Enclosed Unit Hardware Manual (5.7 Inch)

2/19/2010

Note: the software included with this product is subject to a license agreement as described in this Manual.

Reach Technology, Inc.
www.reachtech.com
(510) 770-1417
sales@reachtech.com

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Hardware Limited Warranty and Software License Agreement

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1. Introduction

1.1. *Overview*

The 5.7 inch Enclosed Unit provides a complete enclosed color touch interface for your embedded system. A polycarbonate overlay covers the entire surface, making it completely sealed; the display window is optically bonded to the touch screen for bright, clear performance. When mounted in a NEMA 4 enclosure, the unit's die-cut rear gasket ensures protection from water and dust. Rear connectors are two-part "Phoenix" type for easy wiring. The Display Controller is REACH's SLCD6. Using the SLCD family of controllers is simply the quickest way to generate a user interface without a lot of graphical programming. It has a small size to fit in space-constrained applications.
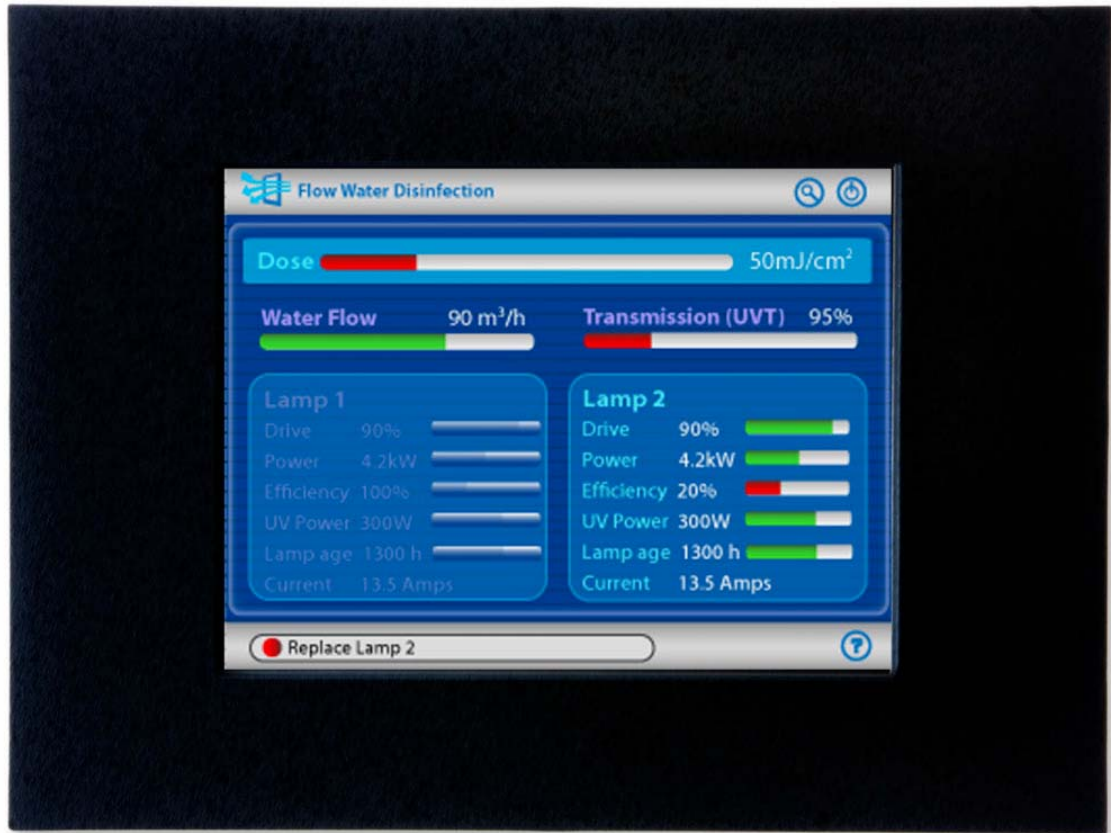
1.2. *Features*

