

LCD-1

Peripheral Board

Technical Manual

Document Revision: 1.03

Date: 22 April, 2003



BiPOM Electronics, Inc.

16301 Blue Ridge Road, Missouri City , Texas 77489
Telephone: 1-713-283-9970. Fax: Fax: 1-281-416-2806
E-mail: info@bipom.com
Web: www.bipom.com

© 1996-2010 by BiPOM Electronics. All rights reserved.

LCD-1 Peripheral Board Technical Manual. No part of this work may be reproduced in any manner without written permission of BiPOM Electronics.

All trademarked names in this manual are the property of respective owners.

WARRANTY:

BiPOM Electronics warrants LCD-1 Peripheral Board for a period of 1 year. If the board becomes defective during this period, BiPOM will at its option, replace or repair the board. This warranty is voided if the product is subjected to physical abuse or operated outside stated electrical limits. BiPOM Electronics will not be responsible for damage to any external devices connected to LCD-1 Peripheral Board. BiPOM Electronics disclaims all warranties express or implied warranties of merchantability and fitness for a particular purpose. In no event shall BiPOM Electronics be liable for any indirect, special, incidental or consequential damages in connection with or arising from the use of this product. BiPOM Electronics' liability is limited to the purchase price of this product.

TABLE OF CONTENTS

1. OVERVIEW	4
2. THEORY OF OPERATION	5
3. SOFTWARE	7
4. BOARD OVERVIEW	8
5. SCHEMATICS	9

1. Overview

LCD-1 is a display interface board for connecting MINI-MAX series and other microcontroller boards to Optrex F-51553GNBJ-LW-AEN graphical LCD display.

2. Theory of Operation

F-51553GNBJ-LW-AEN is a monochrome LCD with a 128 X 64 pixels screen size and operates from -20° to 70° Celsius. The background color is blue and the foreground color is white. The LCD datasheet can be downloaded from:

http://www.optrex.com/SiteImages/PartList/SPEC/F-51553GNBJ-LW-AEN_Eng.pdf

LCD-1 includes circuitry to generate correct supply voltages for the LCD as well as translating from dual row 0.1” pitch LCD connector that is standard on MINI-MAX boards to the 0.5mm pitch connector that mates with the flex cable that comes from the LCD.

LCD-1 can be connected to MINI-MAX boards either directly or using a 14-pin flat cable. For direct connection, LCD-1 is simply inserted to the top of the MINI-MAX board. Flat cable method allows placing the LCD away from the MINI-MAX board; this could be useful for example to mount the LCD to a front panel of an enclosure. As shipped, LCD-1 supports only the flat cable option. For a semi-custom version of LCD-1 with a female connector to mount on top of MINI-MAX boards, please contact BiPOM Electronics.

LCD-1 connects to MINI-MAX or other microcontroller boards through a 14-pin connector X1.

LCD-1 connects to the LCD display through 0.5 mm pitch, 30-pin connector X2 (Part number: **FH19-30S-0.5SH(51)**).

Communications between the microcontroller and LCD is through SPI serial interface. This interface has the following signals:

Signal	Description
MOSI	Serial Data
SCK	Serial Clock
RES	Reset
A0	Mode Select
CS1	Chip Select

LCD-1 buffers RESET and A0 signals to the LCD. SCK and MOSI signals are double buffered. Communications is one way (from the microcontroller to the LCD). SCK and MOSI signals overlap with the D6 and D7 data signals of the LCD. CS1 is not buffered.

Unused data lines (D0 through D5) are pulled high using 10K pull-up resistors.

Tantalum capacitors on LCD-1 form a voltage multiplier circuit to generate the correct voltages for the LCD.

X3 connector has 5V and ground signals for powering the LED backlight of the LCD display. This is optional since the LCD will operate even without backlight. However, the backlight makes the LCD more readable, especially under low light conditions.

The following picture shows **F-51553GNBJ-LW-AEN** LCD:



3. Software

BiPOM's OLED Development Kit has full support for the LCD-1 board and the F-51553GNBJ-LW-AEN graphical LCD. OLED Development Kit can be downloaded from:

<http://www.bipom.com/products/us/851744.html>

OLED Development Kit software (ARM Development System) has graphical library, drivers and examples for the F-51553GNBJ-LW-AEN LCD. The example project is under:

C:\bipom\devtools\GCC\LPC2000\examples\GL\LCD_Demo_GL

Currently, the OLED Development Kit is supported by our MINI-MAX/ARM-C and MINI-MAX/ARM-E boards only. In the future, support will be added for MINI-MAX/AVR and MINI-MAX/51 boards.

4. Board Overview



