

Graphics Prototyping Board for Curiosity Boards User Guide

Preface

The Graphics Prototyping Board for Curiosity (EV48R50A) enables developers and customers to integrate and prototype their display modules with the 32-bit MCU Graphics development boards. Users can utilize the LED driver and bare component pad circuits to test functionalities, such as backlight display.

Figure 1. Graphics Prototyping Board for Curiosity Boards (Top View)

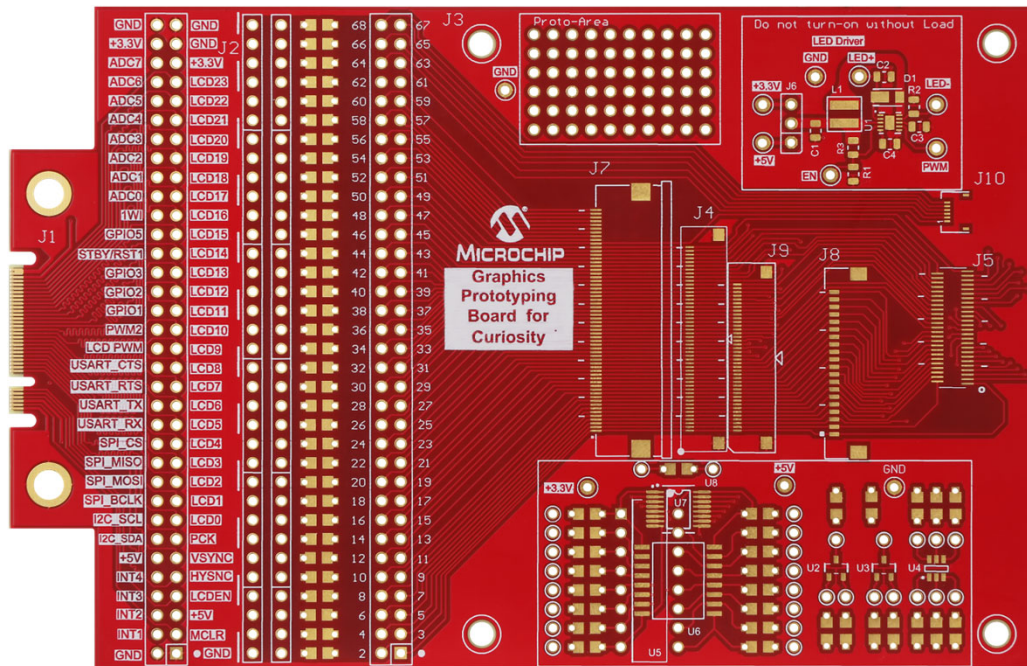


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1. Introduction

The Graphics Prototype Board for Curiosity (EV48R50A) with its graphics connector, 6 LCD connectors, LED driver and bare component pads, enables the user to perform these actions:

- Prototype an off-the-shelf display (RGB, parallel 8080, and so on) to an MCU Graphics development board
- Prototype other color modes, such as RGB332 or other interfaces
- Probe display and touch signals for debugging
- Prototype touch controllers and other touch interfaces
- Connect to the Curiosity Pro or Ultra Graphics Port Standard interface