♦ Product Number: 50-0003
♦ Reach Board Model: SLCD6
♦ Display Manufacturer: Prime View
♦ Display Type: TFT
♦ Colors: 256/65,536
♦ Enclosed Outside Dimension: 7.5" W x 5.65" H x 1.625" D
♦ Display Viewing Area (mm): 86.4(H) x 115.2(W)
♦ Portrait Mode Option: Yes
♦ Horizontal Viewing Angle (degrees): 120 (typical)
♦ Vertical Viewing Angle (degrees): 50 (Top) 40 (Bottom) (typ.)
♦ Screen Resolution: 320x240 (QVGA)
♦ Display Brightness (cd/m2): 560 (typ.), with touch
♦ Contrast Ratio: 600:1 (typ.)
♦ Touch Panel Type: Resistive
♦ Operating Temperature: -20°C to 70°C
♦ Storage Temperature: -40°C to 70°C
♦ Supply Power: 12-24VDC±10%
♦ Interface Connector: two part Phoenix type
♦ Serial Interface: RS232 / RS485
♦ Backlight Display: LED
♦ Number of Serial Ports: 3
♦ USB Port: Yes
♦ Flash Memory: 4MB
♦ RoHS: Yes

(*) temperature to -30ºC available as special order
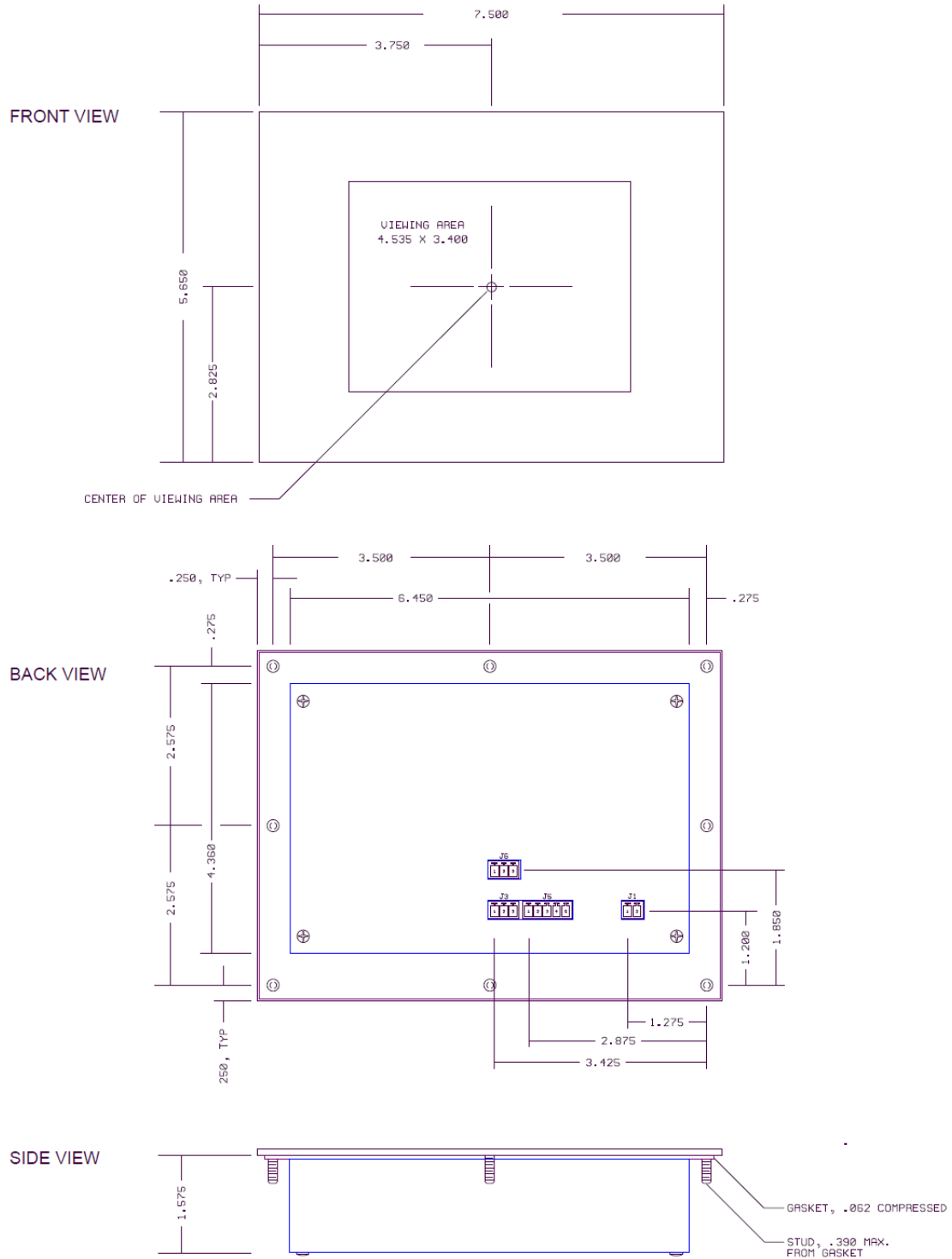
1.3. *Enclosure dimensional drawing*

