MATRIX

Installation and Service Guide

SPECTRUM CORPORATION

8D01

MATRIX WALL MOUNTING

Wall Mounting Notes

WARNING

Do not use MATRIX displays outdoors. Outdoor use can result in personal injury, death, and product damage.

1. MATRIX displays are for indoor use only. Using an MATRIX display outdoors will damage the display and can pose a shock or fire hazard. SPECTRUM manufactures electronic displays intended for outdoor use—contact SPECTRUM for more details.

WARNING

Only mount MATRIX displays on walls capable of supporting 1250 lbs. (567 Kg.) Personal injury and damage to the display can occur if display is mounted incorrectly.

2. Mount the MATRIX display on a sturdy wall. SPECTRUM highly recommends using a masonry wall. The wall bracket must be attached to a wall capable of supporting 1250 lbs. (567 Kg.)

3. Optional Wall mounting kits are **not** provided with MATRIX displays but can be ordered from SPECTRUM at an additional cost. There is a wall mounting kit available for each type of MATRIX display. Contact SPECTRUM to determine the correct kit to use with a MATRIX board.

4. The wall mounting kits sold by SPECTRUM do **not** include fasteners for attaching the wall bracket to the wall. The exact type of fastener which should be used will vary, depending upon the type of wall the display is being attached to (concrete, brick, dry-wall, etc.)

5. The fasteners used to attach the wall bracket to the wall **must** be capable of supporting 1250 lbs. (567 Kg.) each.

Wall Mounting Instructions

Parts Required

wall mounting kit P/N: M2-BKMATRIX containing:
- eight (8) ¼ - 20 x 1.25" (31.8 mm.) long, hex head, stainless steel bolts
- eight (8) ¼" split washers
- two (2) corner brackets
- one (1) wall mounting bracket
- one (1) instruction sheet

fasteners (available at hardware and building supply stores)

Tools Required

one (1) 7/16 socket - ⅜ drive wrench
one (1) #3 phillips head screw driver
drill
drill bit(s)
safety glasses/goggles

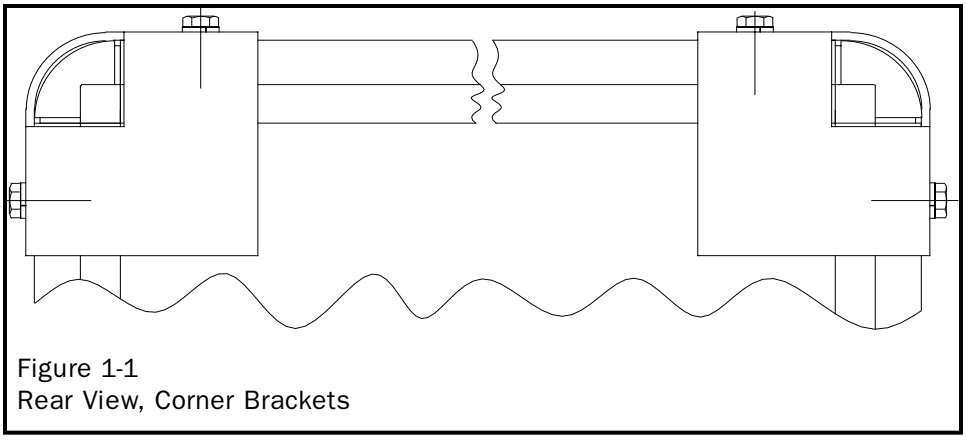


Figure 1-1
Rear View, Corner Brackets

1. Check the wall mounting kit to ensure it contains all parts.

Instructions continue on next page →

2. Using a #3 phillips head screw driver, remove the flat head screws at “B” and “C” on one of the top corners of the display. Remove both the top and side screws (see figures 1-4 and 1-5.)

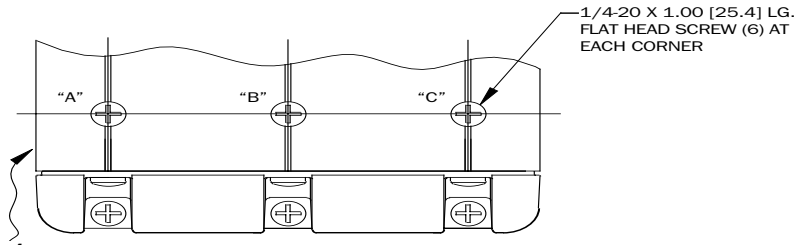


Figure 1-4.
Top View Before Bracket Assembly.

