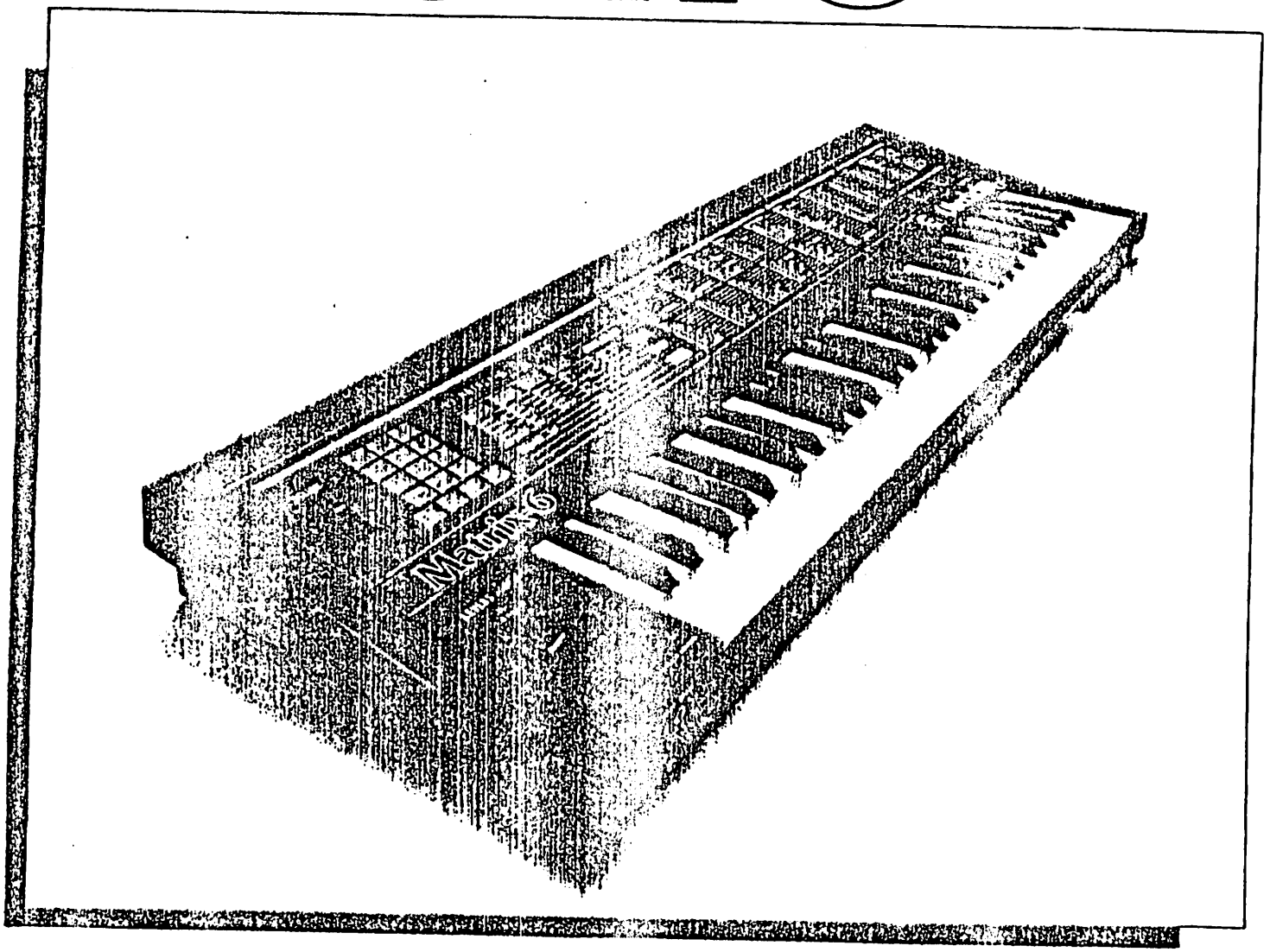
GLINSKY

SERVICE MANUAL

Matrix-6



Oberheim

A Division of ECG Development Corporation

Oberheim

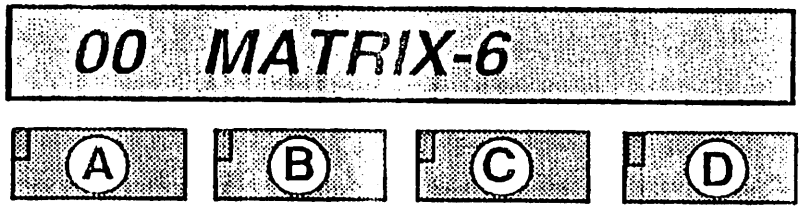
Matrix-6

6-Voice Polyphonic MIDI Synthesizer
SERVICE MANUAL

Preliminary Edition - February 1986

MATRIX-6 SERVICE MANUAL

PRELIMINARY EDITION - February, 1986



CALIBRATIONS

1. **TUNE** - While in MASTER EDIT, pressing the **B** button puts the MATRIX-6 into AutoTune. The cycle takes approximately two to three seconds to complete, during which time the display reads "***TUNING...***". While in TUNE mode, the processor is tuning the MATRIX-6's three High Frequency Oscillators (HFOs).

2. **CALIBRATE** - While in MASTER EDIT, pressing the **A** button puts the MATRIX-6 into Parameter Select mode. While in this mode, call up parameter 52 and the display should read "***52 CALIBRATE***". Now press the [+] button. This will put the MATRIX-6 into VALUE mode and the display will read "***READY?***". Press the YES button on the Keypad - the display will blank out during the Calibration routine. When the process is finished, the display will return to read "***52 CALIBRATE***".

   The CALIBRATE function calibrates the three HFOs as well as the VCF Frequency, Pulse Widths, Resonance amount and VCA2 level on each voice. If the MATRIX-6 encounters any problems while tuning the voices, it will display which voice and the section of that voice that is having the problem. To display tuning failures enter CALIBRATE mode and, with the display blank, press and hold the **C** button until the display returns to "***52 CALIBRATE***".

If the MATRIX-6 tunes all six voices without encountering any problems, the display will remain blank during the tuning process. When problems are encountered, the display will indicate which of the four sections of the tuning process and the voice or voices that are bad. Failures in any of the four sections of the tuning process are displayed with the following messages:

"BAD OSC ** "	for problems with the HFOs.
"BAD WAVE ** "	for oscillator waveform problems.
"BAD RES ** "	for resonance problems.
"BAD VCF ** "	for filter problems.

The two stars in each message represent a two digit number that indicates which voice or voices have failed that section of the Calibration. The number is

decimal equivalent of a binary number, with each digit in the binary number corresponding to a particular voice. For example, if the display reads "***BAD OSC 63*** ", it would be broken down like this:

Decimal number -	63					
Value of binary digits -	32	16	8	4	2	1
Binary equivalent -	1	1	1	1	1	1
Corresponding bad voices -	V6	V5	V4	V3	V2	V1

So if the display reads "***BAD OSC 63*** " this means that all six of the voices have failed the Oscillator section of the tuning. Now if the display reads "***BAD WAVE 24*** ", it would be broken down like this:

Decimal number -	24					
Value of binary digits -	32	16	8	4	2	1
Binary equivalant -	0	1	1	0	0	0
Corresponding bad voices -	--	V5	V4	--	--	--

With "***BAD WAVE 24*** ", Voices four and five have failed the waveform Calibration.

Note: When trying to display the tuning failures, be sure to watch the display, because the failure displays are only shown for a short time.

When tuning failures are encountered, run the CALIBRATE function two more times. If there are no more failures after the third attempt, Tuning is OK. This will happen most often when the unit is cold.

