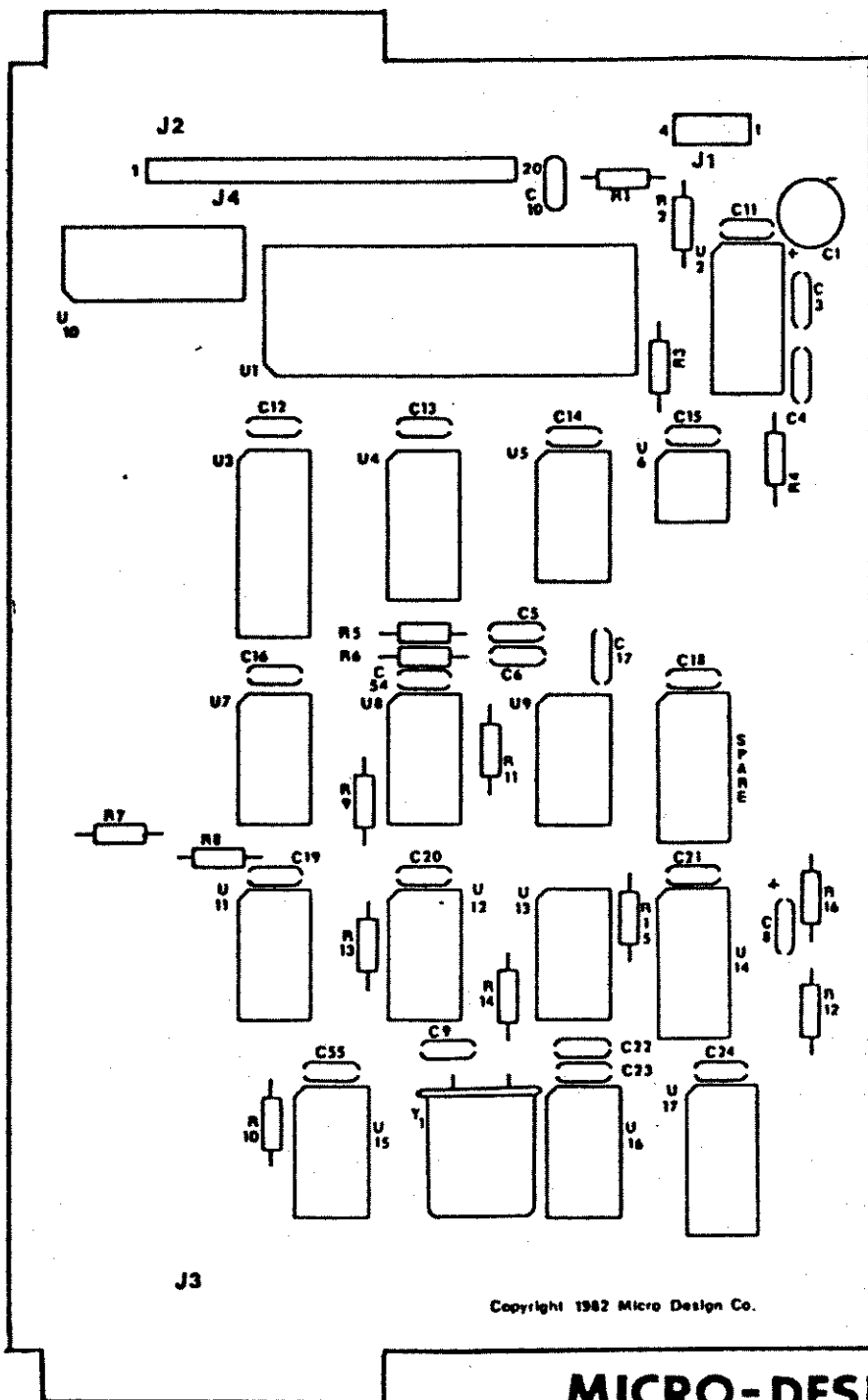


MDX-6 UPGRADE



MICRO-DESIGN
Austin, Texas

The MDX-6 Upgrade

1.0 System Installation

If the sequence described below is followed, system initialization will be quick and easy.

