



MICROCHIP

**dsPIC33A Curiosity Platform
Development Board
User's Guide**

dsPIC33A Curiosity Platform Development Board User's Guide



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Preface

NOTICE TO CUSTOMERS

All documentation becomes dated, and this manual is no exception. Microchip tools and documentation are constantly evolving to meet customer needs, so some actual dialogs and/or tool descriptions may differ from those in this document. Please refer to our website (<https://www.microchip.com>) to obtain the latest documentation available.

Documents are identified with a “DS” number. This number is located on the bottom of each page, in front of the page number. The numbering convention for the DS number is “DSXXXXXXXXA”, where “XXXXXXXX” is the document number and “A” is the revision level of the document.

For the most up-to-date information on development tools, see the MPLAB® X IDE online help. Select the Help menu, and then Topics to open a list of available online help files.

INTRODUCTION

This chapter contains general information that will be useful to know before using the dsPIC33A Curiosity Platform Development Board. Items discussed in this chapter include:

- [Document Layout](#)
- [Conventions Used in this Guide](#)
- [Recommended Reading](#)
- [The Microchip Website](#)
- [Product Change Notification Service](#)
- [Customer Support](#)
- [Document Revision History](#)

DOCUMENT LAYOUT

This user's guide provides an overview of the dsPIC33A Curiosity Platform Development Board. The document is organized as follows:

- **Chapter 1. “Overview”** – This chapter introduces the dsPIC33A Curiosity Platform Development Board and provides a brief overview of its various features.
- **Chapter 2. “Hardware”** – This chapter describes how to program/debug the board using the on-board programmer and the board's main circuit elements.
- **Appendix A. “Board Layout and Schematics”** – This appendix provides schematic diagrams for the dsPIC33A Curiosity Platform Development Board.
- **Appendix B. “Bill of Materials (BOM)”** – This appendix provides the component list used in assembling the board.

CONVENTIONS USED IN THIS GUIDE

This manual uses the following documentation conventions:

DOCUMENTATION CONVENTIONS

Description	Represents	Examples
Arial font:		
Italic characters	Referenced books	<i>MPLAB[®] IDE User's Guide</i>
	Emphasized text	...is the <i>only</i> compiler...
Initial caps	A window	the Output window
	A dialog	the Settings dialog
	A menu selection	select Enable Programmer
Quotes	A field name in a window or dialog	"Save project before build"
Underlined, italic text with right angle bracket	A menu path	<u><i>File>Save</i></u>
Bold characters	A dialog button	Click OK
	A tab	Click the Power tab
N'Rnnnn	A number in verilog format, where N is the total number of digits, R is the radix and n is a digit.	4'b0010, 2'hF1
Text in angle brackets < >	A key on the keyboard	Press <Enter>, <F1>
Courier New font:		
Plain Courier New	Sample source code	<code>#define START</code>
	Filenames	<code>autoexec.bat</code>
	File paths	<code>c:\mcc18\h</code>
	Keywords	<code>_asm, _endasm, static</code>
	Command-line options	<code>-Opa+, -Opa-</code>
	Bit values	<code>0, 1</code>
	Constants	<code>0xFF, 'A'</code>
Italic Courier New	A variable argument	<i>file.o</i> , where <i>file</i> can be any valid filename
Square brackets []	Optional arguments	<code>mcc18 [options] file [options]</code>
Curly brackets and pipe character: { }	Choice of mutually exclusive arguments; an OR selection	<code>errorlevel {0 1}</code>
Ellipses...	Replaces repeated text	<code>var_name [, var_name...]</code>
	Represents code supplied by user	<code>void main (void) { ... }</code>

RECOMMENDED READING

This user's guide describes how to use the dsPIC33A Curiosity Platform Development Board. The device-specific data sheets contain current information on programming the specific microcontroller or Digital Signal Controller (DSC) devices. The following Microchip documents are recommended as supplemental reference resources:

MPLAB® XC-DSC C Compiler User's Guide (DS50003589)

This comprehensive guide describes the usage, operation and features of Microchip's MPLAB XC-DSC C compiler for use with 16-bit devices.

MPLAB® X IDE User's Guide (DS50002027)

This document describes the installation and implementation of the MPLAB X IDE software.

THE MICROCHIP WEBSITE

Microchip provides online support via our website at <https://www.microchip.com>. This website is used to make files and information easily available to customers. Some of the available content includes:

- **Product Support** – Data sheets and errata, application notes and sample programs, design resources, user's guides and hardware support documents, the latest software releases and archived software
- **General Technical Support** – Frequently Asked Questions (FAQs), technical support requests, online discussion groups and a Microchip design partner program member listing
- **Business of Microchip** – Product selector and ordering guides, the latest Microchip press releases, a listing of seminars and events, listings of Microchip sales offices, distributors and factory representatives

PRODUCT CHANGE NOTIFICATION SERVICE

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To register, go to <https://www.microchip.com/pcn> and follow the registration instructions.

CUSTOMER SUPPORT

Users of Microchip products can receive assistance through several channels:

- Distributor or Representative
- Local Sales Office
- Embedded Solutions Engineer (ESE)
- Technical Support

Customers should contact their distributor, representative or ESE for support. Local sales offices are also available to help customers.

A listing of sales offices and locations is included in the back of this document.

Technical support is available through the website at:

<https://www.microchip.com/support>.

DOCUMENT REVISION HISTORY

Revision A (June 2024)

This is the initial release of this document.

Chapter 1. Overview

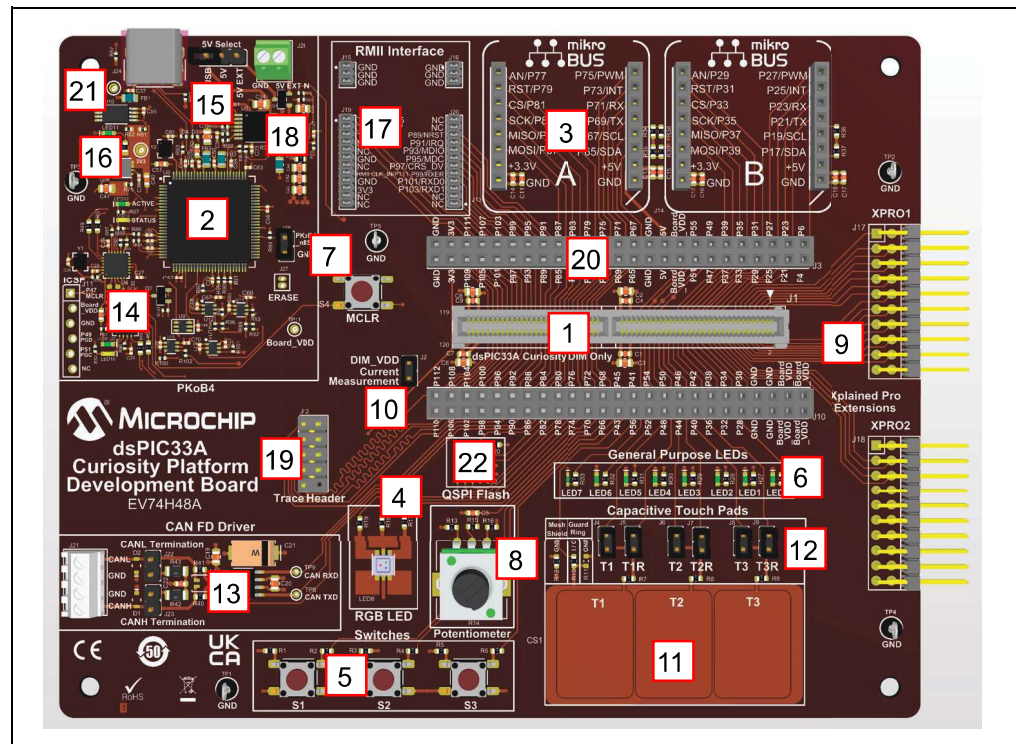
1.1 INTRODUCTION

The dsPIC33A Curiosity Platform Development Board (EV74H48A) is a full-featured development and demonstration platform enabling customers to explore the capabilities of the dsPIC33A DSC family. Board operation requires the insertion of a 120-pin General Purpose Dual In-Line Module (DIM) containing a dsPIC33A DSC device (purchased separately). The board supports custom feature expansion by providing mikroBUS™ and Xplained Pro interfaces, allowing companion development boards such as QTouch® extension boards, BIST-XPRO extension kits, various sensors and interfaces via Click boards™ to be added. Information for supported companion boards is available through the website at:

<https://www.microchip.com/en-us/development-tool/EV74H48A>.

The main hardware features of the board are highlighted in Figure 1-1.

FIGURE 1-1: dsPIC33A CURIOSITY PLATFORM DEVELOPMENT BOARD



1. dsPIC33A Curiosity DIM Connector
2. Integrated PICKit™ On-Board 4 (PKOB4) programmer/debugger
3. 2x mikroBUS™ interfaces for hardware expansion, compatible with a wide range of existing Click boards™ from MikroElektronika (<https://www.mikroe.com>)
4. 1x Red/Green/Blue (RGB) LED
5. 3x general purpose push buttons
6. 8x general purpose green indicator LEDs

7. $\overline{\text{MCLR}}$ Reset push button
8. 10k Ohm potentiometer
9. 2 Xplained Pro Extension Headers
10. 100 mil male header for current measurements of DIM_VDD
11. 3 on-board capacitive touch pads
12. 6 100 mil headers for choosing redundant analog measurements of capacitive touch pads
13. CAN/CAN-FD Driver circuit
14. 2 Channel USB Hub supporting PKOB4 programming and UART/COM channel simultaneously
15. 1x3 pin 100 mil male header to select between 5V external or 5V USB power
16. 5V to 3.3V LDO
17. 50 mil RMII interface
18. 3.3V to adjustable 3.3V or 5V boost
19. 9-pin 100 mil trace header
20. 2x25 pin 100 mil female interface header for all DIM connections
21. USB-C[®] cable connector
22. 2Mbit SQL flash memory

1.2 POWERING THE BOARD

Choose between USB or external power via the 3-pin header J25 by shunting 2 pins together.

1.2.1 USB Power

This board is intended to be primarily powered from the USB Micro-C[®] connector, J24. The official “*USB 2.0 Specification*” restricts USB applications to consume no more than 500 mA of USB VBUS power from the host. For applications higher than 500 mA, 5V should be used.

1.2.2 External Power

An external +5V VDC may optionally be connected through terminal connector J26. Care should be taken to avoid exceeding a maximum of 6V on this input or damage to the 3V3 LDO may occur.

1.2.3 Boost Circuit

In addition to the on-board 3.3V and 5V nodes, there is a power plane labeled in the schematic as “Board_VDD.” Board_VDD utilizes the on-board boost converter to power the dsPIC33A General Purpose DIMs and, depending on the DIM inserted, will output either 3.3V or 5V. This is accomplished by connecting “P55_Board_VDD_SELECT” to GND through a singular DIM pin. If a DIM is designed with a 5V dsPIC33A device, the P55_Board_VDD_Select pin will be tied to GND and the boost circuit will output 5V. Otherwise, P55_Board_VDD_Select is left floating and the boost circuit will operate in Bypass mode, outputting 3.3V.