Figure 1: Enclosure Physical Dimensions (inches)

1.4. *Electrical Characteristics*

The SLCD6 board requires 5V DC.

Current draw is as follows:

Configuration	Typical A	Max. A
SLCD6 with LB040Q02 (5.7") panel	0.8	1.0

1.5. *Environmental*

The standard Enclosed Unit is rated for commercial temperature operation of -20ºC to 70ºC.

2. System Overview

2.1. *General - Enclosed Unit*

The Enclosed Unit acts as a "smart terminal" and is generally connected to a "host" processor that implements the desired Graphical User Interface (GUI). The host can be any kind of processor from an eight bit microcontroller to a PC. The host issues commands to the Unit and receives button press responses from the Unit. In this manual, the term "host" is used to describe the device connected to the Unit

The Unit contains flash memory that is used for bitmap and macro storage. (This is sometimes referred to as "external" flash to distinguish it from the processor's internal flash memory that stores the Unit processor firmware.) A bitmap is equivalent to a Windows ™ bitmap file – it is a rectangular image. Macros are a sequence of Unit commands and are described in the "SLCD+/6/43 Software Command Reference Manual".

The Unit is connected to the host processor via a serial port (RS232, RS485, or USB). There are several reasons for having multiple ports:

a) Host program development and debugging. One port is connected to the host and another to a PC. The PC is used to download images and macros that the host uses. The two ports allow both the host and PC to be connected without having to switch cables. The PC can also be used for interactive command execution / testing.

b) The Unit supports serial pass-through via the "aout" and "ain" commands. This allows serial peripherals to be attached to the Unit and accessed by the host.

2.2. *Demo (shipped with unit)*

The Unit as shipped contains a demo that allows you to verify its functionality. Plug the supplied power supply into the back of the unit with the "Phoenix" style connector (RX and TX shorted). This "Phoenix" style plug invokes the demo macro. The display should light up and lead you through various touch-activated screens.

Note that the demo is pre-loaded into the flash memory, and includes both bitmap files and a macro file. To best learn how the Enclosed Unit board and this kit works, start with simple commands using the serial interface and leave the creation and use of macros for later.

2.3. *Connectors and Power*

Back Side Connections

On the back of the unit are three serial communication connectors and a power connector (see Figure 2, following page):

1. **"RS-232" Connection: Standard RS-232-C serial connection (COM0, COM2)**
   1.1. "R" - Received Data (IN direction)
   1.2. "T" - Transmitted Data (OUT direction)
   1.3. "G" - Signal Ground
   1.4. Male Connector: Manufacturer: Phoenix Contact; P/N: 1803439; Other Name: MCV 1.5/3-G-3.81
   1.5. Female Connector Manufacturer: Phoenix Contact; P/N: 1803581, Other Name: MC 1.5/3-ST-3.81

2. **"RS-485" Connection (COM1)**
   2.1. "R+" - RS-422 / RS-485 receive +
   2.2. "R-" - RS-422 / RS-485 receive -
   2.3. "T+" - RS-422 / RS-485 transmit +
   2.4. "T-" - RS-422 / RS-485 transmit -
   2.5. "100 ohms to GND" - Connect to shield / drain wire of RS422 / RS485 cable
   2.6. Male Connector: Manufacturer: Phoenix Contact; P/N: 1803455; Other Name: MCV 1.5/5-G-3.81
   2.7. Female Connector: Manufacturer: Phoenix Contact; P/N: 1803604, Other Name: MC 1.5/5-ST-3.81