Figure 1-1. Top View

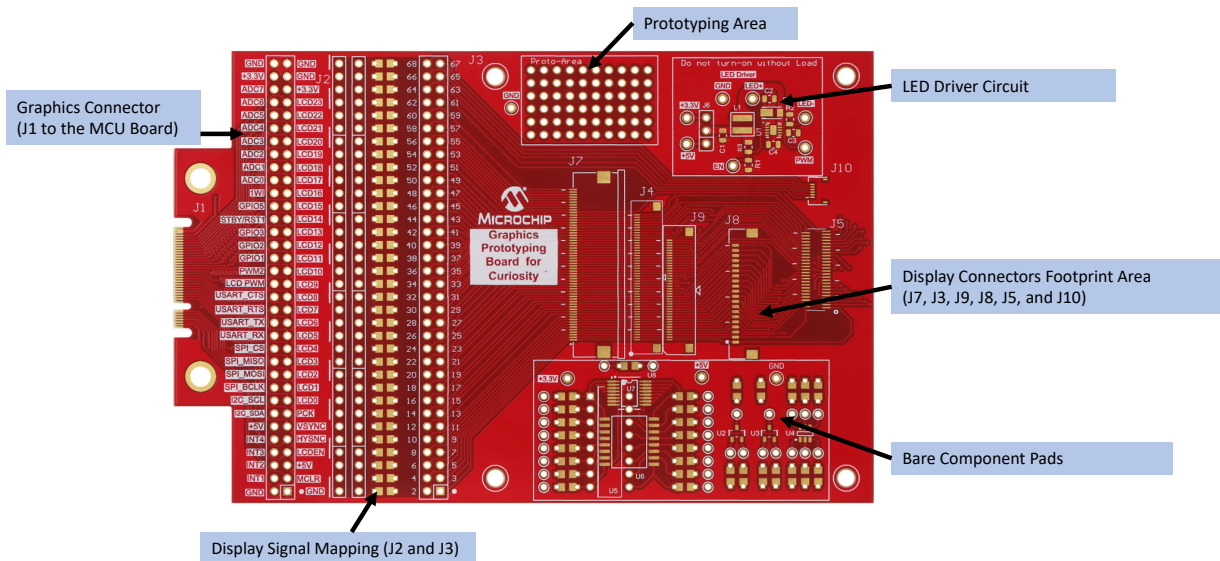
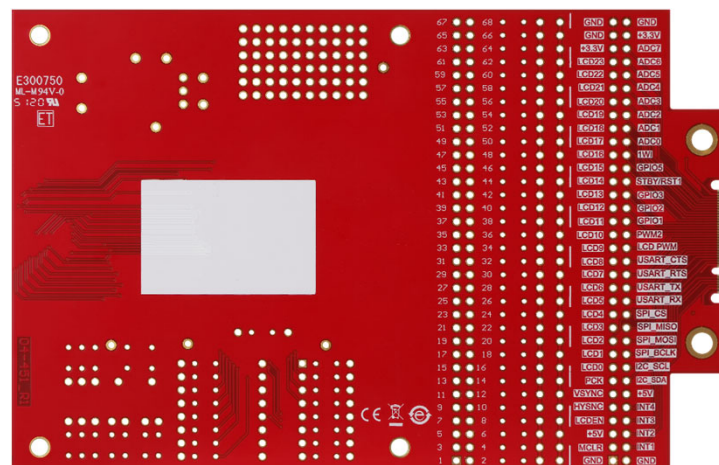