Read this section fully before attempting to install you MDX-6. Some of the components supplied with your MDX-6 Upgrade Kit are easily damaged if im- properly handled or installed. **WARRANTY DOES NOT COVER DAMAGE DUE TO IMPROPER HANDLING, USE OR INSTALLATION!** So please take a few minutes to read this section through to familiarize yourself with what you are about to do.

- A. *BEFORE BREAKING ANY TANDY INSTALLED FACTORY SEALS*, verify proper operation of the following items. No work should be attempted if any of the following items are not working.
- 1) Verify that the printer port works by listing a small program on your printer.
 - 2) Verify that "PRINT MEM" returns the correct amount of memory for your system.
 - 3) Verify that your RS-232 interface works.
 - 4) Proper operation of any user installed options should be verified.
 - 5) Always disconnect the 117 VAC before working on your Model III. Turning off the system is not enough as the switching power supplies still have one leg hot.
- B. Verify and identify that the following parts were shipped with your MDX-6 Upgrade:
- 1) 1 - MDX-6 Circuit Board
 - 2) 1 - Left-hand Drive Tower with power supply attached
 - 3) 1 - Right-hand Drive Tower

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- 4) 1 - 20 Pin Poly Cable (the flat pinkish one)
- 5) 1 - 8 Pin Poly Gore Cable (the other flat pinkish one, Model III only)
- 6) 1 - 34 Pin Drive Cable
- 7) Hardware Packet

C. Assure that you have the following tools before starting:

- 1) #1 Phillips Head Screwdriver
- 2) Standard Wirecutters
- 3) VOM Test Meter of equivalent.

***** CAUTION ***** Always be careful when working around electrical equipment. Electrical shocks can be hazardous and may also damage electrical components.

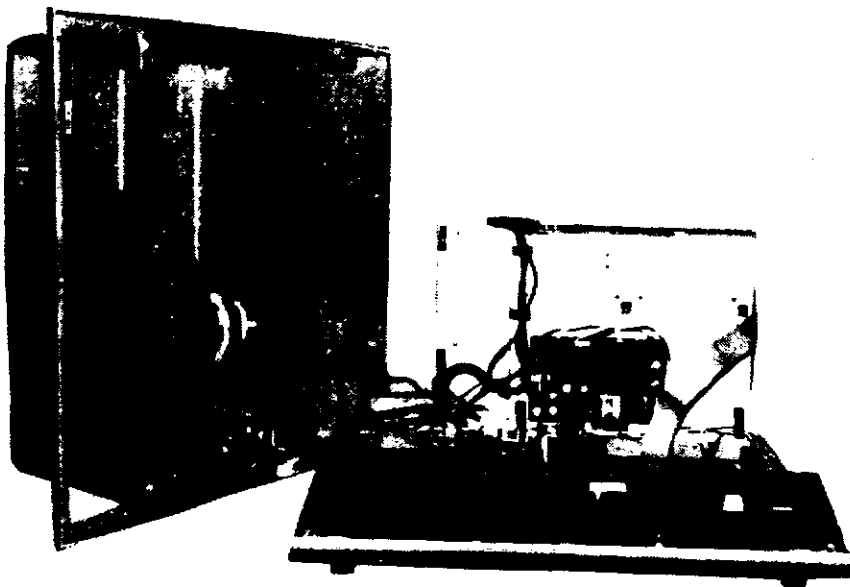
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1.1 Disassembly Procedures

Begin disassembly of your Model III by removing all cables connected to the bottom and rear of your computer. Position the computer on its rear panel with the CRT facing up. Now remove the 10 screws located around the bottom of the system. There are three different types of screws, so keep track of what screws you remove from where. It would be wise to label them and put them in a small container.

Reposition the computer upright again and remove the #6 screw and washer from the rear panel.

VERY CAREFULLY lift the top cover (CRT and all) up and away from the computer's base. BE VERY CAREFUL as the video monitor board is connected by cables to the main CPU board and power supply. Once the cover has cleared the CPU mounting frame, lay it on its side to the left of the computer with the CRT facing you. Carefully disconnect the ground cable and the edge card connector from the video monitor board. Set the top case and the CRT to the side where it won't get damaged.