1.3 USING THE PROGRAMMED DEMO FIRMWARE

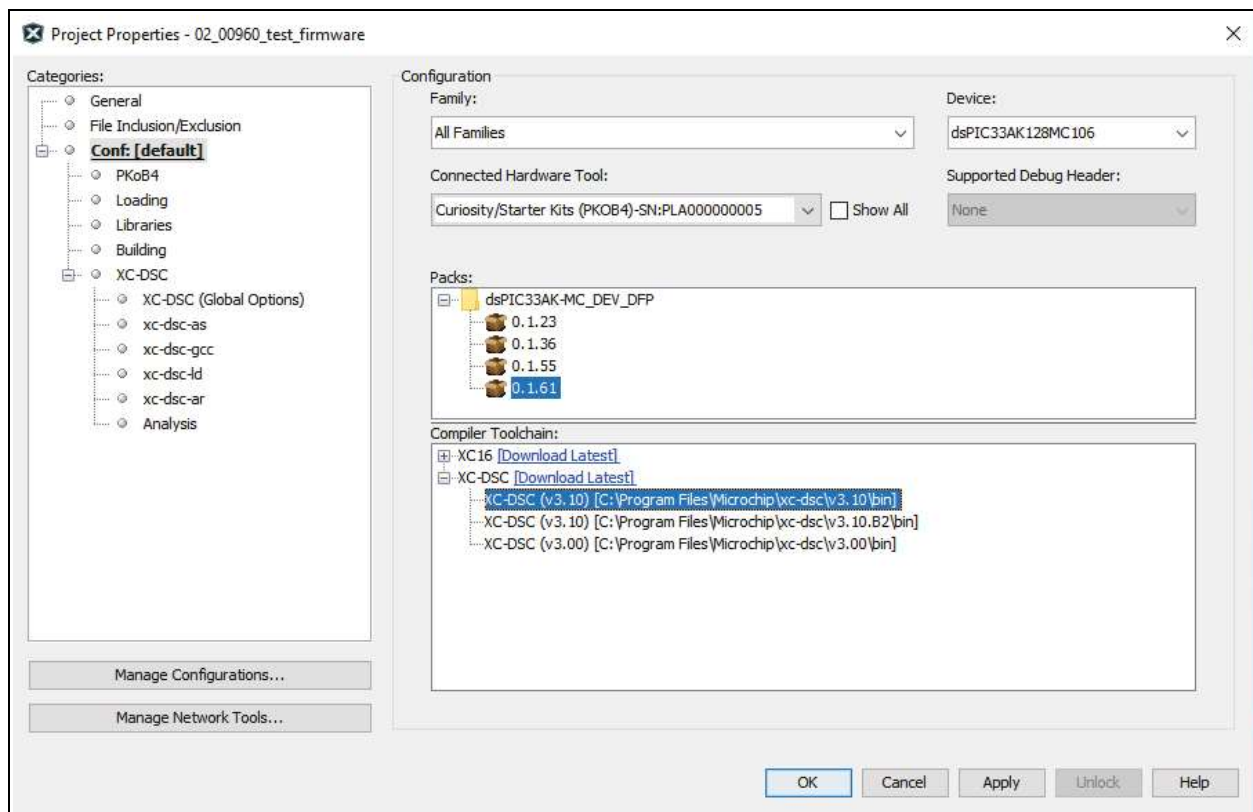
Each General Purpose DIM comes programmed with basic demo firmware which exercises several of the board hardware features, based on available pin count and modules for each device.

The source code for each demo can be obtained at:
<https://www.microchip.com/en-us/development-tool>

1.4 REPROGRAMMING AND DEBUGGING THE dsPIC33A DEVICE

The board has a PICKit™ On-Board (PKOB4) programmer/debugger circuit which can be used to program and debug any dsPIC33A target device attached through the J1 DIM connector. Alternatively, an external programmer/debugger tool can be connected to the board via the 6-pin in-line connector J11 using a male-male 100 mil pitch 6-pin header or to the 6-pin in-line connector on the DIM itself. The PKOB4 circuit should automatically enumerate and be recognized by the MPLAB X IDE, v6.15 or later, when the dsPIC33A Curiosity Platform Development Board is connected to the host via the USB Micro-C connector, J24. No custom USB driver installation is necessary as the PKOB circuit relies on standard OS provided Human Interface Device (HID) drivers; therefore, the driver installation should be fully automatic. When plugged in, the PKOB programmer/debugger tool can be selected from the MPLAB X project properties page by selecting the device under: Hardware Tools>Microchip Kits>Starter Kits (PKOB)>Curiosity/Starter Kits (PKOB4), as shown in [Figure 1-2](#).

FIGURE 1-2: DSPIC33A CURIOSITY PKOB TOOL SELECTION



NOTES:

Chapter 2. Hardware

2.1 USING THE USB-UART INTERFACE

Two USB-UART channels are available for communication from the dsPIC[®] device to a PC via the USB connector. The MCP2221A provides the first channel, and the PKOB4 provides the second. Each channel will enumerate separately and can be used simultaneously.

2.1.1 MCP2221A based USB-UART Channel

The board is equipped with a USB-UART interface based around the MCP2221A chip. The MCP2221A chip implements the standard Communication Device Class (CDC) – Abstract Control Model (ACM) protocol and, therefore, can use standard USB drivers that are provided with modern Windows[®], Mac[®] and Linux[®] operating systems. Under most operating systems, the USB driver installation will be fully automatic. Under certain older operating systems, or if the device is attached to a machine running an operating system older than Windows 10 without an active Internet connection, manual installation of the drivers may be necessary. In this case, the driver package can be downloaded from:

<https://www.microchip.com/mcp2221a>

Details on how to access the serial port from Mac and Linux operating systems can also be found in the associated collateral for the MCP2221A. Under Windows, after a successful USB driver installation, the device will appear as a “COMx” port object in which standard serial terminal programs can open/read/write to and from.

2.1.2 PKOB4 based USB-UART Channel

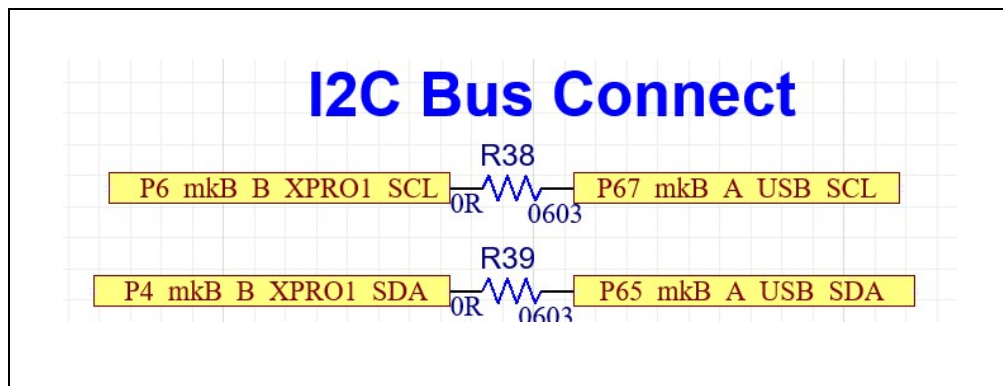
Since this board has a 2-port USB hub, it can support more than one COM channel at a time. The second COM channel is connected through the PKOB4 directly to the USB connector allowing two unique UART interfaces to be utilized from the dsPIC.

To utilize this interface, configure a UART connection to nets P102_UART_PKOB_TX and P100_UART_PKOB_RX. All nets are named assuming the perspective of the dsPIC device, and the respective device infosheet should be used to determine which pins are designated to the USB-UART channel.

2.2 USING THE I2C BUS

Several on-board functions, including mikroBus A, mikroBus B, XPRO1 and I2C to USB, support I2C capability. By default, these functions are tied together on the same I2C bus through 0 Ohm resistors R38 and R39, as shown in [Figure 2-1](#).

FIGURE 2-1: I2C BUS CONNECT



2.2.1 I2C Bus Connect - Populated

While connecting all features on a single bus may provide a more streamlined I2C experience, this also ties DIM pins P6 to P67 and P4 to P65 which limits the number of general purpose header pins that can be utilized at a time.

In this configuration, the pins for the unused I2C module should be configured as digital inputs.

2.2.2 I2C Bus Connect - Not Populated

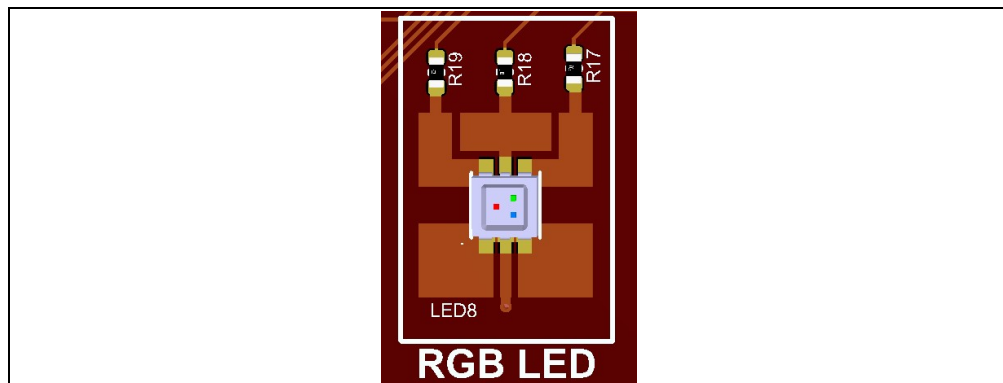
Removing R38 and R39 separates P6 and P67 as well as P4 and P65 into individually-controlled pins.

This groups the features supporting I2C into two separate I2C buses. mikroBus A and I2C to USB are supported on one bus, and mikroBus B and XPRO1 are supported on the other. If all I2C-supported features are required, two separate I2C modules will need to be configured in the dsPIC device.

2.3 RGB LED

Every General Purpose DIM is designed to support a PWM driving signal for each individual color. This design allows a wide range of color options on the RGB LED.

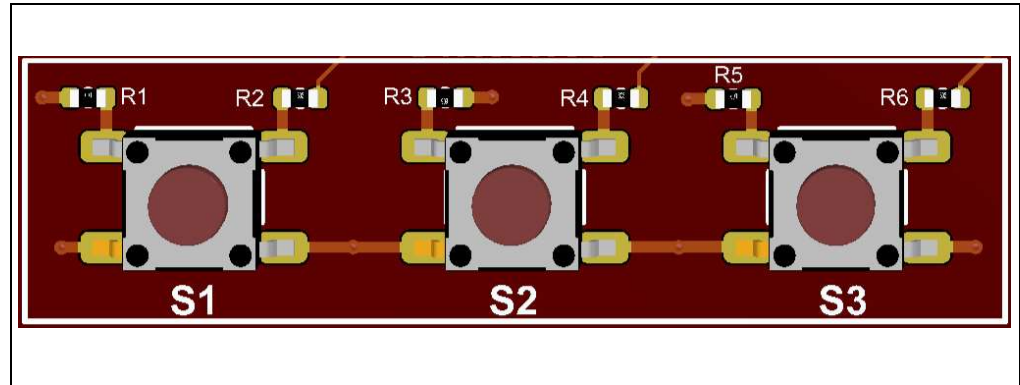
FIGURE 2-2: RGB LED



2.4 GENERAL PURPOSE PUSH BUTTONS

The general purpose push button switches each have a pull up to Board_VDD. The dsPIC IO pins should be configured as digital inputs to utilize these switches. Keep in mind that the switch is an active-low circuit.

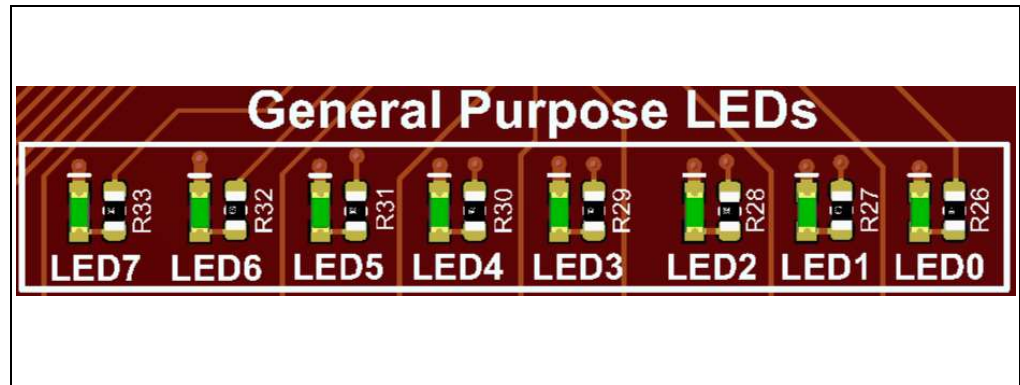
FIGURE 2-3: GENERAL PURPOSE PUSH BUTTONS



2.5 GENERAL PURPOSE GREEN INDICATOR LEDS

While the rest of the board has reference designators ordered from left to right, the general purpose LEDs are ordered from right to left to signify an MSB to LSB representation. This allows an easy display of up to 1 byte of data.