Figure 1-2. Bottom View



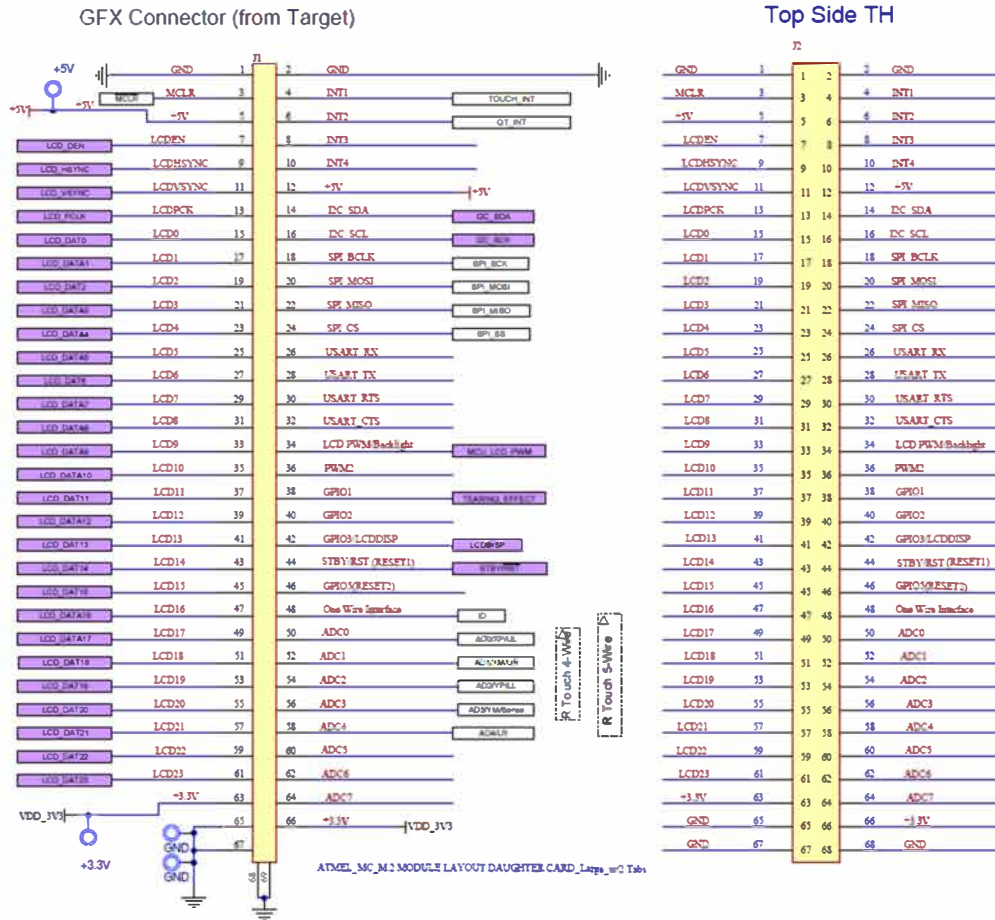
2. Overview

The Graphics Prototype Board has a compatible interface for the display connector on both the SAM and PIC32 development boards. It comes with multiple footprints for flat cable connectors to connect display modules. The board allows for the flexible mapping of display signals from the development board to the display module connectors. Display boards which support a dual edge female 67POS 0.020 connector may be used with the prototyping board.

3. Graphics Connector

The graphics connector provides an interface between the MCU board and the graphics display. It adds the ability to change the wired interface by providing an accessible jumper wire end point when connecting displays of different types to the same MCU board.

Figure 3-1. Graphics Connector Schematics



4. LCD Connectors

The graphics prototype board comes with footprints for LCD connectors of different pitch and positions. This can accommodate display modules with different cables and interfaces, such as RGB and parallel 8080 as well as the interface to a touch screen controller.