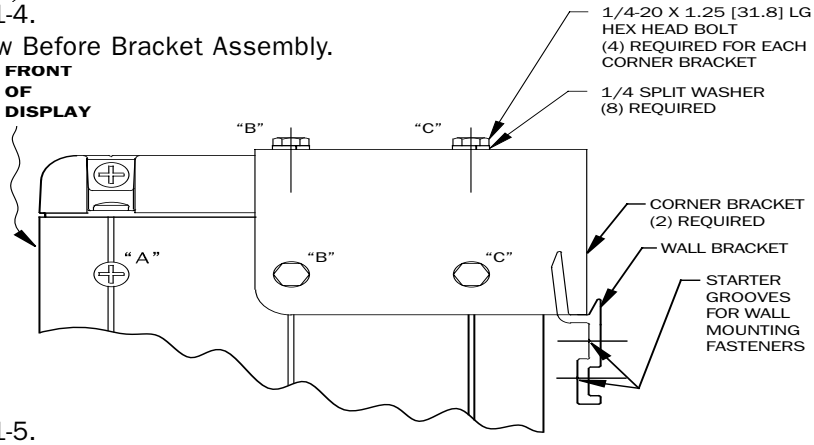


Figure 1-5.
Side View After Bracket Assembly.

3. Align the corner bracket clearance holes with the empty holes at “B” and “C.”

4. While holding the ¼ washers on the ¼ - 20 bolts, thread the bolts through the corner bracket holes into the empty holes at “B” and “C” on the display.

5. Using a 7⁄16 socket and ⅜ drive wrench, tighten all four (4) bolts to 50-60 lbs. (5.7-6.8 Nm.)

6. Repeat steps 2-5 on the other top corner of the display.

7. Following the fastener manufacturer's recommendations, select locations to drill a minimum of six (6) holes into the wall bracket.

   Note that the wall bracket has starter grooves—the holes should be drilled so they are staggered along these grooves (see figure 1-5.) The location of the holes will be dictated by the secure locations in the wall. A minimum of six (6) fasteners must be used to attach the wall bracket to the wall.

CAUTION

Always wear eye protection when drilling. Personal injury can result if eye protection is not used.

8. Put on eye protection, follow the drill manufacturer's instructions, and drill holes into the locations selected in step 7.

WARNING

Display can be damaged or cause personal injury if dropped. Use a safe lifting technique to insure that the display is not dropped.

9. Attach the wall bracket (pointed ends facing up) to the wall. Tighten the fasteners to within the range specified by the fastener manufacturer.

10. Carefully lift the display high enough so that the corner brackets are about 1” (25.4 mm.) above the wall bracket. Make sure that the wall bracket does not extend beyond the ends of the display.

11. Slowly lower the display down onto the wall bracket until the corner brackets rest on the wall bracket.

MATRIX OVERHEAD MOUNTING

Overhead Suspension Mounting Notes

1. MATRIX displays are for indoor use only. Using MATRIX displays outdoors will damage the displays and can pose a shock or fire hazard. SPECTRUM manufactures electronic displays intended for outdoor use—contact SPECTRUM details.

2. MATRIX displays come with the following parts to allow for overhead suspension mounting

   four (4) ¼ - 20 x 2.50" (63.5 mm.) long, stainless steel eyebolts
   four (4) ¼ - 20 hex stop nuts
   four (4) 1.00" (25.4 mm.) O.D. fender washers
   one (1) instruction sheet

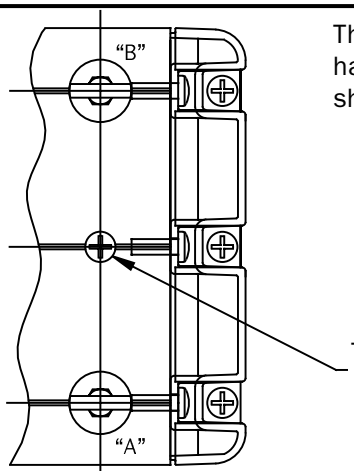
3. MATRIX displays do **not** come with chains or quick links, which can be purchased at hardware and building supply stores. Four (4) chains and four (4) locking quick links are required.