3. DAC CALIBRATION - To enter this mode, the MATRIX-6 must be in MASTER EDIT parameter select mode. With parameter "52 CALIBRATE" displayed, first press and hold the **D** button. Next, press and hold the **C** button then press and hold the **B** button. The MATRIX-6 is now in DAC CALIBRATION mode and all three held buttons can be released. The display should read "***TUNING...***".

Caution: Be careful not to short any pins when zeroing the DAC.

With a DVM in the millivolt range, set the DAC output to 0.000 volts. The DAC output is measured at pin 6 of U712 on the Voice board. Connect the DVM ground to the ground leg of C13 (the leg toward rear of unit). C13 is directly behind U704. Adjust the DAC output to zero by turning the trimmer located directly behind U712. To exit DAC CALIBRATION mode press the MASTER button.

Note: After zeroing the DAC, the MASTER EDIT parameter number "52 CALIBRATE" must be preformed.

4. HFO CALIBRATION - To enter the High Frequency Oscillator Calibration mode, the MATRIX-6 must be in the MASTER EDIT parameter select mode.

Select parameter number "52 CALIBRATE". Now press and hold the **C** button, then press and hold the **B** button. The MATRIX-6 is now in HFO CALIBRATION mode and the held buttons can be released.

> **Caution:** when adjusting the coils of the HFO's, take care not to damage the very fragile core.
>
> When adjusting HFOs, be sure to remove adjusting tool from the core of the coil before taking the frequency measurement.

There are three High Frequency Oscillators which need to be adjusted when Calibrating HFO's. The adjustments are made first at L2, then L3 and last L1. Use a Frequency Counter to set the frequency of all three Oscillators between 3.500 and 3.505 MegaHZ. After L1 is set, the frequency of L2 and L3 should be double checked to make sure they have not changed.

> To adjust L2 connect Frequency Counter to pin 14 of U732.
> To adjust L3 connect Frequency Counter to pin 14 of U733.
> To adjust L1 connect Frequency Counter to pin 14 of U736.

After adjusting all three HFOs, exit HFO CALIBRATION mode by pressing MASTER button.

> **Note:** After Calibrating the HFOs, the MASTER EDIT parameter "52 CALIBRATE" must be preformed.

5. **PROCESSOR RESET & INITIALIZE** - First, make sure the AC power is turned off. Press and hold the red STORE button. Turn the AC power on and the display should have one or two characters flickering in the display. Now release the STORE button and the display will go blank for a few seconds. When the display resets, it will recall patch number "00". Although the unit will display patch "00", it will be playing the initialized patch.

POWER SUPPLY

VOLTAGE	TOLERANCES	J03 PIN # *
-5	+/- 200mv	1
+5A	+/- 200mv	3,4
+5B	+/- 200mv	5,6
+12	+/- 500mv	7,8
-12	+/- 500mv	9,10
-42	-41v to -45v	n/a **

* J03 is the connector located on the Power Supply board.

** The -42 volt supply is measured on the noncomponent side of the Display Board, at the point labeled "-42", located directly behind the fluorescent display.

MEMORY VOLTAGE

The memory voltage is measured at pin 28 of U7 orU8.

Power off: The voltage should range from +3 to +2.4 volts. If the voltage goes below +2.4, the MATRIX-6 may lose all or part of its memory.

Power on : The voltage should be 4.4 volts +/- 60mv.

TAD

GUNSMY

Oberheim

Matrix-6

6-Voice Polyphonic MIDI Synthesizer

SOFTWARE REVISION 2.13

OWNER'S MANUAL ADDENDUM

CAUTION:
Installation of this Sotware Update by anyone other than an ECC/Oberheim Authorized Service Center will void the 12-month Limited Warranty of the Matrix-6. Refer servicing of this instrument to authorized service personnel.

Part Number 950062

Oberheim MATRIX-6
6-VOICE MIDI SYNTHESIZER

SOFTWARE REVISION 2.13
OWNER'S MANUAL ADDENDUM

INTRODUCTION

This addendum to the MATRIX-6 Owner's Manual 1st Edition documents the many new features added with this revision of the MATRIX-6's operating software. There have also been a few changes to some of the parameters already present in the synthesizer. This addendum is used to supplement the Owner's Manual and we suggest trying these new features and changes as you read them. You may want to keep this addendum with your Manual for future reference.

Software Revision 2.13 for the MATRIX-6 primarily adds several features to the operation of its MIDI Interface. The interfacing capabilities of the MATRIX-6 are made even more useful with the addition of these new features.

The majority of the new features added to the MATRIX-6 are located in MASTER. As we mentioned in the 1st Edition Owner's Manual, the MASTER EDIT Page parameters are not programmable with each individual patch. Rather, they are set for the MATRIX-6 as a whole and will do the same thing for one patch as it will for all the others. This is called "Global Control" and selecting a parameter VALUE for one patch selects it for the rest of them.

CORRECTIONS/ADDITIONS TO THE MATRIX-6 OWNER'S MANUAL - 1st Edition

The following text makes corrections and additions to the 1st Edition Owner's Manual starting on Page 54.

MIDI FUNCTIONS

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 (or a MIDI Pitch Wheel) and LEVER2 (or a MIDI Vibrato Wheel), PEDAL1 (most commonly used for Volume) and PEDAL2 (most commonly used for 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.

00 BASIC CHANNEL

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

MIDI IN (RECEIVE) - When MIDI IN is used, the MATRIX-6 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-6 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-6 at all times when in OMNI MODE.

Also, if the MATRIX-6 is set up as a slave (using MIDI IN), when MIDI OUT is used and MASTER Edit Parameter "12 MIDI ECHO" is turned ON, the MATRIX-6 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-6 is technically a Slave in the system - due to its MIDI IN is being used to "slave it" to a Master controller - you can think of it as another "Master" when its MIDI OUT and MIDI ECHO are used together.

MIDI OUT (TRANSMIT) - When MIDI OUT is used, the MATRIX-6 is considered the Master and 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-6 from its own Keypad in addition to **Notes** and **Controllers**. If MASTER Edit Parameter "03 PATCH CHANGES" is selected ON, the MATRIX-6 will transmit a patch change made on its own Keypad to MIDI OUT. Playing Notes on the MATRIX-6 as well as using pitch bend and vibrato are other common examples.

MIDI THRU - When the MATRIX-6'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-6 itself.

01 OMNI MODE

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

When OMNI is ON, the MATRIX-6 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, MIDI Timing data and System Exclusive data are sent on one of the MIDI 1 through 16 Channels.

When OMNI is OFF, the MATRIX-6 will receive MIDI **Notes** and **Controllers** on the BASIC CHANNEL only. The MATRIX-6 will ignore MIDI information coming from any other channel. Please note that this is true only if the MATRIX-6 is in its normal 6-Voice polyphonic playing mode. When the MATRIX-6 is in SPLIT, MIDI operates just a little differently and we'll cover that later when we cover the changes in the SPLIT EDIT Page: refer to page 3 "03 PATCH CHANGES" and page 4 "13 SPILLOVER".

02 CONTROLLERS

When the MATRIX-6 is a Slave using its MIDI IN, this parameter permits you to turn the MIDI Controllers ON or OFF as needed.

When turned ON, the MATRIX-6 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-6's own Pedals (pedals plugged into the Pedal 1 and Pedal 2 jacks on its back panel) and Levers will operate simultaneously with MIDI **Controllers**.

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

08 LEVER 2 SELECT

09 LEVER 3 SELECT

The "Levers" referred to on the MATRIX-6'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-6 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-6 is designed to be used in this way. It defaults to a pitch-bend range of a Whole Tone up or down.