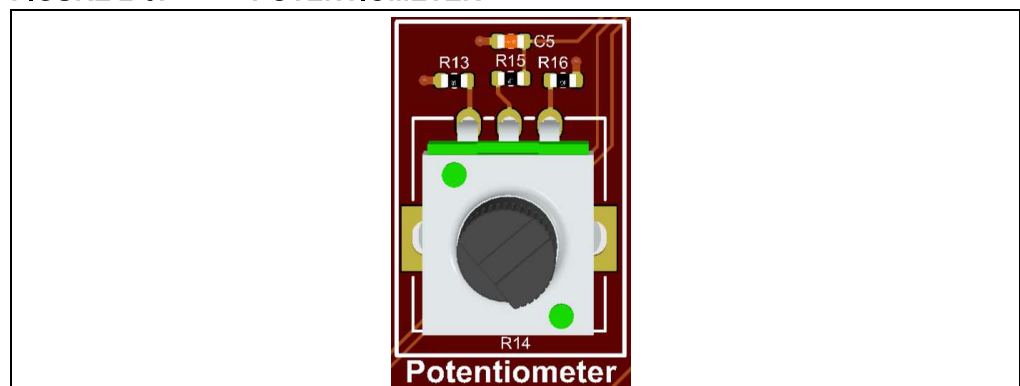
FIGURE 2-4: GENERAL PURPOSE GREEN INDICATOR LEDS



2.6 10K OHM POTENTIOMETER

The 10k Ohm potentiometer presents a simple method of providing an analog input to the 12-bit ADC on the dsPIC33A devices. A 20 Ohm resistor is placed between the potentiometer and Board_VDD, and another is placed between the potentiometer and VSS. This limits the voltage range that can be input to the ADC from just over VSS to just under Board_VDD, providing a method for detecting open and short circuit faults on the input voltage.

FIGURE 2-5: POTENTIOMETER



2.7 XPLAINED PRO EXTENSION HEADERS

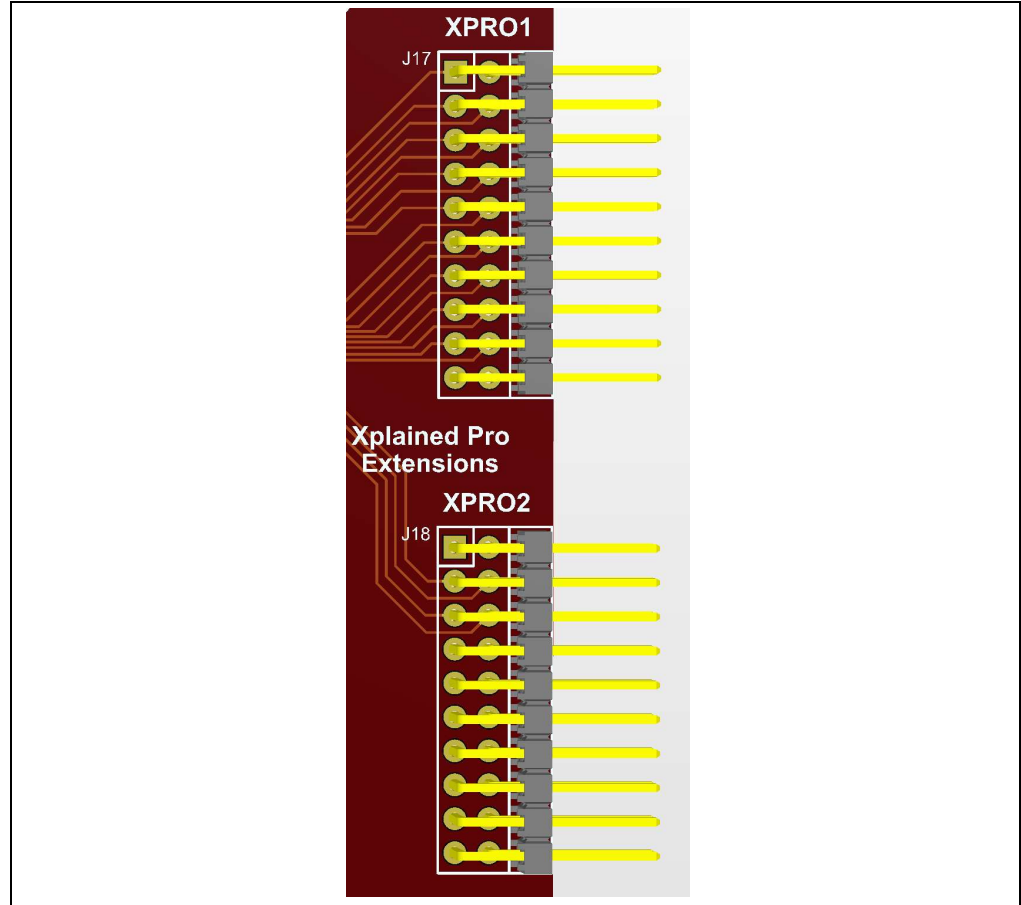
The XPLAINED PRO Extension Headers allow the use of both BIST-XPRO extension kits and QTouch extension boards. Below is a table showing the functions supported on each pin.

Note: Not all dsPIC33A General Purpose DIMs will support full functionality.

TABLE 2-1: XPLAINED PRO EXTENSION HEADER SUPPORT

EXT1	DIM Pin #	Pin Requirements	EXT2	DIM Pin #	Pin Requirements
1	15	PPS / GPIO	1	NC	NC
2	GND	GND	2	GND	GND
3	13	Analog / PPS / GPIO	3	20	Analog
4	11	Analog / PPS / GPIO	4	22	Analog
5	9	Analog / PPS / GPIO	5	24	Analog
6	7	Analog / PPS / GPIO	6	26	Analog
7	5	Analog / PPS / GPIO	7	NC	NC
8	3	Analog / PPS / GPIO	8	NC	NC
9	1	Analog / PPS / GPIO	9	NC	NC
10	2	Analog / PPS / GPIO	10	NC	NC
11	4	I2C / PPS / GPIO	11	NC	NC
12	6	I2C / PPS / GPIO	12	NC	NC
13	8	NC	13	NC	NC
14	10	NC	14	NC	NC
15	15	Analog / PPS / GPIO	15	NC	NC
16	14	Analog / PPS / GPIO	16	NC	NC
17	16	Analog / PPS / GPIO	17	NC	NC
18	18	Analog / PPS / GPIO	18	NC	NC
19	GND	GND	19	NC	GND
20	Board_VDD	Board_VDD	20	Board_VDD	Board_VDD

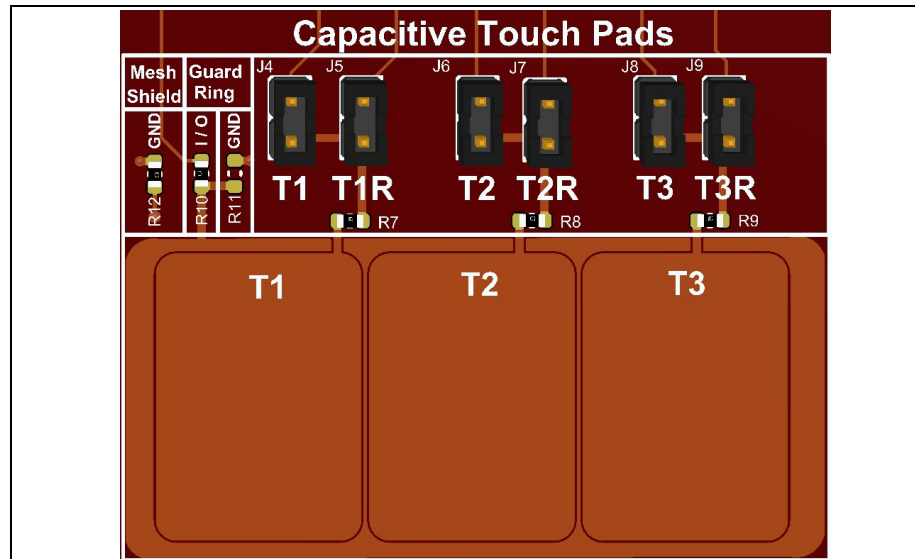
FIGURE 2-6: XPLAINED PRO HEADERS



2.8 CAPACITIVE TOUCH PADS

The out-of-box jumper configuration allows each capacitive touch pad to be read redundantly from two analog channels (Figure 2-7). For functionality purposes, only one jumper from each pair is necessary to measure the touch pad.

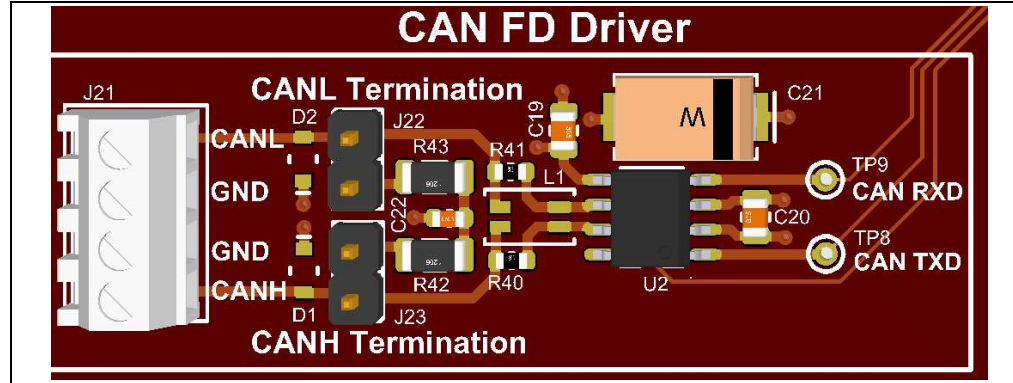
FIGURE 2-7: CAPACITIVE TOUCH PADS



2.9 CAN/CAN-FD DRIVER CIRCUIT

The CAN/CAN-FD driver circuit utilizes Microchip's ATA6563 CAN interface to communicate through a 4-pin terminal header (J21). Installing shunts on J22 and J23 connects a standard 120 Ohm termination between CANH and CANL.

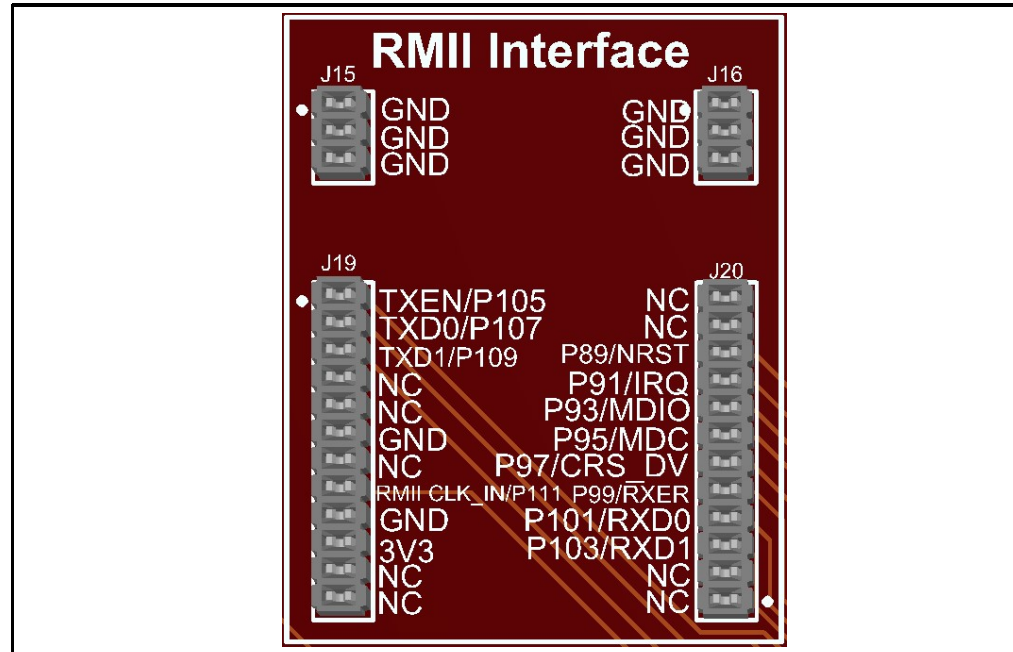
FIGURE 2-8: CAN/CAN-FD DRIVER CIRCUIT



2.10 RMII INTERFACE

The RMII Interface allows the addition of the LAN8670-RMII Evaluation Board for ethernet communication and other evaluation boards of a similar type if the feature is available on the inserted DIM.

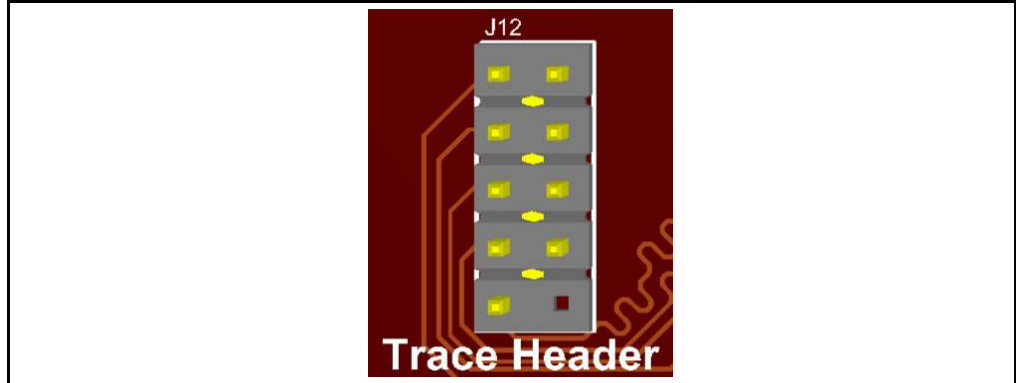
FIGURE 2-9: RMII INTERFACE



2.11 TRACE HEADER

The 9-pin trace header provides instruction trace capabilities if the feature is available on the inserted DIM.