Model III With Cover Removed
Fig. 1

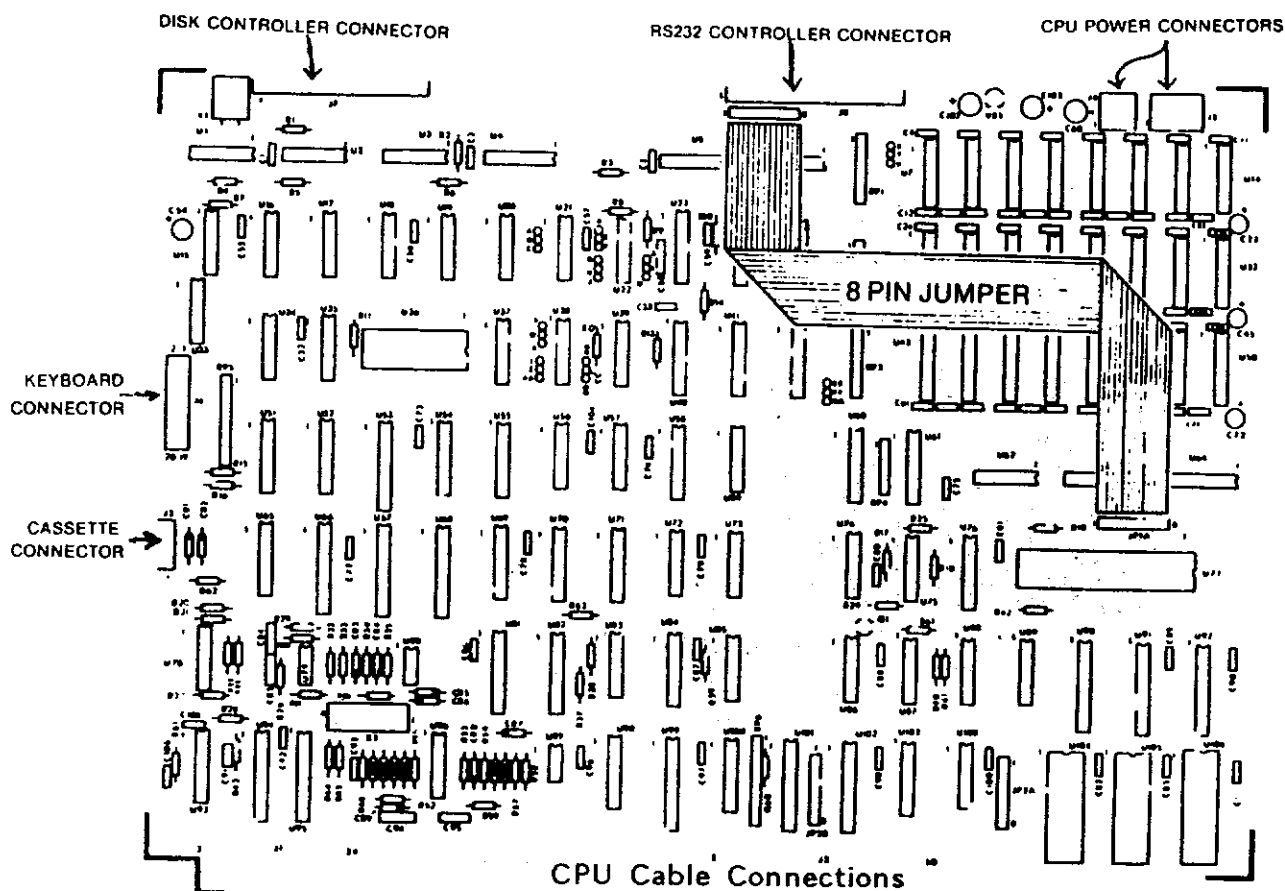
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1.2 CPU Board Removal

Turn the base of the computer around so that the CPU board is facing you and the keyboard is away from you. If your system has the EMI/RFI shield over the CPU, remove it.

