PRIZM™

Mini-Mux 2 LED Display Board

(200930-xxx)

User's Manual And

Troubleshooting Guide

February 24, 2009

Rev. B

Moog Components Group
Springfield Operations
750 West Sproul Road
Springfield, PA 19064
E-Mail: **mcg@moog.com** URL: **www.moog.com/components**
Tel: 610-328-4000   Fax 610-605-6216
24/7 Technical Customer Support Hotline: 610-605-6101

TABLE OF CONTENTS

1 Mini-Mux 2 LED Display Board, Part Number 200930-xxx

The Mini-Mux 2 (MM2) LED Display board, when used in conjunction with a 200620 Revision D MM2 Video Output board and/or a 200860 MM2 RS-422/485 daughterboard, provides the user a remote display of LED status indicator on the MM2 board and/or the RS-422/485 daughterboard. This Display board is meant to be used in rack-mounted MM2 surface installations but may, at a future time, be also available for use in a vehicle installation.

The Display board has been designed to be mounted behind a 1U rack faceplate that has been drilled and labeled for a specific customer's configuration, refer to Section1.2 below.   A programmable logic device is placed on the Display board to allow jumper selection, at JP1, of different operational modes or customer specific configurations. As this board is to be mounted onto an aluminum front panel, the board's display LEDs are placed on the bottom of the PCB and the ribbon headers are placed on the top of the board. The Display board is designed to be bolted to the front panel using 0.25 inch long standoffs to set the appropriate board-to-panel spacing.

The Mini-Mux 2 LED Display board connects to the Prizm MM2 Video Output board via a 16-conductor ribbon or discrete-crimp-pin header (J2) located at the top right side of the board. The Display board connects to the MM2 RS-422/485 daughterboard thru an identical connector located at (J3). Both of these headers contain four power pins and 14 LED status pins. The power pins provide DC operating power to the Display board. The Display board can be used with only the MM2 main board or with both the MM2 main board and the RS-422/485 daughterboard. Power diodes are used on the Display board to allow the board to be powered from either (or both) of the headers at J2 or J3. Small green surface mount LEDs on the top of the Display board indicate if DC power is being provide from the connected ribbon cables.

1.1 Mini-Mux 2 LED Display Board Revision History:

The MM2 LED Display Board has gone through the following printed circuit board (PCB) and Assembly revisions:

PCB Revision A/Assembly Revision A Original design.

1.2 Mini-Mux 2 LED Display Board Dash (-) Numbers*:*

The MM2 LED Display Board has a Dash Number appended to the part number. This Dash Number identifies the specific board configurations:

-001 configuration   Configuration with 13 LEDs populated on the board, to be used with a

MM2 RS-422/RS-485 daughterboard (special custom configuration).
Only LEDs D13-D19, D20-D24, and D26 are placed.
D19, D23 and D26 are placed.

-002 configuration   Configuration with 5 LEDs populated on the board, to be used with only
                       MM2 main board (special custom configuration). Only LEDs D16, D18,
                       D19, D23 and D26 are placed.

-003 configuration   Standard configuration with 11 LEDs populated, to be used with only a
                       MM2 main board. Only LEDs D14-D19, D21-D24, and D26 are placed.

-004 configuration   Standard configuration with 26 LEDs populated, to be used with both
                       MM2 main board and a MM2 RS-422/485 daughterboard. Only
                       LEDs -TBD- are placed.

1.3 Mini-Mux 2 LED Display Board Operation:

The two ribbon headers, at J2 and J3, each have DC power pins to power the Display board. Each
header also has 14 discrete TTL signal lines that mimic the MM2 main board and RS-422/485
daughterboard on-board LED status indicators.

A programmable logic device is located on the top of the Display board and is used to select the
routing of the LED status signal lines from the two ribbon headers to the appropriate physical status
LED on the bottom of the Display board. The placement of appropriate jumper shunts on JP1 selects
different routing of signals from the ribbon header pins to specific physical LEDs on the Display
board.

