



X-Board Quick Installation Guide

August 3, 2005

Introduction:

The X-Board was designed as a daughterboard to receive serial communication and display this data on an LCD, VFD or PLED. The X-Board will support an alphanumeric LCD, VFD or PLED display up to 80 characters. When you order the X-Board, you will receive the following materials:

- X-Board PCB
- 1 - Plastic Bumper
- 2 - rows of 1x8 strip headers
- 3 - jumpers

The X-Board comes equipped with the following features:

- * Built in font with provision for up to 8 user defined characters for applicable displays
- * Configured for 8bit, no parity and 1 stop bit communication (8N1)
- * Utilizes a 4-bit parallel display bus interface
- * Jumper selectable 9600bps or a lighting fast 19.2 Kbps serial communication speed
- * Jumper selectable communication over RS-232 or TTL
- * Fully buffered so that no delays in transmission should be necessary
- * Ability to add a customized splash / startup screen
- * 32 levels of software controlled brightness for an PLED display
- * 4 levels of software controlled brightness for an VFD display
- * 32 levels of software controlled contrast for an LCD display
- * Three general purpose outputs for a variety of applications
- * Horizontal or vertical bar graphs
- * Medium digit capability on applicable displays (a display that consists of 2/4 rows)
- * Large digit capability on applicable displays (a display that consists of 4 rows)

Compatible Displays:

The X-Board is compatible with any of Matrix Orbital's MOP-A Series displays excluding the following; MOP-Ax404X-XXX-XXXX-XXX In addition the X-Board is compatible with most 4 bit parallel displays.. For a complete list of the MOP Series, please see our website at www.matrixorbital.com

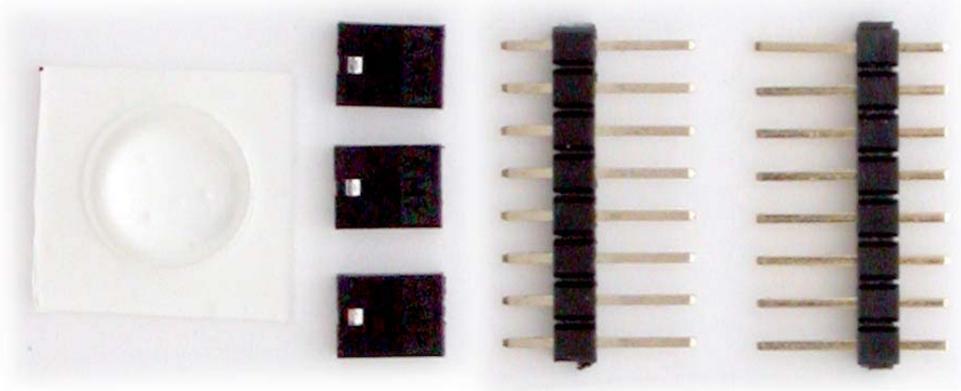
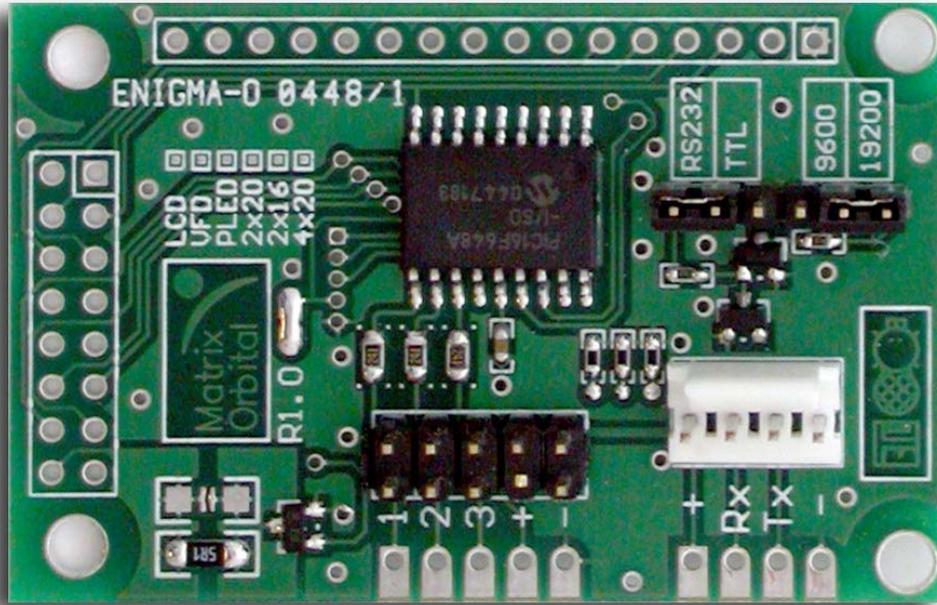


