

# OWNER'S MANUAL

# Matrix-6R



## Oberheim

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# Oberheim

# Matrix-6R

## 6-Voice Polyphonic Rack-Mount MIDI Synthesizer OWNER'S MANUAL

First Edition - February, 1986

"Matrix-6R Owner's Manual"  
First Edition Text by David M. Bertovic

### CAUTION:

To prevent fire or shock hazard, do not expose this appliance to rain or moisture. Do not remove cover. No user serviceable parts inside. Refer servicing to qualified service personnel.

### WARNING:

This equipment generates and uses radio frequency energy and if not installed and used properly, i.e., in strict accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take what ever measures may be required to correct the interference.

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IF YOU HAVE A PROBLEM

# WELCOME TO THE MATRIX-6R

Congratulations! You are now the owner of a powerful and versatile 6-Voice polyphonic synthesizer of outstanding features and value. Based upon the same revolutionary technology as the Oberheim MATRIX-6, the MATRIX-6R utilizes all of its sound programming, performance and MIDI features in a low-cost, rack-mountable unit.

The MATRIX-6R is divided into three main areas of operation called "modes". You have complete control over each mode and all the functions, called "parameters", within them. These three modes - the PATCHES, SPLITS and the general functions in MASTER - provide you with all the necessary ingredients to create patches, edit existing patches, split the Master keyboard and set up your pedals, levers and other controllers quickly and easily. Also included is a full compliment of MIDI features that allows you to interface with other synthesizers, sequencers and computers.

And the sound? The MATRIX-6R utilizes a new breed of Digitally Controlled Oscillators - "DCOs" for short - that provide unparalleled tuning stability and richness of sound. A wide-range, 4-pole low-pass filter, three 5-parameter envelope generators, two independent LFO's, and the Matrix Modulation™ System give you all the basics to precisely articulate the sound of each patch.

You will also find that the MATRIX-6R has one of the most elaborate and useful MIDI Interfacing systems of any polyphonic synthesizer available today. Standard MIDI functions have been expanded and allow you complete control over each one's status. And we've also developed a series of completely new MIDI parameters such as "Patch Mapping" and "Spillover", providing you with a higher level of performance control. The addition of the "MIDI Mono" mode enables individual voice control from different sequencer tracks or MIDI guitar interfaces. These features make the MATRIX-6R the ideal addition to any instrument setup.

The MATRIX-6R's front panel reads from left to right, conveniently laid out in logical fashion. And all the functions and parameters are printed on the top panel and numerically indexed for quick reference. The 16-character fluorescent display co-ordinates the use of all functions and even has a brightness adjustment for different lighting conditions.

Although the MATRIX-6R is designed with many features and controls that you may already be familiar with, we recommend that you read this manual in its entirety. It was written to provide you with all the information you will need to use your MATRIX-6R in an easy-to-read format.

We encourage you to experiment or you'll never know what you might discover. And thank-you for choosing the MATRIX-6R.

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## PLAYING THE MATRIX-6R

### WHAT TO DO IF YOU'RE IN A HURRY

If you absolutely **MUST** start now, take the next five minutes and read the following:

1. **HOOK IT UP** - Refer to the HOOK-UP diagram shown on Page 8. Make sure you use the right cables.

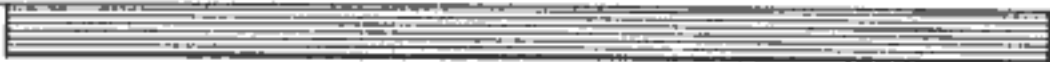
The MATRIX-6R must be used as a SLAVE, so connect the MIDI OUT of the Master instrument to the MIDI IN of the MATRIX-6R.

2. **TURN IT ON** - The POWER SWITCH is on the front panel in the lower right-hand corner. Flip it up.
3. **TUNE IT UP** - Press the orange MASTER button. Press the second grey button right below the display. The display will read "**TUNING . . .**" which will take all of three seconds.
4. **SELECTING PATCHES** - Press the blue PATCHES button and the PATCH SELECT light should go on. If not, press the blue PATCHES button a few times as the lights will "loop" around the three headings.

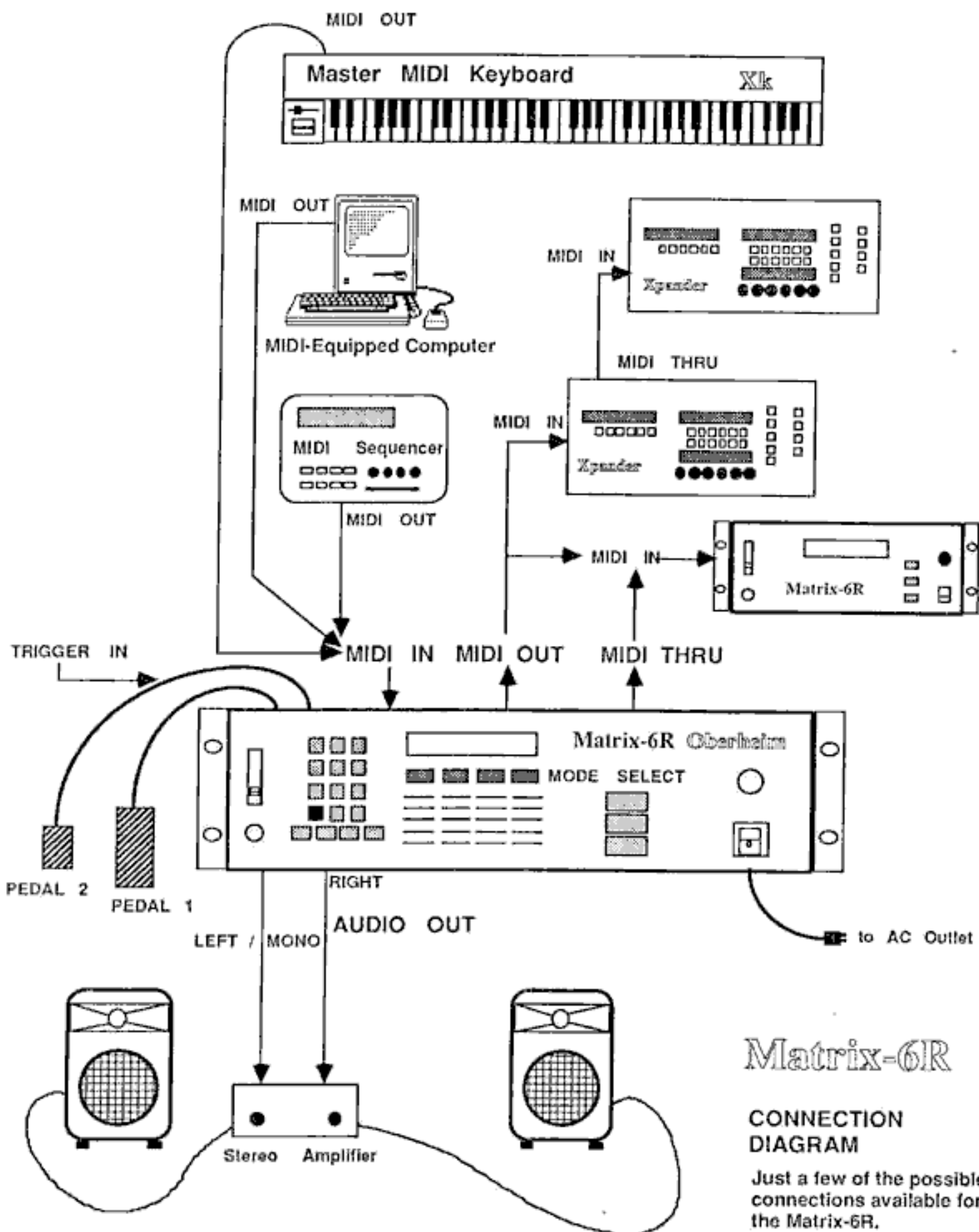
When PATCH SELECT is lit up, you can select any one of the MATRIX-6R's 100 patches numbered 00 through 99. Typing in 2-digit numbers on the Keypad or using the < > or << >> buttons will change patches.

< > change values by 1.  
<< >> change values by 5.

6. **SELECTING SPLITS** - Press the grey SPLITS button. The light next to SPLIT SELECT should come on. If not, press SPLITS again and it will. You can now use the Keypad, < > or << >> buttons to select any one of the MATRIX-6R's 50 SPLIT programs numbered 00 through 49.
7. **ADJUST THE VOLUME** - The VOLUME slider controls the volume of both the main outs on the back panel and the Headphone jack in the front simultaneously. Pushing it up gives an increase in volume. Pulling it down decreases the volume.

- 
- 
8. **PROGRAMMING** - If you want to change ("EDIT") a patch, you must turn MEMORY PROTECT on the back panel OFF or permanent changes cannot take place. In addition, patches can be protected individually. The PROTECT button in the MODE SELECT section of the front panel must also be turned OFF for each patch that you want to alter permanently. To program your edits, press and hold the bright red STORE button and while you are holding it down, type in the 2-digit program Number on the Keypad. This will program the patch, along with its changes, permanently into memory.

These brief procedures are explained in detail throughout the rest of the manual. We encourage you to read the manual in its entirety if you would like to learn more about the MATRIX-6R.



# Matrix-6R

## CONNECTION DIAGRAM

Just a few of the possible connections available for the Matrix-6R.



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# PLAYING THE MATRIX-6R

## BASIC HOOK-UP

### RACK MOUNTING

The MATRIX-6R is designed primarily to be used in a standard 19" rack mount cabinet. All that you will need to install your MATRIX-6R is a Phillips-Head screwdriver. All of the necessary mounting hardware is provided with your Owner's Packet.

First you must attach the synthesizer's "ears" - the two L-shaped metal strips to the left and right sides of the unit's front panel. Notice that each ear has two different types of holes. The circular, countersunk holes are used to mount the ear to the synthesizer itself. The oval holes are used to mount the MATRIX-6R into the rack cabinet. You will notice that they are somewhat larger than the bolts used to mount the unit. These holes are oval-shaped to provide some "play" when installing the unit into a rack cabinet, just in case the dimensions of the rack are not exact.

The MATRIX-6R uses three rack spaces. A standard "rack space" is 1 3/4 inches of vertical space in the cabinet. When installing the MATRIX-6R into the rack, we recommend leaving an air space of approximately 1/2-inch or so above and below the MATRIX-6R and other instruments in the rack so as to insure proper ventilation. This will help prevent the MATRIX-6R from possibly overheating, especially if it will be left powered on for prolonged periods of time.

It is not necessary for the MATRIX-6R to be rack-mounted to work properly. The synthesizer will operate normally if placed on any level surface. That's why we also included four rubber feet. These feet, by the way, can be removed before installing the MATRIX-6R in the rack. Just be sure to keep the unit well ventilated. You may also remove the rack-mount ears if you wish.

### A.C. POWER

The MATRIX-6R is shipped from the factory set for local AC power. The small rectangular AC receptacle on the back panel will be protected by a metal-foil cover. Remove this cover, plug the female end of the AC cord into the MATRIX-6R and the male end into your wall outlet.

### AUDIO and MIDI CONTROL CONNECTIONS

Before powering on the MATRIX-6R, connect the instrument to your sound system. The Hook-Up diagram on the facing page will assist you in setting up the MATRIX-6R, showing the different connections that are possible with the back panel jacks as described in the section titled BACK PANEL FUNCTIONS.

Also before powering on the MATRIX-6R, connect the synthesizer to the MIDI instrument that you will use as its Master. Because the MATRIX-6R does not have its own keyboard, it must be played as a "Slave" from another MIDI instrument as its "Master". The Master can be another MIDI synthesizer, a MIDI guitar synthesizer or MIDI guitar interface, a MIDI-equipped sequencer, drum machine or computer, or a MIDI keyboard controller. Using a standard MIDI interface cable, connect the MIDI OUT of the Master to the MIDI IN of the MATRIX-6R.

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The order in which you power on your instruments is important. First, turn on the synthesizer or MIDI Controller that will drive the MATRIX-6R. Next, turn on the MATRIX-6R with its volume control set to its minimum (knob all the way down). Then turn on the sound system - mixer first then the power amplifier. Powering on in this order will prevent a possible "lock-up" occurring from the MIDI connections and a possible audio "thump" from harming your speaker(s). When shutting down your system, reverse the order - turn off the power amplifier, then the mixer, then the MATRIX-6R and the rest of your keyboards.

### CARE & MAINTENANCE

For proper care and handling, do not expose your MATRIX-6R to direct sunlight or to temperatures above 120 °F (48.9 °C).

Should your MATRIX-6R require cleaning, use a soft cloth with mild soap (such as dishwashing liquid) and luke-warm water. Spray-type window cleaners are acceptable but do not spray the synthesizer directly - spray the cloth first then clean the MATRIX-6R. Do not use harsh or abrasive detergents or solvents. We do not recommend vinyl-treatment products that leave a residue.

### SERVICING

Should your MATRIX-6R need servicing, do not attempt repairs yourself. Refer to the section in the back of this manual titled IF YOU HAVE A PROBLEM and contact your nearest Oberheim Authorized Service Center. A current roster of Service Centers is included in the Owner's Packet along with this manual.

Be sure to save your patches to Cassette before you take your MATRIX-6R in and repairs are started. This will be your "back-up" should the synthesizer's memory be lost during the repair. It is a good idea to make a habit of saving your data routinely. Refer to the section "Programming the MATRIX-6R, Part 3: The MASTER EDIT Page". The procedure for saving your programs to tape is described in the CASSETTE section, starting on Page 76.

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# TOURING THE MATRIX-6R

## Part 1: FRONT & BACK PANEL FUNCTIONS

### FRONT PANEL

In order to gain a better understanding of the numerous capabilities of your MATRIX-6R, we've prepared a short tour of its general functions that will give you a good understanding of what the synthesizer is able to accomplish and how its front, top and back panels are laid out. Detailed information for each specific function will be provided later in the manual. Also, we will get into some step-by-step procedures that will help you make sense of all this new information. But first, let's take a little "tour" around the MATRIX-6R to get an idea of what this synthesizer has and what it can do.

#### VOLUME CONTROL AUDIO & HEADPHONE OUTPUTS

You will notice right away that the MATRIX-6R front panel has only two standard controls. One is the slider used for the instrument's VOLUME, and the other is the power ON / OFF switch. The Volume Slider controls the output level for both the LEFT / MONO and RIGHT channel AUDIO OUT jacks on the back panel as well as the HEADPHONE output jack located just below the Volume Slider. The ON / OFF switch simply turns the unit ON or OFF.

The VOLUME control operates as follows: When the knob is pulled all the way down, the control is at its minimum setting - no volume or silence. When the knob is pushed all the way up, the control is at its maximum setting.

In the MASTER EDIT Page, MISC. Parameter "56 STEREO" determines the status of the two AUDIO OUT jacks on the back panel.

When STEREO is set to OFF, the LEFT / MONO jack outputs sound for both Single patches and SPLIT patches (the two playing modes of the MATRIX-6R) and the RIGHT jack does not output any sound.

When STEREO is set to ON, the LEFT / MONO jack outputs all sounds from single patches and the sound from the LOWER patch when in SPLIT mode; the RIGHT jack only outputs sound when in SPLIT mode, and this sound comes from the UPPER patch.

#### KEYPAD, MODE SELECT and DISPLAY

The KEYPAD and MODE SELECT section is the "control center" of the MATRIX-6R. It is the use of these two sections in conjunction with each other that enables you to operate every function within the MATRIX-6R. The DISPLAY is a visual aid that tells you what particular function has been called up and, in some instances, will "prompt" you or ask you to make a choice.

In addition to the specific information shown on the DISPLAY, the basic "modes" or groups of functions available are indicated by several small red lights. These indicator lights are referred to as "LEDs" (Light Emitting Diodes), so we'll use that term throughout the rest of the manual. There is a

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vertical row of LEDs next to each name right beneath the MODE SELECT heading and an LED in the corner in each of the four grey buttons right under the DISPLAY. You will soon see how cross-matching two LEDs (to select the basic mode) and using the DISPLAY (to select a specific function) is the main idea behind operating the MATRIX-6R.

#### REMOTE

This female receptacle is used to interface the MATRIX-6R with its Remote Programmer. The Oberheim MATRIX-6R remote controller makes programming the MATRIX-6R much easier when it has been installed in a rack cabinet. The MATRIX-6R remote controller is available from your Authorized Oberheim Dealer as an optional accessory.

It should be noted that although the REMOTE plug looks very familiar, it is not a MIDI connector. It has a specialized function strictly in connecting the MATRIX-6R with its optional remote programmer.

#### A.C. POWER SWITCH

The AC switch on the front panel applies power to the MATRIX-6R when turned ON. It is recommended that the MATRIX-6 be turned OFF when not in use.

## TOP PANEL

#### TOP PANEL PARAMETER LISTS

The top panel of the MATRIX-6R's chassis has the operating features printed on it and is arranged in groups of related functions or "parameters" as they are called. This master list of operating parameters is used as a reference guide when programming what specific functions you want the MATRIX-6R to do.

When using the Keypad and MODE SELECT sections, you need to refer to one of these lists when selecting the particular parameter that you want to use. Each parameter is numbered so you simply type in this number on the Keypad and the parameter along with its current VALUE will be shown on the display.

## BACK PANEL

#### PEDAL 1 and PEDAL 2

The MATRIX-6R is capable of being controlled by two footpedals for common functions such as volume control and sustain as well as many others as we will soon see. These pedals are connected to the synthesizer by the PEDAL 1 & PEDAL 2 input jacks on the back panel. Although they look the same, these two jacks operate differently.

**PEDAL 1** is designed to accept a "continuous" pedal - a rocker-type pedal usually used for volume or filter control. As we talk about the MATRIX-6R's modulation capability in a later section, you will discover how you can also route the pedal's control to the DCO's, for example, to get pitch bend, to the LFO's for vibrato amount, and to many other "destinations" as they are called to achieve enormous flexibility in footpedal control.

An important note in operation of PEDAL 1 is that in order to use the pedal properly, you must connect the footpedal and place it in its maximum OFF position each time before you power the MATRIX-6R ON. You must also place the pedal all the way OFF each time the MATRIX-6R is Tuned or Calibrated. This is necessary to accurately set the pedal so that it will operate correctly.

**PEDAL 2** is designed to be used with a "switch" pedal - an on/off type pedal usually used for sustain. As with PEDAL 1, this pedal's control can also be used to perform other functions as well. The PEDAL 2 jack can also be used as an External Trigger input. This means that a "trigger pulse" or signal from a drum machine, sequencer or other device can time the Envelopes and LFOs. We'll cover this special application in the section "Programming the MATRIX-6R".

## CASSETTE

Once you begin to program your own original patches, you will find that you can very easily create more patches than the MATRIX-6R has room for in its own internal memory. The CASSETTE Interface feature allows you to "offload", or record these patches in their digital form (called DATA), on standard cassette tape. You can then begin to program a second set of patches, offload them onto cassette, do a third set and so on until you have built up a library of sounds.

**TO** - this jack is used to connect the MATRIX-6R to your cassette recorder's input jack which can be either its **AUX** or **MIC**. This permits patch data from the synthesizer to be output and recorded onto the tape.

**FROM** - this jack is used to connect the MATRIX-6R to your cassette recorder's output jack which can be either its **EARPHONE**, **HEADPHONE**, or **EXTERNAL SPEAKER** jack. This permits the patch data information on the tape to be loaded back into the synthesizer.

The procedure for using the CASSETTE Interface feature to save and load patches, as well as how you can also use MIDI to do this, is covered in the MASTER EDIT Sub-Page section later in the manual.

## MIDI

The MATRIX-6R utilizes the universally accepted MIDI interface system and employs the three MIDI jacks - **IN**, **OUT** and **THRU** - that permits the synthesizer to be interfaced with other devices (another synth, drum machine, sequencer, computer, etc.) equipped with MIDI.

**MIDI OUT** is used when the MATRIX-6R is intended to be used as the Master, controlling another synthesizer or MIDI instrument.

**MIDI IN** is used when the MATRIX-6R is being controlled as a Slave by another MIDI instrument or controller. In order to play the MATRIX-6R at all, you must connect a Master controller to the MIDI IN.

**MIDI THRU** makes it possible to hook up to five MIDI instruments in a "chain" by passing MIDI data information along from one instrument to another that originates from the Master.

## **MEMORY PROTECT**

When enabled (switched ON), the MEMORY PROTECT prohibits storing anything into memory. This prevents the accidental changing or erasure of your patches for the entire synthesizer. In order to use the STORE button to program patches or use the Cassette Interface to load patch information into the MATRIX-6R, MEMORY PROTECT must be disabled (switched OFF).

### **Individual Patch Protect**

There is a Memory PROTECT function in the MODE SELECT section that is programmable for each patch. If MEMORY PROTECT is OFF on the back panel, you can store patches into any patch number except for the patches that have been individually Protected.

### **MIDI Memory Protect**

The MEMORY PROTECT feature of the MATRIX-6R also includes incoming data transfers via MIDI. If incoming MIDI data is received when the unit's Memory Protect switch is ON, the display will now display "**MEMORY PROTECTED**" briefly and ignore the rest of the incoming data.

## **A.C. POWER RECEPTACLE**

The recessed 3-prong receptacle is used to connect the MATRIX-6R with the AC power cord supplied with the MATRIX-6R as a standard accessory.

## **WHAT CABLES SHOULD I USE?**

The AUDIO OUT LEFT/MONO and RIGHT jacks, the PEDAL 1 and PEDAL 2 jacks, and the CASSETTE IN and OUT jacks all require a standard guitar cord when using them. A guitar cord is simply a 2-conductor shielded cable with a 1/4" plug on the end that plugs into the MATRIX-6R.

The MIDI IN, OUT and THRU jacks require a standard MIDI cable to be used properly.

# TOURING THE MATRIX-6R

## Part 2: KEYPAD / MODE SELECT Sections

The Keypad and MODE SELECT buttons are used in conjunction with each other to aid you in "getting around" the MATRIX-6R. The MODE SELECT section tells the Keypad what particular job it will do in enabling you to change from one patch to another, edit a patch, use the MATRIX MODULATION™ section, create a SPLIT program, etc. We will now explore the ways in which these two sets of buttons are used together to operate the different functions within the MATRIX-6R.

### Using the KEYPAD

The Keypad's functions are very straight-forward and operate the same way in every mode:

#### "0" through "9" BUTTONS

These buttons work much the same as a calculator with a few exceptions. They can be used to change quickly from one patch to another, change a parameter name or its value, and so on.

Unlike a calculator, however, the number buttons respond to 2-digit entries, with a few functions that require three digits.

As an example, let's examine the PATCH SELECT function. Press the blue PATCHES button until the PATCH SELECT LED comes on. Then press the first grey button on the top row below the display. For this example, we'll start out with Patch 00. Press the #0 key twice in succession on the Keypad. Now select Patch 58 by pressing just the #5 button by itself. Notice that "5" is displayed on the left and "0" flashes as the MATRIX-6R will wait for you to press another button. Press the #8 button and Patch 58 is now selected.

As we mentioned before, there are a few functions that require a 3-digit entry on the Keypad to select a Value. In the VCF / VCA section, "21 FREQUENCY" of the Filter has a range of 0 to 127 and always requires three digits to be pressed when selecting its Value. But if you attempt to use three digits to select a 2-digit function, the programmer will get confused.

For example, go back to PATCH SELECT / NUMBER mode. If you attempt to select Patch #158, which doesn't exist, the programmer will recognize the first pair of numerals, 1 and 5, as Patch 15. When the #8 key is pressed, it replaces the 1 and the number 5 will flash because the programmer only recognizes pairs of numbers when selecting Patches. To correct this error, press STORE once to clear the display then select a valid 2-digit patch number.

For any function numbered "00" through "09", you must enter both digits - the "leading 0" followed immediately by the second digit - in order to make the change you want. There are some functions, as in-selecting SPLIT EDIT parameters, that have only a single digit index number, and pressing one button on the Keypad will make the desired change.

## STORE

This bright red button enables you to take newly created patches, edited patches, SPLIT programs etc., and program them into memory. To store information into memory, be sure that the MATRIX-6R is in PATCH SELECT / Number Mode to store a Patch or SPLIT SELECT/Number Mode to store a Split. Press and hold the STORE button. While you are holding the STORE button down, press the two digits of the patch number you want on the Keypad. The patch is now stored in memory in that Patch Number location. Please remember that you cannot use the STORE button if MEMORY PROTECT on the back panel is switched ON or if the patch has its individual PATCH PROTECT feature turned ON.

### Reset

Briefly pressing STORE cuts short any sustaining sound (a patch with long Release times) or will clear partially entered digits on the display.

### Patch Copy

You can also copy a patch from one Number to another. Simply select a patch that you want to copy, press and hold the STORE button and type in the Number of the patch (its destination) that the copied patch will go. Just remember that the destination patch will be erased and replaced by the copied patch. Also, both MEMORY PROTECT on the back panel and individual patch PROTECT must be turned OFF in the Destination Patch for this to occur.

### "+ / -" Key

This handy little button enables quick changes to those parameters that can be used either positive or negative. A good example is an ENVELOPE amount value (try PATCH EDIT "29 VCA2 MOD BY ENV2"). You will discover that the modulation amount of an ENVELOPE can be either positive (its normal state) or negative (inverted). If you give an envelope a positive amount to start with, pressing the "+/-" button once will change it to a negative amount. Pressing it again once will return it to positive. If a parameter can only be used with positive values (try PATCH EDIT "44 PORT RATE"), the "+/-" button will not be operative for that parameter.

### < > REVERSE / ADVANCE ARROWS

These buttons will make any desired change on the display in increments of ONE. The ">" button is used to ADVANCE or INCREASE, and the "<" button is used to REVERSE or DECREASE to the next number or function.

### << (NO / OFF) & >> (YES / ON) ARROWS

These buttons will make any desired change on the display in increments of FIVE. The ">>" button is used to ADVANCE or INCREASE and the "<<" button is used to REVERSE or DECREASE a numerical value or parameter name by five units. For functions requiring YES or NO decisions (try MASTER mode "11 SEND ALL" or "51 PATCH" INITIALIZE), these two buttons allow you tell the MATRIX-6R whether you are ready to proceed or not. For functions that have ON or OFF choices, these buttons are used for that purpose as well.



For added speed, pressing << & < at the same time decreases by 10 and pressing > & >> simultaneously increases by 10.

#### **Arrow Repeat**

If any of the four arrow buttons are pressed and held down, the function displayed will advance or reverse automatically.

Since there is a limit to the number of parameters or values in each mode, the ADVANCE / REVERSE function will stop when these limits are reached.

The ARROW buttons can be used at any time instead of the Keypad to make a +/-1, +/-5, or a +/-10 increment change as needed.

## **The MODE SELECT Section**

The MODE SELECT section of the MATRIX-6R is the section where all of the possible features and functions of the synthesizer are accessed. As you can tell just by looking at the operating parameters printed on the right half of the front panel, there are a lot of functions under your control. For simplicity and speed, we have arranged these parameters into sections of related functions. These three main sections - the MODES - are titled as follows:

- 1. Patches**
- 2. Splits**
- 3. Master**

Using the parameters within each of these pages in conjunction with the Keypad is the key to operating the MATRIX-6R. The MODE SELECT buttons allow you to access any of the three Modes listed above and operate within them by using the Keypad. As you can see, the MODE SELECT section further divides these four pages into related functions into what are called PAGES, as follows:

<b>PATCHES</b>	<b>Patch Select</b> <b>Patch Edit</b> <b>Matrix Mod</b>
----------------	---

Pressing the PATCHES button repeatedly will loop through the three Pages from top to bottom.

<b>SPLITS</b>	<b>Split Select</b> <b>Split Edit</b>
---------------	--

Pressing the SPLITS button repeatedly will switch back and forth between the two modes.

<b>MASTER</b>	<b>Master Edit</b>
---------------	--------------------

## Using the MODE SELECT Buttons

In using the MODE SELECT section, you may want to think of it as a "grid" where all the possible controls are located. The three buttons to the right of the grid titled PATCHES, SPLITS and MASTER select which main Page of functions you are using, indicated by the adjacent LED. The top row of four buttons (plain grey with an LED in the corner) indicate which VERTICAL column of functions is being used. By matching up the two LEDs, you can find out what function the MATRIX-6R is ready to perform.

As an example, let's select PATCH EDIT and take a look at some of the available controls.

**STEP 1.** Press the blue PATCH button and select PATCH EDIT. You may have to press the button several times to get to it as the selector will "loop" among the three Pages. When the red light is on next to PATCH EDIT, that mode has been selected.

**STEP 2.** Press the first grey button on the top row. You are now in the PARAMETER select mode in the PATCH EDIT Page. Now, by typing in a two-digit number on the Keypad or using the < > or << >> buttons, you can pick any edit parameter in the PATCH EDIT Page. This is used in creating new sounds, changing existing sounds or just finding out what settings were used to make up the patches that are in there now. And the Display will always show you where you are.