Remove the following cables from the CPU board:

- a. Power Supply Connectors
- b. Cassette Cable
- c. RS-232 Connector
- d. Keyboard Cable
- e. Remove the small bracket located near the RS-232 connector. The bracket is held in by two screws and may have a ground strap attached to it.
- f. Disconnect the ground cable that runs between the left-hand side of the board to the left-hand side of the chassis.
- g. Remove the screws that hold the CPU board to its frame.



CPU Cable Connections
Fig. 2

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Remove the CPU board by pressing the small tabs on the plastic spacer mounts that protrude through the mounting holes in the printed circuit board while gently pulling the CPU board off. Some of the newer units have mounting screws throughout the system. If your computer has these, simply remove the screws to disengage your CPU board.

NOTE: When removing the CPU board, watch on the solder side of the board for flat plastic insulators where the 6/32 screws were used to mount the CPU board. These insulators are used to prevent grounding of the traces near the mounting holes in the CPU board. Make sure that you install these insulators in the same places when you are putting the system back together.

1.3 MDX-6 Installation

Remove the MDX-6 from its packaging. ***** NOTE ***** The integrated circuits used on the MDX-6 are static sensitive. Be very cautious and handle the board only by the edges.

If you plan on using 8" drives, you must first decide which drives will be 8" and which will be 5". Only Drive 3 and Drive 4 can be set up as 8" drives. To do this, simply cut through the trace(s) between B and C, (the board has been hardwired to 5" drives) and connect a jumper (or jumpers) between A and B, the 8" selects. This is all that is required.

Carefully install one end of the 20 pin cable into the MDX-6. This cable is very temperamental and does not give way to many attempts at inserting it. The other end will be inserted into the CPU board later. The MDX-6 may have the cable soldered into place. If so, skip this step.

Place the MDX-6 up against the spacers that are provided on the left hand side of the frame that holds the CPU board. Position the MDX-6 such that the 4 pin power cable is at the top. With the MDX-6 component side facing you, install the 4 mounting screws supplied.

****** NOTE ****** Some of the earlier Model III's used plastic standoffs to mount the drive controller board. If you have one of these systems, use the 1/4" standoffs provided to mount your MDX-6.

Now connect the disk drive cable to the MDX-6 connector at the top of the board (J2). There is a greater distance between the connector that goes to the MDX-6 and the connector that goes to the first disk drive. When connected properly, the ribbon cable will loop over the top of the MDX-6, thus positioning the drive connectors so that they will plug into the drives when they are mounted.

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1.4 Drive Bracket Mounting and Assembly

Mount the left and right hand brackets to the base plate using the 8/32 screws provided in your kit. The right hand bracket is the shorter of the two brackets and should be mounted on the right hand side of the computer when the keyboard is facing you. The left hand bracket has the power supply mounted on it. It is also about 2" higher than the right hand bracket. This works as a shield for RF interference. The dimpled holes should be facing in towards the drives.

Now connect the 117 VAC plug to the two-prong connector on the power supply (orientation is not critical). The 117 VAC line is located on the inside of your Model III and can be identified as two wires (one white and one black) that originate at the back of the computer where the AC line comes in. Follow these wires to the unused plug. If it is attached to the base of the computer, simply cut the tie-wrap that is holding it in place.

Install the 4 pin power connector that comes off the top of the MDX-6 to one of the open connections on the Aztec power supply that powers the CPU board (usually mounted on the back of the CPU chassis). *BE VERY CAREFUL AND DON'T GET IT BACKWARDS OR YOU WILL DESTROY YOUR MDX-6.* This connector is designed to only fit one way, but with a little effort, one can install it backwards. *BE CAREFUL.* We have marked one side of the connector with a "RED" or "BLACK" mark (the side that the wire comes out of). This side should be facing away from the PC board on the power supply.

1.5 Configuring the Disk Drives

Configuration of the Remex disk drives is easy. Simply place the jumper pin (a small green plastic connector) located on the PC board (mounted on the top of the drive) onto the appropriate pins to signify the drive number. If you are using only one drive, slip the jumper connector over the (DS1) pins. The other jumper on the board is for testing the drives and should not be tampered with.