Figure 4-1. LCD Connectors Schematics

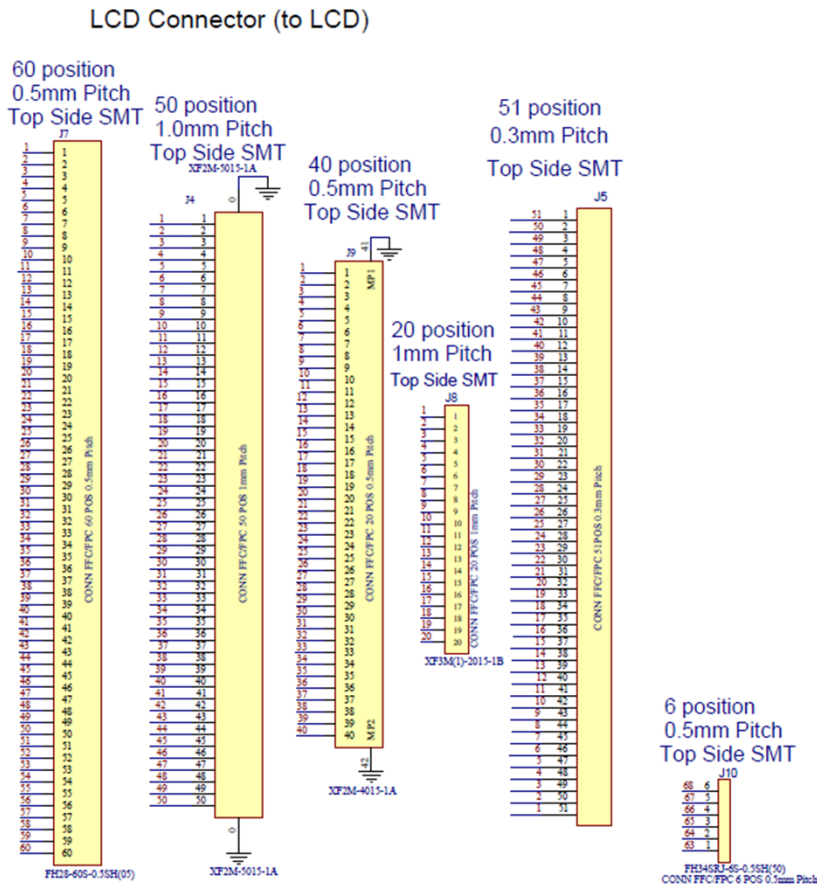


Table 4-1. Pitch Size and Number of Pins for the LCD Connectors

S. No.	Connector	Pitch Size (mm)	Number of pins
1	J7	0.5	60
2	J4	1	50
3	J9	0.5	42
4	J8	1	20
5	J5	0.3	51
6	J10	0.5	6

5. Bare Component Pads

The bare component pads further extend the capabilities of the board, allowing the addition of more functionality to the design including prototyping touch interfaces, probing displays, and touch signals for debugging. The user can add features to the design, such as the addition of different sensor types.

Figure 5-1. Bare Component Pads Schematics

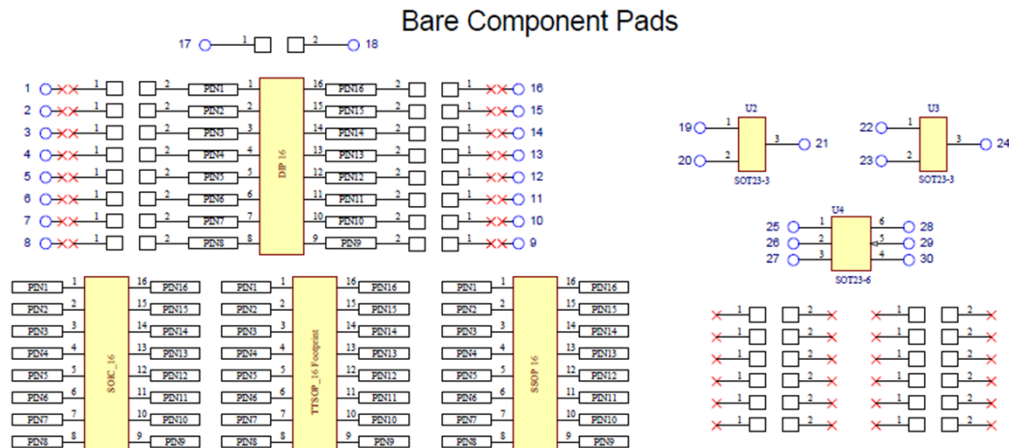


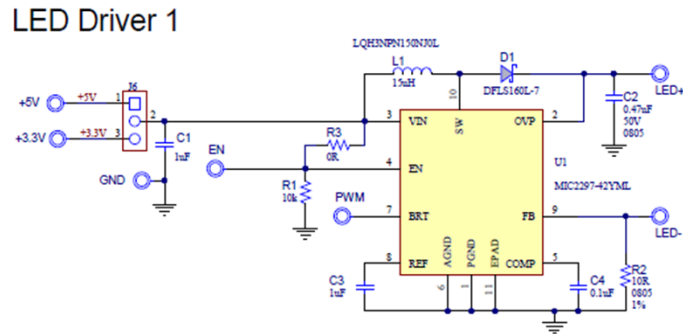
Table 5-1. Bare Component Pad Pitches and Footprints