## Terminology

In explaining the remaining functions of the MATRIX-6R, we'll be using terms and phrases that will help us get through the discussion faster. In using the MODE SELECT section as a grid, we'll be able to move through the various procedures quickly by understanding a basic concept. When a MODE has been selected from the right-hand column of the available modes in conjunction with one of the four grey buttons along the top row, we say that a function has been ENTERED. This function is the one in the column below the lit grey button and across from the MODE that you just selected.

As an example, we will "Enter PATCH EDIT / VALUE Mode".

First, you press the blue PATCHES button a few times until the LED comes on next to PATCH EDIT. Then, you press the appropriate grey button above VALUE in the PATCH EDIT row. The KEYPAD can now be used to change the numerical value on the display above the grey button. If you press PARAMETER, the KEYPAD can then be used to change the actual parameter of the patch that you are working with. The display, of course, will always show you what change has been made.

## Functions of the MODE SELECT Section

The following descriptions explain the various functions of the MODE SELECT section:

## PATCHES

### Modes of the PATCH SELECT Page

#### 1. NUMBER

Typing in a 2-digit number or using the < > or << >> buttons on the Keypad will enable you change from one patch to another from among the MATRIX-6R's 100 patch memories, numbered 00 through 99.

#### 2. NAME

This mode allows you to give each of the 100 patches a name up to eight characters (letters, numerals or symbols) long. The MATRIX-6R gives you the 26 letters of the English alphabet, numerals 0 through 9, 26 symbols including various punctuation marks, and a BLANK character for spaces.

When this mode is first entered, the first character of the patch's name will flash on and off. This flashing character is the one that you are now able to change. To change a character, use the < > or << >> buttons on the Keypad to advance or reverse to the new character. The 0 through 9 buttons are not active in this mode.

Once you have selected the desired character, pressing the grey button above NAME again once advances the display one character to the right so that it will flash. You are now able to change this character.

Pressing the grey button above NAME repeatedly advances through the characters from left to right. Once you have reached the eighth character, pressing this button again returns the display to the first character. This enables you to loop through the characters as necessary.

#### 3. COMPARE

The COMPARE mode allows you to listen to an edited patch in its original state before it was edited. Pressing the COMPARE button recalls the patch from memory in its programmed or original state. The Patch NAME will flash off and on to remind you that you are comparing. Pressing COMPARE again recalls the edited version, and the Patch NAME will stop flashing.

This mode is identical to the COMPARE mode in PATCH EDIT described in the next section. The advantage to having a Compare feature in this mode is so that you won't have to switch into PATCH EDIT to Compare.

#### 4. PROTECT

One the most useful features of the MATRIX-6R is the Patch PROTECT function. Patch PROTECT tells the computer inside the synthesizer to ignore any STORE command you give it that will affect its PATCH EDIT or MATRIX MODULATION memories. This prevents the unwanted and often frustrating accidental changing or erasure of your patches while PROTECT is switched ON for that patch.

The PROTECT feature, not to be confused with the back panel MEMORY PROTECT, is programmable for each patch individually, even if MEMORY PROTECT on the back panel is off. To Protect a patch simply press the grey button above PROTECT and its LED will light. Whenever that patch is recalled from memory, it is protected. If you attempt to use the STORE button on a protected patch, the display will flash PATCH PROTECTED when a number or arrow button is pressed on the Keypad.

If you plan to make any changes to a Protected patch, Patch PROTECT and the back panel MEMORY PROTECT must both be disabled (switched OFF). To do this, press the grey button above PROTECT and its LED will go out, disabling the Patch PROTECT feature. Switch the MEMORY PROTECT on the back panel to its OFF position. You can now make any change to the MATRIX-6R and, of course, store it into memory with the STORE button. You will not be able to use the STORE function until PROTECT is turned OFF.

You are able to turn Patch PROTECT ON or OFF at any time while you are in the PATCH SELECT Page.

#### Modes of the PATCH EDIT Page

##### 1. PARAMETER

This mode allows you to select any one of the 96 functions of the MATRIX-6R that deal with the basic sound of a patch. These PARAMETERS are printed on the MATRIX-6R's front panel for convenience under the heading PATCH EDIT and numbered 00 through 98. These functions are explained later in this manual in the section on PATCH EDIT PARAMETERS.

When the PARAMETER mode has been entered, pressing a 2-digit number or the < > or << >> buttons on the Keypad will change from one patch PARAMETER to another and will be shown on the display. Notice that PARAMETER numbers 39, 49, 89 and 99 have no current function and will be shown as blank on the display if selected.

## 2. QUICK

When you have become familiar with the programming and editing capabilities of the MATRIX-6R, you will be able to get around the different functions much faster. The QUICK mode gives you even more speed, hence the name.

When in QUICK mode, the PARAMETER and VALUE modes of PATCH EDIT are used at the same time. The Keypad now operates differently so that the 0 through 9 buttons change the VALUE only and the < > and << >> buttons select the PARAMETER. You can see how this feature adds even greater flexibility and speed to editing and creating patches.

## 3. COMPARE

The COMPARE mode allows you to examine a patch in its original state before it was edited. If, for example, you have edited a patch and want to find out what the original setting was for any PARAMETER or VALUE, press the COMPARE button and it will appear on the display. The COMPARE button LED will light to remind you that you are comparing.

You can also listen to the original patch because the MATRIX-6R will recall it from memory during the COMPARE process. Playing notes from the Master controller allows you to hear the patch in its original state. Switching to another mode in PATCH EDIT (either PARAMETER, QUICK or VALUE) returns the patch to its edited state. You may COMPARE a patch as often as you like.

Please note that when you are in COMPARE mode, you cannot use the STORE button to program the patch into memory.

## 4. VALUE

This mode of operation allows you adjust the output of the Parameter to determine how it will affect the sound quality of the patch. There are three types of outputs, depending on the Parameter you're using:

### Numerical

A numerical VALUE can take on various forms. For DCO1 "00 FREQUENCY", changing the number changes the oscillator's tuning. The VALUE of 0 means the lowest end of the tuning range and 63 the highest. In the case of VCF / VCA "24 RESONANCE", changing the Value changes the Resonance amount. The Value of 0 in this case means "no output" or that the RESONANCE parameter has been effectively turned off.

For the majority of Parameters the numerical range is 0 to +63, with the exception of the VCF/VCA "21 FREQUENCY" which goes from 0 to 127 and DCO2 "12 DETUNE" which goes from -31 to +31. The majority of Modulations (Envelopes, LFOs, Velocity, Ramps, etc.) can also be

assigned a negative amount, in order to invert their effect, so that their ranges go from -63 to +63.

The Keypad is used to select the numerical VALUE. The 0 through 9, < > or << >> buttons are used to change from one VALUE to another. Typing in a number that is out of the range of the VALUE selects the highest number in the range. If the < > or << >> buttons are used, they will stop when the range limit is reached.

### Type

Certain PARAMETERS have distinctive types of outputs rather than a numerical amount. Take for example DCO1 "06 WAVE SELECT". This PARAMETER gives you a choice of two waveform outputs, PULSE or WAVE, a combination of the two labelled BOTH, and an option of turning the oscillator OFF for a total of four choices.

Most Parameters with output "types" have four choices of outputs that you can select, although this varies from parameter to parameter. DCO 2 "16 WAVE SELECT", for example, has the same four choices as DCO 1 plus a NOISE output used for effects for a total of five choices. Other examples would include LFO 1 "82 WAVEFORM" and LFO 2 "92 WAVEFORM" that have seven options each and "33 TRACK INPUT" that has 19.

The < and > buttons on the Keypad are the easiest to use in selecting Parameter output types. The << >> and the 0-9 buttons will work as well. In using the 0-9 buttons, "0" is always assigned to the first type, "1" to the second, "2" to the third and "3" to the fourth, etc.

### Status

The remaining PARAMETERS have either ON or OFF as choices. The ON or OFF status of a function can be selected as follows:

<	OFF
<< NO / OFF	OFF
>	ON
>> YES / ON	ON
0	OFF
1	ON

Typing in numbers higher than 1 will always select ON status.

## Modes of the MATRIX MOD Page

MATRIX MODULATION™ is a very useful and powerful system that allows you to construct a modulation routing with amazing flexibility. A more detailed explanation of its features as well as how to use it is covered in the section USING MODULATION. We will only concern ourselves with the basic set-up of the MATRIX MOD mode here.

The MATRIX MOD mode is simply putting together a "combination" of functions in which a SOURCE modulates a DESTINATION by a certain AMOUNT.

### 1. NUMBER

Typing in a 1-digit number or using the < > or << >> buttons on the Keypad will enable you to change from one MATRIX MOD combination to another from among the MATRIX-6R's ten MATRIX MOD program memories, numbered 0 through 9.

### 2. SOURCE

Refer to the MATRIX MODULATION section on the top panel to select the type of modulation required as a SOURCE. Using the Keypad's 0-9, < > or << >> buttons will permit changes from one SOURCE to another from among the MATRIX-6R's possible 20 modulation SOURCES, numbered 01 through 20.

If you are creating a new patch from PATCH INITIALIZE, the first four combinations will be set up for you (they can be edited or erased) and the remaining six MATRIX MOD programs will be blank. Selecting a SOURCE for a blank MATRIX MOD will cause it to appear on the display with a corresponding AMOUNT of 0.

If you are editing a patch that is already using a MATRIX MOD combination, you can change the SOURCE as necessary and the AMOUNT value will not be affected.

If you want to erase a MATRIX MOD combination, select "00 DELETE MODULATION". The display will go blank and the modulation will be removed from the patch.

### 3. AMOUNT

This mode allows you to determine how much of the SOURCE will affect the DESTINATION. Its range is from -63 to +63. The 0-9, < > and << >> buttons on the Keypad can be used to select the AMOUNT value.

### 4. DESTINATION

Refer to the MATRIX MODULATION section of the top panel to select the modulation's DESTINATION. Using the KEYPAD's 0-9, < > or << >> buttons will permit changes from one modulation DESTINATION to another from among the MATRIX-6R's 32 DESTINATIONS, numbered 01 through 32.

Creating and editing a MATRIX MOD combination, as well as deleting modulation, has the same function for the DESTINATIONS as the SOURCES described above.

## SPLITS

The MATRIX-6R allows you to take any two existing single patches and play them from the Master controller at the same time. This feature provides for some very interesting possibilities because SPLIT Mode permits splitting the Master controller's keyboard even if the Master itself does not have this capability. You can now play two sounds, one from the left side of the keyboard and the other from the right, from instruments like the Yamaha DX-7, Sequential's PROPHET 600 and the Roland JX-8P, just to name a few. In using SPLITS in conjunction with a MIDI sequencer, two completely different sounds can be sequenced at the same time from two independent MIDI tracks. And guitar players using a MIDI guitar or MIDI guitar interface can program the MATRIX-6R so that one sound plays from the top two strings and the other sound plays from the bottom four, as just one possibility.

There are two ways to use SPLIT Mode:

First, as the name SPLIT implies, you can put one of these patches on the left part of the Master controller's keyboard (called LOWER) and the other patch on the right part of the Master's keyboard (called UPPER). The imaginary point where the keyboard "splits", or where the left-hand sound stops and the right-hand sound starts, is programmed as well.

Second, the patches can be "overlapped" on the Master's keyboard to create a Double program in which pressing one key plays both of the patches at the same time.

The SPLITS section provides much flexibility in the way you can assign voices, UPPER and LOWER limits (where the SPLIT point or overlap occurs), key TRANSPOSE and even different MIDI channel assignments for each half of the Master's keyboard.

### Modes of the SPLIT SELECT Page

This Page enables you to program the basic structure of a SPLIT: selecting the SPLIT NUMBER, giving it a six character NAME and assigning the UPPER and LOWER patches. We will cover the PARAMETER and VALUE assignments - the LIMITS, TRANSPOSE, MIDI channels etc. - in just a moment.

#### 1. NUMBER

Typing in a 2-digit number or using the < > or << >> buttons on the Keypad will enable you to change from one SPLIT combination to another from among the MATRIX-6R's 50 SPLIT program memories, numbered 00 through 49.



## 2. NAME

As with single patches, you can give each of your SPLITS a name. The only difference is that you can use up to six characters instead of eight. Refer to the instructions on how to program a NAME in the PATCH SELECT / NAME section.

## LOWER / UPPER Patch Assignments

The basic construction of a SPLIT program is in choosing two existing patches from among the MATRIX-6R's 100 single patch programs, using one as the LOWER and the other as the UPPER. This is accomplished as follows:

### 3. LOWER

Select a single patch that you want to be played on the left part of the keyboard. Using the 0-9, < > or << >> buttons on the Keypad, enter the patch's 2-digit number. This will appear on the display as the left number of the two PATCH numbers and is now assigned to the LOWER part of the keyboard.

### 4. UPPER

Select a single patch that you want to be played on the right part of the keyboard. Using the 0-9, < > or << >> buttons on the Keypad, enter the patch's 2-digit number. This will appear on the display as the right number of the two PATCH numbers and is now assigned to the UPPER part of the Master controller's keyboard.

## Modes of the SPLIT EDIT Page

The SPLIT EDIT Mode is where you program all of the performance functions of a SPLIT. This mode allows you customize each SPLIT program in any way you like. Thus, you have the versatility you need in setting up a SPLIT that best suits your performance requirements.

### 1. PARAMETER

This mode allows you to select any one of the eight functions of the MATRIX-6R that deal with the set-up of a SPLIT, numbered 0 through 7. These PARAMETERS are printed on the MATRIX-6R's top panel for convenience under the heading SPLIT EDIT. These functions are explained later in this manual in the chapter on SPLIT EDIT PARAMETERS.

When the PARAMETER mode has been entered, pressing a 2-digit number or the < > or << >> buttons on the Keypad will change from one SPLIT PARAMETER to another and will be shown on the display.

### 2. QUICK

The QUICK mode operates the same as it does in PATCH EDIT. When in QUICK mode, the PARAMETER and VALUE modes of SPLIT EDIT are accessed to be used at the same time. The

Keypad now operates differently so that the 0 through 9 buttons change the VALUE only and the < > and << >> buttons select the PARAMETER.

### 3. COMPARE

The COMPARE Mode operates the same as in PATCH EDIT. It allows you to listen to the SPLIT in its original state before it was edited. If, for example, you have edited a SPLIT and want to find out what the original setting was for any PARAMETER or VALUE, press the COMPARE button and it will appear on the display. The PARAMETER number will flash to remind you that you are comparing.

You can also listen to the original SPLIT because the MATRIX-6R will recall it from memory during the COMPARE process. Playing notes from the Master controller allows you to hear the SPLIT in its original state. Switching to another mode in SPLIT EDIT (either PARAMETER, QUICK or VALUE) returns the SPLIT to its edited state. You may COMPARE a SPLIT as often as you like.

### 4. VALUE

The VALUE mode in SPLIT EDIT is similar to VALUE in PATCH EDIT. If you refer back to the discussion on VALUE in PATCH EDIT, you will see that we categorized VALUE as being "numerical", "type" or "status". In SPLIT EDIT, the VALUEs used are numerical for parameters 0,1,3,4 & 6, ON/OFF for 2 and 5 and type for #7.

As in the PATCH EDIT Page, the Keypad is used to select the VALUE. The 0 through 9, < > or << >> buttons are used to change from one VALUE to another. Typing in a number that is out of the range of the VALUE selects the highest number in the range. If the < > or << >> buttons are used, they will stop when the range limit is reached.

The application of these parameters is covered in the section on SPLIT EDIT PARAMETERS.

## MASTER

The MASTER section contains only one Page, MASTER EDIT. The MASTER EDIT Page groups its functions into five categories that are used as the over-all controls of the synthesizer. In other words, whatever controls are necessary to operate the MATRIX-6R that are not a part of an actual patch program are found in the MASTER EDIT Page. Thus, it is important to remember that these settings are NOT programmable with each individual patch. They are, however, stored in what is called a "Global" memory (memory for the entire synthesizer) and will remain as they are set until you change them.

## 1. PARAMETER

As in PATCH EDIT and SPLIT EDIT, the 0-9, < > or << >> buttons on the Keypad are used to change from one function to another from among the MATRIX-6R's 36 MASTER EDIT Parameters, numbered 00 through 57. They are conveniently listed on the top panel under the MASTER EDIT heading. Notice that PARAMETER numbers 19, 24-29, 37-49 and 58-99 are not listed as they have no current function in this mode and the display will be blank if selected.

## 2. TUNE

While in MASTER EDIT, pressing the second grey button on the top row puts the MATRIX-6R into AutoTune. The cycle takes approximately one to three seconds to complete during which time the display reads "TUNING. . .". You should make sure that the footpedal connected to the PEDAL 1 jack on the back panel is set to its maximum OFF position.

While in TUNE mode, the computer inside the MATRIX-6R is performing very precise tuning calibrations to all 12 DCO's (there are two per voice). The result is an instrument that has been fine tuned to very strict tolerances.

**IMPORTANT NOTE:** You should be careful not to use or disturb the Pedal connected to the PEDAL 1 jack on the MATRIX-6R's back panel during TUNE since it is being recalibrated while the synthesizer is being tuned.

## 3. VALUE

As with PATCH EDIT, using the Keypad will enable you to select either numerical outputs, choose among types of outputs or determine the ON/OFF status of a PARAMETER. Refer to the VALUE section of the PATCH EDIT discussion for more information on VALUE select.

# PROGRAMMING THE MATRIX-6R

## Part 3: USING THE EDIT PAGES

As we mentioned earlier, all of the operating parameters of the MATRIX-6R are printed on the top panel, arranged into groups of related functions called Pages. In this section of the manual, we will examine each of these features and discuss what they do and how they operate.

### PATCH EDIT Page

The PATCH EDIT Page contains the basic sound producing and modifying functions of the MATRIX-6R. "Editing" a patch means making whatever changes are necessary to produce the sound you want. In addition to the basic components of a voice - the oscillators (DCOs), VCF / VCA section, envelopes and LFOs - you will notice that there are many modulation features in this Page as well. These are the most often-used modulation routings and were included in the PATCH EDIT Page for practical reasons. Because of the elaborate network of modulation designed into the MATRIX-6R, a separate Page - MATRIX MODULATION™ - is used to program modulation for special purposes.

The PATCH EDIT Page contains 10 "Sub-Pages", each dealing with a specific part of the final sound that you hear. In this section of the manual, we will talk about each of these Sub-Pages and the functions within them, and find out how they affect the overall sound.

### The DCOs

The DCO - short for "Digitally Controlled Oscillator" - is the circuitry that produces the basic tone or sound of the patch. Since the two DCOs are almost identical, we'll cover them both together.

#### 00 & 10 FREQUENCY

This function determines the pitch of the DCOs. VALUE range is 0 to +63 (five Octaves and a Minor-3rd) where each VALUE increment represents one semi-tone.

#### 01 & 11 FREQUENCY MOD BY LFO 1

The pitch of both DCOs can be modulated by the first LFO. VALUE range is -63 to +63 where 0 as the VALUE represents no effect and +63 is maximum modulation. -63 is maximum "negative" modulation obtained by inverting the LFO's waveform 180° out of phase.

#### 02 SYNC (DCO1 only)

#### 12 DETUNE (DCO2 only)

These two functions operate the opposite of each other and are described as follows:

**SYNC**, the abbreviation for "synchronize", places both DCOs in close tune with each other by electronically slaving the waveform of DCO1 to that of DCO2 using three varying degrees of Sync plus OFF :

- "0": OFF - SYNC has no effect and the DCOs' waveforms are independent of each other.
- "1": SOFT Sync
- "2": MEDIUM Sync
- "3": HARD Sync

The main idea to keep in mind while using SYNC is that its audible effects vary drastically with DCO tuning (are they in unison or several octaves apart?), the waveform selected for each DCO, where you are playing on the Master controller's keyboard (high notes or low notes) and what kind and how much modulation is used in the patch. The important thing is to keep experimenting.

**DETUNE** enables the pitch of DCO2 to be adjusted slightly sharp or flat relative to DCO1. This produces a richer sound quality caused by two closely tuned oscillators "beating" from the slight variation in tuning. VALUE range is -31 to +31 (+/- a 1/4 tone) where 0 is no detune, -31 is the Flat limit and +31 is the Sharp limit. Each increment of 1 represents varying amounts of detune: settings close to 0 provide very slight detuning while settings towards the extremes produce greater amounts of detune as each higher number is used.

### 03 & 13 PULSE WIDTH

If **PULSE** is selected as the DCO's waveform (see 06 & 16 WAVE SELECT), this control sets the pulse's width output. VALUE range is from 0 to +63 where 63 is an extremely narrow Pulse that becomes gradually wider as the settings approach 31, the setting for a Square wave. From 30 on down, the pulse becomes even wider with the same audible characteristics as narrow Pulses until 0 is reached and very little sound is heard.

In describing the audible characteristics of a Pulse wave, a very narrow or very wide pulse (settings towards the extremes of the range) has a "nasal" quality and is traditionally used to synthesize woodwind instruments like Oboe and Bassoon or plucked-string instruments such as Harpsichord. A wide pulse (settings around 31 where the Square wave is produced) has a "hollow" sound quality and resembles a Clarinet.

### 04 & 14 PW MOD BY LFO 2

The PULSE WIDTH of both DCOs can be modulated by the second LFO to obtain a "periodic" or steady back-and-forth change (using a TRI waveform) between a wide pulse and a narrow pulse. This can be used as a form of vibrato. VALUE range is from -63 to +63 where 0 is no effect and 63 is the maximum amount of positive modulation. Using negative modulation Values (-63 being the negative limit) inverts the LFO waveform 180° out of phase.

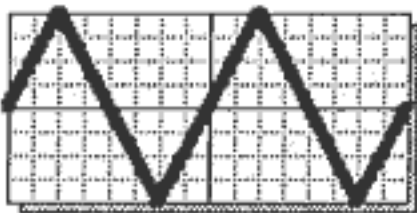
### 05 & 15 WAVE SHAPE

If **WAVE** is selected as the waveform output of the DCOs in 06 & 16 **WAVE SELECT**, this control varies the waveform between a Sawtooth wave (a bright sound used in creating strings and brass patches) and a Triangle wave (a mellower wave used for flutes, etc.). Since Sawtooth and Triangle waveforms are similar, they are made available in the same parameter.

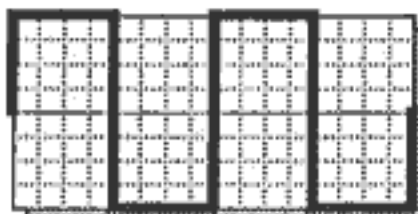
**VALUE** Range is from 0 to +63 where 0 produces the Sawtooth and 63 produces the Triangle. Settings in between these two extremes permits a variable mix of the two Waves. A setting of 31 produces a waveform that has elements of both.



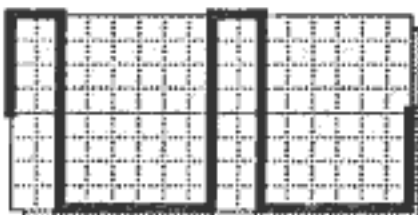
Sawtooth Wave



Triangle Wave



Pulse Wave  
(set at 31=Square)



Pulse Wave  
(set at 15=Narrow)

### 06 & 16 WAVE SELECT

The waveform output of the DCOs give each patch its tonal identity and is selected here. Your four choices are **OFF**, **PULSE**, **WAVE** or **BOTH**. DCO2 adds **NOISE** as a fifth choice. The **NOISE** generator produces a pitchless "rushing" sound suitable for wind and thunder effects as well as adding breath inflections to flute, brass and woodwind sounds.

If **BOTH** is selected, a Pulse and a Wave are output at the same time, allowing for some very interesting and complex tones to be produced. Experiment with varying the Pulse Width (03 & 13) or the Wave Shape (05 & 15) with **BOTH** selected.

### 07 & 17 LEVERS

The performance **LEVERS** or Wheel-type controllers of the Master are selected in this parameter.

**OFF** disables both **LEVERS** or Wheels. They will not affect the DCOs.

**BEND** permits **LEVER1** or the Pitch-Bend Wheel to modulate the pitch of the DCOs by providing pitch bend up (pull it towards you) or down (push it away from you) a whole tone either way. When **BEND** is selected, **LEVER1** (or the Pitch Wheel) is the only one that is active.

**VIB** adds vibrato modulation to the DCOs, normally controlled by **LEVER2** or a Vibrato Wheel. Vibrato parameters such as **SPEED**, **WAVEFORM** etc. are set up in the **MASTER EDIT** Page. When **VIB** is selected, **LEVER2** or the Vibrato Wheel is the only one that is active.

**BOTH** turns on both **LEVERS** (or both Wheels) to modulate the DCOs.

## 08 & 18 KEYBOARD / PORTAMENTO

Portamento routing to the DCOs is selected in these parameters. Portamento is described as a "sliding" between notes played on from the Master controller. The specific operating parameters of Portamento - its RATE, MOD BY VELOCITY, MODE, and LEGATO select - are programmed in the RAMP / PORTAMENTO Sub-Page discussed later in this section.

**PORTA** - When this is selected, PORTAMENTO is routed to the DCO.

**KEYBD** - When this is selected, PORTAMENTO is turned off and the MATRIX-6R will be controlled from the Master's keyboard normally.

**OFF** - (available for DCO2 ONLY) - This option disables the Master control to DCO2. This means that DCO2 will play the same pitch no matter what keys are played. This is definitely used for effects.

## 09 & 19 KEY CLICK

An effect that can be used to add an audible "punch" or "bite" to the beginning of a sound, KEY CLICK can be turned ON or OFF in this parameter. The amount is preset at the factory. You may want to experiment by using KEY CLICK with piano, vibes and other percussive instruments just to name a few.

## VCF / VCA

The VCF / VCA section of the MATRIX-6R is where the sound generated by the DCOs is "tailored" by you to determine what the patch will finally sound like. This section performs important functions such as determining the volume between the two DCOs, controlling the harmonics (the overall brightness of the sound) and adding dynamics to the patch.

**VCF** stands for "Voltage Controlled Filter" and is the circuit that gives you very precise control over the harmonic content of the patch. In adjusting the harmonic content, the VCF acts somewhat like a tone control but with much more flexibility. After you have selected the waveforms for DCOs 1 & 2, the VCF allows you to determine the tonality of the sound and articulate this tone setting with Envelope #1 (abbreviated ENV1) and PRESSURE. It is in the way you use ENV1 and PRESSURE that dynamics are added to the harmonics of the patch.

**VCA**, which stands for "Voltage Controlled Amplifier", is the circuit that controls the final volume output of the patch. Two VCAs are designed into the MATRIX-6R to provide an increased ability to control patch volume. As you can see, we've included modulation routings of ENV2 and VELOCITY which you can use to apply volume or loudness dynamics to the patch.

## VCF Parameters

### 20 BALANCE

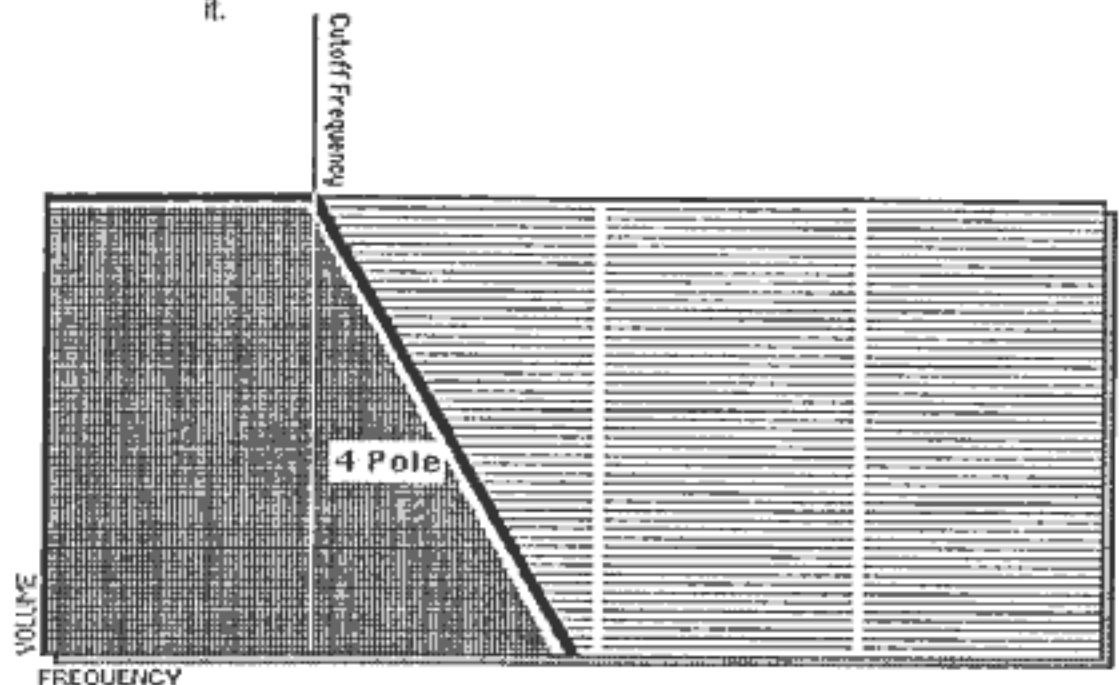
This is used to set the relative volumes of DCO1 and DCO2 just before they are sent to the VCF / VCA. VALUE range is from 0 to +63. You can think of this function as a mix control where a setting of 31 makes the outputs of the two DCOs equal. As you increase above 31, more of DCO1 is heard and DCO2 fades out. As you decrease the setting below 31, more of DCO2 is heard and DCO1 fades out. A setting of 0 indicates that DCO2 is heard only and a setting 63 is DCO1 only.

