on the **Quantize** EDIT function. The chart below shows the possible **Step Sizes,** along with how many Clock pulses each corresponds to.

1/4 — Quarter Note	24 Clocks
1/4T — Quarter Note Triplet	16 Clocks
1/8 — Eighth Note	12 Clocks
1/8T — Eighth Note Triplet	8 Clocks
1/16 — Sixteenth Note	6 Clocks
1/16T — Sixteenth Note Triplet	4 Clocks
1/32 — Thirty-second Note	3 Clocks
1/32T — Thirty-second Note Triplet	2 Clocks

When, for example, **Step Size=1/8,** each time you press the "Soft" Button below STEP, the Sequence will be advanced by one eighth note, or twelve "ticks" of the **SQ-80's** Clock. When **Step Size=1/4,** each time you press STEP, the Sequence will be advanced by one quarter note, or twenty-four "ticks" of the Clock. And so on.

TIME=

The readout in the Upper left corner tells you exactly where you are in the Sequence. The three numbers displayed after TIME= represent the **Bar,** the **Beat,** and the Clock number of your exact location within the Sequence.

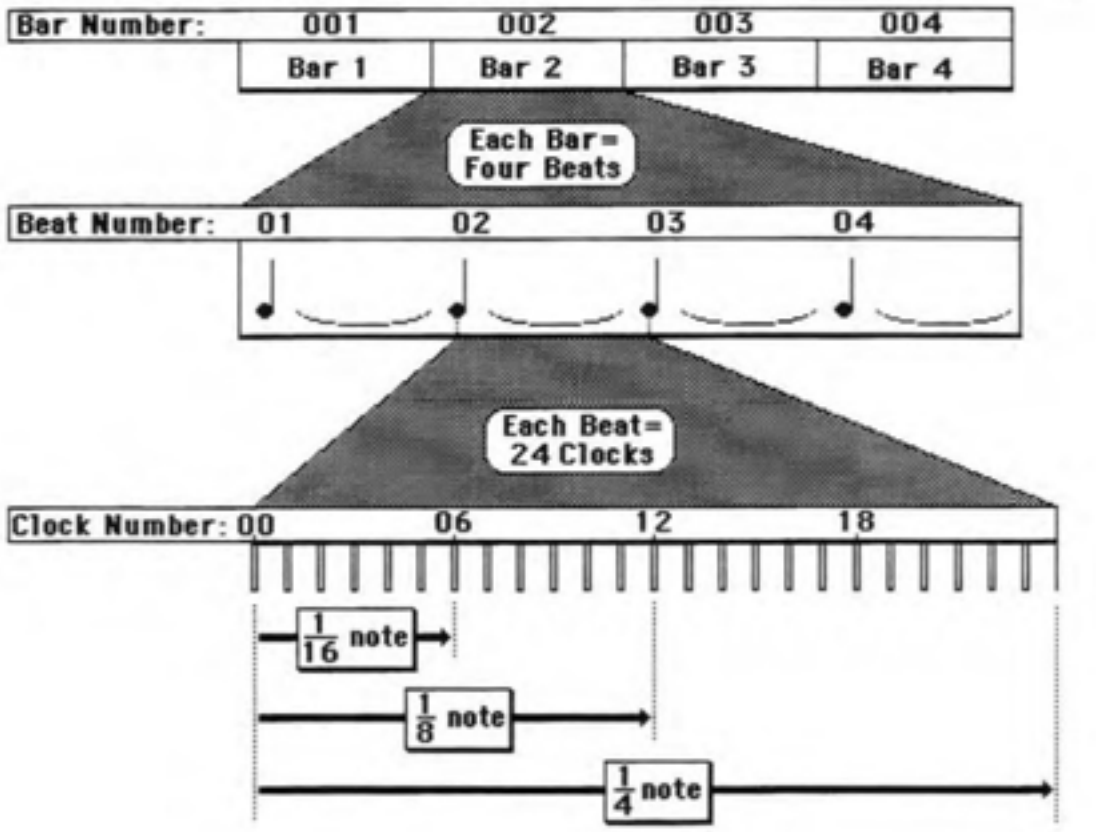
•> **Bar Number** tells you which bar of the Sequence you are in.

Beat Number tells you which Beat of that Bar you are in. The value of a Beat is defined by the Time Signature of the Sequence. In 4/4 or 3/4 Time, for example, one Beat is a Quarter note. In **6/8** Time, one beat would be an Eighth note.

Clock Number tells you which Clock pulse, within that Beat, you are on. One Clock is a very small amount of time defined as 1/24 of a Quarter note. In normal Sequencer operation, when you change the Tempo of a Sequence. what you are really doing is varying the Clock Frequency. In the **Step Edit** Mode, the Clock is stopped, and this readout tells you at exactly which Clock pulse within the Beat it is stopped.

So if the Display reads: **TIME= 003 .02 .12,** that means that you are in **Bar Number 3** of the Sequence, **Beat Number** 2 of that Bar, and **Clock Number 12** of that Beat. If the Display reads: **TIME= 007 .01 .09,** that means that you are in **Bar Number** 7 of the Sequence, **Beat Number 1** of that Bar, and **Clock Number 9** of that Beat.

The following illustration shows the relationship of Bars, Beat and Clocks, for a Four Bar Sequence in 4/4 Time:



6. IN — Punch In

Pressing this Button puts the SQ-80 into **Record,** causing the word IN to be underlined. Remember that all recording will be done on the selected Track. The right Track must be selected before you enter the EDIT Page.

Punching In will have no effect until you press either the STEP or CLOCK (see below) Button to advance the Sequencer. Anything you play (or don't play) will then be recorded as long as you continue to advance the Sequencer, pressing STEP or CLOCK, or until you press OUT to Punch Out. Either IN or OUT is always underlined.

7. OUT — Punch Out

When OUT is underlined the SQ-80 is in Play Mode. In this state you can step through the Sequence by pressing the STEP or CLOCK Button to find the exact place where you want to Punch In.

8. STEP — Advance One Step

Pressing STEP moves the Sequence ahead by one Step, as defined by the **Step Size,** above. If **STEP=1/16,** pressing STEP once will advance you exactly one Sixteenth Note, or 6 Clocks, beyond where you were. If **STEP=1/8,** pressing STEP once will advance you exactly one Eighth Note, or 12 Clocks, beyond where you were. And So on.

9. CLOCK — **Advance One Clock**

Pressing CLOCK moves the Sequence ahead by one Clock Pulse. There are 24 Clocks per Quarter note, so this is a very slow way to step through a Sequence. Often it is a good idea to press

the STEP Button to get into the area where you want to edit, then slowly press CLOCK to find the exact note.

10. EXIT

If you haven't Recorded anything, pressing EXIT simply returns you to the EDIT Page. If you have **Punched In,** while you were on this Page, pressing EXIT gets the **PLAY/KEEP** Page, where you can hear the fruits of you Step Editing labors before deciding whether to keep them, or to leave the Track as it was.

Using the Step Edit Mode

The basic procedure for **Step Editing** is as follows:

– > Make sure the Track you want to Edit is selected.
> Select EDIT Page, and press STEP

– > The Page appears. as shown at the beginning of this Section, with the TIME= Readout showing the location where you were before entering the EDIT Page. The Page always comes up in the **Punch Out** state, so you don't have to worry about accidentally recording anything. A note might sound, and keep playing, when you press STEP. That means there is a Key Down on that beat. The note will remain until you advance the Sequencer (by pressing STEP or CLOCK) to the point where the Key Up for that note was recorded.

____ Advance the Sequencer by one Step or one Clock Pulse at a time (by pressing STEP or CLOCK) to get to the place where you want to **Punch In.** When you are close, start pressing CLOCK, one press at a time, until you reach the exact point where you want to record.
> Press IN to Punch In.

– > Play the note on the Keyboard that you want to start on that beat. Now press STEP or CLOCK to advance to the point where you want to release the note. When you release the key, a Key Up will be recorded at exactly the time showing on the Display.

– > Press OUT to Punch Out. This puts you back in Play. where you can Step through to listen to more of the Sequence, or press EXIT. You cannot Punch back In once you have punched out. You can only do one edit per trip to this page.
Pressing EXIT puts you on the **PLAY/KEEP** Page. Audition the edited Track by pressing **PLAY NEW TRACK.** If the effect was not what you had in mind, press **KEEP ORIGINAL TRACK.** If it worked, press **KEEP NEW TRACK.**

It might take you a while to get good at **Step Editing.** But because each attempt is followed by the **PLAY/KEEP** Page, you can afford to experiment without the risk of trashing a good Track. Here are a few more hints:

– > Any note that sounds the instant you press CLOCK was recorded exactly on that Clock Pulse (the one identified on the Display). This is not necessarily true when you press **STEP.** If **STEP=1/4** notes, for example, when you press STEP, all the notes that were recorded between the new location and the location 24 Clocks back will sound. So the only way to really zero in on a single Event is to step through by single Clocks.

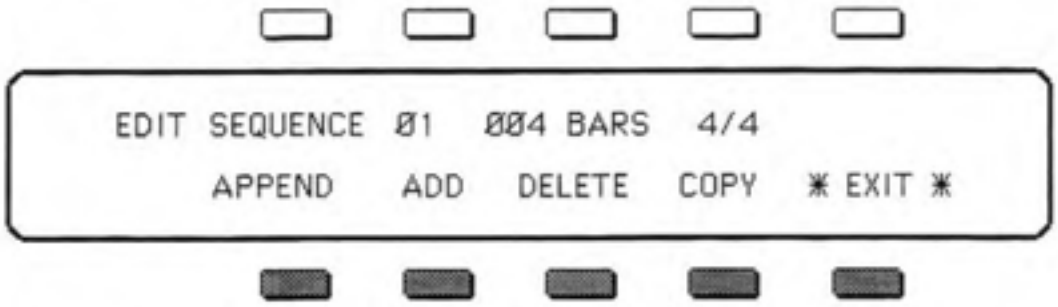
– > To Erase just one note:
1) First get to a location a little before the note, pressing STEP or CLOCK. depending on how far into the Sequence it is.
2) Then press CLOCK slowly, one press at a time, until the offending note sounds (Don't step past the note yet — let it sustain.)
3) Press IN to Punch In.

4) Press CLOCK once. This records over the Key Down of the note.
5) Now press OUT to Punch Out. The Note is gone. (Since you Erased the Key Down and then Punched out, the Key Up was erased automatically.)

If you want to perform a STEP Edit somewhere in the middle of a Sequence. use the **Auto-Locate** Controls to Locate to the Bar you want before going to the EDIT Page. The **STEP EDIT** Page will then appear showing the Location you selected. This is especially useful with long Sequences, since it is considerably faster than Stepping through sixteen Bars to get to the point where you want to begin editing.

EDITING A SEQUENCE

When you select **SEQUENCE** from the Menu on the EDIT Page. the Display shows another menu, from which you select which **SEQUENCE EDIT** function you want:



The upper portion of the Display tells you which Sequence is selected, how many Bars long that Sequence is, and its Time Signature. As with all EDIT Pages, the EXIT Button is there in the lower-right corner. so you can bail out at any time. Pressing EXIT will return you to the EDIT Page.

The EDIT functions here will affect the entire Sequence — all eight Tracks (or however many Tracks have been Recorded.)

As with the **TRACK EDIT** Pages, you can't change the selected Sequence from here. You must make sure that the right Sequence is selected before entering the EDIT Page.

SEQUENCE EDIT FUNCTIONS:

6) APPEND

Use this function to take a Sequence and "tack it on" to the end of the selected Sequence. This allows you to record a Sequence in parts, as several different Sequences, and then use the **APPEND** function to put them together into one long Sequence.

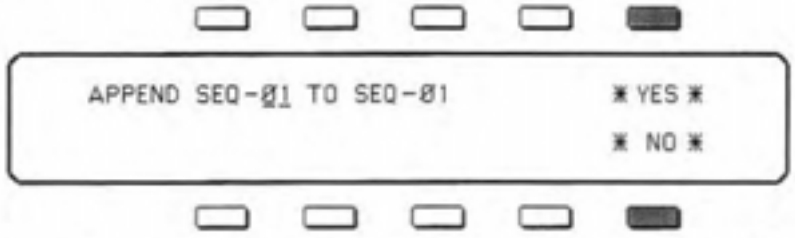
Also, you can Append a Sequence to itself, doubling its length. Say you need a sixteen Bar repeating pattern. To save yourself aggravation, you can record a four Bar Sequence, then Append it to itself twice.

The Sequence to be Appended must have the same Time Signature as the selected Sequence. Also, the Programs and all Mix•MIDI configurations of the selected Sequence will still apply to the new Sequence, so it is best to use this function to Append Sequences that are set up the same as the selected Sequence.

To APPEND a Sequence to the Selected Sequence:

—> Select EDIT Page, and press SEQ.
— > Press **APPEND —** the Display shows the following:

> Use the Data Entry Slider and the Up and Down Arrow Buttons to choose which Sequence will be Appended to the end of the selected Sequence.



— > Press *YES* to **Append** the Source Sequence to the selected Sequence. You will then be returned to the **EDIT SEQUENCE** Page. Or Press *NO* to cancel the procedure for any reason.

---

7) **ADD Bars**

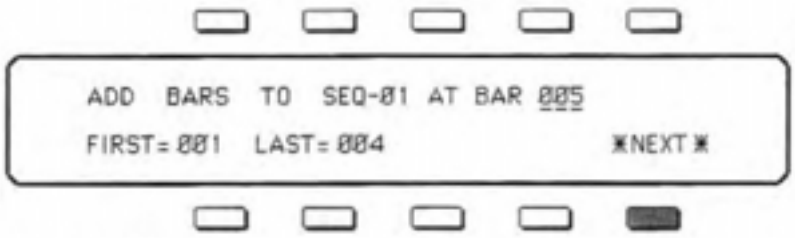
Though the length of the First Track determines the Length of the Sequence, you can, at any time, use the ADD and **DELETE** EDIT functions to add empty Bars, starting from any Bar within the Sequence, or to remove Bars from the Sequence.

The ADD Bars function lets you Add up to 99 Bars to the Sequence at a time. It consists of two steps: 1) you tell the SQ-80 at which bar you want to start adding Bars, and then 2) you tell it how many Bars you want to add.

To ADD Bars to the Selected Sequence:

> Make sure the Sequence to which you want to ADD Bars is selected.
> Select EDIT Page, and press SEQ.
> Press ADD — the Display shows the following:

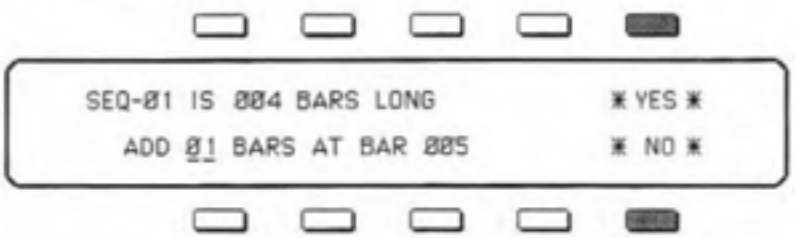
> Use the Data Entry Slider and the Up and Down Arrow Buttons to determine at which Bar the new Measures will be added. This can be any Bar within the Sequence. Bars will be added from the beginning of the Bar you select here.



- Selecting Bar 01 will cause Bars to be added at the beginning of the Sequence.
- Selecting the Bar after the last Bar will cause Bars to be added at the end of the Sequence.
- Selecting any other Bar will cause Bars to be added at that point in the

Sequence. > Press *NEXT*. The Display shows the following:

> Use the Data Entry Slider and the Up and Down Arrow Buttons to select how many Bars you want to add. You can adjust this from 01 to 99 Bars. Empty Bars (no Track Data) will be added beginning from



the Bar selected in the previous step. (If you wish to Add more than 99 Bars, just do the procedure more than once.)

> Press *YES* to ADD the selected number of Bars to the selected Sequence. You will then be returned to the **EDIT SEQUENCE** Page, which will now reflect the new Length of the Sequence. Or Press *NO* to cancel the procedure for any reason.

---

8) DELETE Bars

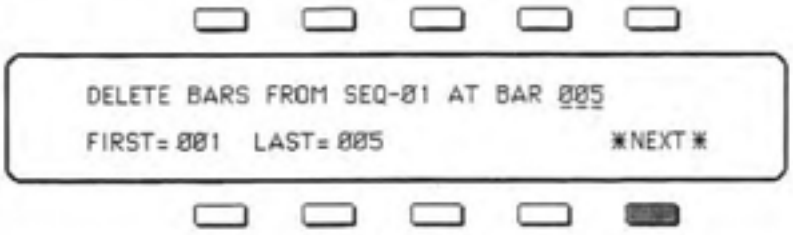
The DELETE Bars function lets you Delete (or remove) up to 99 bars from a Sequence, starting from any bar within the Sequence.

This is handy when, for example, you record a first Track which is perfect in every way except that it runs to 5 Bars instead of four. With this EDIT function you can easily chop off the extra Bar.

To DELETE Bars from the Selected Sequence:

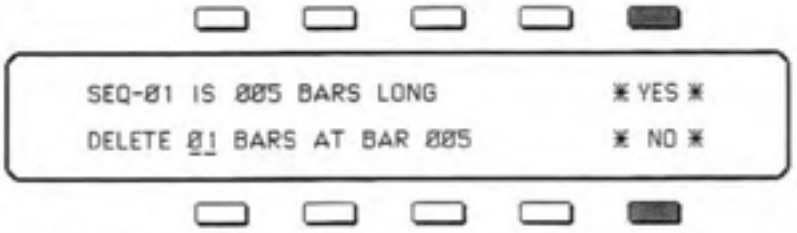
-> Make sure the Sequence from which you want to **DELETE** Bars is selected.
-> Select EDIT Page, and press SEQ.
-> Press **DELETE —** the Display shows the following:

-> Use the Data Entry Slider and the Up and Down Arrow Buttons to determine at which Bar you want to begin removing Bars. This can be any Bar within the Sequence. Bars will be Deleted from the beginning of the Bar you select here.



-> **Press *NEXT*.** The Display shows the following:

-> Use the Data Entry Slider and the Up and Down Arrow Buttons to select how many Bars you want. to Delete. You can adjust this from 01 to 99 Bars. (If the Sequence is very long, and you wish to Delete more than 99 Bars, just do the procedure more than once.)



> Press *YES* to **DELETE** the selected number of Bars from the selected Sequence. You will then be returned to the **EDIT SEQUENCE** Page, which will now reflect the new Length of the Sequence. Or Press *NO* to cancel the procedure for any reason.

---

9) COPY

This EDIT function copies the selected Sequence, with all of its Track, Program and MIDI information and Tempo, to another Sequence Location, leaving the Source Sequence intact.

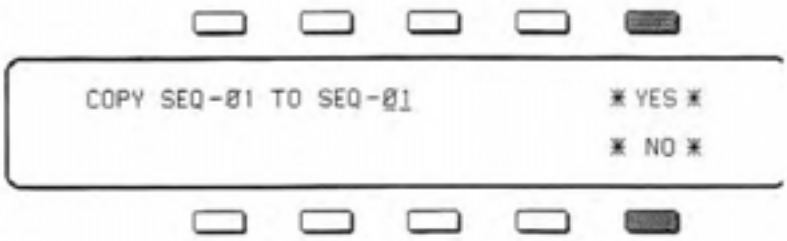
The COPY function can save you time and trouble in many ways. If you have a good basic track, you can Copy the Sequence to another Location, and record different data on the remaining Tracks, for easy Song construction. Or, if you are planning to do some radical re-recording or Editing of a Sequence, Copy it to another Location, and edit the copy, That way your original Sequence is still there if your

experiments aren't completely successful.

You can't Copy a Sequence into a Location that already has one. The Destination Sequence Location must be blank.

To COPY a Sequence to Another Location:

–> Make sure the Sequence you want to make a Copy of (the Source Sequence) is selected.
–> Select EDIT Page, and press SEQ.
–> Press COPY — the Display shows the following:



–> Use the Data Entry Slider and the Up and Down Arrow Buttons to choose which Sequence Location the selected Sequence will be Copied into. This must be a Location where a Sequence that hasn't yet been created. The **SQ-80** will not let you Copy over an existing Sequence.
–> Press *YES* to Copy the Source Sequence into the Destination Sequence Location. You will then be returned to the **EDIT SEQUENCE** Page. Or Press *NO* to cancel the procedure for any reason.

Making a Sequence Template

One highly recommended application of the Copy function is the use of a Sequence **Template.** If you plan to record a number of Sequences with the same basic Track configuration, you can set up a "Template" Sequence with no recorded Track Data.

Create a new Sequence. and set up its various Tracks the way you want them to be for the group of Sequences you are about to record. For each Track, assign a Status, Program. MIDI Channel, etc. Set the Tempo of the Sequence to the Tempo you'll want. But don't Record anything on any of the Tracks.

Now Copy the Template to an empty Sequence Location, and start Recording on the copied Sequence. For each new Sequence, Copy the Template to another Location and Record there. This way you avoid having to set up the Tracks of each Sequence individually.

Note: As you will see in the next section. a Song is a series of Sequences which the SQ-80 has been programmed to play in a particular order. If, when a Sequence is selected, you press SONG on the EDIT Page, this may have the effect of changing which Sequence is the current Sequence — from the Sequence that was selected, to the one that is the next Step in the Song. If you do this the Display will ask **"SELECT SEQUENCE IN NEXT SONG STEP?"** If you pressed SONG by accident, and wish to avoid confusion over what is really the current Sequence, answer *NO*. You will be returned to the EDIT Page, with nothing changed. If you meant to edit a Song, answer *YES*. But bear in mind that when you return to Sequence Mode, a different Sequence might be selected than when you left.

SONG MODE

The **SQ-80'** s **Song** Mode allows you to chain Sequences together in any order to create up to 20 Songs.

Each Song can be given a name of up to six characters. You name a Song when you Create it (see **CREATE** Page, p. 109), much as you name a Program when Writing it to Memory. You can also change a Song's name at any time from the **SONG EDIT** Page.

Songs are constructed in **Steps.** Each Step of a Song consists of:

1) A Sequence that will be played during that Step;
2) The number of times the Sequence will be Repeated during the Step; and
3) The Transpose value, which allows you to Transpose the entire Sequence up or down by as much as an octave for the duration of the Step.

Either a Song or a Sequence is selected at any given time — never both. When a Song is selected, the SQ-80 is in **Song Mode.** Pressing **Play** will cause the selected Song to play. You cannot Record in Song Mode — a Song is really just a series of instructions to the Sequencer, telling it to play certain Sequences in a certain order.

Each time a new Sequence starts playing as a Step in a Song, each Track of the new Sequence sends out a Program Change and MIDI Volume instructions on its selected Midi Channel (unless the Track is assigned LOCAL Status). This allows you to change the Patch that a remote instrument is playing for each Song Step, if you wish.

Any Sequence can be connected to any other in a Song — they don't have to have the same Tempo or Time Signature. The **SQ-80** will simply play the Sequences in the order you program them in.

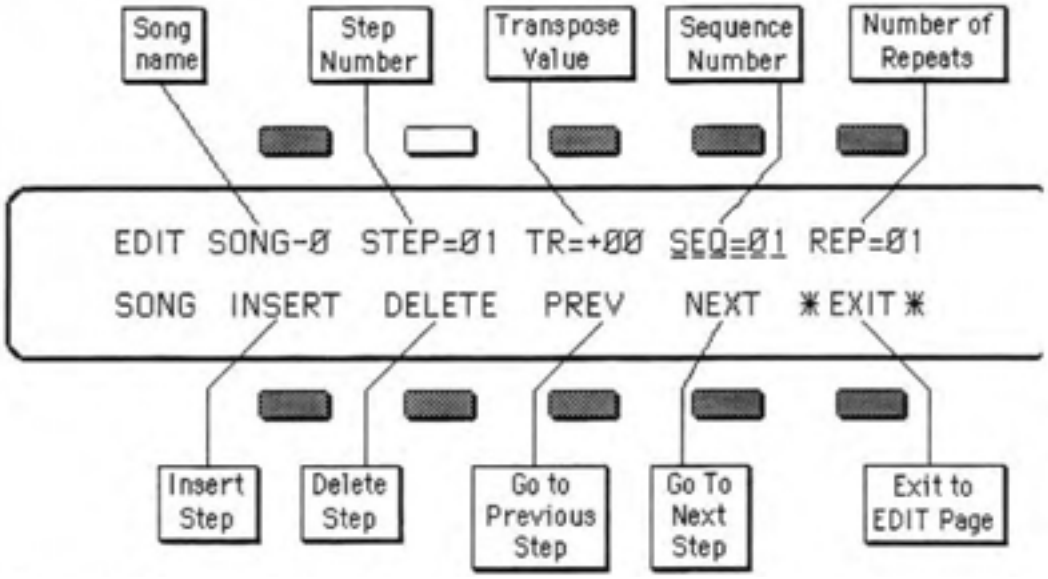
When a Song is selected, you can make changes to a Sequence within the Song, but, unless the Song is stopped, those changes will be forgotten as soon as the next Step begins to play. For example, while playing a Song, you might change the Tempo of the Sequence that's currently playing, or change the Program that's playing on a Track. Those changes will only remain as long as that Step is playing. The next time the same Step comes around, the Sequence will be as it was originally.

If you make these changes while the Sequencer is stopped. or you Stop the Sequencer before the Song Step is over, the **SQ-80** will ask you whether you want to save those changes when you next press Play or select a new Sequence or Song (see **SAVE CHANGES TO OLD SEQUENCE,** p. 91.)

Note: All changes made to a Sequence must be made with the Sequence selected, or when the Sequence is the Current Step in a Song and the Song is stopped. If you find yourself trying to make changes to a Sequence, and the SQ-80 keeps changing them back, or otherwise reacting strangely, make sure you are not in Song Mode.

SONG EDIT PAGE

For Chaining Sequences together to make Songs.



(Inactive Buttons Appear in White)

The **SONG EDIT** Page appears when you 1) Create a new Song, or 2) select SONG from the menu on the EDIT Page.