3. **"Power" Connection**
   3.1. "+12V Only" - Positive 12 volts. Do not use a range of voltages.
   3.2. "GND" - Electrical Ground.
   3.3. Male Connector: Manufacturer: Phoenix Contact; P/N: 1803426; Other Name: MCV 1.5/2-G-3.81
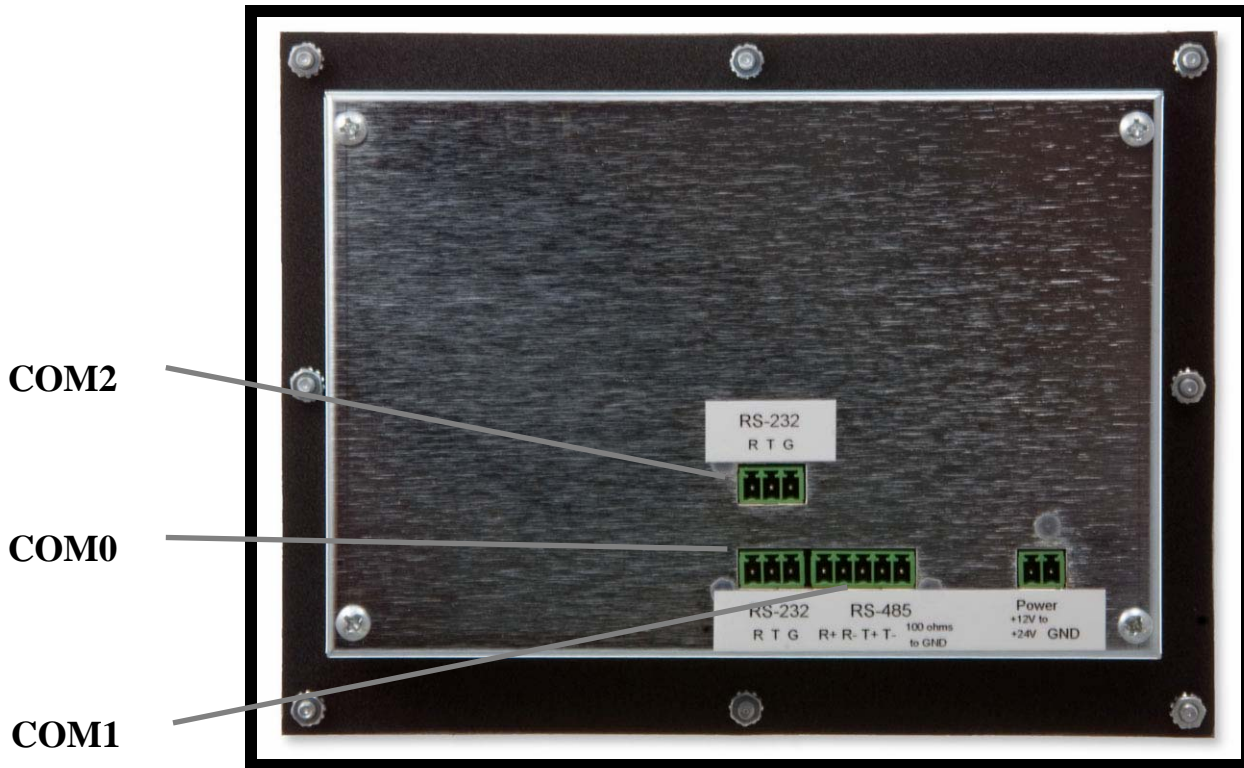   3.4. Female Connector: Manufacturer: Phoenix Contact; P/N: 1803578, Other Name: MC 1.5/2-ST-3.81