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 and is set to MIDI Controller 1 as a default.

Operation with Oberheim Instruments

If you are playing the MATRIX-6 as the Master, or from another Oberheim synthesizer as a Slave, 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 the MATRIX-6 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-6 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.

NEW FEATURES

Software Reveion 2.13 expands the number of MIDI assignments to 19 MIDI Parameters, numbered 00 through 18. The new features of the MASTER EDIT Page are described as follows:

03 PATCH CHANGES

Patch Changes in SPLIT Mode

When turned ON, the MATRIX-6 will transmit and receive MIDI information that will cause instruments in the system to change to another Patch Number. Revision 2.13 adds the ability to send and receive SPLITS via MIDI.

MIDI OUT - When used as a MIDI Master, the MATRIX-6 will transmit Single Patches as well as SPLIT Patches to its Slaves. Please note that the slave instruments must also have Split-keyboard capability and be able to recognize Split PATCH CHANGES via MIDI for this to occur.

MIDI IN - If your Master controller has a Split-Keyboard capability and it is designed to send Split Program Changes via MIDI, the MATRIX-6 will also respond to these commands when "03 PATCH CHANGES" is enabled.

When turned OFF, the MATRIX-6 will not transmit a MIDI Patch Number when you change patches and it will ignore commands to change patches from other instruments in the system as before.

11 SEND ALL

When executing a MASTER EDIT Parameter "11 SEND ALL" command, the display will scroll the messages "*SENDING PATCHES* ", "*SENDING SPLITS* " then "*SENDING MASTER* " (this last message is only a 1/4 second long) during the transfer instead of continuing to show the message "*READY?* ".

12 MIDI ECHO

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

Certain MIDI commands received by the MATRIX-6 when it is being used as a 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-6 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-6's MIDI OUT when it is slaved. Under normal conditions, these controls are simply passed along to other slave instruments in the system via the MATRIX-6'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-6 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 MIDI commands from both the MATRIX-6 and its Master controller together.

When OFF, the MATRIX-6 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-6 itself.

Since the design of all 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-6 control over the other slaves. MIDI ECHO makes it possible for the MATRIX-6 and its Master to have complete control over the other slave instruments using only one MIDI input on the Slave.

13 SPILLOVER

This feature allows you to play another synthesizer from the MATRIX-6 via MIDI as if the second slave synthesizer were part of the MATRIX-6's internal voices. Although SPILLOVER was first introduced in Software Revision 1.05, its implementation has been improved in Rev. 2.13. The following discussion discribes the current operation of SPILLOVER in the MATRIX-6.

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

When SPILLOVER is ON, the seventh, eighth, ninth, etc. (up to the 16th) notes played on the MATRIX-6 will be transmitted from its MIDI OUT on the BASIC MIDI Channel + 2 and will be heard on the Slave synth connected to the MATRIX-6. As an example, if the MATRIX-6's Basic Channel is set to 1 (MASTER Page Parameter #00), notes will spillover on Channel 3. If the MATRIX-6 is set to transmit on BASIC CHANNEL 2, notes 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 MATRIX-6's Keyboard, 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-6 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-6'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 are transmitted out MIDI from the MATRIX-6 instead of being ignored as they would be normally.

Operation #1
MATRIX-6 as Master
SPILLOVER is more commonly used with the MATRIX-6 as the Master. As an experiment, set up the following:

1. Connect another MIDI synthesizer as a Slave to the MATRIX-6 (the Master). The MIDI OUT of the MATRIX-6 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-6 to 1.

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 MATRIX-6. Notice that if you play six notes or less on the MATRIX-6, only its Voices play and the second Slave synth connected to the MATRIX-6 does not sound - the MATRIX-6 is transmitting across a MIDI Channel (in this case Channel 1) on which the second Slave synthesizer is not receiving (in this case Channel 3).

5. Now, play and hold six notes on the MATRIX-6. 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-6 will be doubled on the Slave, just as normal.

Operation #2
SPILLOVER In Split Mode
SPILLOVER also works when the MATRIX-6 is in SPLIT MODE and occurs independently from each of the two Zones.

The number of notes that are needed to be played from the MATRIX-6's Keyboard 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 MATRIX-6 in order for SPILLOVER to happen from the Lower Split. Five or more notes must be held on the Upper Zone of the MATRIX-6 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. All notes played on a "0" Zone play on the BASIC Channel.

- 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 verify that they are enabled.

Operation #3
MATRIX-6 as Slave
SPILLOVER can also occur from the MATRIX-6 to other slaves in the system when it is the first Slave being played from a Master controller. In this case, connect the second slave unit to the MATRIX-6's MIDI OUT (not its MIDI THRU) for SPILLOVER to occur.

When SPILLOVER is OFF and you are playing the MATRIX-6 from the Master controller in ROTATE or REASGN, playing six notes and holding them down at the same time causes the seventh, eighth, ninth, etc. notes not to sound - there are no more voices left inside the MATRIX-6 to be played, just as before.

When SPILLOVER is ON, the seventh, eighth, ninth, etc. (up to the 16th) notes played on the Master controller will be transmitted from the MATRIX-6's MIDI OUT on the BASIC MIDI Channel +2 and will be heard on the Slave synth connected to the MATRIX-6. What happens in this instance is that the Master controller driving the MATRIX-6 will play the MATRIX-6's Voices first, then spill any excess notes to the Slave connected to the MATRIX-6.

UNISON and REAROB modes operate in SPILLOVER as described previously.

Connect another MIDI synthesizer as a second Slave in the system to the MATRIX-6 (the MATRIX-6, remember, is a Slave to the Master controller to begin with in this case). The MIDI OUT - not MIDI THRU - of the MATRIX-6 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. Follow the procedure given previously but notes must be played from the Master controller in order to have Voices SPILLOVER from the MATRIX-6 to the second Slave.

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-6 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-6 is set to Basic MIDI Channel 15, the extra notes are spilled to MIDI Channel 1.

2. If the MATRIX-6 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-6 and its Master controller, or the MATRIX-6 and its Slave(s) in the system. One of the most common "malfunctions" that would normally occur if the MIDI connection between the MATRIX-6 and the Master or other slaves is broken is that notes being held would get "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-6's software is defeated and the MATRIX-6's MIDI connections to the Master controller and / or a second slave are not monitored.

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

But First.... A Word About MIDI Notes

MIDI Note commands from a MIDI Master instrument contain, among other things, a "Note On" command (when a key is played) to start a note playing on the Slave followed by a "Note Off" command (when the key is let go) to tell the Slave to stop playing this note. Since a broken MIDI connection prevents the MIDI "Note Off" command from reaching the Slave, notes being held at the moment of the MIDI connection break will continue to sound indefinitely on the Slave. Try holding down a key on the MATRIX-6 while it is driving a Slave and pulling the MIDI cable out with Active Sense OFF. This note will lock on the Slave until it is turned off.

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-6 will expect to receive either notes from the Master or, if the Master utilizes Active Sensing, the MATRIX-6 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 the stream of information, the MATRIX-6 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-6 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-6 will just wait for notes to be played. ACTIVE SENSE, whether ON or OFF will not make any difference in this case. Both instruments must have Active Sensing for this feature to be effective.

MIDI OUT

The MATRIX-6 also sends Active Sense data to other slaves in the system as a monitor. If you are not playing any notes from the MATRIX-6 or its Master controller, the MATRIX-6 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-6, thus prevent their own notes from locking on. If not, Active Sense will not be effective.