### 21 FREQUENCY

As we mentioned before, the VCF permits you to adjust the patch's tone level by controlling the harmonic content. Harmonics are upper frequencies that give each sound its own identity. It is the amount and structure of harmonics that allow our ears to differentiate between sounds. The structure of the harmonics in the MATRIX-6R is determined by the waveform you selected with the DCOs. The amount is set with the FREQUENCY control.

The VALUE range of the VCF is from 0 to +127 where 0 is minimum or fewest harmonics and 127 is the maximum setting where all the harmonics for that waveform are present. Another way of stating this is a Value of 0 makes the patch sound muffled and a Value of 127 causes the patch to sound bright and buzzy.

The word FREQUENCY is used because each harmonic has its own specific pitch and thus the Filter can be "tuned". The tuning of the Filter, therefore, depends upon what Value (0 to 127) you give it.



## Filtering Effect of the MATRIX-6 Filter

Adding RESONANCE boosts the amplitude at the initial cutoff point.



## 22 FREQ MOD BY ENV 1

One of the characteristics of sound as we perceive it is the way in which the harmonics change as the sound occurs. Just listen to the different playing styles of a violin or those of a trumpet. All of the different "personalities" that an instrument can have depends in great part upon how the musician articulates in his / her playing. In the MATRIX-6R, using an envelope is the primary way in which harmonics are shaped - the Filter's frequency is modulated by Envelope #1 (listed as "ENV1").

This parameter is concerned only with the amount of ENV1 affecting the Filter's frequency. The actual settings of the envelope are made in the ENV1 Sub-Page. VALUE range is from -63 to +63. A Value of 0 indicates that the envelope has no effect on the Filter's frequency and a setting of +63 is the maximum. Negative Values invert the effect of ENV1 on the Filter's FREQUENCY. A Value of -63 is the maximum inversion.

## 23 FREQ MOD BY PRESSURE

Another way of modulating the Filter is through the use of keyboard after-touch. This feature is activated by playing a note or chord on the Master's keyboard and pressing into the keys. This assumes that the Master controller that you are using has PRESSURE or After-Touch. If it does not, this parameter will not work.

Range is from -63 to +63. A setting of 0, of course, means that keyboard PRESSURE has no effect. Using a positive Value causes PRESSURE to "open" the Filter and thus adds more brightness to the sound. Using a negative Value "closes" the Filter from its original setting and causes the sound to become dull.

## 24 RESONANCE

The RESONANCE Parameter is used to emphasize the harmonic closest to the Filter's FREQUENCY. This control actually increases the loudness or "gain" of the harmonic resulting in a ringing or whistling effect as more RESONANCE is used. This Parameter is especially useful in synthesizing the resonant characteristics of acoustic instruments (particularly woodwinds) and to achieve many other electronic special effects.

VALUE range is from 0 to +63 where 0 indicates no RESONANCE and 63 is maximum. At a RESONANCE setting of 63, the VCF will oscillate - that is, produce its own pure tone.

## 25 LEVERS

Similar to 07 & 17 LEVERS for the DCOs, this parameter selects LEVER1 (or the Pitch Wheel) and LEVER2 (the Vibrato Wheel) modulation to the VCF Frequency.

*OFF* disables the LEVERS or Wheels.

**BEND** permits you to route LEVER1 or the Pitch Wheel to the VCF Frequency so that if you're using LEVER1 to pitch bend the DCOs, for example, the VCF will also change by a corresponding amount. This keeps the Filter level relative to the DCOs constant no matter what bend amount you're using and the sound of the patch remains the same. On the other hand, LEVER1 can be used to open or close the filter whether it is bending the DCOs or not. When BEND is selected, LEVER1 or the Pitch Wheel is the only one that is active.

**VIB** adds vibrato modulation to the VCF, normally controlled by LEVER2 or the Vibrato Wheel. When VIB is selected, LEVER2 (Vibrato Wheel) is the only one that is active.

**BOTH** activates both LEVERs or Wheels to modulate the VCF.

## 26 KEYBOARD / PORTAMENTO

This Parameter is similar in operation to "18 KEYBOARD / PORTAMENTO" found in the DCO2 Sub-Page although the results are different audibly.

**OFF** - When this is selected, the keyboard has no effect on the VCF FREQUENCY and the Master controller will not track the Filter. The VCF FREQUENCY will remain as you set it in Parameter #21. If **OFF** is selected, you will need to increase the Filter FREQUENCY slightly to compensate for the Master's control being removed.

**PORTA** - When this is selected, Portamento as set in the RAMP / PORTAMENTO Sub-Page will affect the VCF FREQUENCY. Just like the DCOs sliding from note to note, the Filter frequency will also exhibit a sliding effect when PORTA is selected in this Parameter.

**KEYBD** - When KEYBD is selected, the VCF will follow the Master controller as different notes are played. This is called "the keyboard tracking the filter". Playing high notes from the Master opens the Filter and low notes close the Filter. This allows the VCF FREQUENCY that you set with Parameter #21 to keep its relative interval with the DCOs no matter what keys are played.

## VCA Parameters

The VCA section in the MATRIX-6R is a 2-Stage function allowing for expanded flexibility in the volume articulation of the patch. This section contains two independent Voltage Controlled Amplifiers labeled VCA1 and VCA2.

## 27 VCA 1 VOLUME

This first-stage VCA sets the initial output of the patch. VALUE range is 0 to +63 where 0 indicates no output or silence and 63 is maximum output.

## 28 VCA 1 MOD BY VELOCITY

One of the more common applications of VELOCITY is its use in creating loudness dynamics. VELOCITY refers to making subtle or dramatic changes by striking the keys on the Master's keyboard rapidly or slowly (playing the keys harder or softer). This assumes that the Master controller that you are using is Velocity-responsive. If it is not, this parameter will not work.

In this parameter, VELOCITY is used to play the patch **louder** or **quieter**. VALUE range is from -63 to +63. A 0 setting indicates no effect by VELOCITY. When positive Values are used, notes played quickly will increase volume and slower notes will not. When negative Values are used, the opposite effect occurs: volume decreases the faster you play notes and slow playing keeps the volume close to normal.

### How "Volume" and "Velocity" Work

Parameters "27 VCA 1 VOLUME" and "28 VCA 1 MOD BY VELOCITY" work hand-in-hand. If the Value of VCA 1 VOLUME is set to 63, Velocity will seem to have little or no effect if you give it a positive Value. This is because at a Value of 63, VCA1 is set as loud as it will go and Velocity cannot make it any louder. Also, if VCA1 is given low Values, positive Velocity settings will require very hard playing all the time or some notes will seem to "drop out" and not be heard. You should plan to spend some time experimenting to find the right combination of Values to suit your particular need.

As you experiment, you may experience some results that you didn't expect. This may be due to the fact that many of the MATRIX-6R's modulations are inter-related and editing one parameter could possibly affect another indirectly. One example of this is using VELOCITY on the output of Envelope #2 ("66 AMP MOD BY VELOCITY"). Since ENV 2 is routed to VCA2, Velocity in this case may affect VCA2 unexpectedly.

Although we will cover this in more detail later, VELOCITY performance also relies on the Values you give it for "Scale" and "Sensitivity" (see MASTER EDIT / KEYBOARD "40 VELOCITY SCALE" and "41 VELOCITY SENS."). Using extremes in the available Values may yield unusable results. For example, setting "27 VCA 1 VOLUME" to 0 and a +63 on "28 VCA 1 MOD BY VELOCITY" will be almost useless if the Sensitivity is set to maximum. The resulting dynamic range will be too wide to be of any real use.

## 29 VCA 2 MOD BY ENV 2

This second-stage VCA is used to determine the final output of the patch. As you can see, there is no Volume parameter for VCA2 like there is for VCA1. The volume of VCA2 is pre-set to be 0 because its output level is controlled exclusively by Envelope #2.

This function is concerned only with the amount of ENV2 affecting the VCA's VOLUME output. The actual settings of the envelope are made in the ENV2 Sub-Page. VALUE range is from -63 to +63. A Value of 0 indicates that the envelope has no effect on the VCA which results in no sound when the Keyboard is played. A setting of +63 is the maximum. Using negative Values invert the effect of ENV2 on the VCA's VOLUME. A Value of -63 is the maximum inversion.

## FM / TRACK

The FM / TRACK section involves the functions of two independent modulation generators, listed here in the same Sub-Page.

"FM", which stands for Frequency Modulation, allows you to achieve a form of special-effect modulation that is routed to the VCF Frequency. Explained in more detail later, FM basically involves a high-frequency modulation of the Filter to obtain tone colors not possible with conventional LFO modulation.

"TRACK" is the abbreviation for Tracking Generator which can be described as a special-purpose function that permits the rescaling of a control source. We'll cover the operation and use of TRACK in just a moment.

### FM

Frequency Modulation, or FM, is a basic analog concept. The evolution of Linear FM as a technique for sound synthesis has become possible in recent years because of major breakthroughs in digital signal processing and oscillator stability.

The fundamental idea of FM is that if you take two oscillators and modulate one of them (called the Carrier) by the other (called the Modulator), a series of new overtones or harmonics will be generated. This new harmonic structure is related to the frequency (pitch) and the amplitude (loudness) of the Modulator. If the frequency and amplitude of the Carrier is changed, yet another set of harmonics is produced.

In the MATRIX-6R, DCO1 is used to modulate the VCF. DCO1 is the Modulator and the VCF, although not actually an oscillator, is the Carrier. FM in this case is best heard when "24 RESONANCE" is set to its maximum,

causing the VCF to oscillate. The VCF then becomes the second "oscillator". To experiment with FM in its simplest form, do the following:

- STEP 1: Perform the PATCH INITIALIZE function as described later in the MASTER EDIT / MISC. section of the manual. We will need to use the MATRIX-6R's Basic Patch for this experiment.
- STEP 2: Enter PATCH EDIT / PARAMETER mode.
- STEP 3: Select DCO1 "06 WAVE SELECT".
- STEP 4: Enter VALUE mode for this parameter.
- STEP 5: Press the << button once to turn off DCO1's waveforms. Its SAW (Sawtooth) waveform is routed separately for FM so we don't need to actually hear it.
- STEP 6: Repeat Steps 1 through 4 for DCO2 "16 WAVE SELECT". We are not interested in hearing DCO2 either for this experiment.
- STEP 7: Select VCF / VCA "24 RESONANCE" and set its VALUE to +63 so that the Filter will oscillate.
- STEP 8: Select FM / TRACK "30 VCF FM AMOUNT" and with the > button, gradually increase its VALUE while you are playing notes on the Master controller's keyboard. What you will hear will be the new harmonics generated by the FM process.

### Working with FM

A wide variety of FM-generated sounds can be produced by the MATRIX-6R. There are three main components that interact to create FM sounds on the MATRIX-6R: DCO1 "00 FREQUENCY", VCF / VCA "21 FREQUENCY" and FM / TRACK "30 VCF FM AMOUNT". Experiment by changing the Values of each of these three parameters.

### 30 VCF FM AMOUNT

This parameter, as described previously, controls the amount of DCO1 modulating the VCF. It is the "amplitude" or depth portion of FM. VALUE range is from 0 to +63 where 0 is no effect and 63 is maximum amplitude.

With a small FM amount, the overtones generated will be the frequencies of DCO1 and the VCF plus the sum and difference of their frequencies. Increasing the AMOUNT Value will cause other overtones to be generated as well. Changing the AMOUNT Value changes the volume and number of the overtones, similar to conventional filtering.

### 31 FM MOD BY ENV 3

The AMOUNT of DCO1 modulating the VCF can be controlled by Envelope #3 (ENV3). The characteristics of ENV3 are programmed in its own Sub-Page; we are only concerned with the AMOUNT Value affecting the Filter.

VALUE range is from -63 to +63. A setting of 0 is no effect. Using positive Values increases the amount of ENV3 modulating the VCF. As an example, if ENV3 is programmed to have slow ATTACK, DECAY and RELEASE times, the effect of FM will be gradually heard and then gradually fade. Using negative Values inverts ENV3 so that the opposite effect is obtained: the effect of FM will be present when the patch is first played, fade away and come back again.

### 32 FM MOD BY PRESSURE

The AMOUNT of DCO1 modulating the VCF can also be controlled by Keyboard PRESSURE. Playing notes on the Master's keyboard and pressing into the keys activates this function. It bears repeating that if the Master controller that you are using does not have PRESSURE or After-Touch, this parameter will not work.

VALUE range is from -63 to +63. A Value of 0 indicates no effect by PRESSURE. Positive Values cause PRESSURE to increase the amount of FM. As an example, pressing into the keys on the Master controller increases the amount of FM affecting the Filter. As the keys are released, FM modulation goes away. Negative Values decrease FM by inverting the effect of PRESSURE: FM modulation is present when the patch is first played and pressing into the Master's keys takes it away. Letting up on the keys brings the effect of FM back.

## The TRACKING GENERATOR

The TRACKING GENERATOR (PATCH EDIT Parameters 33 through 38) is a circuit that allows you to "re-shape" a control source. In other words, TRACK lets you take any one of the MATRIX-6R's modulation sources, such as the LFO's, an Envelope or even the Keyboard, and use it in a different way.

The Tracking Generator, like other circuits, has an INPUT and an OUTPUT. The INPUT is any one of the MATRIX-6R's modulation sources that you want to change. The OUTPUT is the result of changing the five "Points" in the TRACKING GENERATOR that form a "response curve" allowing you to re-shape this modulation.

## Basic TRACK Operation

### 33 TRACK INPUT

The Tracking Generator is able to process any one of the MATRIX-6R's MATRIX MODULATION™ Sources. For convenience, you can refer to the SOURCES listing printed on the front panel when selecting an INPUT in VALUE mode. The Keypad, < > and << >> can be used to select an INPUT.

The 20 possible modulation sources that you can select, plus a Value to delete the source, are (in order):

01 ENV1	the shape of Envelope #1
02 ENV2	the shape of Envelope #2
03 ENV3	the shape of Envelope #3
04 LFO1	the waveform of LFO #1
05 LFO2	the waveform of LFO #2
06 VIB	the waveform of the Vibrato LFO
07 RMP1	the shape of Ramp Generator #1
08 RMP2	the shape of Ramp Generator #2
09 KEYB	the MATRIX-6R's Keyboard scaling
10 PORT	the Portamento speed
11 TRAK	the Tracking Generator's curve
12 GATE	the Keyboard's gate pulse
13 VEL	Velocity response
14 RVEL	Release Velocity response
15 PRES	keyboard Pressure response
16 PED1	the response of Pedal #1
17 PED2	the response of Pedal #2
18 LEV1	the response of Lever #1
19 LEV2	the response of Lever #2
20 LEV3	the response of "Lever #3" which is accomplished by pushing Lever #2 forward.

This means that any one of these modulation functions can be modified to sound different than the way they already sound. Thus, the Tracking Generator gives you virtually unlimited possibilities when using the MATRIX-6R's modulation sources. Each of the 20 modulation sources can be tailored in 1,073,744,824 ways using the five POINT parameters.

- 34 TRACK POINT 1
- 35 TRACK POINT 2
- 36 TRACK POINT 3
- 37 TRACK POINT 4
- 38 TRACK POINT 5

These five TRACK POINTs represent the five sections of the TRACK's control range. Each POINT Value goes from 0 to +63. Unlike other modulations, however, using a Value of 0 for all five

POINTS does not mean "no effect". The Tracking Generator's default settings - or the Values that produce no effect - are as follows:

POINT 1 = 0  
POINT 2 = 15  
POINT 3 = 31  
POINT 4 = 47  
POINT 5 = 63

When the POINT Values have been set to these values, TRACK is said to have a LINEAR output. The input is the same as the output - no effect, no change. When using TRACK, use these Values as a place to start from in getting the result you want. Changing any one of these Values changes the curve of the Tracking Generator and whatever you selected as the INPUT will behave in a different way.

Let's take a look at how TRACK accomplishes this. Read on.

### Using the TRACKING GENERATOR

You can think of TRACK as having two components: the modulation source that you want to change (labelled INPUT) and the re-shaping functions (labelled POINTs 1 through 5) which make up the generator's curve and thus its OUTPUT. So, when using TRACK, assign it to its destination like you would any other modulation source (see the section covering MATRIX MOD). Then select the actual modulation source you want to use for the INPUT. The real magic begins when we experiment with the five POINT values.

Here's an example:

A very basic and easy to hear demonstration of how the Tracking Generator re-shapes a modulation source is to modulate the pitch of DCO1 by an LFO. We'll use a slow UPSAW (positive Sawtooth) waveform that will produce an effect of the note having a smooth rise in pitch with a sharp dropoff at its peak. We are going to use TRACK to put an audible "hump" in the rising portion of the wave. Let's set up the patch as follows:

- STEP 1: To hear exactly what the Tracking Generator can do without interference from other modulations, set up the MATRIX-6R's Basic Patch from PATCH INITIALIZE. Refer to this function's procedure in the MASTER EDIT / MISC. section of the manual, on Page 84.
- STEP 2: Enter PATCH EDIT / PARAMETER Mode.
- STEP 3: Type in the number "16" on the KEYPAD to display DCO2's WAVE SELECT.
- STEP 4: Select the VALUE Parameter.
- STEP 5: Press the << button on the Keypad so that the display reads OFF. We have just turned off the output of DCO2 so that in our experimentation with TRACK we will only be listening to DCO1.



- STEP 6:** Go back to PARAMETER Mode.
- STEP 7:** Type in number "33" on the Keypad. We will now select LFO1 as the TRACK's INPUT.
- STEP 8:** Select the VALUE Parameter.
- STEP 9:** Type in number "04" on the Keypad. LFO1 has now been selected as the TRACK's INPUT and is our modulation source.
- STEP 10:** Press the blue PATCHES button again once to enter the MATRIX MOD Page. We will now set up the modulation routing using the Tracking Generator.
- STEP 11:** Select the NUMBER Parameter.
- STEP 12:** Press the #4 button on the Keypad to access the fifth modulation route. The display will be blank to show that this MATRIX MOD is available.
- STEP 13:** Select the SOURCE Parameter.
- STEP 14:** Type in the number "11" on the Keypad and the word "*TRAK*" appears on the display. We have now selected the Tracking Generator as our modulation source.
- STEP 15:** Select the AMOUNT Parameter.
- STEP 16:** Use the >> button on the Keypad to advance the VALUE to +63. We'll use a maximum modulation amount for the most audible effect.
- STEP 17:** Select the DESTINATION Parameter.
- STEP 18:** Press number "01" on the Keypad and the display reads "*DC1FR*". This indicates that we have selected DCO1's FREQUENCY, or its basic pitch, as the modulation destination.
- STEP 19:** Press the blue PATCHES button repeatedly until the PATCH EDIT light is lit. We are now back in the PATCH EDIT page.
- STEP 20:** Enter PARAMETER Mode.
- STEP 21:** Type in the number "82" and the display reads "*LFO1 TRI*". This indicates that we are ready to select a waveform that we will manipulate with TRACK.
- STEP 22:** Select the VALUE Parameter.

STEP 23: Press the > button twice to select the Positive-Sawtooth waveform. The display will read "UPSAW".

STEP 24: Go back to PARAMETER mode.

STEP 25: Select LFO1 "80 SPEED".

STEP 26: Select the VALUE Parameter.

STEP 27: Set the LFO's SPEED to "30" for this experiment.

We have just set up the MATRIX-6R's MATRIX MODULATION to perform a slow, deep modulation. By experimenting with the 5 track POINTs, we will see how the Tracking Generator modifies a modulation source to do something that it cannot do normally.

STEP 28: Go back to PARAMETER Mode.

STEP 29: Select parameter "35 TRACK POINT 2".

STEP 30: Select the VALUE Parameter.

STEP 31: Change the VALUE of TRACK POINT 2 from "15" to "60" using the Keypad.

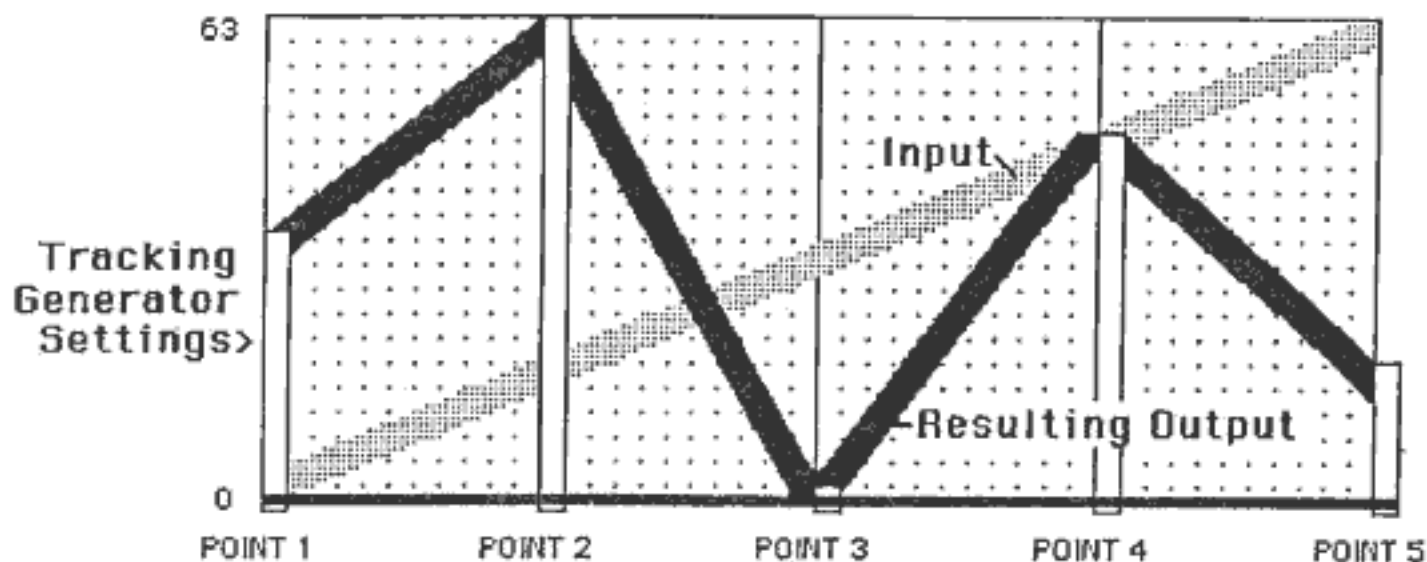
STEP 32: Play a note from the Master controller and listen to how the normally smooth rise in the waveform now has a noticeable "glitch".

By experimenting with other POINT Values, see how many ways you can change the UPSAW waveform. Bonus Question: What POINT Values do you use to turn the UPSAW into a DOWNSAW?

TRACK will operate in two different ways, depending on the INPUT:

#### 1. "POSITIVE ONLY"

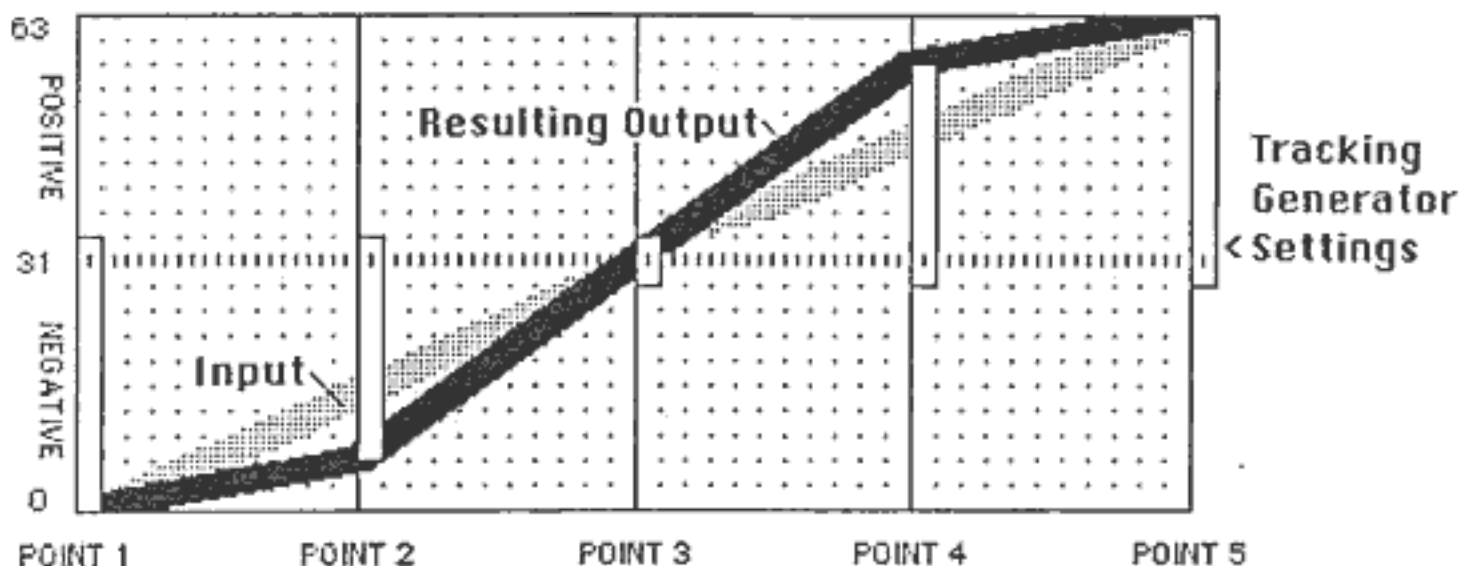
INPUTs such as the Keyboard, an Envelope or a Ramp have positive outputs only. POINT1 represents the selected INPUT's starting point (its "0 level"). Setting a POINT to 0 gives no output and all of the other available POINT Values are positive.



**TRACKING GENERATOR OUTPUT**  
 from a Positive input such as a KEYBOARD or ENVELOPE

**2. "POSITIVE / NEGATIVE"**

INPUTs such as an LFO or Lever, on the other hand, have outputs that alternate between negative and positive. POINT3 in this case represents the selected INPUT's "0 level". Setting a POINT Value to 31 results in no output, below 31 is negative and above 31 is positive.



**TRACKING GENERATOR OUTPUT**  
 from a Positive/Negative input such as an LFO or BENDER

## ANSWER TO BONUS QUESTION

Turning an UPSAW into a DNSAW means that we are intending to reverse or invert the direction of the UPSAW's waveform. To accomplish this, simply set the POINT Values so that the TRACK's normally positive-linear output is inverted to a negative or inverse-linear output. Use the following settings:

POINT 1	63
POINT 2	47
POINT 3	31
POINT 4	15
POINT 5	0

## RAMP / PORTAMENTO

The RAMP / PORTAMENTO Sub-Page contains three independent controllers: two Ramp generators that allow for linear modulation and a "Lag Processor" circuit that produces Portamento.

### The RAMP Generator

The two RAMPs in the MATRIX-6R produce a type of modulation that can be best described as a smooth, linear transition that resembles the Attack portion of an envelope. When used as a modulation source, the RAMP starts its cycle when it receives a trigger (a kind of "go" signal) from the Master controller, one of the LFOs or an external source through the PEDAL2 jack. It then begins to generate an increasing control signal gradually until it reaches its maximum. The time that it takes to do this is set by the RATE parameter.

#### 40 RAMP 1 RATE

#### 42 RAMP 2 RATE

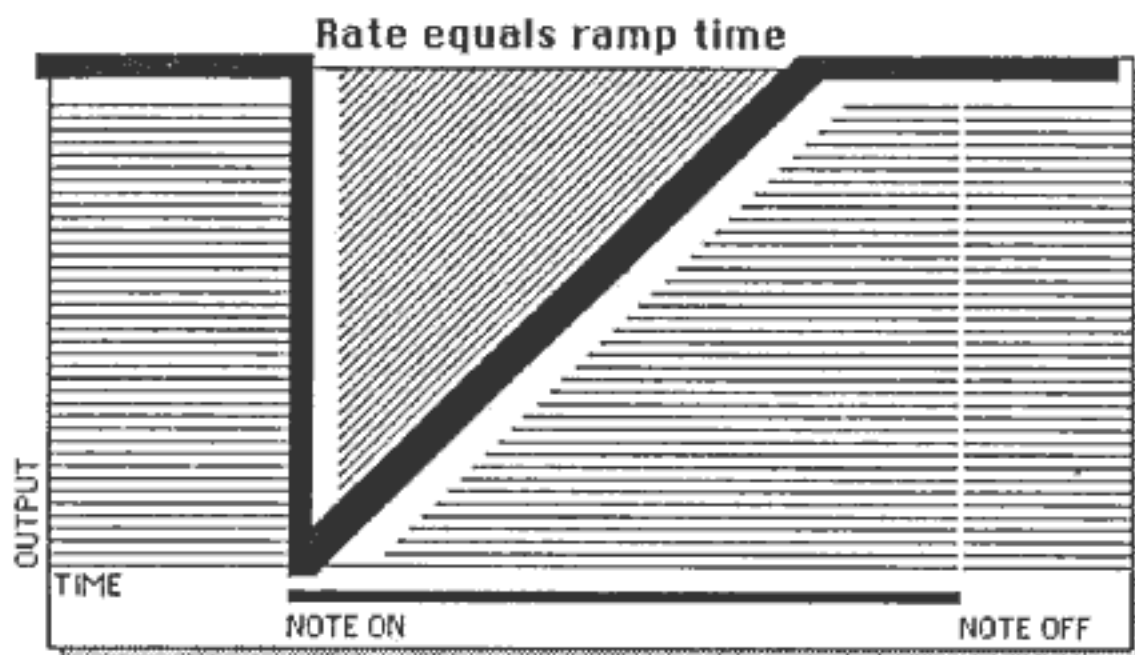
When triggered, the RAMP will begin its control cycle. It will complete its cycle and wait for another trigger to start again. The MATRIX-6R's MIDI IN from the Master controller or an External Trigger (input to PEDAL2) serve as trigger sources for the RAMPs. The time that it takes to complete one cycle is set by the RATE control. VALUE range is 0 to +63 where 0 is an instantaneous transition (no time) and 63 is the maximum.