If you are not using Remex Drives, consult the manual supplied with your drive.

When installing two drives in a system, remove the resistor pack located at Socket 10, near the interface connector (34 pin) on Drive 1, but leave the one in Drive 0. This resistor pack serves as a terminator for the signals coming from the MDX-6.

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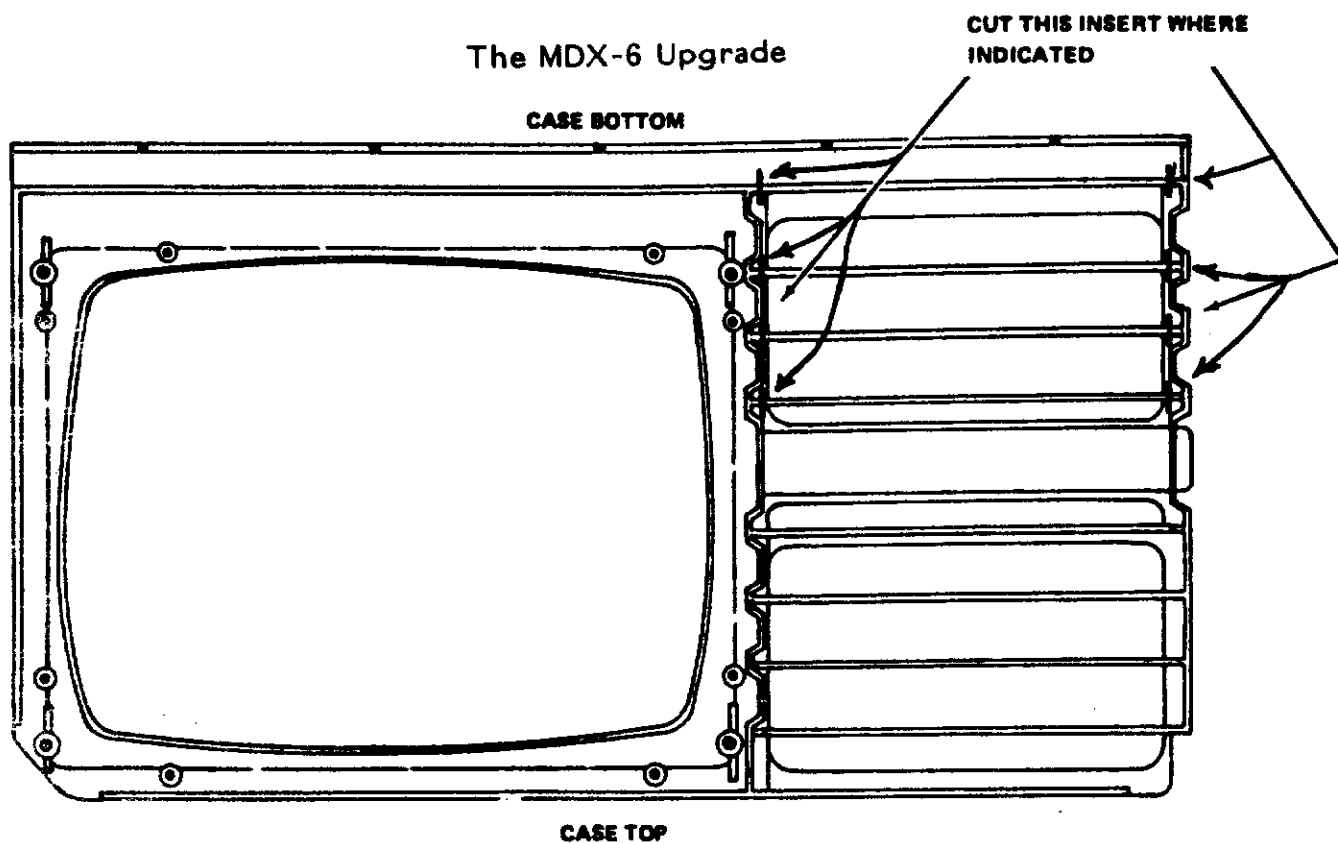
1.6 Model III Disk Drive Installation

After configuring the drives, you are ready to install them. The first disk drive (drive 0) should be mounted in the bottom position of your Model III. The second disk drive (drive 1) should go in the top position. Perform the following steps (in the noted order) for each drive to be installed in the Model III.