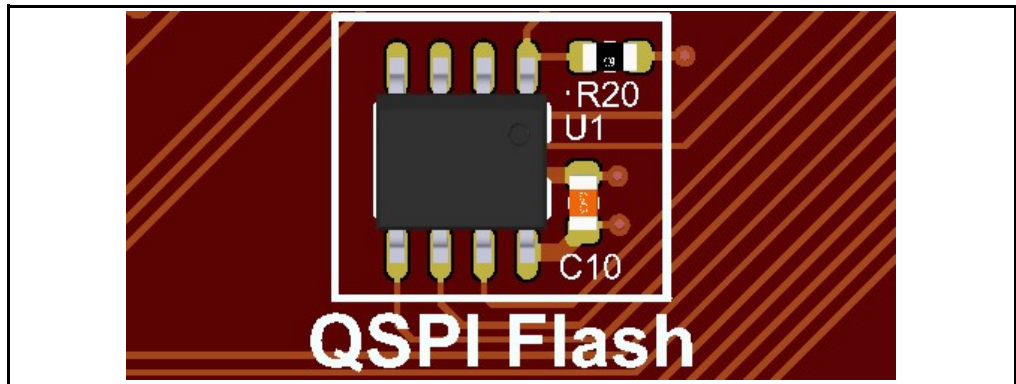
FIGURE 2-10: TRACE HEADER



2.12 2MBIT SQI FLASH MEMORY

The SST26VF020A is a Quad SPI Flash[®] memory device (QSPI or SQI) with standard SPI communication availability. When in use, the device operates in SPI mode until the command to enable QSPI mode is sent, allowing the QSPI mode to be available at all times.

FIGURE 2-11: QSPI FLASH



NOTES:

Appendix A. Board Layout and Schematics

This appendix contains the jumpers, pinout, schematics and board layouts for the dsPIC33A Curiosity Platform Development Board.

A.1 JUMPERS

Table A-1 shows the jumpers for the dsPIC33A Curiosity Platform Development Board Device.

TABLE A-1: JUMPERS

Jumper	Description
J1	dsPIC33A Curiosity GP DIM Connector.
J2	2-pin 100 mil header used for dsPIC33A Current Measurement.
J3, J10	Two 2x25 pin 100 mil female header interfaces that can be used to connect to most DIM pins for general purpose use.
J4, J5, J6, J7, J8, J9	Six 100 mil headers used to determine which analog pins from the dsPIC33A connect to each capacitive touch pad. All six channels can be connected at once, enabling redundant analog measurement for each pad.
J11	Unpopulated 6-pin staggered header interface that can be used optionally to connect an external programmer/debugger to the target DSC. The J11 header connects to the debug port. The holes are slightly staggered to provide some friction retention force without requiring physical soldering when a straight male-male or right angle male-male header is installed.
J12	9-pin 100 mil header used for Trace communication.
J13, J14	Headers used for mikroBus interface connectors A and B, respectively.
J15, J16, J19, J20	50 mil female headers used for interface with the LAN8670 RMI Evaluation Board.
J17, J18	Xplained Pro Extension Interface headers used to connect to a variety of boards.
J21	4-pin terminal connector used as the output of the CAN Driver circuit.
J22, J23	2-pin 100 mil headers that can be used as termination shunts for CANH and CANL.
J24	Micro-C USB connector. Used as a 5V power source for the board, PKOB4 programming and COM ports.
J25	3-pin header used to select input voltage between USB power (5V_USB) and external power (5V_EXT).
J26	2-pin terminal header for external 5V use.
J28	2-pin 100 mil header that can be shunted to hold PKOB4 in Reset, effectively deactivating the PKOB4 circuit.

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A.2 PINOUT

Table A-2 shows the pinout for the dsPIC33A Curiosity Platform Development Board device.

TABLE A-2: PINOUT

Name	dsPIC33A Curiosity DIM Pin		Name
P1_XPRO1_9	1	2	P2_XPRO1_10
P3_XPRO1_8	3	4	P4_mkB_B_XPRO1_SDA
P5_XPRO1_7	5	6	P6_mkB_B_XPRO1_SCL
P7_XPRO1_6	7	8	P8_XPRO1_13
P9_XPRO1_5	9	10	P10_XPRO1_14
P11_XPRO1_4	11	12	P12_XPRO1_15
P13_XPRO1_3	13	14	P14_XPRO1_16
P15_XPRO1_1	15	16	P16_XPRO1_17
NC	17	18	P18_XPRO1_18
NC	19	20	P20_XPRO2_3
P21_mkB_B_TX	21	22	P22_XPRO2_4
P23_mkB_B_RX	23	24	P24_XPRO2_5
P25_mkB_B_INT	25	26	P26_XPRO2_6
P27_mkB_B_PWM	27	28	P28_LED_0
P29_mkB_B_AN	29	30	P30_LED_1
P31_mkB_B_RST	31	32	P32_LED_2
P33_mkB_B_CS	33	34	P34_LED_3
P35_mkB_B_SCK	35	36	P36_LED_4
P37_mkB_B_MISO	37	38	P38_Cap_Touch_3R
P39_mkB_B_MOSI	39	40	P40_Cap_Touch_3
P41_S3	41	42	P42_Cap_Touch_2R
P43_S2	43	44	P44_Cap_Touch_2
P45_S1	45	46	P46_Cap_Touch_1R
P47_MCLR	47	48	P48_Cap_Touch_1
P49_PGD	49	50	P50_LED_5
P51_PGC	51	52	P52_LED_6
NC	53	54	P54_LED_7
P55_Board_VDD_Select	55	56	P56_Cap_Touch_DS
DIM_VDD	57	58	DIM_VDD
DIM_VDD	59	60	DIM_VDD
GND	61	62	GND
GND	63	64	GND
P65_mkB_A_USB_SDA	65	66	P66_POT
P67_mkB_A_USB_SCL	67	68	P68_LED_R
P69_mkB_A_TX	69	70	P70_LED_G
P71_mkB_A_RX	71	72	P72_LED_B
P73_mkB_A_INT	73	74	P74_QSPI_MOSI
P75_mkB_A_PWM	75	76	P76_QSPI_SCK

TABLE A-2: PINOUT (CONTINUED)

P77_mkB_A_AN	77	78	P78_QSPI_HOLD
P79_mkB_A_RST	79	80	P80_QSPI_WP
P81_mkB_A_CS	81	82	P82_QSPI_MISO
P83_mkB_A_SCK	83	84	P84_QPSI_CS
P85_mkB_A_MISO	85	86	P86_CAN_STBY
P87_mkB_A_MOSI	87	88	P88_CAN_TXD
P89_RMII_NRST	89	90	P90_CAN_RXD
P91_RMII_IRQ	91	92	P92_GPIO
P93_RMII_MDIO	93	94	P94_GPIO
P95_RMII_MDC	95	96	P96_UART_USB_RX
P97_RMII_CRS_DV	97	98	P98_UART_USB_TX
P99_RMII_RXER	99	100	P100_UART_PKoB_RX
P101_RMII_RXD0	101	102	P102_UART_PKoB_TX
P103_RMII_RXD1	103	104	P104_TRCLK
P105_RMII_TXEN	105	106	P106_TRDAT0
P107_RMII_TXD0	107	108	P108_TRDAT1
P109_RMII_TXD1	109	110	P110_TRDAT2
P111_RMII_CLK_IN	111	112	P112_TRDAT3
DIM_VDD	113	114	DIM_VDD
DIM_VDD	115	116	DIM_VDD
GND	117	118	GND
GND	119	120	GND

A.3 dsPIC33A CURIOSITY PLATFORM DEVELOPMENT BOARD SCHEMATICS

Figure A-1 through Figure A-7 show the board schematics.

FIGURE A-1: dsPIC33A CURIOSITY PLATFORM DEVELOPMENT BOARD SCHEMATICS, REV. 4.0 (PAGE 1 OF 7)

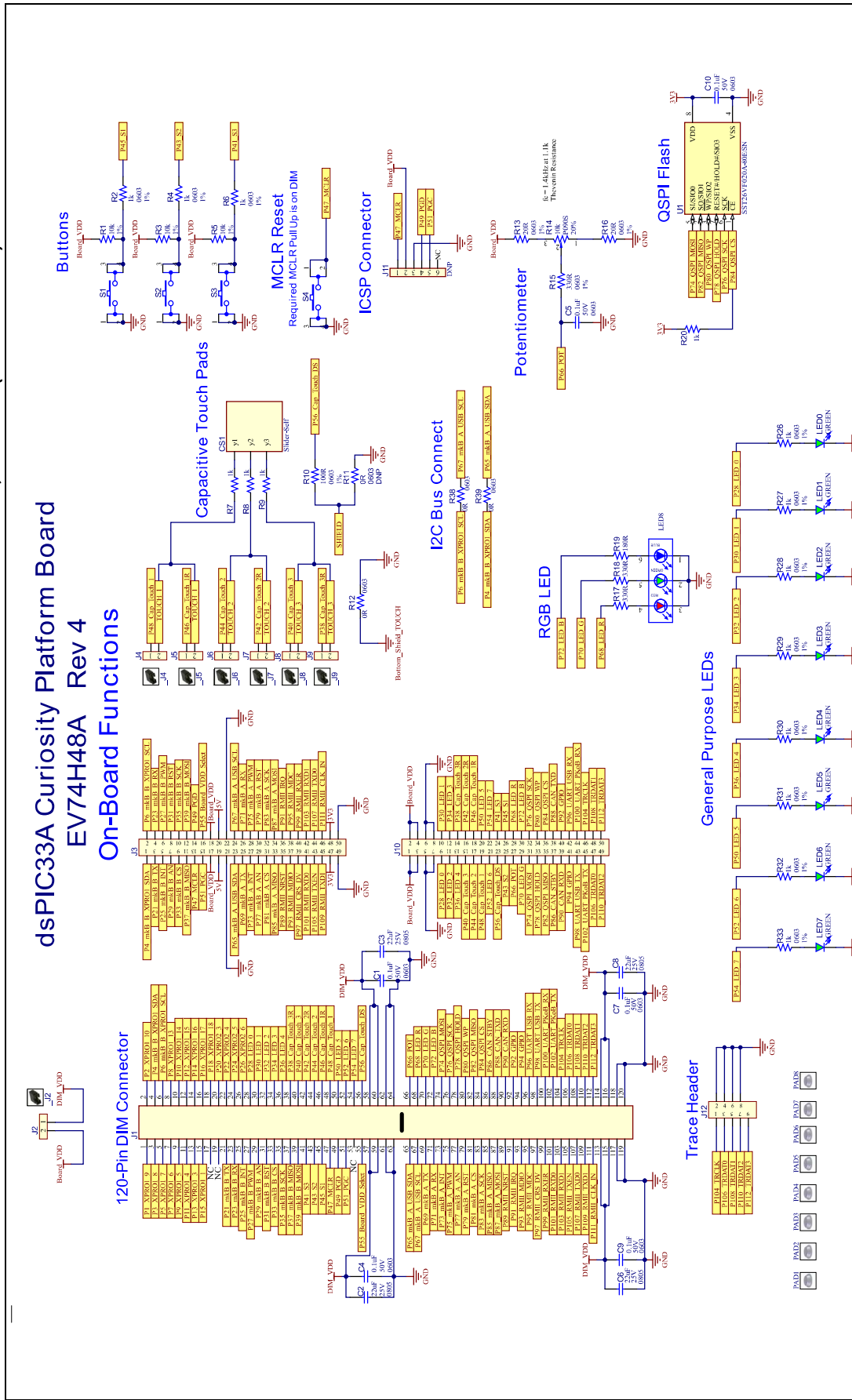


FIGURE A-2: dsPIC33A CURIOSITY PLATFORM DEVELOPMENT BOARD SCHEMATICS, REV. 4.0 (PAGE 2 OF 7)