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-6 - such as its control panel locking up, memory crash, etc. - turn Active Sense in the MATRIX-6 OFF or disconnect the slave from the MATRIX-6'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-6, 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 reorganize the 100 patches in the MATRIX-6 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-6 without actually

re-arranging them. This is accomplished by using the "Table" in Parameter 16 P MAP EDIT to make the MATRIX-6 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-6.

15 PATCH MAP

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

When OFF, the synthesizer transmits and receives MIDI PATCH CHANGE commands normally. When the MATRIX-6 is the Master, selecting a patch from its Keypad sends the same Patch Number out MIDI. Selecting Patch Number 23, for example, sends MIDI Patch Number 23 out MIDI to the Slaves in the system. Remember that 03 PATCH CHANGES must be turned ON for this to occur.

When the MATRIX-6 is a Slave, if MIDI Patch Number 23 is sent from the Master controller to the MATRIX-6, it will respond to this command by simply recalling its own patch number 23. MIDI Patch Numbers transmitted from the Master will cause the MATRIX-6 to recall corresponding patch numbers from its own memory. Remember, MIDI Patch Changes on the MATRIX-6 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 according to the Patch Mapping Table you can program in the next MASTER Edit Parameter 16 P MAP EDIT.

16 P MAP EDIT - "Patch Map Edit"

It is in this Sub-Page that the MATRIX-6'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-6 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-6's Patch Number that will be recalled when the Reference Patch Number is received. "***XX***" is any desired Patch Number in the MATRIX-6 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-6 will transmit from its MIDI OUT to a second slave in the line if the Reference Patch Number is selected from the MATRIX-6's front panel. "***XX***" is any desired MIDI Patch Number 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-6's MIDI IN. If you have another MIDI instrument, connect its MIDI IN to the MIDI OUT of the MATRIX-6 so that it will act as the slave.

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-6 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-6 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-6 is in PATCHES, not SPLITS.

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

00	*IN = 44*	*OUT = 15*
01	*IN = 31*	*OUT = 76*
02	*IN = 65*	*OUT = 20*
03	*IN = 19*	*OUT = 09*
04	*IN = 88*	*OUT = 52*

With this set-up, selecting Patch 00 on the Master, selects Patch 44 on the MATRIX-6. Patch 01 on the Master selects Patch 31 on the MATRIX-6. Patch 02 on the Master selects Patch 65 on the MATRIX-6. 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-6 to the second slave according to the *OUT* Patch Numbers. Referring to our first example, if you select Patch 23 on the MATRIX-6's front panel, Patch 17 is selected on the second slave. Selecting a Patch Number on the MATRIX-6's front panel is referred tot as selecting the patch **locally**.

In the sample Table on the previous page, Local Patch 00 selects Patch 15 on the second slave. Local 01 selects 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-6 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-6 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-6 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-6 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-6's front panel (or the slave's own front panel, of course).

IMPORTANT NOTE: The MATRIX-6 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-6 will recall the *IN* Patch but the Reference Patch will be sent to the MATRIX-6'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-6's Patch Change Parameters:

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

18 MIDI MONO

Under normal conditions, the MATRIX-6 - as with most MIDI synthesizers - receive MIDI Notes polyphonically from the Master controller from one specified MIDI Channel. In SPLIT Mode, the MATRIX-6 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-6's six Voices are played from six separate MIDI Channels. This parameter turns MIDI MONO either ON or OFF.

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

When ON, the MATRIX-6 receives MIDI Notes 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), etc. The chart on the next page lists 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 "0" Zone is ignored.

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

1. MIDI MONO overrides the following settings:

   - Whatever has been selected in PATCH Edit Parameter 48 KEYBOARD MODE is ignored and the MATRIX-6 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-6 will use only six adjacent MIDI Channels to receive.

   - If SPILLOVER is ON, it will be disabled.

2. 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. VELOCITY and RELEASE VELOCITY, being transmitted with MIDI Notes, always affect each Voice independently.

3. 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-6 will not transmit anything on six separate MIDI Channels. If MIDI MONO is ON, the MATRIX-6 will still transmit on the BASIC CHANNEL N when in Single Patch Mode and on Channel N and N+1 when in SPLIT Mode.

ADDITIONAL MASTER EDIT PARAMETERS

45 TRANSPOSE

This MATRIX-6 MASTER Edit parameter now permits you to transpose the entire instrument up or down in this mode. Being a "Global" function, TRANSPOSE affects all Single and SPLIT programs equally. Thus, if you select a TRANSPOSE Amount VALUE of + Major 3rd, all Patches and SPLITS will be transposed up by a Major 3rd. SPLIT patches that were programmed with 1 LEFT TRANSPOSE and/or 4 RIGHT TRANSPOSE used will be further transposed by whatever Amount you selected in this parameter. Also, the TRANSPOSE Amount is retained in memory until you change it and is not lost when the MATRIX-6 is powered OFF.

Range is from -63 to +63 where each increment of 1 represents one semi-tone of transpose. This range translates into a whopping 10-1/2 Octaves of transpose which does not take into consideration any other transpose Amount you may already be using such as DCO tuning, Master Tune or SPLIT Transpose.

More Tricks....

If you are updating your MATRIX-6 from 1.04 Sotware (check MASTER Edit "54 SOFTWARE VERSION"), the following parameters were added in Rev. 1.05 and retained in this 2.13 Software Revision.

44 STANDOFF

This parameter controls the threshold of the Pressure sensor of the Keyboard. VALUE Range is 0 to +63. Raising this value increases the amount of pressure or after-touch on the keyboard that is required to initially activate the sensor. This permits the customizing of Pressure response to your own playing style.

Please bear in mind that this new feature does not affect Pressure Sensitivity or Amount Values, just the point where Pressure "kicks in" when you lay into the keys after they are played. Pressure Amount is set in PATCH EDIT Parameters "23 FREQ MOD BY PRESSURE", "32 FM MOD BY PRESSURE", "81 SPEED MOD BY PRESSURE" or any Matrix Mod combination you select in Matrix Modulation Sources "15 PRESSURE". It is very important that you understand this distinction.

57 SQUICK

A new master parameter #57 SWITCH-QUICK, displayed as "57 SQUICK", has been added. When SQUICK is OFF the unit functions normally. When SQUICK is ON, when the unit is in PATCH EDIT/QUICK mode the function of the arrows and the keypad is reversed. This means that the keypad now selects which parameter to edit and the arrow keys change the value of a parameter. This switch will be remembered by the MATRIX-6 until changed and is not lost when power is turned On or Off.

MIDI Memory Protect

The MEMORY PROTECT feature of the MATRIX-6 has been expanded to include 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.

CHANGES OF OPERATION

54 SOFTWARE VERSION

The micro-processor inside your MATRIX-6, as we have already dicussed, 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-6 can be displayed at any time simply by entering this Parameter. When this is entered, the current Version Number of the MATRIX-6's operating software will be displayed as "*54 VERS 2.13* ". 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-6's software.