COM2

COM0

COM1

RS-232
R T G

RS-232   RS-485
R T G   R+ R- T+ T-   100 ohms
                        to GND

Power
+12V to
+24V GND

Figure 2: Back Side Connectors

Bottom Side Connectors

On the bottom side of the Enclosure Unit is a Mini-B USB connector (male). Use a USB extension cord (with a Mini-B connector (female) to communicate with a host computer.
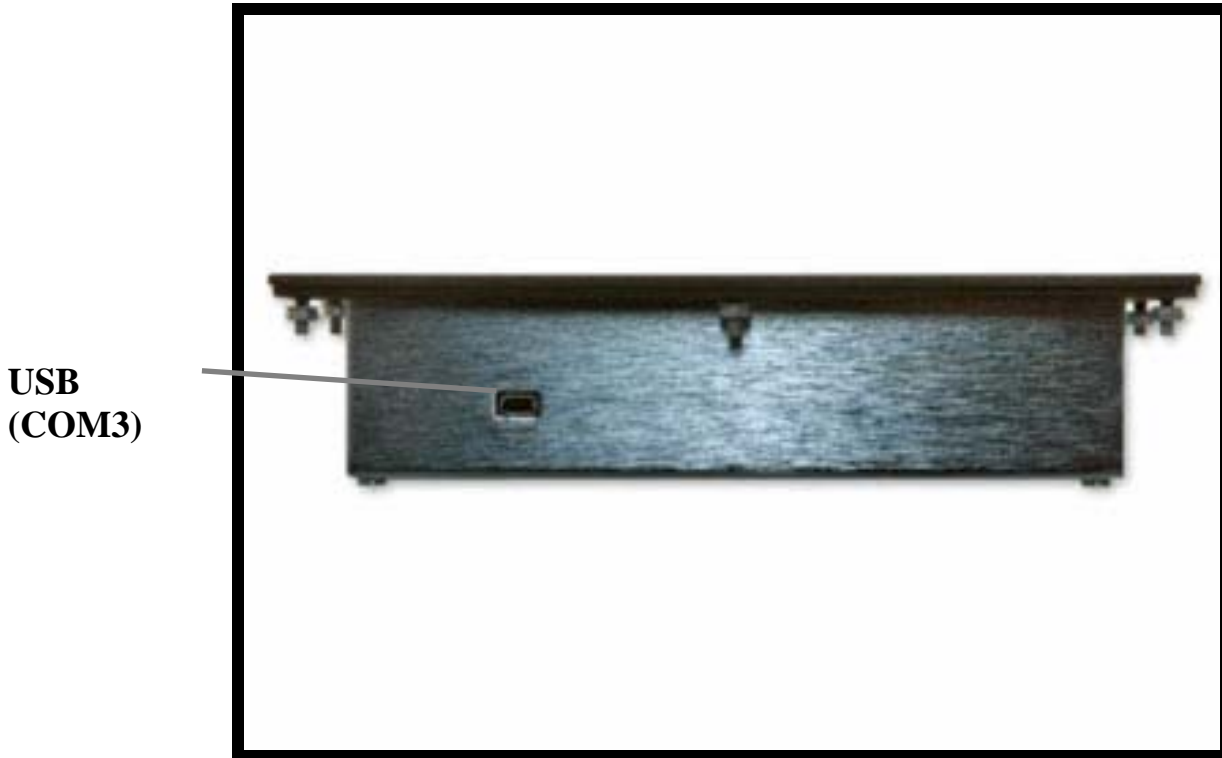
USB
(COM3)