#### 41 RAMP 1 TRIGGER

#### 43 RAMP 2 TRIGGER

The RAMP starts its cycle when it receives a trigger signal. There are four types of triggering available with the RAMPs:

**STRIG** "Single Trigger": The RAMP will be activated for a voice only if that voice is not already playing. This means that if you are holding a key down, the RAMP for that voice will not start again (won't get a new trigger) until you let go of the key and play the same voice again. Single triggering only operates when the



MATRIX-6R is in UNISON (see PATCH Edit Parameter "48 KEYBOARD MODE") or using MIDI MONO (see MASTER Edit Parameter "18 MIDI MONO"). Playing Staccato generates new triggers and playing Legato does not.

**MTRIG** "Multiple Trigger": The RAMP will be activated any time a new key is played. Playing Staccato or Legato will always generate new triggers. This function operates in the polyphonic Keyboard Modes or in UNISON (PATCH Edit Parameter 48).

**EXTRIG** "External Single Trigger": The RAMP will be activated when a trigger pulse is received from an external source (such as a drum machine or a footswitch). This permits the RAMP timing to be synchronized with other instruments in your system. Otherwise, the triggering operates the same as STRIG.

**GATEDX** "Gated External Single Trigger": If the RAMP is being triggered externally, GATEDX causes the MATRIX-6R to recognize the triggers only when keys are being played. Otherwise, the RAMP will trigger whenever a trigger is received as in EXTRIG - whether keys are being played or not.

One of the most common uses of the RAMP is for Vibrato delay. Refer to LFO1 "85 AMP MOD BY RAMP 1" or LFO 2 "95 AMP MOD BY RAMP 2". If an LFO is being used for vibrato, a RAMP can be used to gradually bring it in. Or, if used with a negative Value (inverted), the RAMP can take the LFO at its programmed amount and gradually fade it out. So, anytime you need a simple increase or decrease of a modulation amount or speed etc., use a RAMP.

## PORTAMENTO

As stated before, PORTAMENTO provides a sliding from note to note, smoothing out the otherwise sharp transitions between notes played from the Master controller. We've already talked about Portamento when we covered the DCOs and VCF / VCA sections earlier in the manual (see 08, 18 and 26 "KEYBOARD / PORTAMENTO"). These parameters are concerned with programming the amount of Portamento modulating those functions. This section of the Sub-Page is where we set up the Portamento's operational parameters.

### 44 PORTAMENTO RATE

This parameter determines the speed with which the transition from note to note occurs. Value range is from 0 to +63 where 0 is no Portamento (actually its fastest speed) and 63 is the maximum (the slowest). Therefore, the higher the Value, the longer the PORTAMENTO time.

PORTAMENTO RATE is expressed in "seconds per octave" or the time that it takes for a note to slide from its original note to its destination (the new note being played from the Master). This rate is not related to the VALUE number on the display - it is used simply as a reference number in programming. You will notice that selecting among the three different modes in "46 PORTAMENTO MODE", will affect their relative Rates even though the RATE Value is set to the same number. This is because PORTAMENTO is calculated by the MATRIX-6R's processor in a slightly different way for each mode.

### 45 PORT MOD BY VELOCITY

The PORTAMENTO RATE can be modulated by Velocity. When this parameter is used, the speed in which notes are played from the Master controller will change the RATE. VALUE range is from -63 to +63 where a setting of 0 indicates that the RATE is not affected by Velocity. Using positive Values slows the RATE as keys are played faster to a maximum set by +63. Using negative Values speeds up the RATE as keys are played faster. Remember that if your Master controller is not Velocity responsive, this parameter will not operate.

### 46 PORTAMENTO MODE

This parameter gives you a choice among the three response modes of Portamento:

**LINEAR** : Linear Portamento provides an even glide between notes. The RATE remains the same across the Master's keyboard. As an example, the time that it takes to glide two octaves is twice as long as the time it takes to glide one octave. When the Rate VALUE is set for 63, the maximum Portamento is about 35 seconds per octave.

**CONST:** This abbreviation stands for "Constant Time" Portamento. As with LINEAR, CONST Portamento provides an even transition between notes. The difference is that the MATRIX-6R's processor re-calculates the RATE depending upon the interval between notes. As an example, it will take the same amount of time to glide between a Root note and its Major 3rd as it does to glide between the Root and four octaves. Because of this, using a Rate VALUE of 63 gives a maximum Portamento speed of about 70 seconds per octave, twice that of LINEAR.

**EXPO:** This stands for "Exponential" Portamento. Where LINEAR gives an even transition between intervals, EXPO starts out with a fast rate at the beginning of the glide and slows down as the destination note is reached. As with CONST, using a Rate VALUE of 63 gives a maximum EXPO speed of about 70 seconds per octave.

#### 47 LEGATO PORTAMENTO

This parameter is in actuality the fourth Portamento mode but is programmed separately because of its unique operation. When LEGATO PORTAMENTO is used, Portamento will be active only when notes are played Legato (playing a new note without immediately releasing the first note). No Portamento will be heard while playing Staccato (playing a new note only after the first note has been completely released).

**NOTE:** This Portamento mode can only be used when parameter 48 KEYBOARD MODE is in UNISON. Putting the MATRIX-6R in Polyphonic mode will automatically disable this mode. The next section, "48 KEYBOARD MODE", describes the various playing modes that the MATRIX-6R will respond to from the Master controller.

#### 48 KEYBOARD MODE

This parameter allows you to set up the basic playing mode of whatever instrument is used as the MATRIX-6R's Master controller. There are three Basic modes and an interesting and useful Variation that you can choose. And the mode that you select is programmable with each patch.

##### The Basics:

**ROTATE:** When playing notes from the Master, this polyphonic mode loops through the six Voices assigning each new note to next available voice.

**REASGN:** Abbreviation for "Reassign", this polyphonic mode is similar to ROTATE but notes that have the same pitch (otherwise known as "note value") are reassigned to the same voice. For example, if you play Middle C it will be assigned to a certain voice. Every time thereafter when Middle C is played from the Master, that voice will play. "Reassign", by the way, is the KEYBOARD MODE enabled in the Basic Patch.

**UNISON:** This mode takes the MATRIX-6R out of polyphonic mode and makes the synthesizer monophonic. All six Voices play with one note and only one note can be played at a time. This mode has "Low Note Priority" meaning that if you play two or more notes at the same time, only the lowest one is heard.

**The Variation:**

**REAROB "Reassign Rob":** In the normal REASGN mode, holding down six notes at the same time will not allow any more notes played to be heard. The seventh note played will not sound. REAROB permits new notes to "rob" voices from those notes already being held from the Master controller. Each new note played will steal a voice from the notes already being played.

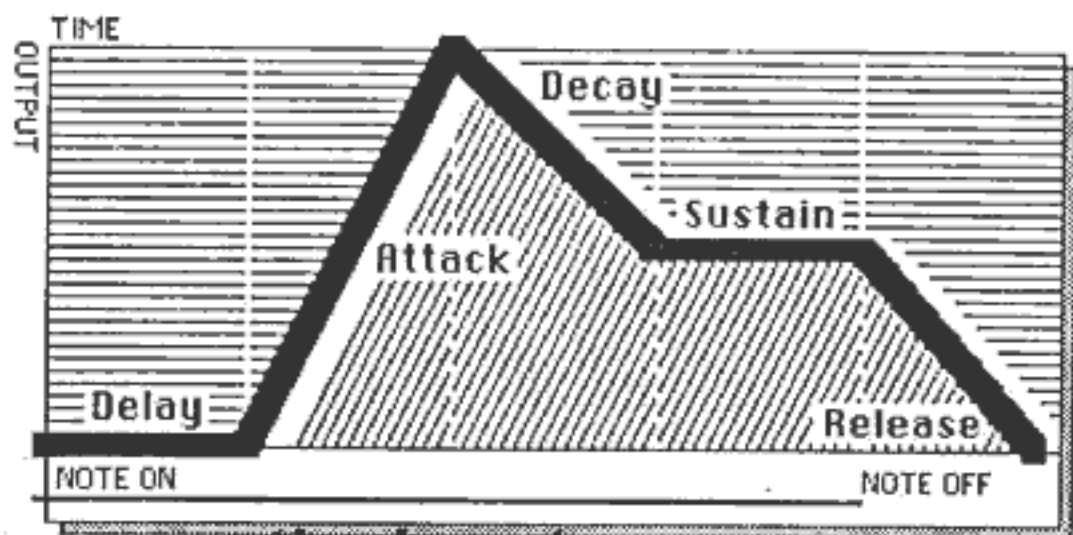
## The ENVELOPE Pages

### ENV 1, ENV 2 and ENV 3

The MATRIX-6R utilizes three 5-stage independent Envelope Generators for "time dependent" modulation. This means that Envelopes are used primarily to change the various patch parameters during a given time period, which could be mere fractions of a second to several minutes depending on the setting. Each "stage" of an envelope, with the exception of SUSTAIN - which sets the Envelopes' level as a key or keys are being held down - operates for an amount of time that is set with its Value.

Envelopes are most commonly used to modulate the frequency of the Filter (VCF) and the patch's overall loudness (VCA2). In addition, ENV1 and ENV2 can be used simultaneously to modulate any one of 32 parameter destinations in the MATRIX MODULATION™ Page that require this type of time control. The MATRIX-6R provides yet a third Envelope (ENV3) for additional envelope modulation when you need it.

Envelopes operate much the same as RAMPs in that they require a trigger to work. When an Envelope gets a trigger (that "go" signal we mentioned before) from the Master Controller, one of the LFOs or from the PEDAL1 input, it begins its cycle and waits for another trigger to start again.





Since the three Envelopes are identical, their parameters are covered together in the following discussion:

#### **50, 60 & 70 DELAY**

This is the time that the Envelope will wait before starting its cycle. VALUE range is from 0 to +63. A setting of 0 means no Delay and the Envelope will start its cycle with the Attack stage the moment it is triggered. +63 is the maximum Delay time.

#### **51, 61 & 71 ATTACK**

After the DELAY stage is completed, this stage sets the amount of time it will take for the Envelope to reach its output level (set in parameters 55, 65 & 75 AMPLITUDE). VALUE range: 0 to +63. 0 = instant ATTACK. 63 is the maximum Attack time.

#### **52, 62 & 72 DECAY**

After the ATTACK stage finishes and the Envelope's output level is reached, the Envelope will then start to decrease. DECAY sets the time it will take for this decrease to occur. VALUE range: 0 to +63. 0 = instant DECAY. +63 is the maximum Decay time.

#### **53, 63 & 73 SUSTAIN**

The DECAY stage will decrease the output of the Envelope until the SUSTAIN level is reached. SUSTAIN, then, sets the Envelope's output level while you are holding a key or keys on the Master controller's keyboard. It is important for you to understand that SUSTAIN is not a time parameter but determines the Envelope's output if a key or keys are held after the DELAY, ATTACK and DECAY stages.

If SUSTAIN is set to its maximum, there will be no decrease in the Envelope's output until the keys you are holding are let go. In this case, DECAY has no effect. The envelope will remain at whatever the SUSTAIN level is until the keys you are holding are released.

VALUE range: 0 to +63. 0 = no SUSTAIN level and if keys are held for the duration of the DECAY stage, the Envelope will return to its 0 output level (its starting point). 63 = maximum Envelope output level and is maintained while keys are held.

#### **54, 64 & 74 RELEASE**

After you have let go of the key or keys, the Envelope will continue to decrease in output level until 0 level is reached. The RELEASE parameter sets the time for this to occur. VALUE range is from 0 to +63 where 0 returns the Envelope instantly to its 0 level and 63 is the maximum Release time.

#### **55, 65 & 75 AMPLITUDE**

As we mentioned earlier in this section, the Envelopes' primary function is to increase and decrease a control signal's output level over a time period. This output level is set by the AMPLITUDE parameter. In other words, AMPLITUDE determines how much the Envelope as a modulation source will affect its destination. VALUE range is from 0 to +63.

### 56, 66 & 76 AMP MOD BY VELOCITY

The AMPLITUDE of the Envelopes can be increased or decreased by the speed that you play notes on the Master's keyboard assuming, of course, that your Master controller is velocity responsive. VALUE range is from -63 to +63.

0 indicates no effect on the output level by VELOCITY.

When positive Values are used, the Amplitude is increased as keys are played faster above the initial level set in Parameters 55, 65 or 75. Remember that the higher you set the AMPLITUDE, the less effect VELOCITY will have. A Value of +63 sets the maximum positive amount.

When negative Values are used, the Amplitude is decreased below the initial output level the faster keys are played. A Value of -63 sets the maximum negative amount.

### 57, 67 & 77 TRIGGER MODE

As stated in the introduction to this Sub-Page, an Envelope starts its cycle when it receives a trigger pulse. In this parameter, we select between using the Master controller's keyboard as the source to start the Envelopes' cycles or External triggers to accomplish this. There are several types of Triggers for this purpose:

#### Keyboard Triggers

**STRIG "Single Trigger"**: The Envelope will be activated for a voice only if that voice is not already playing. This means that if you are holding a key down, the Envelope for that voice will not start again (won't get a new trigger) until you let go of the key and play the same voice again. Single triggering only operates when the MATRIX-6R is in UNISON (see Parameter "48 KEYBOARD MODE). This means that playing Staccato generates new triggers and playing Legato does not.

**MTRIG "Multiple Trigger"**: The Envelope will be activated any time a new key is played. Playing Staccato or Legato will always generate a new trigger.

**SRESET "Single Trigger Reset"**: Selecting this mode combines Single Triggering with the RESET Envelope mode. RESET mode tells the envelope to start its cycle from the beginning. Otherwise, the envelope will start from its current output level if it gets a new trigger part way through its cycle. Playing keys Staccato will generate a new trigger and start the Envelope from the beginning of its cycle.

**MRESET "Multiple Trigger Reset"**: As with SRESET, this mode combines Multiple Triggering with the RESET Envelope mode. MRESET generates a new trigger and starts the Envelope at the beginning of its cycle on every note, no matter how it is played.

## External Triggers

In the MATRIX-6R, External Triggering takes the place of the Master Controller when driving the Envelopes. The trigger source is plugged into the PEDAL 2 jack on the back panel using a standard guitar cord: a 2-conductor, shielded cable with a 1/4" plug on the end that goes into the MATRIX-6R.

Suitable trigger sources for this purpose can be a footswitch or any trigger source that provides a DC pulse of at least 20 ms. (milliseconds) in width and an amplitude of +1 to +10 volts in order to operate.

The External Trigger modes operate the same as their Keyboard Trigger counterparts. Refer to the previous descriptions to find out the operations of each different mode. The following list deciphers the display abbreviations:

<i>XTRIG</i>	"External Single Trigger"
<i>XMTRIG</i>	"External Multiple Trigger"
<i>XRESET</i>	"External Trigger Reset"
<i>XMRST</i>	"External Multiple Trigger Reset"

## 58, 68 & 78 ENVELOPE MODE

We already know that an Envelope receives a trigger to start its cycle. How the Envelope completes its cycle is selected in this parameter.

**NORM "Normal"**: The normal operating mode of an Envelope is to complete its cycle while a key or keys are being held down during the DELAY, ATTACK, DECAY and SUSTAIN stages of its cycle. After the keys are let go, the RELEASE stage finishes the Envelope. Holding a key or keys is called "Gating" - the Envelope in NORM mode needs a Gate to complete its cycle.

If the keys are let go at any time before the SUSTAIN level is reached (even during DELAY or ATTACK), the Envelope goes immediately to its RELEASE stage.

**DADR "Delay-Attack-Decay-Release"**: This mode causes the Envelope to skip its SUSTAIN portion while gated (keys are being held down). This has the same effect as if you release the keys as soon as the DECAY stage finishes. DADR otherwise operates the same as NORM. Releasing keys during the ATTACK stage, for instance, causes the Envelope to go immediately to its RELEASE stage.

**FREE "Freerun"**: This mode causes the Envelope to complete its entire cycle even if the key or keys are released before the SUSTAIN level is reached. Simply tapping a key very briefly to start the Envelope (give it a trigger) is sufficient to complete the cycle. FREE, therefore, provides the Envelope with a Gate even though the keys are let go.

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**BOTH** : This mode combines the action of DADR and FREE. If BOTH is selected, a DADR mode will complete its cycle (DADR is Gated) even if the keys are released before the DECAY stage is finished.

### 59, 69 & 79 LFO 1 TRIGGER

The Envelopes can also be triggered by a third source: LFO1. This parameter is available separately because it can be used at the same time with Keyboard or External Triggering. This parameter allows you to use LFO1 as a trigger source in order to synchronize the Envelopes' cycles with LFO1's cycle.

**NORMAL** : When this option is selected, the Envelopes operate with no LFO triggering. This is actually the switching LFO1 TRIGGER off.

**LFO1** : When this is selected, the Envelope will now be triggered by LFO1. This is actually switching LFO1 TRIGGER on. Since most of the LFO's waveforms are periodic (continuous and cyclical), exactly what point on the LFO's wave that does the triggering must be determined. This is accomplished the LFO1 Sub-Page "83 RETRIGGER POINT".

**G-LFO1 "Gated LFO 1 Trigger"**: When this is selected, LFO1 will trigger the Envelope only when a key or keys are played (the Envelope is Gated). If this is not selected, the Envelope will be continually triggered because the LFO is always running.

## The LFO Pages

### LFO1 and LFO2

The abbreviation "LFO" stands for "Low Frequency Oscillator". An LFO is, in most respects, similar to a regular oscillator except that its pitch (frequency) range is below the threshold of normal human hearing. Thus, its primary application is being used as a modulation source.

The two LFOs in the MATRIX-6R each contain seven types of waveforms to be used for modulation. The first four are called "periodic" (TRI, UPSAW, DNSAW & SQUAR) because they repeat in even patterns or cycles. The next two are called "aperiodic" (RANDM & NOISE) because are basically disorderly patterns that do not repeat with any regularity. The seventh choice "SAMPL" is used to sample any one of the other modulation sources and uses the result of this sampling as its waveform.

The MATRIX-6R contains two independent LFOs labeled LFO1 and LFO2. Since they are almost identical, we'll cover their parameters together.

## 80 & 90 SPEED

This parameter sets the LFOs' frequency or rate. VALUE range is from 0 to +63 where 0 represents the LFOs' slowest speed and 63 the fastest.

## LFO 1: 81 SPEED MOD BY PRESSURE

## LFO 2: 91 SPEED MOD BY KEYBOARD

The initial speed of the LFOs can be increased or decreased by another source of modulation. The speed of LFO1 can be modulated by Keyboard PRESSURE - pressing into the Master controller's keys after the notes are played. LFO2 can be modulated by keyboard notes: playing high notes or low notes on the Master's keyboard will speed up or slow down the LFO Speed.

LFO1 PRESSURE range is from -63 to +63. Using positive VALUES increase the LFO speed when PRESSURE is added. Negative VALUES decrease LFO speed when PRESSURE is added. A 0 setting represents no effect by PRESSURE.

LFO2 KEYBOARD range is also -63 to +63. Using positive VALUES causes the LFO to speed up as higher notes are played on the Keyboard and slow down when low notes are played. Using negative VALUES gives the opposite effect: high notes slow the LFO and low notes speed it up.

## 82 & 92 WAVEFORM

This parameter allows you to select the waveform of the LFO that will be used as the modulation source.

### Periodic Waveforms

**TRI "Triangle"**: This is the most commonly used waveform which can be described as a symmetrical wave with a regular up-down shape. This waveform is primarily used for vibrato or tremolo effects.

**UPSAW "Up or Positive Sawtooth"**: A variation of TRI where the rising (positive) portion of the wave gradually reaches its peak then drops off sharply.

**DNSAW "Down or Negative Sawtooth"**: An inverted variation of UPSAW where the wave starts at its peak and gradually decreases.

**SQUAR "Square Wave"**: Another symmetrical waveshape where the rising and falling portions are sharp transitions. The SQUARE does not "peak" like the other waves but has equal high and low "plateau" portions that give the wave symmetry. This waveform, therefore, provides sharp high-low modulation.

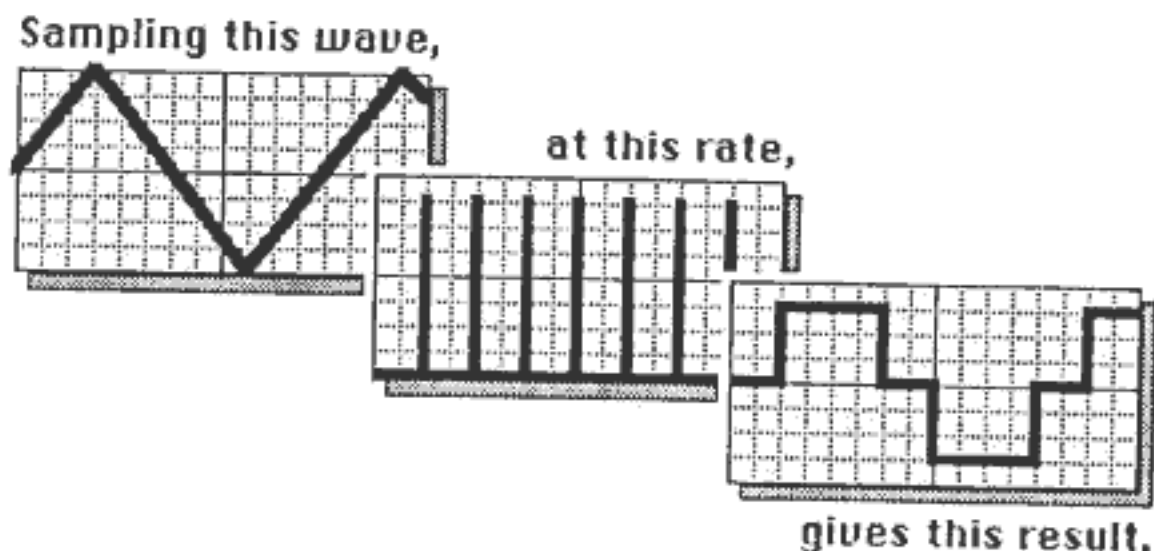
### Aperiodic Waveforms

**RANDM "Random Modulation"**: This waveform outputs an irregular modulation pattern used mostly for effects.

**NOISE "Noise Modulation"**: This is also an irregular modulation signal in many respects similar to RANDM but sounds like Random Modulation at a much higher speed. As a result, using this wave gives a noisy, harsh effect to the sound, hence the name.

### Special Modulation

**SAMPL "Sampled Modulation"**: When this is selected, the LFO samples another modulation source and uses that as its waveform. Parameters 80 & 90 SPEED control how often this source is sampled (the RATE). The source to be sampled can be any of the MATRIX-6's 20 modulation sources, selected in PATCH Edit Parameters 88 and 98 "SAMPLE".



### 83 & 93 RETRIGGER POINT

An LFO normally cycles freely with no apparent "beginning" or start point to its cycle. An LFO, however, can be set to start at a programmable point in its cycle whenever a trigger (from the Keyboard or External) is received.

The LFO is selected to be retriggered in Parameters "86 & 96 TRIGGER MODE". You are able to set the actual retrigger point in this parameter. Remember that if Parameters 86 and 96 are set to OFF, this mode will not be operative.

VALUE range is from 0 to +63 where 0 sets the retrigger point to be at the beginning of its cycle and 63 sets it at the wave's half-way point.

#### 84 & 94 AMPLITUDE

This sets the output level of the LFO. "Output level" in this case refers to the "intensity" of the LFOs modulation. The higher the VALUE number, the wider the waveform's sweep or "depth" as it is also called.

VALUE range is from 0 to +63. A setting of 0 represents no LFO output and effectively turns the LFO off. 63, of course, is the maximum.

#### LFO 1: 85 AMP MOD BY RAMP 1

#### LFO 2: 95 AMP MOD BY RAMP 2

As we stated in the section on RAMP / PORTAMENTO, RAMPs are more commonly used to simply increase or decrease something in the patch. We also mentioned that LFO amplitude or depth is one useful example. In the LFO Sub-Pages, RAMP1 is assigned to LFO1's Amplitude and RAMP2 goes to the Amplitude of LFO2.

These two Parameters operate in the same way. VALUE range is from -63 to +63. 0, as always, indicates no AMP MOD by the RAMP. Using positive numbers increases the Amplitude from its initial setting selected in Parameters 84 and 94. Using negative numbers, which invert the RAMP, decreases the LFO's output.

#### 86 & 96 TRIGGER MODE

The LFOs, like the Envelopes and Ramps, can be triggered by the Keyboard or by an External source. As we mentioned in Parameters "83 & 93 RETRIGGER POINT", we are able to select the mode of triggering in this Parameter.

**OFF** : This indicates that the LFO is not triggered and will cycle freely.

**STRIG "Single Trigger"**: As with Ramps and Envelopes, the LFO will retrigger only if the voice is not already playing. A Staccato style of playing will retrigger the LFO and Legato will not.

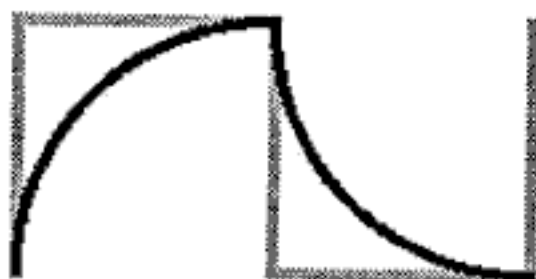
**MTRIG "Multiple Trigger"**: The LFO will retrigger regardless of the playing style.

**XTRIG "External Single Trigger"**: The LFO will retrigger only when a trigger pulse is received from an external source plugged into the PEDAL 2 jack.

#### 87 & 97 LAG

The Lag Processor that generates the same control signal to produce Portamento is routed to the LFOs in this Parameter in order to reshape their waveform. Just as LAG smooths out sharp or instantaneous transitions between notes played on the Master controller's keyboard, Lagging the LFOs rounds off any sharp transitions in a selected waveform.

The effect of LFO LAG is especially prominent when used to reshape the Square wave because it has two instantaneous transitions - a 90° rising edge and a corresponding 90° falling edge. The diagram below shows a "before" and "after" effect of LAG on a Square wave. The sharp falling edge of UPSAW and the rising edge of DNSAW are affected by LAG as well. The TRI wave can also be Lagged but because of its lack of sharp edges, the effect is not as noticeable.



**Square Wave before and  
after Lag Processor**

#### **88 & 98 SAMPLE**

As we indicated in Parameters "82 & 92 WAVEFORM", one of the available choices for the LFO's output is a Sampled waveform. When SAMPL is used, the modulation source to be sampled is selected in this Parameter. You can choose from among any of the MATRIX-6's 20 modulation Sources, selected in the VALUE mode of this Parameter.



## PROGRAMMING THE MATRIX-6R

### Using MATRIX MODULATION™

As we have just seen in the PATCH EDIT Page, there are a number of pre-determined Modulation Routings designed into each of the 10 Sub-Pages - 18 to be exact. These 18 "hardwired" (or permanent) modulations were chosen because of their usefulness and also because they are the most commonly required routings in performance synthesizers like the MATRIX-6R. For reference, we've listed them below:

DCO 1 :	01 FREQ MOD BY LFO 1 04 PW MOD BY LFO 2
DCO 2:	11 FREQ MOD BY LFO 1 14 PW MOD BY LFO 2
VCF / VCA:	22 FREQ MOD BY ENV 1 23 FREQ MOD BY PRESSURE 28 VCA 1 MOD BY VELOCITY 29 VCA 2 MOD BY ENV 2
FM / TRACK:	31 FM MOD BY ENV 3 32 FM MOD BY PRESSURE
RAMP / PORTAMENTO:	45 PORT MOD BY VELOCITY
ENV 1:	56 AMP MOD BY VELOCITY
ENV 2:	66 AMP MOD BY VELOCITY
ENV 3:	76 AMP MOD BY VELOCITY
LFO 1:	81 SPEED MOD BY PRESSURE 85 AMP MOD BY RAMP 1
LFO 2:	91 SPEED MOD BY PRESSURE 95 AMP MOD BY RAMP 2

There will be times, however, that these permanent routings don't offer the kind of modulation you really need to do the job. That's why we created the MATRIX MODULATION™ System. This system permits taking any one of the MATRIX-6R's 20 modulation Sources (most of them we already discovered in the PATCH EDIT Sub-Pages) and routing it to any one of 32 destinations. That's 640 new combinations. You are given 10 combination locations in the MATRIX MOD Page that make the possibilities practically limitless.