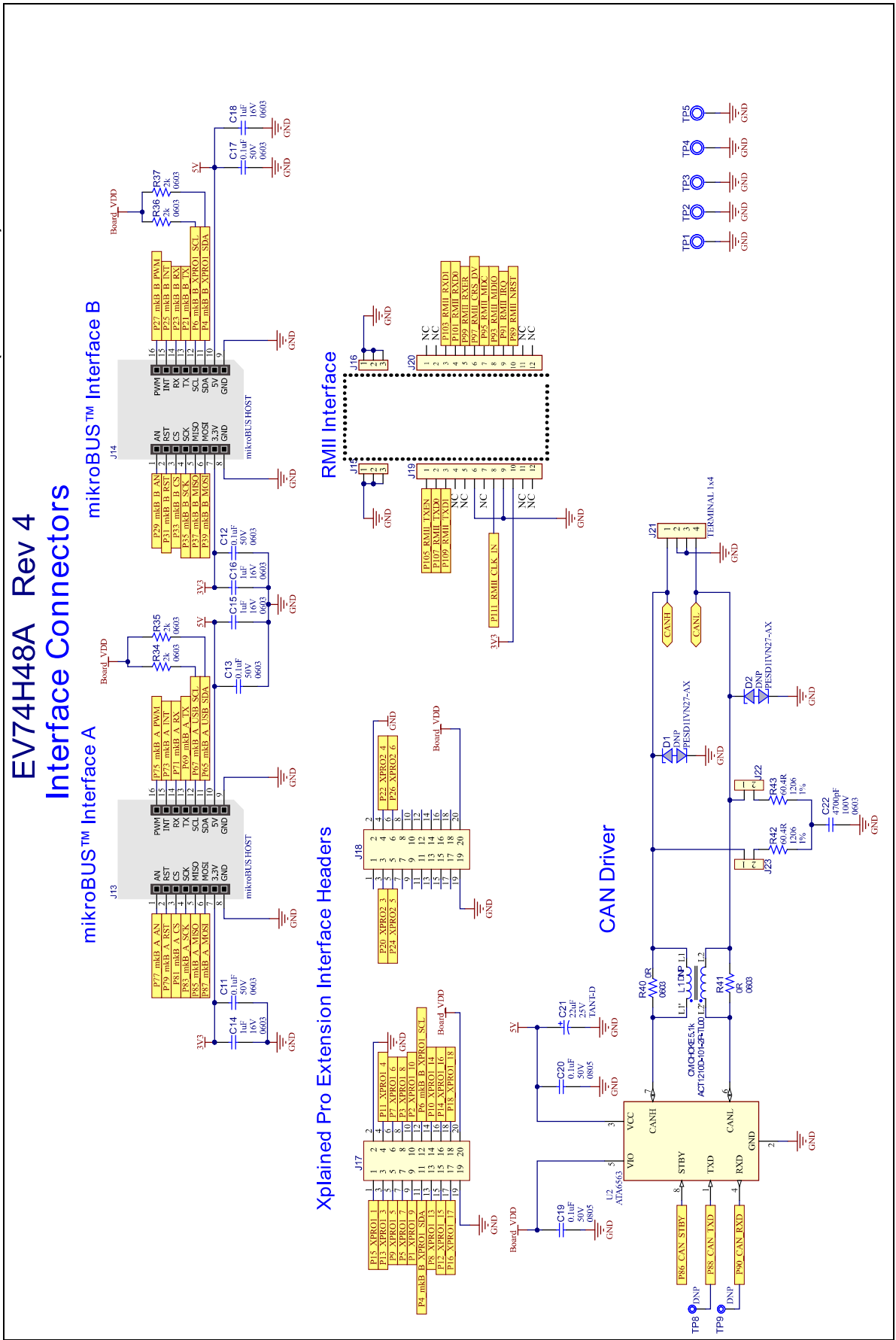


FIGURE A-3: dsPIC33A CURIOSITY PLATFORM DEVELOPMENT BOARD SCHEMATICS, REV. 4.0 (PAGE 3 OF 7)

EV74H48A Rev 4 USB COM Interface

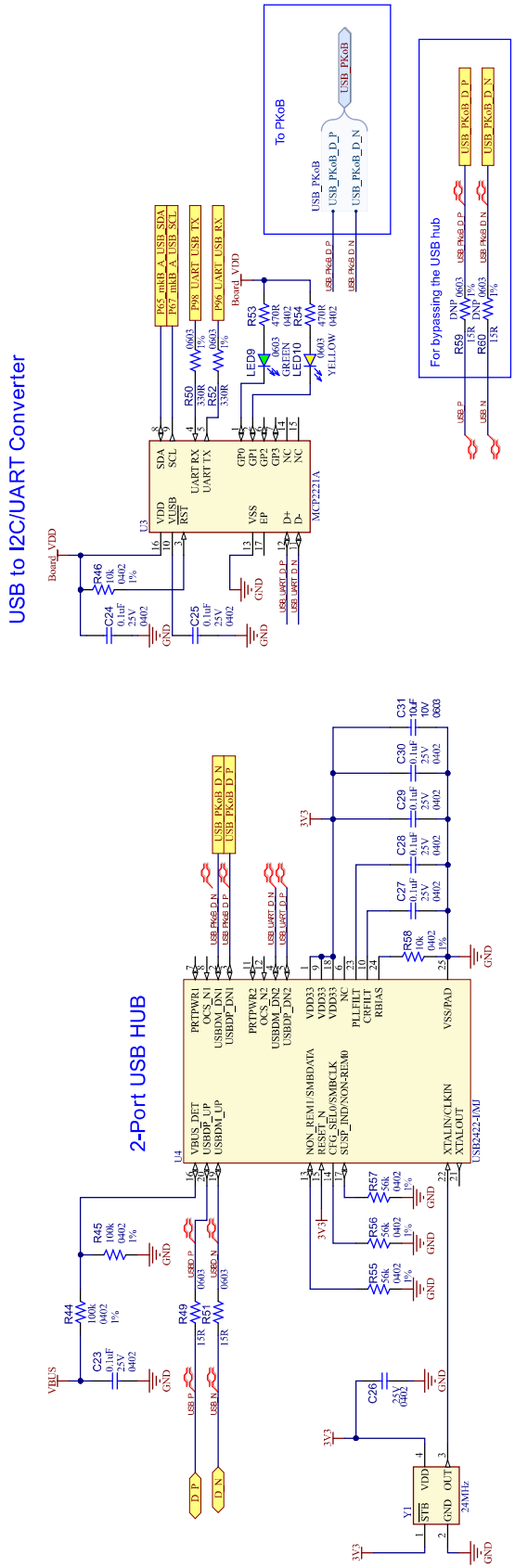


FIGURE A-4: dsPIC33A CURIOSITY PLATFORM DEVELOPMENT BOARD SCHEMATICS, REV. 4.0 (PAGE 4 OF 7)

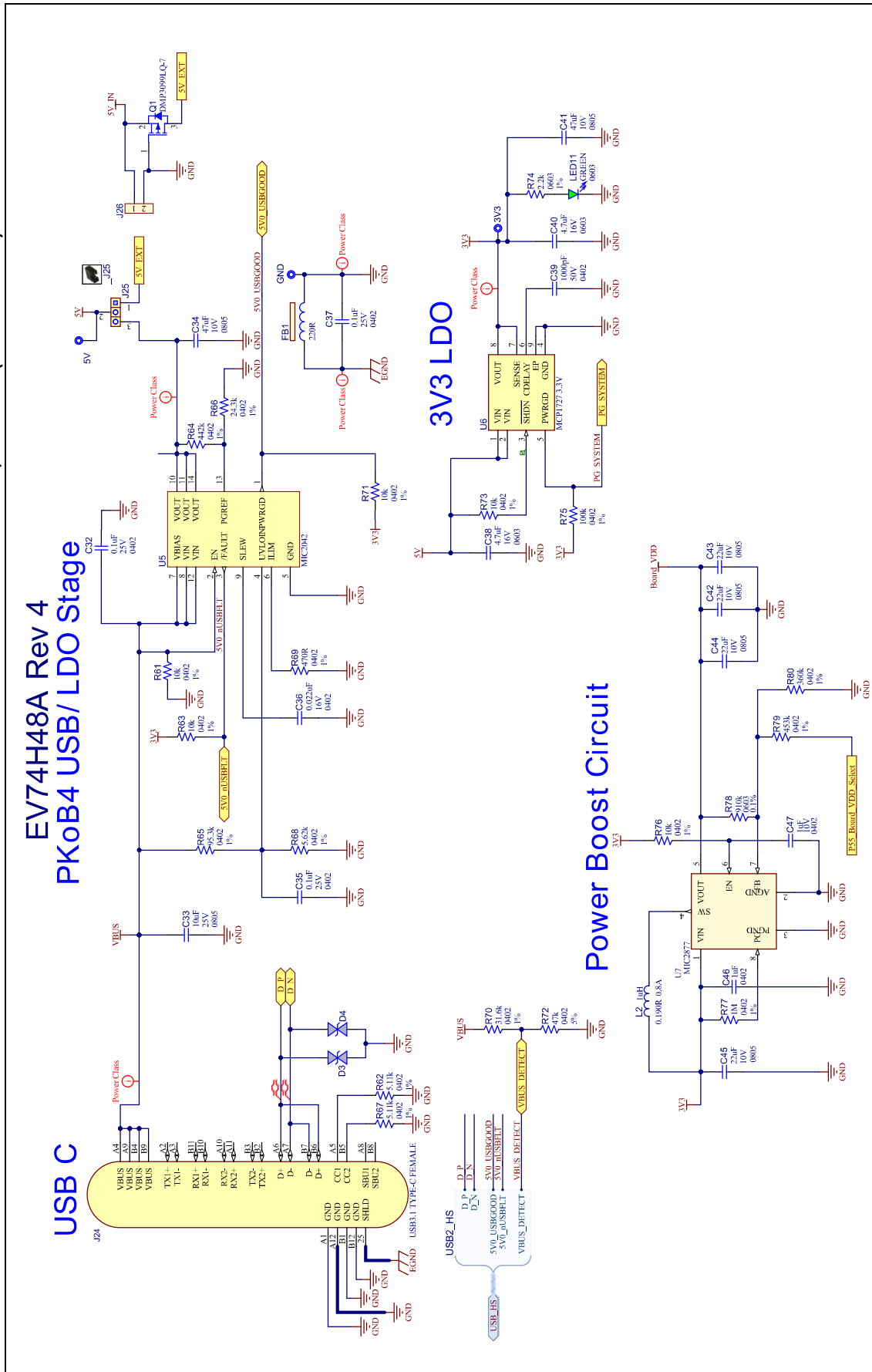


FIGURE A-5: dsPIC33A CURIOSITY PLATFORM DEVELOPMENT BOARD SCHEMATICS, REV. 4.0 (PAGE 5 OF 7)