Figure 1: X-Board Part List

Installation with a typical LCD, VFD and PLED:

Please refer to the figures below for installation procedures on how an X-Board will connect to a typical LCD, VFD, and PLED.

NOTE: Please be aware that these connections are typical and in some instances you may have more or less connection pins on the display, depending on the type of display you are connecting to. It is essential that pin 1 is recognized and connected correctly. The X-Board utilizes a 4-bit bus interface, therefore pins 7-10 must be connected accordingly from the data bus to the display. Pins 15 and 16 are used for the backlight in an LCD application. Pins 15 and 16 are not applicable for VFD and PLED applications.

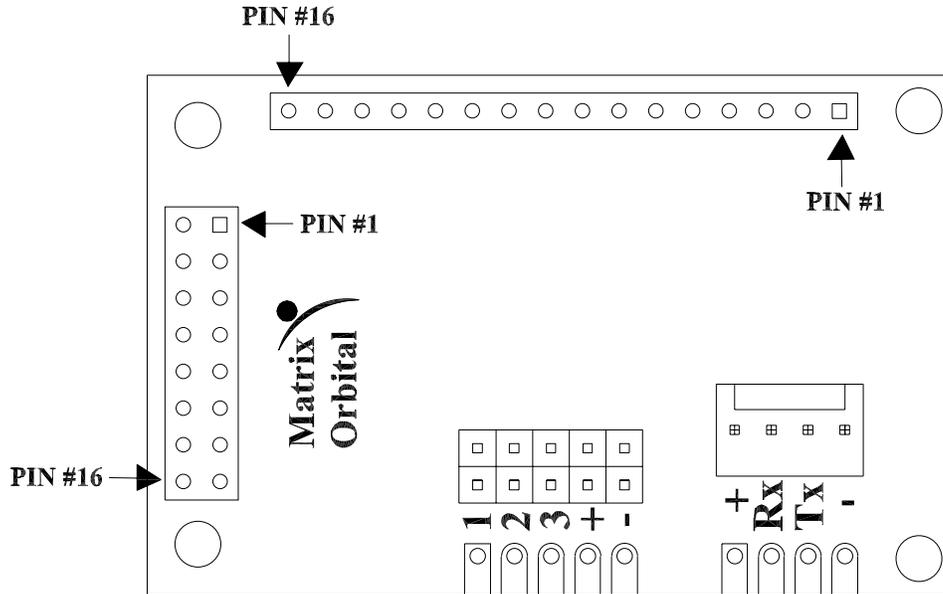


Figure2: Pin Connections

<i>Pin</i>	<i>Symbol</i>	<i>Description</i>
1	Vss	Power Supply 0V
2	Vdd	Power Supply +5V
3	Vo	Power Supply for Display
4	RS	Register Select
5	R/W	Read/Write
6	E	Enable
7 to 14	DB0-DB7	Data Bus
15	A	Anode for Backlight
16	K	Cathode for Backlight

Table 1: Pin Connections

Peel and stick plastic bumper as shown. Place X-Board over 1x16 connector, slide down and solder accordingly. X-Board component side-up.