The J2 (labeled MM2 board) ribbon header has the following signal definitions:

PIN	Signal	Signal Direction
1	GROUND	INPUT
2	+5VDC	INPUT
3	RCV_LINK	INPUT
4	RMT_LINK	INPUT
5	FIBER_LED	INPUT
6	FUTURE1_LED	INPUT
7	VID1_LED	INPUT
8	VID2_LED	INPUT
9	MR1_LED	INPUT
10	MT1_LED	INPUT
11	MR2_LED	INPUT
12	MT2_LED	INPUT
13	MR3_LED	INPUT
14	MT3_LED	INPUT
15	GROUND	INPUT

16   +5VDC   INPUT

Note: Pin 1 is located at the top left side of the connector, pin 2 is at the top right side of the connector and so on down to pin 16 at the bottom right of the connector.

The J3 (labeled RS-422 board) ribbon header has the following signal definitions:

PIN	Signal	Signal Direction
1	GROUND	INPUT
2	+5VDC	INPUT
3	RLINK_LED	INPUT
4	TLINK_LED	INPUT
5	RCV_LINK_LED	INPUT
6	FUTURE2_LED	INPUT
7	R1_LED	INPUT
8	T1_LED	INPUT
9	R2_LED	INPUT
10	T2_LED	INPUT
11	R3_LED	INPUT
12	T3_LED	INPUT
13	R4_LED	INPUT
14	T4_LED	INPUT
15	GROUND	INPUT
16	+5VDC	INPUT

Note: Pin 1 is located at the top left side of the connector; pin 2 is at the top right side of the connector and so on down to pin 16 at the bottom right of the connector.

The Display board also provides a single output connector, the status of which is whether the MM2 main board has a valid receive optical link (MM2 LINK STATUS). The signal is TTL level with a low indicating an active link.

 The MM2 LINK STATUS connector (J1) has the following signals:

GROUND   2   o
MM2 LINK STATUS   1   o

Note: Pin 1 is located at the bottom of the connector; pin 2 is at the top of the connector.

1.3.1 Mini-Mux 2 LED Display Board Indicators:

There are two surface mount diagnostic status LEDs on this board.

The SMD LEDs are meant for board level troubleshooting but may be of some limited use to the user in diagnosing a problem. The SMD LEDs are as follows:

D1 - ON if +5VDC is present on the J2 ribbon connector from the MM2 main board

D2 - ON if +5VDC is present on the J3 ribbon connector from the RS-422 daughterboard

Note: D3, D4, and D12 are Shottky diodes for DC power steering and protection and are not LEDs.

Note: The following display LEDs (a total of 28) may or may not be populated depending on the specific board configuration.

D5 thru D33
- ON to mimic the status of the appropriate MM2 main board or RS-422 daughterboard LEDs (depending on board configuration)

1.3.2 Mini-Mux 2 LED Display Board Specifications:

Number of Ribbon Connectors: Two; one for MM2 main board and one for
                                                                RS-422 daughterboard
Total number of display LEDs: 28; actual number placed on board dependent on specific
                                                                board configuration

1.3.3 Mini-Mux 2 LED Display Board Dimensions:

Printed circuit board (PCB): 1.55 in high x 6.00 in long
                                          (38.1 mm high x 152.4 mm long)

1.3.4 Mini-Mux 2 LED Display Board Power Requirements:

The board requires +5VDC at approximately 200 milliamps (depending on specific board LED configuration). The board is powered by the MM2 main board and/or the MM2 RS-422 daughterboard via one or both ribbon cables. There are no fuses on this board; however fuses are provided on the MM2 main board and on the MM2 RS-422 daughterboard as the source of the operating DC power.