For those of you interested in the mathematics behind this, the actual number of possibilities is  $2.96 \times 10^{21}$ . That's just under 3 billion trillion combinations in which no two ever repeat and does not take into consideration different Value AMOUNTs. If we include all the possible Value AMOUNTs in our equation, the number comes to  $1.2 \times 10^{42}$  with no two combinations ever repeating. Have fun.

**[www.synthesizer.at](http://www.synthesizer.at)**

With the 18 permanent and 10 custom modulation routings available, you have a total of 28 modulations per patch - and they're all programmable. You will soon find that the MATRIX-6R gives you incredible flexibility when programming modulation in a patch.

What exactly is modulation? To modulate means to "change". Modulation is simply changing something by something else. In the strictest use of the term, even the Master controller's keyboard is a source of modulation. We've already seen how it can change the pitch of the DCOs and the VCF frequency. Using MATRIX MOD, the Keyboard can be used to change 29 other parameters as well.

The 18 permanent modulations and the 10 MATRIX MODs all have ranges from -63 to +63 to achieve positive (normal) and negative (inverted) effects. The numbers along this range are not absolute values and may differ from source to source in their ultimate effect on the sound. They are intended to be regarded simply as an index that you can use as a reference when programming patches.

The range of any modulation may in some cases not be enough to do the job. No problem. Just set up a MATRIX MOD with the same Source and Destination and adjust the AMOUNT value until the required range is achieved. If you still need more just do it again.

As an example, Pitch Bend is achieved by routing one of the LEVERs to DCO1 and DCO 2 00 & 10 FREQUENCY. When 07 & 17 LEVERs are enabled, Pitch Bend is preset to be +/- a Whole Tone. But what if you want some other interval? Easy: set up two MATRIX MODs, the first with "18 LEVER 1" as the Source and "01 DCO1 FREQUENCY" as the Destination and the second with "18 LEVER 1" as the Source and "04 DCO 2 FREQUENCY" as the Destination. Notice that we have one Source (LEVER1) modulating two different Destinations (DCOs 1 & 2 FREQUENCY). You can do that whenever you like and with any Source. As a matter of fact, you can take LEVER1 (or any of the other 19 Sources) and route it to a maximum of 10 different Destinations in the MATRIX MOD Page. How's that for flexibility?

Use the following chart to select an AMOUNT Value when programming different semitone intervals:

AMOUNT	INTERVAL
46	min 2nd
53	Maj 2nd
56	min 3rd
58	Maj 3rd
60	Perf 4th
61	dim 5th
62	Perf 5th
63	min 6th

A wider interval can be achieved by modulating the DCO's Frequencies by LEVER1 twice. You will use four MATRIX MODs in this case, two for each DCO. An octave bend is created by setting one AMOUNT to a min 6th (63) and the other to a Maj 3rd (58) to equal an octave. Just as you can route one Source to 10 different Destinations, you can have 10 different Sources modulate the same Destination. Keep experimenting - you're only limited by your own imagination.

## MASTER EDIT PAGE

As we mentioned in the beginning of the manual, the MASTER EDIT Page parameters are not programmable with each individual patch. Rather, they are set for the MATRIX-6R as a whole and will do the same thing for one patch as it will for all the others. This is called "Global Control" - selecting a parameter VALUE for one patch selects it for the rest of them.

The MASTER EDIT Page is comprised of five Sub-Pages of related functions. They are selected and given VALUE amounts just like the other Pages. And although they are not programmable per patch, they are stored in Global memory and will remain as they are until you change them. Even if you turn the MATRIX-6R off, come back a week later and turn it on again, these settings will still be intact.

### MIDI

MIDI is an acronym for Musical Instrument Digital Interface. MIDI is a universally accepted system of digital communication that allows you to hook up your MATRIX-6R to other devices - synthesizers, sequencers, drum machines, computers, etc. - as long as they also are equipped with a MIDI interface. MIDI makes it possible to hook up instruments by different manufacturers.

Because your MATRIX-6R uses an internal computer (called a "microprocessor"), it is able to communicate through MIDI to other microprocessor based devices that have this interface. MIDI, then, is a digital language that enables two or more MIDI-equipped instruments to "talk" to each other.

In the MIDI Sub-Pages, you are able to determine when and what kind of communication takes place and how it will occur. MIDI communication is transmitted and received, and this occurs through channels - much the same as radio or television, but using cables instead of antennas. Connecting two or more MIDI devices together constitutes a MIDI "system".

MIDI channel communication is divided into two main categories:

**NOTES** - notes played on one instrument are played on the other(s) as well as **VELOCITY** and **RELEASE VELOCITY**.

**CONTROLLERS - LEVER1 (Pitch Wheel) and LEVER2 (Vibrato Wheel), PEDAL1 (Volume) and PEDAL2 (Sustain), PATCH CHANGES and PRESSURE (After-Touch) used on one will modulate the others in the MIDI system. The main thing to keep in mind is that if the Master instrument is transmitting on a certain channel, the receiving instruments must also be set to that channel for these events to be recognized.**

The MATRIX-6R enables you to set MIDI assignments using 12 MIDI Parameters, numbered 00 through 11. They are described as follows:

#### **00 BASIC CHANNEL**

This selects the transmitting and receiving channel for the MATRIX-6R. VALUE selects any one of the available MIDI Channels numbered 1 through 16. The BASIC CHANNELs are concerned primarily with transmitting and receiving Notes and Controllers. There are, however, a few details you must keep in mind:

**RECEIVE** - When MIDI IN is used, the MATRIX-6R is considered a SLAVE and will receive Notes and Controllers on the BASIC CHANNEL. The Master controller must be set to transmit on this channel as well. The exception to this (and this is an important one) is that if OMNI MODE is turned ON in the next parameter 01 OMNI MODE, the MATRIX-6R will receive Notes and Controllers on any MIDI channel. The Master instrument can be set to transmit on any one MIDI channel and its Notes and Controllers will be received by the MATRIX-6R at all times when in OMNI MODE.

**TRANSMIT** - When MIDI OUT is used, the MATRIX-6R will transmit its own internal MIDI information to other slaves in the system. An example of this would be making a patch change on the MATRIX-6R from its own Keypad. If MASTER Edit Parameter "03 PATCH CHANGES" is selected ON, the MATRIX-6R will transmit a patch change made on its own Keypad to MIDI OUT.

When MIDI OUT is used and MASTER Edit Parameter "12 MIDI ECHO" is turned ON, the MATRIX-6R is considered the second "Master" in the system and will transmit MIDI Notes and Controllers coming from the Master controller as well as its own MIDI on whatever you select as the BASIC CHANNEL. Even though the MATRIX-6R is technically a Slave in the system - due to the fact that to play it, you must "slave it" to a Master controller - you can think of it as another Master when its MIDI OUT and MIDI ECHO are used.

**THRU** - When the MATRIX-6R's MIDI THRU is used instead of MIDI OUT, it will only respond as a Slave in your MIDI system and will simply pass information received from its MIDI IN to other slave instruments in the system, unaffected by any MIDI processing going on inside the MATRIX-6R itself.

## 01 OMNI MODE

As we mentioned before, OMNI MODE can be turned ON or OFF from this parameter.

When OMNI is ON, the MATRIX-6R will receive MIDI Notes and Controllers from the Master instrument on all 16 Channels plus special MIDI data such as TUNE, ACTIVE SENSE and SYSTEM EXCLUSIVE messages. As a rule of thumb, keep in mind that all MIDI information except Tune, Active Sense and System Exclusive data are sent on one of the MIDI 1 through 16 Channels.

When OMNI is OFF, the MATRIX-6R will receive MIDI Notes and Controllers on the BASIC CHANNEL only. The MATRIX-6R will ignore MIDI information coming from any other channel. Please note that this is true only if the MATRIX-6R is in its normal 6-Voice polyphonic playing mode. When the MATRIX-6R is in SPLIT, MIDI operates just a little differently and we'll cover that later in the SPLIT EDIT Page.

## 02 CONTROLLERS

Although MATRIX-6R is always a Slave, this parameter permits you to turn the MIDI Controllers ON or OFF as needed.

When turned ON, the MATRIX-6R will respond to LEVER1, LEVER2, PEDAL1, PEDAL2 and PRESSURE from the Master instrument. If MIDI Parameter "05 LOCAL CONTROL" is also turned ON, the MATRIX-6R's own Pedals (pedals plugged into the Pedal 1 and Pedal 2 jacks on its back panel) will operate simultaneously with MIDI Controllers.

When turned OFF, the MATRIX-6R will ignore all controller information except for MIDI Notes (NOTES, VELOCITY and RELEASE VELOCITY).

## 03 PATCH CHANGES

This parameter is treated separately from other Controllers because there may be many times when you will not want PATCH CHANGES to be transmitted or received.

PATCH CHANGES occur when a new patch is selected on the Master controller. Any instrument in the system set to receive PATCH CHANGES will respond by going to the new patch number when this command is sent. This is only an index number for the patch; it has nothing to do with the actual sound of the patch itself.

When turned ON, the MATRIX-6R will transmit and receive MIDI information that will cause instruments in the system to change to another Patch Number. If your Master controller has a Split-Keyboard capability and it is designed to send Split Program Changes via MIDI, the MATRIX-6R will also respond to these commands when PATCH CHANGES is enabled.

When turned OFF, the MATRIX-6R will not transmit a patch number when you change patches and it will ignore commands to change patches from other instruments in the system.

#### 04 SYSTEM EXCLUSIVE

Each MIDI instrument has several functions that make it unique. Thus, each manufacturer of a MIDI instrument has a special MIDI code that distinguishes it from other manufacturers' products in the system. This is called a SYSTEM EXCLUSIVE message. It allows, for example, two MATRIX-6Rs or a MATRIX-6R and a MATRIX-6 to perform certain functions that one MATRIX-6R hooked up to "Brand X" cannot do because of design differences.

One example of this is the ability to send an actual Patch data (not just the patch Number) from one MATRIX-6R to another by using MIDI Parameter "10 SEND PATCH". SYSTEM EXCLUSIVE allows this type of communication to occur that cannot happen between two different brands of synthesizers. If you plan to store MATRIX-6R patches on your home computer, it must first be programmed with Oberheim's SYSTEM EXCLUSIVE code before this can take place.

This parameter permits SYSTEM EXCLUSIVE to be turned ON or OFF. "SYSTEMX" as it is shown on the display is not necessary for routine MIDI functions.

#### 05 LOCAL CONTROL

The MATRIX-6R can be controlled by its own Pedals or by Keyboard, Lever and Pedal information sent to it via MIDI from the Master controller. This parameter selects whether the MATRIX-6R's own Pedals work (its LOCAL CONTROL) or just MIDI PEDAL information.

When this parameter is turned ON, both the MATRIX-6R's Pedal inputs are enabled. If "02 CONTROLLERS" is enabled, both LOCAL and MIDI controllers will operate simultaneously. Please note that LOCAL CONTROL is always enabled (activated) when the MATRIX-6R is powered on.

When this parameter is turned OFF, the MATRIX-6R's back panel Pedal inputs are disabled.

#### 06 PEDAL 1 SELECT

#### 07 PEDAL 2 SELECT

These two parameters allow you to select the MIDI Controller channel on which the MATRIX-6R will send and receive Pedal information. You can choose any one of the 122 available MIDI Controller Numbers (don't confuse these with the 16 MIDI Channels) numbered 0 through 121.

MIDI Pedals can be used simultaneously with LOCAL Pedals. Be sure to check the Owner's Manual of the other instrument to find out what Controller Number it's using so that you can set up this Parameter accordingly. And if you are using the Keypad to select the channel number, don't forget that you are required to enter a 3-digit number.

#### **08 LEVER 2 SELECT**

#### **09 LEVER 3 SELECT**

The "Levers" referred to on the MATRIX-6R's display are used to describe the Pitch Bend and Vibrato modulation controls found on the majority of synthesizers on the market today. In some cases, these controls exist on a synthesizer as wheel-type controls and others use joy-stick mechanisms. We use the term "lever" in reference to the spring-return "paddle" type mechanism for performance modulation found on all Oberheim synthesizers. Using the word "lever" keeps the terminology consistent with our design, although they all operate pretty much the same.

#### **Lever 1**

LEVER1 on the MATRIX-6R always transmits and receives on the MIDI Controller dedicated for Pitch Bend. This is called the BENDER controller. That's why there is no separate front panel Parameter for a LEVER1 MIDI assignment. You cannot select another Controller Number for LEVER1.

Wheel, joy-stick and lever controllers normally provide Pitch Bend Up and Pitch Bend Down capability as these pitch-bend controllers are moved in two directions. LEVER1 on the MATRIX-6R is designed to be used in this way.

#### **Lever 2**

LEVER2, on the other hand, can be set to transmit and receive on any MIDI Controller Number from 0 to 121.

LEVER2's normal status is to increase the modulation amount of Vibrato.

#### **Operation with Oberheim Instruments**

If you are playing the MATRIX-6R from another Oberheim synthesizer, LEVER2 also can be moved back and forth in two directions. Vibrato amount is increased when LEVER2 is pulled toward you but it has no effect when pushed away from you. We've provided a means to make use of this unused portion of LEVER2. We call it "LEVER3" which does not exist as a separate physical lever on Oberheim instruments but is controlled by LEVER2. LEVER3 increases its modulation amount when LEVER2 is pushed away from you. LEVER3 can be set to transmit and receive on any MIDI Controller Number from 0 to 121.

Because the Oberheim LEVER2 can be used in two directions, you can set up a patch that uses both LEVER2 and LEVER3 at the same time. When the Lever is pulled toward you, the effect of LEVER2 is heard; when the Lever is pushed away from you, the effect of LEVER3 is heard.

#### **Operation with Other Instruments**

If you are playing the MATRIX-6R from a controller equipped with wheels or a joy-stick, they normally provide modulation control in **one direction only**. The patch that you are playing must specify, in the way you have programmed it, that LEVER2 or LEVER3 is used. If you program a patch using **both** Levers at the same time and both are set to MIDI Controller 1 in these parameters, using the wheel or joy-stick will cause the effect of LEVER2 and LEVER3 to be heard at **the same time** in the patch. This design makes for some very interesting possibilities.

#### **10 SEND PATCH**

#### **11 SEND ALL**

Any one or all 100 of the MATRIX-6R's patches can be sent through its MIDI OUT to another MIDI device. This is not Patch Numbers but the actual data that makes up the sound. The receiving instrument can be another MATRIX-6R, an Oberheim MATRIX-6 or another device such as a computer that has been programmed with the Oberheim SYSTEM EXCLUSIVE code for reception.

- STEP 1: Using a standard MIDI cable, connect the MIDI OUT of the MATRIX-6R to the MIDI IN of the receiving instrument.
- STEP 2: On the MATRIX-6R, select the patch that you want to send. If you are planning to SEND ALL, this step can be skipped.
- STEP 3: On the receiving instrument, select the destination patch Number. Again, if you are planning to SEND ALL, this step can be skipped.
- STEP 4: Turn on SYSTEM EXCLUSIVE for both instruments.
- STEP 5: Select "10 SEND PATCH" or "11 SEND ALL" on the MATRIX-6R.
- STEP 6: Press the VALUE button. The display will now read "READY?"
- STEP 7: Press the YES button and the MATRIX-6R will begin its data transfer. When the transfer is completed, the display will switch back to the "SEND PATCH" or the "SEND ALL" message.



When executing a MASTER EDIT Parameter "11 SEND ALL" command, the display will scroll the messages "*SENDING PATCHES*", "*SENDING SPLITS*" then "*SENDING MASTER*" during the transfer instead of continuing to show the message "*READY?*".

**STEP 8:** Check the receiving instrument to verify that the data transfer was successful.

#### MATRIX-6R MIDI Controller Number Assignments

Controller	MIDI Number	Re-Assignable
PEDAL 1	7	YES
PEDAL 2	64	YES
LEVER 1	BENDER (Dedicated)	NO
LEVER 2	1	YES
LEVER 3	2	YES
PRESSURE	PRESSURE (Dedicated)	NO
VELOCITY	Transmitted w/ Notes	NO
RELEASE VELOCITY	Transmitted w/ Notes	NO

## 12 MIDI ECHO

This parameter permits the MIDI commands received by the MATRIX-6R sent from the Master controller to be combined with MIDI information generated by the MATRIX-6R itself and re-transmitted via the MATRIX-6R's MIDI OUT. This parameter is used to turn the MATRIX-6R's MIDI ECHO feature ON or OFF.

Certain MIDI commands received by the MATRIX-6R as a slave are always sent via MIDI OUT normally. MIDI Notes (NOTES, VELOCITY and RELEASE VELOCITY) information are the three MIDI commands that will be both re-transmitted by the MATRIX-6R to its MIDI OUT and passed to its MIDI THRU normally. Thus, MIDI OUT and MIDI THRU both handle MIDI Notes routinely.

The remaining MIDI IN commands - PRESSURE, PATCH CHANGES, LEVER1 and LEVER2, PEDAL1 and PEDAL2 - are not normally transmitted out the MATRIX-6R's MIDI OUT. Under normal conditions, these controls are simply passed along to other slave instruments in the system via the MATRIX-6R's MIDI THRU port only.

When ON, MIDI ECHO makes it possible to enhance the control over the other slave instruments in the system by combining what would normally be passed only to MIDI THRU with MATRIX-6R generated MIDI information and sending all of these commands to its MIDI OUT. Thus, MIDI ECHO allows for the other slave instruments in the line to be controlled from two "Masters" in a sense, because ECHO uses the MIDI commands from both the MATRIX-6R and its Master controller together.

When OFF, the MATRIX-6R returns to normal MIDI operation. MIDI THRU simply passes MIDI commands from the Master controller to the other slaves unaffected by any additional MIDI information generated by the MATRIX-6R. MIDI OUT transmits only those commands coming from the MATRIX-6R itself.

Since the design of the majority of MIDI synthesizers provide for a single MIDI IN port, there is no method other than switching MIDI cables or purchasing a MIDI Merge device to change from Master control to MATRIX-6R control over the other slaves. MIDI ECHO makes it possible for the MATRIX-6R and its Master controller to have complete control over the other slave instruments using only one MIDI cable.

### 13 SPILLOVER

This feature allows you to play another synthesizer from the MATRIX-6R via MIDI as if the second slave synthesizer were part of the MATRIX-6R's internal voices. This is how it works:

When SPILLOVER is OFF, playing the MATRIX-6R from the Master normally in ROTATE or REASGN, you know that if you play six notes and hold them down on the Master controller at the same time, playing a seventh note will not sound - there are no more voices left inside the MATRIX-6R to be played. Try it.

When SPILLOVER is ON, the seventh, eighth, ninth, etc. (up to the 16th) notes played on the Master will be transmitted from the MATRIX-6R on its BASIC MIDI Channel + 2 and will be heard on a second Slave synth connected to the MATRIX-6R. SPILLOVER will transmit both MIDI Notes and Controllers for SINGLE Patches and SPLIT Patches.

As an example, if the MATRIX-6R's Basic Channel is set to 1 (MASTER Page Parameter #00), Notes and controllers will spillover on Channel 3. If the MATRIX-6R is set to transmit on Channel 2, Notes and Controllers will spillover on Channel 4, and so forth.

#### Exceptions

UNISON works the same way but with a slight twist. If six keys are held down on the Master controller, extra keys played will be spilled to the Basic Channel + 2. But due to the nature of the UNISON Mode playing style (playing only one key activates all six Voices at once), SPILLOVER has a somewhat limited use when the MATRIX-6R is in UNISON.

REAROB Mode does not permit SPILLOVER due to its design. Since notes in excess of six being held on the Master controller at any one time are robbed from the MATRIX-6R's internal voices, SPILLOVER simply does not occur in this Mode. What actually happens when SPILLOVER occurs is that "excess" notes played in ROTATE or REASGN on the Master controller are transmitted out MIDI from the MATRIX-6R instead of being ignored as they would be normally.

As an experiment, set up the following:

1. Connect another MIDI synthesizer as a second Slave in the system to the MATRIX-6R (the MATRIX-6R, remember, is a Slave to the Master controller to begin with). The MIDI OUT - not MIDI THRU - of the MATRIX-6R should be connected to the MIDI IN of the Slave. The Slave synth can be any other MIDI instrument but for SPILLOVER to work, it must have the ability to turn off its OMNI MODE and allow you to select a single MIDI Channel to receive.
2. Set the BASIC MIDI Channel on the MATRIX-6R to 1. The MATRIX-6R can be either in OMNI MODE or receiving on a single MIDI Channel. Just be sure that it is the same Receiving Channel that the Master controller is transmitting on.
3. Turn OMNI MODE **off** on the second Slave synth and select Channel 3 as the Receiving Channel.
4. Select your favorite patches on both instruments and play the Master controller. Notice that if you play six notes or less on the Master, only the MATRIX-6R plays and the second Slave synth connected to the MATRIX-6R does not sound - the MATRIX-6R is transmitting on a MIDI Channel (in this case Channel 1) that the second Slave synthesizer is not receiving (in this case Channel 3).
5. Now, play and hold six notes on the Master controller. Then, with your remaining fingers, play the seventh, eighth, ninth and tenth notes and they will be heard coming from the Slave synth only. If you turn the OMNI MODE of the Slave instrument back on, notes played on the MATRIX-6R will be doubled on the Slave, just as normal.

#### **SPILLOVER in Split Mode**

SPILLOVER also works when the MATRIX-6R is in SPLIT MODE and occurs **Independently** from each of the two Zones.

The MATRIX-6R's voices can also be "Split" so that the Master controller can play two sounds from the MATRIX-6R at the same time - one from the left-hand side of the keyboard and one from the right-hand side of the keyboard - even if the Master does not have a Split-Keyboard capability of its own. The left side of the keyboard is referred to as the "Lower Zone" and the right side of the keyboard is referred to as the "Upper Zone". For a detailed description on how to program Splits, refer to the section titled SPLIT EDIT PAGE.

The number of notes that are needed to be played from the Master controller before SPILLOVER can occur depends on the MASTER Page Parameter "7 VOICE / ZONE SELECT" setting:

- √ If a 2/4 setting is selected, three or more notes must be played from the Lower Zone of the Master controller in order for SPILLOVER to happen from the Lower Split. Five or more notes must be held on the Upper Zone of the Master controller for SPILLOVER to occur from the Upper Split. The reverse applies to a 4/2 Split. But if a 0/6 or a 6/0 voice assignment is selected, SPILLOVER will **never** occur from the "0" Keyboard Zone, only from the Zone that has the six voices assigned to it.
- √ Spillover will occur from a Zone only if its MIDI Output is turned ON. Check your SPLIT EDIT Parameters "2 LEFT MIDI OUTPUT" and "5 RIGHT MIDI OUTPUT" and make sure that they are turned ON.

Use the following chart to find the SPILLOVER scheme for a particular Split Patch. The letter "N" refers to the BASIC Channel that the MATRIX-6R is transmitting on. Remember to set your Slave synthesizer to receive on the the proper Channel if you want SPILLOVER to happen.

VOICE/ZONE SELECT		MIDI OUT CHANNEL		SPILLOVER CHANNEL	
Lower	Upper	Lower	Upper	Lower	Upper
2	4	N	N+1	N+2	N+3
4	2	N	N+1	N+2	N+3
0	6	N	N+1	No Spillover	N+3
6	0	N	N+1	N+2	No Spillover

#### Other Things to Keep in Mind....

1. If the MATRIX-6R is set to Basic MIDI Channel 15, the extra notes are spilled to MIDI Channel 1.
2. If the MATRIX-6R is set to Basic MIDI Channel 16, the extra notes are spilled to MIDI Channel 2.

These situations apply both to Single Patch Mode and to either part of a Split (Lower or Upper) in Split Mode.

#### 14 ACT SENSE "Active Sense"

Active Sense is a special MIDI function that is basically designed to prevent a malfunction should the MIDI connection be broken between the MATRIX-6R and its Master controller, or the MATRIX-6R and the second Slave in the system. One of the most common "malfunctions" that would normally occur if the MIDI connection between the MATRIX-6R and the Master or other slaves is broken is

that notes being held would get stuck or "locked on". Active Sense is designed to prevent this from happening by monitoring the MIDI line and making sure that it the connection is intact. It is simply turned ON or OFF in this mode.

When OFF, the Active Sense routine in the MATRIX-6R's software is defeated and the MATRIX-6R's MIDI connections to the Master controller and / or a second slave are not monitored.

When ON, the Active Sense routine is enabled and the MATRIX-6R's MIDI connections are monitored.

### **A Word About MIDI Notes**

MIDI Note commands from the Master contain, among other things, a "Note On" command (when a key is played) to start a note playing on the MATRIX-6R followed by a "Note Off" command (when the key is let go) to tell the MATRIX-6R to stop playing this note. Since a broken MIDI connection prevents the MIDI "Note Off" command from reaching the MATRIX-6R, notes being held at the moment of the MIDI connection break will continue to sound indefinitely. Try holding down a key on the Master to play the MATRIX-6R and pulling the MIDI cable out with Active Sense OFF. This note will lock on until the MATRIX-6R is turned off or until you change to another patch from the MATRIX-6R's front panel. With Active Sense ON, the MATRIX-6R will perform the necessary "Note Off" command for you automatically.

### **How Active Sensing Works**

Active Sense monitors the MIDI lines by sending a steady stream of MIDI information as long as it is ON. This stream of information is designed to "keep the line busy". If this stream of information is cut short, the instrument will execute an "All Notes Off" command to prevent a possible note lock. The Active Sense feature operates a little differently for MIDI IN than it does for MIDI OUT:

#### **MIDI IN**

The MATRIX-6R will expect to receive either notes from the Master or, if the Master utilizes Active Sensing, the MATRIX-6R will expect to receive a continuous stream of the Active Sensing data once it has received the first Active Sense byte. If it does not receive any of this information, the MATRIX-6R will execute "All Notes Off" as a preventative measure. Active Sense performs "All Notes Off" by turning off any Note On commands, so any patch on the MATRIX-6R that has a long release time will let any sustaining notes die out.

If the Master controller that you are using does not have Active Sense, the MATRIX-6R will just wait for notes to be played.

#### **MIDI OUT**

The MATRIX-6R also sends Active Sense data to other slaves in the system as a monitor. If you are not playing any notes from the Master controller, the MATRIX-6R will not send notes either and will begin

sending the stream of Active Sense data to the other slaves in the system, keeping "the line busy". If any of the other slaves in the system have Active Sense, they will be able to use this stream of information coming from the MATRIX-6R, thus prevent their own notes from locking on.

**IMPORTANT NOTE:** Some older synthesizers, perhaps due to the simplicity of their MIDI implementation, may not be able to properly interpret Active Sensing data received at their MIDI IN. If you experience strange symptoms or erratic behavior from a synthesizer connected as a slave to the MATRIX-6R - such as its control panel locking up, memory crash, etc. - turn Active Sense in the MATRIX-6R OFF or disconnect the slave from the MATRIX-6R's MIDI OUT and use MIDI THRU instead.

## PATCH MAPPING

MIDI Interfacing, as we have seen in this section of the manual, provides for a number of extremely useful performance functions to be shared among the various instruments connected together in what is called a MIDI "system". One of these handy features is the ability of the Master controller to send a command to the instruments that it is driving to change from their current patch to a new one.

A limitation in this feature exists, however, in that all instruments in the system must change to the same MIDI Patch Number. Each instrument, of course, can be programmed to play a different sound but there is really no easy way to set up a logical arrangement so that each instrument will change to the patch that compliments the rest of the instruments.

For example, under the present MIDI system, you must re-program each synthesizer by shuffling programs around in memory so that the same patch number in each unit can be used to recall the sounds you want. If the Master controller sends out MIDI Patch Number 23, every other synthesizer in the line must recall its own "Patch 23". If Patch 23 in the MATRIX-6R, as one of these instruments, is not the sound that you want to use in conjunction with the others, you must replace Patch 23 with another existing patch or re-program Patch 23 entirely from scratch. Just think of how much time it would take to re-organize the 100 patches in the MATRIX-6R so that they correspond to and compliment the patch played on the Master, let alone work that would be required to re-organize three or four instruments in your rig.

PATCH MAPPING solves this problem and allows the Patch Change feature of MIDI to become really useful. Patch Mapping gives you the ability to "re-arrange" your patches in the MATRIX-6R without actually re-arranging them. This is accomplished by using the "Table" in Parameter 16 P MAP EDIT to make the MATRIX-6R respond to any patch you want, regardless of what Patch Number command is sent to it from MIDI. Patch Mapping also provides the means to transmit selective patch change commands to other instruments in the system that are slaved to the MATRIX-6R.