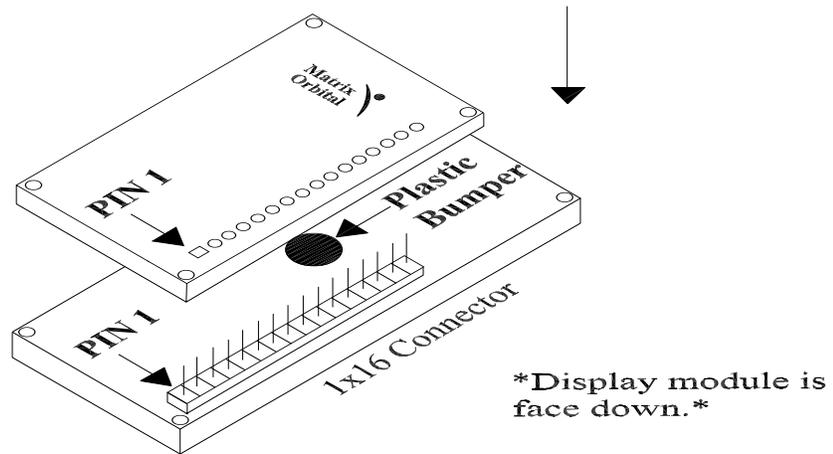


Figure 3: 1x16 Connector

Peel and stick plastic bumper as shown. Place X-Board over 2x8 connector, slide down and solder accordingly. X-Board component side-up.

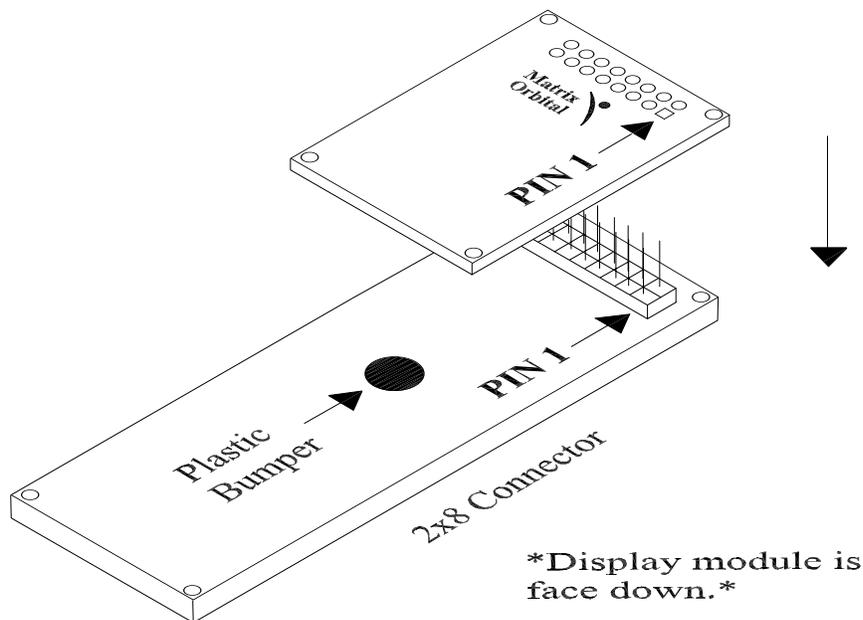


Figure 4: 2x8 Connector

WARNING: When an X-Board is purchased you will receive one plastic bumper for mounting purposes. It is essential that you mount the X-Board properly to avoid contact with the display. Improper installation may cause a short circuit and void your warranty.