Figure 3: Bottom Side Connector

2.4. *Connector-Display Controller Interface Electronics*

This product supports both RS232-C and RS-485 communication interfaces. An electronics interface board (POWERCOM5) inside the Enclosed Unit provides the electrical support between the external connectors and the appropriate Display Controller Board. This board also provides a physical interface between external and internal (Display Controller) connectors. As a matter of convenience and improved understanding, the schematic is provided. The details of the Display Controller Board can be found in the appropriate "*<Display Controller Model>* Controller Manual".
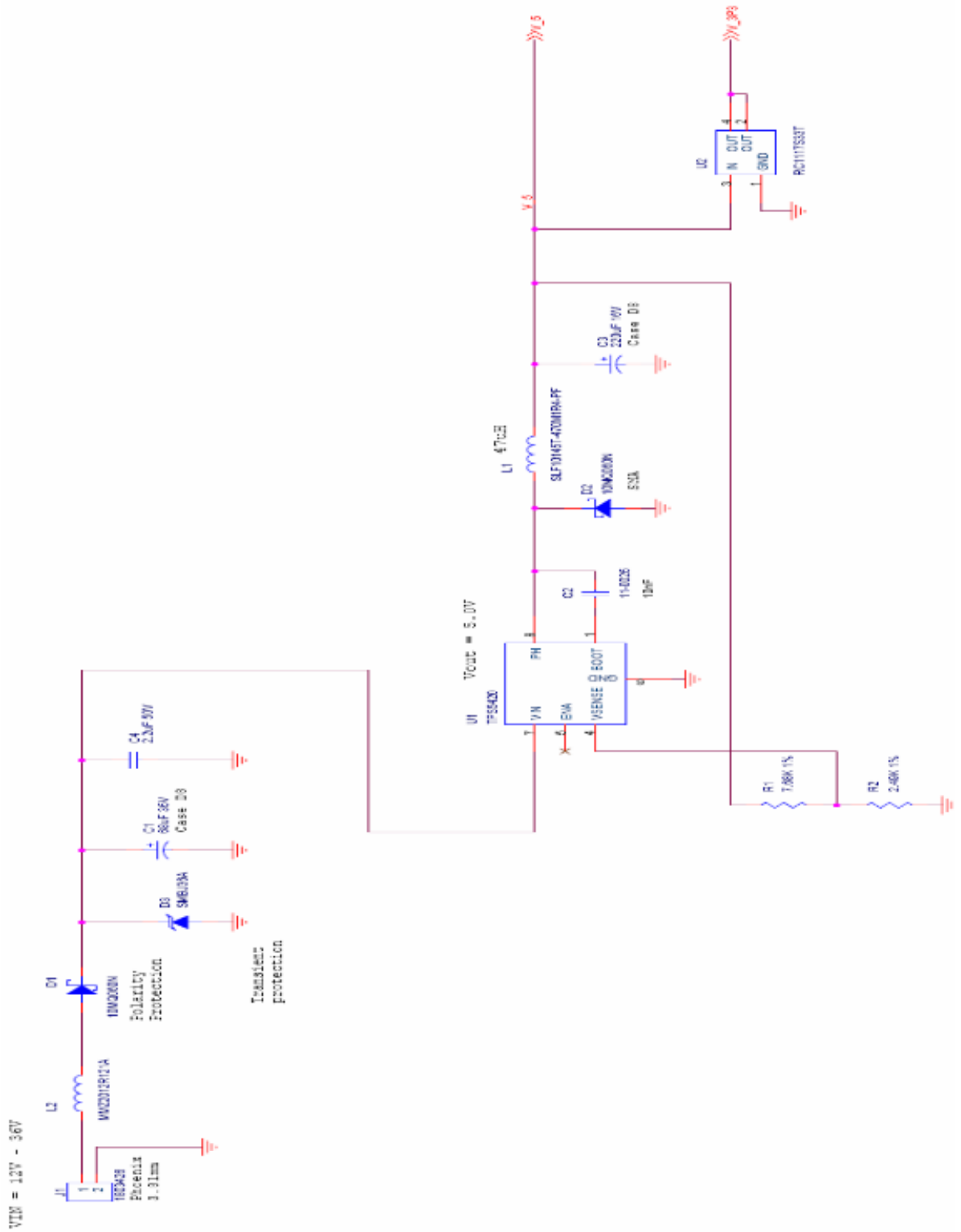
PowerCom5 Schematic
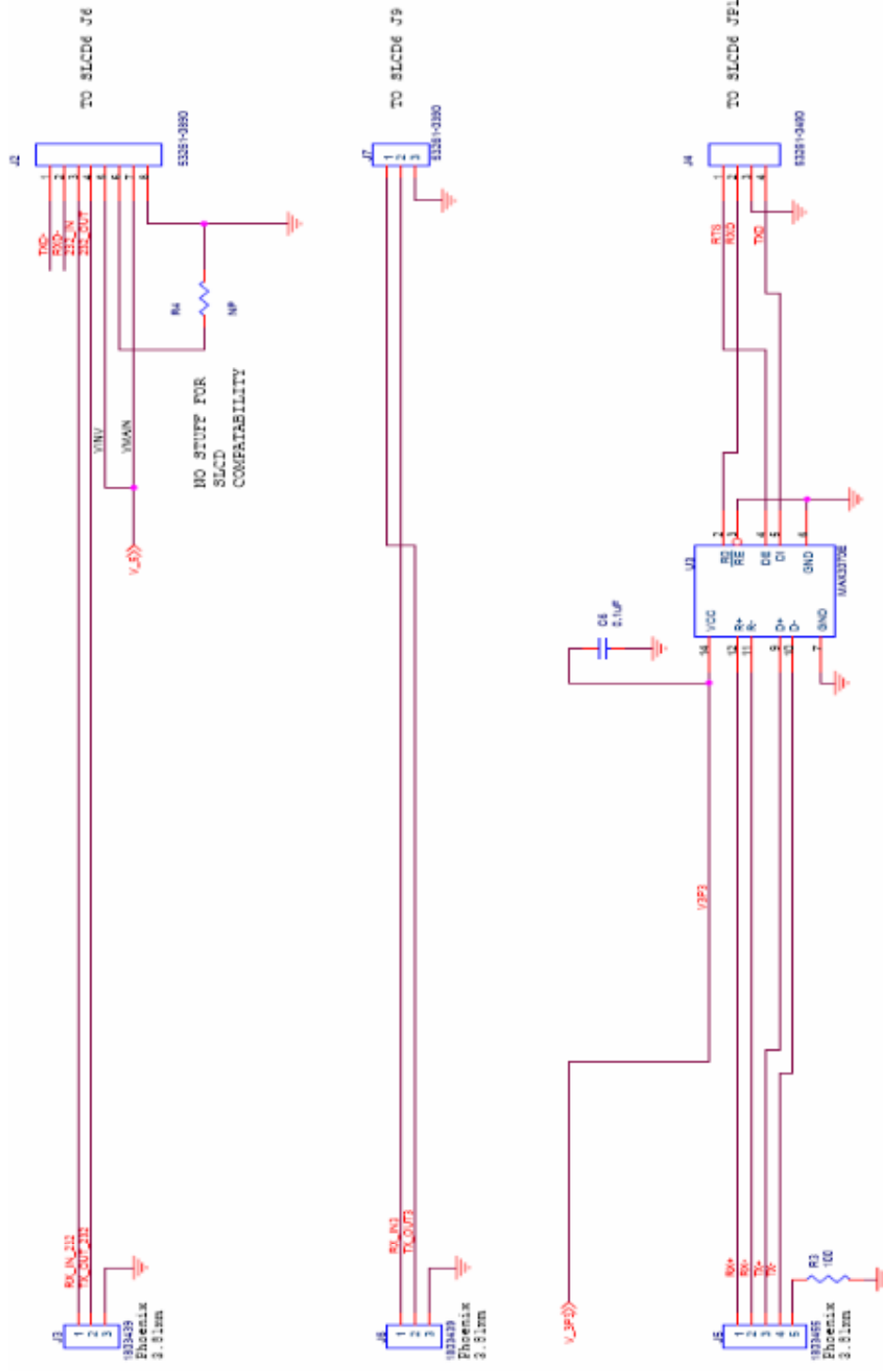