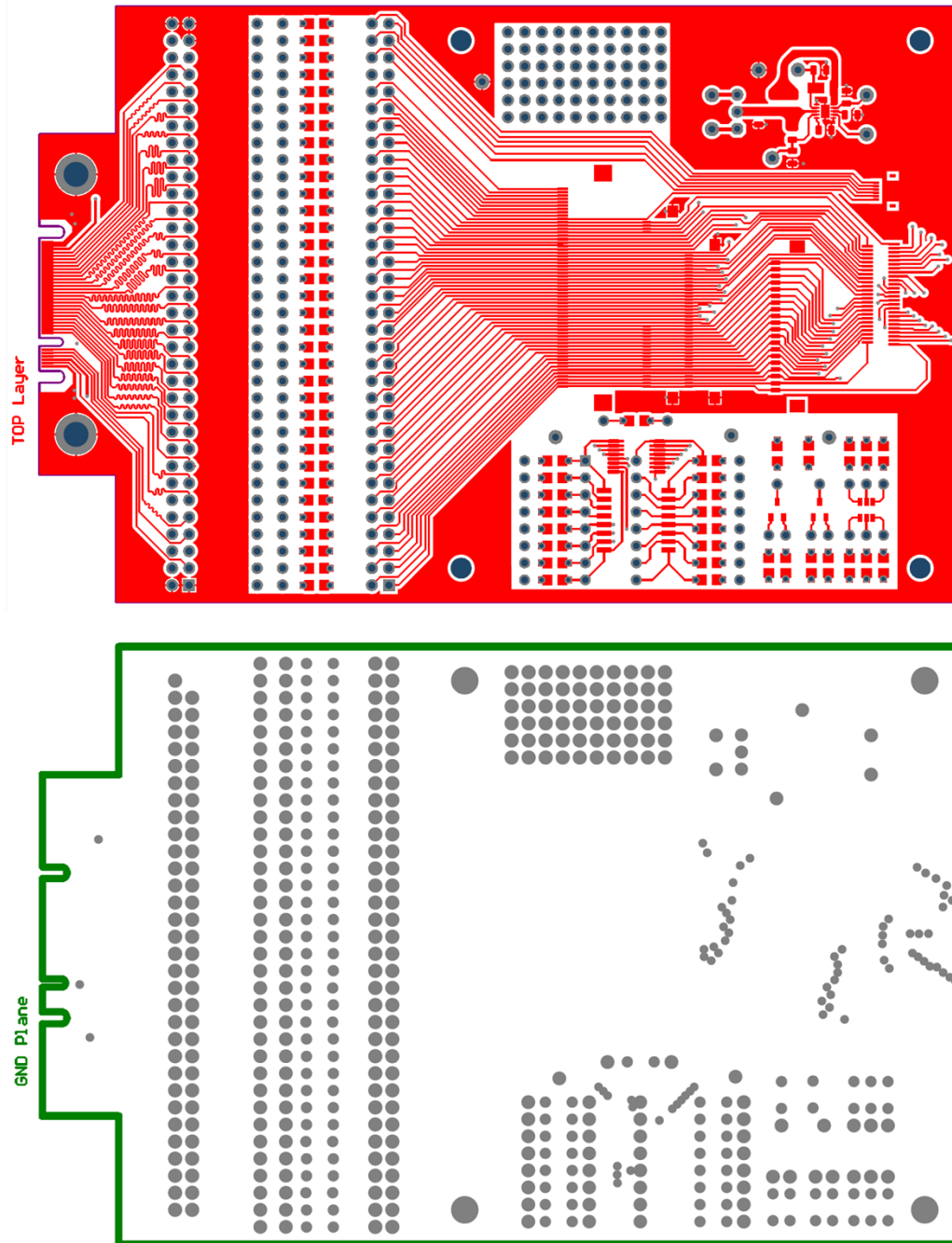
Component	Pitch (mm)	Footprint (mm)
DIP 16 Through hole	2.54	19 x 6.4
SOIC-16 SMT	1.27	10.2 X 6.0
TTSOP-16 SMT	0.65	5.0 X 6.4
SSOP-16 SMT	0.65	5.0 X 6.4
SOT23-3 SMT	0.95	2.9 X 1.3
SOT23-6 SMT	0.95	2.9 X 1.3