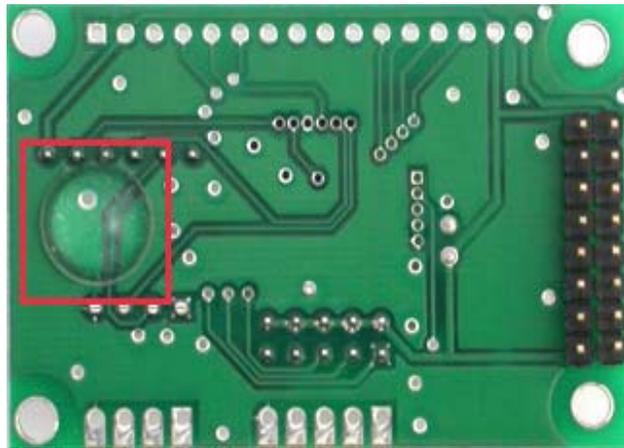


Figure 5: Plastic Bumper Placement

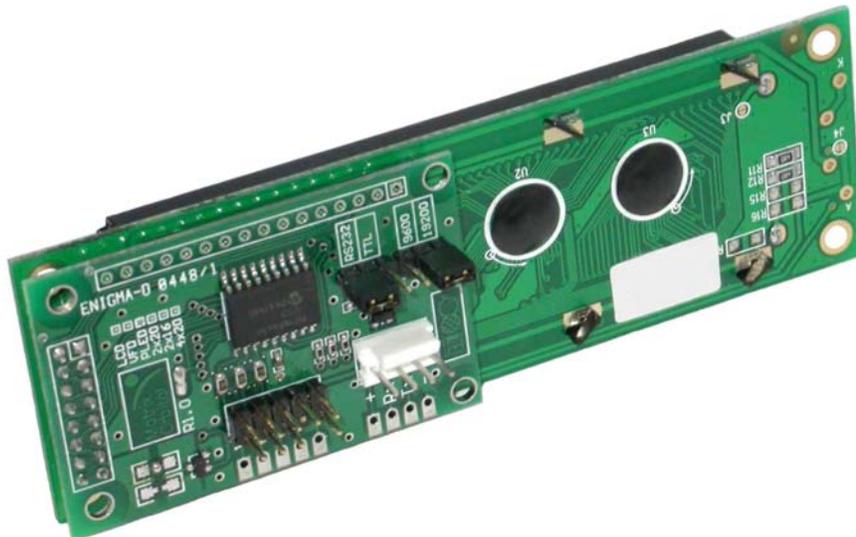


Figure 6: X-Board Assembled with a 2x20 Display

Configuring Your X-Board:

1. The X-Board modules come with a pre-programmed module type. This may very well not be the display type and size you will be using the X-Board with, therefore there is a need to configure (program) the X-Board to the type and size of your display.
2. Familiarize yourself with the 2x5 header connector, also known as the GPO header labeled in Figure 7. You will need 3 jumpers that will short a combination of the pins as described later. The connector has been labeled with "1,2,3,+,-". You will only be shorting a combination of the pins labeled "1,2,3" to the other row of the header.