Figure 4: POWERCOM5 Schematic (Page 1)

Figure 5: POWERCOM5 Schematic (Page 2)

2.5. Developing the GUI Application

The host sends commands to create buttons and display data on the screen and also responds to button presses. See the separate *SLCD+/6/43 Software Command Reference Manual* document for the command protocol and command syntax, and for a description of the BMPload program used to store bitmaps and other data into the unit. Connect one of the Unit's serial ports to an available serial port on the host. Typically, this will be the "com0" port on the unit which is the default main control port. As shipped, the RS-232 Connection is set to 115,200 baud, 8 bit, 1 start, 1 stop, no parity.

In order to easily download bitmaps and test out commands to see what they do before coding them into the host, the Unit should also be connected to a PC. This can be done via the other RS-232 port, or via the USB serial device port. The USB port is implemented with the FTDI FT232R chip. To use this port, download and install the VCOM (Virtual COM port) drivers from the manufacturer at http://www.ftdichip.com/Drivers/VCP.htm The driver should be installed before the USB port is plugged into the PC.

A USB-to-serial adapter cable can also be used. *Note: the Belkin USB-serial adapter has software compatibility issues and is not recommended; Reach recommends either Prolific or FTDI chip based adapters.*

How this dual port connection (host on one port, PC on another) works is as follows. Only one port is the active or "main" at any time. When any other port receives three <return> characters in a row, it auto switches to become the main port. This way, the PC can take control of the unit to download new bitmaps or send commands. The BMPload program automatically auto switches and then restores the active port. The reset button, "*RESET" command, or a power cycle also restores the previously active main port. The active port is also displayed on the power-on screen if no power-on macro is defined.