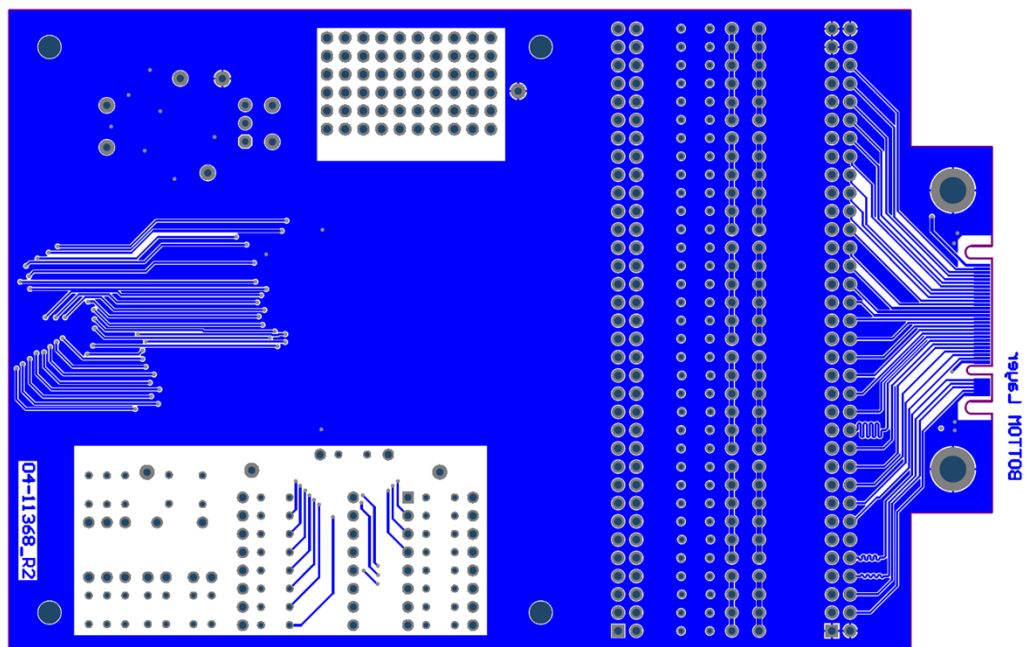
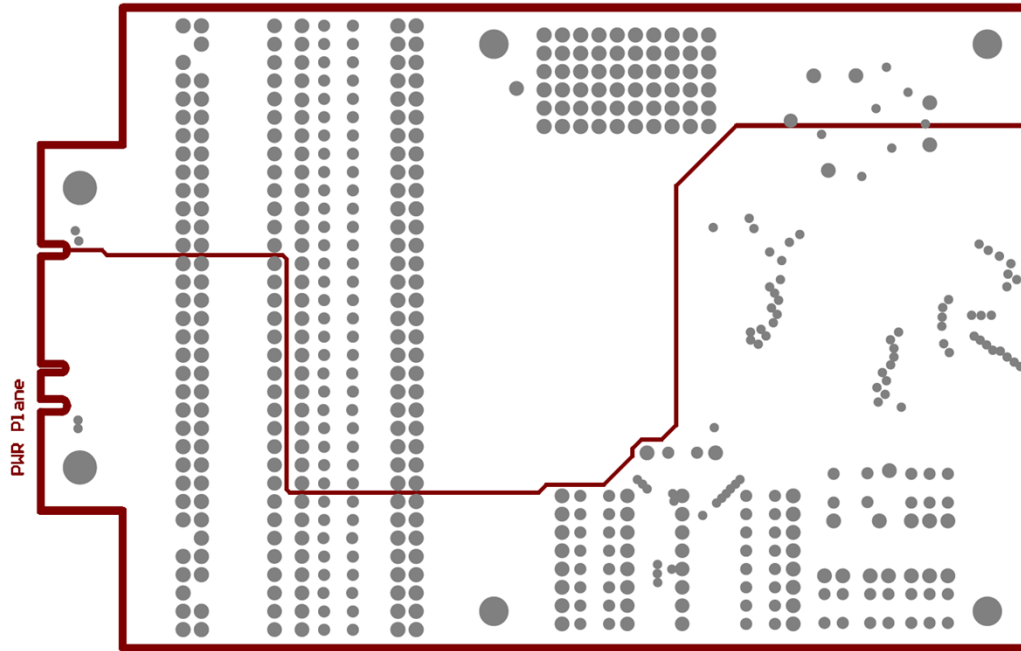
6. LED Driver