WARNING

Make sure the chains and quick links meet the specifications listed on the next page. Damage to the display and personal injury can occur if incorrect equipment is used.

WARNING

Only suspend an MATRIX display from a structure capable of supporting 1250 lbs. (567 Kg.) Personal injury and damage to the display can occur if the display is installed incorrectly.



The flat head screws at locations "A" and "B" have been removed and the eyebolts are shown installed.

The center screw should not be removed.

Figure 1-6.
Top View of MATRIX Display.

4. Each chain must be capable of supporting 800 lbs. (363 Kg.)

5. The chains and the eyebolts must be linked together with 0.25" (6.4 mm.) diameter locking quick links having a working load limit of no less than 1,250 lbs. (567 Kg.)

6. The quick links must have a working load limit which is equal to or greater than the working load limit of the chain.

7. The structure that the MATRIX display is attached to must be capable of supporting a minimum of 1,250 lbs. (567 Kg.)

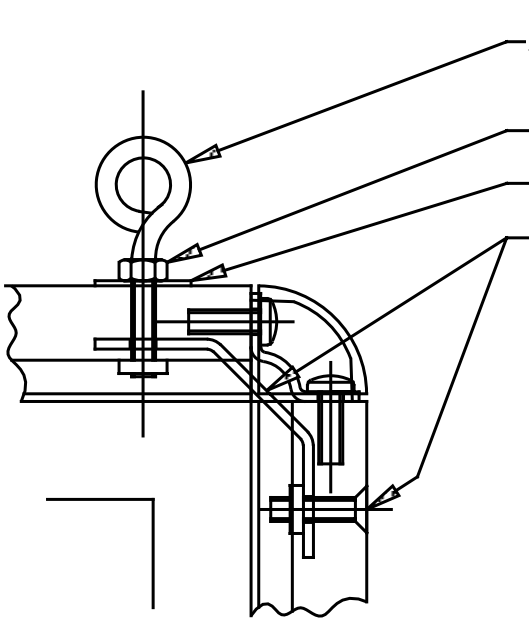


Figure 1-7.
Side View, MATRIX Display.

8. There must be a minimum of 1" (25.4 mm.) clearance on the top and the bottom of the MATRIX display to allow for adequate ventilation. Without adequate ventilation, the MATRIX can malfunction and become damaged.

Overhead Suspension Mounting Instructions

Parts Required

included with MATRIX displays

four (4) ¼ - 20 x 2.50" (63.5 mm.) long, stainless steel eyebolts
four (4) ¼ - 20 hex stop nuts
four (4) 1.00 " (25.4 mm.) O.D. fender washers
one (1) instruction sheet

available at hardware and building supply stores

four (4) chains
four (4) locking quick links

Tools Required

one (1) #3 phillips head screw driver
an adjustable wrench

1. Check the parts bag to ensure all parts are there.

2. Remove the flat head screws from holes "A" and "B" on the top, **right** side of the MATRIX display (see figure 1-6.)

3. Thread the stop nut onto the eyebolt, up to the end of the eyebolt thread. Make sure no threads are showing above the stop nuts.

4. While holding the fender washer under the stop nut, thread the eyebolt into empty holes "A" and "B" until snug (see figure 1-4.)

5. Wrench-tighten the stop nut down onto the fender washer.

6. Check to insure that the no threads are showing above the stop nuts (see figure 1-7.) If threads are visible, remove the stop nuts and fender washer from holes "A" and "B" and repeat steps 1-6.

7. Remove the flat head screws from holes "A" and "B" on the top, **left** side of the MATRIX display (see figure 1-4.)

8. Repeat instructions 3-6.

REPLACING THE EPROM CHIP

Required Tools/Equipment

The following items are needed to install the EPROM chip upgrade

- EPROM chip upgrade
- Phillips head screwdriver
- Small flat head screwdriver
- Safety glasses/goggles
- Needle nose pliers
- Anti-static protection device, such as a wrist or heel strap

DANGER

Hazardous voltage. Contact with high voltage will cause death or severe personal injury. Always disconnect power to display prior to servicing and installing or removing components.