READOUTS AND ACTIVE CONTROLS:

1. SONG NAME (RENAME SONG)

The **Name** of the selected Song appears in this Location. You can change the name of an existing Song if you like. Pressing the "Soft" button above the Song name puts you on a RENAME SONG sub-page. The procedure for renaming a Song is the same as for naming it when first created. Use the Data Entry Slider and the Up and Down Arrow buttons to choose the character you want; then use the MOVE CURSOR buttons to select a different character. Repeat the process until the name you want shows on the Display. Press "EXIT" to return to the SONG EDIT Page with the new name in place.

2. STEP

This tells you which **Step** of the Song you are on. Up to **99** Steps can be programmed into a Song. The Step Number which appears here is always the one you are currently Editing. You move from one step to another by pressing the PREV and NEXT Buttons (see below).

3. TR — TRANSPOSE

This control will Transpose (raise or lower the pitch of) the selected Sequence for the duration of the Step. If **TR=** anything other than Zero for a given Step, when the Song reaches that Step every Track in the Sequence will be Transposed up or down by the selected amount. Each increment represents a semitone (halfstep). The range is from one Octave up (+12) to one Octave down (-12).

By using the same Sequence for several Steps, and transposing some of the Steps, you can save time and Sequence Memory. Remember though that if you have Drums, or similar sounds, on a Track, they will be Transposed too.

4. SEQ

Here you select which Sequence you want to be played during the current Step. For each Step of the Song, press SEQ (it gets underlined) and use the Data Entry Slider and the Up and Down Arrow Buttons to select the Number of the Sequence you want for that Step. (While editing a Songs, whenever you press NEXT or **PREV,** to change Steps, SEQ is automatically selected for the new Step.)

5. REP — REPEATS

Here you select the number of times that the Sequence is to **Repeat** during the selected Step. Ifs for example, on a given Step, **SEQ=05,** and REP=04, that Step would repeat Sequence # 5 four times when the Song is played.

For each Step of the Song, after you select a Sequence, press REP (it gets underlined) and use the Up and Down Arrow Buttons to select the number of the Repeats for that Step. Up to 99 repetitions can be programmed for each Step.

6. INSERT

Pressing **INSERT** simply inserts a new Step into a Song. The Inserted Step always reads **SEQ=01, REP=01,** After inserting a Step you then adjust the SEQ and REPs as described above. The new Step is inserted in front of the one you were previously on, and all later Steps are moved back by one,

For example; if you are on **Step 3** of a Song, and you press **INSERT.** a new **Step 3** (defined as **SEQ=01, REP=01)** will show on the Display. The old **Step 3** is now **Step** 4. The old **Step 4** is now **Step 5.** And so on.

7. DELETE Pressing **DELETE** removes the currently selected Step from the Song.

For example: if you are on **Step** 5 of a Song, and you press **DELETE.** the old **Step 5** will disappear and all later Steps will move up by one. The old **Step 6** is now **Step** 5. The old **Step** 7 is now **Step 6.** And so on.

8. PREV Pressing PREV "backs up" one Step within a Song.

9. NEXT

Pressing NEXT advances the Song forward to the next Step. You can't advance more than one Step beyond the last defined Step. If Steps 1 through 4 have been defined (by selecting a Sequence for those Steps), when you press NEXT to advance to Step 5, it will read **SEQ=XX. REP=XX.** You cannot go to Step 6 until you have defined Step 5. Moving the Data Entry Slider or the Up and Down Arrow Buttons replaces the XX' s with Sequence numbers, and Step 5 is now defined.

MAKING A SONG

Lets suppose that you have recorded a number of Sequences, and that you now want to Create a Song that consists of the following:

Step 1— Sequence 04 for 2 times through,
Step 2 — Sequence 05 for 1 time through,
Step 3 — Sequence 06 for 1 time through,
Step 4 — Sequence 08 for 2 times through,
Step 5 — Sequence 08, Transposed up a Fifth, for 2 times through,
Step 6 — Sequence 10 for 4 times through,

The Procedure is as follows:

1) Create a New Song

-> Select **CREATE/ERASE** Page, and press NEW SONG.
-> Name the new Song, as described on p. 109.
-> Press *YES*. You will automatically be placed on the SONG EDIT Page. (The SONG EDIT Page is also reached from the EDIT Page by pressing SONG.) The Page comes up as follows: **STEP=01, TR=+00. SEQ=01, REP=01,**

2) Edit Step 1

– **SEQ** is already selected (underlined). Move the Data Entry Slider or the Up and Down Arrow Buttons until the Display reads SEQ=04.
--> Press **REP.** Adjust to **REP=02.**

3) Edit the Remaining Steps

Step 2:
____ > Press NEXT. The Display reads: **STEP=02, TR=+00, SEQ=XX, REP=XX. SEQ** is already selected.
____ > Move the Data Entry Slider or the Up and Down Arrow Buttons until SEQ=05.
____ > Press REP. Adjust to **REP=01,**
Step 3:
– > Press NEXT. The Display reads: **STEP=03, TR=+00, SEQ=XX, REP=XX.** > Move the Data Entry Slider or the Up and Down Arrow Buttons until SEQ=06.
– > Press REP. Adjust to **REP=01,**
Step 4:
– > Press NEXT. The Display reads: **STEP=04, TR=+00, SEQ=XX, REP=XX.**
– > Move the Data Entry Slider or the Up and Down Arrow Buttons until SEQ=08.
– > Press REP. Adjust to **REP=02.**
Step 5:
> Press NEXT. The Display reads: **STEP=05, TR=+00, SEQ=XX, REP=XX.**
> Move the Data Entry Slider or the Up and Down Arrow Buttons until SEQ=08.
Press REP. Adjust to REP=02.
– Press TR=. Adjust to TR=+07. This will Transpose Sequence 06 up a Fifth (seven semitones) during this Step.

Step 6:

> Press NEXT. The Display reads: **STEP=06, TR=+00, SEQ=XX, REP=XX.**

– Move the Data Entry Slider or the Up and Down Arrow Buttons until **SEQ=10.**

> Press REP. Adjust to **REP=04.**

4) Check your Song

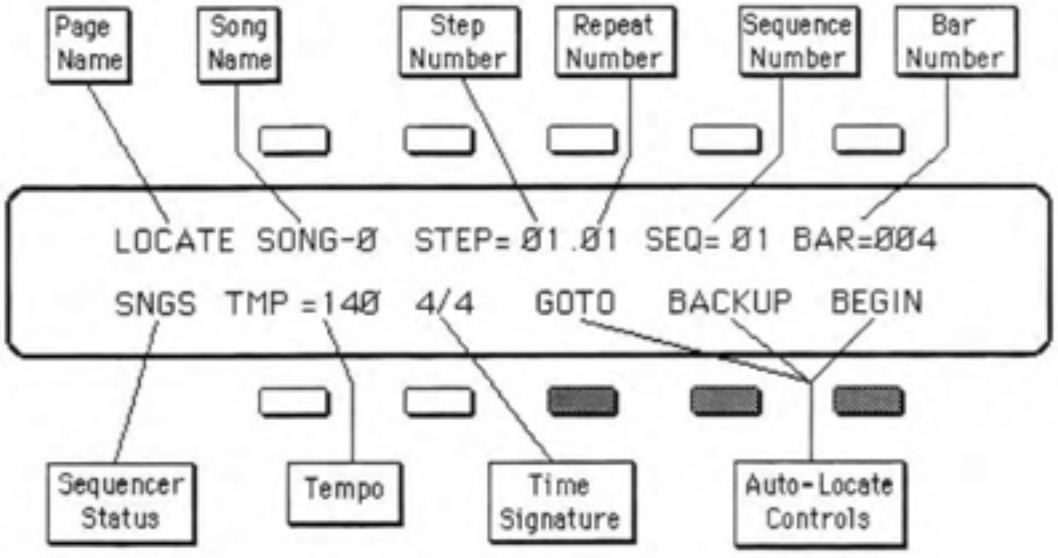
– > Press PREV to back up. one Step at a time, until you reach **Step 1,** Now use the NEXT and PREV Buttons to move around the various Steps and check to see that they are right. If one of the values is wrong, or if you just decide you want something different, simply select it, and change it.

5) Press *EMT* to exit to the EDIT Page.

Note: Remember that a Song is just a series of pointers telling. the **SQ-80** which Sequences to play, and in which order. A Song contains no Track Data. It doesn't have to be saved — it just stays like it is until you change it, or Erase it. You can't do any harm to a Sequence or any of its Tracks by anything you do in Song Edit Mode. When playing back a Song, any changes you make to a Sequence will only be saved if you instruct the SQ-80 to save them, as described earlier.

[LOCATE] SONG LOCATE PAGE

Provides information about location within a Song; Allows access to any Step within a Song; Shows Tempo and Time Signature.



I nactive Buttons appear i n White)

When a **Song** is selected, the LOCATE Page looks a little different than in Sequence Mode. In Song Mode the Page is reconfigured to show you where you are within a Song. The **Auto-Locate** Controls now locate to Song Steps rather than Bars.

The **Status** of the Sequencer, whether it is in **Song Play (SNGP)** or **Song Stop (SNGS)** is always shown in the lower left-hand corner of the Display on this Page.

The TEMPO Control is still active, but any changes you make to a Sequence during a Step of a Song will be immediately forgotten as soon as the next Step comes around, unless you Stop the Song during the Sequence you changed.

READOUTS AND ACTIVE CONTROLS:

1. **SONG NAME** The name of the current song is displayed here.

2. **STEP=**
This Segment of the Display shows the **Step** that the Song is on, and which **Repeat** of that Step it is on. For example, if STEP= 02 .03, it is on the third repeat of **Step** 2.

4. **SEQ=**
Tells you which Sequence is currently playing: or, if the Sequencer is in **Song Stop** Mode, which Sequence will play from if you press **Stop•Cont.**

5. **BAR=**
Tells you which Bar of the Sequence is playing: or, if the Sequencer is in **Song Stop** Mode, which Bar it will play from if you press **Stop•Cont.**

6. **TMP=** The **Tempo** of the Sequence that is currently playing is displayed here.

7. **TIME SIGNATURE**
The **Time Signature** of the currently playing Sequence is displayed here. Sequences with different Time Signatures can be put together into Songs.

AUTO-LOCATE CONTROLS:

8. **GOTO** **GOTO** allows you to Play the Song from any Step within the Song. To reach a particular Step:

____ > Press GOTO. The Display shows the following:
____ > Use Data Entry Slider and the Up and Down Arrow Buttons to adjust the GOTO Step number to the Step at which you want to start. You can choose any Step within the current Song.

> Press GOTO again. You are returned to the **SONG LOCATE** Page, with the new Step number showing on the Display. Or press *EXIT* to return to the LOCATE Page without changing your current location in the Song (which is useful if you pressed GOTO by accident).

9. **BACKUP** Each press of this button backs the Song Location up One Step .

10. **BEGIN** Pressing this button resets the Song to the beginning of Step 1.

S E C T I O N 5

Sequencer and Controller Applications

USING THE SQ-80 WITH A DRUM MACHINE

When you use the SQ-80 in conjunction with a Drum machine or other rhythm Sequencer, there are basically three ways you can go:

1) Sync the Drum Machine's clock to the **SQ-80:**
2) Sync the **SQ-80's** clock to the Drum Machine: or
3) Sequence the Drum Machine from the SQ-80, just as you would a Synthesizer.

To Sync a Drum Machine to the SQ-80:

– > Connect the MIDI Out of the **SQ-80** to the MIDI In of the Drum Machine. If you have other instruments connected to the **SQ-80** via MIDI, you can simply include the Drum Machine in the MIDI Thru chain depicted on p. 115. (If the Drum Machine has no MIDI Thru jack, put it last in the Chain.)

– > Set the Drum Machine to MIDI Sync.

____ > Set the Drum Machine to receive on an unused MIDI Channel, OMNI Off: or disable Channel information. You don't want the Drum Machine playing **SQ-80** Sequence Data intended for other instruments. **MIDI Clocks, Start, Stop and Continue** are **Real Time** commands, and are sent and received regardless of MIDI Channel or Mode.

– > The Drum Machine should now Sync to the **SQ-80's** clock. Pressing **Play** or **Stop·Cont** will Start, Stop and Continue the Drum Machine, assuming it receives those commands (most do).

To Sync the SQ-80 to a Drum Machine:

— > Connect the MIDI Out of the Drum Machine to the MIDI In of the SQ-80.

> Set the SQ-80 to **MIDI Sync.** On the **CONTROL** Page, select **SYNC= MIDI CLOCK.**

> Set the Drum Machine to send on a MIDI Channel that is not being used by the SQ-80 (Straight Synth or any Track.) Again, MIDI Clocks, Start, Stop and Continue are **Real Time** commands, and are sent and received regardless of MIDI Channel or Mode.

– > The **SQ-80** should now Sync to the Drum Machine's clock. Starting, Stopping or Continuing the Drum Machine will Start. Stop and Continue the SQ-80.

To Sequence a Drum Machine from a Track of the SQ-80:

– > Connect the MIDI Out of the SQ-80 to the MIDI In of the Drum Machine.

– > Set the Drum Machine to **Tape Sync** or **External Clock,** or any setting other than Internal or MIDI Clock. This way it will not play it's own patterns, but will act only as a sound-producing device, sequenced from a Track of the **SQ-80.**

– > Set the Drum Machine to OMNI Off, and select a MIDI Channel.

____ > From the Mix·MIDI Page, assign a Track on the **SQ-80** MIDI Status, and set it to the same MIDI Channel you assigned the Drum Machine.

– You should now be able to play the Drum Machine from the SQ-80's Keyboard. You can then record a Track on the SQ-80, from the **SQ-80's** Keyboard, which will play on the Drum Machine — just as if you were sequencing an external synthesizer. The advantage of this approach is that some Drum Machines respond to Velocity when played from MIDI, but not when played from their own front panels. Thus you may get more dynamic range out of your Drum Machines if you use this approach. The disadvantage is that you use up SQ-80 Sequencer Memory to sequence the Drum Machine.

SONG POSITION POINTERS

The **SQ-80** sends and receives **Song Position Pointers** via MIDI. Song Position Pointers are MIDI commands that tell a Sequencer or Drum Machine where to Locate within a Song or Sequence.

When the SQ-80 receives a Song Position Pointer, it will Locate to the appropriate place in the selected Song or Sequence.

The **SQ-80** sends a Song Position Pointer over MIDI whenever you use the **Auto-Locate** Controls (BEGIN, BACKUP or GOTO on the Locate Page. Any receiving unit which recognizes Song Position Pointers will Locate to the same spot. (Not all devices recognize Song Position Pointers. Consult the Manual of any other sequencing device you are using, to see if it does,)

MIDI SONG SELECTS

MIDI Song Selects allow a sequencer such as the SQ-80 to instruct a remote sequencer or drum machine to select a new song whenever you select a Sequence or Song on the **SQ-80.** The **SQ-80** will always send Song Selects. Whether or not it receives them depends on the setting of the **MIDI ENABLES** on the MIDI Page (p, 26)

The **SQ-80** transmits and receives **MIDI Song Selects** in Sequence Mode as well as Song Mode. (depending again on the setting on the ENABLE control). This allows you to select SQ-80 Sequences as well as Songs from a remote sequencer, computer or drum machine, and vice versa. They are set up as follows:

> **MIDI Song selects # 00-19** will select **SQ-80 Songs** # **1-20. MIDI Song selects # 20-79** will select **SQ-80 Sequences** # **1-60.**

Conversely, selecting **Songs # 1-20** will cause the SQ-80 to send **MIDI Song selects # 00-19.** Selecting **Sequences** # **1-60** will cause the SQ-80 to send out **MIDI Song selects** # **20-79.**

TAPE SYNC

Whenever the Sequencer is running, the SQ-80 sends a Clock Signal to the **Tape Out** jack on the Rear Panel. By recording this signal on one Track of a multi-track tape recorder, you can then sync the **SQ-80** to the recorded Clock Signal on the tape. This enables you to combine sequenced and recorded Data. to increase the capabilities of a small (or large) multitrack set-up.

Recording a Sync Track

Connect the Tape Out Jack of the SQ-80 to the input of one Track of your Tape Recorder. Generally, it's best to use an outside Track — Track I or 4 on a 4-Track deck, Track 1 or 8 on a 8-Track deck, etc. Also, if possible, you should not have any noise reduction on the Channel of the deck where you record a sync Track.

– Adjust the Record Level. Press Play on the SQ-80 (make sure **SYNC= INTERNAL)** to start the Song or Sequence playing. Adjust the level to around -6dB to 0 dB. You may have to experiment to find the level that works best for you.

– Start the Tape Deck recording.

> Press Play on the SQ-80 to play the Song or Sequence. Let the Song or Sequence run its full length. Remember, what you are recording is a Clock Signal that will cause the **SQ-80** to play at a certain Tempo when you later sync it to the recorded track.

---> At the end the Song or Sequence, stop the Tape deck, and press Stop to stop the Sequencer.

Syncing the SQ-80 to a Recorded Sync Track

– Connect the Tape In Jack of the SQ-80 to the output of the Track of your Tape Recorder which contains the Sync Track.
— > Rewind the Tape Deck to a point before the beginning of the recorded Sync Track.
> Set the SQ-80 to **Tape** Sync (SYNC= TAPE SYNC on the **CONTROL Page.)**
– > Start the Tape deck.
— > Press Play on the SQ-80. It will now wait for the recorded Clock Signal before starting to play the Song or Sequence. When the Sync Track on the tape begins, the SQ-80 will begin to play.

Note: The Sync Track you record to tape sends only Clock, or Tempo, information to the SQ-80 — it doesn't communicate where you are in a Song or Sequence. If you rewind the tape to a different place and start it playing again, the **SQ-80** will start from wherever it last stopped — things will definitely get out of sync. To keep everything playing together, you must start the Tape from the beginning each time. Always press Play on the SQ-80 after starting the tape, to start it from the beginning of the Song or Sequence.

System Controller Tricks — Sending Eight Program Changes at Once

There are some subtle features of the SQ-80 Sequencer which enhance its capabilities as a MIDI controller, allowing you, among other things, to change Programs on every instrument in your rig. with the push of a button. Each Sequence you create and store in the SQ-80's Sequencer Memory contains up to eight sets of Program and Volume information, each of which will be sent out on the designated MIDI Channel when you select that Sequence.

If you have the SQ-80 connected to other instruments via MIDI, try this:

– > Create a new Sequence.
>- Select the **Tracks Select** Page, and select an UNUSED Track.
– > Go to the Mix˙MIDI Page. and set up the Track to send to one of your external instruments, as described in **Track Configuration,** on p. 117.
– > Select another UNUSED Track, and do the same, setting this Track up to drive a different instrument. And so on, until you have one Track playing each external instrument. Create a couple of LOCAL Tracks with different Programs too. Selecting one of them will let you play the **SQ-80** only. Selecting any of the MIDI Tracks will let you play only the receiving instrument that is set to the same MIDI Channel as that Track..

You see that from the **Tracks Select** Page, you can change what plays from the SQ-80 keyboard simply by selecting. different Tracks. Remember too that a Track with BOTH Status will play on the **SQ-80** and an external instrument.

Now Create another Sequence. (The **SQ-80** will ask you "SAVE CHANGES TO OLD SEQUENCE?" Answer YES.) For the Tracks of the new Sequence, go through the same procedure as before. but assigning different Program Numbers to the external instruments. (Remember always to change Programs from the **SQ-80's Mix˙MIDI Page.)**

Again, you can play a different external instrument, or the **SQ-80,** or the SQ-80 and an external Instrument, depending on which Track is selected. If you press a selected Track's button again. so there's no Track selected, you hear the "Straight Synth" Program and transmit on the Base MIDI Channel, giving you a ninth possibility.

Now go to the proper **Sequence Select** Page and reselect the first Sequence. (Again, the **SQ-80** will ask you "SAVE CHANGES TO OLD SEQUENCE?" Answer Yes.) Notice when you select the New Sequence that all the external instruments connected to the SQ-80 change to the proper Program for that Sequence — each Track sent out a Program Change on its MIDI Channel when the Sequence was selected. Now select the second Sequence again. Each external instrument again changes back to the proper Program.

Notice that you haven't recorded anything on either of these Sequences. They exist merely as Templates, which serve two useful purposes when using the SQ-80 as a System Controller:

1) Every time you select a new Sequence, each Track can send a Program Change to an external instrument. You can change the sound that every synth in your rig is playing with one press of a button.

2) When you select any Track of a Sequence, the **SQ-80** Keyboard plays whatever Program is on that Track, or sends on the Track's MIDI Channel, or both. Select a different Track and you have a different configuration. From the **Tracks Select** Page you select up to nine different internal Programs and/or MIDI channels to send on (counting the Straight Synth.)

Of course you can record data on any of these Sequences if you want. Whether you do or not, they will work as Templates. You can play external instruments from the **SQ-80** or from their own Keyboards. You can have a Track send a Program Change to a MIDI Digital Delay or Reverb unit; or have it send Load instructions to a Mirage while you play the Straight Synth Program on the **SQ-80,** just by selecting a new Sequence. No doubt you will come up with some applications of your own, based on your equipment and your needs.

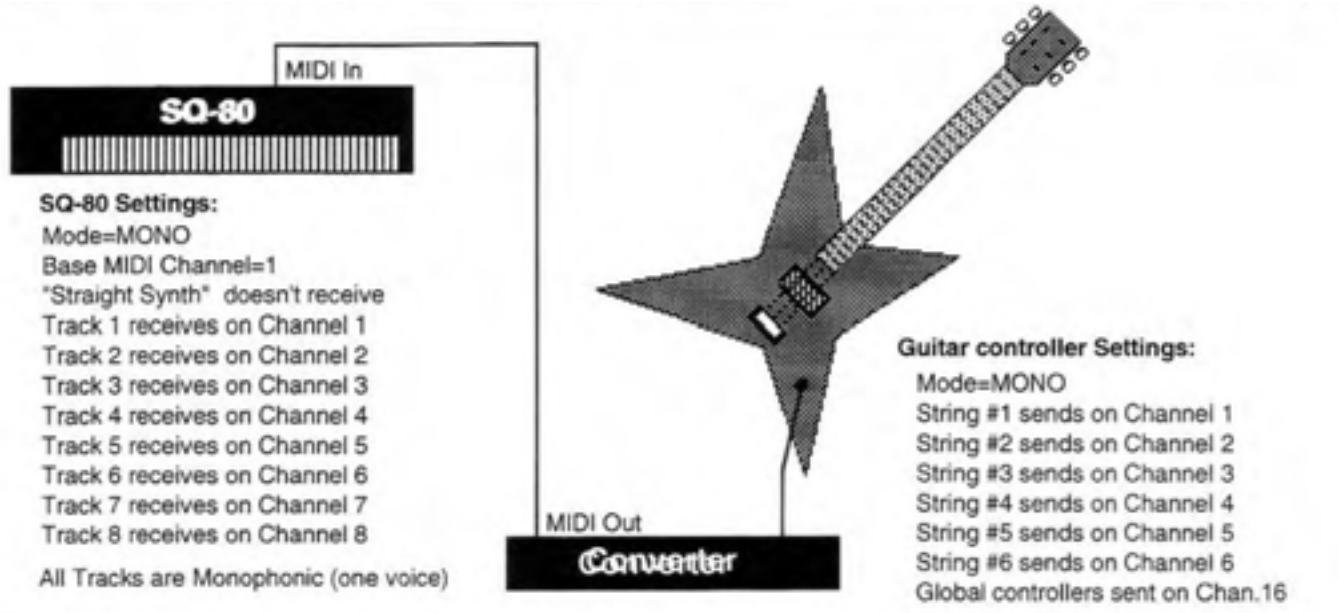
USING THE SQ-80 WITH A MIDI GUITAR CONTROLLER

The **SQ-80** makes an ideal voice module to use with any MIDI Guitar Controller which is capable of sending in MONO Mode. MONO Mode (MIDI Mode 4) allows a guitar controller to send the notes played on each string on a different MIDI Channel. This has the advantage of letting each string send Pitch Bends independently, which is the only way to truly recreate guitar technique on a synthesizer.

Some earlier guitar synths do not support MONO mode. You will have to consult the manual of your particular model to see if it does. If you have a guitar synth which only sends in POLY Mode (i.e. sends all six strings on the same MIDI Channel) you should use the SQ-80 in POLY Mode (or OMNI Mode) and set the guitar controller to send on the MIDI Channel that is selected for the **Base Channel** on the MIDI Page.

For MIDI Guitar Controllers which do support MONO Mode you should set up the **SQ-80** and the guitar synth as follows:

- Create a new Sequence on the **SQ-80** (p. 108)
- On the MIDI Page, set the MODE parameter to **MODE=MONO.** This sets up Tracks 1-8 of the Sequence to be independent, monophonic receivers. (Consult p. 25 for a more complete description of MONO Mode.)
- Also on the **MIDI** Page, set the Base MIDI Channel to CHAN=1, Now Track 1 will receive on Channel 1, Track 2 will receive on Channel 2, Track 3 will receive on Channel 3, etc. (The Straight Synth will not receive any MIDI data at all.)
- Set your guitar controller to send in MONO Mode on Channels 1-6. (Some models have an easy shortcut for getting into this state.)
- Connect the MIDI Out of the guitar controller's converter to the MIDI In of the **SQ-80.**



Now you're ready to play. The picture above shows the optimal settings for both the SQ-80 and the guitar synth. You will notice that Tracks 7 and 8 won't be used in this set-up. They would, however, respond to any MIDI information on MIDI Channel 7 or 8 if any were to come in.