- a. Connect the power connector to the disk drive.
- b. Connect the 34 pin edge card connector from the MDX-6 to the disk drive. There should NOT be a twist in the connector. If there is, you will not have pin 1 of the MDX-6 connected to pin one of the drive.
- c. Connect one end of the ground cable (supplied) to the ground lug located on the back of the drive. The other end should be attached to the CPU chassis. A screw is provided for this on the top corner.
- d. Slide the drive into the brackets until you have lined up the mounting holes. Install a 6/32" screw (provided) into the front holes of the drive. Repeat for the rear holes.

Repeat steps a - d for the second drive.

The final step in the installation of the disk drives is to knock out the front panel plates molded into the Model III case (see Fig. 3). Using a heavy pair of wire cutters, cut out the tabs that hold the fake covers in place. Then use a heavy screwdriver to knock out the panels. The tabs are marked for you in Fig. 3.



Panel Cut-outs
Fig. 3

1.7 Model III Reassembly

Connect the other end of the 20 pin poly gore cable to the CPU board.
NOTE - The CPU board may have to be held at a slight angle close to the MDX-6 to have the best access in connecting this cable. Please be careful with this cable. It is fragile.

Remount the CPU board by placing it in its proper position against the back panel. Making sure that all of the insulation washers are back in their place, install the screws that hold in the CPU board.

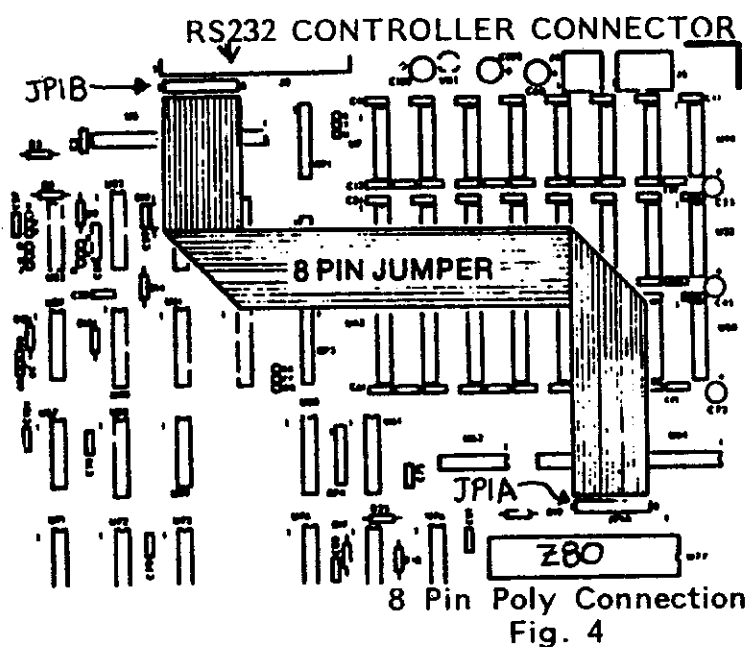
Reconnect the following cables. Be sure to connect the cables exactly as you disconnected them. Use Fig. 2 for assistance.

- a. Reconnect the power supply cables.
- b. Reconnect the cassette cable
- c. Reconnect the keyboard cable
- d. Reconnect any ground wires that you may have disconnected.
- e. Reconnect the bracket that is located near the RS232 connector.

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You will find an 8 pin poly gore connector with your kit (if you are installing in a Model 3). This connector is installed on the CPU board by simply plugging it into connectors JP1A (located by the Z80 I.C.) and JP1B (located by the RS-232 connector.) See Fig. 4 for details.

Reconnect the video monitor by reconnecting the ground wire and the card edge connector. Get it right! We have come too far to blow it now! Now, let's try your system.