Removing the Existing EPROM Chip

1. Make sure that you are properly grounded—use an anti–static protection device such as a grounding wrist or heel strap.

2. Locate component U51 on the controller board (slot U51 is marked with an X in figure 1-13.)

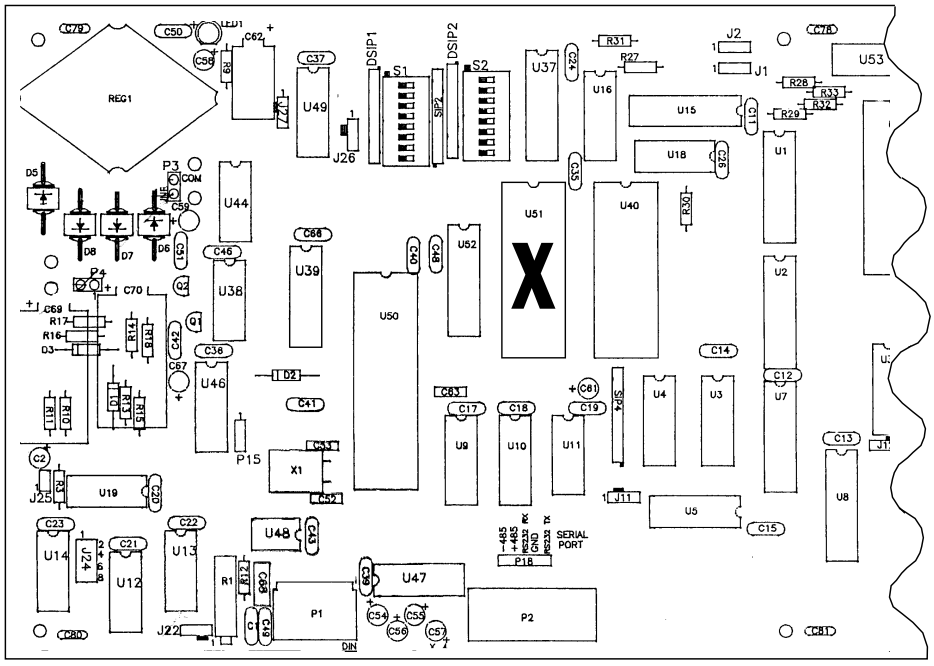


Figure 1-13.
Controller Board.

3. Place a small screwdriver under the bottom of the chip and slowly move towards the top of the chip until the entire chip is away from the socket. Then lift the chip up and out of the socket (see figure 1-14.)

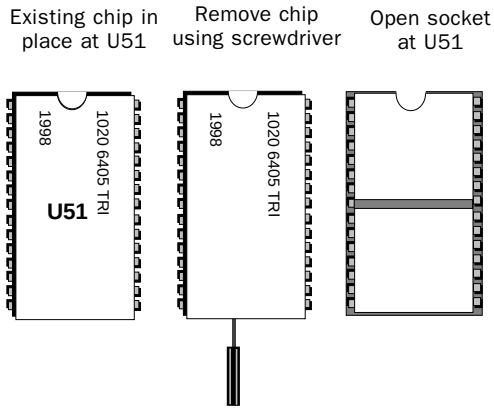


Figure 1-14.
Removing the U51 Chip.

Replacing the EPROM Chip

1. With the chip label facing up, align the notches at the top of the socket with the EPROM chip (see figure 1-15.)

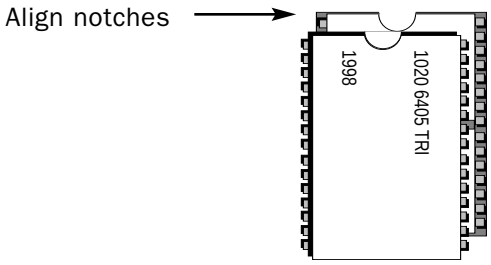


Figure 1-15.
Aligning the Notches of the EPROM Chip.

2. Carefully align the pins on the right side of the chip with the corresponding sockets at slot U51, right side.

3. With the notches and right side aligned, gently push the pins on the left side in towards the chip. Make sure all the pins are aligned on both sides.

4. Gently push the chip in towards the controller board until it is seated in the socket. Make sure the pins do not bend under or away from the chip when pushing in.