A few things to bear in mind:

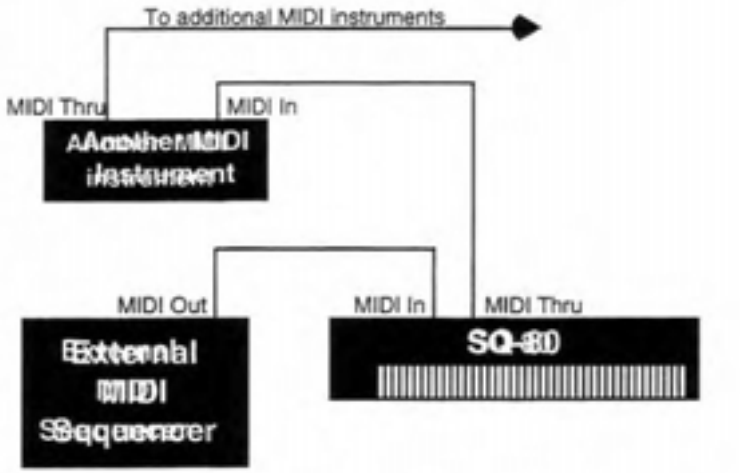
- Notes played on each string will play only the corresponding Track. Each String/Track combination is totally independent.
- You can change the Program for each Track manually from the SQ-80's front panel or by sending Program Changes from the controller via MIDI.
- Each Track will accept Program Changes independently. In many cases you will want to have the guitar controller send the same-numbered Program Change on all six channels so that all six strings play the same sound. You can, however. send the SQ-80 a different Program Change for each Track. You could use this effect to have, for example. a bass sound play on the bottom two strings and a piano sound on the top four. Or if you are feeling experimental you could play a different sound on each string.
- The **Base Channel** doesn't have to be set to Channel 1. It can be set to any channel from 1 to 9, and the channels for the Tracks will be adjusted accordingly (see p. 25). In most cases, though, setting things up as shown above will provide the most straight-forward and intuitive arrangement.
- The automatic channel assignments for Sequencer Tracks 1-8 in MONO Mode are only in effect as long as the SQ-80 is in MONO Mode — they don't alter channels that might have assigned to the Tracks while in any other Mode. If you exit MONO Mode and go to MULTI Mode each Track will still have the same MIDI Channel it did before you entered MONO Mode. If you change the Base Channel, however, that change remains in effect for all MIDI Modes.
- Still, it's a good idea to set up one Sequence — say, Sequence #60 — which you always use in conjunction with the guitar synth. That way you won't accidentally change the Programs in the Tracks of an existing Sequence.
- If your Guitar synth can send certain MIDI Controllers on their own MIDI Channels, have it send any controllers you want to affect all the Tracks (such as the "whammy bar") on the Base-Channel-minus-1. When the Base Channel is I, as is the case in our example, Global controllers should be sent on Channel 16.
- Remember that the **SQ-80** Sequencer can only record one Track at a time. If you want to Record Tracks from the guitar Controller, you will have to record all six strings onto one Track (POLY Mode) or else put the SQ-80 in MONO Mode as described above and record the piece one Track (one string) at a time.

Playing the SQ-80 from an External Sequencer

Having used its built-in Sequencer, you already know that the SQ-80 can play lots of different sounds at once. If you already have a computer-based or stand-alone sequencer that you like, you'll find that you can access the SQ-80's Multi-timbral capabilities in much the same way via MIDI. The **SQ-80's** ability to "listen to" nine MIDI Channels at once (when in MULTI Mode) means that it can take the place of several synthesizers in your rig. If you haven't already done so, you should read the description of MULTI Mode on p. 25 for a fuller understanding of how the Tracks can act as independent MIDI receivers.

Connections

The illustration to the right shows a typical set-up involving the SQ-80 and an external Sequencer. Of course the SQ-80 doesn't have to be first in the chain after the sequencer — you can chain MIDI instruments in any order, with one exception. If any of the units doesn't have a MIDI Thru jack, you must place that unit last in the chain. (Or you could get a MIDI Thru Box, available from a number of manufacturers, which will split up the MIDI signal and send it to several devices at once.)

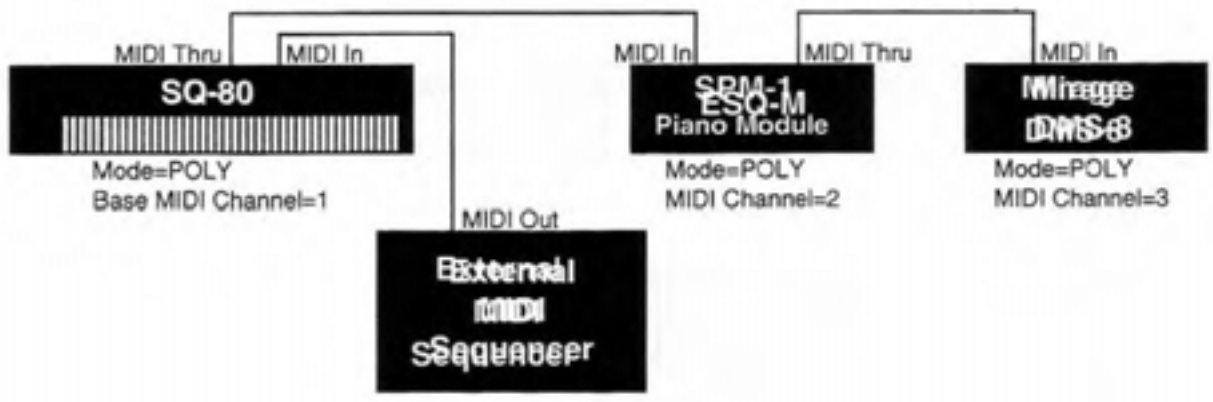


The SQ-80 as One Synthesizer

We'll start with the most basic sequencing situation, in which you will use the SQ-80 as if it were an ordinary synth, capable of playing only one sound at a time. This is how it will act in POLY mode. In POLY Mode the **SQ-80** will respond only to information received on the Base MIDI Channel, and will play only the sound which is on the current Track.

– On the MIDI Page, set the MIDI Mode parameter to **MODE=POLY.**

– > Also on the MIDI Page, set the MIDI Channel (CHAN=) to whichever of the 16 MIDI Channels you want the SQ-80 to receive on. The **SQ-80** will respond only to data received on this MIDI Channel. If no Sequencer Track is selected, the "Straight Synth" will receive on the Base Channel. If you select a Track of a Sequence, that Track will receive on the Base Channel.



In the example on the previous page we have a sequencer connected to an **SQ-80,** a **Mirage** Digital Multisampler and an ESQ-M Digital Wave Synthesizer module. With the SQ-80 in POLY Mode and the Base Channel set to CHAN=1, it will play information received on MIDI Channel 1. The ESQ-M will respond to information on MIDI Channel 2, the Mirage to information on MIDI Channel 3. With this set-up you can send Keys, Controllers and Program Changes independently to each unit by sending on the proper MIDI Channel.

The SQ-80 as Nine Synthesizers

As we have discussed earlier, when you select MULTI Mode on the MIDI Page the **SQ-80** becomes nine "virtual synthesizers," each receiving on its own MIDI Channel, but all sharing the same eight voices" The "Straight Synth" receives on the Base Channel and each of the eight Tracks of the Current Sequence can receive on its own Channel.

– > On the MIDI Page, set the MIDI Mode parameter to **MODE=MULTI.**

– > Also on the MIDI Page, set the Base MIDI Channel to whichever Channel you want the "Straight Synth" to receive on. For this example, set it to **CHAN=01,**

---> Create a new Sequence.

– > On the **Tracks Select** Page, select Track 1. The word "UNUSED" is replaced by the name of the current Program.

Select the Mix MIDI Page, and go to the **MIDI CHAN** sub-Page (by pressing "MORE"). Press the Up Arrow Button to set Track 1 ' s MIDI Channel to 2.

___ -> Select Track 2. Press the Up Arrow Button to set Track 2's MIDI Channel to 3.

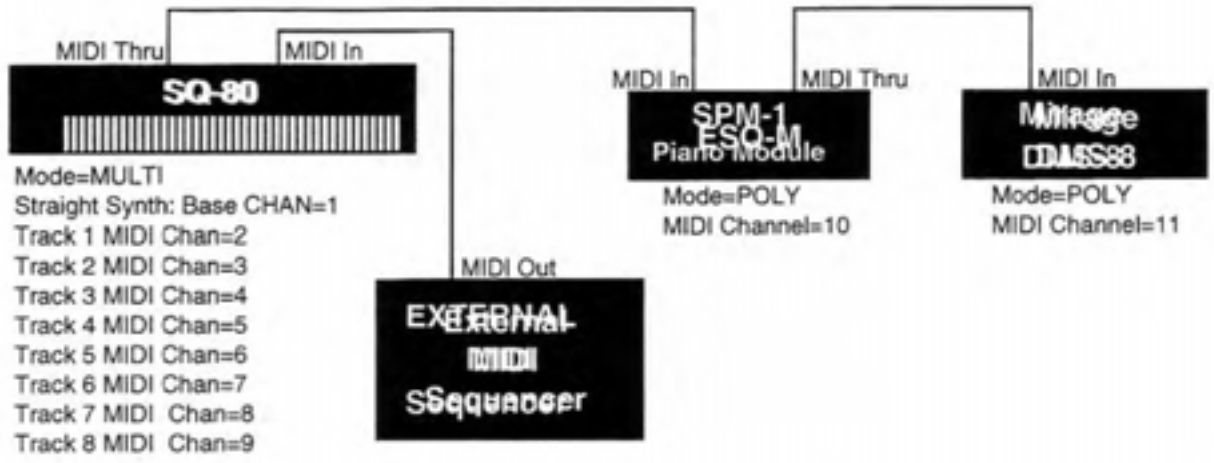
– > Select Track 3. Press the Up Arrow Button to set Track 3's MIDI Channel to 4.

– Do the same for the remaining Tracks, selecting each Track in turn and assigning it the next higher MIDI Channel.

___ > Press the SEQ Button to go to the **Sequence Select** Page, and select the same Sequence again (press the "Soft" button above or below the Sequence Location that's already underlined). The Display will ask "SAVE CHANGES TO OLD SEQUENCE." Answer YES. This saves the Track assignments you made.

> You don't need to Record anything on this Sequence — just leave it as a template for receiving on nine different MIDI Channels. Whenever you want the SQ-80 to act as a multi-channel MIDI receiver, just select this same Sequence.

The illustration below shows a typical configuration with the SQ-80 receiving on nine MIDI Channels in MULTI Mode:



As you can see, the set-up is similar to the earlier POLY Mode example, except that now the SQ-80 is responding to nine MIDI Channels rather than one. The ESQ-M and the **Mirage** have been set to receive on MIDI Channels 10 and 11 respectively.

Some Important Notes About MULTI Mode

- Each of the nine MIDI Channels is completely independent and polyphonic. The **SQ-80's** Dynamic Voice Assignment means that each Track (or the Straight Synth) can have up to all eight voices if it needs them. If all eight voices are in use and a Track needs a voice, it will "steal" the voice from the oldest note playing.
- In MULTI Mode the Straight Synth receives on the Base MIDI Channel. Each of the eight Tracks of the Current Sequence will receive on the Channel it is set to. Each Track will respond independently to Controller and Program Changes on its MIDI Channel.
- The channel assignments shown in the illustration above are suggested values. You may find it handy to use these channel assignments, or you can set the Straight Synth and the Sequencer Tracks to any MIDI Channels you like.
- Only one Track can receive on a given MIDI Channel. If two (or more) Tracks are set to the same MIDI Channel, the lower-numbered Track will receive on that Channel and the higher-numbered Track(s) will not receive at all. The Straight Synth has priority over the Sequencer Tracks — any Track set to the same Channel as the Base Channel will not receive any MIDI information.
- You may not want all nine Tracks to receive. Tracks that you leave in the "UNUSED" state will not receive any MIDI data. Just create as many Tracks as you need.
- It's generally a good practice to assign a certain MIDI Channel (or channels) to each instrument in your rig and always leave it set to that Channel. You can avoid a lot of confusion if you know, for example, that the SQ-80 always responds to Channels 1 through 9, the ESQ-M always responds to Channel 10, the **Mirage** to Channel 11, etc.

Diagram A. Snowstorm in Alaska

SECTION 6

DATA STORAGE
Disk, MIDI, Cartridge, and Tape Functions

[STORAGE (Disk)] STORAGE PAGE

For Saving and Loading Data to Disk, to Cartridge, Over MIDI or to Audio Tape.

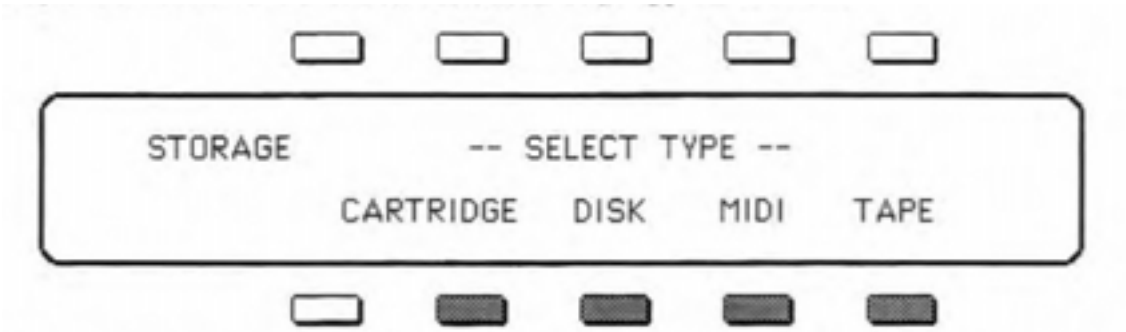
All of the **SQ-80's Disk** functions (including System Exclusive storage) are handled from the **Storage** Page. In addition, the **Storage** Page is used to send and load Program and Sequence Data to various other media for saving and storage.

The **STORAGE** Page handles four basic types of Data transfer:

1) **CARTRIDGE —** An entire Master Bank (all 40 Programs) can be transferred from the Internal Memory to CART A or CART B of an EPROM Storage cartridge. Or the 40 Programs in CART A or CART B can be transferred to the Internal Memory. Note that the Cartridge is for storing Programs only — not Sequencer data.
2) **DISK —** The **SQ-80's** 3 1/2" disk drive can store 40 Program Banks, 128 individual Programs and 10 Sequencer/System Exclusive blocks on each Double-Sided Double-Density (DSDD) disk.
3) **MIDI —** All 40 Internal Programs, or any single Internal or Cartridge Program, can be sent via MIDI to another **SQ-80,** to an ESQ-1 or to a computer which has been programmed to accept such information.

   Note: Storage of System Exclusive data from other Instruments, though it involves transferring the data over MIDI. is treated as a Disk function by the SQ-80 and is handled from the DISK menu on the **Storage** Page (see p. 171).
4) **TAPE —** The 40 Programs in the Internal Memory can be saved to Audio Tape, or a Bank of 40 Programs can be loaded into the internal Memory from Tape.

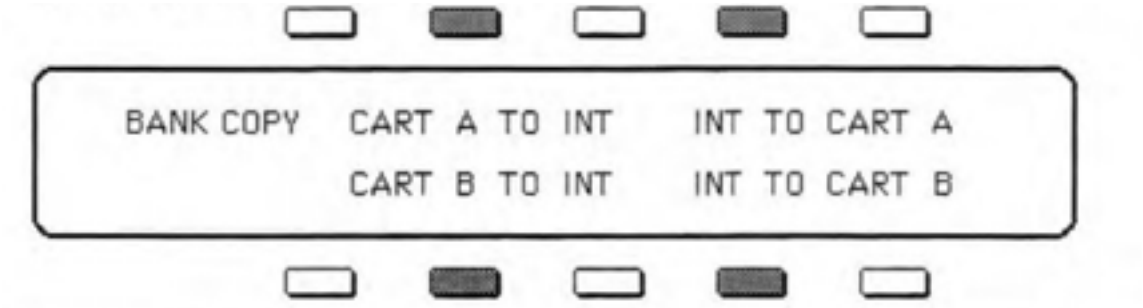
When you press the **STORAGE (Disk)** button, the Page appears like this:



From here you choose which type of Data Transfer you want.

CARTRIDGE — Bank Copy

The Bank Copy function allows you to transfer all forty Programs between the Internal memory and either Bank of the Cartridge. When you press **CARTRIDGE** from the menu on the **STORAGE** Page, the following Page appears:



Transferring Internal Programs to a Cartridge

To Transfer all 40 INTERNAL Programs to CART A:

– > Insert an **ENSONIQ E²PROM Storage Cartridge** in the Program Cartridge Slot.
– > Select the **STORAGE** Page.
– Press **CARTRIDGE.** The **BANK COPY** Page appears as shown on the previous page.
– Press **INT TO CART A.** The Display will ask **"COPY PROGRAMS FROM INT TO CART A"** and give you the option of answering *YES* or *NO*.
___ > Press *YES* to Copy the Internal Programs to CART A. The Display will read **"PROGRAMS BEING COPIED, PLEASE WAIT."** Copying an entire Bank to the Cartridge takes about two minutes. Or Press *NO* to cancel the procedure for any reason.
> When the PLEASE WAIT... message disappears, the transfer is complete.

To Transfer all 40 INTERNAL Programs to CART B:

– _ Insert an **ENSONIQ EPROM Storage Cartridge** in the Program Cartridge Slot.
__ > Select the **STORAGE** Page.
> Press **CARTRIDGE.** The **BANK COPY** Page appears as shown on the previous page.
– > Press **INT TO CART B.** The Display will ask **"COPY PROGRAMS FROM INT TO CART B"** and give you the option of answering *YES* or *NO*.
– > Press *YES* to Copy the Internal Programs to CART B. The Display will read **"PROGRAMS BEING COPIED, PLEASE WAIT."** This takes about two minutes. Or Press *NO* to cancel the procedure for any reason.
> When the PLEASE WAIT... message disappears, the transfer is complete.

Transferring Cartridge Programs to the Internal Memory

To Transfer all 40 CART A Programs to the INTERNAL Memory:

___ > Insert an **ENSONIQ E²PROM Storage Cartridge,** or other Program Cartridge, in the Program Cartridge Slot.
—> Select the **STORAGE** Page.
___ > Press **CARTRIDGE.** The **BANK COPY** Page appears as shown on the previous page.
___ > Press **CART A TO INT.** The Display will ask **"COPY PROGRAMS FROM CART A TO INT"** and give you the option of answering *YES* or *NO*.
> Press *YES* to Copy the 40 Programs in CART A to the Internal Memory. The Display will read **"PROGRAMS BEING COPIED, PLEASE WAIT..."** Copying an entire Bank from a Cartridge to the Internal Memory takes only about two seconds. Or Press *NO* to cancel the procedure for any reason.
___ -> When the PLEASE WAIT... message disappears, the transfer is complete.

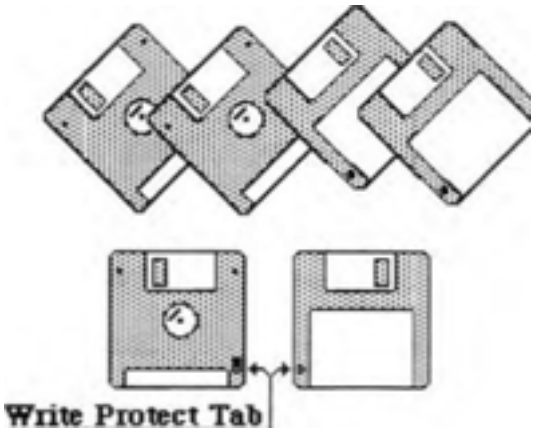
To Transfer all 40 CART B Programs to the INTERNAL Memory:

– Insert an **ENSONIQ EPROM Storage Cartridge,** or other Program Cartridge, in the Program Cartridge Slot.
___ > Select the **STORAGE** Page.
> Press **CARTRIDGE.** The **BANK COPY** Page appears as shown on the previous page.
– > Press **CART B TO INT.** The Display will ask **"COPY PROGRAMS FROM CART B TO INT"** and give you the option of answering *YES* or *NO*.
> Press *YES* to Copy the 40 Programs in CART B to the Internal Memory. The Display will read **"PROGRAMS BEING COPIED, PLEASE WAIT..."** This only takes a couple of seconds. Or Press *NO* to cancel the procedure for any reason.
> When the PLEASE WAIT... message disappears, the transfer is complete.

Disk Storage — Using the Disk Drive to Save and Load Data

The **SQ-80's** built-in Disk Drive can be used to store all your Sound and Sequencer data, as well as System Exclusive messages from other MIDI devices. The **SQ-80** has a double-sided drive, which can store over 800 Kilobytes of data per disk. You must use **Double-Sided Double-Density (DSDD) 3.5" micro-floppy disks** for reliable disk operation. The disks 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.

The 3.5" disks have a sliding write-protection tab so that you can protect your own sounds and sequences against accidental erasure. Sliding the write-protection tab in the lower left corner of the disk so that the window is closed will allow you to store information on the disk. Sliding the tab so that the window is open will protect the disk against being accidentally reformatted or having files deleted.



Disks are a magnetic storage medium, and should be treated with the same care you'd give important audio tapes. Here are a few Do's and Don'ts concerning disks and the Disk Drive.

DO:

- use only Double-Sided Double-Density (DSDD) 3.5 inch Micro Floppy disks. These are available from almost any computer store, and many music stores carry them as well:
- keep your disks and the Disk Drive clean and free of dust, dirt, liquids, etc:
- label your disks, and keep a record of what is saved on each.

DON'T:

- use Single-Sided (SSDD or SSSD) disks. These disks have not passed testing on both sides. While a single-sided disk might work successfully with the SQ-80, it is possible that you will eventually lose important data to a disk error if you try using Single-Sided disks;
- put anything other than a disk in the Disk Drive:
- expose disks to extremes of temperature. Temperatures below 50^0 F and above 140° F can damage the plastic outer shell:
- subject disks to strong magnetic fields. Exposure to magnetic energy can permanently damage the information on the disk. Keep disks away from speaker cabinets. tape decks, power cables. airline x-ray equipment, power amplifiers, TV sets, and any other sources of magnetic energy;
- eject the disk while the drive is operating (the Disk Drive light is on).

Disk Capacity

Each formatted **SQ-80** disk is partitioned in such a way that it can store the following:

- **10 Sequencer/Sys-Ex Blocks —** These are large data blocks, which can hold up to 64k bytes of information. Each of the ten available Sequencer/Sys-Ex Blocks can contain one of the following:
  - One Sequence (ONE SEQ),
  - the entire Sequencer Memory (ALL SEQ), or
  - a System Exclusive (SYS-EX) message (or messages) from an external MIDI Instrument(s). *Plus*
- **40 Program Banks —** The forty Programs in the Internal Memory comprise a BANK. You can store

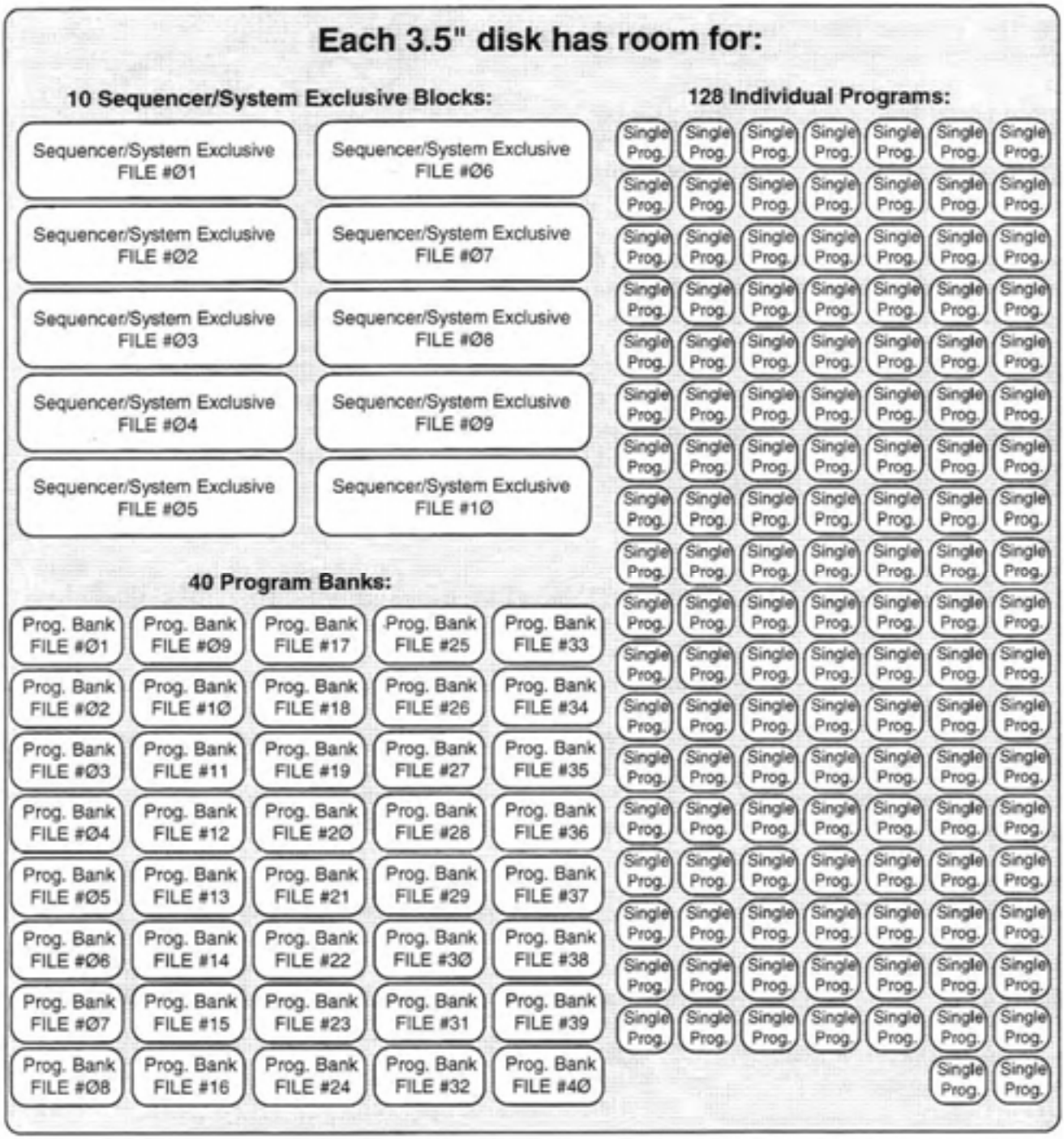
40 such banks per disk (that's 1600 Programs).

Plus

• **128 Single Programs —** 128 Individual Programs can be stored on disk. This is useful for mixing, and matching Programs between different Banks.

Each formatted Disk has space allocated for all of the above. These are fixed partitions — you cannot save more than ten Sequencer/Sys-Ex Blocks on a disk. or more than 40 Program Banks, or more than 128 individual Programs, no matter what else is on the disk.