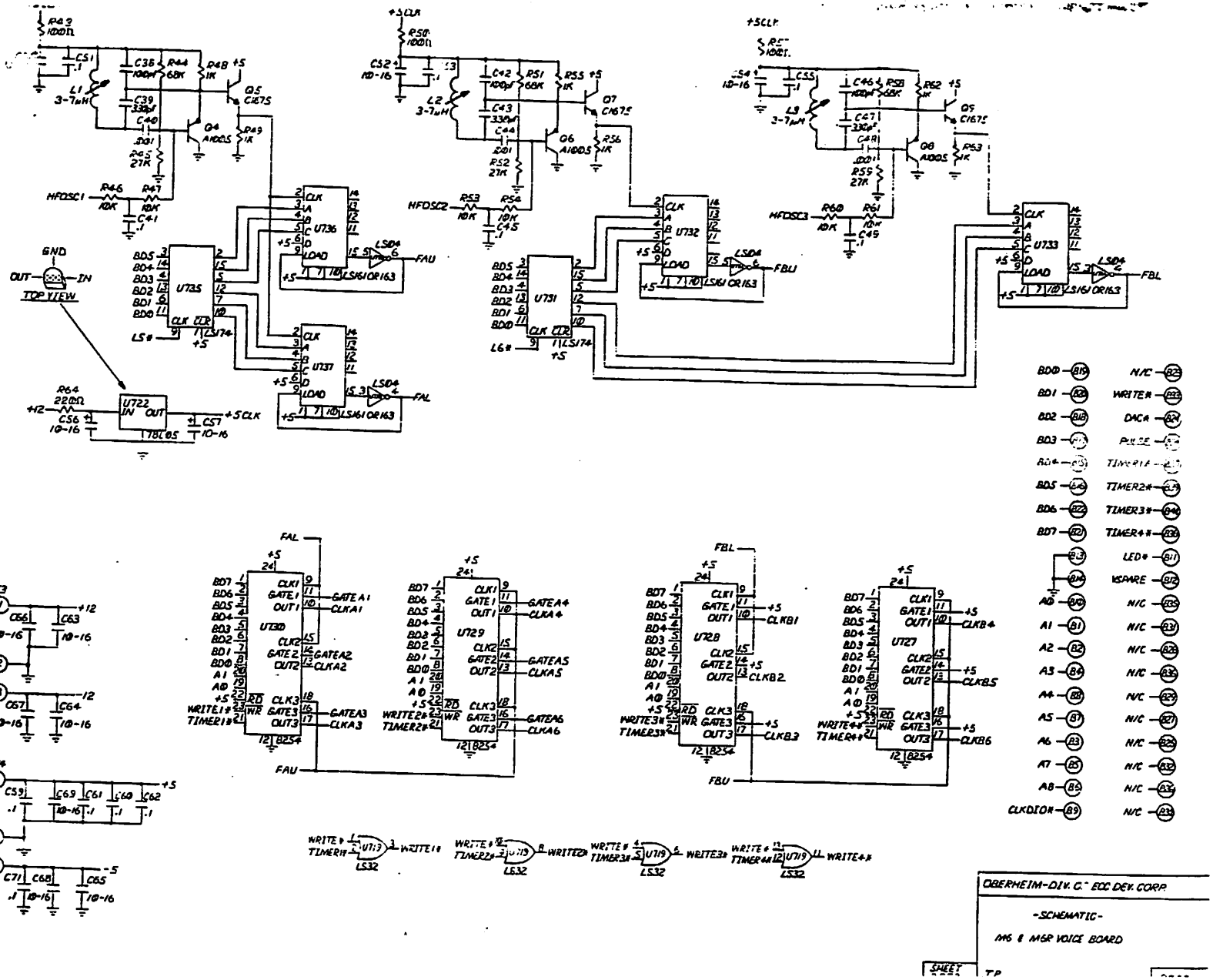
Software Updates issued by Oberheim can be retrofitted to any MATRIX-6. Contact your nearest ECC / Oberheim Authorized Service Center for prices and availability.

"VOICE GATE" Display Indication

The MATRIX-6's 16-character fluorescent Display now shows which Voice or Voices are being played by displaying a little dot or series of dots along the lower edge of the window as notes are played. This Voice Gate indication is activated whenever a Voice or Voices are played from the MATRIX-6's own Keyboard or coming in from MIDI. Voice Gate dots are present in all display modes with the exceptions of TUNING, CALIBRATING and CASSETTE functions.

Keyboard Modes

PATCH EDIT Parameter "48 KEYBOARD MODE" has been changed in order to make its operation consistent and reliable with the internal operation of the MATRIX-6's microprocessor and patch memory. For this reason, ROTROB has been deleted from this parameter and will no longer appear on the display as an option. Patches that you may have programmed with ROTROB will default to REAROB when Software Revision 2.13 is installed.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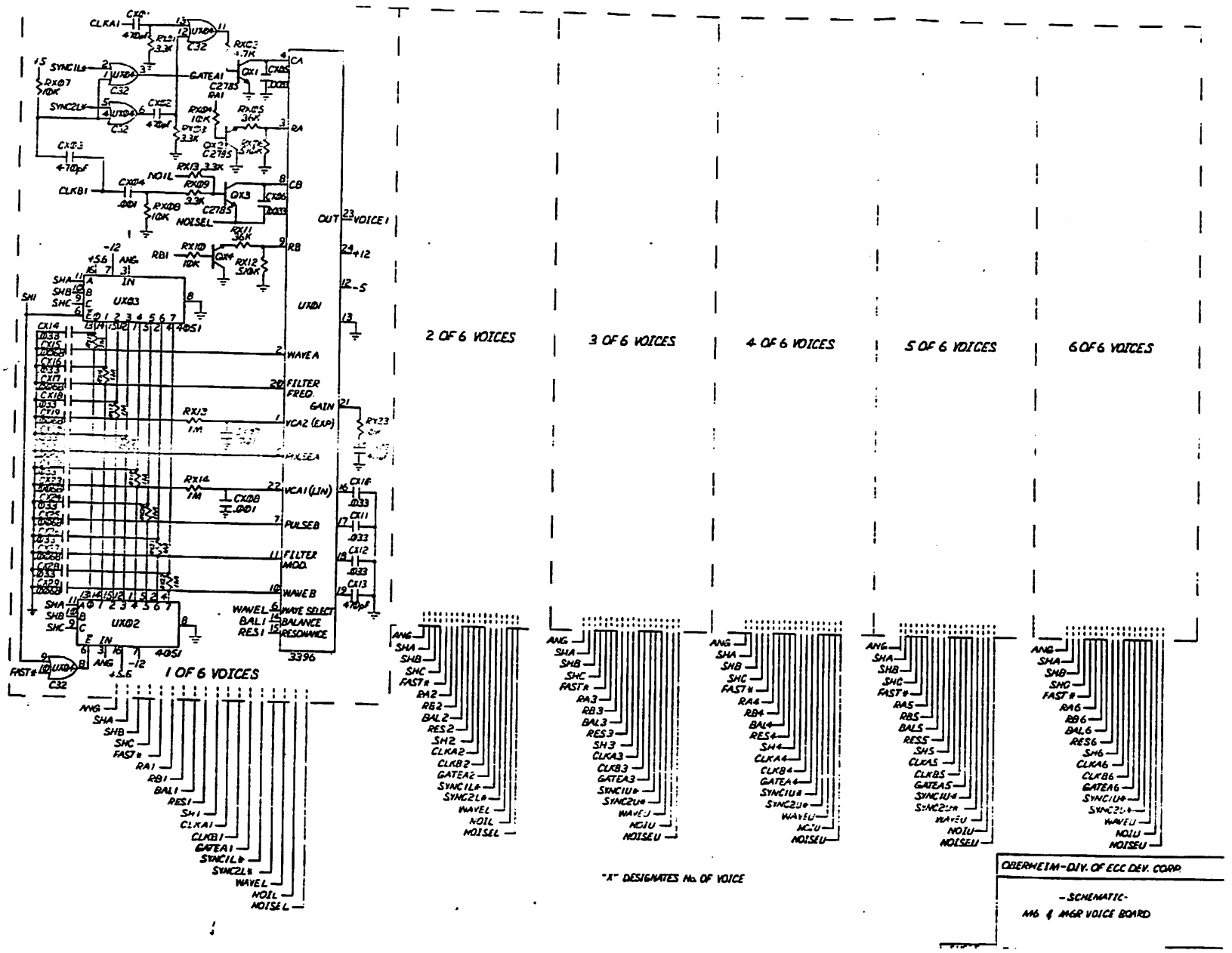
1 OF 6 VOICES
2 OF 6 VOICES
3 OF 6 VOICES
4 OF 6 VOICES
5 OF 6 VOICES
6 OF 6 VOICES
"X" DESIGNATES No. OF VOICE
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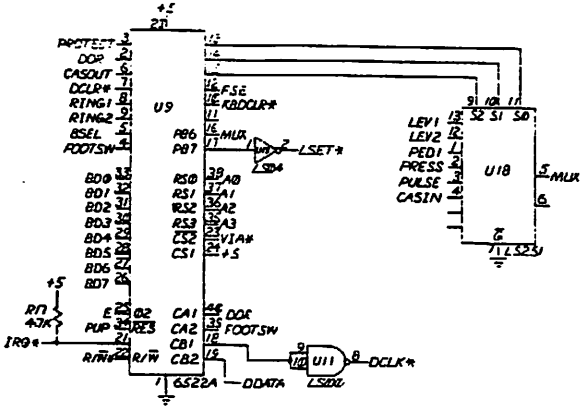