1.8 Preliminary Checkout

IF YOUR SYSTEM DOES NOT PERFORM ACCORDING TO ANY OF THE FOLLOWING DESCRIPTIONS, IMMEDIATELY TURN OFF THE SYSTEM AND PROCEED TO THE TROUBLESHOOTING SECTION (Sec. 2.0). FAILURE TO DO SO MAY RESULT IN DAMAGE TO YOUR SYSTEM.

Without inserting a diskette into your system, plug in the Model III and turn on the system. The LED on Drive 0 should light up and the motor should spin for a few seconds, then go off. During this time, the screen may display "Diskette". Insert a copy of your DOS into Drive 0 and press the reset button. The LED should light, the motor spin, and after a few moments, your DOS prompt should appear.

Now, verify that the system is writing properly by making a backup of a diskette. Follow the instructions provided with your DOS for this procedure. If all of the preceding steps are successful, you are ready to assemble the Model III.

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CAREFULLY -- repeat -- **CAREFULLY** reinstall the Model III cover. The yoke on the back of the video monitor is going to want to hang up on the mass of wires in your computer. Be very careful with this yoke. It is extremely fragile and also very expensive! Verify that the cover is correctly seated on the base of the computer. If so, turn the computer over and install the screws.

Congratulations! You've done it!! If you have gotten to this point, you are done. Enjoy your new MDX-6 system.!!!

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2.0 Troubleshooting

All of the assemblies used in the Model III drive controller kits from Micro Design are tested on a Model III prior to shipping. However, during the process of installing your controller, or even during shipping, the assemblies may be electrically or mechanically damaged. For this reason we have compiled a troubleshooting section.

You will need a voltmeter and a general knowledge of how to use a voltmeter to make voltage measurements and continuity measurements. If these are not available, CALL MICRO-DESIGN.

***** NOTE ***** Be very careful when checking voltages not to short a hot point (+5, +12, or 117 VAC) to ground. It is suggested that you use the CPU chassis as a ground point. When verifying continuity of connectors, cables, etc., be sure at least one end is disconnected to avoid possible damage to sensitive devices.

SYSTEM DISPLAYS "CASS" WHEN POWERED UP OR ON RESET

- o Verify that the MDX-6 has 5 volts at J1 pin 1 and +12 volts at J1 pin 3.
- o Verify that all of the power cables are connected correctly. Specifically check the power connectors that go from the power supply to the drives. Check the +5 and +12 volts at the disk drives. If there is no voltage at the disk drives, check the 117 VAC that is connected to the disk drive power supply. If 117 VAC exists, the power supply is probably defective. The supply should be returned for replacement.
- o If only one of the voltages is missing, you may have a bad cable. Using the voltmeter, check the continuity of the power cables. **DON'T FORGET TO: 1. POWER DOWN THE SYSTEM. 2. AND UNPLUG THE 117 VAC AT THE WALL. 3. DISCONNECT THE CABLES AT ONE END.**
- o Using a voltmeter, verify the continuity of the 20 pin polygore cable that runs between the MDX-6 and the CPU board. Do the same for the 8 pin polygore cable and the disk drive cable.

DRIVE 0 LED AND MOTOR STAY ON CONTINUOUSLY

- o Verify again that each drive is configured correctly.

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- o Review and perform the step outlined above for SYSTEM DISPLAYS "CASS" WHEN POWERED UP OR ON RESET.

BOTH DRIVE LEDS COME ON

- o Verify Drive 1 configuration. It should be set up as a "DS2" drive.

SYSTEM WILL NOT BOOT UP OR LOAD A FILE

- o Verify that you DOS is a good copy. This will require a friend's TRS-80. A lot of problems can be caused by flaky software. USE A GOOD DOS!!!
- o With the power off, very carefully push the disk drive head towards the center of the drive. The reason that we suggest this step is due to the fact that the disk drive head can be jogged beyond the track 0 position during shipping; therefore, when the MDX-6 issues the signal telling the drive to go track 0 and read the boot, the drive head will already be past track 0 and will not be able to read data from track 0.