The illustration below shows the capacity of each disk:



Disk Functions

The **SQ-80's** disk functions are all handled from the **Storage** Page. Press the **Storage (Disk)** button to get to this Page, then press the "Soft" button beneath DISK. When you select **DISK** from the **Storage** Page, the Display shows the Disk Storage Menu.

From here you select which of the 5 disk functions you want:

– **> DELETE —** Allows you to delete (or remove) any file from the disk.

– **> SAVE —** Lets you save to disk 1) a single Sequence, 2) the entire Sequencer Memory, 3) a single Program , 4) a bank of 40 Programs, or 5) System Exclusive data from a remote MIDI device or devices. There are two ways to save data — SAVE NEW FILE, which creates a new file on the disk, and UPDATE OLD FILE, which will save the selected data "over top of" an existing file.

– **> LOAD —** Lets you load from disk 1) a single Sequence, 2) the entire Sequencer Memory, 3) a single Program , 4) a bank of 40 Programs, or 5) System Exclusive data for transmission to a remote MIDI device or devices.

____ > **COPY —** Allows you to make a backup copy of a disk.

– **FORMAT** —Formats a blank disk for use with the SQ-80. Since you have to do this before you can perform almost any other disk function, we'll cover disk formatting first.

FORMAT — Formatting a Blank Disk

Before it can be used by the SQ-80 to store data, a disk must be formatted. Formatting puts information on the disk which the **SQ-80** needs to read and write files. In addition to formatting a blank disk, the Format procedure can be used to reformat a disk which has been used with some other device, such as a personal computer. Note that any data (of whatever type) on a disk will be lost when the disk is formatted by the **SQ-80.**

To Format a Blank Disk:

– > Insert a blank, Double-Sided Double-Density 3.5" micro-floppy disk into the Disk Drive, with the label-side facing up, and the metal shutter facing away from you. Make sure the plastic Write-Protect tab is in the closed position (no light showing through the window).

____ > Press the **Storage** button to go to the **Storage** Page.

– > Press **DISK.** The Disk Storage menu appears (as shown earlier).

____ > Press **FORMAT.**

____> The Display asks "FORMAT DISK INSERTED IN DRIVE." It also reminds you that "ALL DISK FILES WILL BE LOST."

– > Press *YES* to proceed. (Pressing *NO* will return you to the **Storage** Page with no harm done.)

– > While the SQ-80 is formatting the Disk the Display reads "FORMATTING DISK.,," The formatting process takes about 2 minutes.

– When the Formatting is done, the Display reads "DISK FORMATTED SUCCESSFULLY", and then you are returned to the **Storage** Page. The disk is ready to accept Program, Sequencer or System Exclusive data. You should label the disk, and keep an up-to-date record of all data you subsequently save on it.

FORMAT Disk Error Messages

There are a number of messages you might get while formatting a disk:

____ > **DISK FORMAT FAILURE—DISK IS UNUSABLE** —This indicates a defective disk. If you get this message we advise that you throw out the disk in question. Try again with another disk. > **NO DISK IN DRIVE** —This one is pretty obvious. Put a disk in the drive.

> **DISK IS WRITE-PROTECTED —** The plastic Write-Protect tab in the lower-left corner of the disk must be closed (so you can't see through the hole) before anything can be written to the disk. Close the Write-Protect tab and try again.

> **DISK CONTROLLER ERROR - CONSULT MANUAL —** If this message appears during any disk procedure, it might indicate a hardware problem with the SQ-80's Disk Drive controller chip. Try a different disk; if the message persists, consult an authorized ENSONIQ Service Center.

SAVE — Saving Data to Disk

There are two ways to save data to the **SQ-80's** Disk Drive.

1) You can Save the data to an empty or unused file on the disk, or
2) You can "write over" an existing file, replacing it with the new data.

This second option (called Updating a File) lets you easily save changes you make to a Program or Sequencer Bank during a work session. We will cover Saving new files first, and then discuss Updating old Files.

SAVE NEW FILE — Saving New Files to Disk

When you press SAVE from the Disk Storage Menu, the Display shows:

Press **SAVE NEW FILE,** the Display shows the following:

-> **SYS-EX —** Lets you receive via MIDI, and save to disk, System Exclusive messages from other devices. The MIDI Sys-Ex Storage procedure is covered in depth in the next section. Here we will concern ourselves with saving SQ-80 data.

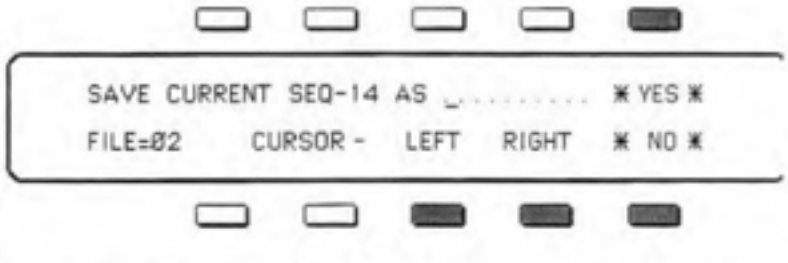
-> **ONE (SEQ) —** Lets you save the Current Sequence to disk. When One Sequence is saved, no matter how much or how little memory it uses, it will occupy one of the ten available Sequencer/ Sys-Ex Blocks on the disk (see Disk Capacity above). This is necessary because it is possible for one Sequence to be up to 64k long. This is not a particularly efficient means of storing Sequencer data. It is most useful for temporarily storing single Sequences from different sessions prior to combining (loading) them into one Sequencer Bank.

– **> ALL (SEQ)** —Allows you to save the entire Sequencer Memory (all Songs and Sequences) to Disk. Each time you save ALL SEQ the data takes up one of the ten available Sequencer/Sys-Ex Blocks on the disk.
– **> BANK —** Saves the 40 Programs in the Internal Memory to disk. Each disk has room for forty (40) such banks. Note that Program Banks can only be saved to disk from the Internal Memory — they cannot be saved directly from a Cartridge. If you have a Bank of Cartridge Programs which you want to save to disk, transfer the bank to the Internal memory first (see p.154) and then save them to disk.
PROGRAM — Will save the Current Program to disk. 128 individual Programs can be saved on each disk.

To Save One Sequence to disk:

– > Insert a formatted 3.5" Double-Sided Double-Density disk into the Disk Drive
– > Make sure the Sequence you want to save is selected (underlined on the Display).
– > Press the **Storage** button to go to the **Storage** Page.
– > Press **DISK.** The Disk Storage menu appears.
– > Press SAVE. The **SQ-80** then gives you two options: 1) SAVE NEW FILE or 2) UPDATE OLD FILE. (Updating Files is covered later in this section.)
– > Press **SAVE NEW FILE.** The disk drive light goes on briefly and the Display says "READING DIRECTORY FROM DISK." Then the Disk Save Menu appears as shown above.
– > Press ONE. The Display shows the following:

– > Choose a Name of up to ten letters for the data. The default name is shown as ten dots, with a Cursor (underline) beneath the first character. Use the Data Entry Slider and the Up and Down Arrow buttons to select a letter or number for the first character of the name.



Then press RIGHT to move the Cursor to the next character, and select a letter or number there. Continue this, pressing LEFT and RIGHT to move the Cursor, and using the the Data Entry Slider and :he Up and Down Arrow buttons to change the character until the Display shows the name you want.

The data will be saved to the lowest-numbered empty Sequencer/Sys-Ex Block on the disk. The lower-left portion of the Display (FILE=_) shows you which of the ten Sequencer/Sys-Ex Blocks the data will occupy on the disk.

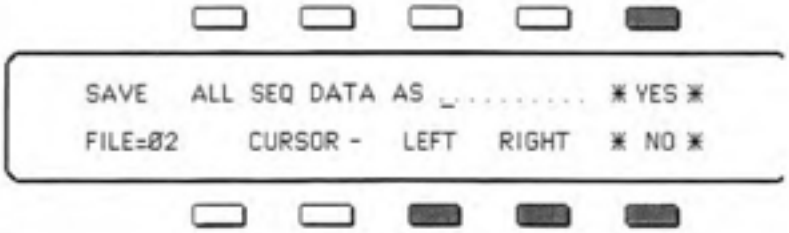
– > Press *YES*. The Display reads "ACCESSING DISK DRIVE..." while the data is being saved. When it is done you are returned to the **Storage** Page.
Or Press *NO* to cancel the procedure for any reason.

To Save the Entire Sequencer Memory to disk:

-> Insert a formatted 3.5" Double-Sided Double-Density disk into the Disk Drive -
> Press the **Storage** button to go to the **Storage** Page.
– > Press **DISK.** The Disk Storage menu appears.
-> Press SAVE. The **SQ-80** then gives you two options 1) SAVE NEW FILE or 2) UPDATE OLD FILE. (Updating Files is covered later in this section.)
-> Press **SAVE NEW FILE.** The disk drive light goes on briefly and the Display says "READING

DIRECTORY FROM DISK." Then the Disk Save Menu appears as shown earlier. -
> Press ALL. The following Display appears:

-> Name the Sequencer data. The default name is shown as ten dots, with a Cursor (underline) beneath the first character. Use the Data Entry Slider and the lip and Down Arrow buttons to select a letter or number for each character, and press LEFT and RIGHT to move the Cursor, until the Display shows the name you want.



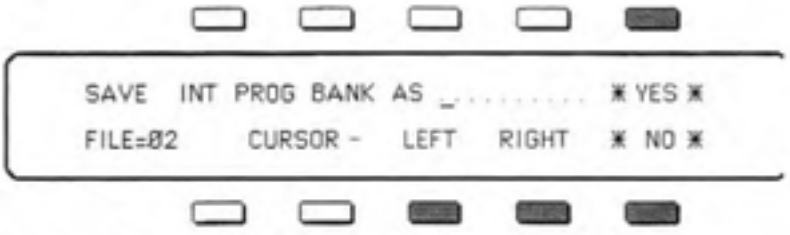
The data will be saved to the lowest-numbered empty Sequencer/Sys-Ex Block on the disk. The lower-left portion of the Display (FILE=_) shows you which of the ten Sequencer/Sys-Ex Blocks the data will occupy on the disk.

-> Press *YES*. The Display reads "ACCESSING DISK DRIVE.,." while the data is being saved. When it is done you are returned to the **Storage** Page.
Or Press *NO* to cancel the procedure for any reason.

Save the 40 Internal Programs to disk:

-> Insert a formatted 3.5" Double-Sided Double-Density disk into the Disk Drive -
> Press the **Storage** button to go to the **Storage** Page.
-> Press **DISK.** The Disk Storage menu appears.
-> Press SAVE. The **SQ-80** then gives you two options: 1) SAVE NEW FILE or 2) UPDATE OLD FILE. (Updating Files is covered later in this section.)
-> Press **SAVE NEW FILE.** The disk drive light goes on briefly and the Display says "READING DIRECTORY FROM DISK." Then the Disk Save Menu appears as shown earlier. -> Press BANK. The following Display appears:

-> Select a name of up to ten characters for the Bank, The default name is shown as ten dots, with a Cursor (underline) beneath the first character. Use the Data Entry Slider and the Up and Down Arrow buttons to select a letter or number for each character, and press LEFT and RIGHT to move the Cursor, until the Display shows the name you want.



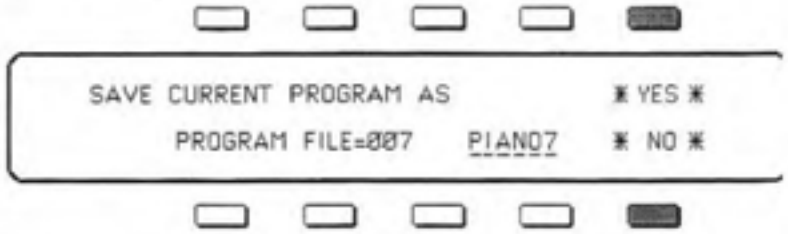
The data will be saved to the lowest-numbered empty Program Bank File on the disk. The lower-left portion of the Display (FILE=_) shows you which of the forty Program Bank blocks the data will occupy on the disk,

-> Press *YES*. The Display reads "ACCESSING DISK DRIVE..." while the data is being saved. When it is done you are returned to the **Storage** Page.
Or Press *NO* to cancel the procedure for any reason.

To Save the Current Program to disk:

- Insert a formatted 3.5" Double-Sided Double-Density disk into the Disk Drive
- > Make sure the Program you want to save is selected (underlined). The Program can be in the Internal Memory or on a Cartridge.
- > Press the **Storage** button to go to the **Storage** Page.
  Press **DISK.** The Disk Storage menu appears.
- > Press SAVE. The **SQ-80** then gives you two options: 1) SAVE NEW FILE or 2) UPDATE OLD FILE. (Updating Files is covered below.)
- Press **SAVE NEW FILE.** The disk drive light goes on briefly and the Display says "READING DIRECTORY FROM DISK." Then the Disk Save Menu appears as shown earlier.
- > Press **PROGRAM.** The following Display appears:

The Display shows the six-letter name of the Program. Note that you cannot change the name of the Program at this time — whatever name it has in the **SQ-80** will remain with it on the disk. To rename a sound you must use the Write Page.



The data will be saved to the lowest-numbered empty Single-Program block on the disk. The lower-left portion of the Display (FILE=__) shows you which of the 128 Single-Program blocks the data will occupy on the disk.
Press *YES*. The Display reads "ACCESSING DISK DRIVE..." while the data is being saved. When it is done you are returned to the **Storage** Page.
Or Press *NO* to cancel the procedure for any reason.

UPDATE OLD FILE — Updating an Existing File

Let's say you have Loaded a group of Sequences into the SQ-80 from disk. You have worked on the Sequences for several hours, recording new parts, editing this, changing that. Now you want to save the updated data to disk, replacing the original file with the new data.

In this case you would press UPDATE OLD FILE after pressing SAVE on the Disk Storage menu. The procedure for updating a file is essentially the same for all types of **SQ-80** data.

To Save an Updated Version of an Existing File:

- •> Insert the disk which contains the original file into the Disk Drive.
  If you are updating One Program or One Sequence, make sure that Program or Sequence is selected.
  Press the **Storage** button, then press DISK
- •> Press SAVE. The **SQ-80** then gives you two options: 1) SAVE NEW FILE or 2) UPDATE OLD FILE.
- •> Press **UPDATE OLD FILE.** The disk drive light goes on briefly and the Display says "READING DIRECTORY FROM DISK." Then the Disk Save Menu appears as shown earlier, but with the word "UPDATE" in the upper left corner of the Display.
- •> Press ONE (SEQ), ALL (SEQ), **BANK** or **PROGRAM,** depending on the type of file you are saving. The Display then shows you the files of that type that are on the disk.
- •> Use the Data Entry Slider and :he Up and Down Arrow buttons to find the file you want to write over. Make sure you have chosen the same file you originally started with.

WARNING: You must select the proper file before answering *YES*. The **SQ-80** does not automatically know which file you loaded in the first place. If you are updating an ALL SEQ file, for example, and you scroll to the wrong ALL SEQ file and then answer *YES*, the SQ-80 will save the current Sequencer Memory to that disk location, wiping out the wrong file. Ifs up to you to indicate which file you want replaced before answering *YES*.

– Press *YES*.

– The Display reads "ACCESSING DISK DRIVE...". After the file is Updated, you are returned to the **Storage** Page.

SAVE Error Messages:

There are a number of Error Messages which you might encounter when Saving data to disk:

– **> NO DISK IN DRIVE —** Put a formatted disk in the drive before trying to save data.

> **DISK WRITE-PROTECTED —** The plastic Write-Protect tab in the lower-left corner of the disk is in the open position (you can see through the hole). You cannot save anything to the disk until the tab is moved to the closed position.

– **> DISK IS UNREADABLE OR UNFORMATTED —** The disk in the Disk Drive is not formatted for **SQ-80** data. Use a different disk which has already been formatted, or format the disk (see above) before proceeding. If you get this message with a disk has is formatted, it usually indicates that the disk has been damaged in some way, and cannot be read.

– **> NO UNUSED FILES OF THAT TYPE —** This indicates that all the available files on the disk, of the type you tried to save, are full. You will have to Delete a File, as described below, or use a different disk which has more room on it. (Or you can use the UPDATE OLD FILE option if you intend to delete one of the files on the disk anyway)

– **COMMAND CANCELED - INCORRECT FILE TYPE —** This message can occur when Updating ONE (SEQ), ALL (SEQ) or SYS-EX files, if you accidentally have a file of the wrong. type showing when you answer *YES*. Try the procedure again.

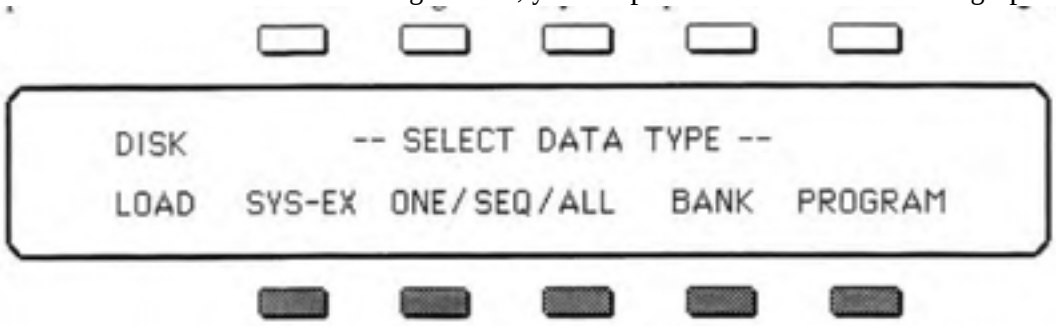
– **DISK CHANGE DETECTED — RE-ENTER COMMAND —** When the SQ-80 went to save the data it discovered that the disk in the drive was not the same one whose directory it initially read. You switched disks sometime after you pressed SAVE, which the SQ-80 considers a very naughty thing to do. Repeat the procedure, leaving the same disk in the drive throughout.

> **DISK IS DAMAGED - DATA ERRORS DETECTED —** While trying to Verify the data it had saved to disk, the SQ-80 encountered a discrepancy between what it had saved and what was on the disk. This usually means the disk is suspect. Save the data to another disk.

– **> DISK CONTROLLER ERROR - CONSULT MANUAL —** If this message appears during any disk procedure, it might indicate a hardware problem with the SQ-80's Disk Drive or the Disk Drive controller chip. Try a different disk: if the message persists, consult an authorized **ENSONIQ** Service Center.

LOAD — Loading Data from Disk

When you Press LOAD from the Disk Storage Menu, you are presented with the following options:



•> **SYS-EX —** This lets you load from disk, and then transmit via MIDI, System Exclusive messages from other devices. The MIDI Sys-Ex Storage procedure is covered in depth in the next section. Here we will concern ourselves with Loading **SQ-80** data.

-> **ONE (SEQ) —** This lets you Load a single Sequence from the disk into the Internal memory of the **SQ-80.** When One Sequence is Loaded from disk, it is placed in the highest-numbered empty location in the Sequencer Memory.

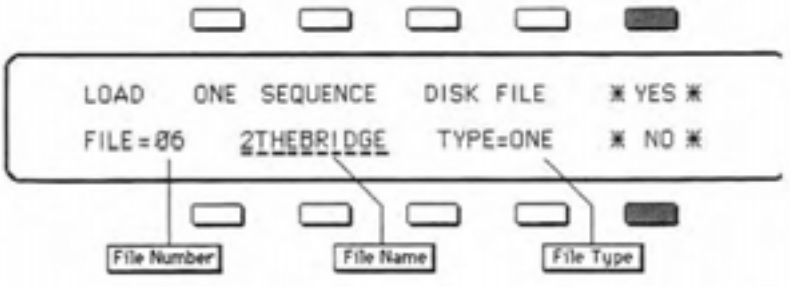
-> **ALL (SEQ) —** Allows you to Load the entire Sequencer Memory (all Songs and Sequences) from Disk. This will erase, and replace the current contents of the Sequencer Memory, so make sure all Sequencer data is saved before you wipe it out by loading in different data from disk.

-> **BANK —** To load a bank of 40 Programs from the disk to the Internal Memory . Each disk can store 40 complete Program Banks. Again, Loading a Bank from disk will wipe out the current Internal Programs, so make sure all Programs in memory are saved before proceeding.

-> **PROGRAM —** You can Load a single Program from disk. 128 individual Programs can be stored per disk. When you Load a Single Program, it is placed on the Write Page, and from there you can put it where you want in the Internal or Cartridge memory.

To Load One Sequence from disk:

– > Insert the disk containing the Sequence data into the Disk Drive.
– Press the **Storage** button to go to the **Storage** Page.
– > Press **DISK.** The Disk Storage menu appears.
– > Press LOAD. The disk drive light goes on briefly and the Display says "READING DIRECTORY FROM DISK." Then the Disk Load Menu appears as shown above.
– > Press ONE. The following Display appears:



– > Use the Data Entry Slider and the lip and Down Arrow buttons to scroll through the ten Sequencer/Sys-Ex Blocks on the disk. For each of these files you see. along the bottom row of the Display:

- **FILE NUMBER** (shown as FILE=_), the
- **FILE NAME,** the ten-character name which was given to the file when it was saved, and
- **FILE TYPE,** which tells you which of the three possible types of Sequencer/Sys-Ex files it is — ONE (a single Sequence), ALL (the entire Sequencer Memory) or SYS (a System Exclusive message from a remote MIDI Instrument). When you Load a file. its File Type must match the type that you selected in the previous step — in this case, the type must be ONE.

Files which contain no data (and are thus available for saving data to) will show "EMPTY FILE" as the File Name, and TYPE=XXX as the File type. You can't load an Empty File.

Find the Sequence File you want to load. Again, its File Type must be ONE. If there are no files of this type on the disk, press *NO* to exit to the **Storage** Page. Once the file you want is showing on the Display...

____> Press *YES*. The Display reads "ACCESSING DISK DRIVE..." while the data is being Loaded. When you Load One Sequence, it is placed in the highest-numbered empty Sequence Location. For example. if Sequence #60 is empty, the new Sequence will be put there. if Sequence #60 has already been defined, the new Sequence will be put in Sequence Location #59. And so on.

Or Press *NO* to cancel the procedure for any reason.

Note: When you Load single Sequences from disk, it is possible to get the SQ-80's memory so full that it has is no room left for performing routine Recording and Editing procedures. If after Loading ONE SEQ, the **Create/Erase** Page shows the available memory as FREE=00000, you are right at the limit and you won't be able to do much with the Sequences (other than play them). You should probably avoid this condition if possible.

LOAD ONE SEQ Error Messages:

____> **NOT ENOUGH FREE MEMORY TO LOAD SEQUENCE —** there is not enough free Sequencer memory in the SQ-80 to Load the Sequence in question. Erase one or more Sequences before proceeding.

NO EMPTY SEQUENCE LOCATIONS — all 60 available Sequence Locations have been defined. You have to erase a Sequence before Loading one from disk.

To Load the Entire Sequencer Memory from disk:

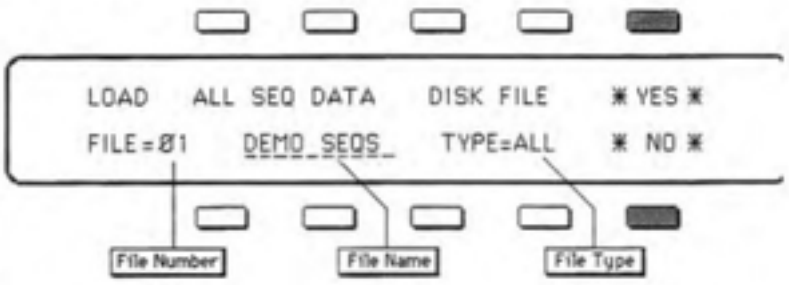
-> Insert the disk containing the Sequence data into the Disk Drive.

-> Press the **Storage** button to go to the **Storage** Page.

-> Press **DISK.** The Disk Storage menu appears.

-> Press LOAD. The disk drive light goes on briefly and the Display says "READING DIRECTORY FROM DISK." Then the Disk Load Menu appears as shown above.

-> Press ALL. The following Display appears:



-> Use the Data Entry Slider and the Up and Down Arrow buttons to scroll through the ten Sequencer/Sys-Ex Blocks on the disk. For each of these files you see, along the bottom row of the Display:

- **FILE NUMBER** (shown as FILE=_), the number of the file, 01 through
- **FILE NAME.** the ten-character name which was given to the file when it was saved, and
- **FILE TYPE,** which tells you which of the three possible types of Sequencer/Sys-Ex files it is — ONE (a single Sequence), ALL (the entire Sequencer Memory) or SYS (a System Exclusive message from a remote MIDI Instrument). When you Load a file, its File Type must match the type that you selected in the previous step — in this case, the type must be ALL.

Files which contain no data (and are thus available for saving data to) will show "EMPTY FILE" as the File Name, and TYPE=XXX as the File type. You can't load an Empty File.

> Find the Sequencer File you want to load. Again, its File Type must be ALL. If there are no files of this type on the disk, press *NO* to exit to the **Storage** Page. Once the file you want is showing on the Display...

> Press *YES*. The Display reads "ACCESSING DISK DRIVE..." while the data is being Loaded. When the Load procedure is done, you are put on a Sequence Select Page. and the Sequencer data from the disk File has replaced the Sequences and Songs that were previously in memory.

Or Press *NO* to cancel the procedure for any reason. •

Load a Bank of 40 Programs from disk:

> Insert the disk containing the Program data into the Disk Drive.

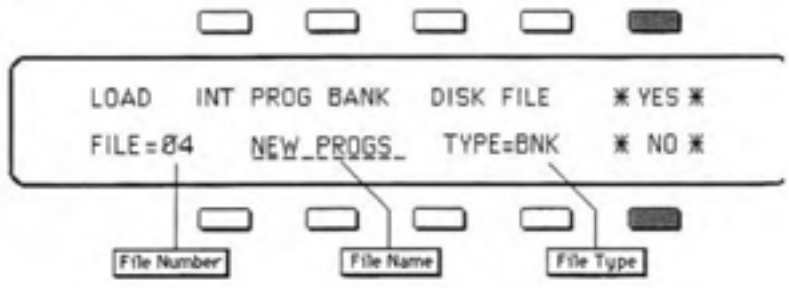
> Press the **Storage** button to go to the **Storage** Page.