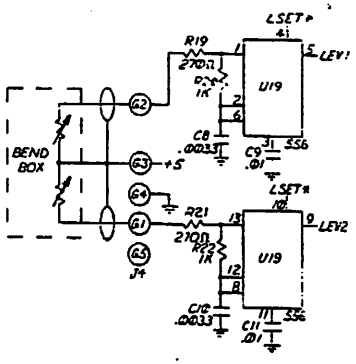

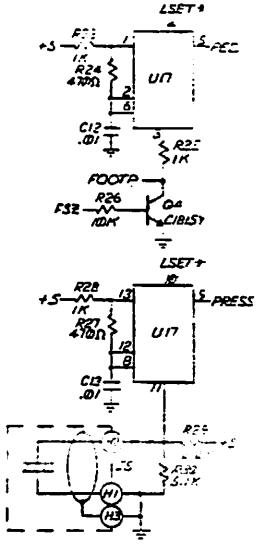

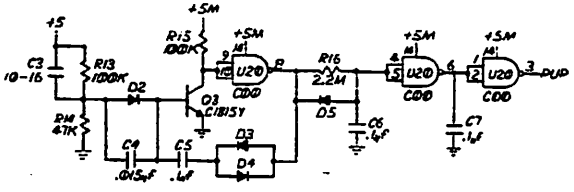

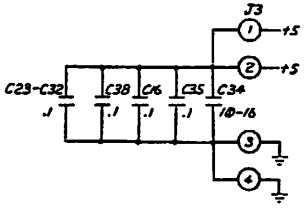

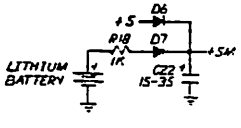

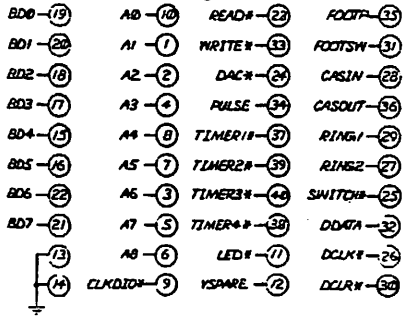

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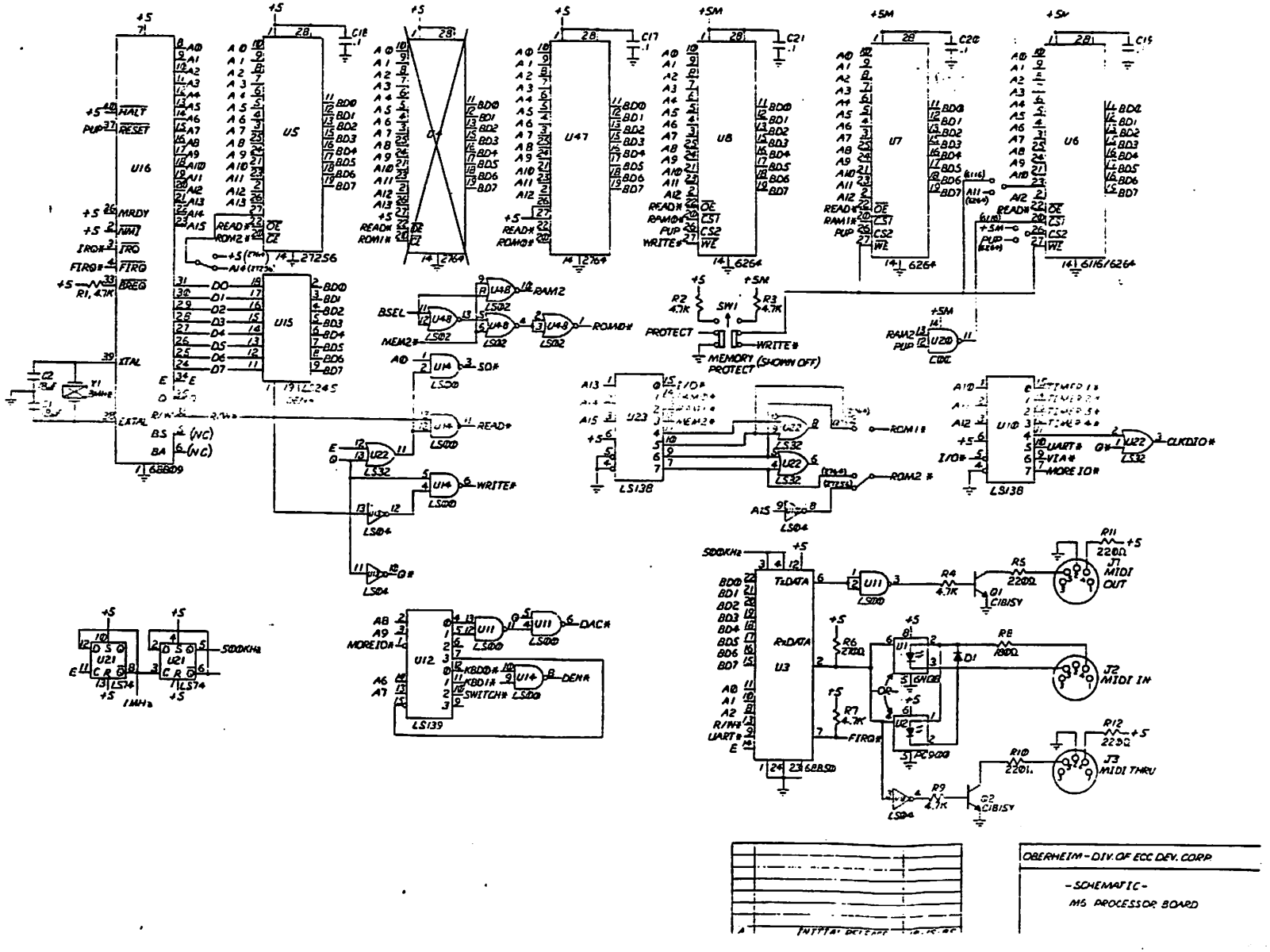