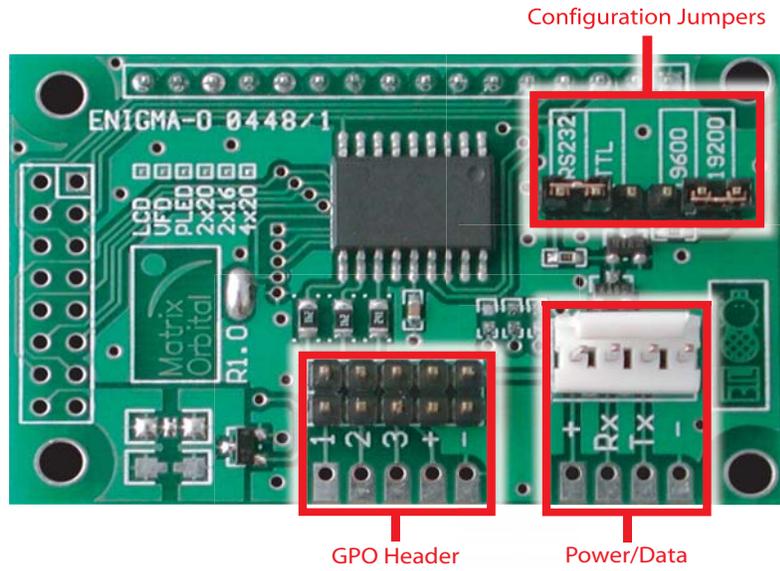


Figure 7: Connections for Testing

3. Connect the display that you intend to use with the X-Board. Be mindful of pin 1 for the display.
4. Before turning the power on, jumper connections 1, 2 and 3. This puts the unit to `re-configuring` mode. If at any point you want to change the display on your X-Board, this is one of the 2 ways to re-configure the X-Board: with power off, place the 3 jumpers accordingly, then turn the unit on.

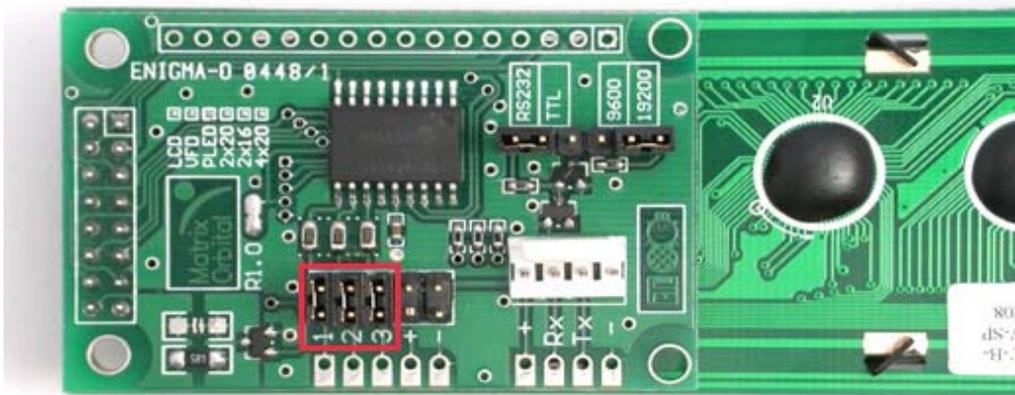


Figure 8: Re-configure Jumpers

5. After power up, "Restart" and "Set Type" is displayed on the screen. Your screen might not be displaying the best possible contrast/brightness but this is due to the fact that the X-Board does not know yet what type of display it is actually connected to.



Figure 9: Re-configure Screen

6. Turn the power off. Place the jumpers necessary to configure the type of the display. Please refer to Table 5 for selection.