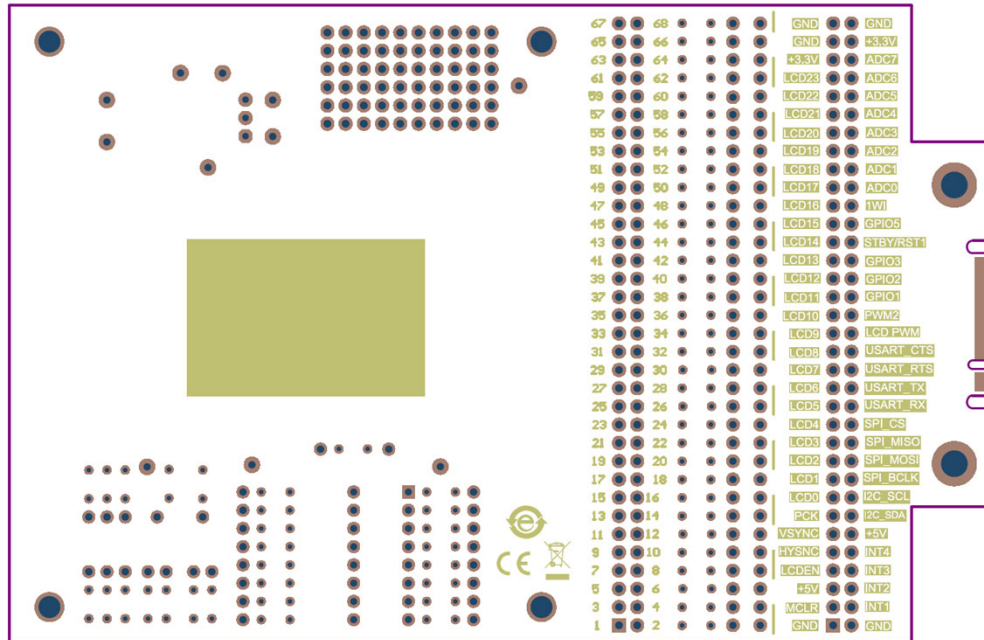
The LED driver circuit allows the control of back light settings for displays without an LED driver.