REPLACING THE MICRO-CONTROLLER BOARD

Tools Required

Phillips head screwdriver
flat–head screwdriver
anti–static protection device, such as a grounding wrist or heel strap

Ordering Replacement Controller Boards From SPECTRUM

Replacement controller boards can be ordered from SPECTRUM with or without EPROM chips. If the EPROM chip in the defective board is out-of-date (not the most current chip), it may be convenient to order a new controller board which has the newest EPROM chip already installed.

If a controller board is ordered without a new EPROM chip, the existing EPROM chip must first be removed from the defective controller board and installed on the new controller board. Please remember, however, that it is possible for the EPROM chip to be the defective part.

DANGER

Hazardous voltage. Contact with high voltage will cause death or severe personal injury. Always disconnect power to display prior to servicing and installing or removing components.

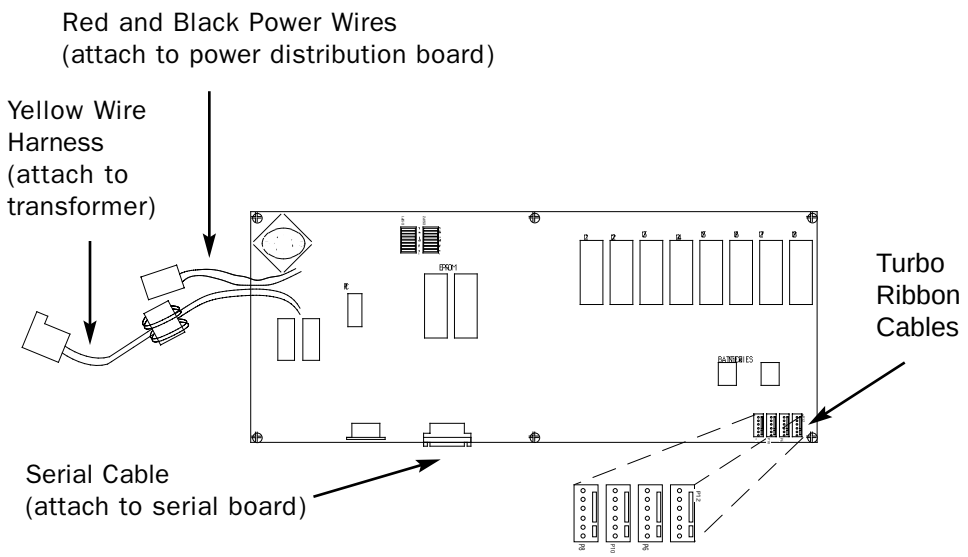


Figure 1-16.
Connections to the Micro-Controller Board.

Removing the Controller Board

1. Make sure that you are properly grounded—use an anti–static protection device such as a grounding wrist or heel strap.

2. Remove the turbo ribbon cable(s) from the controller board. The turbo ribbon cable will be attached to the controller board at location P12. Large displays will have two turbo ribbon cables—one at location P12 and one at location P10. When removing two turbo ribbon cables, mark the cables so they can be easily identified and put back into their original locations. If the cables are not installed into the proper location on the controller board, messages and graphics may be displayed erratically—messages intended for the top may be displayed on the bottom, for instance.

3. Disconnect the serial cable from the controller board. Use a small flat head screwdriver to remove the two small screws that hold the serial cable to the controller board.

4. Unplug the red and black power wires that connect the controller board to the power distribution board. The red and black power wires may be connected with plastic connectors or held together with wirenuts.

4. Disconnect the yellow wire harness that connects the controller board to the transformer. The yellow wires may be connected with plastic connectors or held together with wirenuts.

5. If the Piezo tone device is installed, disconnect it from location P15 on the controller board.

6. Remove the six screws that secure the controller board to the rails.

7. Remove the Eprom chip from the controller board (see *Installing the Eprom Chip* for more information.)

8. Set the controller board aside.

Installing New Controller Board

1. If needed, install the Eprom chip from the defective controller board into the new controller board.

2. If necessary, connect the Piezo tone device to location P15 on the controller board.

3. Attach the new controller board to the rails using the six phillips head screws.

4. Attach the yellow wire harness that connects the controller board to the the transformer.

5. Attach the red and black wires that connect the controller board to the power distribution board.

6. Attach the serial cable to the controller board.

7. Attach the turbo ribbon cables to the controller board.

Test Unit

1. Reconnect power to the display.

2. Send a test message to insure that the unit is operating properly.

REPLACING DISPLAY CUBES

Sequential Order of Display Cubes

At SPECTRUM, the LED display cubes are installed into the driver boards in a special sequence, insuring that all of the LED cubes in an area of the display will emit light at approximately the same intensity. Once display cubes have been removed from the driver board, they need to be re-installed into their original locations on the driver board so that this special sequence is maintained.