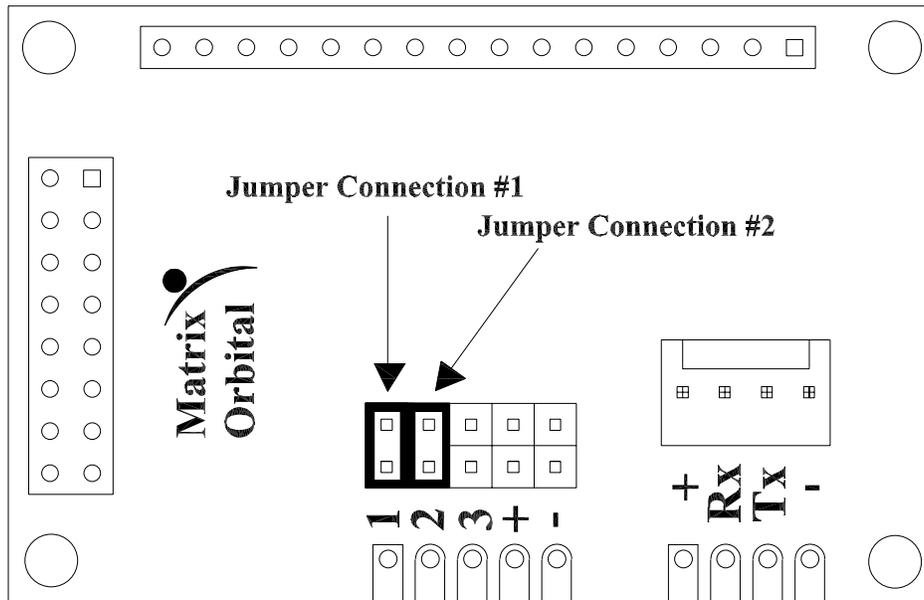


Figure 10: Configuring Display Type for a PLED

<i>Display Type</i>	<i>Jumper Pin#</i>
LCD (any color)	1
VFD (Samsung type)	2
VFD (Noritake type)	3
PLED	1,2

Table 5: Configuring Display Type

7. Turn the power back on. If the correct pin(s) has been jumpered, the display type should now be displayed on the screen. "Set Size" should also be displayed on the screen now.



Figure 11: Setting Display Type

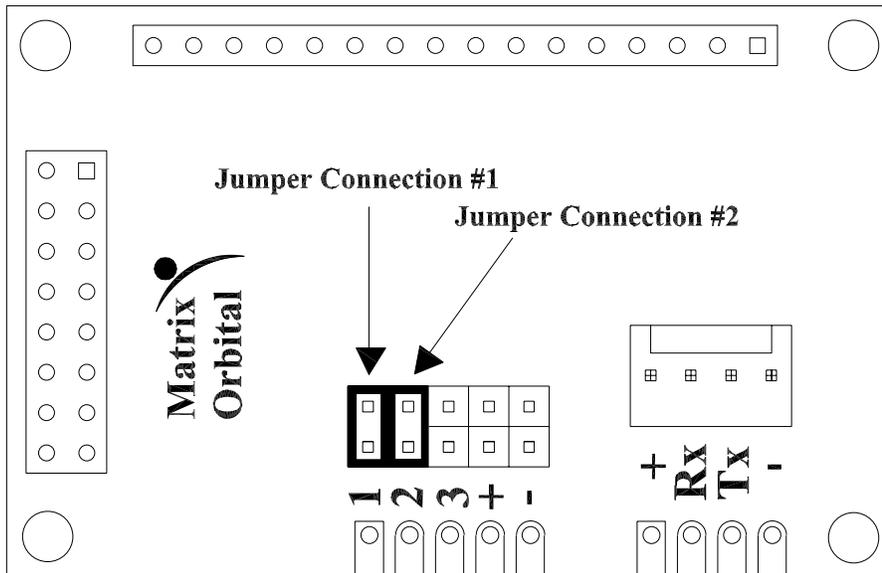


Figure 12: Configuring Display Size for a 2x20

<i>Display size (row x column)</i>	<i>Jumper Pin#</i>
1x16	0
2x8	1
2x16	2
2x20	1,2
2x24	3
2x40	1,3
4x16	2,3
4x20	1,2,3

Table 6: Configuring Display Size

8. Turn the power off. Place the jumpers necessary to configure the size of the display. Please refer to Table 6 for selection.



Figure 13: Setting Display Size

9. Turn the power back on. If the correct pin(s) has been jumpered, the display type and size should now be displayed on the screen. Turn the power off, take all the jumpers off and then turn the power back on. The unit is ready to talk to the type and size of the display you have configured it with.