Figure 6-1. LED Driver Schematics

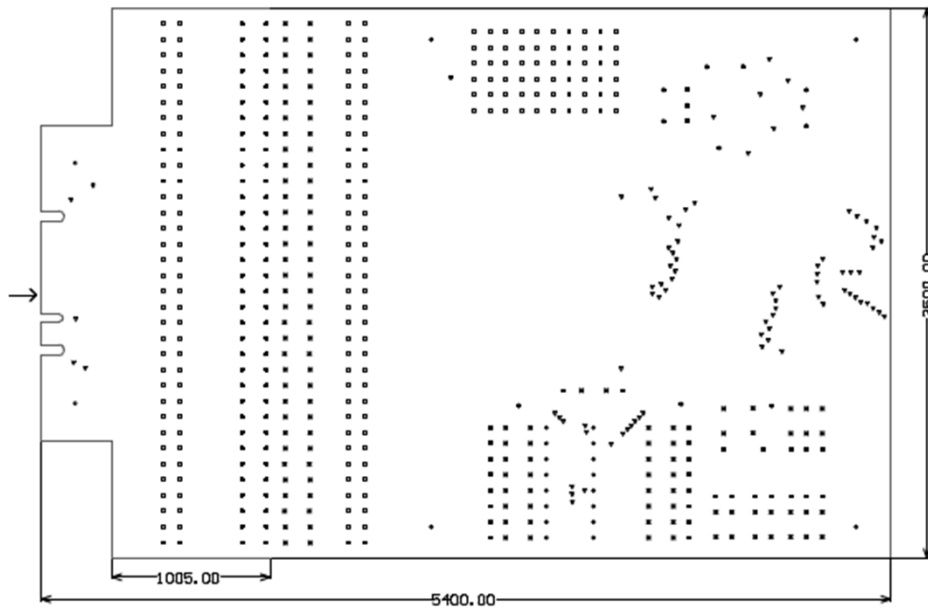








9. Board Dimensions



10. Bill of Materials

Designator	Description	Manufacturer	MPN
J2	HDR 0.1" (2.54 mm) 2x34	-	-
J3	HDR 0.1" (2.54 mm) 2x34	-	-
J4	CONN FPC 50POS 0.50 mm R/A	OMRON	XF2M-5015-1A
J5	CONN FPC BOTTOM 51POS 0.30 mm R/A	Hirose Electric Co Ltd	FH23-51S-0.3SHW(06)
J7	CONN FFC/FPC FH28 0.50 mm 60P Female Bottom SMD R/A	Hirose Electric Co Ltd	FH28-60S-0.5SH(05)
J8	CON FFC/FPC XF3M 1 mm 20P Female SMD R/A	OMRON	XF3M(1)-2015-1B
J9	CONN FFC 40POS 0.50 mm TOP BOT XF2M SMD RA	OMRON	XF2M-4015-1A
J10	CON FFC/FPC FH34SRJ 0.5 mm 6P Female SMD R/A	Hirose Electric Co Ltd	FH34SRJ-6S-0.5SH(50)
U2	Generic SOT23-3 SMT Footprint	-	-
U3	Generic SOT23-3 SMT Footprint	-	-
U4	Generic SOT23-6 SMT Footprint (0.95 mm pitch)	-	-
U5	Generic DIP 16 Through Hole Footprint (0.1" pitch)	-	-
U6	Generic SOIC-16 SMT Footprint (1.27 mm pitch)	-	-
U7	Generic TTSOP-16 SMT Footprint (0.65 mm pitch)	-	-
U8	Generic SSOP-16 SMT Footprint (0.65 mm pitch)	-	-

Quantity	Designator	LED Driver Circuit	Manufacturer	MPN
2	C1, C3	CAP CER 1 uF 16V 10% X7R SMD 0805	KEMET	C0805C105K4RACTU
1	C2	CAP CER 0.47 uF 50V 10% X7R SMD 0805	Murata	GRM21BR71H474KA88L
1	C4	CAP CER 0.1 uF 16V 10% X7R SMD 0805	Panasonic	ECJ-2VB1C104K
1	D1	DIO SCTKY DFSL130L 310 mV 1A 30V POWERDI-123	Diodes Incorporated	DFSL130L-7
1	J6	HEADER VERT 2.54 mm 1X3	Sullins	PBC03SAAN
1	L1	INDUCTOR 10 uH 2.2A 20% SMD L4.3W4.3H4.1	Coilcraft	XAL4040-103MEB
1	R1	RES TKF 10k 1% 1/16W SMD 0805	Stackpole	RMCF0805FT10K0
1	R2	RES TKF 10R 1% 1/8W SMD 0805	ROHM	MCR10EZHF10R0
1	R3	RES TKF 0R 1/8W SMD 0805	Panasonic	ERJ-6GEY0R00V
-	GND	MISC, TEST POINT MULTI PURPOSE MINI BLACK 0.040" Diameter	Keystone	5001
-	+5V	MISC, TEST POINT MULTI PURPOSE MINI RED 0.040" Diameter	Keystone	5000
-	+3.3V	MISC, TEST POINT MULTI PURPOSE MINI WHITE 0.040" Diameter	Keystone	5002

Note: Many other Manufacturer parts fit footprints for J4-J6. Part numbers shown have already been validated.

11. References

The following documents may provide further information for the Graphics Prototype Board for Curiosity Boards and related products. For further information, please visit the Microchip [Website](#), or speak with a local Microchip sales representative.

- SAM E70 Xplained Ultra User's Guide:
ww1.microchip.com/downloads/en/DeviceDoc/SAME70_Xplained_Ultra_Evaluation_User's%20Guide_DS70005389B.pdf
- SAM E54 Curiosity Ultra User's Guide:
ww1.microchip.com/downloads/en/DeviceDoc/SAME54_Curiosity_Ultra_Users_Guide_DS70005405A.pdf
- PIC32MZ DA Curiosity Board Users Guide:
ww1.microchip.com/downloads/en/DeviceDoc/PIC32MZ-DA-Curiosity-User-Guide-DS70005433A.pdf
- Curiosity PIC32MZ EF 2.0 Development Board User's Guide:
ww1.microchip.com/downloads/en/DeviceDoc/PIC32MZ-EF-2.0-Development-Board-Users-Guide-DS70005400.pdf
- Some development boards that can be used with this board:
 - [SAM E70 XPLAINED ULTRA](#)
 - [SAM E54 CURIOSITY ULTRA](#)
 - [PIC32MZ DA CURIOSITY](#)
 - [CURIOSITY PIC32MZ EF 2.0](#)

12. Revision History

Revision A - December 2021

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