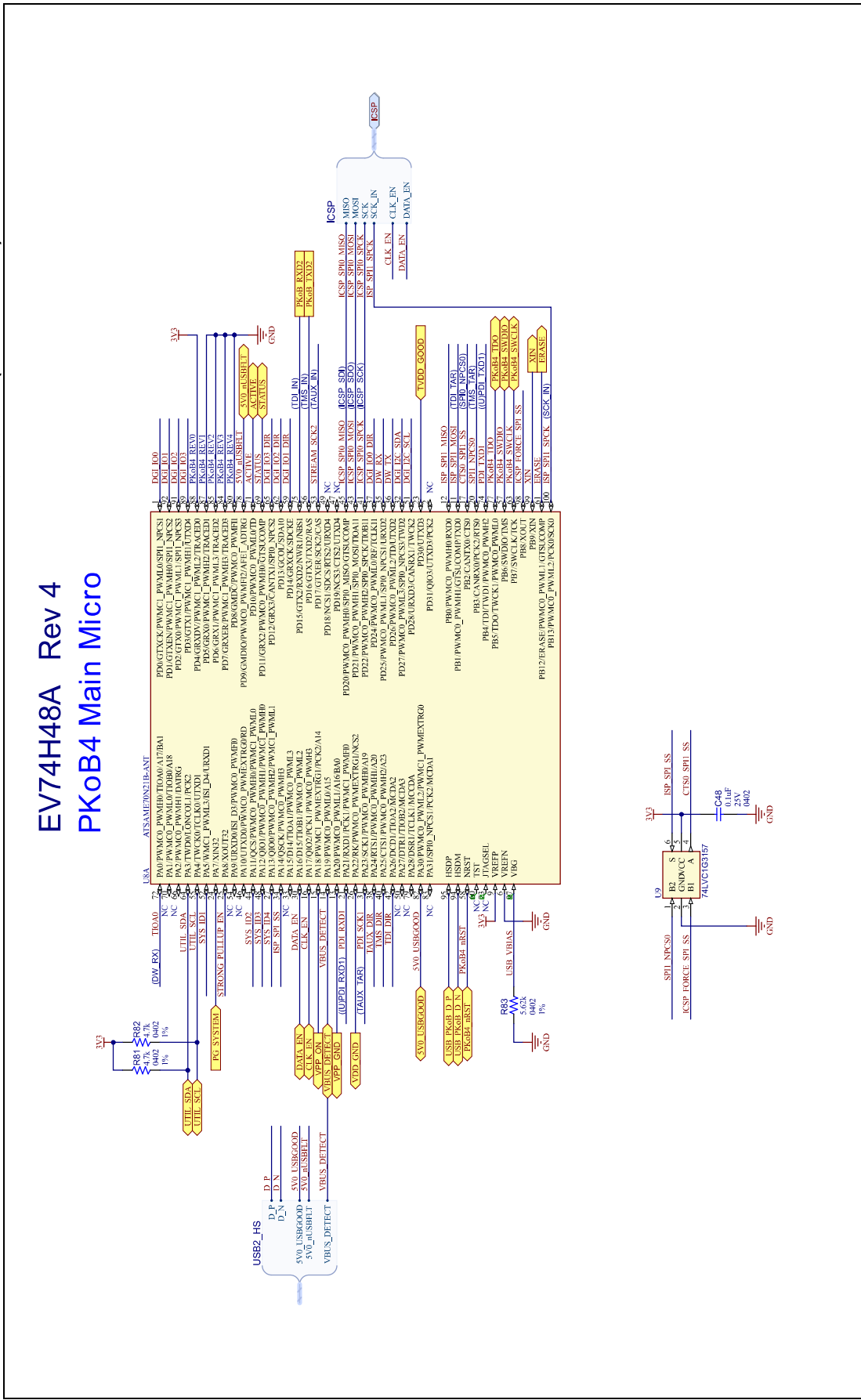


FIGURE A-6: dsPIC33A CURIOSITY PLATFORM DEVELOPMENT BOARD SCHEMATICS, REV. 4.0 (PAGE 6 OF 7)

EV74H48A Rev 4 PKoB4 Main Micro Misc.

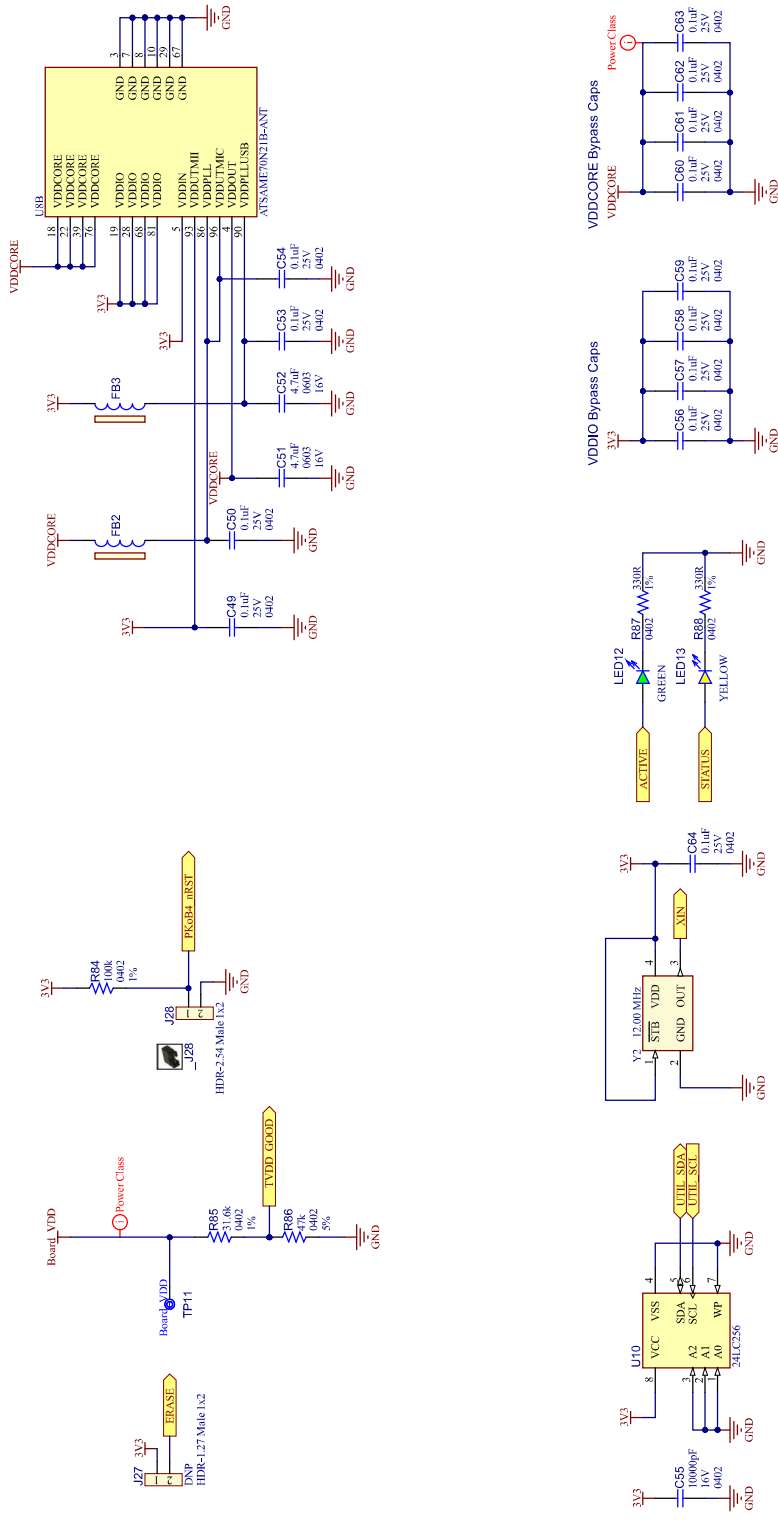
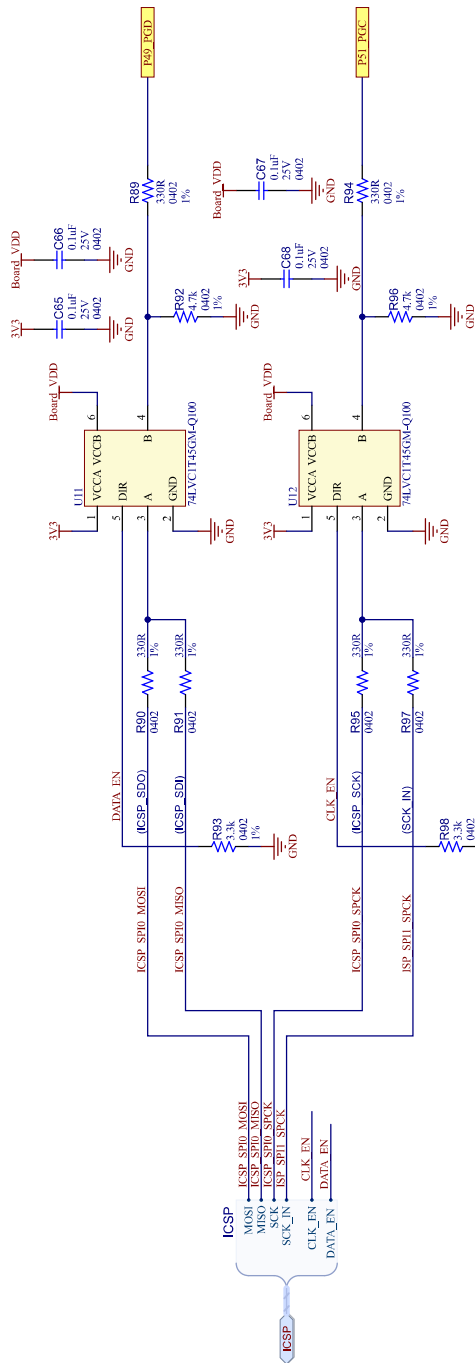


FIGURE A-7: dsPIC33A CURIOSITY PLATFORM DEVELOPMENT BOARD SCHEMATICS, REV. 4.0 (PAGE 7 OF 7)

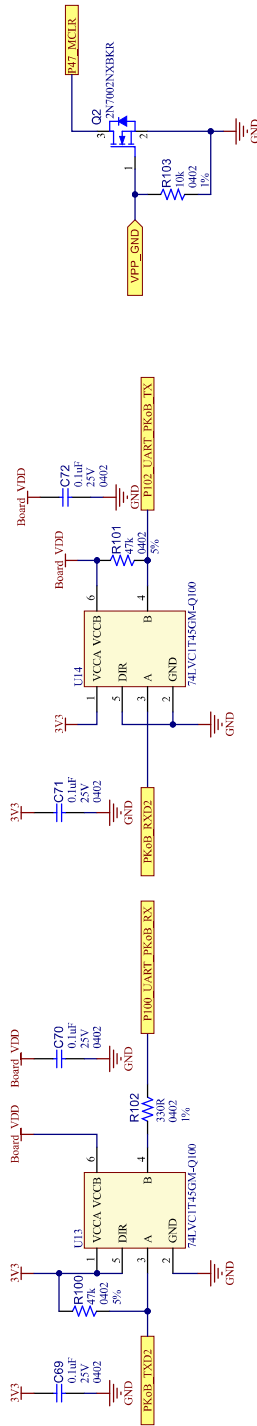
EV74H48A Rev 4

PKoB4 ICSP/UART Voltage Translators



PKoB4 VPP Switch

UART Translators



A.4 DSPIC33A CURIOSITY PLATFORM DEVELOPMENT BOARD LAYOUT, REV. 4.0

THIS PCB TO BE MANUFACTURED TO MEET ALL ACCEPTANCE LEVELS OF A CLASS 2 PCB PER ANSI/IPC-A-600G.

MATERIAL: FR-4 or Equivalent
 MULTILAYER 4 LAYERS CONTROLLED IMPEDANCE
 EXTERNAL LAYERS 35µm FINISHED
 INTERNAL LAYERS 35µm FINISHED
 Cu WEIGHT OVERALL THICKNESS 1.6 / mm ± 10 %
 COPPER THICKNESS ALLOWED YES NO

FINISH: LEAD-FREE HOT AIR LEVELING
 IMMERSION GOLD
 IMMERSION TIN
 SMOBC WITH SELECTIVE GOLD PLATING ON LANDS
 NICKEL OVER 5-10 µm NICKEL

SOLDERMASK DYNACHEM EPC 200 LPI OR EQUIVALENT
 SOLDERMASK COLOR RED HIGH GLOSS
 SILKSCREEN COLOR WHITE

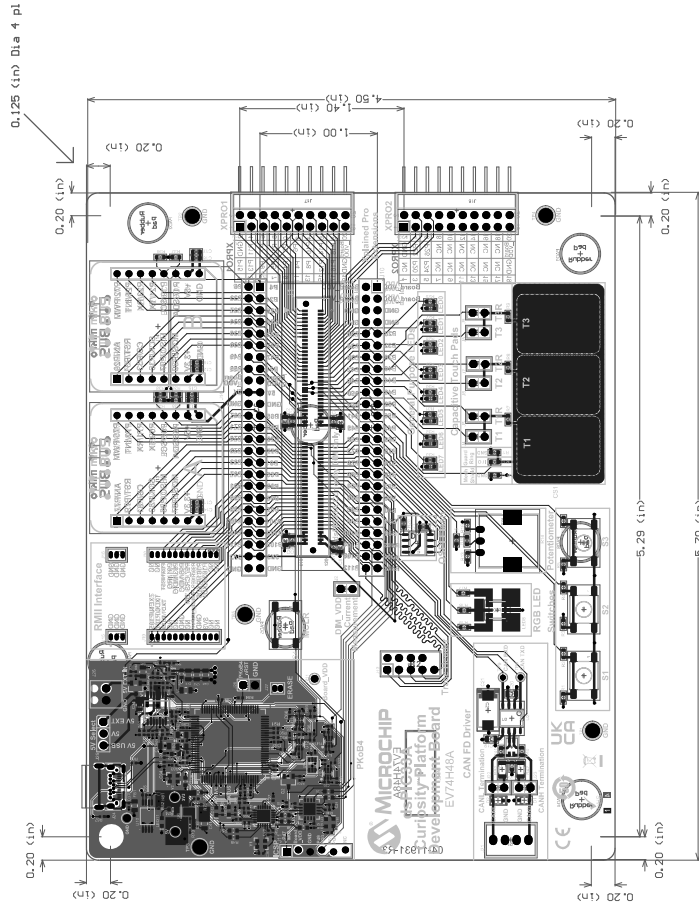
DRILLING: Blind / Burried Vias
 Via Layer Pairs Tap-Bottom

ALL HOLES TO BE LOCATED BY THE COORDINATES FROM THE NC DRILL DATA PROVIDED.