1.4 Mini-Mux 2 LED Display Board Installation and Checkout

A typical system configuration that utilizes the Display board would have a MM2 Video Input board placed in the subsea or vehicle location and the MM2 Video Output board located at the surface location. The Display board (with a -003 configuration, refer to Section 1.2) would be plugged into the MM2 Video Output board's J9 ribbon header via a 16-conduction ribbon cable. The Display board would receive its operating DC power from the MM2 main board through this ribbon cable and be configured (with the appropriate firmware in the programmable logic device and correct jumper settings at JP1) to drive the Display board's LEDs to mimic the

To begin the checkout of the MM2 LED Display board, ensure that the MM2 Video Input and Output pair is functioning properly (i.e. fiber is connected, the boards are linked without optical errors, etc.).

To properly check out the MM2 Display board the user must have at two PCs with 10BASE-T boards installed and operational. These PCs must be correctly configured to communicate via 10BASE-T with each other (correct IP addresses, etc.) and have the appropriate network software installed (Windows 98 for example). Verify that the PCs can communicate between themselves by attaching them through your own hub or switch or directly. 10BASE-T test software is helpful but simply PINGing at the DOS level is adequate for checking network connectivity. Once you are sure your test network is operational follow these steps to insert the Prizm System into your network and to prove that the Prizm System is correctly carrying the network traffic.

1. Install the Mini-Mux 2 boards with the daughterboard in your system.
2. Install the appropriate fiber optic cables between the Mini-Mux 2 optics.
3. Power up the Mini-Mux2 Surface Video Out and Vehicle Video In boards.
4. Verify that all boards power up correctly and show the appropriate status LED indications.
5. Verify that the Mini-Mux 2 boards are linked via the fiber cables and that no optical errors are being reported.
6. With no Ethernet cables attached to either of the Mini-Mux 2 Ethernet Daughteboards, verify that both boards have the top right two LEDs lit (RLINK and TLINK) and the bottom right LED lit (+5V PWR).
7. Plug the Ethernet cables from two of the test PCs into the RJ-45 connectors on each board. The LAN LNK LEDs should now be lit.
8. Attempt to PING from one test PC to another test PC. The PING program should show that there was a reply from the PINGed PC and the round-trip time in milliseconds. If the PING was unsuccessful, the displayed message will be that the request timed-out. If successful, the round-trip time will be displayed and should be in the range of 3 milliseconds to 5 milliseconds with small PING data packets.

1.5 Mini-Mux2 LED Display Board Troubleshooting

In normal operation the following LED status should be observed with the Ethernet daughterboard plugged into MM2 main board with no network or RS-232 cables attached:

1.5.1 DC Power Troubleshooting

The SMD LEDs are as follows:

    D18 – ON (+5VDC available)

    D1 – On (RLINK)

    D2 – On (TLINK)

    The remaining LEDs will be off.

The LED status conditions of the Ethernet boards are detailed for several scenarios assuming two test PCs.   The statuses are as follows:

1.5.2 10BASE-T Ethernet Troubleshooting

Note: The "Local" board denotes the Ethernet board on one end of the Prizm MM2 System and "Remote" board refers to the other end of the Prizm MM2 System. The "Local" and "Remote" identifiers are arbitrary.

1. The Prizm Mini-Mux 2 system is fully functional and each PC is plugged into one of the Ethernet boards:

  At the "Local" end (with the PC connected and PINGing):
        When PINGing from this PC:
                RLINK LED - ON green
                TLINK LED - ON green
                LAN ERR LED – OFF
                LAN COL - OFF
                WAN TX LED - Blinks ON green with PING
                WAN RX LED - Blinks ON green with response
                LAN TX LED - Blinks ON green with response
                LAN RX LED - Blinks ON green with PING
                LAN LNK LED - ON green

  At the "Remote" end (with the PC connected):
        When PINGing that PC:
                RLINK LED - ON green
                TLINK LED - ON green
                LAN ERR LED - OFF
                LAN COL LED - OFF
                WAN TX LED - Blinks ON green with response
                WAN RX LED - Blinks ON green with PING
                LAN TX LED - Blinks ON green with PING
                LAN RX LED - Blinks ON green with response
                LAN LNK LED – On green