SYSTEM WILL NOT WRITE ON OR BACKUP A DISKETTE

- o Exchange Drive 0 with Drive 1 (if applicable) and retry the backup procedure. If you succeed in performing the backup, then the drive is probably at fault. Return it for exchange.
- o Be sure that you are using a diskette that is rated for double-density operation.

ATTEMPTS TO READ OR WRITE RESULT IN CRC, GAT OR HIT ERRORS

- o Exchange Drive 0 with Drive 1 and attempt a single drive backup. If the problem disappears, then the problem is the disk drive. Return the drive for repair or replacement.
- o Be sure that you have attached all required ground cables as discussed in the assembly instructions. The Model III is very temperamental to ground loops and RF interference.

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If you are unsuccessful in getting you system up as described, the problem may be in either one of the sub-assemblies supplied with the kit, or it could be in your Model III CPU board.

The next step is to contact a service center for more assistance. They will attempt to troubleshoot the problem over the phone. If this is unsuccessful, you should return it to the place of purchase for repair or replacement.

If you have any questions or problems with any dealer or service center, please call us at Micro-Design.

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3.0 Returning A Kit For Repair

You have done everything you know how to do. You've read and re-read your DOS operating manual, MDX-6 manual and still the %\$' thing won't work. Don't despair -- call us (or a service center), and let us help you BEFORE you throw it out of the window. There are a few things that you can do to help us before you call or return a kit.

1. Write or call before sending us anything. If you are calling please have all information about your problem ready.
2. If you are returning the unit, be sure to call first and get a return authorization number (RAN). The RAN is used in-house to help us track your unit. RETURNS WITHOUT THE RAN WRITTEN ON THE OUTSIDE OF THE BOX WILL NOT BE ACCEPTED.
3. Out of warranty repairs are billed at a rate of \$36.00 an hour not including parts and shipping. Do NOT enclose payment. Your unit will be shipped COD for repairs and shipping.
4. If your kit is in warranty, it must be shipped to us pre-paid. We will pay return shipping. If after looking at your unit, it is determined that the kit was not defective or that the equipment that it was installed in caused the malfunction (this includes hooking it up wrong), then you will be billed at the regular rate.

Authorized Micro-Design service centers (Non-warranty):

Progressive Electronics
643 East Chestnut
Lancaster, Ohio 43130
(614) 687-1019

Recycled Computers
5906 South Loop 1610 East
Houston, Texas 77033
(713) 733-6277

Micro-Design Products

Limited Warranty

For a period of 90 days from the date of delivery, Micro-Design warrants to the original purchaser that the computer or hardware unit shall be free from manufacturing defects. This warranty is only applicable to the original purchaser who purchased the unit from Micro-Design or a duly authorized dealer. The warranty is voided if the unit is sold or transferred by the purchaser to a third party. This warranty shall be void if the unit's case or cabinet (computers only) is opened. This warranty is voided if the unit has been subjected to improper or abnormal use, or if the unit is altered or modified. If a defect occurs during the warranty period, the unit must be returned to Micro-Design, the authorized dealer from which it was purchased or an authorized service center utilizing the procedures outlined in the product manual for returning merchandise. A copy of the original invoice is required. Purchaser's sole and exclusive remedy in the event of defect is limited to the correction of the defect by adjustment, repair, replacement or complete refund* at Micro-Design's election and sole expense. Micro-Design shall have no obligation to repair or replace expendable items.

Any statements made by Micro-Design or its' employees, including but not limited to statements regarding capacity, suitability for use or performance of the unit, shall not be deemed a warranty or representation by Micro-Design for any purpose, nor give rise to any liability or obligation of Micro-Design.

Except as specifically provided in this warranty or in the Micro-Design Computer sales agreement, there are no other warranties, express or implied, including, but not limited to, any implied warranties of merchantability or fitness for a particular purpose. In no event shall Micro-Design be liable for loss of profit or benefits, indirect, special, consequential or other similar damages arising out of any breach of this warranty or otherwise.

* The refund option shall apply to the first fifteen (15) days after receipt of the product. For the remainder of the warranty period, Micro-Design shall resort to the options of adjustment, replacement or repair to fulfill its warranty obligations.