> Press **DISK.** The Disk Storage menu appears.

> Press LOAD. The disk drive light goes on briefly and the Display says "READING DIRECTORY FROM DISK." Then the Disk Load Menu appears as shown earlier.

•> Press BANK. The following Display appears:

> Use the Data Entry Slider and the Up and Down Arrow buttons to scroll through the 40 Program Bank Files on the disk. For each of these files you see, along the bottom row of the Display:



- **FILE NUMBER** (shown as FILE=_), the number of the file, 01 through 40,
- **FILE NAME,** the ten-character name which was given to the file when it was saved, and
- **FILE TYPE,** which for Program Bank Files is TYPE=BNK.

Files which contain no data will show -EMPTY FILE" as the File Name, and TYPE=XXX. You can't load an Empty File.

> Find the Program Bank File you want to load.

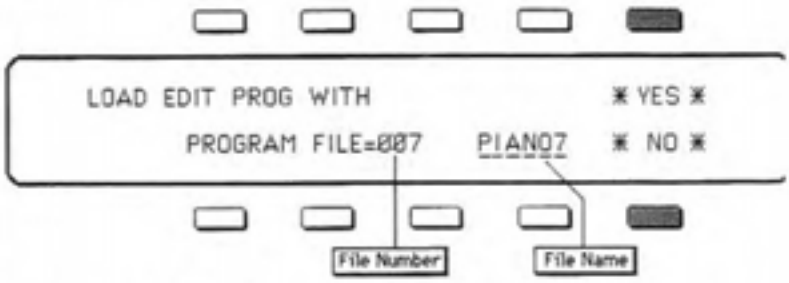
•> Press *YES*. The Display reads "ACCESSING DISK DRIVE..." while the data is being Loaded. When the Load procedure is done, you are put on a Program Select Page, and the 40 Internal Programs from the disk File have replaced the Programs that were previously in the Internal Memory.

Or Press *NO* to cancel the procedure for any reason.

To Load a Single Program from disk:

– > Insert the disk containing the Program data into the Disk Drive.
-> Press the **Storage** button to go to the **Storage** Page.
-> Press **DISK.** The Disk Storage menu appears.
-> Press LOAD. The disk drive light goes on briefly and the Display says "READING DIRECTORY FROM DISK." Then the Disk Load Menu appears as shown earlier.
-> Press **PROGRAM.** The following Display appears:

-> Use the Data Entry Slider and the Up and Down Arrow buttons to scroll through the 128 Individual Program Files on the disk. For each of these files you see, along the bottom row of the Display:



- **FILE NUMBER** (shown as PROGRAM which is the number of the file, 001 through 128, and
- **FILE** NAME, the six-character name of the Program. The File Name is underlined.

Files which contain no data (and are thus available for saving data to) will show "UNUSED" as the File Name. You can't load an UNUSED File.

– Find the Program File you want to load.
-> Press *YES*. The Display reads "ACCESSING DISK DRIVE..." while the data is being Loaded. When the Load procedure is done, the new Program is placed on the **Write** Page, from which the Program can be renamed (if you so desire) and then written to any Internal or Cartridge Location as described in the Section **WRITE PAGE.**

Or Press *NO* to cancel the procedure for any reason.

LOAD Error Messages

:e are a number of Error Messages which you might encounter when Loading data from disk:

– **NO DISK IN DRIVE —** Put a data disk in the drive before trying to Load.
– **> DISK IS UNREADABLE OR UNFORMATTED —** The disk in the Disk Drive is not formatted for **SQ-80** data. If you get this message with a disk that is formatted, it usually indicates that the disk has been damaged in some way, and cannot be read.
– **> COMMAND CANCELED - INCORRECT FILE TYPE —** This message will occur when Loading one of the 10 Sequencer/Sys-Ex files — ONE (SEQ), ALL (SEQ) or SYS-EX — if you accidentally have a file of the wrong type showing when you answer *YES*. Try the procedure again.
– **> DISK CHANGE DETECTED — RE-ENTER COMMAND —** When the SQ-80 went to load the data it discovered that the disk in the drive was not the same one whose directory it initially read. You switched disks sometime after you pressed LOAD. Repeat the procedure, leaving the same disk in the drive throughout.
– **UNUSED OR EMPTY FILES CANNOT BE ACCESSED —** You tried to Load an empty file. You can't do that.

DISK IS DAMAGED - DATA ERRORS DETECTED — The **SQ-80** encountered a discrepancy between the actual data on the disk and the "check sum" which it uses to verify the data. This usually means the disk (or at least the sector where that file is located) is bad.

– **DISK CONTROLLER ERROR - CONSULT MANUAL —** If this message appears during any disk procedure, it might indicate a hardware problem with the SQ-80's Disk Drive or Disk Drive controller chip. Try a different disk: if the message persists, consult an authorized **ENSONIQ** Service Center.

DELETE — Deleting Files from a Disk

Keeping your Disk Files in good order will sometimes require you to Delete (or remove) files which you no longer need. When you press **DELETE** from the Disk Storage Menu, you are presented with the following options:

At this point you must choose which type of File you wish to Delete:

— > **SYS-EX —** This lets you Delete from the disk a MIDI System Exclusive message. Deleting a Sys-Ex File will free one of the ten Sequencer/Sys-Ex Blocks on the disk. The MIDI Sys-Ex Storage procedure is covered in depth in the next section. Here we will concern ourselves with SQ-80 data.

> **ONE (SEQ) —** Lets you Delete a One Sequence File from the disk. Deleting a One Sequence File will free one of the ten available Sequencer/Sys-Ex Blocks on the disk.

— › **ALL (SEQ) —** Allows you to Delete an ALL Sequencer Memory File from the disk. Deleting an ALL SEQ File will free one of the ten available Sequencer/Sys-Ex Blocks on the disk.

– > BANK—To Delete a Program Bank File (40 Programs) from the disk. Deleting a Program Bank File will free one of the 40 available Program Bank blocks on the disk.

> **PROGRAM—** Lets you Delete a Single Program File from the disk. Deleting a Single Program File will free one of the 128 available Single Program blocks on the disk.

To Delete a ONE SEQUENCE File from the disk:

Insert the disk containing the Sequence data into the Disk Drive.

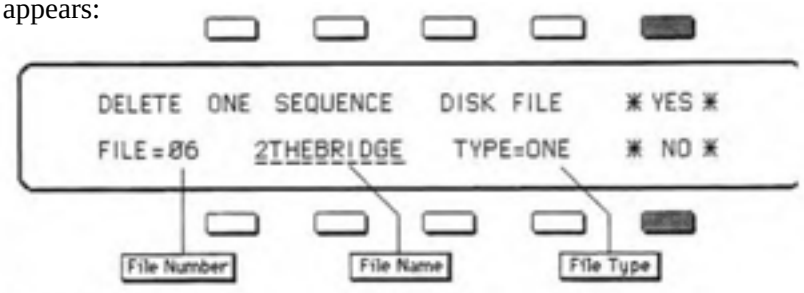
› Press the **Storage** button to go to the **Storage** Page.

› Press **DISK.** The Disk Storage menu appears.

– Press **DELETE.** The disk drive light goes on briefly and the Display says "READNG DIRECTORY FROM DISK." Then the Disk Delete Menu appears as shown above.

> Press ONE. The following Display appears:

> Use the Data Entry Slider and the Up and Down Arrow buttons to scroll through the ten Sequencer/Sys-Ex Blocks on the disk. For each of these files is shown, along the bottom row of the Display, the FILE NUMBER (shown as FILE=_), the FILE NAME (underlined) and the **FILE TYPE (ONE,** ALL or SYS).



When you Delete a file, its File Type must match the type that you selected in the previous step — in this case, the type must be ONE. Files which contain no data will show "EMPTY FILE" as the File Name, and TYPE=XXX as the File type. You can't Delete an Empty File.

-> Find the Sequence File you want to Delete. Again, its File Type must be ONE. If there are no files of this type on the disk, press *NO* to exit to the Storage Page. Once the file you want is showing on the Display...

-> Press *YES*. The Display briefly reads "ACCESSING DISK DRIVE..." and returns to the **Storage** Page. The file is Deleted and the Sequencer/Sys-Ex Block it occupied on the disk is now available.
Or Press *NO* to cancel the procedure for any reason.

To Delete an ALL SEQUENCE File from the disk:

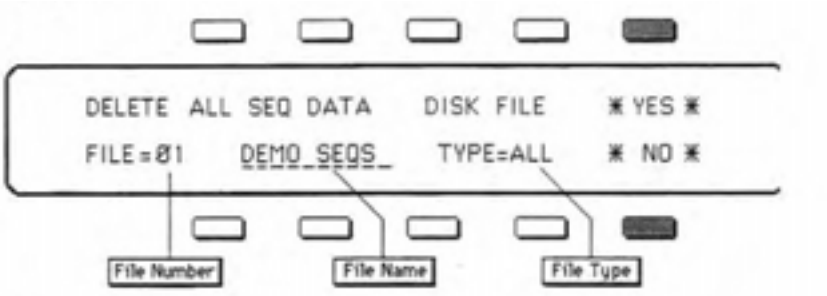
-> Insert the disk containing the Sequence data into the Disk Drive.

-> Press the **Storage** button to go to the **Storage** Page.

-> Press **DISK.** The Disk Storage menu appears.

-> Press **DELETE.** The disk drive light goes on briefly and the Display says "READING DIRECTORY FROM DISK." Then the Disk Delete Menu appears as shown above. -> Press ALL. The following Display appears:

-> Use the Data Entry Slider and the Up and Down Arrow buttons to scroll through the ten Sequencer/Sys-Ex Blocks on the disk. For each of these files is shown, along the bottom row of the Display, the FILE NUMBER (shown as FILE=_), the FILE NAME (underlined) and the FILE TYPE (ONE, ALL or SYS).



When you Delete a file, its File Type must match the type that you selected in the previous step — in this case. the type must be ALL.

-> Find the Sequence File you want to Delete. Once the file you want is showing on the Display... -> Press *YES*. The Display briefly reads "ACCESSING DISK DRIVE..." and then returns to the **Storage** Page. The file is Deleted and the Sequencer/Sys-Ex Block it occupied on the disk is now available.
Or Press *NO* to cancel the procedure for any reason.

To Delete a Program Bank File from the disk:

-> Insert the disk containing the Program data into the Disk Drive,

-> Press the **Storage** button to go to the **Storage** Page.

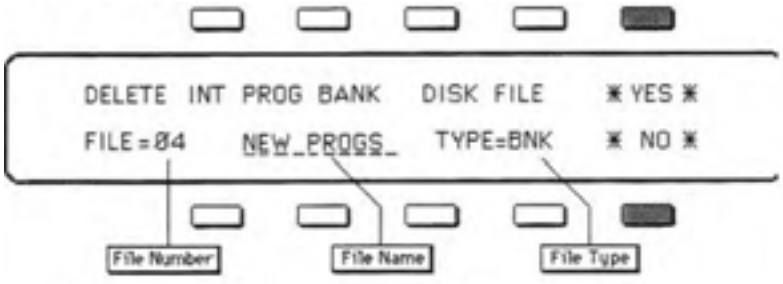
-> Press **DISK.** The Disk Storage menu appears.

-> Press **DELETE.** The disk drive light goes on briefly and the Display says "READING DIRECTORY FROM DISK." Then the Disk Load Menu appears as shown above. -> Press BANK. The following Display appears:

-> Use the Data Entry Slider and the Up and Down Arrow buttons to scroll through the 40 Program Bank Files on the disk.

– > Find the Program Bank File you want to Delete.

– > Press *YES*. The Display briefly reads "ACCESSING



DISK DRIVE..." and then returns to the **Storage** Page. The file is Deleted and the Program Bank block it occupied on the disk is now available.
Or Press *NO* to cancel the procedure for any reason.

To Delete a Single Program File from the disk

– > Insert the disk containing the Program data into the Disk Drive.
-> Press the **Storage** button to go to the **Storage** Page.
-> Press **DISK.** The Disk Storage menu appears.
-> Press **DELETE.** The disk drive light goes on briefly and the Display says "READING DIRECTORY FROM DISK." Then the Disk Load Menu appears as shown above.
– > Press **PROGRAM.** The following Display appears:

– > Use the Data Entry Slider and the Up and Down Arrow buttons to scroll through the 128 Program Files on the disk.
– > Find the Program File you want to Delete.
– > Press *YES' The Display briefly reads "ACCESSING DISK DRIVE,.," and then returns to the Storage Page. The file is Deleted and the Single Program block it occupied on the disk is now available. Or Press *NO* to cancel the procedure for any reason.

DELETE Error Messages:

There are a number of Error Messages which you might encounter when Deleting a File:

NO DISK IN DRIVE — Put the disk with the file you want to Delete into the drive.

– **DISK WRITE-PROTECTED —** The plastic Write-Protect tab in the lower-left corner of the disk is in the open position (you can see through the hole). You cannot Delete a file until the tab is moved to the closed position.
– **> DISK IS UNREADABLE OR UNFORMATTED —** The disk in the Disk Drive is not formatted for **SQ-80** data. If you get this message with a disk has is formatted. it usually indicates that the disk has been damaged in some way, and cannot be read.
– **COMMAND CANCELED - INCORRECT FILE TYPE —** This message will occur when Deleting ONE (SEQ), ALL (SEQ) or SYS-EX files, if you have a file of the wrong type showing when you answer *YES*. Try the procedure again.
– **> UNUSED OR EMPTY FILES CANNOT BE ACCESSED —** You tried to Delete an empty file. The **SQ-80** considers this counter-productive, and won't do it.
– **> DISK CHANGE DETECTED — RE-ENTER COMMAND —** When the SQ-80 went to Delete the file it discovered that the disk in the drive was not the same one whose directory it initially read. You switched disks sometime after you pressed DELETE. Repeat the procedure, leaving the same disk in the drive throughout.
– **> DISK CONTROLLER ERROR - CONSULT MANUAL —** If this message appears during any disk procedure, it might indicate a hardware problem with the **SQ-80's** Disk Drive or Disk Drive controller chip. Try a different disk; if the message persists, consult an authorized **ENSONIQ** Service Center.

COPY — Making a Backup Copy of a Disk

The COPY function lets you duplicate the contents of one disk (the Source Disk) onto another disk (the Destination Disk). It is a good practice to regularly back up your valuable data in this way.

WARNING: This procedure uses the Sequencer Memory to temporarily hold the information while copying it between disks. Anything in the Sequencer Memory before you start will be erased. Save any important Sequencer data before Copying a disk.

You'll need an **formatted** disk to use as the Destination Disk, so Format a disk before proceeding. The Destination Disk doesn't have to be empty — it can have SQ-80 files on it, but they will be replaced during the copy procedure. Once it has been formatted, the same disk can be used over and over as a backup for a particular data disk.

To Make a Backup Copy of a Disk:

> Format a blank disk, as described earlier, or get a formatted disk whose files you don't mind erasing. This is your Destination Disk — the Copy,

> Slide the plastic Write-protect tab on the Source Disk — the Original — so that the disk is write protected (you can see through the hole). This is an extra precaution to safeguard the data. > Select the **Storage** Page and press DISK. The Disk Storage menu appears.

— > Press COPY. The **SQ-80** briefly reminds you that the Sequencer Memory will be erased. > The Display then says "INSERT FORMATTED DESTINATION DISK." Insert the disk that will be the backup copy, and then press *OK*.

– > After a moment the Display will say "INSERT SOURCE DISK." Insert the Source disk and press ***OK*.**

___ > The **SQ-80** will load the data from the Source Disk and save it to the Destination Disk, asking you to insert the disks as it needs them. Each time, insert the proper disk and press *OK*.

___ > The amount of time and the number of disk swaps required will depend on how large the files on the disk are, and how many files are used. The maximum for a completely full disk is 13 swaps.

– > Once the Copy procedure is successfully done, the Display will read **"COPY COMPLETE."**

COPY DISK Error messages:

> **DISK IS WRITE-PROTECTED —** When asked for the Destination disk you inserted a Write-protected disk. The Destination Disk must have the Write-protect window closed.

– **COPY TERMINATED INCOMPLETE —** If you press *QUIT* during the Copy Procedure, or if you press *OK* without a disk in the drive, the **SQ-80** will abort the procedure and return you to the **Storage** Page.

– **> DISK IS NOT SOURCE DISK** or **DISK IS NOT DESTINATION DISK —** You put the wrong disk in the drive when prompted for a certain disk. This is not fatal; it doesn't abort the Copy procedure. Just insert the asked-for disk and proceed.

– **DISK IS UNREADABLE OR UNFORMATTED —** The Destination disk must have been formatted by the SQ-80 before starting the Copy Procedure.

STORING SYSTEM EXCLUSIVE MESSAGES TO DISK

What are System Exclusives?

Some MIDI information—such as Key events, Controllers, Program Changes, etc.— is understood by virtually all MIDI devices, regardless of manufacturer. The common ability to send and receive these messages is what allows you to play any MIDI synth from any other, to change Programs and Volume remotely, to start and stop sequencers and drum machines together, and the many other performance miracles we have come to expect from MIDI.

There are other messages which each manufacturer has reserved for communicating specific information with a specific machine (or family of machines). These machine-specific messages are called **System Exclusive** (or Sys-Ex) messages, since they are meant to be recognized only by a particular device and ignored by all others (i.e, they are exclusive to a particular *system).*

The **SQ-80,** for example, can transfer Sequences or Programs via MIDI to another **SQ-80,** to an ESQ1 or to a computer. It is a process not unlike sending a file from one computer to another via modem. The l's and 0's that make up the data in memory are sent out the MIDI port. This data can be received and understood by another **SQ-80,** by an ESQ-1 (for many types of **SQ-80** data), or by a computer running the proper librarian software.

"Generic" System Exclusive Storage

It is not strictly necessary, however, for the receiving system to understand the data it receives, if the purpose is to store it for later reloading into the original system Oust as it's not necessary for a file cabinet to understand the pieces of paper you file there), The **SQ-80** can receive any MIDI System Exclusive message up to 64k (65,536) bytes and save it to disk without having the foggiest notion what it means or what type of device it came from. When you want to send the data back to the original device, you just load the data from disk back into the **SQ-80,** which will then re-transmit the message exactly as it was received.

Here are a few examples of the kinds of information which you can use the SQ-80 to store in this way:

- > The Program (patch) memory of virtually any MIDI synthesizer
- > The pattern memory of a drum machine
- > The sequence memory of a MIDI sequencer
  Wavesample dumps (up to 64k) from samplers and drum machines
- > The preset memory of any MIDI reverb or other effects device which can send and receive it

In short, any MIDI data (up to 64k in length) which can be transmitted from one device to another can be received and stored by the **SQ-80.** With the SQ-80 at the heart of your system you now have disk storage for the data in all your MIDI instruments.

It uses the Sequencer Memory

The **SQ-80** uses the 64k of RAM (Random Access Memory) that is normally devoted to the Sequencer to "buffer" incoming System Exclusive messages before saving them to disk. A buffer is an area of memory where data is held temporarily. When the **SQ-80** receives a System Exclusive data dump, or loads it from disk for sending out via MIDI, it stores it in the Sequencer memory until you either save the data to disk or transmit it. This has one extremely important implication:

You must save all Sequences and Songs before using the System Exclusive Save and Load functions.

Of course you should save your work frequently whether or not you use the Sys-Ex Storage feature of the SQ-80 — that is a good practice when working with any computer. But it is especially important to realize that performing the following procedures will cause the SQ-80 to clear and re-initialize the Sequencer memory before returning to normal operation. When you are done with the Sys-Ex Storage functions, you can then load Sequencer data back into the SQ-80 from disk.

SAVING System Exclusive Data from an External Device

Using the **SQ-80's** Disk Drive for storing data from external devices is essentially a three-step process:

1) First you get the SQ-80 ready to receive the data via MIDI:
2) next, you send the data from the external device to the SQ-80: and finally
3) you save the data to a disk with the SQ-80's Disk Drive.

To Save System Exclusive Data from an External MIDI Device:

> Connect the MIDI Out of the sending device to the MIDI In of the SQ-80.
> Insert a formatted double-sided 3.5" disk into the **SQ-80** Disk Drive.
> Press the **Storage** button to select the **Storage** Page.
> Press **DISK.** The Disk Storage menu appears.

– Press SAVE. You are given two options: 1) SAVE NEW FILE and 2) UPDATE OLD FILE. SAVE NEW will create a new file on the disk: UPDATE OLD will save the data "over top of" an existing Sys-Ex file on the disk without your having to rename the file. First we will take the case of saving a new file.

____> Press **SAVE NEW FILE.** The Display briefly says "READING DIRECTORY FROM DISK," then asks which type of data you wish to Save.

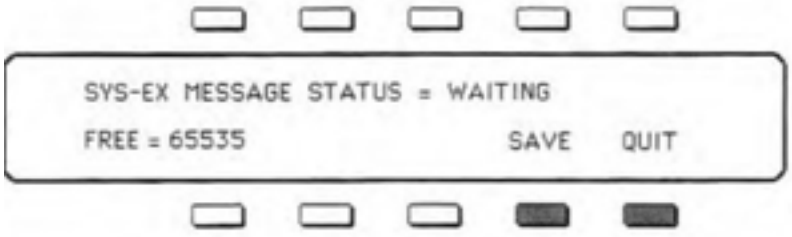
– > Press **SYS-EX.**

– > The Display flashes the message "WARNING — ALL SEQUENCER DATA WILL BE LOST" to remind you that any songs and Sequences currently in memory will be wiped out (see above), It's not too late, however, to bail out and preserve the Sequencer memory intact. Pressing QUIT at this point will return you to the Storage Page without erasing the Sequencer memory, allowing you to save it to disk before proceeding.

The Display reads "READY TO RECEIVE MIDI SYS-EX DATA"

____> Press **START** to enable the SQ-80 to record System Exclusive messages;
or press QUIT to return to the **Storage** Page with the Sequencer memory intact.

– After you press **START,** the following screen appears:

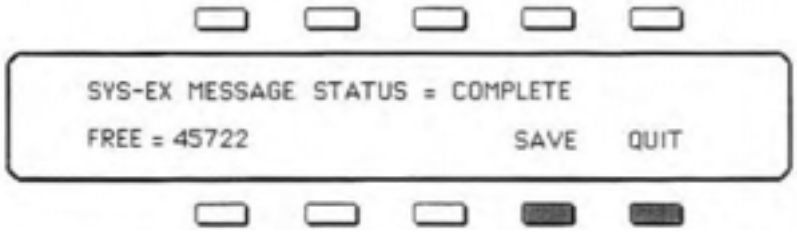


The **SQ-80** is now ready to record into its memory any System Exclusive message which it receives.

- At the lower left of the Display you see the number of bytes available for Sys-Ex storage (FREE=65535)
- Pressing SAVE lets you name and save to disk what been received so far (don't do that yet)
- Pressing QUIT lets you exit to the Storage Page if you change your mind.

___ > From the external Instrument, transmit the System Exclusive message. The Display will read **"SYS-EX MESSAGE STATUS = RECEIVING"** while the data is being received.

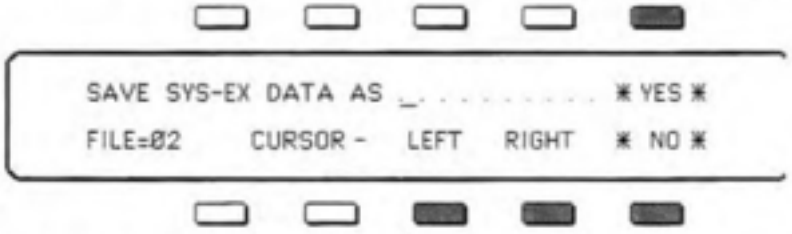
– > When a complete message has been received, the following Display will appear:



The Display shows how many bytes of memory are left. At this point, assuming there's enough memory, you can send the **SQ-80** another System Exclusive message (from a different instrument, for example) which will be stored right after the first one. You can save as many different messages as memory permits in a single Sys-Ex block. Each time a message is received, the Display will read "SYS-EX MESSAGE STATUS = RECEIVING' and then return to the screen shown above, telling you how many bytes remain free. When the data is later re-transmitted, all the messages will be sent out in the order they were received, with a 150 millisecond pause between each. In this way you could load new data into all your devices with a single Sys-Ex Load command from the **SQ-80.**

– > If after receiving a Sys-Ex message the Display reads "SYS-EX MESSAGE STATUS = INCOMPLETE" this means that the **SQ-80** did not receive an "End of Exclusive" message at the end of the data. See SYS-EX Error messages on the next page.

– > Once you have successfully received the Sys-Ex message (or messages), press SAVE. The following screen appears:



– > Select a name of up to ten characters for the Sys-Ex data. The file-name is initially represented by ten dots. A Cursor (underline) appears beneath the first dot. Use Entry Slider and the Up and Down Arrow buttons to select the letter or number you want for the first character of the name. Then press the button labeled RIGHT to move the Cursor to the next character, and select a second character.

Continue this, pressing the RIGHT and LEFT buttons to move the Cursor and using the Data Entry Slider to change the character, until the Display shows the name you want.

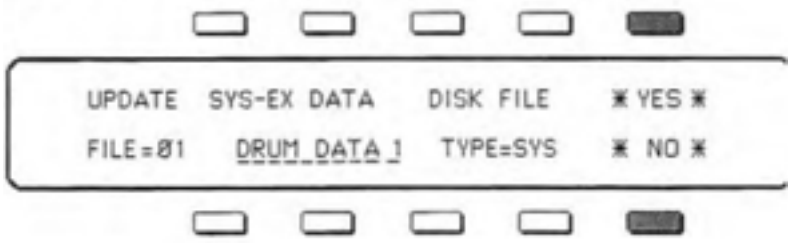
Note that the lower-left of the Display tells you which of the ten available Sequencer/Sys-Ex Blocks the File will occupy on the disk.

– > Press *YES*. The Display reads "ACCESSING DISK DRIVE..." while the data is being saved. When it is done you are returned to the **Storage** Page.
Or Press *NO* to cancel the procedure for any reason.

Updating an Existing Sys-Ex File

If you want to save an updated version of System Exclusive data already on the disk, press UPDATE OLD FILE after pressing- SAVE.