2. The Prizm System is fully functional but at the "Remote" end the Ethernet cable is not plugged in or the PC is not powered up:

  At the "Local" end (with the PC connected and PINGing):
        When PINGing from this PC:
                RLINK LED - ON green
                TLINK LED - ON green
                ERR LED - OFF
                LAN COL LED - OFF
                WAN TX LED - Blinks ON green with PING
                WAN RX LED - OFF
                LAN TX LED - OFF
                LAN RX LED - Blinks ON green with PING

LAN LNK LED – ON green

At the "Remote" end (with the PC NOT connected):
When PINGing that PC:
RLINK LED - ON green
TLINK LED - ON green
ERR LED – OFF initially, but will blink ON red after DRAM fills up
LAN COL LED - OFF
WAN TX LED - OFF
WAN RX LED - Blinks ON green with PING
LAN TX LED - ON green
LAN RX LED - OFF
LAN LNK LED – On green

3. The fiber at the "Local" end is unplugged from the MM2's receive (RX) optical port but each PC is plugged into one of the Ethernet daughterboards:

At the "Local" end (with the PC connected and PINGing):
The MM2 FIBER LED is OFF , RCV LINK is OFF and RMT LNK LED is ON.

When PINGing from this PC:
RLINK LED - ON green
TLINK LED - ON green
ERR LED - Blinks ON red with PING
LAN COL LED - OFF
WAN TX LED - OFF
WAN RX LED - OFF
LAN TX LED - OFF
LAN RX LED - Blinks ON green with PING
LAN LNK LED – ON green

At the "Remote" end (with the PC connected):
The MM2 FIBER LED is ON, RCV LINK is ON but and RMT LNK is OFF

When PINGing that PC:
RLINK LED - ON green
TLINK LED - ON green
ERR LED - OFF
LAN COL LED - OFF
WAN TX LED - OFF
WAN RX LED - OFF
LAN TX LED - OFF
LAN RX LED - OFF
LAN LNK LED – ON green

1.5.3 RS-232 Channel Troubleshooting

Note: The RS-232 channels are only enabled in -003 versions. -001 and -002 version will typically not have a data header installed at J2.

Note: The "Local" board denotes the Ethernet board on one end of the Prizm MM2 System and "Remote" board refers to the other end of the Prizm MM2 System. The "Local" and "Remote" identifiers are arbitrary.

1. The Prizm Mini-Mux 2 system is fully functional and a PC that is running a serial communications program (i.e. terminal or hyperterminal) is plugged into RS-232 channel 1 of the "Local" Ethernet board. A loop-back cable is plugged into the "Remote" MM2 data header to loop RS-232 data back to the "Local" MM2 board set:

   At the "Local" end (with the PC connected and serial data being generated):
          RLINK LED (D1)- ON green
          TLINK LED (D2)- ON green
          T1 LED (D5) - ON red or blinking ON with RS-232 traffic from "Remote" end
          R1 LED (D7) - ON green or blinking ON with RS-232 traffic into board
          T2 LED (D9) - OFF
          R2 LED (D1) - OFF
          T3 LED (D13) - OFF
          R3 LED (D14) - OFF
          T4 LED (D16) - OFF
          R4 LED (D17) - OFF
T2 LED (D9) - OFF

At the "Remote" end:
          RLINK LED (D1)- ON green
          TLINK LED (D2)- ON green
          T1 LED (D5) - ON red or blinking ON/OFF with RS-232 traffic from "Local" end
          R1 LED (D7) - ON green or blinking ON/OFF with RS-232 traffic (looped back)
          T2 LED (D9) - OFF
          R2 LED (D1) - OFF
          T3 LED (D13) - OFF
          R3 LED (D14) - OFF
          T4 LED (D16) - OFF
          R4 LED (D17) - OFF

2. Now move the data cable connection from RS-232 channel 1 to channels 2, 3 and then 4. Also move the loop-back cable follow the channel under test. The same LED statuses should be observed as above except moved from channel 1 to 2 to 3 and then to 4, as appropriate.