## 15 PATCH MAP

This parameter simply turns the MATRIX-6R's Patch Mapping feature ON or OFF.

When OFF, the synthesizer transmits and receives MIDI PATCH CHANGE commands normally. If, for example, MIDI Patch Number 23 is sent from the Master controller, the MATRIX-6R will respond to this command by simply recalling its own patch number 23. MIDI Patch Numbers transmitted from the Master will cause the MATRIX-6R to recall corresponding patch numbers from its own memory. Remember, MIDI Patch Changes on the MATRIX-6R must first be enabled in MASTER Edit Parameter 03 PATCHES for any patch change at all to occur from MIDI.

When ON, the synthesizer transmits and receives MIDI PATCH CHANGE commands for Single Patches according to the Patch Mapping Table you have programmed in the next MASTER Edit Parameter 16 P MAP EDIT. If the MATRIX-6R is in SPLIT Mode, it will recognize PATCH CHANGE commands 00 - 49.

## 16 P MAP EDIT - "Patch Map Edit"

It is in this Sub-Page that the MATRIX-6R's Patch Map Table is constructed. It consists of three imaginary "columns" of numbers that make up the Map's patch change Input / Output configurations.

1. To enter the Patch Map, press the VALUE button.
2. The display will read "READY?".
3. Press YES on the Keypad and the display will recall the last Patch Map configuration displayed. We are now ready to set up our Table.

When the Patch Map is first entered, the first grey button directly beneath the display is lit and the vertical row of LEDs in MODE SELECT are turned off. The 0-9 buttons of the Keypad and the < > and << >> buttons are used to change VALUE. The STORE and "+ / -" buttons are not active in this Mode. To exit Patch Map Mode, press any of the three buttons in MODE SELECT.

The display is divided into three sections, described as follows:

1. The first 2-digit number on the display is called the **Reference Patch** and corresponds to either one of the 100 Single Patches in the MATRIX-6R or 100 MIDI Patch Numbers coming in from the Master controller, numbered 00 through 99.

Pressing the first grey button under the display selects this parameter.

2. The second part of the display reads *IN = XX*. This is the MATRIX-6R's Patch Number that will be recalled when the Reference Patch Number is received. "XX" is any desired Patch Number in the MATRIX-6R numbered 00 through 99.

Pressing the second grey button under the display selects this parameter. The third grey button is not active in this mode and is ignored if pressed.

3. The third part of the display reads *OUT = XX*. This is the MIDI Patch Number that the MATRIX-6R will transmit from its MIDI OUT to a second slave in the line if the Reference Patch Number is selected from the MATRIX-6R's front panel. "XX" is any desired Patch Number in the MATRIX-6R numbered 00 through 99.

Pressing the fourth grey button under the display selects this parameter.

## HOW TO USE PATCH MAPPING

In the following examples, we will set up a number of situations that will clearly illustrate the flexibility and usefulness of Patch Mapping. To get started, connect your Master controller's MIDI OUT to the MATRIX-6R's MIDI IN. If you have another MIDI instrument, connect its MIDI IN to the MIDI OUT of the MATRIX-6R so that it will act as the second slave in the system.

### Patch Map Operation #1

The simplest operation of Patch Mapping is to program our Table so that a given MIDI Patch Change command coming in from the Master controller will change the MATRIX-6R to another patch number. You have no less than 100 Patch Maps in the Table to program any way you like.

1. Select Reference Patch 23.
2. Select the *IN* Patch to be 35.
3. Select the *OUT* Patch to be 17.
4. Pressing the orange MASTER button will allow you to exit "16 P MAP EDIT", Enter MASTER Edit Parameter "03-PATCHES" and make sure it is enabled ON. Make sure that the Master controller is set to send Patch Changes via MIDI. Also make sure that the second slave instrument connected to the MATRIX-6R is set to receive Patch Changes via MIDI.
5. Exit Patch Map Mode by pressing the blue PATCHES button in MODE SELECT. You can actually exit "16 P MAP EDIT" by pressing any one of the PATCHES, SPLITS or MASTER buttons, but you want to make sure that the MATRIX-6R is in PATCHES, not SPLITS.



In this example, changing to Patch Number 23 on the Master controller causes the MATRIX-6R to recall Patch 35. Re-enter "16 P MAP EDIT" and set up a few more Patch Maps. Try these:

<i>00</i>	<i>IN = 44</i>	<i>OUT = 15</i>
<i>01</i>	<i>IN = 31</i>	<i>OUT = 76</i>
<i>02</i>	<i>IN = 65</i>	<i>OUT = 20</i>
<i>03</i>	<i>IN = 19</i>	<i>OUT = 09</i>
<i>04</i>	<i>IN = 88</i>	<i>OUT = 52</i>

With this set-up, selecting Patch 00 on the Master, selects Patch 44 on the MATRIX-6R. Patch 01 on the Master selects Patch 31 on the MATRIX-6R. Patch 02 on the Master selects Patch 65 on the MATRIX-6R. Master 03 recalls 19 and Master 04 recalls 88. Just remember you have no less than 100 of these Maps to program in any way you need.

#### **Patch Map Operation #2**

In the hypothetical situations above, you can transmit selective Patch Changes from the MATRIX-6R to the second slave according to the *OUT* Patch Numbers. Referring to our first example, if you select Patch 23 on the MATRIX-6R's front panel, Patch 17 is selected on the second slave. Selecting a Patch Number on the MATRIX-6R's front panel is referred to as selecting the patch locally.

In the sample Table above, Local Patch 00 selects Patch 15 on the second slave. Local 01 selects Patch 76 on the slave. Local 02 selects 20 on the slave, 03 selects 09 and 04 selects 52.

#### **17 P MAP ECHO - "Patch Map Echo"**

In many situations, you may find it convenient (even necessary) to have selective Patch Changes occur on both the MATRIX-6R and the second slave simultaneously from the Master controller. This is where Patch Map Echo comes in.

#### **Patch Map Operation #3**

When P MAP ECHO is ON, selecting a Patch Number on the Master controller (the Reference Patch) causes the MATRIX-6R to recall the *IN* Patch and send the the *OUT* Patch to the second slave at the same time. This permits the Master controller to set up the other two slaves in the system, the MATRIX-6R and the second slave, with one MIDI Patch Change command. Pretty convenient, eh?

When "17 P MAP ECHO" is OFF, selecting a Patch Number on the Master controller (the Reference Patch) causes the MATRIX-6R to recall the *IN* Patch only and the second slave instrument's Patch Number does not change. In this case, changing patches on the second slave is accomplished by selecting a new Patch Number from the MATRIX-6R's front panel (or the slave's own front panel, of course).

**IMPORTANT NOTE:** The MATRIX-6R must also have MASTER Edit Parameter "12 MIDI ECHO" turned ON for Patch Map Echoing to occur. If MIDI ECHO is disabled, Patch Map Echoing will not happen even if it is ON.

Also, if "12 MIDI ECHO" is ON but Patch Map Echo is OFF, the MATRIX-6R will recall the *IN* Patch but the **Reference Patch** will be sent to the MATRIX-6R's MIDI OUT. As you can see, there are several different combinations as to the ON / OFF status of the four MASTER Edit Parameters that deal with Patch Changes. As a check list, keep in mind the following chart when using the MATRIX-6R's Patch Change Parameters:

03	PATCHES	ON	OFF
12	MIDI ECHO	ON	OFF
15	PATCH MAP	ON	OFF
17	P MAP ECHO	ON	OFF

### 18 MIDI MONO

Under normal conditions, the MATRIX-6R - as with most MIDI synthesizers - receive MIDI Notes polyphonically from the Master controller from one specified MIDI Channel. In SPLIT Mode, the MATRIX-6R receives MIDI Notes polyphonically from two specified MIDI Channels - one for the LEFT ZONE and one for the RIGHT ZONE. MIDI MONO is the means by which each of the MATRIX-6R's six Voices are played from six separate MIDI Channels. This parameter selects MIDI MONO either ON or OFF.

When OFF, the MATRIX-6R receives MIDI Notes from the Master controller polyphonically, as described above.

When ON, the MATRIX-6R receives MIDI from the Master monophonically. Each Voice is reset to respond to single notes received on a separate MIDI Channel.

### Using MIDI MONO

MIDI MONO is a useful mode when independent control of each Voice is necessary. Playing six single-note lines from a MIDI sequencer on six separate play tracks is one example. MIDI guitar players will really enjoy the added flexibility of being able to have each string control a Voice independent of the others, complete with Pitch Bend and Volume dynamics.

When using MIDI MONO, the MIDI Channel assignments to Voices are based on what you have selected as the BASIC CHANNEL "N" in MASTER Edit Parameter 00. If the BASIC Channel = 1, then Voice 1 receives on Channel N or 1 from the Master controller, Voice 2 - Channel 2 (N+1), Voice 3 = Channel 3 (N+2), and so on. The following table gives the possible MIDI Channel assignments for each Voice.

## MIDI MONO CHANNELS

Voice 1 (BASIC CHANNEL)	Voice 2	Voice 3	Voice 4	Voice 5	Voice 6
1	2	3	4	5	6
2	3	4	5	6	7
3	4	5	6	7	8
4	5	6	7	8	9
5	6	7	8	9	10
6	7	8	9	10	11
7	8	9	10	11	12
8	9	10	11	12	13
9	10	11	12	13	14
10	11	12	13	14	15
11	12	13	14	15	16
12	13	14	15	16	1
13	14	15	16	1	2
14	15	16	1	2	3
15	16	1	2	3	4
16	1	2	3	4	5

MIDI MONO also operates in SPLIT Mode and the MIDI Channel/Voice assignments conform to the values listed in the table above for 2 / 4 and 4 / 2 Splits. For 0 / 6 and 6 / 0 Splits, the Zone with 0 Voices assigned is ignored.

When MIDI MONO is enabled, a number of changes to its internal MIDI system are made automatically:

- MIDI MONO overrides the following settings:
  - ✓ Whatever has been selected in PATCH Edit Parameter 48 KEYBOARD MODE is ignored and the MATRIX-6R is put into ROB Mode. This does not alter the programming of your patches - the programmed Keyboard Mode is only ignored as long as MIDI MONO is used.
  - ✓ If OMNI Mode is ON, it will be disabled and the MATRIX-6R will use only six adjacent MIDI Channels to receive.
  - ✓ If SPILLOVER is ON, it will be disabled.
- If LEVER1, PEDAL1 and PRESSURE information are received from the Master controller, they will affect each Voice **independently**. This means, for example, that you can use Pitch Bend and Volume on one Voice and not the others, or on two or three Voices, etc. without having to affect all of them if you don't want.
- If LEVER2 and PEDAL2 information are received from the Master controller, they will affect each Voice **globally**. This means, for example, that Vibrato or Sustain Pedal commands affect all Voices - they are not independent per Voice.

4. MIDI MONO is a "MIDI Receive" function only. The MATRIX-6R will not transmit anything on six separate MIDI Channels. If MIDI MONO is ON, the MATRIX-6R will still transmit on the BASIC CHANNEL N when in Single Patch Mode and on Channel N and N+1 when in SPLIT Mode.

## CASSETTE

In addition to offloading your patches via MIDI, the MATRIX-6R also utilizes a system that permits saving your patches to tape. The Cassette Interface feature of the MATRIX-6R allows you to offload your Patches, Splits and the information in the MASTER EDIT Page (the Global data) onto standard cassette tape. You may find that your creativity in programming new patches exceeds the memory space (100 Patches and 50 Splits) available. You may also find it useful to save the MASTER EDIT settings along with the Patches and Splits. The Cassette Interface makes it possible to store your sounds on tape, programming a new set of Patches and Splits, storing those and so on until you have a library of programs. We suggest that you become familiar with the CASSETTE operation and learn to use it as you would any other Sub-Page.

We also recommend that saving your programs to tape be done on a regular basis anyway as a "back-up" in the event that one or more of your patches are edited or erased accidentally or if a malfunction causes the MATRIX-6R to drop memory. A back-up data tape should also be made before your MATRIX-6R is ever serviced for this reason.

### What You Will Need

The MATRIX-6R's Cassette Interface system was designed so that it would not be necessary to invest a lot in tape recording equipment nor would it be required to carry around a large, expensive stereo deck. Best results are obtained with using a portable monophonic recorder or a computer data recorder. We have achieved consistent results with the Radio Shack CCR-82 Computer Cassette Recorder although many others will work. When shopping for a cassette machine, keep the following specifications in mind. Your cassette recorder should have:

1. "Auxilliary" (AUX) or "Line" Input - Microphone (MIC) inputs may work but are not reliable.
2. Earphone, Headphone or 8-ohm External Speaker Output - These outputs are able to drive the Cassette Interface circuitry easily. Using a Line output is usually not reliable.
3. Playback Volume Control - It is extremely important to be able to adjust the playback level of the data so that the MATRIX-6R is able to recognize the information coming from tape. This is also why earphone, headphone or external speaker outputs are necessary and a Line output is not - the volume control is able to set the level of these outputs while Line out remains steady and is not affected by the playback volume.

4. **Record Level Control** - It is equally important to be able to control the volume of the data signal while it is being recorded onto tape. Too high of a level will distort the signal and too low of a level will not provide enough playback volume to drive the CASSETTE circuit. A VU Meter or Record Level indicator LED is necessary for you to visually set the record level. Many cassette recorders have an "ARL" (Automatic Record Level) feature which automatically sets the record volume to its optimum level. ARL replaces the need for a separate record control and meter and will simply use a record LED indicator. Both of these methods work just as well.

#### Options

5. **Record / Play Tone Control** - If your cassette machine has a tone control, set it to its half setting. A tone control is helpful but not absolutely essential.
6. **Tape Counter** - Since you will be able to fit many banks of data on one cassette, a 3-digit tape counter to index where the data starts and ends will be helpful.
7. **AC Adaptor** - Most cassette recorders made today have a jack for an optional AC adaptor. You may want to consider getting one to insure proper tape speed. Making a tape with low batteries means that the tape will not play back properly when fresh batteries are used. An AC adaptor is also convenient in that you won't have to replace the batteries every few days.

#### You Will Also Need . . .

8. **Tape** - A good quality grade of tape can make the difference between consistent successful data transfers and total frustration. You don't have to buy the expensive premium tape but stay away from the 3-for-99¢-drug-store "specials" too. You want a tape that is made from good materials - dropouts on the tape or an inconsistent tape surface will cause nothing but problems.

You should also use a tape that is "biased" for the machine that you are using. Chrome or metal tape will not usually work on most portable cassette recorders. Some experimentation may be required here.

9. **Connecting Cables** - Your cassette interface system requires two standard audio cables in order to connect the tape recorder to the MATRIX-6R. The cable must be "2-conductor shielded" with a 1/4" plug on the MATRIX-6R end and a 1/8" Mini plug on the cassette end. If you are using a stereo deck, the plug should be an RCA type.

Do not use "attenuating" type cables as these are designed to reduce the signal from one end of the cable to the other.

## HOOK-UP

Connect one of your cables from the cassette's output jack (earphone, headphone or speaker) to the jack on the MATRIX-6R labeled **FROM**.

Connect the other cable from the cassette's input jack (Aux or Line) to the jack on the MATRIX-6R labeled **TO**.

Both cables must be connected at the same time for the CASSETTE function to work properly.

## OPERATION

### 20 STORE ALL

This parameter is used to save all of the MATRIX-6R's programs onto the cassette tape. The Patches and Splits are not removed from the MATRIX-6R, just copied onto the tape. The synthesizer will still have its programs intact when this process is completed.

1. When this Parameter is entered, the display will read "**20 SAVE CASS**".
2. Press the VALUE button. The display will read "**READY?**".
3. Press the RECORD button on your tape recorder. Let a few seconds of tape run so that the leader tape at the beginning passes completely.
4. Press the YES button on the MATRIX-6R's Keypad. The MASTER EDIT LED will go out and if your cassette machine has a monitor feature, a high-pitched Leader Tone from the MATRIX-6R will be heard.

The display will show the message "**SAVING DATA**" for the entire time the data is being transferred. During this time, the VALUE LED will slowly flash on and off to indicate that the STORE ALL function is in process and the data "chatter" will be heard through the cassette recorder's monitor speaker. Remember that if your cassette recorder does not have a monitor function, no sound will be heard.

5. When the STORE ALL function is finished, the display will return to the "**20 SAVE CASS**" message.

### 21 CHECK ALL

The data that you just recorded can be checked to verify that the transfer was successful. We strongly recommend that you check the data every time you save to tape. The CHECK ALL process makes sure that the data was recorded at the right volume and tone and that there are no bad spots on the tape itself. You'll never know if you have a good data tape unless you check it.

1. When this mode is entered, the display will read "**21 CHECK CASS**".
2. Rewind the tape to the point where the data's leader tone just begins. This is where a tape counter on your recorder comes in handy, especially if you have several banks of data in a row.
3. Press the VALUE button on the MATRIX-6R. The display will read "**READY?**".
4. Press PLAY on your cassette recorder.
5. Press the YES button on the MATRIX-6R. The VALUE button LED will go out and the leader tone will be heard followed by the data chatter. Again, if your recorder does not have a monitor, no sound will be heard.
6. During this time, the display will show the message "**CHECKING DATA**" and the VALUE button LED will slowly flash on and off to verify that the CHECK ALL function is in process.
7. When the CHECK ALL process is completed, one of two things will happen. If the tape is verified, the display will return to the "**21 CHECK CASS**" message. If the tape is found to have one or more things wrong with it, you will get an "Error Message" on the display. Error Messages are described later in this section.

## **22 LOAD ALL**

This parameter loads the MATRIX-6R's memory with the data on the tape. Please bear in mind that the **LOAD ALL** function will erase all of the memory in the synthesizer and replace it with the data coming from the tape.

The procedure for LOAD ALL is almost identical to that for CHECK ALL. The only extra step is to make sure that MEMORY PROTECT on the back panel is turned OFF. If it is left ON, LOAD ALL cannot take place. However, any patches with individual patch PROTECT turned on will be erased and replaced as front panel PROTECT is ignored during LOAD ALL.

When this Parameter is entered, the display will read "**22 LOAD CASS**". Follow the procedure above for CHECK ALL to re-load the MATRIX-6R from tape. The display will show the message "**LOADING DATA**" while the transfer is taking place. If the data transfer is successful, the display will return to the "**22 LOAD CASS**" message. If the tape has anything wrong with it, you will get an "Error Message" on the display. Error Messages are described later in this section.

## 23 SELECTIVE LOAD

This Parameter allows you to take a single Patch or a single Split from the tape and load it individually into the MATRIX-6R. This feature permits the loading of individual patches from several tapes in order to compile them into one bank of memory.

1. Turn off MEMORY PROTECT on the back panel.
2. When this parameter is entered, the display will read "**23 LOAD ONE**".
3. Rewind the tape to the point where the data's leader tone just begins. In this process, we will play the entire bank of data from the tape. The MATRIX-6R, being set up to load in just a single patch, will pick the selected patch only and ignore the rest of the data on the tape.
4. Press the VALUE button. The display will read "**LOAD FROM 00**". Here is where we select the Number of the patch on the tape that we want to load in. As always, the 0-9 buttons, < > or << >> buttons on the Keypad are used to select this patch Number.
5. Press the VALUE button again. The display will change to read "**INTO PATCH 00**". Here is where we select the Number of the patch where we want the one coming from tape to be stored in the MATRIX-6R. Remember that the patch that is currently stored in this memory location will be erased and replaced with the patch coming in from tape. Also, if PROTECT has been turned on for this patch, you must turn it off or SELECTIVE LOAD cannot occur.
6. Press the VALUE button a third time. The display will now read "**READY?**".
7. Press the PLAY button on your cassette machine.
8. Immediately press the YES button on the MATRIX-6R. The LED on the VALUE button will go out and the leader tone from the tape will be heard followed by the data chatter. During this time, the display will show the message "**LOADING DATA**" and the VALUE button LED will slowly flash on and off.
9. As soon as the MATRIX-6R identifies the patch on the tape, it will store it into the selected patch Number in the MATRIX-6R and immediately exit the transfer mode. The display will return to the "**23 LOAD ONE**" message if the transfer was successful. If not, an Error Message will be displayed.



## ERRORS

As we mentioned before, you will occasionally get an Error Message on the display after the CHECK ONE, LOAD ALL or SELECTIVE LOAD functions complete their cycles. An Error Message indicates that there is one or more things wrong with the data itself or that there is a mechanical problem - bad connections, poor tape quality, dirty tape heads in your cassette machine and so forth - that would cause the information on tape to not load properly.

The following list explains the "**CASS ERROR**" message codes that will be displayed should a problem arise during a data transfer:

**CASS ERROR 1** - The data transfer was aborted. Did you press the VALUE button while the tape transfer was still in progress?

**CASS ERROR 2** - The MATRIX-6R detected one or more errors in the single Patch data from among the PATCHES numbered 00 through 99.

**CASS ERROR 3** - The MATRIX-6R detected one or more errors in the SPLIT Patch data from among the SPLITS numbered 00 through 49.

**CASS ERROR 4** - NOT USED

**CASS ERROR 5** - The MATRIX-6R detected one or more errors in the MASTER EDIT Page data.

**CASS ERROR 6** - The MATRIX-6R is unable to read the incoming data because it was made from another MATRIX-6R with an updated software version. To correct this problem, you will need a software revision to make your synthesizer and that particular tape compatible. You should contact your nearest Authorized Oberheim Service Center for prices and availability. As long as you make and load tapes from the same MATRIX-6R, this error will not occur.

**CASS ERROR 7** - The MATRIX-6R is unable to recognize any of the data. This may be due to either recording the data at too high a volume or playing it back at too high a volume. Either of these two situations will cause the data to be distorted. Another possibility that would cause this error is attempting to load in a tape made on another device such as a drum machine, for example.

**CASS ERROR 8** - The cassette speed is too slow. Are your batteries getting low? If you have a speed control on your cassette recorder, was it accidentally changed?

**CASS ERROR 9** - NOT USED

**CASS ERROR A** - The cassette speed is too fast. Did you put in fresh batteries since this tape was made? If you have a speed control on your cassette recorder, was it accidentally changed?

One other problem that cannot be listed by displaying an Error Message is if you record the data at too low a volume or play it back at too low a volume. The result would be no reaction or response from the MATRIX-6R at all. The display will read "**CHECKING DATA**" or "**LOADING DATA**" (depending on what function you're executing) and never change. The VALUE LED will not flash either. The MATRIX-6R cannot "hear" any of the data and, as a result, will continue to wait patiently. You should also recheck your connections.

In addition to the causes mentioned above, some of the more likely causes of cassette errors are:

- √ The tape heads are dirty, out of alignment, or need to be demagnetized.
- √ The tape quality is inferior or is not biased for the cassette machine.
- √ The connecting cables between the MATRIX-6R and your tape recorder are the wrong type, broken, not pushed in the jacks all the way, or the connections are reversed.

Please bear in mind that cassette interfacing requires a lot of patience and experimentation. But once you've found the right settings for your recorder, the cassette function will prove to be very reliable.

## VIBRATO

The MATRIX-6R contains a third LFO dedicated for VIBRATO, freeing up LFO 1 and LFO 2 to be used for other modulation purposes if needed. VIBRATO can be on constantly or can be controlled by either Local PEDAL1, a MIDI PEDAL1 or MIDI LEVER1 (Vibrato Wheel), selectable.

### 30 SPEED

Same as for the LFOs. Variable from 0 to +63.

### 31 WAVEFORM

Same as for the LFOs. Selectable TRI, DNSAW, UPSAW, SQUAR, RANDM and NOISE.

### 32 AMPLITUDE

Same as for the LFOs. Variable from 0 to +63.

### 33 SPEED MOD SOURCE

The SPEED of the VIBRATO can be modulated by either PEDAL1 or LEVER2 and is selected in this parameter. Many other synthesizers do not offer this type of Vibrato programming and generally keep the Speed of the Vibrato constant. Having performance control over the SPEED as well as the AMOUNT of the Vibrato adds flexibility to this popular modulation.

If OFF is selected, the SPEED will not be modulated and VIBRATO will run at the rate selected in MASTER EDIT Parameter "30 SPEED".

If ON is selected, the SPEED of the Vibrato set in Parameter "30 SPEED" will increase as the LEVER2 / Vibrato Wheel or PEDAL1 is used.

### 34 SPEED MOD AMOUNT

If PEDAL1 or LEVER2 is selected as the MOD SOURCE above, you can set the AMOUNT (the actual Range of the SPEED Change) of modulation in this parameter. It's the same as the LFOs: variable from 0 to +63.

### 35 AMP MOD SOURCE

The AMPLITUDE (output level) of VIBRATO can also be modulated by either PEDAL1 or LEVER2 / Vibrato Wheel and is selected in this Parameter. Naturally, using the Master controller's LEVER2 or Vibrato Wheel are the most popular methods when using Vibrato as a performance modulation, but this parameter allows you to use PEDAL1 for this purpose as well.

If turned OFF, the VIBRATO will run at its output level set in Parameter "32 AMPLITUDE".

If PEDAL1 or LEVER2 is selected, set "32 AMPLITUDE" to 0 and let the Pedal or Lever bring it in.

### 36 AMP MOD AMOUNT

If PEDAL1 or LEVER2 is selected as the MOD SOURCE above, you can set the AMOUNT of modulation in this parameter. It's the same as the LFOs: variable from 0 to +63.

### MISC.

The MISC. (Miscellaneous) Sub-Page of MASTER EDIT contains the 6 "special purpose" Parameters of the MATRIX-6R.

### 50 EDIT RECALL

Were you just editing a patch and accidentally selected another patch? Did you just lose all of your edits and can't remember how you got them? No problem - this Parameter will recall your last edit from memory.

STEP 1: Enter MASTER EDIT Page.

STEP 2: Select "50 EDIT RECALL".

STEP 3: Enter VALUE mode. The display will read "READY?".

STEP 4: Press the YES button on the KEYPAD. The display return to the "RECALL EDT" message and the patch will be recalled in its last edited state.

**STEP 5:** Go back to PATCH EDIT Page and continue editing the patch.

## **PATCH INITIALIZE**

As stated throughout the manual, you are able to edit or modify existing patches in the MATRIX-6R using the PATCH EDIT modes. Patches can be altered just a little for whatever minor changes you need, or dramatically, so that the edited patch doesn't sound anything like the original.

Creating new patches from scratch is actually one form of editing. The MATRIX-6R has a Basic Patch stored in its permanent memory that you can edit to create these new sounds. This "Basic Patch" can be recalled from memory at any time with the PATCH INITIALIZE parameter.

The Basic Patch is useful in creating patches because it gives you only the essential ingredients - the "raw materials" - of a synthesizer sound that you can use to start building your patch. All but the most basic of modulations are not used but easily accessible when you need them.

### **51 INIT PATCH - "Initialize Patch" Function**

PATCH INITIALIZE is accomplished as follows:

**STEP 1:** Enter PATCH SELECT / NUMBER mode and select a patch that you no longer want or a patch location that is blank. The Basic Patch that is generated by this operation must be edited from one of the MATRIX-6R's patch Numbers. Although PATCH INITIALIZE does not itself alter your patches permanently, you may want to select a blank or unnecessary patch before initializing. This is to prevent an important patch from being lost when STORE is used. See STEP 8 below.

**STEP 2:** Press the orange MASTER EDIT button. We are now in the MASTER EDIT Page.

**STEP 3:** Enter the PARAMETER mode of the MASTER EDIT Page.

**STEP 4:** Type in 51 on the Keypad. The display will read "**51 INIT PATCH**". We are now ready to "initialize" the MATRIX-6R to its Basic Patch that we will use to start "from scratch".

**STEP 5:** Enter VALUE mode. The display will now read "**READY?**".

**STEP 6:** Press the YES button on the Keypad. The display will return to the display "**51 INIT PATCH**" showing that the patch has been reset to a basic starting point for creating a new patch or experimenting.

**STEP 7:** You can now return to the PATCH EDIT Page in order to start programming your new patch by editing the Basic Patch.

**STEP 8:** When you are finished editing the Basic Patch, you must STORE it into memory if you intend to keep it. But before you STORE your new patch, remember that typing in the patch Number erases the patch that is in that location and replaces it with the one you just edited. Also, remember that the MATRIX-6R must be in PATCH SELECT / Number Mode before STORE can take place.

PATCH INITIALIZE sets all the Basic Patch VALUES to settings called "defaults". A default is simply a choice that the MATRIX-6R's computer makes for every Parameter VALUE when told to initialize a patch. Each of these Values represent a setting that you can most easily use as a starting point when creating a new patch. Defaults will remain as they are until you change them and are Stored with the patch.

## 52 CALIBRATE

This Parameter takes up where the TUNE ("AutoTune") function in the MODE SELECT / MASTER EDIT Page leaves off. Where TUNE simply fine tunes the DCOs, CALIBRATE performs precise adjustments to the VCF Frequency, Pulse Widths, Resonance amount and VCA2 Level on each voice as well as resetting PEDAL 1 on the back panel. The CALIBRATE procedure takes about 20 seconds to complete.