When removing LED display cubes, make sure to remove them in an organized manner so they can be put back in their proper sequence. For instance, start with the first cube on the left side of the top row of the driver board, remove it, then remove the next cube to the right. When all of the cubes on the top row have been removed, go on to the next row of cubes and remove them, working from left to right.

Removing Display Cubes

DANGER

Hazardous voltage. Contact with high voltage will cause death or severe personal injury. Always disconnect power to display prior to servicing and installing or removing components.

1. Before removing any cubes, the front lens needs to be removed. See *Case Assembly and Disassembly.*

2. To remove a display cube, firmly grab the cube and pull it out (away from the MATRIX display), wiggling the cube back and forth while pulling.

Note: To remove defective display cubes which are not along the edge of the display, it may be necessary to remove some functioning display cubes in order to obtain a firm grip on the defective display cube.

3. Remember the locations of all display cubes removed from the MATRIX display. All display cubes should be put back into their original locations. Also remember the locations of defective display cubes - when SPECTRUM sends out replacement display cubes, we will indicate which defective display cubes the new display cubes are replacing.

Calling SPECTRUM to Order New Display Cubes

Before calling SPECTRUM to request replacement display cubes, remove the defective display cubes from the MATRIX display. Find the numbers located on the back of these display cubes and give these numbers to your SPECTRUM representative when calling.

Inserting Display Cubes into Driver Board

Character Matrix Displays
There are two rows of header pins on LED display cubes for character matrix displays—one row of eight (8) pins and one row of nine (9) pins. Make sure to insert the row with 8 pins into the row of 8 holes on the display socket and the row with 9 pins into the row of 9 holes on the display socket. (see figure 1-17.)

Full Matrix Displays
Insert the header pins on the display cube into the display socket. Make sure that the display cube's tabs are on the left and the display cube's notches are on the right (see figure 1-18.)

Final Assembly and Testing

1. Replace the front polycarbonate lens (see *Case Assembly and Disassembly.)*

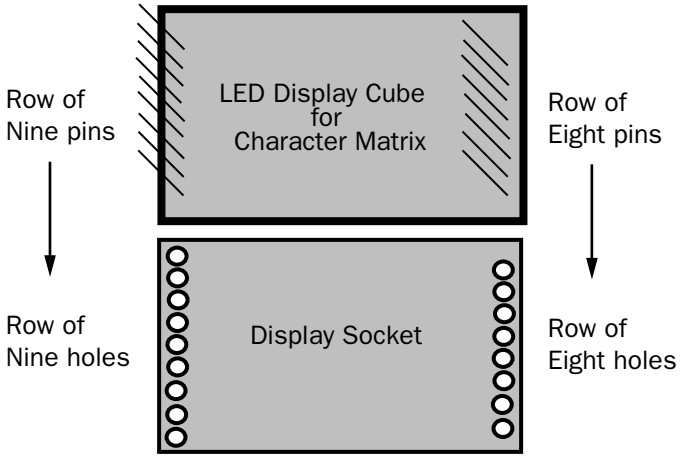


Figure 1-17.
Inserting Character Matrix Display Cubes.

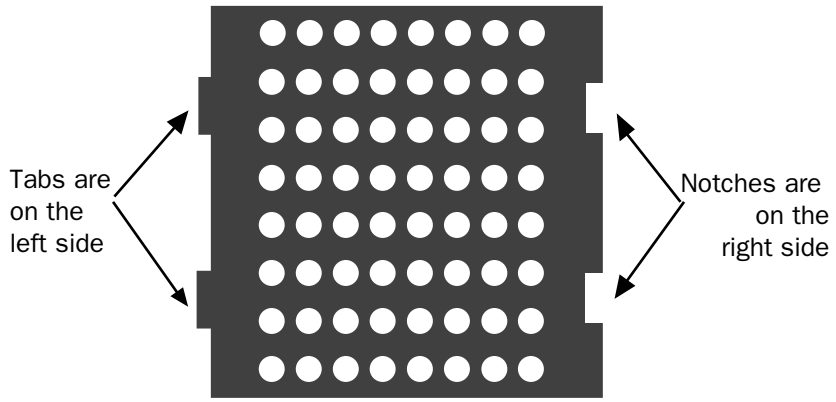


Figure 1-18.
Inserting Full Matrix Display Cubes.