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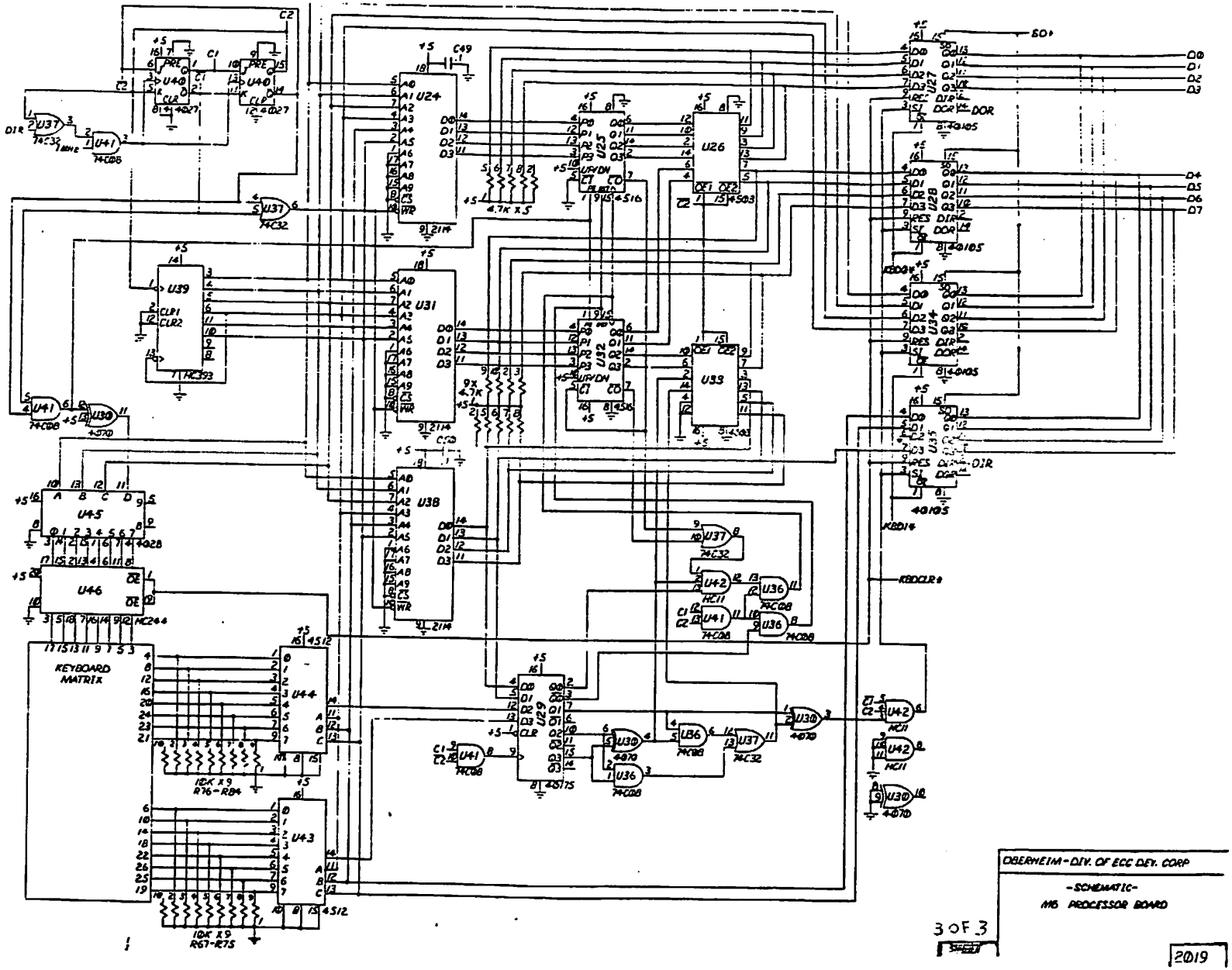

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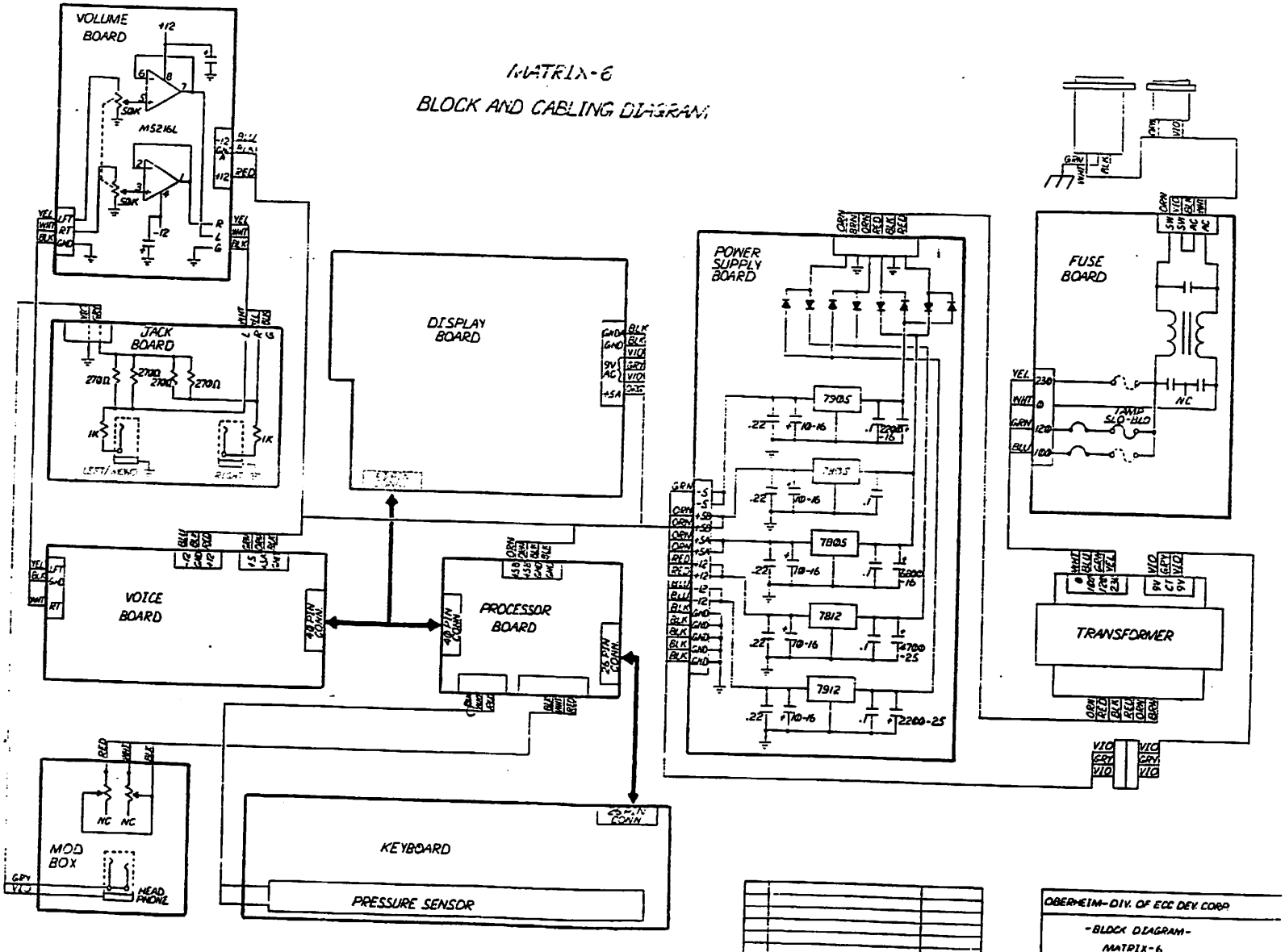
BLOCK AND CABLING DIAGRAM