**STEP 1:** Enter the MASTER EDIT Page.

**STEP 2:** Enter the 52 CALIBRATE Parameter. Make sure that if you have a footpedal connected to the PEDAL 1 jack on the back panel, it is set to its maximum OFF position.

**STEP 3:** Enter VALUE mode and the display will read out "READY?".

**STEP 4:** Press the YES button and the display will read "CALIBRATING " for about 20 seconds during the calibration process.

When this routine is finished, the display will return to the "52 CALIBRATE " message .

**IMPORTANT NOTE:** You should be careful not to use or disturb the Pedal connected to the PEDAL 1 jack on the MATRIX-6R's back panel during CALIBRATE since it is also being recalibrated while in this Mode.

## 53 DISPLAY BRIGHTNESS

The brightness level of the display can be adjusted to suit your personal needs. VALUE range is from +1 to +31. A VALUE of 1 is the dimmest setting where the display is barely visible and a setting of 31 is the brightest. The 0-9 buttons on the Keypad as well as the < > and << >> buttons can be used to make this adjustment.

#### 54 SOFTWARE VERSION

The micro-processor inside your MATRIX-6R, as we have already discussed, is a computer that handles the calculations required to perform the various functions of the synthesizer. The processor works according to a pre-programmed set of operating instructions called "software". Software can be altered at any time by Oberheim to reflect improvements or additions to these operating instructions. Everytime software is revised, a new index number is assigned to the revision. This is known as the SOFTWARE VERSION.

The VERSION of your MATRIX-6R can be displayed at any time simply by entering this Parameter. When entered, the Date of Release (Day, Month and Year) of the MATRIX-6R's operating software will be displayed. Press VALUE and the display will read "READY?". Press YES on the Keypad and the display will automatically scroll through a series of messages relating to the nature and development of your MATRIX-6R's software. Software Updates issued by Oberheim can be retrofitted to any MATRIX-6R. Contact your nearest ECC / Oberheim Authorized Service Center for prices and availability.

#### 55 MASTER TUNE

After you have performed the TUNE function in MASTER EDIT, the MATRIX-6R can be manually tuned to another instrument in this Parameter. VALUE range is from -63 to +63, which represents a tuning scale of +/- a quarter tone.

#### 56 STEREO

This parameter determines the status of the two AUDIO OUT jacks on the back panel.

When STEREO is set to OFF, the LEFT / MONO jack outputs sound for both single patches and SPLIT patches (the two playing modes of the MATRIX-6R) and the RIGHT jack does not output any sound.

When STEREO is set to ON, the LEFT / MONO jack outputs all sounds from single patches and the sound from the LOWER patch when in SPLIT mode; the RIGHT jack only outputs sound when in SPLIT mode, and this sound comes from the UPPER patch.

#### 57 SQUICK - "Switch Quick"

This handy little parameter permits the reversing of the Keypad's numeral and arrow button functions when the MATRIX-6R is in the QUICK Mode of PATCH EDIT or SPLIT EDIT.

When SQUICK is OFF the Keypad functions normally - the numeral buttons change the Value of the selected parameter and the < > and << >> buttons change the parameter Number.

When SQUICK is ON, the function of the arrows and the Keypad is reversed. This means that the numeral buttons now select which parameter to edit (parameter Number) and the arrow keys change the Value of the selected parameter. This switch will be remembered by the MATRIX-6R until you change it and is not lost when the power is turned ON or OFF.

# PROGRAMMING THE MATRIX-6R

## The SPLIT EDIT Page

We've already briefly covered the use of the SPLIT EDIT buttons in the beginning of the manual in the section "Functions of the MODE SELECT Section". All we did there was give a quick overview of what makes up a SPLIT and little on how the buttons work. Now we will get into some detail about programming a SPLIT and how the various Parameters are used in "customizing" each SPLIT to suit each particular need.

As mentioned before, a SPLIT program is simply taking any two single Patches and putting one on the left-hand (LOWER) part of the Master controller's keyboard and the other on the right-hand (UPPER) part of the Master. You are also able to determine the performance components of the SPLIT: the point on the keyboard where the SPLIT occurs, transposition settings, MIDI enables, Voice assignments and the volume balance between the two parts of the SPLIT.

The magic of the MATRIX-6R's SPLIT Mode is that you can split the Master controller's keyboard even if it does not have split capability itself. Since the Split-Point of the Master's keyboard is set within the MATRIX-6R according to MIDI Note Numbers, we are actually using MIDI to accomplish the keyboard splitting. If your Master does have its own split function, it can be further enhanced by the MATRIX-6R in the ability to construct a three-way split, as just one possibility.

The easiest way to learn how a SPLIT operates is to actually put one together. Use the following procedure:

### STEP 1: SELECT YOUR PATCHES

Use the grey SPLITS button to enter the SPLIT SELECT Page.

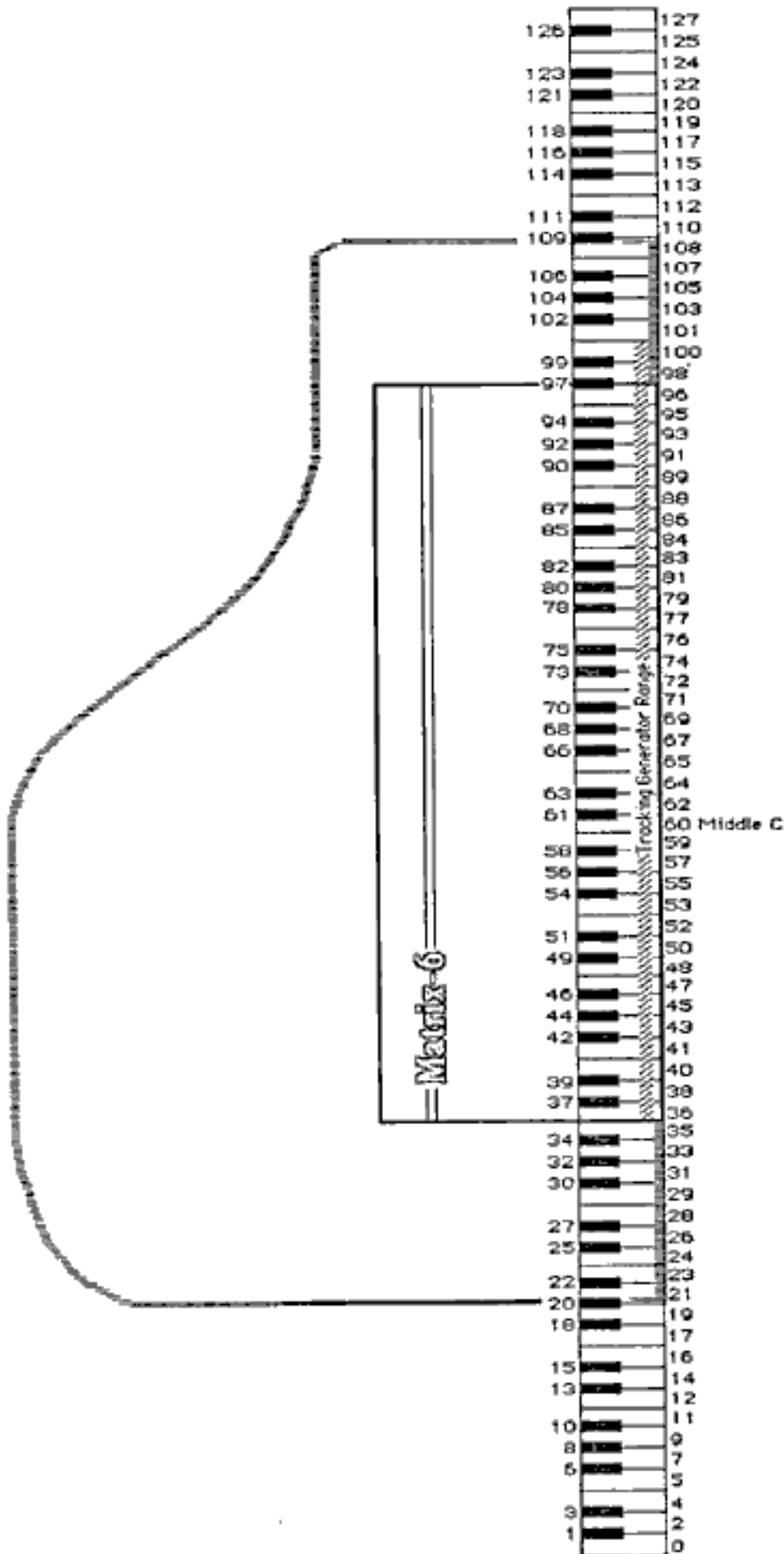
Using the Keypad, select a blank SPLIT Number.

Enter LOWER mode and select the Number of the patch that you want to be played on the left part of the Master controller's keyboard.

Enter UPPER mode and select the Number of the patch that you want to be played on the right part of the Master's keyboard.

At this time, you can enter NAME mode and give your SPLIT a Name if you want. If not, you can always come back to it later and name it.

We have now determined what Patches we will use and what part of the keyboard each will play from. The next sections cover how to program the performance components of a SPLIT.





## STEP 2: PROGRAM THE SPLIT POINT

### 0 LEFT UPPER LIMIT

This determines the highest note of the LOWER or Left-hand section of the Master controller's keyboard. This is the "Split Point" for the LOWER. Playing keys above this note will play the UPPER section of the keyboard. VALUE range is from 0 to 127 which represent MIDI note numbers. Look at the illustration on the facing page. This will give you a visual idea of how the range of the Oberheim MATRIX-12's and MATRIX-6's keyboards (MIDI Notes 36 through 96), as just two examples, compare to that of a Grand Piano and then how they compare to MIDI. The range of MIDI, as you can see, is the widest of all - over 10 octaves. Consult the Owner's Manual of your Master controller to find out the range of its MIDI Notes.

Use the Keypad to select the MIDI Note Number that you want to be the upper LIMIT of the LOWER keyboard.

**IMPORTANT NOTE:** Be sure to check the Owner's Manual of the Master controller to find out the MIDI Note Range of its keyboard. If it has a five-octave range, it is more than likely that its range is from MIDI Note #36 to MIDI Note #96. Setting the LEFT UPPER LIMIT to numbers less than 36 will actually put the LOWER patch off the keyboard as its limit will be below the lowest note of the Master's keyboard.

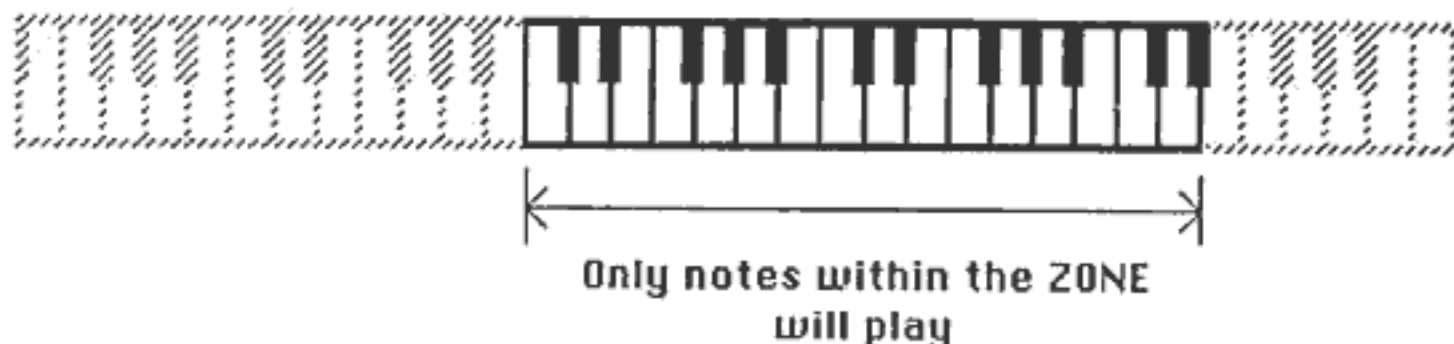
### 3 RIGHT LOWER LIMIT

This setting determines the lowest note of the UPPER or Right-hand section of the keyboard. This is the "Split Point" for the UPPER. Playing keys below this note will play the LOWER section of the keyboard. VALUE range is from 0 to 127 and operates the same as "0 LEFT UPPER LIMIT".

Use the Keypad to select the MIDI Note Number that you want to be the lower LIMIT of the UPPER keyboard.

As with "0 LEFT UPPER LIMIT", you must be careful in setting the MIDI Note Number for the RIGHT LOWER LIMIT. Setting the it to numbers higher than MIDI Note #96 may put the UPPER patch off the keyboard as its limit will be above the highest note of the Master controller's keyboard. Consult the Owner's Manual to be sure.

Another consideration that you should keep in mind as you set LIMITs is that for normal SPLIT operation, the MIDI Note Numbers that you select for the LOWER and UPPER LIMITs must be numbers that next to each other. If, for example, you set the "0 LEFT UPPER LIMIT" to be 60 and the "3 RIGHT LOWER LIMIT" to be 64, keys numbered 61, 62 and 63 will not play because they have not been assigned to either of the two keyboard parts. Try it.



### STEP 3: SET UP THE TRANSPOSITIONS

While you are still in SPLIT EDIT, you are able to transpose either or both LOWER and UPPER keyboard parts to be in a different key signature.

#### 1 LEFT TRANSPOSE

#### 4 RIGHT TRANSPOSE

These two Parameters operate the same. VALUE range is from -36 to +24 where a setting of 0 indicates no transpose - the patch on that part of the Master controller's keyboard will play in its normal key. Each number represents a change of 1 semitone so you can see that the range gives you the ability to transpose up 2 octaves or down 3 octaves:

+24	UP 2 Octaves
+12	UP 1 Octave
+7	UP Perf. 5th
+5	UP Perf. 4th
0	No Transpose
-5	DOWN Perf. 4th
-7	DOWN Perf. 5th
-12	DOWN 1 Octave
-24	DOWN 2 Octaves
-36	DOWN 3 Octaves

### STEP 4: SET THE MIDI OUTPUTS

You are able to determine if the SPLIT will allow the two keyboard sections to transmit and receive MIDI information. Either of the LOWER or UPPER, both or neither can be set to transmit and receive MIDI. Please remember, however, that since the MATRIX-6R must be controlled by a Master controller, you must make sure that 2 LEFT MIDI OUTPUT and 5 RIGHT MIDI OUTPUT are turned ON for all SPLITS. Otherwise, the MATRIX-6R will not play because it has been set not to recognize MIDI in SPLIT Mode.

Also, if your Master controller does not have its own Split capability make sure MASTER EDIT Parameter 01 OMNI MODE is turned ON. This will ensure that both the Lower and Upper parts of the SPLIT will play in the MATRIX-6R.

#### 2 LEFT MIDI OUTPUT

The ability for the MATRIX-6R's LOWER Voices to transmit and receive MIDI is turned ON or OFF in this Parameter.

**57 ENV1 (Trig)** - We will set up the triggering for ENV1 so that it will start from the beginning every time a new voice is played.  
VALUE = SRESET.

**58 ENV1 (Mode)** - In order to expand the playability of this patch, we will leave ENV 1 at its default of Normal. In STEP 12, we will set up several MATRIX MOD combinations, one of which applies inverted RELEASE VELOCITY to the Release stage. This will provide a shorter fade-out when keys are released quickly.  
VALUE = NORM.

**59 ENV1 (LFO1 Trig)** - We only want the Keyboard to control ENV1 as a trigger source, so leave the Default VALUE of NORMAL as it is.

**STEP 8:** ENV2 is used in this patch to add dynamics to the VCA. Its application is described as follows:

<b>60</b> ENV 2	Delay 0	Attack 30	Decay 20	Sustn 50	Rel 45	Amp 40	Amp/Vl +63	Trig SRSET	Mode NORM	Lf1Trig NORM
--------------------	------------	--------------	-------------	-------------	-----------	-----------	---------------	---------------	--------------	-----------------

**60 ENV2 DEL** - As with ENV1, no delay is required for this patch. Keep the default VALUE at 0.

**61 ENV2 ATK** - In order to achieve the "ensemble" effect for this string patch, a slightly longer ATTACK time is required.  
VALUE = 30.

**62 ENV2 DEC**

**63 ENV2 SUS**

Using a VALUE of 50 for the SUSTAIN level permits the sound to decrease slightly in volume after the ATTACK stage. The DECAY rate diminishes the volume and is set to a VALUE of 20.

**64 ENV2 REL** - We will approach the programming of ENV2 like we did with ENV 1. We'll give it a long Release time but also set up a MATRIX MOD routing that uses negative RELEASE VELOCITY, allowing you to shorten the Release time by letting go of the keys quickly. VALUE = 45.

**65 ENV2 AMP** - As with ENV1, we will add VELOCITY dynamics in a MATRIX MOD combination. To allow for enough headroom, set VALUE to 40.

66 ENV2 / VEL            Default VALUE = +63  
 67 ENV2 (Trig)            Default VALUE = SRESET  
 68 ENV2 (Mode)            Default VALUE = NORM  
 69 ENV2 (LFO1 Trig)      Default VALUE = NORMAL

ENV2 dynamics and Trigger modes are set up to act the same as ENV1, although their effect on the sound will naturally be different since ENV1 modulates the VCF and ENV2 modulates the VCA. Program their VALUES as listed above.

**STEP 9:** ENV3 is not used in this patch, so its defaults should remain as they are.

**STEP 10:** Set up LFO 1 according to the chart below:

<b>80</b>	Speed	Sp/Prs	Wave	Retrig	Amp	Ap/R1	Trig	Lag	Smpl	
LFO 1	57	0	TRI	0	63	0	MRST	OFF	KYBD	

**80 LFO1 SPD** - A high LFO rate is required to simulate violin string vibrato. VALUE = 57.

**81 LF1S / PRS** - We'd like to keep the LFO speed constant throughout the duration of the sound, therefore "SPEED MOD BY PRESSURE" is not required. Keep the default VALUE of 0.

**82 LFO1 (Wave)** - The default value of TRI (Triangle wave) is the most suitable modulation shape for vibrato for our purposes in this patch. We'll use this one.

**83 LF1 RETRG** - We will use the Multiple-Reset trigger mode in Parameter 86. We want the LFO to retrigger at the point where its cycle starts. Use its default VALUE of 0.

**84 LFO 1 AMP** - We will want to use the LFO at full output. Its effect on the pitch of DCO1 was "lined tuned" by Parameter 02 to a setting of +20. VALUE = 63.

**85 LF1A / RP1** - The amplitude of LFO1 should remain constant. RAMP1 modulation is therefore not necessary. Use the default VALUE of 0.

**86 LFO1 (Trig mode)** - Use the Multiple-Reset mode so that the LFO will start at the retrigger point (set in Parameter 83) every time a new note is played. VALUE = MRESET.

**87 LFO1 LAG** - The TRI wave that we selected is suitable as the modulation shape. No LAG is required to re-shape it. Leave it OFF.

**88 L1 SMP** - Since we did not select **SAMPL** as a waveform (we're using **TRI**), this Parameter is ignored in this patch.

**STEP 11:** LFO2 should be set up like this:

<b>90</b> LFO 2	Speed 40	Sp/Kbd 0	Wave TRI	Retrig 0	Amp 0	Ap/R2 +63	Trig STRIG	Lag OFF	Smpl KYBD	
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**90 LFO2 SPD** - An excellent way to increase the "animation" of a string sound is to use two different LFO speeds that are going to two different destinations. LFO2 is modulating the Pulse Width of DCO2 which itself produces its own type of vibrato. Use a VALUE of 40.

**91 LF2S / PRS** - As with LFO1, we'd like to keep the speed of LFO2 constant. Keep the default VALUE at 0.

**92 LFO2 (Wave)** - Same as with LFO1. We'll keep the default TRI waveform.

**93 LF2 RETRG** - LFO2 will not need to be retriggered since RAMP2 will fade it in. The default VALUE of 0 should be kept.

**94 LFO 2 AMP** - Default VALUE = 0. Use this setting as RAMP2 will be set in the next Parameter to bring it in gradually as a modulation.

**95 LF2A / RP2** - We'll want RAMP2 to fade in LFO2 to its maximum output. And as with LFO1, the amplitude LFO2 has already been fine adjusted at its destination "14 PW MOD BY LFO 2". VALUE = +63.

**96 LFO2 (Trig mode)** - Since the LFO fades in by the control of RAMP2, special triggering is not necessary. The start point of the LFO's cycle is barely heard, if at all, by the fade-in. Keep the default VALUE of STRIG.

**97 LFO2 LAG** - Same as with LFO1. LAG is not required so leave it OFF.

**98 L2 SMP** - Same as with LFO1. Since we selected TRI as our waveform, this Parameter is ignored.

## Matrix Modulation

	Source	Amount	Destination
0	VEL	-50	E1ATK
1	VEL	-55	E2ATK
2	RVEL	-55	E2REL
3	TRAK	+63	VCFFO
4			
5			
6			
7			
8			
9			

**STEP 12:** In order to add dynamic expression and performance control to our String patch, we will construct two MATRIX MODULATION combinations using VELOCITY and one using RELEASE VELOCITY. The fourth MATRIX MOD uses TRACK to custom-tailor the Master controller's keyboard control of the VCF.

Enter the MATRIX MOD Page of the PATCHES Mode and set up the following:

**0 VEL -50 E1ATK**

VELOCITY is inverted in order to shorten the ATTACK time of ENV1 which is modulating the Filter. Playing keys quickly causes the VCF to open faster making the sound bright at the beginning. Playing keys slowly lets the VCF open according to the ATTACK time set in Parameter 51.

**1 VEL -55 E2ATK**

Negative VELOCITY is used here again to shorten the ATTACK time of ENV2 modulating the VCA (the patch's overall loudness). Fast playing causes the sound to reach peak volume quicker and slow playing causes the Strings to fade in by the ATTACK time set in Parameter 61.

## **2 RVEL -55 E2REL**

Negative (inverted) RELEASE VELOCITY is used to modulate the RELEASE time of ENV2 that is controlling the VCA. You can control how fast the sound will die out depending upon how quickly keys are let go. The sound will end abruptly with fast key release and fade out much slower with a slow key release. We set the maximum RELEASE time in Parameter 64.

## **3 TRAK +63 VCFFQ**

We defeated the Keyboard control of the VCF in Parameter 26 in order to select TRACK as the modulation source here. In Parameter 33, we selected KEYB as the INPUT controller and defined its control curve with Parameters 34 through 38. In setting up this MATRIX MOD, use an AMOUNT value of +63. We want TRACK to add to the VCF FREQUENCY as you play notes up and down the Master's keyboard. Try using lower AMOUNTs and hear how the brightness of the patch diminishes. Inverting the AMOUNT lowers the Filter content until no sound is heard.

**STEP13: NAME IT** - Enter the PATCH SELECT Page of the PATCHES Mode. Select NAME and call it anything you want. We call it "STRINGS1" but if you have a better name, it's OK by us.

**STEP 14: STORE IT** - If you would like to keep this patch, stay in the PATCH SELECT Page but select NUMBER. Press and hold the STORE button and type in the two-digit Patch Number of your choice. To prevent unwanted editing of your new patch, you may want to enable the Individual Patch PROTECT while you're at it.

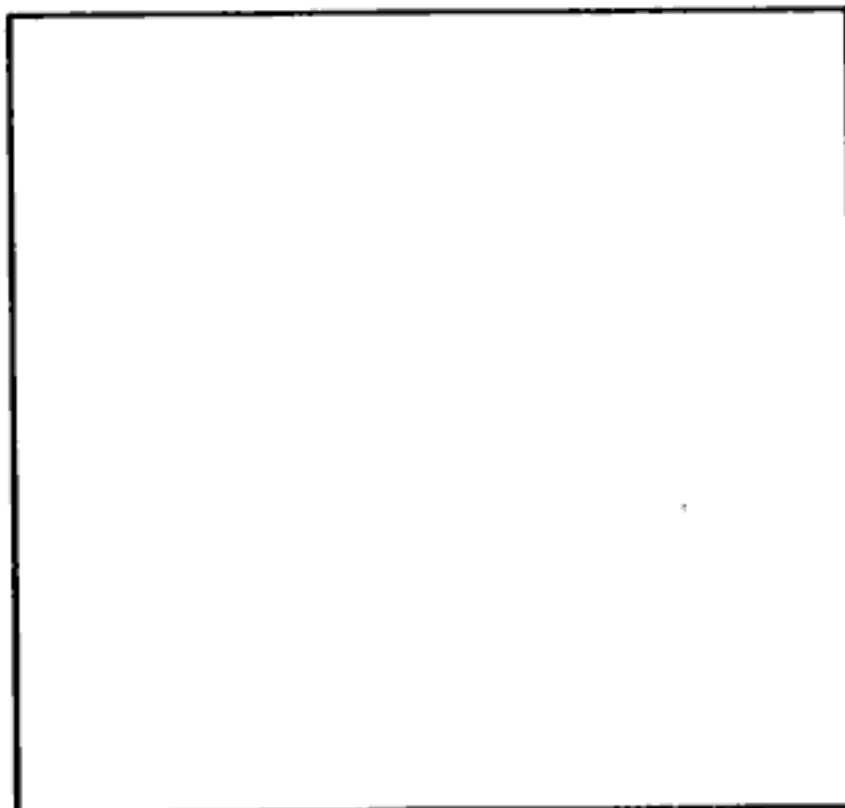
# Matrix-6R Basic Patch

	0	1	2	3	4	5	6	7	8	9
<b>00</b> DCO1	Freq 0	Fr/Lf1 0	Sync 0	Pw 31	PW/Lf2 0	Wave 31	Wsel WAVE	Levers BOTH	Keybd KYBD	Click OFF
<b>10</b> DCO2	Freq 0	Fr/Lf1 0	Detune +2	Pw 24	PW/Lf2 0	Wave 31	Wsel PULSE	Levers BOTH	Keybd KYBD	Click OFF
<b>20</b> VCF/VCA	Mix 31	Freq 55	Fr/E1 +42	Fr/Prs 0	Res 0	Levers OFF	Keybd KYBD	VA1 63	VA/VI 0	VA/E2 +63
<b>30</b> FM/TRCK	FM 0	FM/E3 0	FM/Prs 0	TrckIn KYBD	Track1 0	Track2 15	Track3 31	Track4 47	Track5 63	
<b>40</b> RMP/PRT	R1Spd 0	Trig STRIG	R2 Spd 0	Trig STRIG	Port 0	Spd/VI 0	Mode L IN	Legato OFF	Keymd RSGN	
<b>50</b> ENV1	Delay 0	Attack 0	Decay 10	Sustn 50	Rel 10	Amp 40	Amp/VI +63	Trig STRIG	Mode NORM	Lf1Trig NORM
<b>60</b> ENV2	Delay 0	Attack 0	Decay 10	Sustn 50	Rel 10	Amp 40	Amp/VI +63	Trig STRIG	Mode NORM	Lf1Trig NORM
<b>70</b> ENV3	Delay 0	Attack 0	Decay 20	Sustn 0	Rel 20	Amp 40	Amp/VI 63	Trig STRIG	Mode NORM	Lf1Trig NORM
<b>80</b> LFO1	Speed 40	Sp/Prs 0	Wave TRI	Retrig 0	Amp 0	Ap/R1 +63	Trig OFF	Lag OFF	Smpl KYBD	
<b>90</b> LFO2	Speed 30	Sp/Kbd 0	Wave TRI	Retrig 0	Amp 0	Ap/R2 +63	Trig OFF	Lag OFF	Smpl KYBD	

## Matrix Modulation

	Source	Amount	Destination
0	PED2	0	E1REL
1	PED2	0	E2REL
2	TRAK	0	VCFFQ
3	LEV3	0	VCFFM
4			
5			
6			
7			
8			
9			

## Performance Notes





## **IF YOU HAVE A PROBLEM**

### **Part 5: WARRANTY**

The staff at E.C.C. / Oberheim wish to thank-you for purchasing an Oberheim product and hope that you will remain a long-time Oberheim player. We are confident that your instrument will provide you with years of excellent service as each unit is thoroughly tested and inspected before it leaves the factory. The Owner's Manual was written to be logical and comprehensive so that you will be able to get the most out of your Oberheim.

Although we have taken great care in manufacturing your Oberheim instrument and preparing thorough documentation in the manual, products at this level of technology may require servicing. The following Warranty Policy outlines your rights and responsibilities, and also lists several limitations of coverage and important exclusions. We strongly recommend that you read the following policy statements carefully and refer to the procedure at the end in obtaining service for your Oberheim product should it ever be needed.

#### **OBERHEIM LIMITED CUSTOMER WARRANTY (Non-Transferable)**

Oberheim, a Division of E.C.C. Development Corporation, warrants its products, when purchased in the United States of America from an Authorized Oberheim Dealer, to be free from defects in materials or workmanship for a period of 12 months from the date of purchase. Warranty service is effective and available to the original purchaser **ONLY**, and only upon completion and return of the Oberheim Warranty Registration card within 14 days of the date of purchase.

Warranty coverage is valid for Factory-Authorized updates to Oberheim products when their installation is performed by an ECC / Oberheim Authorized Service Center and a properly completed Warranty Certificate is returned to the factory within 14 days of installation.