USE ARTWORK SET NO. 04-11931 PCB REV 3
 ANY ALTERNATIVES TO THE ABOVE SPECIFICATIONS MUST FIRST BE APPROVED.

Layer	Name	Material	Thickness	Control	Center
1	Top Overlay	35µm Nickel	0.00138in	3L	0.01
1	Top Prepreg	35µm Nickel	0.00138in	3L	0.01
2	Core	FR4	0.0043in	4.2	0.01
3	Prepreg	FR4	0.0043in	4.2	0.01
4	Bottom Overlay	35µm Nickel	0.00138in	3L	0.01
4	Bottom Prepreg	35µm Nickel	0.00138in	3L	0.01
5	Bottom Copper	35µm Nickel	0.00138in	3L	0.01

Test Report Reference: 0.0000in



- ASSEMBLY NOTES:**
1. ALL COMPONENTS SHALL BE MOUNTED TO THE BOARD.
 2. ALL UNUSED THROUGH HOLE COMPONENT LOCATIONS SHALL BE FREE OF SOLDER.
 3. ALL COMPONENTS SHALL BE MOUNTED FLUSH TO THE BOARD, EXCEPT AS NOTED.
 4. FINISHED BOARD SHALL BE FREE OF ALL RESIDUES.
 5. ALL LEADS SHALL BE TRIMMED TO A MAXIMUM HEIGHT OF 2mm
 6. PLACE LABEL ON THE LOCATION INDICATED.

A.5 dsPIC33A CURIOSITY PLATFORM DEVELOPMENT BOARD PCB LAYOUT

The dsPIC33A Curiosity Platform Development Board is a four-layer FR4, 1.6 mm, Plated-Through-Hole (PTH) PCB construction. Figure A-8 and Figure A-9 illustrate the PCB layers.

FIGURE A-8: dsPIC33A CURIOSITY PLATFORM DEVELOPMENT BOARD TOP SILKSCREEN AND TOP COPPER

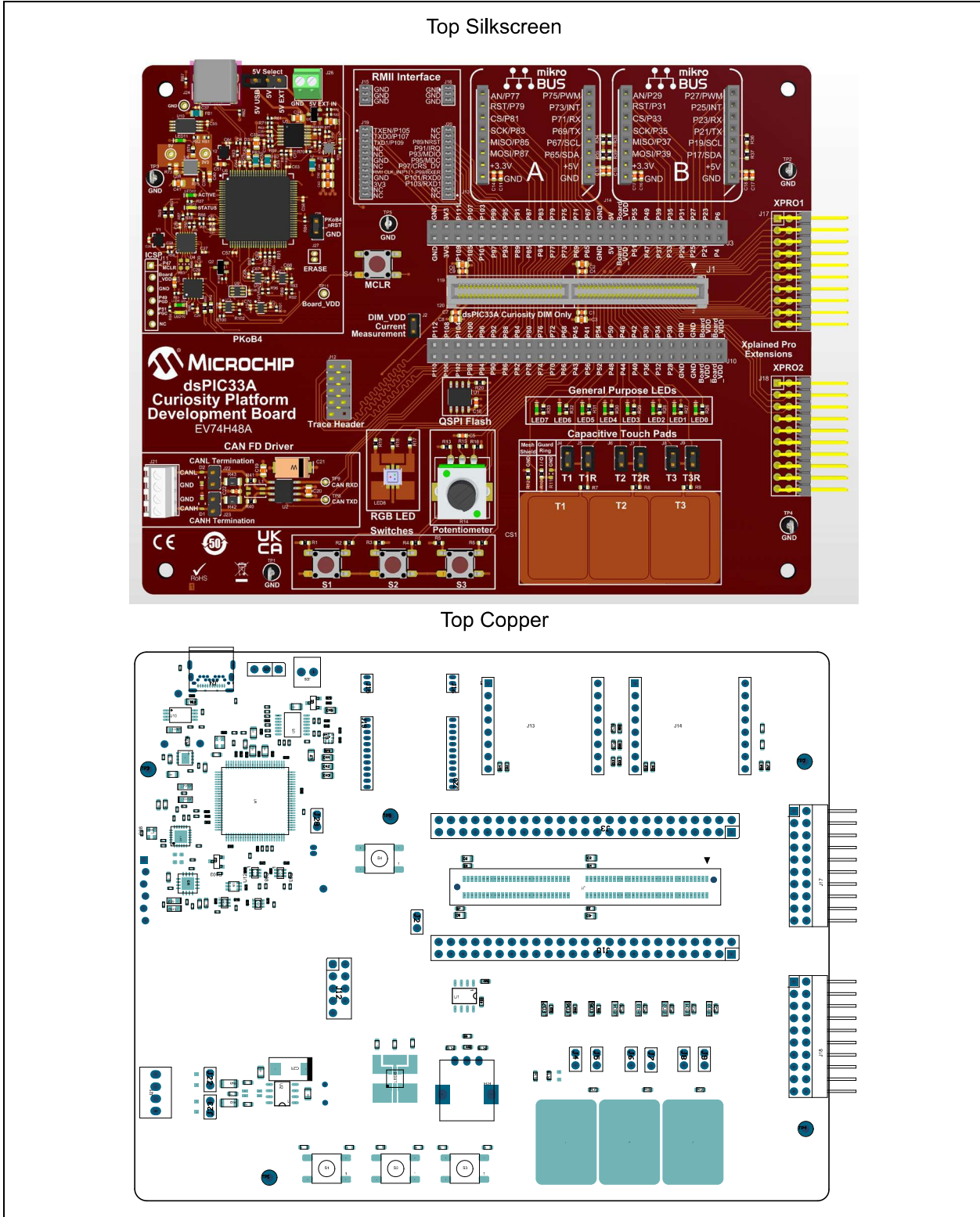
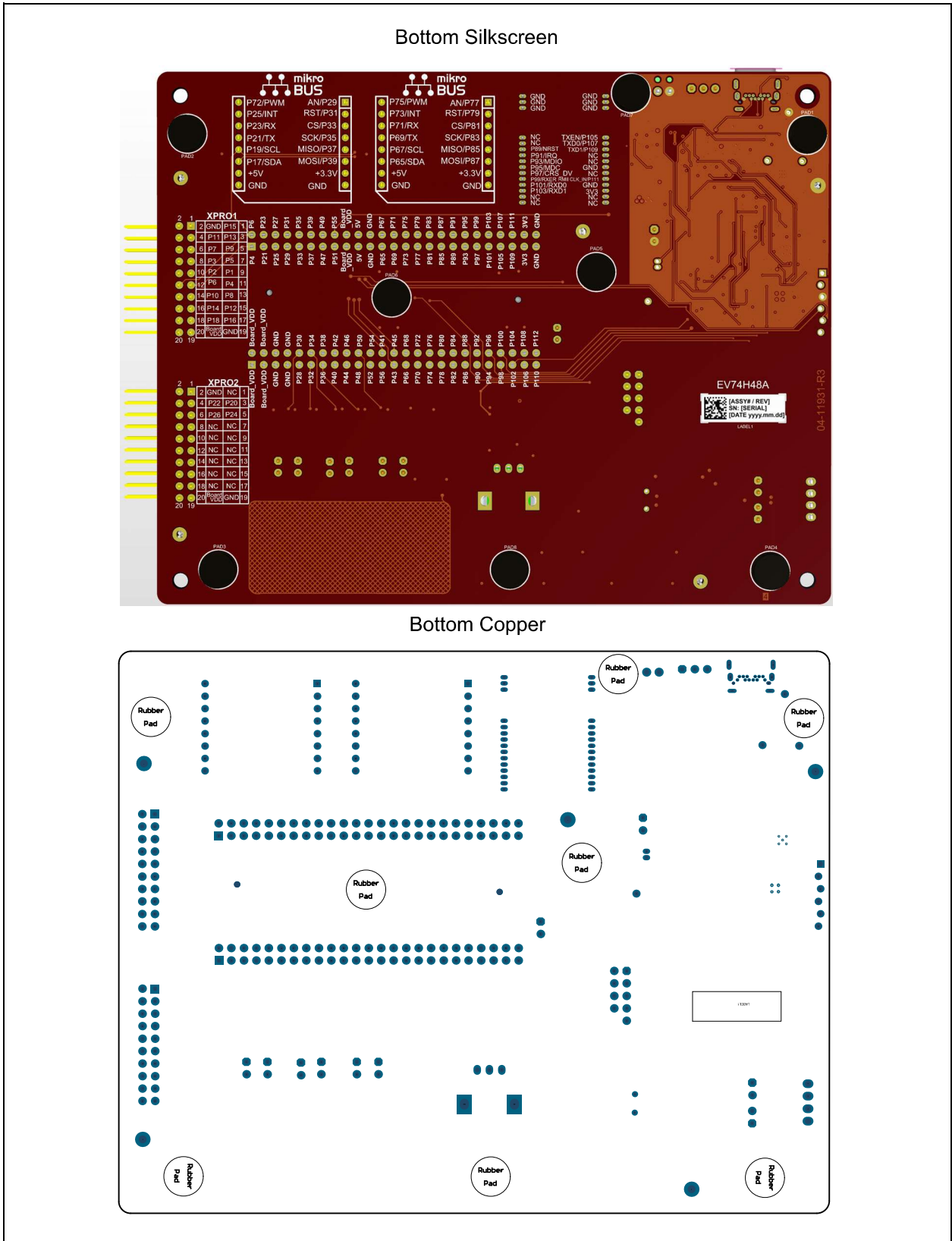


FIGURE A-9: dsPIC33A CURIOSITY PLATFORM DEVELOPMENT BOARD BOTTOM SILKSCREEN AND BOTTOM COPPER



NOTES:

Appendix B. Bill of Materials (BOM)

This appendix contains the Bill of Materials (BOMs) for the dsPIC33A Curiosity Platform Development Board.

B.1 BILL OF MATERIALS – dsPIC33A CURIOSITY PLATFORM DEVELOPMENT BOARD

Table B-1 shows the Bill of Materials for the dsPIC33A Curiosity Platform Development Board.

TABLE B-1: dsPIC33A CURIOSITY PLATFORM DEVELOPMENT BOARD BOM

Qty	Designator	Description	Manufacturer	Manufacturer Part #
9	_J2, _J4, _J5, _J6, _J7, _J8, _J9, _J25, _J28	MECH HW JUMPER 2.54mm 1x2	Sullins Connector Solutions	SSC02SYAN
10	C1, C4, C5, C7, C9, C10, C11, C12, C13, C17	CAP CER 0.1uF 50V 10% X7R SMD 0603	Yageo Corporation	CC0603KRX7R9BB104
4	C2, C3, C6, C8	CAP CER 22uF 25V 20% X5R SMD 0805	Samsung	CL21A226MAYNNNE
4	C14, C15, C16, C18	CAP CER 1uF 16V 10% X7R SMD 0603	Taiyo Yuden	EMK107B7105KA
2	C19, C20	CAP CER 0.1uF 50V 10% X7R SMD 0805	Samsung	CL21B104KBCNNNC
1	C21	CAP TANT 22uF 25V 10% 0.8Ohm SMD D	KEMET	T491D226K025AT
1	C22	CAP CER 4700pF 100V 10% X7R SMD 0603 AEC-Q200	TDK Corporation	CGA3E2X7R2A472K080AA
33	C23, C24, C25, C26, C27, C28, C29, C30, C32, C35, C37, C48, C49, C50, C53, C54, C56, C57, C58, C59, C60, C61, C62, C63, C64, C65, C66, C67, C68, C69, C70, C71, C72	CAP CER 0.1uF 25V 10% X7R SMD 0402	TDK Corporation	C1005X7R1E104K050BB
1	C33	CAP CER 10uF 25V 10% X5R SMD 0805	Murata Electronics®	GRM21BR61E106KA73L
2	C34, C41	CAP CER 47uF 10V 20% X5R 0805	Murata Electronics	GRM21BR61A476ME15K
1	C36	CAP CER 0.022uF 16V 10% X7R SMD 0402	Yageo Corporation	CC0402KRX7R7BB223
4	C38, C40, C51, C52	CAP CER 4.7uF 16V 10% X5R SMD 0603	TDK Corporation	C1608X5R1C475K080AC