REPLACING FANS

Tools Required

1 Phillips head screwdriver
1 flat head screwdriver

Calling SPECTRUM to Order Replacement Fans

There are two different types of fans on MATRIX displays—old models use 3" fans while new models use 3.6" fans. To make sure you receive the correct replacement fan, give the model number of the MATRIX display requiring a replacement fan to your SPECTRUM representative when calling.

How Fans are Connected

All MATRIX displays have at least one fan, while large displays will have several fans. The fan closest to the power supply will always be connected directly to the terminal block and to the thermostat. There are power wires attached directly (soldered) to the 3" fans. The 3.6" fans have no wires attached to them; instead, they are connected via a two-prong terminal and cords (see figure 1-21.)

DANGER

Hazardous voltage. Contact with high voltage will cause death or severe personal injury. Always disconnect power to display prior to servicing and installing or removing components.

Removing 3" Fans

1. Remove the wire nuts from the power wires connected to the defective fan and, if necessary, separate the wires (see figure 1-19.)

2. Remove the nuts which hold the fan to the top of the case (see figure 1-20.) Do not remove the screws.

3. Remove the defective fan from the case and set aside.

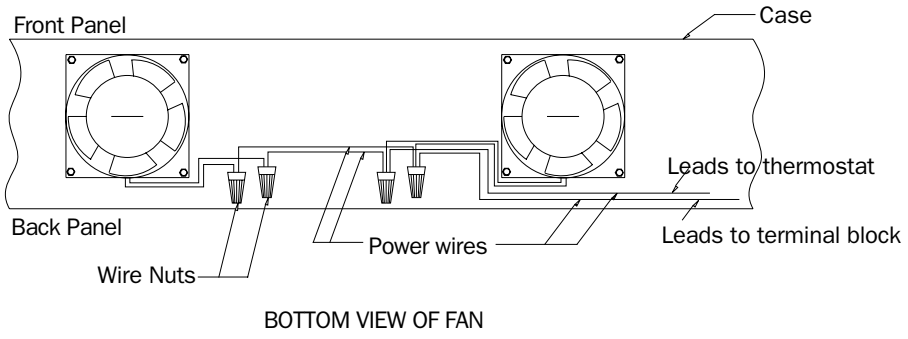


Figure 1-19.
Power Wires on 3" Fans.

Installing Replacement 3" Fans

1. Make sure that you are properly grounded—use an anti–static protection device such as a grounding wrist or heel strap.

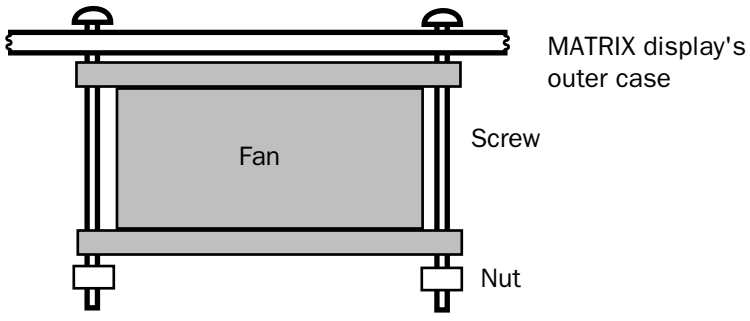


Figure 1-20.
Removing 3" fans from MATRIX displays.

Installing Replacement 3" Fans

1. Make sure that you are properly grounded—use an anti–static protection device such as a grounding wrist or heel strap.

2. Attach the replacement fan to the case. Insert the fan under the screws, insert the nuts onto the screws, and tighten the nuts until the fan is secure (see figure 1-20.)

3. Connect the power wires to the replacement fan. Place wire nuts on the wires that need to be connected and turn the wire nuts until they are secure.