To obtain service under this Warranty, the product must, upon discovery of the defect, be properly packed and shipped to the nearest Oberheim Authorized Service Center. The party requesting Warranty service must provide proof of original ownership and date of purchase of the product, or date of installation of the update, by supplying to the Oberheim Authorized Service Center either the Warranty Registration Sticker applied to the unit itself, or the sales receipt / installation receipt. In the event that both have been lost or misplaced, the Service Center shall, at the Service Center's or owner's expense, contact Oberheim to verify the Warranty status of the product.

If the Warranty has been verified, Oberheim will, without charge for parts or labor, either repair or replace the defective part(s). If the Warranty cannot be verified, the entire cost of the repair in parts and labor is the responsibility of the product's owner.

**PRICES AND SPECIFICATIONS ARE SUBJECT TO CHANGE  
WITHOUT NOTICE**

**WHAT IS COVERED**

ECC / Oberheim warrants that it will make all necessary adjustments, repairs or replacements at no cost to the original owner within the first 12 months from the purchase date if:

1. The product fails to perform its specified functions due to failure of one or more of its components.
2. The product fails to perform its specified functions due to defects in workmanship.
3. The product is maintained and operated by the owner in strict accordance with the written instructions for proper maintenance and use as specified in the Owner's Manual.

**WHAT IS NOT COVERED**

Before purchasing and using, the owner shall determine the suitability of the product for his/her intended use, and the owner assumes all risk and liability whatsoever in connection therewith. Oberheim shall not be liable for any injury, loss or damage, direct or consequential, arising out of the use or inability to use the product.

The Warranty provides only the benefits specified and does not cover defects or repairs needed as a result of acts beyond the control of Oberheim including but not limited to:

1. Damage caused by abuse, accident or negligence.  
  
**Oberheim will not cover under warranty any Sound Chip or Voice Card damaged or destroyed as a result of the owner's mis-handling, or the improper removal and installation into the DMX, DX or Stretch Digital Drum Machines.**
2. Any tampering, alteration or modification of the product's mechanical or electronic components.
3. Failure to operate the product in strict accordance with the procedures written in the Owner's Manual.
4. Repairs performed by unauthorized persons.
5. Damage caused by fire, smoke, falling objects, water or liquids etc. or natural events such as rain, earthquakes, floods, lightning, tornadoes, storms, etc.
6. Damage caused by operation on improper voltages.

**IMPORTANT NOTICE: The warranty is VOID if the product is electronically or mechanically modified, altered or tampered with in any way.**

Oberheim shall not be liable for costs involved in packing or preparing the product for shipping with regards to time, labor or materials, shipping and freight costs, or time and expenses involved in transporting the product to and from an Oberheim Authorized Service Center, an Oberheim Authorized Dealer or the Oberheim Factory. If a suitable shipping container is unavailable, a replacement carton may be purchased from Oberheim.

Oberheim will not cover under Warranty an apparent malfunction that is determined to be in fact user error, or the owner's inability to use the product.

Oberheim will not cover under Warranty an apparent malfunction that is inaccurately or inadequately described by the owner to the Service Center at the time of repair.

**THE DURATION OF ANY OTHER WARRANTIES, WHETHER IMPLIED OR EXPRESS, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTY OF MERCHANTABILITY, IS LIMITED TO THE DURATION OF THE EXPRESS WARRANTY HEREIN.**

Oberheim hereby excludes incidental and consequential damages, including but not limited to:

1. Loss of time
2. Inconvenience
3. Delay in performance of the Warranty
4. The loss of use of the product
5. Commercial loss
6. Breach of any express or implied warranty, including the Implied Warranty of Merchantability, applicable to this product.

Oberheim shall not be liable for damage or loss resulting from the negligent or intentional acts of the shipper or his contract affiliates. The owner of the product should contact the shipper for proper claims procedures in the event of damage or loss resulting from shipment.

#### **HOW TO OBTAIN WARRANTY SERVICE**

If you have reason to believe that your Oberheim product is malfunctioning or otherwise not operating properly, do the following:

**STEP 1: CONTACT YOUR NEAREST ECC / OBERHEIM SERVICE CENTER**

Telephone them as soon as the problem is discovered. Be prepared to discuss the problem as completely and accurately as possible. A current roster of Authorized Service Centers is included with the Owner's Manual.

**[www.synthesizer.at](http://www.synthesizer.at)**

The Service Center will let you know when the repair can be scheduled, the approximate number of days it will take to complete the repair and if the required parts are in stock or if they need to be ordered.

Take the failed unit to the Service Center along with the sales receipt as the Service Center will need to verify the Warranty. If you have returned your Warranty Card, the Warranty Verification Sticker affixed to the bottom panel of your unit is sufficient to prove warranty status.

The Service Center will then inspect the product and take the necessary steps to complete the repair.

If the product continues to malfunction or another problem different from the original problem occurs, contact the service center IMMEDIATELY so that the problem can be resolved without delay or further complications.

## **STEP 2. CONTACT YOUR ECC / OBERHEIM DEALER**

If you feel that your problem has not been resolved, contact the Oberheim Dealer where the product was purchased. It will be most expedient if you discuss the matter personally with the salesperson who sold you the instrument. By making the salesperson aware of your situation, they will be in a better position to assist you in getting the problem resolved.

## **STEP 3: CALL OR WRITE TO THE OBERHEIM FACTORY**

If you believe that the problem is still unresolved after you have contacted the Service Center and Dealer, contact the Oberheim factory. In an attempt to resolve your problem, we will work with your local Service Center or Dealer to review and verify the information and facts. Based on these facts, we will advise or consult with the Service Center or Dealer as appropriate.

Written correspondence should be addressed to:

OBERHEIM  
Division of E.C.C. Development Corporation  
Customer Services Department  
11650 Olympic Boulevard  
Los Angeles, CA 90064

Every attempt will be made to respond to your letter as quickly as possible.

If you would prefer to contact the Oberheim factory by telephone, a Service Representative will be available to assist you. Our telephone hours are from 1:00 PM to 4:00 PM West Coast Time, Monday through Friday only. The Customer Services Department can be reached at 213-479-4851. Collect calls cannot be accepted.

When calling the ECC / Oberheim offices:

- √ Have your instrument and amplifier turned on and in front of you when you are on the phone. You should also have your Owner's Manual with you.
- √ Tell the receptionist that you are having a problem with your Oberheim product and ask to speak to a Service Representative.
- √ Be prepared to provide the following information:
  1. Your name.
  2. The model of the product.
  3. The product's Serial Number.
  4. The name of the Dealer from where it was purchased.
  5. The exact date of purchase.
  6. A complete description of the problem.

When writing to Oberheim, please also include your full address, telephone number and the best time to call should it be necessary to call you rather than answer your letter.

**www.synthesizer.at**

## MATRIX MODULATION

### SOURCES

00	DELETE MODULATION
01	ENVELOPE 1
02	ENVELOPE 2
03	ENVELOPE 3
04	LFO 1
05	LFO 2
06	VIBRATO
07	RAMP 1
08	RAMP 2
09	KEYBOARD
10	PORTAMENTO
11	TRACKING GENERATOR
12	KEYBOARD GATE
13	VELOCITY
14	RELEASE VELOCITY
15	PRESSURE
16	PEDAL 1
17	PEDAL 2
18	LEVER 1
19	LEVER 2
20	LEVER 3 = LEVER 2 REVERSE

### DESTINATIONS

00	DELETE MODULATION
01	DCO 1 FREQUENCY
02	DCO 1 PULSE WIDTH
03	DCO 1 WAVE SHAPE
04	DCO 2 FREQUENCY
05	DCO 2 PULSE WIDTH
06	DCO 2 WAVE SHAPE
07	DCO 1 - DCO 2 MIX
08	VCF FM BY DCO 1
09	VCF FREQUENCY
10	VCF RESONANCE
11	VCA 1 VOLUME
12	VCA 2 VOLUME
13	ENV 1 DELAY
14	ENV 1 ATTACK
15	ENV 1 DECAY
16	ENV 1 RELEASE

### MIDI

00	BASIC CHANNEL
01	OMNI MODE
02	CONTROLLERS
03	PATCH CHANGES
04	SYSTEM EXCLUSIVE
05	LOCAL CONTROL
06	PEDAL 1 SELECT
07	PEDAL 2 SELECT
08	LEVER 2 SELECT
09	LEVER 3 SELECT
10	SEND PATCH
11	SEND ALL
12	MIDI ECHO

### CASSETTE

20	STORE ALL
21	CHECK ALL
22	LOAD ALL
23	SELECTIVE LOAD
<b>MISC.</b>	
50	EDIT RECALL
51	PATCH INITIALIZE
52	CALIBRATE
53	DISPLAY BRIGHTNESS
54	SOFTWARE VERSION
55	MASTER TUNE
56	STEREO OUTPUT
57	SWITCH QUICK

## MASTER EDIT

### SPLIT EDIT

0	LEFT UPPER LIMIT
1	LEFT TRANSPOSE
2	LEFT MIDI OUTPUT
3	RIGHT LOWER LIMIT
4	RIGHT TRANSPOSE
5	RIGHT MIDI OUTPUT
6	LEFT-RIGHT BALANCE
7	VOICE/ZONE SELECT

## PATCH EDIT

### DCO 1

00	FREQUENCY
01	FREQ MOD BY LFO 1
02	SYNC
03	PULSE WIDTH
04	PW MOD BY LFO 2
05	WAVE SHAPE
06	WAVE SELECT
07	LEVERS
08	KEYBOARD/PORTAMENTO
09	KEY CLICK

### DCO 2

10	FREQUENCY
11	FREQ MOD BY LFO 1
12	DETUNE
13	PULSE WIDTH
14	PW MOD BY LFO 2
15	WAVE SHAPE
16	WAVE SELECT
17	LEVERS
18	KEYBOARD/PORTAMENTO
19	KEY CLICK

### VCF/VCA

20	BALANCE
21	FREQUENCY
22	FREQ MOD BY ENV 1
23	FREQ MOD BY PRESSURE
24	RESONANCE
25	LEVERS
26	KEYBOARD/PORTAMENTO
27	VCA 1 VOLUME
28	VCA 1 MOD BY VELOCITY
29	VCA 2 MOD BY ENV 2

### FM/TRACK

30	VCF FM AMOUNT
31	FM MOD BY ENV 3
32	FM MOD BY PRESSURE
33	TRACK INPUT
34	TRACK POINT 1
35	TRACK POINT 2
36	TRACK POINT 3
37	TRACK POINT 4
38	TRACK POINT 5

### RAMP/PORTAMENTO

40	RAMP 1 RATE
41	RAMP 1 TRIGGER
42	RAMP 2 RATE
43	RAMP 2 TRIGGER
44	PORTAMENTO RATE
45	PORT MOD BY VELOCITY
46	PORTAMENTO MODE
47	LEGATO PORTAMENTO
48	KEYBOARD MODE

### ENV 1

50	DELAY
51	ATTACK
52	DECAY
53	SUSTAIN
54	RELEASE
55	AMPLITUDE
56	AMP MOD BY VELOCITY
57	TRIGGER MODE
58	ENVELOPE MODE
59	LFO 1 TRIGGER

### ENV 2

60	DELAY
61	ATTACK
62	DECAY
63	SUSTAIN
64	RELEASE
65	AMPLITUDE
66	AMP MOD BY VELOCITY
67	TRIGGER MODE
68	ENVELOPE MODE
69	LFO 1 TRIGGER

### ENV 3

70	DELAY
71	ATTACK
72	DECAY
73	SUSTAIN
74	RELEASE
75	AMPLITUDE
76	AMP MOD BY VELOCITY
77	TRIGGER MODE
78	ENVELOPE MODE
79	LFO 1 TRIGGER

### LFO 1

80	SPEED
81	SPEED MOD BY PRESSURE
82	WAVEFORM
83	RETRIGGER POINT
84	AMPLITUDE
85	AMP MOD BY RAMP 1
86	TRIGGER MODE
87	LAG
88	SAMPLE INPUT

### LFO 2

90	SPEED
91	SPEED MOD BY KEYBOARD
92	WAVEFORM
93	RETRIGGER POINT
94	AMPLITUDE
95	AMP MOD BY RAMP 2
96	TRIGGER MODE
97	LAG
98	SAMPLE INPUT

When OFF, the LOWER will not output MIDI information and will ignore MIDI information coming in.

When ON, the MATRIX-6R's LOWER Voices will both transmit and receive MIDI on the BASIC CHANNEL set in MASTER EDIT Parameter "00 BASIC CHANNEL".

#### **5 RIGHT MIDI OUTPUT**

The ability for the MATRIX-6R's UPPER Voices to transmit and receive MIDI is turned ON or OFF in this Parameter.

When OFF, the UPPER will not output MIDI information and will ignore MIDI information coming in.

When ON, the UPPER will both transmit and receive MIDI on the BASIC CHANNEL +1 set in MASTER EDIT Parameter "00 BASIC CHANNEL".

This means that the LOWER and UPPER Voices can control or be controlled from two other instruments on two separate MIDI Channels. As an example, if the BASIC CHANNEL is set to #5, the LOWER transmits and receives on MIDI Channel 5 and the UPPER transmits and receives on MIDI Channel 6, and so forth.

The ON or OFF status of LOWER and UPPER is independent. If the LOWER "2 LEFT MIDI OUTPUT" is turned OFF, the UPPER will still transmit and receive if turned ON.

#### **STEP 5: SET THE LEFT / RIGHT BALANCE**

There's always a possibility that the two patches that you have selected for LOWER and UPPER each have a different loudness due to the way they were programmed. You can adjust the relative "mix" between the LOWER and UPPER volumes to achieve an even balance. Or you can deliberately make one louder than the other. It's entirely up to you.

#### **6 LEFT - RIGHT BALANCE**

VALUE range is from -31 to +31 where 0 represents no change in the relative volumes - if the LOWER is louder, it will stay that way unless the BALANCE is adjusted.

Negative VALUES increase the output of the LOWER Voices relative to the UPPER Voices. As you use increasing negative numbers, the LOWER gets louder and the UPPER gets quieter. At a setting of -31, the LOWER is at its maximum output and the UPPER can barely be heard.

Positive VALUES increase the output of the UPPER Voices relative to the LOWER Voices. As you use increasing positive numbers, the UPPER Voices get louder and the LOWER Voices get quieter. At a setting of +31, the UPPER are at their maximum output and the LOWER can barely be heard.

## STEP 6: SET THE SPLIT'S VOICE ASSIGNMENTS

The MATRIX-6R permits you to configure the voicing of the LOWER and UPPER sections to suit your playing needs.

Another way of looking at the LOWER and UPPER Voice Assignments is to regard them as "ZONES" or specific physical areas of the Master's keyboard with certain performance characteristics. Thus, the MATRIX-6R has two ZONES - one is called the LOWER (Left) and the other is called the UPPER (Right). These "characteristics" are the SPLIT Parameters that we just set up (0 through 6). We can sum them up as follows:

**A ZONE can be defined by its:**

**NOTE VALUE BOUNDARIES** set in Parameters "0 LEFT UPPER LIMIT" and "3 RIGHT LOWER LIMIT".

**KEY SIGNATURE** set in Parameters "1 LEFT TRANSPOSE" and "4 RIGHT TRANSPOSE".

**MIDI STATUS** set in Parameters "2 LEFT MIDI OUTPUT" and "5 RIGHT MIDI OUTPUT".

**VOLUME OUTPUT** set in Parameter "6 LEFT - RIGHT BALANCE".

**VOICE ASSIGNMENTS** set in Parameter "7 VOICE / ZONE SELECT" discussed below.

### 7 VOICE / ZONE SELECT

You are given four different ways to play the voices in a SPLIT:

**2 / 4** allows you to play Voices 1 & 2 from the LOWER ZONE and Voices 3, 4, 5 & 6 from the UPPER ZONE.

**4 / 2** assigns Voices 1, 2, 3 & 4 to the LOWER ZONE and Voices 5 & 6 to the UPPER ZONE.

**6 / 0** assigns all six Voices to the LOWER ZONE and no Voices to the UPPER ZONE.

**0 / 6** assigns all six Voices to the UPPER ZONE and no Voices to the LOWER ZONE.

The question becomes "Why would I want to have a ZONE play no Voices?" The **6 / 0** and **0 / 6** options allow one ZONE to play the MATRIX-6R Voices only and the other to play another MIDI instrument only, as one possibility. Just be sure to turn ON the MIDI for that ZONE in either "2 LEFT MIDI OUTPUT" or "5 RIGHT MIDI OUTPUT".



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## OVERLAPPING THE ZONES

One other way of using the LIMITS (Parameters 0 and 3) is to set the MIDI Note Number for each ZONE so that the "0 LEFT UPPER LIMIT" is set to a higher number than the "3 RIGHT LOWER LIMIT".

As an example, set the "0 LEFT UPPER LIMIT" Note Number to 72 and the "3 RIGHT LOWER LIMIT" Note Number to 60. The overlap occurs from Notes 60 through 72 as this octave is shared by both ZONES.

## STORING A SPLIT

After you have set up a SPLIT to be just the way you want it, don't forget to STORE it. The procedure is the same as in storing PATCHES but the difference is that you must be in the NUMBER Mode of the SPLIT SELECT Page. Press and hold STORE. While you are holding down STORE, type in the 2-digit SPLIT Number on the Keypad. Your SPLIT program is now stored in memory.

# Matrix-6R Patch

	0	1	2	3	4	5	6	7	8	9
<b>00</b> DCO1	Freq	Fr/Lf1	Sync	Pw	PW/Lf2	Wave	Wsel	Levers	Keybd	Click
<b>10</b> DCO2	Freq	Fr/Lf1	Detune	Pw	PW/Lf2	Wave	Wsel	Levers	Keybd	Click
<b>20</b> VCF/VCA	Mix	Freq	Fr/E1	Fr/Prs	Res	Levers	Keybd	VA1	VA/VI	VA/E2
<b>30</b> FM/TRCK	FM	FM/E3	FM/Prs	TrckIn	Track1	Track2	Track3	Track4	Track5	
<b>40</b> RMP/PRT	R1Spd	Trig	R2 Spd	Trig	Port	Spd/VI	Mode	Legato	Keymd	
<b>50</b> ENV1	Delay	Attack	Decay	Sustn	Rel	Amp	Amp/VI	Trig	Mode	Lf1Trig
<b>60</b> ENV2	Delay	Attack	Decay	Sustn	Rel	Amp	Amp/VI	Trig	Mode	Lf1Trig
<b>70</b> ENV3	Delay	Attack	Decay	Sustn	Rel	Amp	Amp/VI	Trig	Mode	Lf1Trig
<b>80</b> LFO1	Speed	Sp/Prs	Wave	Retrig	Amp	Ap/R1	Trig	Lag	Smpl	
<b>90</b> LFO2	Speed	Sp/Kbd	Wave	Retrig	Amp	Ap/R2	Trig	Lag	Smpl	

## Matrix Modulation

	Source	Amount	Destination
0			
1			
2			
3			
4			
5			
6			
7			
8			
9			

## Performance Notes

# PROGRAMMING THE MATRIX-6R

## Part 4: CREATING A PATCH

Now that we have covered each of the MATRIX-6R's edit functions, we are ready to put this information to practical use. In this section of the manual, we will create an actual patch starting from the synthesizer's Basic Patch. This will allow you to see how the various Edit Parameters work together in programming a sound from scratch.

For our purposes, we will put together a simple String Ensemble-type sound. The following procedure will take us step-by-step through the programming process.

**STEP 1:** Initialize the MATRIX-6 by performing the "51 PATCH INITIALIZE" function covered in the MASTER EDIT section. It will be easiest for us to start with the Basic Patch.

**STEP 2:** Set up DCO 1 by programming the parameters as follows:

<b>00</b> DCO1	Freq 12	Fr/Lf1 +20	Sync 0	Pw 31	PW/Lf2 0	Wave 0	Wsel WAVE	Levers BOTH	Keybd KYBD	Click OFF
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**00 DCO1 FREQ** - We will transpose the DCO up 1 octave. VALUE = +12.

**01 DC1F / LF1** - DC0 1 will be modulated by LFO1 to obtain a small amount of vibrato. VALUE = +20.

**02 DCO 1 SYNC** - Synchronizing the DCOs is not used in this particular patch because we will use a small amount of detune and LFO modulation between the oscillators in order to add richness to the sound. VALUE = 0.

**03 DCO1 PW** - PATCH INITIALIZE defaults this VALUE to 31. Since the Pulse wave is not used for DCO1 in this patch, this setting can be left the way it is.

**04 DC1PW / LF2** - PATCH INITIALIZE defaults this VALUE to 0. Since we are not using a Pulse wave in this patch, PW MOD would be pointless. Leave this setting as it is.

**05 DCO1 SHAPE** - We want to use a Sawtooth WAVE for this type of sound. VALUE = 0.

**06 DCO1 (Wave Select)** - PATCH INITIALIZE defaults to WAVE which we will use for this patch, so leave this setting as is. We set its SHAPE above to a Sawtooth for our purposes.

**07 DC1 LEV** - Default setting = **ON**. You may want to use **LEVER1** and **LEVER2** for Pitch Bend and Vibrato as you play the patch, so we will keep this setting.

**08 DC1 KEY** - Default setting = **KEYBD**. We want the Keyboard to control DCO1 as normal, so keep this setting.

**09 DCO 1 CLIK** - Default setting = **OFF**. Key Click is not usually associated with a String sound; leave this Parameter **OFF**.

**STEP 3:** Set up DCO2 as follows;

<b>10</b> DCO2	Freq 12	Fr/Lf1 0	Detune +8	Pw 31	PW/Lf2 -55	Wave 0	Wsel BOTH	Levers BOTH	Keybd KYBD	Click OFF
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**10 DCO 2 FREQ** - We'll program DCO2 to have a unison pitch with DCO1. **VALUE = 12.**

**11 DC2 / LF1** - Default setting = **0**. We'll leave this setting alone in order to keep the pitch of DCO2 stable. DCO1 being modulated slightly by LFO1 produces a warm, moving detuning effect relative to DCO1.

**12 DCO 2 DETU** - Using a slight amount of **DETUNE** enhances the detuning effect of the DCO1 "01 FREQ MOD BY LFO 1". **VALUE = +8.**

**13 DCO 2 PW** - The Pulse Width of DCO2 will be modulated by LFO2 in the next Parameter. For our purposes in this patch, we want to use a Square wave. Set **VALUE** to **31**.

**14 DC2PW / LF2** - We want a wide Pulse Width modulation on the Square wave we set up in the previous Parameter. Using a negative number inverts the LFO's effect relative to LFO1 (which is modulating DCO1 FREQ.) for an enhanced modulation. Set **VALUE** to **-55**.

**15 DCO2 SHAPE** - We will again use a Sawtooth wave for this oscillator and use the same setting as for DCO1. **Value = 0.**

**16 DCO2 (Wave Select)** - For added harmonic richness, we will use a combination Pulse and Sawtooth waves for DCO2. The Pulse Width modulation that we are using in Parameter 14 creates a unique harmonic motion as the Pulse Width changes relative to the Sawtooth, which is stable. **VALUE = BOTH.**

**17 DC2 LEV** - Since we are using Pitch Bend and Vibrato on DCO1, we want to keep the default setting for DCO2 as well. **VALUE = BOTH.**

**18 DC2 KEY** - Same as for DCO1. We'll keep the default setting: VALUE = KEYBD.

**19 DCO2 CLIK** - Same as for DCO1. Key Click is not needed for this sound. VALUE = OFF.

**STEP 4:** The VCF / VCA Sub-Page is programmed as follows:

<b>20</b> VCF/VCA	Mix 31	Freq 35	Fr/E1 +40	Fr/Prs +25	Res 12	Levers OFF	Keybd OFF	VA1 50	VAVI +57	VA/E2 +63
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**20 DCO MIX** - Default VALUE = 31. The patch calls for equal volume from both DCOs so we'll use the default setting.

**21 VCF FREQ** - We want to have the Filter set to an initial level a little lower than the default setting of 55. ENV1 will "open" the VCF to add the needed brightness. VALUE = 35.

**22 VCFF / EN1** - The modulation amount of ENV1 affecting the Filter is "fine tuned" to a VALUE of 40. You can experiment with different VALUES to get different brightness levels as needed.

**23 VCFF / PRS** - For expression, Pressure is routed to the VCF Frequency. VALUE = 25.

**24 VCF RES** - A very small amount of Resonance is added to the Filter as an enhancement of the upper harmonics. VALUE = 12.

**25 VCF LEV** - The effect of LEVER1 and LEVER2 is not necessary on the Filter in this patch. VALUE = OFF.

**26 VCF KEY** - Default VALUE = KEYBD. We will set up a custom Keyboard scaling for the Filter using TRACK in the next Sub-Page. Set this VALUE to OFF.

**27 VCA1 VOL** - Default VALUE = 63. In the next Parameter we will set up VCA1 to get louder by VELOCITY. So a setting of 50 for this Parameter will give us the necessary "headroom" for this to occur.

**28 VCA1 / VEL** - The setting of +57 gives a useable VELOCITY amount for our purposes in setting up this function. Adjust as needed to suit your playing style.

**29 VCA2 / EN2** - Default VALUE = +63. This maximum setting opens the VCA to maximum output and is suitable for the patch.

**STEP 5 :** Program the FM / TRACK Sub-Page as follows:

<b>30</b> FM/TRCK	FM 0	FM/E3 0	FM/Prs 0	TrckIn KYBD	Track1 17	Track2 26	Track3 31	Track4 47	Track5 52	
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**30 VCF FM** Default VALUE = 0.

**31 FMOD / EN3** Default VALUE = 0.

**32 FMOD / PRS** Default VALUE = 0.

FM is not required in this patch. The default settings should not be changed.

**33 TRACK IN** - Since we turned the Keyboard control OFF in the VCF (refer back to parameter 26), we'll use it as the input of the Tracking Generator and custom-shape its control curve. VALUE = KEYB.

**34 - 38 TRAK PT 1 to 5** - The five Track Points are set to give TRAK a curve that opens the VCF more for low notes and slightly closes it for uppermost notes on the Keyboard. Thus, the sound gets somewhat brighter at the low end and less towards the top. Set VALUES: PT1 = 17, PT2 = 26, PT3 = 31, PT4 = 47, and PT5 = 52.

**STEP 6:** The RAMP / PORTAMENTO Sub-Page is set up as follows:

<b>40</b> RMP/PRT	R1Spd 35	Trig STRIG	R2 Spd 0	Trig STRIG	Port 0	Spd/Vl 0	Mode L IN	Legato OFF	Keymd ROTAT	
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**40 RAMP1 SPD** - We will use RAMP1 to increase the Amplitude of LFO1. In other words, RAMP1 will increase LFO1 gradually to achieve a delicate string vibrato. VALUE = 35.

**41 RAMP1** - It will suit our purposes for this patch to have the LFO fade in and stay on until a new voice is played. Keep the default VALUE of STRIG.

**42 RAMP2 SPD**

**43 RAMP2**

RAMP2 is not used in the patch. Leave their default VALUEs as they are.

**44 PORT RATE**      Default VALUE = 0  
**45 PORT / VEL**      Default VALUE = 0  
**46 PORT (Mode)**    Default VALUE = LINEAR  
**47 LEG PORT**        Default VALUE = OFF

Portamento is not used in this patch. Do not change their default VALUES.

**48 KEYBD** - The KEYBOARD MODE defaults to ROTATE. We can use this since we need a Keyboard voice assignment to allow for overlaps in the Release times of the Envelopes.

**STEP 7:** ENV1 is used in this patch to add dynamics to the VCF. Its application is described below. But first, program ENV1 according to the following chart:

<b>50</b> ENV1	Delay	Attack	Decay	Sustn	Rel	Amp	Amp/Vl	Trig	Mode	Lf1Trig
	0	15	10	63	50	48	+63	SRSET	NORM	NORM

**50 ENV1 DEL** - No delay is needed on this VCF Envelope. Keep the default setting of 0.

**51 ENV1 ATK** - A brief ATTACK on the VCF is just enough to brighten the sound slightly (remember, this works in conjunction with VCF settings) at its beginning. VALUE = 15.

**52 ENV1 DCY** - Since we will be using a SUSTAIN level of 63, DECAY has no effect. Use the default VALUE of 10.

**53 ENV1 SUS** - For our purposes in creating this patch, we want the VCF to remain open while keys are being held on the Keyboard so that the sound will retain its brightness. VALUE = +63.

**54 ENV1 REL** - Using a VALUE of 50 provides a long time period for the VCF Frequency to diminish after the keys are let go. Since ENV1 is contouring the Filter's Frequency, this Parameter determines how long it will take for the VCF Frequency to reach its initial level after the keys are released.

**55 ENV1 AMP** - We will need to set ENV1's output level to a setting lower than full. This is because in the next parameter, we are going to use VELOCITY to raise the output thus increasing the VCF. Your playing dynamics in this case will add a small amount of brightness to the sound. VALUE = 48.

**56 EN1 / VEL** - Use the default VALUE of +63. This will give us maximum VELOCITY modulation to ENV1 Amplitude.