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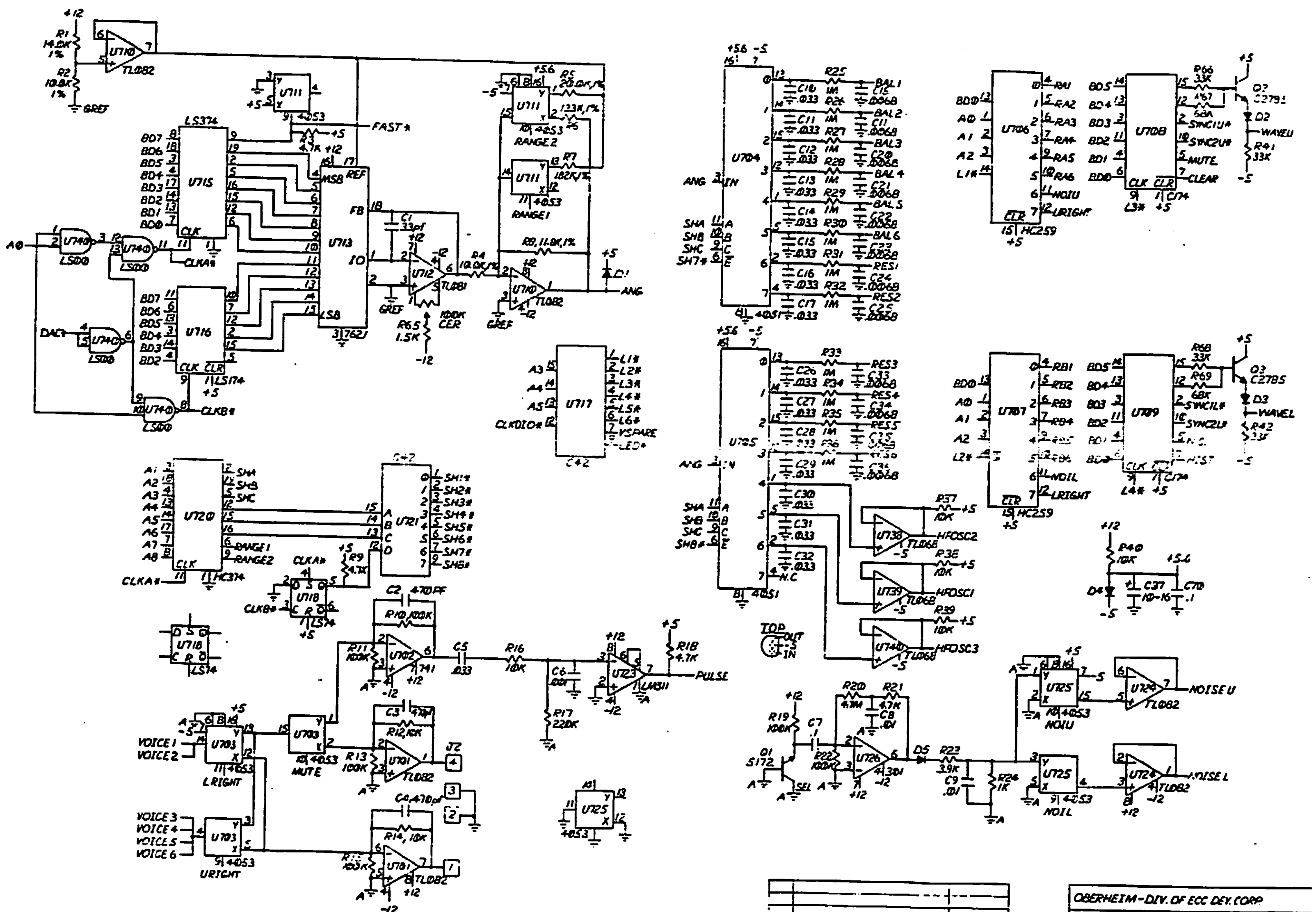

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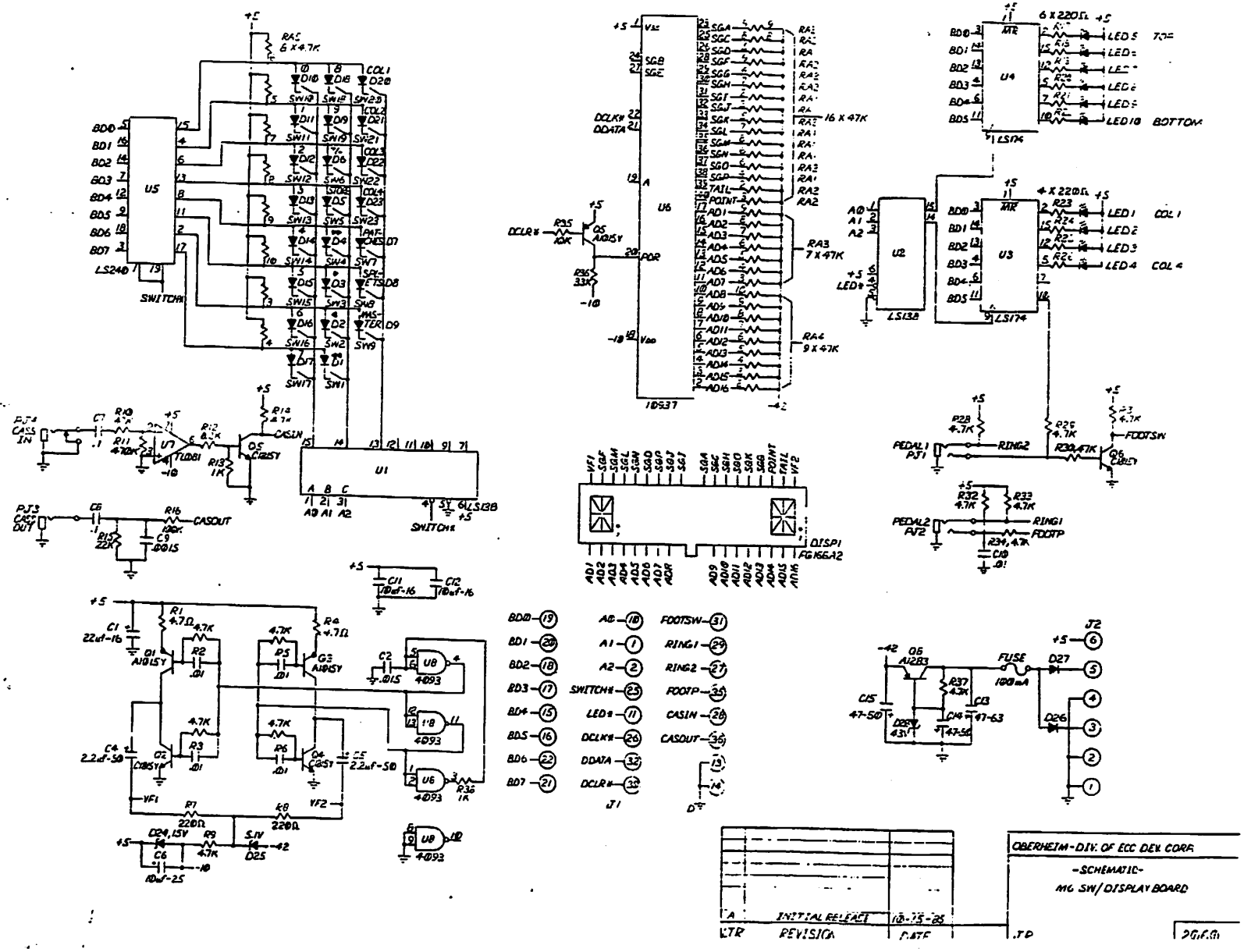
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