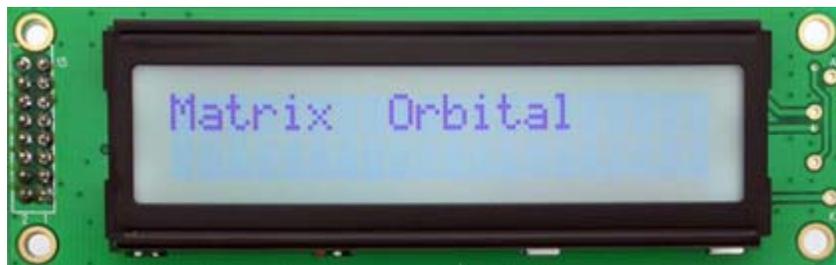


Figure 14: Properly Configured Display

10. At any point there has been a configuration set that is not within the tables given, the unit will display "Invalid" and the step is to be started from where it left off. For example, if you were configuring the type, then it will go back to configuring the type. If you get lost to where you are at in these steps, try jumpering ALL the pins 1,2,3 and start all over.

Setup for Testing With a PC:

WARNING: DO NOT apply power directly to the 4 pin connector of the X-Board. This will void your manufactures warranty and may cause serious damage.

NOTE: To test the module with a PC, the appropriate cable will need to be ordered or created accordingly.

Before setting up the application, the user may want to try out the display. When connected to a PC, the following will be required:

- * A 4-pin power connector of the type used to connect 3.5" floppy drive.
- * A PC with a spare RS-232 port (COM1 or COM2).
- * A straight through serial cable (DB9F to DB9M). This part is available directly from Matrix Orbital or from one of our distributors.
- * A custom cable is required for connection from the PC to the X-Board. This custom cable can be ordered directly from Matrix Orbital or from one of our distributors. The display connection is a four pin header. This header consists of power, Rx, Tx and ground as shown in Figure 16.

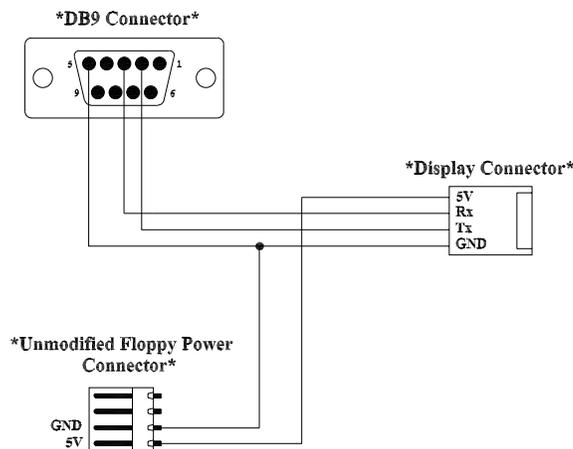


Figure 15: Connections for Testing



Figure 16: Communication and Power Cable

Please refer to Figure 15 and 16 for communicating with the X-Board via a PC:

1. Connect the female end of your straight through serial cable to a spare com port on your PC.
2. Connect the male end of your straight through serial cable to the DB9 connector of the custom cable.
3. Using a spare unmodified floppy power cable (female), connect to the "Unmodified Floppy Power Connector (male)" of the custom cable. Since this is a locking connector, it will only fit one way.
4. The final step is to connect the "Display Connector" of the custom cable to the header on the X-Board labeled "Power/Data"

WARNING: The Manufacturer's Warranty becomes void if the unit is subjected to over-voltage or reversed polarity.

Trying Out the X-Board:

The unit should be connected to power as described in the “Setup for Testing With a PC” section in the manual. To experiment with typing text, run Display Tuner.exe that's located on your eCD. Make sure it's configured to use the correct com port. Set the baud rate to 19,200 as described in Section 2.3 “Set Baud Rates” of the manual. Enter text in the appropriate location and send. Once the text has been sent to the display, it will appear as typed on the screen. Text will wrap around to the next line when the end of a line has been reached.

To exercise some of the other features of the display, a program (in any convenient language such as Basic or C) will need to be written in order to issue the required command strings. Most terminal programs are unable to issue the 0xFE character needed as a command prefix.

Technical Support:

For technical support regarding this module, please see the following links provided:

<http://www.matrixorbital.ca>

<http://www.lcdforums.com/forums/>