Removing 3.6" Fans

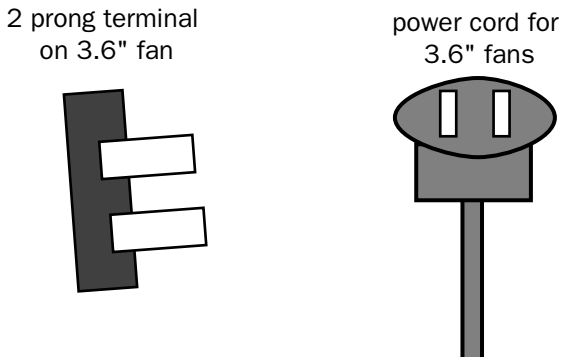


Figure 1-21.
Power Cord and Terminal for 3.6" Fans.

1. Make sure that you are properly grounded—use an anti–static protection device such as a grounding wrist or heel strap.

2. Remove the nuts that hold the fan to the top of the case (see figure 1-20.)

3. Hold the fan with one hand and use the other hand to unplug the power cord from the two-prong terminal on the fan.

4. Remove the defective fan from the case and set aside.

Installing Replacement 3.6" Fans

1. Make sure that you are properly grounded—use an anti–static protection device such as a grounding wrist or heel strap.

2. Plug the power cord into the two-prong terminal on the replacement fan.

3. Attach the replacement fan to the case. Insert the fan under the screws, insert nuts onto the screws, and tighten the nuts until the fan is secure (see figure 1-20.)

Warranty

Spectrum Corporation, Inc. warrants to the original purchaser that the Spectrum Electronic Message Center will be free of defects in workmanship and materials for a period of one year from the date of purchase.

Spectrum Corporation, Inc. will without charge, repair or replace, at its option, defective product or component parts upon delivery to the factory service department accompanied by proof of the date of purchase in the form of a sales receipt. The original purchaser will pay the freight/postage charges to the factory.

This warranty does not apply in the event of any misuse or abuse of the product, or as a result of any unauthorized repairs or alterations.

Local ordinances prohibiting the use of flashing signs may exist in some locations. Compliance with local ordinances is the sole responsibility of the customer.

Should your Spectrum Electronic Message Center need servicing, return it to Spectrum Corporation, Inc. Please call to receive a return merchandise authorization number before sending your unit back for servicing. Shipments will not be accepted without a Return Merchandise Authorization Number.

All wallboards and converter boxes should be installed on electrical power that is filtered through a ups (uninterrupted power supply) or surge protector. Warranty claims will be voided if electrical power is not filtered.

How to obtain warranty service

1. Contact Spectrum Corporation, Inc. at 713-944-6200. Ask for the Message Center Service Department.
2. Ask for a Return Merchandise Authorization (RMA) number. An RMA number is required to obtain warranty service.
3. Fill out the Return Merchandise Authorization (RMA) Form on the following page. To obtain warranty service, this form including the RMA number must accompany the product.
4. Follow return instructions on the RMA form to return to Spectrum Corporation, Inc.

Return Merchandise Authorization (RMA) form

RMA Number:_____

Date of Purchase:_____

Company Name: _____

Contact Person: _____

Address: _____

_____

Phone Number: _____

Description of Problem:_____

_____

_____

_____

_____

Return Instructions:

Step 1: Obtain an RMA number from Spectrum Corporation, Inc.

Step 2: Fill out this form and include proof of purchase receipt if product is under warranty.

Step 3: Pack this form, the sign, keyboard and transformer in the original carton (or a suitable replacement). Please write the RMA number on the outside of the package. Any damage to the product during shipment is the responsibility of the freight company or the owner of the sign.

Step 4: Ship the package, **postage/shipping prepaid** to:

Spectrum Corporation, Inc.
Attn: RMA No _____
10048 Easthaven
Houston, TX 77075

PLEASE WRITE THE RMA NUMBER ON THE LABEL OF THE SHIPPING BOX - THANK YOU.

VOICE 713-944-6200
FAX 713-944-1290
E-MAIL info@specorp.com
HTTP:// www.specorp.com

SPECTRUM
800-392-5050
10048 EASTHAVEN BLVD.
HOUSTON, TX USA 77075