Once a PC is connected, use HyperTerminal or similar terminal emulator to send and receive commands from the unit. HyperTerminal has limitations that can cause problems; specifically, some versions cannot send the "escape" character. We recommend the RealTerm (http://sourceforge.net/projects/realterm) open source program. Remember to issue three returns, and on the fourth you will get the ">" prompt from the unit.

Note: the protocol is full duplex, but the unit does not echo received characters and terminates return data with a <return> only instead of <return><linefeed>. You will need to set "half duplex" or "echo characters locally" and "add newline to return" options on the terminal emulator. Received characters are not echoed because in a real application the host can be sending a command at the same time the unit is sending a button press notification. Also, it is more efficient to terminate unit responses with just a <return> instead of a <return><linefeed>

Also note that the "*prevCons" command will also restore the previously active main port after an auto switch. Also, the control port autoswitch character is <return> by default but can be set to a different value with the "*auxEsc" command.

The Enclosed Unit has non-volatile memory which remembers which port is the main control port. This allows any of the Enclosed Unit serial/USB ports to be the main port on power-on. See the SET CONTROL PORT command in the *SLCD+/6/43 Software Command Reference Manual*.

3. Software Command Reference

The software commands and utilities are described in a separate document, "SLCD+/6/43 Software Command Reference Manual".

Appendix A - Parts and suppliers for Enclosed Unit controller connections

A.1 *DB9 Connector*

Reach provides an optional serial cable (P/N: 23-0056) that has a DB9 female on one end and a three pin screw terminal mating connector on the other. This cable is designed to be connected one-to-one to the male DB9 serial port on a PC. The wiring diagram of this cable is shown below:
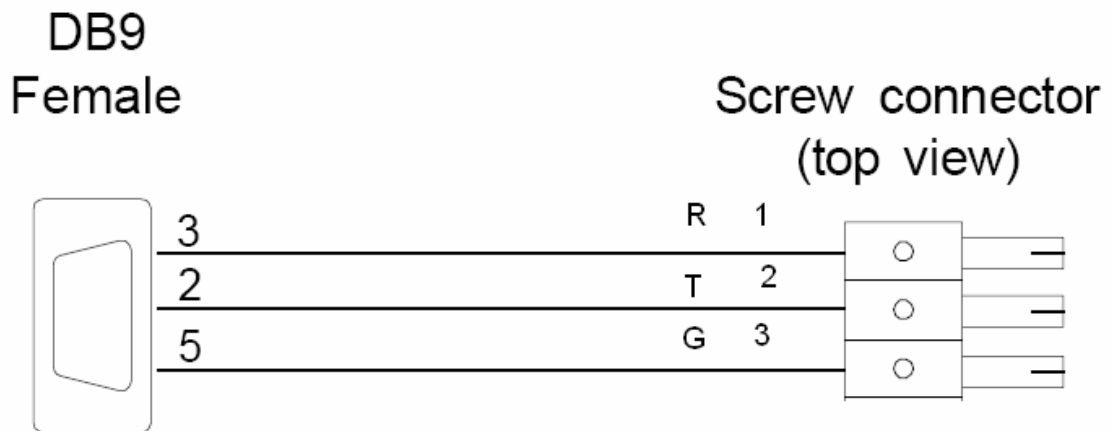

Figure 6: PC Compatible DB9 Serial Cable (P/N: 23-0056)

Appendix B - Ordering information

B.1   Contact Reach directly for ordering information.

Reach Technology Inc
842 Boggs Avenue
Fremont, California 94539
www.reachtech.com
(510) 770-1417

Order Number: 50-0003-XX, Description: 5.7" Prime View Enclosed Unit

Appendix C - Troubleshooting

C.1   *Touch unreliable or non-operative*

If the touch screen is unreliable or non-operative, do the following:

Run the TOUCH CALIBRATE command, "tc". This will reset the calibration values and allow you to recalibrate the touch screen.

To determine the accuracy and sensitivity of the touch, you can use the "debug" command as follows:

*debug 1<return>

This puts an "X" on the screen whenever a valid touch is recognized. To turn off, use:

*debug 0<return>