- The procedure for receiving the data is the same as for Saving a new file.
- After the message(s) have been received press SAVE. the Display shows the following:
- Use the Data Entry Slider and the Up and Down Arrow buttons to scroll to the Sys-Ex file which you want to replace with the new data, and then press *YES*.



SAVE SYS-EX Error Messages:

You might encounter the following messages when Saving Sys-Ex data to disk.

> **NO SYS-EX DATA HAS BEEN RECORDED —** While the SQ-80 is still waiting, for the first Sys-Ex message, pressing Save will cause this message to appear. It just means that the **SQ-80** needs to have received at least one System Exclusive message before it can save anything to disk.

___> **SYS-EX MEMORY IS FULL - FREE=00000 —** The **SQ-80** ran out of memory while receiving the Sys-Ex dump. This means that it probably did not get the "End of Exclusive" which terminates every proper Sys-Ex message. If you were saving multiple messages, the last one was not fully received. If it was a single Sys-Ex message, then the message is too large to be saved to disk by the **SQ-80.** You can still save the data to disk, but it will probably not be properly understood if re-transmitted to the external Instrument.

SYSTEM ERROR - SYS-EX DATA LOST — If you get this message once it probably just indicates a minor glitch in the MIDI transfer. Try re-initializing the SQ-80 (see p. 16) and try the procedure again. If you get this message repeatedly, it might mean a hardware problem. Consult your local **ENSONIQ** Service Center.

> See **"SAVE Error Messages,"** p. 162, for a list of other Error messages you might encounter when Saving data to disk.

Note: If the SQ-80 returns from the "RECEIVING" state with the message "SYS-EX MESSAGE STATUS = INCOMPLETE" this means it did not receive an "End of Exclusive" after the System Exclusive message. This would indicate that external device did not transmit a complete message for some reason. This could be caused by a faulty MIDI connection (or the MIDI cable being unplugged during the transfer). If the sending unit in question usually works properly, press *QUIT* and try the transfer again.

However, some devices, particularly older models without up-to-date MIDI implementation, might not terminate Sys-Ex messages with an "End of Exclusive," Receiving data from such a device would cause the SQ-80 to come back with the "INCOMPLETE" message. This would be normal in such a case. Save the data and proceed as usual.

LOADING System Exclusive Data from Disk to an External Device

After you have saved a System Exclusive message from an external MIDI Instrument, getting the data back to the original Instrument involves three steps:

1) First you prepare the receiving Instrument(s) to receive System Exclusive messages via MIDI:
2) next, you Load the data from the SQ-80's Disk Drive into Memory: and then
3) you transmit the data to the remote Instrument(s) from the **SQ-80.**

To Load (and Transmit) a System Exclusive File from disk:

____ > Connect the MIDI Out of the **SQ-80** to the MIDI In of the Receiving device(s).

– Enable the Receiving Instrument(s) to receive System Exclusive messages. Many devices have a switch or a parameter which enables or disables the receiving of System Exclusive messages. Consult the manual of each particular device for details.

> Insert the disk containing the Sys-Ex data into the Disk Drive.

– > Press the **Storage** button to select the **Storage** Page.

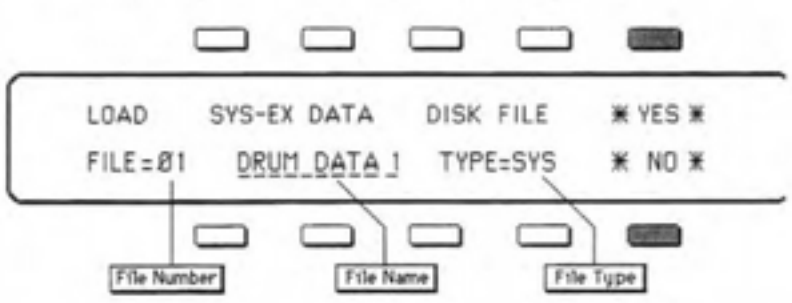
> Press **DISK.** The Disk Storage menu appears.

> Press LOAD. The Display briefly says "READING DIRECTORY FROM DISK," then the Display asks which type of data you wish to LOAD.

> Press **SYS-EX.**

The Display briefly flashes the message "WARNING — ALL SEQUENCER DATA WILL BE LOST" to remind you that any Songs and Sequences currently in memory will be wiped out (see above). It's not too late, however, to bail out and preserve the Sequencer memory intact. Pressing *NO* at this point will return you to the Storage Page without erasing the Sequencer memory, allowing you to save it to disk before proceeding. The following Display appears:

-> Use the Data Entry Slider and the Up and Down Arrow buttons to scroll through the ten Sequencer/Sys-Ex Blocks on the disk. For each of these files you see, along the bottom row of the Display:



- **FILE NUMBER** (shown as FILE=_), the number of the file, 01 through
- **FILE NAME,** the ten-character name which was given to the file when it was saved, and
- **FILE TYPE,** which tells you which of the three possible types of Sequencer/Sys-Ex files it is — ONE (a single Sequence), ALL (the entire Sequencer Memory) or SYS (a System Exclusive message from a remote MIDI Instrument). When you Load a file, its File Type must match the type that you selected in the previous step — in this case, the type must be SYS.

Files which contain no data (and are thus available for saving data to) will show "EMPTY FILE" as die File Name, and TYPE=XXX as the File type. You can't load an Empty File.

-> Find the Sys-Ex File you want to load. Again, its File Type must be SYS. If there are no files of this type on the disk, press *NO* to exit to the Storage Page. Once the file you want is showing on the Display...

-> Press *YES*. The Display reads "ACCESSING DISK DRIVE,.," while the data is being Loaded. Once the data is in memory, the following screen appears:

-> Press SEND to transmit the data. The Display reads "MIDI DATA BEING TRANSFERRED" and then returns to same page, ready to send the data again if necessary.

-> Check the Receiving Instrument(s) to see that the data was received correctly. If it wasn't, make sure that:

- the MIDI connections are correct (SQ-80's MIDI Out to the Receiving device's MIDI In),
- the receiving device(s) is enabled to receive System Exclusive messages,
- the receiving device(s) is set to the same MIDI Channel(s) as when the data was initially sent to the SQ-80.

Then press SEND again, and the data will be transmitted again. You can keep repeating this until the data has been successfully received by the remote device(s).

-> Once the data has been successfully transmitted, press QUIT. The Display flashes a note to remind you that the Sequencer has been reinitialized (all Songs and Sequences erased) and returns you to the Storage Page.

DELETING Sys-Ex Files from the Disk

Sys-Ex Files are deleted in the same way as ONE SEQ and ALL SEQ files, except that you must specify SYS-EX after selecting DELETE from the Disk Storage menu.

To Delete a SYS-EX File from the disk:

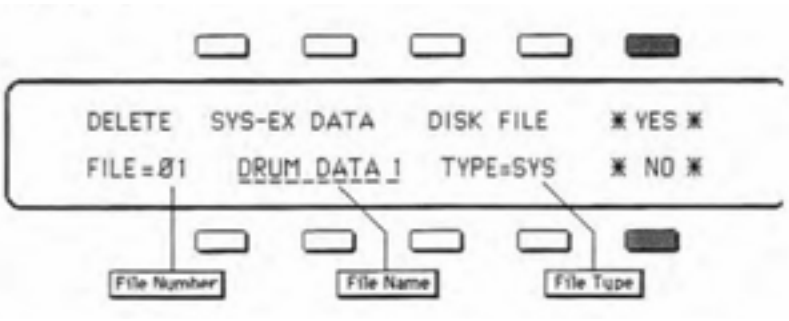
Insert the disk containing the Sys-Ex data into the Disk Drive.

-> Press the **Storage** button to select the **Storage** Page.

-> Press **DISK.** The Disk Storage menu appears.

•> Press **DELETE.** The disk drive light goes on briefly and the Display says "READING DIRECTORY FROM DISK." Then the Disk Delete Menu appears.

-> Press **SYS-EX.** The following Display appears:



-> Use the Data Entry Slider and the Up and Down Arrow buttons to scroll through the ten Sequencer/Sys-Ex Blocks on the disk. When you Delete a file, its File Type (TYPE=—) must match the type that you selected in the previous step — in this case, the type must be SYS.

•> Find the Sys-Ex File you want to Delete. Again, its File Type must be SYS. If there are no files of this type on the disk, press *NO* to exit to the Storage Page. Once the file you want is showing on the Display...

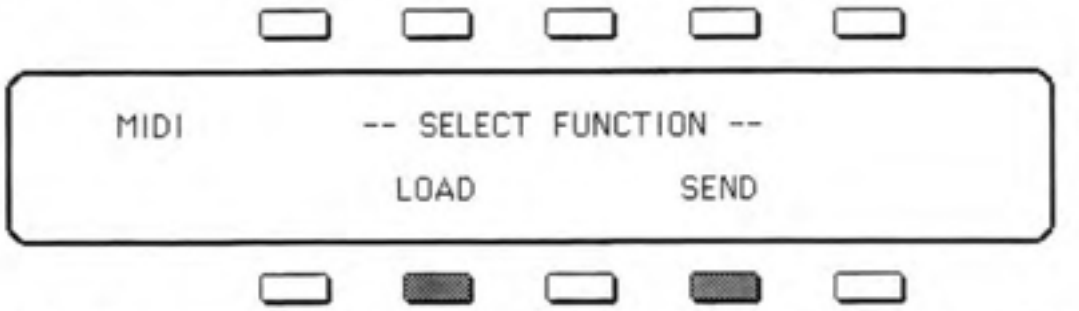
-> Press *YES*. The Display briefly reads "ACCESSING DISK DRIVE..." and then returns to the **Storage** Page. The file is Deleted and the Sequencer/Sys-Ex Block it occupied on the disk is now available.

Or Press *NO* to cancel the procedure for any reason.

MIDI TRANSFER OF SQ-80 DATA

The **SQ-80** can be instructed to send Program and Sequencer Data over MIDI. (These Program and Sequence "dumps" are System Exclusive messages, like those discussed earlier.) Though these procedures are meant for sending data to another **SQ-80,** they can also be used to send data to any other device, such as a Computer or, for some types of data, an ESQ-1. Here we are concerned with sending Data from one SQ-80 (the Sending Unit) to another (the Receiving Unit).

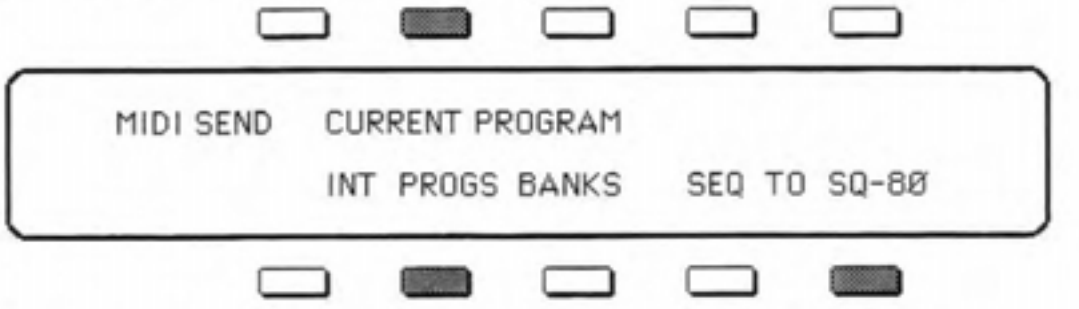
When you press MIDI on the **Storage** Page you are given these two choices:



- The LOAD option is only for Loading ESQ-1 Sequencer data from a **Mirage** Digital Sampling Keyboard or **Mirage** Digital Multi-sampler.

- Pressing SEND gives you a menu of options for sending Program or Sequencer data to another **SQ80.** (Note: the SQ-80 does not support Sending its own Sequencer data to a **Mirage,** only Loading data which has been previously saved to Mirage from an ESQ-1.)

When you press SEND, the following screen appears:



Sending Programs via MIDI

The **SQ-80** can send one Program (CURRENT PROGRAM) or the 40 Internal Programs (INT PROG BANKS) to another SQ-80 via MIDI. SQ-80 Programs can also be received by an ESQ-1, though the ESQ-1 probably won't be able to play most of them properly. This procedure can also be used to send Programs to a computer or generic System Exclusive receiver (though because of the SQ-80's built-in Disk Drive, you probably won't often need to do this).

MIDI Connections and settings: In the case of Sending Program Data via MIDI

- It is only necessary that the **MIDI Out** jack of the Sending **SQ-80** be connected to the **MIDI In** jack of the Receiving Unit.
- Both Units must be set to the same **Base MIDI Channel (MIDI** Page).
- The Receiving Unit must have System Exclusive messages Enabled. (On the MIDI Page, set MIDI Enables to **ENABLE=KEYS+CT+PC+SS+SX.)**

- The Receiving Unit must be on a **Program Select** Page when receiving the Programs. Any Program Select Page, Internal or Cartridge, will do.

To SEND All Internal Programs via MIDI to another SQ-80:
This will Send the 40 Programs in the Internal Memory of the Sending Unit to the Internal Memory of the Receiving Unit, replacing whatever is there.

-> Connect the MIDI cable, and set up the units as described above.
-> On the Sending Unit, select the **STORAGE** Page, and press MIDI.
-> Press SEND, The MIDI SEND Page appears as shown on the previous Page:
-> Press **INT PROG BANKS.** The Display will read ***MIDI DATA BEING TRANSFERRED* PLEASE WAIT...** for about two seconds.
-> When the transfer is complete the Display will say ***MIDI PROCEDURE COMPLETE*,** and then return to the **STORAGE** Page. The new Programs are now in the Internal Memory of the Receiving Unit.
-> If the Receiving Unit does not respond, check 1) your MIDI connections, 2) the MIDI Channel on both units, 3) the MIDI Enables on the Receiving Unit, and 4) make sure the receiving unit is showing a Program Select Page, and try again.

To SEND One Program via MIDI to another SQ-80:
This will Send the selected Program of the Sending Unit to the Edit Buffer of the Receiving Unit, replacing whatever is there.

-> Connect the MIDI cable, and set up the units as described above.
-> Make sure the Program you want to send is selected on the Sending Unit
-> On the Sending Unit, select the **STORAGE** Page, and press MIDI.
-> Press SEND.
-> Press **CURRENT PROGRAM.** The Display will flash ***MIDI DATA BEING TRANS-FERRED* PLEASE WAIT...** (One Program doesn't take long)
-> The Display will say ***MIDI PROCEDURE COMPLETE*.** and then return to the **STORAGE** Page. The new Program is now on the **WRITE** Page of the Receiving Unit" Edit its Name if you wish, and then Write it into Memory as described earlier **(WRITE PROGRAM** Page, p. 76).
-> If the Receiving Unit does not respond, check 1) your MIDI connections, 2) the MIDI Channel on both units, and 3) the MIDI Enables on the Receiving Unit, and 4) make sure the receiving unit is showing a Program Select Page, and try again.

Sending Sequencer Data via MIDI

The **SQ-80** can send All Sequencer Data, or a single Sequence, over MIDI to another **SQ-80.** This procedure can also be used to send Sequencer Data to a computer or generic System Exclusive receiver (though since the SQ-80 has its own built-in Disk Drive this won't often be necessary). You can send one Sequence (CURRENT SEQUENCE) to an ESQ-1 via MIDI, but an ESQ-1 cannot receive the entire Sequencer memory (ALL SEQUENCER DATA) from an SQ-80 because of the SQ-80's greater number of Songs and Sequences.

MIDI Connections and settings: In the case of Sending Sequencer Data via MIDI.

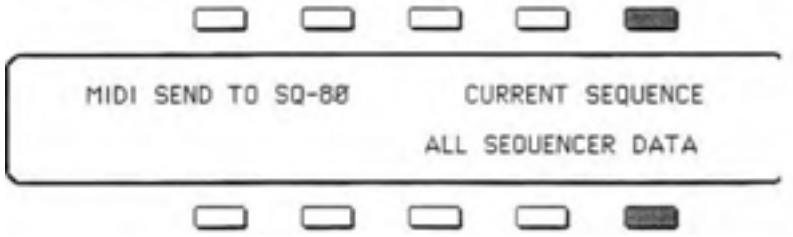
- Both the **MIDI Out** jack and the **MIDI In** jack of the Sending Unit must be connected to the **MIDI In** and the **MIDI Out** jacks of the receiving Unit.
- Both units must be assigned the same **Base MIDI Channel (MIDI** Page).
- The Receiving Unit must have System Exclusive messages Enabled (Set the Enables on the MIDI Page

to **ENABLE= KEYS+CT+PC+SS+SX.)**

To SEND All Sequencer Memory via MIDI to another SQ-80:
This will send the entire Sequencer memory (all Songs and Sequences) of the Sending Unit to the Receiving Unit, replacing whatever was there.

-> Connect the MIDI Out of the Sending **SQ-80** to the MIDI In jack of the Receiving SQ-80:
Connect the MIDI In of the Sending SQ-80 to the MIDI Out jack of the Receiving SQ-80
-> On the Receiving **SQ-80,** Set the Enables on the **MIDI** Page to **ENABLE= KEYS+CT+PC+SS+SX.**
-> On the Sending **SQ-80,** select the **STORAGE** Page, and press MIDI.
-> Press **SEND.** The MIDI SEND Page appears, as shown previously:
-> Press **SEQ TO SQ-80.** The Displays shows the following:

Press **ALL SEQUENCER DATA.** The Display will read ***MIDI DATA BEING TRANSFERRED* PLEASE WAIT...**



-> If the transfer is successful, the Display will say ***MIDI PROCEDURE COMPLETE*,** and then return to the STORAGE Page. The Sequencer Data is now in the Sequencer Memory of the Receiving SQ-80, replacing whatever was there previously.
-> If the Display says *DATA TRANSMITTED - CHECK RECEIVER*, this means that the sending SQ-80 did not receive the expected response from a receiving SQ-80, but it sent the data anyway.

- If you were sending the data to something other than another SQ-80 (such as a computer), this is normal, and indicates simply that the data was transmitted.
- If you were sending the data to another **SQ-80,** this message indicates that the transfer may not have been received properly. Check your MIDI connections, and the MIDI Enables on the MIDI Page of the Receiving Unit, and try again.

To SEND One Sequence via MIDI to another SQ-80:
Again, both units must be assigned the same MIDI Channel. The Receiving Unit must have System Exclusive messages Enabled (Set the Enables on the MIDI Page to **ENABLE= KEYS+CT+PC+SS+SX.)**

•> Make sure the Sequence you want to Send is Selected on the Sending Unit.
.> Connect the MIDI Out of the Sending SQ-80 to the MIDI In jack of the Receiving SQ-80:
Connect the MIDI In of the Sending SQ-80 to the MIDI Out jack of the Receiving SQ-80. On the Receiving **SQ-80.** Set the Enables on the MIDI Page to **ENABLE= KEYS+CT+PC+SS+SX.**
On the Sending SQ-80. select the **STORAGE** Page, and press MIDI.
•> **Press SEND.**
-> Press **SEQ TO SQ-80.**
•> Press **CURRENT SEQUENCE.** The Display will read ***MIDI DATA BEING TRANSFERRED* PLEASE WAIT...**
•> If the transfer is successful, the Display will say ***MIDI PROCEDURE COMPLETE*,** and then return to the **STORAGE** Page. The Sequence is now in the highest-numbered empty, Sequence Memory Location of the Receiving **SQ-80.** (SEQ-60 if it was not defined, SEQ-59 if

#60 is full, and so on.)

— > If there were no empty Sequences on the Receiving Unit, the Display of the Sending Unit will read ***NO SEQUENCE LOCATIONS AVAILABLE*.** Erase a Sequence and try again. If the Receiving Unit doesn't have enough free Memory for the Sequence, the Display of the Sending Unit will read ***INSUFFICIENT MEMORY TO LOAD SEQUENCE*.** Erase some Sequences on the receiving SQ-80 and try again.

— > If the Display says ***DATA TRANSMITTED - CHECK RECEIVER*,** this means that the sending **SQ-80** did not receive the expected response from a receiving SQ-80. but it sent the data anyway.

- If you were sending the data to something other than an SQ-80 (such as a computer), this is normal, and indicates simply that the data was transmitted.
- If you were sending the data to another **SQ-80,** this message indicates that the transfer may not have been received properly. Check your MIDI connections, and the MIDI Enables on the MIDI Page of the Receiving Unit, and try again.

LOADING ESQ-1 Sequencer Data via MIDI from a Mirage

This procedure lets you Load ESQ-1 Sequencer data which has been saved to a **Mirage** Digital Sampling Keyboard or **Mirage** Digital Multi-sampler. When the **ESQ-1** initially transmitted the data to **Mirage,** the 40 Internal Programs were sent along with the Sequencer data. When you Load ESQ-1 Sequencer Data from the **Mirage,** you have the option of also Loading the 40 Internal Programs along with that Data. This will replace the Internal Programs that were in the **SQ-80** before.

To LOAD ESQ-1 Sequencer Data via MIDI from a Mirage:

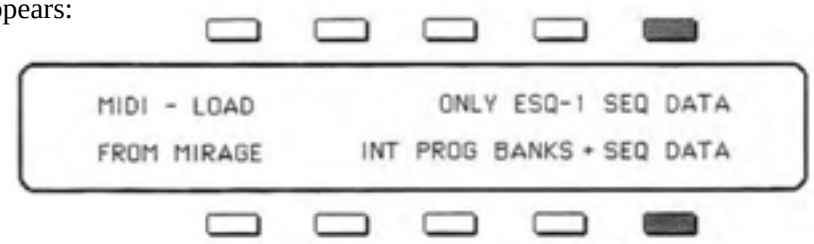
– > Boot the **Mirage** with a MASOS diskette.

– > Load the Sequence Data into the **Mirage** from a diskette where it has been stored. Both Upper and Lower Memory must be loaded.

– > Connect the MIDI In of the SQ-80 to the MIDI Out jack of the **Mirage;**
Connect the MIDI Out of the SQ-80 to the MIDI In jack of the **Mirage.**

– > On the SQ-80, select the **STORAGE** Page, and press MIDI.

-> Press LOAD. The following Page appears:



– > Press **ONLY ESQ-1 SEQ DATA** to Load only the Sequencer Data; or press **INT PROG BANKS + SEQ DATA** to Load both the Sequencer Data and the 40 Internal Programs. The Display will read ***MIDI DATA BEING TRANSFERRED* PLEASE WAIT...**

– **)** If the transfer is successful, the Display will say ***MIDI PROCEDURE COMPLETE*,** and then return to the Storage Page. The Sequencer Data is now in the SQ-80's Sequencer Memory; and if you selected **INT PROG BANKS + SEQ DATA,** the 40 Internal Programs have also been replaced.

– > If the Display says ***TARGET SYSTEM NOT RESPONDING*,** check 1) your MIDI connections, 2) that the **Mirage** is booted with MASOS, and 3) you loaded both the Upper and Lower halves from the **Mirage** disk which contained the Sequencer data.

– > Two other error messages are also possible:

- ***ONLY SEQUENCE DATA CAN BE LOADED* —** If you try to load Mirage sound Data into the SQ-80's Sequencer Memory, you will get this message.
- ***FATAL ERRORS DETECTED — SEQUENCER MEMORY IS CLEARED*** The MIDI connections being disconnected during the transfer can result in this message. Try again.

TAPE STORAGE

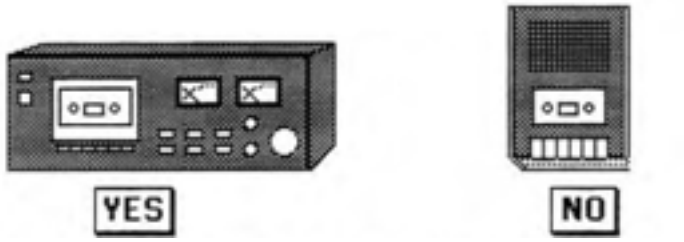
The following types of information can be saved to audio Tape (cassette or reel-to-reel) and later loaded back into the **SQ-80's** Memory from Tape:

- The forty Internal Programs,
- The entire Sequencer memory, or
- A single Sequence.

A "Decent" Tape Deck

Because of the sheer amount of information involved, the SQ-80 sends Data to Tape at a rate that is a good bit faster than most synthesizers. For this reason it is recommended that you use a "decent" Tape deck to Save and Load your **SQ-80** Program and Sequence Data. This doesn't mean you need an audiophile unit — any home stereo-type cassette or reel-to-reel deck should do fine. Decks specifically designed for use with computers should work as well.

What is definitely NOT recommended is a very cheap portable-type recorder. Such recorders cannot be relied upon to handle the SQ-80's high speed data transfer.



The higher grade of tape you use, the more reliable the results you will get. Definitely do not use three-for-a-dollar generic cassettes. A good quality Normal Bias cassette should do the job; a Chrome Bias cassette is better; a Metal Bias cassette is best. Tapes which are specifically made for computer data storage will work. These are available at any Computer store.

It is generally recommended that you not use any Noise Reduction when Saving or Loading Programs, as Noise Reduction circuits tend to "round off' the square pulses that the SQ-80 uses to store information.

The Tape circuitry is very level-sensitive — it is important to record the data at the right level on the tape in the first place. and to find the right playback level when re-loading the data back into the SQ-80. Small differences in record level can make a big difference when saving Data to Tape. You may need to experiment a bit to see what works best with your equipment. It may take a little patience, but once you find the proper record and playback levels, these Tape procedures will perform reliably.

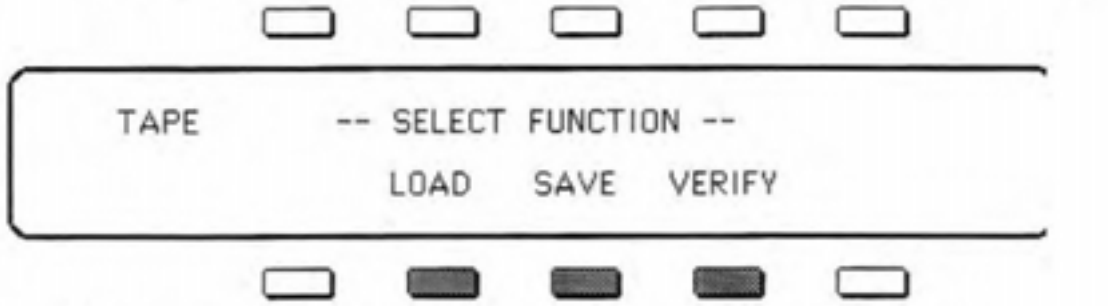
Tape Connections

To Save Data to Tape, connect the **Tape Out** Jack on the Rear Panel of the **SQ-80** to the **Input** of your tape recorder. For Loading Data, or Verifying Data that has been Saved, connect the proper **Output** of the tape recorder to the **Tape In** jack of the SQ-80.

When Saving Data to Tape, it's not a bad idea to use a "Y" adapter at the tape recorder end of the cable. and to feed the signal to both channels of the deck. That way you can record duplicate copies of the information (on the left and right channels of the Tape), in case a dropout or other problem causes an error on one of the channels. Also, when you later Load the Data into the **SQ-80,** this method allows you to monitor one channel while sending the other to the **SQ-80.**

Note: The first time you save Data to Tape, it is a good idea to go through the procedure once without starting the Tape Deck, just to get your Record levels properly adjusted. Also, recording some sort of spoken "Slate" on the tape, immediately before each batch of Programs you save, will help you keep Track of which Bank is where on the Tape.

When you press the Soft button under TAPE on the STORAGE Page, the following screen appears:



From here you select which of the three available functions you want.

SAVE — Saving Programs and Sequences on Tape

To SAVE SQ-80 Data to Audio Tape

-> Connect the **SQ-80's Tape Out** Jack to the Input of one channel of your tape recorder (or to both channels, as described above).
-> Put your Tape Deck in Record/Pause.
-> Select the STORAGE Page, and select TAPE from the menu there.
-> Press SAVE. The Display shows the following:
-> Start the Deck Recording.
Press:

- **INT BANKS** to save the forty Internal Programs : or
- **ONE SEQ** to save the current Sequence; or
- **ALL SEQ** to save the entire Sequencer memory (all Sequences and Songs)

This starts the Data Transfer. The Display will read ***SAVING DATA TO TAPE*.** The **SQ-80** will put out an eight second "Leader" tone. During the Leader tone, adjust the Recorder's Input level. The VU meter readings right at 0 dB seem to work best for home and semi-pro cassette decks: slightly lower (around -6) for professional equipment operating at +4 dBm. The Leader tone is followed by the Data, which takes about 16 seconds for Program data, or up to four minutes for a fully loaded Sequencer memory.

____> When the Data has been transferred, the Display reads ***TAPE PROCEDURE COMPLETE*,** and the STORAGE Page returns.

____> Stop the Tape Deck, and Verify the Transfer, as described below.

VERIFY — Verifying Program and Sequence Data Saved to Tape

After you have saved Data to Tape, you should Verify the Data on the tape, to make sure that the transfer was successful. This will save you from finding out later, when you try to Load the data back into the SQ-80, that a dropout, the wrong recording level or some other problem has garbled your data (very annoying).

To VERIFY SQ-80 Data Saved to Audio Tape

> Connect the Output of the channel of your tape recorder that contains the Program Data to the **SQ-80's Tape In** Jack.
Select the STORAGE Page, and select TAPE from the menu there.

> Rewind the Tape Deck to the beginning of the Data to be Verified.

> Press VERIFY. The Display shows the following:

> Start the Tape Deck Playing. Listen to the Output, or watch the VU meters, and wait for the Leader Tone which precedes the Data to begin.

> After the Leader Tone begins, press **ONE SEQ. ALL SEQ** or **INT BANKS.** depending on which type of data you just saved. This starts the **SQ-80** checking the Data on the Tape. The Display will read ***READING DATA FROM TAPE*.**

> If the Data on the Tape is correct, and the level is properly adjusted, the Display will say ***TAPE PROCEDURE COMPLETE*,** and then return you to the **STORAGE** Page.

____ > If the Verify is unsuccessful, you will get one of the following messages:

1) *TAPE NOT STARTED ON LEADER TONE* — The Leader Tone must be actually playing when you press one of the soft buttons begin Verifying. Try the procedure again. If you are sure that the tone *was* playing when you started, then this message probably indicates that the playback level into the SQ-80 is too low (so that it cannot detect the tone). Increase the level and try again"

2) *VERIFY FAILED — INVALID TAPE DATA* — Often you will get this message when the playback level into the SQ-80 is too high. Turn the level down and try again, The ideal playback level lies between this Error message and #1 above. If the level is correct, this error message can indicate from a number of things — the Data was recorded at too high. or too low, a level: a serious dropout or other Tape problem has garbled the Data: or a bad connection has resulted in a loss of Data. Try recording the data again on another part of the tape.

3) *INCORRECT TYPE OF DATA ON TAPE* — This message would result if, for example, you pressed **INT BANKS** and then played Sequencer Data into the **SQ-80.** Don't do that.

> There is one more message you might get, which is not fatal, but requires your attention. If after a Verify, the Display reads ***DATA ERROR FROM TAPE WAS FIXED*,** that means that the SQ-80 found one bit of wrong information on the Tape, but was able to correct it. This might indicate an aging Tape, or a slight dropout, and it is a good idea to save the information to another Tape.

Note: Whenever you get an error message while transferring Data by Tape or via MIDI, the message will remain on the Display until you press one of the front panel buttons. Press any button (except a Soft Button) to continue.

LOAD — Loading Programs and Sequences from Tape

To LOAD Data from Audio Tape

– Connect the Output of the channel of your tape recorder that contains the Program Data to the **SQ-80's Tape In** Jack.

– > Select the **STORAGE** Page, and select TAPE from the menu there.

____ > The Tape Deck should be in Stop or Pause, at the beginning of the Data to be Loaded.

> Press LOAD. The Display shows the following:

> Start the Tape Deck Playing. Listen to the Output, or watch the VU meters, and wait for the Leader Tone, which precedes the Data, to begin.

> After the Leader Tone begins, press **ONE SEQ, ALL SEQ** or **INT BANKS,** depending on which type of data you are loading, This starts the SQ-80 Loading the Data from the Tape, The Display will read ***READING DATA FROM TAPE*.**
If the Load is successful, the Display will say ***TAPE PROCEDURE COMPLETE*,** and then return you to the appropriate Program or Sequence Select Page.

> When you Load One Sequence **(ONE SEQ)** from Tape, that Sequence is placed in the highest-numbered empty Sequence Memory Location. So if SEQ #60 is not defined, the new Sequence will be put there when you Load it into the **SQ-80.** If location #60 already contains a Sequence, the new Sequence will be put in Location #59. If locations #59 and 60 contain Sequences, the new Sequence will be put in Location #58. And so on. If there are no empty Sequence Locations when you try to Load One Sequence, the Display will read ***NO SEQUENCE LOCATIONS AVAILABLE*.** Erase a Sequence and try again.

ERROR MESSAGES— INT BANKS

If an attempt to Load Internal Program Banks is unsuccessful, one of the following error messages will appear:

1) ***TAPE NOT STARTED ON LEADER TONE* —** The Leader Tone must be actually playing when you press one of the soft buttons to begin Loading. Try the procedure again. If you are sure that the tone was playing when you started, then this message probably indicates that the playback level into the SQ-80 is too low (so that it cannot detect the tone). Increase the level and try again.
2) ***INCORRECT TYPE OF DATA ON TAPE* —** The Data was not of the proper type. If you pressed **INT BANKS** while playing back Sequence data, you would get this Error message.
3) ***FATAL ERRORS DETECTED—ALL INTERNAL PROGRAMS RESET*** This means that midway through the transfer, the **SQ-80** got some bad Data, and had to erase and re-initialize all the Internal Bank Programs. Usually this means that the level is too high. Reduce the level of the signal coming into the SQ-80 and try again.
4) The Display might read ***DATA ERROR FROM TAPE WAS FIXED*.** This means that the **SQ-80** found one bit of wrong information on the Tape, but was able to correct it. Save the information to another Tape location.

ERROR MESSAGES— ALL SEQ

If an attempt to Load All Sequencer data is unsuccessful, one of the following error messages will appear:

1) ***TAPE NOT STARTED ON LEADER TONE* —** The Leader Tone must be actually playing when you press ALL DATA to begin Loading. Or, the level is too low. Try again with a slightly higher level.
2) ***INCORRECT TYPE OF DATA ON TAPE* —** The Data was not Sequence Data.
3) *FATAL **ERRORS DETECTED — SEQUENCER MEMORY IS CLEARED*** If the SQ-80 encounters more than one serious Data error after it has already begun replacing the Sequencer Memory with the Data off the Tape, you will get this message. It means that the Load failed but it was too late to save the Internal Sequencer Memory. Often this means that the level is too high. Reduce the level of the signal coming into the SQ-80 and try again.

4) The Display might read ***DATA ERROR FROM TAPE WAS FIXED*.** This means that the SQ-**80** found one bit of wrong information on the Tape, but was able to correct it. Save the information to another Tape location,

ERROR MESSAGES— ONE SEQ

If an attempt to Load a single Sequence is unsuccessful. one of the following error messages will appear:

1) ***TAPE NOT STARTED ON LEADER TONE* —** same as above
2) ***INCORRECT TYPE OF DATA ON TAPE* —** same as above
3) ***SEQUENCE LOAD FAILED — TAPE ERROR*** If the SQ-80 cannot Load the Sequence because of bad Data on the tape or too high a level, the this message will! appear. The **SQ-80** will not erase the entire Sequencer Memory while trying unsuccessfully to Load one Sequence. This does not damage the Sequences and Songs that were already in Memory — they should still be intact. Often this means that the level is too high. Reduce the level of the signal coming into the SQ-80 and try again.
4) ***INSUFFICIENT MEMORY TO LOAD SEQUENCE* —** This message will appear if you try to Load more Data than the SQ-80 has Sequencer Memory for. For example, if you have only 8k of memory left and you try to Load a sequence that consists of 10k of data, you will get this message. Erase one or more Sequences and try again.

ESQ-1 COMPATIBILITY

Are Programs and Sequences from the **ENSONIQ ESQ-1** compatible with the SQ-80, and vice-versa? The answer is "Yes and No." Though the SQ-80 and the ESQ-1 use the same file formats for Programs and Sequences, there are some key differences between the two instruments which prevent their data from being totally interchangeable. Generally speaking, any ESQ-1 data can be understood by the **SQ-80,** but not all SQ-80 data can be understood by the **ESQ-1,**

Programs:

- All **ESQ-1** Programs will play properly on the SQ-80.
- All **SQ-80** can be played on the ESQ-1 (that is, they won't blow it up) but any **SQ-80** Programs which use Waves other than the lower 32 Waveforms will produce unpredictable-sounding results, and are unlikely to resemble the original sound. SQ-80 sounds which use only Waves from among the lower 32 Waveforms, however, will play on the ESQ-1.
- Programs can be transferred between SQ-80 and ESQ-1 (or vice versa) via MIDI. Cartridge or Tape by following the **Storage** Page directions in either manual. Just remember the above caveat — not all SQ-80 Programs will sound right on the **ESQ-1,**

Sequences:

- All **ESQ-1** Sequence data (one Sequence or the entire Sequencer memory) can be transferred via MIDI or Tape to the SQ-80 and will play properly on the **SQ-80.** Once there, however, the following restrictions apply for returning the data to the ESQ-1:
- You cannot transfer the entire Sequencer memory from the SQ-80 to the ESQ-1, Though the format of the individual Sequences is the same, the SQ-80's greater number of Sequence locations makes it impossible for the ESQ-1 to receive an ALL SEQUENCER DATA dump from the **SQ-80.**
- You can, however, send a single Sequence from an SQ-80 to an ESQ-1 using the MIDI SEND command on the MIDI Page. Also you can Load a single SQ-80 Sequence into an ESQ-1 from Tape. So if you want, for example, to transfer an entire Song from an SQ-80 to an ESQ-1, you'll have to transfer the Sequences one at a time, and then re-create the Song on the ESQ-1,
- The **SQ-80** can Load ESQ-1 Sequencer data from an **ENSONIQ Mirage** Digital Sampling Keyboard or Digital Multisampler. The **SQ-80** cannot send Sequencer or Program data to a **Mirage.** (Since the SQ-80 has its own disk drive, you will not need to use the **Mirage** drive for data storage.)

Diagram B. Close-up of Key C4

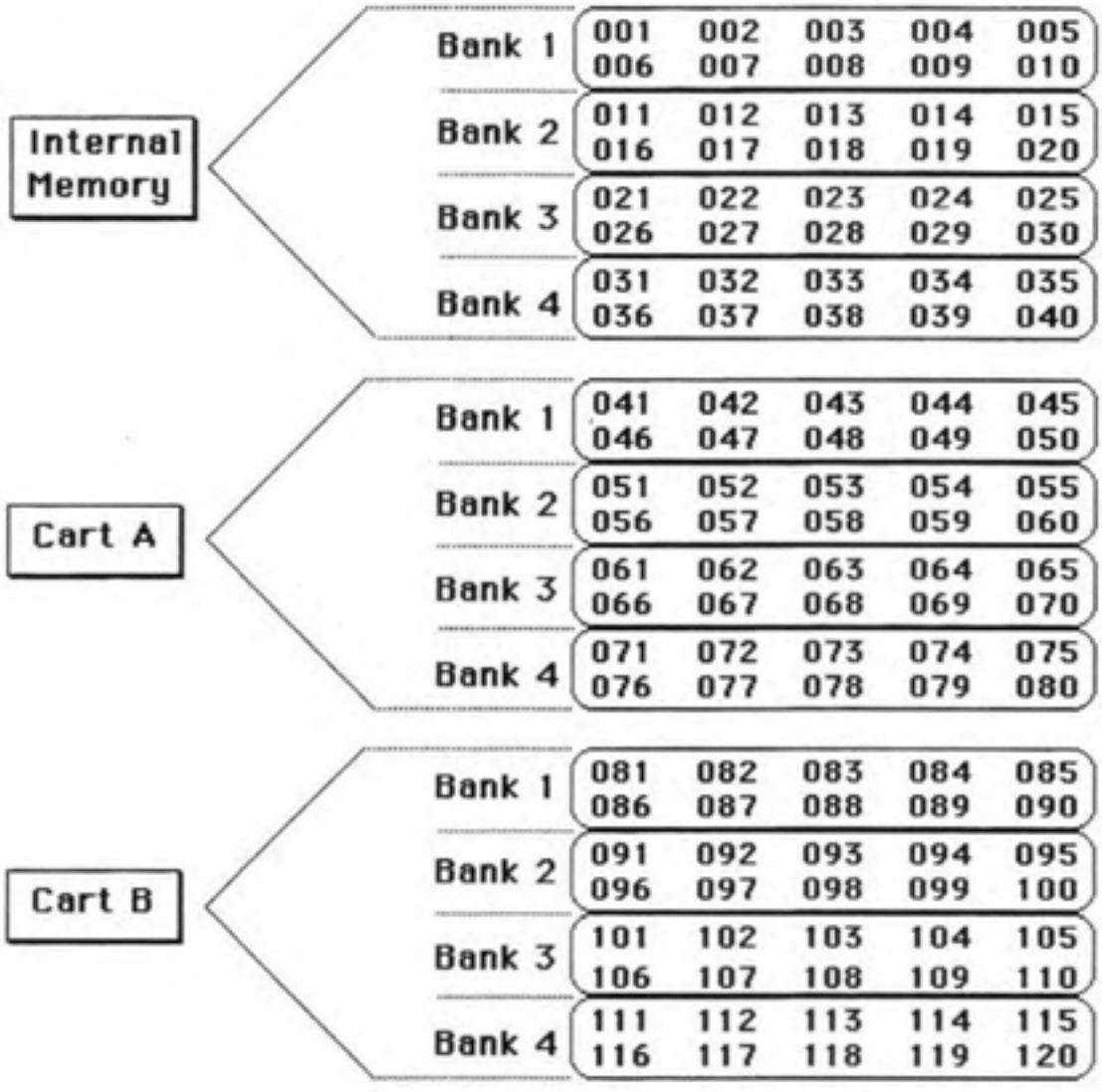
SECTION 7

APPENDICES

MIDI Program Numbers on the SQ-80

The Chart below shows the Program Number of each Internal and Cartridge Program on the **SQ-80.** For each Program Bank, the chart shows the Program number that corresponds to each of the ten locations on the Display. For a given SQ-80 Program, this number is:

1) The Program Number (plus 1; see note below) that will be sent out over MIDI whenever the corresponding SQ-80 Program is selected (assuming Program Changes are Enabled);
2) The Program Number that will cause the corresponding SQ-80 Program to be selected when it is received over MIDI: and
3) The number that will show on the **TRACK PROG NUM** Sub-Page of the Mix˙MIDI Page, when the corresponding Program is selected for a Track on the **Tracks Select** Page.



Note: True MIDI Program Numbers begin at 00 instead of one. To determine the true MIDI Program number, subtract 1 from the number shown in the table above.

SQ-80 MIDI Implementation Specification (Software Version 1.0)

1.0 Sequencer Dump - Mirage Format

1.1 Mirage Format Wave Sample Requests

The SQ-80 will issue up to four Mirage wavesample absolute dump messages in order to retrieve ESQ-1 sequence data from a Mirage. Refer to the Mirage Advanced Samplers Guide for more information on these messages.

11110000	System Exclusive
00001111	ENSONIQ Code
00000001	Mirage Code
00001010	Wavesample absolute request code
000nLLLL	n=0 lower. n=1 upper
0000LLLL	L =low byte of start address
0000hhhh	
0000hhhh	h= high byte of start address
0000LLLL	
0000LLLL	L= low byte of end address
0000hhhh	
0000hhhh	h= high byte of end address
11110111	End of exclusive

1.1.1 I.D. Packet Request

Requests the Mirage to send the data from upper bank locations FFOOH through FFOAH. The data sent in response to this request is then checked to determine if the data in the Mirage is actually ESQ-1 sequence data. If it is, then the size of the data block is also checked to determine if the receiving unit has sufficient available memory to load the data. (This is used in the ESQ-1 to determine whether or not the sequencer memory expansion cartridge is required to load the sequence data. It is not an issue with the SQ-80, which as enough internal memory to accommodate any ESQ-1 Sequencer dump.)

1.1.2 Sequencer Variables Request

Requests the Mirage to send the sequencer variables and sequence header data from upper bank locations 0000H through 0132H.

1.1.2 Sequence Data Request

Requests to send the data from the lower bank starting at location 0000H. The end address is determined by the data that was retrieved in the I.D. packet.

1.1.3 Voice Program Request

An optional request to send the voice program data in locations 1000H through 1 FFOH of the upper bank. The user may specify whether or not to load the internal program banks of the SQ-80 with this data when the sequence load command is initiated.

2.0 SQ-80 System Exclusive Format

2.1 ESQ/SQ-80 System Exclusive Header

All SQ-80 System Exclusive messages start with the following header. The receiving SQ-80 or ESQ will only

recognize system exclusive messages if the MIDI channel number in the message is the same as the MIDI base channel selected on its MIDI page and its MIDI enable parameter is set to recognize system exclusive messages (i.e the display should show ENABLE=KEYS+CT+PC+SS+SX).

11110000	System Exclusive status byte
00001111	ENSONIQ I.D. code
0000001 0	ESQ/SQ-80 Product I.D. code
0000nnnn	MIDI channel number

2,2 Program Dumps

To be able to receive this data. the SQ-80 must be in program select mode (i.e. one of the program bank pages must be displayed) and the MIDI enable parameter on the MIDI page must he set to receive system exclusive messages.

2.2.1 Single Program Dump

This transmits the program currently selected on the synth main keyboard (the "straight-synth' program). Refer to Table 1 for details on the structure of the program.

xxxxxxxx	ESQ/SQ-80 System Exclusive header
00000001	Single Program Dump code
0000LLLL	2 nybbles per byte of program data
0000hhhh	102 data bytes (204 nybble-ized MIDI bytes) L = low nybble, h = high nybble
11110111	End of exclusive

2.2.2 All Program Dump

This message transmits the 40 programs currently in the four internal banks.

xxxxxxxx	ESQ/SQ-80 System Exclusive header
00000010	All Program Dump code
0000LLLL	2 nybbles per byte of program data
0000hhhh	102 * 40 data bytes (9160 nybble-ized MIDI bytes) L = low nybble, h = high nybble
11110111	End of exclusive

2.3 Sequence dumps

Sequencer dumps are transmitted as a multi-packet sequence of messages. The transmitter first sends a dump alert packet. This packet contains the size of the sequence to be transmitted. If the receiver can accept this amount of data it sends an accept message: otherwise it sends a reject message.

After the transmitting SQ-80 receives an accept message, it will then transmit the sequence data dump. If it does not receive an accept message, it transmits the data anyway. This allows sending the data to non-ESQ/SQ-80 devices.

NOTE: Sequence dumps should not be sent to an SQ-80 without first transmitting a sequence dump alert message and then waiting for the response.

2.3.1 All Sequence Dump Alert Packet

This message is transmitted by the sending SQ-80 to inform the receiving unit that it wishes to dump the entire sequencer memory. Note: this message will not be recognized by an ESQ-1.

xxxxxxxx	ESQ/SQ-80 System Exclusive Header
00100001	SQ-80 All Sequence Dump Alert code
0000LLLL 0000LLLL	Low byte (in nybbles) of sequence size
0000hhhh 0000hhhh	High byte (in nybbles) of sequence size
11110111	End of exclusive

2.3.2 One Sequence Dump Alert Packet

Transmitted by the sending SQ-80 to inform the receiving unit that it wishes to dump the currently selected single sequence. This message can be received by an ESQ-1.

xxxxxxxx	ESQ/SQ-80 System Exclusive Header
00000111	ESQ/SQ-80 One Sequence Dump Alert code
0000LLLL 0000LLLL	Low byte (in nybbles) of sequence size
0000hhhh 0000hhhh	High byte of sequence size
11110111	End of exclusive

2.3.3 Accept Message

Transmitted by the receiving SQ-80 to indicate that it will accept a sequence dump.

xxxxxxxx	ESQ/SQ-80 System Exclusive Header
00000100	Sequence Accept code
11110111	End of exclusive

2.3.4 Reject Message

Transmitted by the receiving SQ-80 to indicate that it does not have sufficient memory to accept the dump from the sending SQ-80.

xxxxxxxx	ESQ/SQ-80 System Exclusive Header
00000101	Sequence Reject code
11110111	End of exclusive

2.3.5 No Free Sequence Message

Transmitted by the receiving SQ-80 in response to a One Sequence Dump Alert Packet (2.3.2) to indicate that it does not have any empty sequence locations in which to place the incoming sequence.

xxxxxxxx	ESQ/SQ-80 System Exclusive Header
00001101	No free sequence reject code
11110111	End of exclusive

2.3.6 All Sequence Dump Packet

This packet contains the sequence data. The data block consists of 1 E6H bytes of track and pointer information. followed by the number of bytes of sequence data, as determined by the sequence size specified in the All Sequence Dump Alert packet. (see 2.3.1).

xxxxxxxx	ESQ/SQ-80 System Exclusive Header
00100000	SQ-80 Sequence Dump code
0000LLLL 0000hhhh	Data.. variable number of bytes of sequence data L = low nybble, h = high nybble
11110111	End of exclusive

2.3.7 One Sequence Dump Packet

This packet contains the data for the current sequence. The packet will contain the number of bytes specified in the one sequence alert packet (see section 2.3.2).

xxxxxxxx	ESQ/SQ-80 System Exclusive Header
00001000	ESQ/SQ-80 One sequence Dump code
0000LLLL 0000hhhh	Data.. variable number of bytes of sequence data L = low nybble, h = high nybble
11110111	End of exclusive

2.4 Request Messages

The following are messages which can be sent to an SQ -80 to initiate program or sequence dumps.

2.4.1 Current Program Dump Rawest

This request asks for a dump of the currently selected program. The SQ-80 responds with a Single Program Dump Packet (2.2.1).

xxxxxxxx	ESQ/SQ-80 System Exclusive Header
00001001	Program Dump Request code
11110111	End of exclusive

2.4.2 All Program Dump Request

This request asks the SQ-80 to dump all 40 of its internal programs. The SQ-80 responds with an All Program

Dump Packet (2.22).

xxxxxxxx	ESQ/SQ-80 System Exclusive Header
00001010	All Program Dump Request code
11110111	End of exclusive

2.4.3 All Sequence Dump Request

This request asks the SQ-80 to dump all sequencer data. The SQ-80 responds with a Sequence Dump Alert Packet (2.3.1). The requesting unit should then respond with an accept or reject packet as described in section 2.3.1

xxxxxxxx	ESQ/SQ-80 System Exclusive Header
00100010	SQ-80 All Sequence Dump Request code
11110111	End of exclusive

2.4.4 One Sequence Dump Request

This request asks the SQ-80 to dump its currently selected sequence. The SQ-80 Responds with an One Sequence Dump Alert Packet (2.3.2).

xxxxxxxx	ESQ/SQ-80 System Exclusive Header
00001100	ESQ/SQ-80 One Sequence Dump Request code
11110111	End of exclusive

2.5 Received Virtual Keypad Events

This system exclusive message allows an external device to simulate the pressing of the SQ-80's front panel buttons. The format of the message is an ESQ/SQ-80 System Exclusive Header, followed by the Keypad Command Code, and then a stream of button down and button up codes which is terminated by an End of Exclusive.

NOTE: Each Button Down keypad event should be followed by a Button Up event for the same button to prevent the inbound keypad event processor from becoming "hung up" while waiting for a button to be released. This should usually be done within one system exclusive message. It should also be possible to follow up with separate messages, but be careful not to leave dangling button downs !

xxxxxxxx	ESQ/SQ-80 System Exclusive header
00001110	Keypad Command code
	(Data stream...)
Onnnnnnn	Any number of keypad events (button down/up codes) One button down or button up event per byte. (button codes are specified in the table below)
11110111	End of exclusive

Button Codes

Down	Up

As you may have observed, the button up codes are differentiated from the button down codes by a positive offset of 51 decimal or $33 hex. The Button Code 00 is reserved for illegal key events within the system and should not be sent to the SQ-80 . Also, button codes out of the range specified in the above table should not be sent to the SQ-80.

2.5.1 Compare Button Status Message

This message is both sent and received by the SQ-80 . It is sent whenever the Compare status of the SQ-80 is changed by pressing the Compare button. The same message format is recognized when it is received from another SQ-80 or ESQ product if recognition of system exclusive messages is enabled (MIDI ENABLE=KEYS+CT+PC+SS+SX).

xxxxxxxx	ESQ/SQ-80 System Exclusive header
00010000	Compare Status Command code
0000000n	Status of the Compare button n=1, Compare On n=0, Compare Off
11110111	End of exclusive

2.6 MIDI Song Selects

MIDI Song Selects may be received by the SQ-80 when the setting of the MIDI Enable parameter is "KEYS+CT+PC+SNGSL" or "KEYS+CT+PC+SS+SX". Inbound MIDI Song Selects are recognized only in sequencer STOP or SNGS (Song Stop) modes. Song Selects 00 to 19 will select defined songs within that range and put the sequencer into Song Mode. Selects for undefined songs will be ignored. The ESQ-1 will interpret MIDI Song Selects 20 through 79 as sequence selects, and will map them onto SEQ-1 through SEQ-60. A Song Select 20, for example, will select SEQ-1 if it is defined, and will then put the sequencer into Sequence Mode. MIDI Song Selects are transmitted whenever a song or sequence is selected from the SEQ BANK pages by using the softkeys on the front panel (virtual keypad events will also transmit them).

2.7 MIDI Device Inquiry/I.D. Messages

2.7.1 Device Inquiry Message

The SQ-80 supports the MIDI Device Inquiry message which allows instruments and computers to ascertain the identity of the unit(s) to which they are connected. The SQ-80 will respond to the following Device Inquiry Message with the Device ID Message detailed below. The SQ-80 will respond to the inquiry if the channel information in the message contains either the base MIDI channel number of the SQ-80 or the all channel broadcast code ($7F).

11110000	System Exclusive status byte
01111110	Non real time message
0000nnnn	nnnn=MI DI Channel number
Or	
01111111	All channel broadcast code
00000110	General Information message code
00000001	Device Inquiry Message message code
11111110	End of Exclusive

2.7.2 Device ID Message

When the SQ-80 receives a correctly formatted MIDI Device Inquiry message it will respond with the following Device ID Message. This message follows the MMA recommendations for device ID messages, and contains information about the responding device including manufacturer, product family and software revision.

11110000	System Exclusive Status byte
01111110	Non real time message
0000nnnn	nnnn=Base MIDI Channel
00000110	General Information message code
00000010	Device ID Message code
00001111	ENSONIQ System Exclusive manufacturer's code
00000010	ESQ/SQ-80 Product Family code (lsb)
00000000	ESQ/SQ-80 Product Family code (msb)
00000011	SQ-80 Family Member code (lsb)
00000000	SQ-80 Family Member code (msb)
00000000	Software revision information
00000000	
Onnnnnnn	Major Version number (integer portion)
Onnnnnnn	Minor version number (decimal fraction)
11111110	End of Exclusive

2.8 ESQ-1 Sequence Messages Received

These ESQ-1 Sequencer Messages are received and understood by the SQ-80 but not transmitted.

2.8.1 ESQ-1 All Sequence Dump Alert

This message is transmitted by the sending ESQ-1 to inform the receiving unit that it wishes to dump the entire sequencer memory.

xxxxxxxx	ESQ/SQ-80 System Exclusive Header
00000011	ESQ-1 All Sequence Dump Alert code
0000LLLL	
0000LLLL	Low byte (in nybbles) of sequence size
0000hhhh	
0000hhhh	High byte (in nybbles) of sequence size
11110111	End of exclusive

2.8.2 ESQ-1 All Sequence Dump Packet

This packet contains the sequence data. The data block consists of 132H bytes of track and pointer information, followed by the number of bytes of sequence data, as determined by the sequence size specified in the All Sequence Dump Alert packet. (see 2.8.1).

xxxxxxxx	ESQ/SQ-80 System Exclusive Header
00000110	ESQ-1 Sequence Dump code
0000LLLL 0000hhhh	Data.. variable number of bytes of sequence data L = low nybble, h = high nybble
11110111	End of exclusive

SQ-80 Parameter Number List

The numbers below are the numbers that are sent in the Parameter Select controllers (MIDI Controller #'s 98 and 99). Note that the SQ-80 will recognize MIDI Parameter Selects only if System Exclusive messages are enabled (ENABLE=KEYS+CT+PC+SS+SX on the MIDI Page.)

Page	Param # dec	Param # hex	Parameter
ENV4			
	30	1E	ENV4 L1 parameter
	31	1F	ENV4 L2 parameter
	32	20	ENV4 L3 parameter
	33	21	ENV4 LV parameter
	34	22	ENV4 T1V parameter
	35	23	ENV4 T1 parameter
	36	24	ENV4 T2 parameter
	37	25	ENV4 T3 parameter
	38	26	ENV4 T4 parameter
	39	27	ENV4 TK parameter
LFO1			
	40	28	LFO1 frequency parameter
	41	29	LFO1 reset parameter
	42	2A	LFO1 humanize switch parameter
	43	2B	LFO1 modulation waveform parameter
	44	2C	LFO1 L1 parameter
	45	2D	LFO1 Delay parameter
	46	2E	LFO1 L2 parameter
	47	2F	LFO1 modulation source parameter
LFO2			
	48	30	LFO2 frequency parameter
	49	31	LFO2 reset parameter
	50	32	LFO2 humanize switch parameter
	51	33	LFO2 modulation waveform parameter
	52	34	LFO2 L1 parameter
	53	35	LFO2 delay parameter
	54	36	LFO2 L2 parameter
	55	37	LFO2 modulation source parameter
LFO3			
	56	38	LFO3 frequency parameter
	57	39	LFO3 reset parameter
	58	3A	LFO3 humanize switch parameter
	59	3B	LFO3 modulation waveform parameter
	60	3C	LFO3 L1 parameter
	61	3D	LFO3 delay parameter
	62	3E	LFO3 L2 parameter
	63	3F	LFO3 modulation source parameter
OSC1			
	64	40	OSC1 octave parameter
	65	41	OSC1 semitone parameter
	66	42	OSC1 finetune parameter
	67	43	OSC1 waveform parameter
	68	44	OSC1 modulation source 1 parameter
	69	45	OSC1 modulation amount 1 parameter
	70	46	OSC1 modulation source 2 parameter
	71	47	OSC1 modulation amount 2 parameter

Page	Param # dec	Param # hex	Parameter
OSC2			
	72	48	OSC2 octave parameter
	73	49	OSC2 semitone parameter
	74	4A	OSC2 finetune parameter
	75	4B	OSC2 waveform parameter
	76	4C	OSC2 modulation source 1 parameter
	77	4D	OSC2 modulation amount 1 parameter
	78	4E	OSC2 modulation source 2 parameter
	79	4F	OSC2 modulation amount 2 parameter
OSC3			
	80	50	OSC3 octave parameter
	81	51	OSC3 semitone parameter
	82	52	OSC3 finetune parameter
	83	53	OSC3 waveform parameter
	84	54	OSC3 modulation source 1 parameter
	85	55	OSC3 modulation amount 1 parameter
	86	56	OSC3 modulation source 2 parameter
	87	57	OSC3 modulation amount 2 parameter
DCA1			
	88	58	DCA1 level parameter
	89	59	DCA1 output enable parameter
	90	5A	DCA1 modulation source 1 parameter
	91	5B	DCA1 modulation amount 1 parameter
	92	5C	DCA1 modulation source 2 parameter
	93	5D	DCA1 modulation amount 2 parameter
DCA2			
	94	5E	DCA2 level parameter
	95	5F	DCA2 output enable parameter
	96	60	DCA2 modulation source 1 parameter
	97	61	DCA2 modulation amount 1 parameter
	98	62	DCA2 modulation source 2 parameter
	99	63	DCA2 modulation amount 2 parameter
DCA3			
	100	64	DCA3 level parameter
	101	65	DCA3 output enable parameter
	102	66	DCA3 modulation source 1 parameter
	103	67	DCA3 modulation amount 1 parameter
	104	68	DCA3 modulation source 2 parameter
	105	69	DCA3 modulation amount 2 parameter
DCA4			
	106	6A	DCA4 modamt parameter
	107	6B	PAN position parameter
	108	6C	PAN modulation source parameter
	109	6D	PAN modulation amount parameter

Page	Param # dec	hex	Parameter
FILTER			
	110	6E	FILTER Fc (cutoff) parameter
	111	6F	FILTER Q (resonance) parameter
	112	70	FILTER modulation amount 3 parameter
	113	71	FILTER modulation source 1 parameter
	114	72	FILTER modulation amount 1 parameter
	115	73	FILTER modulation source 2 parameter
	116	74	FILTER modulation amount 2 parameter
MODES			
	117	75	MODES AM switch parameter
	118	76	MODES glide parameter
	119	77	MODES mono switch parameter
	120	78	MODES sync switch parameter
	121	79	MODES voice reassign switch parameter
	122	7A	MODES envelope reset switch parameter
	123	7B	MODES wave reset switch parameter
	124	7C	MODES cycle switch parameter
SPLIT/LAYER			
	125	7D	S/L split layer switch parameter
	126	7E	S/L split layer program parameter
	127	7F	S/L layer switch parameter
	128	80	S/L layer program parameter
	129	81	S/L split direction parameter
	130	82	S/L split program parameter
	131	83	S/L split point parameter

* the following parameter numbers (132-143) are used for the non-pcb system parameters

System parameters:

MASTER			
	132	84	MASTER tuning parameter
	133	85	MASTER velocity parameter
	134	86	MASTER pedal switch parameter
	135	87	MASTER pitch bend range parameter
	136	88	MASTER pitch bend mode parameter
MIDI			
	137	89	MIDI base channel parameter
	138	8A	MIDI overflow switch parameter
	139	8B	MIDI xcontrol parameter
	140	8C	MIDI pressure parameter
	141	8D	MIDI mode parameter
	142	8E	MIDI enable parameter

The parameters on the MIDI Page (137-142) can be selected but not modified via MIDI.

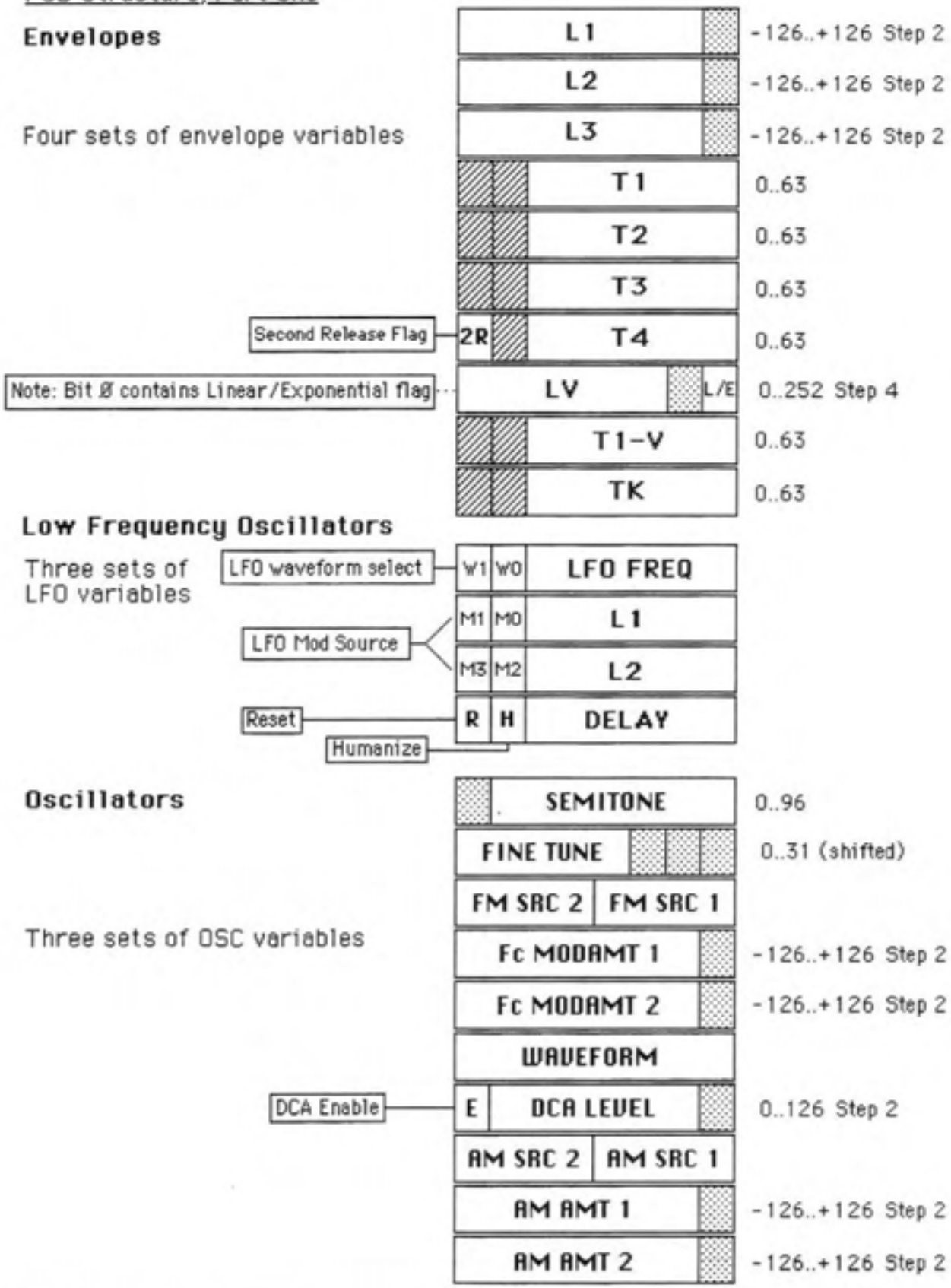
MODEL: SQ-80 **MIDI Implementation Chart** **Date: 9/7/87 Version: 1.0**

Function...		Transmitted	Recognized	Remarks
Basic Channel	Default Channel	1 1- 16	1 1- 16	
Mode	Default Messages Altered		1, 3, 4, Multi	memorized (Global Controllers In MONO Mode)
Note Number	True Voice	21 - 108	21 - 108	
Velocity	Note ON Note OFF	O O	O O	
After Touch	Key's Ch's	O O	O O	
Pitch Bender		O	O	
Control Change		1 - 95 1 Mod Wheel 2 Breath 4 Foot 6 Data 7 Volume 96 Inc 97 Dec 98 Param 99 Param	1 - 95 1 Mod Wheel 2 Breath 4 Foot 6 Data 7 Volume 96 Inc 97 Dec 98 Param 99 Param	programmable
Prog Change	True #	0 - 119	0 - 119	
System Exclusive		O	O	
System Common	: Song Pos : Song Sel : Tune	O O X	O O X	
System Real Time	: Clock : Commands	O Clock O Start, Stop, Cont	O Clock O Start, Stop, Cont	
Aux Mes-sages	: Local On/Off : All Notes Off : Active Sense : Reset	X X X X	X X X X	
Notes				

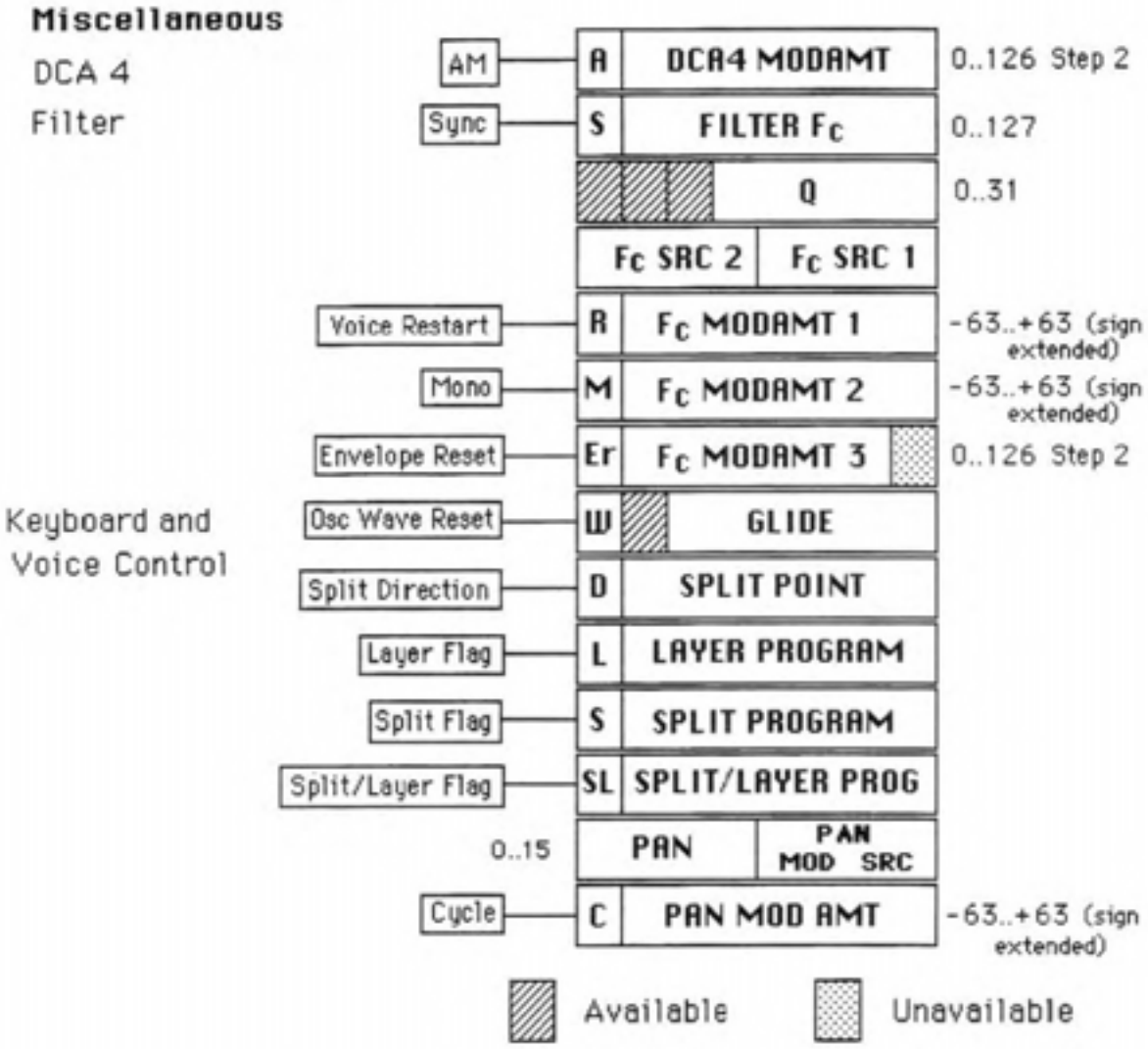
Mode 1: OMNI ON, POLY
Mode 2: OMNI ON, MONO
Mode 3: OMNI OFF, POLY
Mode 4: OMNI OFF MONO

O : YES
X : NO

PCB Structure, Part One

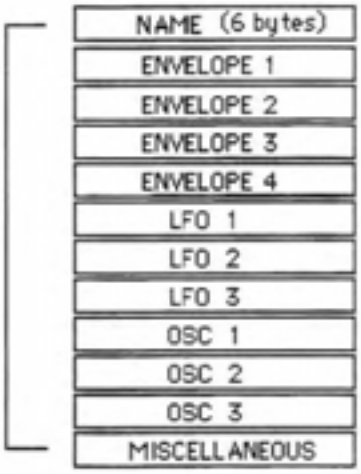


PCB Structure, Part Two



Complete PCB Structure

102 Bytes Total



SQ-80 TRACK SHEET

SEQ #	☐ Template
STORED:	☐ Recorded Seq.

TIME SIG. =	TEMPO=	SYNC=	LOOP= ☐ On ☐ Off

	Tracks Select	Tracks Mix•MIDI				Receiving Instrument	
	Program	Status	Prog. Num	Mix	MIDI Chan	Name	Special Notes
Track 1							
Track 2							
Track 3							
Track 4							
Track 5							
Track 6							
Track 7							
Track 8							

Other Notes:

SQ-80 PROGRAM SHEET

PROGRAM:

	OCT=	SEMI=	FINE=	WAVE=	MOD #1	DEPTH	MOD #2	DEPTH
OSC 1								
OSC 2								
OSC 3								

	LEVEL=	OUTPUT=	MOD #1	DEPTH	MOD #2	DEPTH
DCA 1						
DCA 2						
DCA 3						

	FREQ=	Q=	KEYBD=	MOD #1	DEPTH	MOD #2	DEPTH
Filter							

	FINAL VOL (ENV 4)	PAN=	PAN MODULATOR	DEPTH
DCA 4				

	FREQ=	RESET=	HUMAN=	WAV=	L1=	DELAY=	L2=	MOD=
LFO 1		On Off	On Off					
LFO 2		On Off	On Off					
LFO 3		On Off	On Off					

	L1=	L2=	L3=	LV=	T1V=	T1=	T2=	T3=	T4=	TK=
ENV 1										
ENV 2										
ENV 3										
ENV 4										

	SYNC=	AM=	MONO=	GLIDE=	VC=	ENV=	OSC=	CYC=
Modes	On Off	On Off	On Off		On Off	On Off	On Off	On Off

	SPLIT/LAYER=	SPLIT/LAYER PROGRAM	LAYER=	LAYER PROGRAM	SPLIT=	SPLIT PROGRAM	SPLIT KEY=
Split/ Layer	On Off		On Off		Off Lower Upper		

SQ-80 SPECIFICATIONS

KEYBOARD

- 61 note (C-C) weighted-action keyboard with velocity sensitivity and Key pressure (polyphonic after-touch)
- Programmable split point
- Sound layering on either or both keyboard halves
- Polyphonic glide, fingered mono glide

VOICE ARCHITECTURE

- 8-voice polytimbral
- 3 digital Wave oscillators per voice
- Amplitude modulation on each oscillator
- 75 multi-sampled and synthetic Waveforms, Tran-
  sient Attacks and Inharmonic Loops in memory
- 15 routable voice modulation sources
- 3 multi-waveform LFO's per voice with humanized random variation
- 4 complex envelope generators per voice, velocity controlled, with simulated reverb (second release) stage
- Programmable panning
- Hard sync and ring modulation (AM)
- Analog filters, 4-pole low-pass with variable resonance

PROGRAM PARAMETERS

- 80-character fluorescent display. readable in all li ghting conditions
- 10 program names simultaneously displayed
- Multiple display pages for simple yet flexible programming
- 40 internal programs, direct access
- 80 external cartridge programs, direct access with cartridge installed
- Compare mode for comparing programs

SEQUENCER

- 8 polyphonic tracks, each with separate Program. Volume and MIDI channel
- Tracks can play internal voices and/or external MIDI instruments
- Up to 8 voices per track, dynamically assigned
- Post-quantization (auto-correct to 1/32 note triplets)
- Built-in auto-locator and metronome
- Mixdown facility for balancing individual tracks
- 60 separate sequences, chainable into 20 songs
- Internal storage - 20,000 notes

MIDI

- Poly, Omni, Multi and Mono modes
- "MIDI Overflow Mode" permits slaving additional units for 16 or more voices
- 9 simultaneous polyphonic channels with separate programs
- Global controllers in mono mode for use with MIDI guitar controllers, etc.
- MIDI song position pointers for use with SMPTE auto-locators
- MIDI standard remote programming

DISK

- 880K double-sided 3.5" micro-floppy
- Each disk stores:
  10 Seq/Sys-Ex files +
  40 Bank files +
  128 single programs
- Save to disk MIDI System Exclusive dumps of up to 64k from any MIDI device

INPUTS/OUTPUTS

- Left and Right/Mono audio outputs allow programmable stereo mix
- Headphone jack
- Pedal/Control Voltage Input (allows modulation of voices from an external source or pedal control of volume)
- Sustain Pedal, Sequencer Footswitch, Tape In/Out for sync and storage
- MIDI In, MIDI Out, MIDI Thru

STANDARD ACCESSORIES

Standard accessories include:

- Musician's Manual, detachable power cord. Sustain Pedal/footswitch - for voice sustain or sequence triggering.
- Voice/Data Disk #1

OPTIONAL ACCESSORIES

- Ensoniq E^{2P}ROM Cartridge - for storing up to 80 player-created programs
- Additional Voice/Data Disks
- CV Pedal - for voice modulation
- Footswitch

DIMENSIONS

- 38 3/4" (98CM) wide X 3 1/2" (9cm) high X 13 1/2" (34cm) deep
- Weight: 29.2 pounds (13.2 kilograms)

WARRANTY

- One year, parts and labor

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

IMPORTANT SAFETY INSTRUCTIONS

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

1. Read all the instructions before using the product.

2. Do not use this product near water - for example, near a bathtub, washbowl, kitchen sink, in a wet basement, or near a swimming pool, or the like.

3. This product should be used only with a cart or stand that is recommended by the manufacturer.

4. This product, either alone or in combination with an amplifier and headphones or speakers. may be capable of producing sound levels that could cause permanent hearing loss. Do not operate for a long period of time at a high volume level or at a level that is uncomfortable. If you experience any hearing loss or ringing in the ears, you should consult an audiologist.

5. The product should be located so that its location or position does not interfere with its proper ventilation.

6. The product should be located away from heat sources such as radiators, heat registers, or other products that produce heat.

7. The product should be connected to a power supply only of the type described in the operating instructions or as marked on the product.

8. This product may be equipped with a polarized line plug (one blade wider than the other). This is a safety feature" If you are unable to insert the plug into the outlet, contact an electrician to replace your obsolete outlet. Do not defeat the safety purpose of the plug.

9. The power supply cord of the product should be unplugged from the outlet when left unused for a long period of time.

10. Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.

11. The product should be serviced by qualified service personnel when:

    a. The power supply cord or the plug has been damaged; or
    b. Objects have fallen, or liquid has been spilled into the product; or
    c. The product has been exposed to rain: or
    d. The product does not appear to operate normally or exhibits a marked change in performance: or
    e. The product has been dropped, or the enclosure damaged.

12. Do not attempt to service the product beyond that described in the user-maintenance instructions. All other servicing should be referred to qualified service personnel.

SAVE THESE INSTRUCTIONS

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