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TABLE B-1: dsPIC33A CURIOSITY PLATFORM DEVELOPMENT BOARD BOM (CONTINUED)

1	C39	CAP CER 1000pF 50V 10% X7R SMD 0402	Murata Electronics	GCM155R71H102KA37D
4	C42, C43, C44, C45	CAP CER 22uF 10V 20% X5R SMD 0805 >50%C_at_3V3	Taiyo Yuden	LMK212BBJ226MG-T
2	C46, C47	CAP CER 1uF 10V 10% X5R SMD 0402	Samsung	CL05A105KP5NNNC
1	C55	CAP CER 10000pF 16V 10% X7R SMD 0402	KEMET	C0402C103K4RACTU
2	D3, D4	DIO TVS BIDIR PGB101 SMD 0402	Littelfuse®	PGB1010402KR
1	FB1	FERRITE 2A 220R SMD 0805	Murata Electronics®	BLM21PG221SN1D
2	FB2, FB3	FERRITE 2A 600R SMD 0805	TDK Corporation	MPZ2012S601AT000
1	J1	CON EDGE HTEC8 0.80mm 120P Female SMD VERT	Samtec	HTEC8-160-01-L-DV-A-K-TR
10	J2, J4, J5, J6, J7, J8, J9, J22, J23, J28	CON HDR-2.54 Male 1x2 Gold 5.84MH TH VERT	Multicomp SPC	SPC20481
2	J3, J10	CON HDR-2.54 Female 2x25 Tin TH VERT	Samtec	SSW-125-01-F-D
1	J12	CONN HEADER VERT 10POS 2.54MM	Samtec	TSW-105-07-L-D-010
2	J13, J14	SOCKET mikroBUS HOST DIP 16 TH	Sullins Connector Solutions	PPTC081LFBN-RC
2	J15, J16	CON STRIP-1.27 Female 1x3 Gold TH VERT	Samtec	SLM-103-01-L-S
2	J17, J18	CON HDR-2.54 Male 2x10 Rotated 180Degrees Gold TH RT ANGLE	Sullins Connector Solutions	PBC10DBAN
2	J19, J20	CON STRIP-1.27 Female 1x12 Gold TH VERT	Samtec	SLM-112-01-L-S
1	J21	CON TERMINAL 2.54mm 1x4 Female 20-30AWG 6A TH R/A	On-Shore Technology	OSTVN04A150
1	J24	CON USB3.0 TYPE-C FEMALE SMD R/A	Advanced-Connectek Inc.	NBR25-AK5322
1	J25	CON HDR-2.54 Male 1x3 Gold 5.84MH TH VERT	Amphenol Communications Solutions	68000103HLF
1	J26	CON TERMINAL 2.54mm 1x2 Female 20-30AWG 6A TH R/A	Phoenix Contact	1725656
1	L2	INDUCTOR 1uH 0.8A 20% SMD 0805	Murata Electronics	LQM21PN1R0MC0D
11	LED0, LED1, LED2, LED3, LED4, LED5, LED6, LED7, LED9, LED11, LED12	DIO LED GREEN 2V 30mA 35mcd Clear SMD 0603	Vishay® Lite-On	LTST-C190KGKT
1	LED8	DIO LED TRI RED, GREEN, BLUE 2.1V, 3.0V, 3.2V 50mA, 35mA, 35mA SMD 6-PLCC	Cree LED®	CLX6F-FKC-CNP1ST1E 1BB7D3D3
2	LED10, LED13	DIO LED YELLOW 2.1V 20mA 6mcd Clear SMD 0603	Vishay Lite-On	LTST-C190YKT

Bill of Materials (BOM)

TABLE B-1: dsPIC33A CURIOSITY PLATFORM DEVELOPMENT BOARD BOM (CONTINUED)

1	Q1	TRANS FET P-CH DMP3099LQ-7 -30V -3.8A 1.08W SOT-23-3	Diodes Incorporated [®]	DMP3099LQ
1	Q2	TRANS FET N-CH 2N7002NXBKR 60V 270mA 2.8R 0.4W SOT23-3	Nexperia	2N7002NXBKR
3	R1, R3, R5	RES TKF 10k 1% 1/10W SMD 0603	NIC Components Corp [®]	NRC06F1002TRF
15	R2, R4, R6, R7, R8, R9, R20, R26, R27, R28, R29, R30, R31, R32, R33	RES TKF 1k 1% 1/10W SMD 0603	Stackpole Electronics, Inc.	RMCF0603FT1K00
1	R10	RES TKF 100R 1% 1/10W SMD 0603 AEC-Q200 (Use RSMT0696)	Yageo Coporation	AC0603FR-07100RL
5	R12, R38, R39, R40, R41	RES TKF 0R 1/10W SMD 0603	Stackpole Electronics, Inc.	RMCF0603ZT0R00
2	R13, R16	RES TKF 20R 1% 1/10W SMD 0603	Panasonic [®]	ERJ-3EKF20R0V
1	R14	RES VARIABLE 10k 20% TH P090S	TT Electronics / BI Tech- nologies	P090S-14T20BR10K
5	R15, R17, R18, R50, R52	RES TKF 330R 1% 1/10W SMD 0603	Stackpole Electronics, Inc.	RMCF0603FT330R
1	R19	RES TKF 180R 1% 1/10W SMD 0603	Yageo Corporation	RC0603FR-07180RL
4	R34, R35, R36, R37	RES TKF 2k 1% 1/10W SMD 0603	Stackpole Electronics, Inc.	RMCF0603FT2K00
2	R42, R43	RES TKF 60.4R 1% 1/4W SMD 1206	Yageo Corporation	RC1206FR-0760R4L
4	R44, R45, R75, R84	RES TKF 100k 1% 1/10W SMD 0402 AEC-Q200	KOA Speer Electronics, Inc. [®]	RK73H1ETTP1003F
8	R46, R58, R61, R63, R71, R73, R76, R103	RES TKF 10k 1% 1/10W SMD 0402	Panasonic	ERJ-2RKF1002X
2	R49, R51	RES TKF 15R 1% 1/16W SMD 0603	Stackpole Electronics, Inc.	RMCF0603FT15R0
3	R53, R54, R69	RES TKF 470R 1% 1/16W MF 0402	Yageo Corporation	RC0402FR-07470RL
3	R55, R56, R57	RES TKF 56k 1% 1/16W SMD 0402	Rohm Semiconductor	MCR01MZPF5602
2	R62, R67	RES TKF 5.11k 1% 1/10W SMD 0402 AEC-Q200	KOA Speer Electronics, Inc.	RK73H1ETTP5111F
1	R64	RES TKF 442k 1% 1/16W SMD 0402	Samsung	RC1005F4423CS
1	R65	RES TKF 95.3k 1% 1/16W SMD 0402 AEC-Q200	Yageo Corporation	AC0402FR-0795K3L
1	R66	RES TKF 24.3k 1% 1/16W SMD 0402	Samsung	RC1005F2432CS
2	R68, R83	RES TKF 5.62k 1% 1/16W SMD 0402	Vishay / Dale	CRCW04025K62FKED

dsPIC33A Curiosity Platform Development Board User's Guide

TABLE B-1: dsPIC33A CURIOSITY PLATFORM DEVELOPMENT BOARD BOM (CONTINUED)

2	R70, R85	RES TKF 31.6k 1% 1/10W SMD 0402	Panasonic	ERJ-2RKF3162X
4	R72, R86, R100, R101	RES TKF 47k 5% 1/10W SMD 0402	Panasonic	ERJ-2GEJ473X
1	R74	RES TF 2.2k 1% 1/10W SMD 0603 AEC-Q200	Stackpole Electronics, Inc.	RMCF0603FT2K20
1	R77	RES TKF 1M 1% 1/10W SMD 0402	Panasonic	ERJ-2RKF1004X
1	R78	RES TF 910k 0.1% 1/16W SMD 0603	TE Connectivity	CPF0603B910KE1
1	R79	RES TKF 487K 1% 1/10W SMD 0402	Panasonic	ERJ-2RKF4873X
1	R80	RES TKF 340k 1% 1/10W SMD 0402	Panasonic	ERJ-2RKF3403X
4	R81, R82, R92, R96	RES TKF 4.7k 1% 1/16W SMD 0402	Yageo Corporation	RC0402FR-074K7L
9	R87, R88, R89, R90, R91, R94, R95, R97, R102	RES TKF 330R 1% 1/16W SMD 0402	Yageo Corporation	RC0402FR-07330RL
2	R93, R98	RES TKF 3.3k 1% 1/10W SMD 0402	Panasonic	ERJ-2RKF3301X
4	S1, S2, S3, S4	SWITCH TACT SPST 12V 50mA PTS645SM43SMTR92 LFS SMD	C&K Switches [®]	PTS645SM43SMTR92LFS
5	TP1, TP2, TP3, TP4, TP5	CON TP LOOP Black TH	Keystone Electronics [®]	5011
1	U9	IC SWITCH SPDT 74LVC1G3157 SC-70-6	Rochester Electronics [®]	SN74LVC1G3157DCKR
4	U11, U12, U13, U14	IC TRANSCEIVER 74LVC1T45GM or 74LVC1T45GW Single Bit Voltage Translator SOT-886 SOT-363 Dual FP	Nexperia	74LVC1T45GM,115
Microchip Parts listed below				
1	U1	MCHP MEMORY SERIAL FLASH 16M 104MHz SST26VF020A-80E/SN SOIC-8	Microchip Technology	SST26VF020A-80E/SN
1	U2	MCHP INTERFACE CAN ATA6563-GAQW1 SOIC-8	Microchip Technology	ATA6563-GAQW1
1	U3	MCHP INTERFACE USB I2C/UART MCP2221A-I/ML QFN-16	Microchip Technology	MCP2221A-I/ML
1	U4	MCHP INTERFACE USB 2.0 HS 2 PORT HUB CTRLR QFN-24 USB2422-I/MJ	Microchip Technology	USB2422-I/MJ
1	U5	MCHP ANALOG POWER SWITCH 5.5V 3A MIC2042-1YTS TSSOP-14	Microchip Technology	MIC2042-1YTS
1	U6	MCHP ANALOG LDO 3.3V MCP1727-3302E/MF	Microchip Technology	MCP1727-3302E/MF

Bill of Materials (BOM)

TABLE B-1: dsPIC33A CURIOSITY PLATFORM DEVELOPMENT BOARD BOM (CONTINUED)

1	U7	MCHP ANALOG SWITCHER Boost 3V to 5.5V MIC2877-AYFT-TR FTQFN-8	Microchip Technology	MIC2877-AYFT-TR
1	U8	MCHP MCU 32-BIT 300MHz 2MB 384kB ATSAME70N21B-ANT LQFP-100	Microchip Technology	ATSAME70N21B-ANT
1	U10	MCHP MEMORY SERIAL EEPROM 256k I2C 24LC256T-E/ST TSSOP-8	Microchip Technology	24LC256T-E/ST
1	Y1	MCHP OSC MEMS DSC6011- JI2B-024.0000_2.5LX2.0WX0. 89H_LGA	Microchip Technology	DSC6011JI2B-024.0000
1	Y2	MCHP CLOCK OSCILLATOR SINGLE 12.000MHZ DSC6011JI1B-012.0000 VLGA	Microchip Technology	DSC6011JI1B-012.0000
Mechanical Parts to be added in the package				
1	LABEL1	LABEL PCBA 18x6mm Data- matrix Assy# / Rev / Serial / Date	ACT Logimark AS [®]	505462
8	PAD1, PAD2, PAD3, PAD4, PAD5, PAD6, PAD7, PAD8	MECH HW RUBBER PAD Cylindrical flat top D8H2.8 Black	3M [™]	SJ5076BLACK
PCB				
1	PCB1	Printed Circuit Board		04-11931-R3
Do Not Populate Parts listed below				
2	D1, D2	DIO TVS PESD11VN27-AX 45V 3A SOD-323	Nexperia	PESD11VN27-AX
1	J11	CON HDR-2.54 Male 1x6 Staggered DNP	Sullins Connector Solu- tions	PBC36SAAN
1	J27	CON HDR-1.27 Male 1x2 Gold TH VERT	Harwin	M50-3530242
1	L1	CM CHOKE 5.1k@10MHz 1.5R SMD 1210 AEC-Q200	TDK Corporation	ACT1210D-101-2P-TL00
1	R11	RES TKF 0R 1/10W SMD 0603	Stackpole Electronics, Inc.	RMCF0603ZT0R00
2	R59, R60	RES TKF 15R 1% 1/16W SMD 0603	Stackpole Electronics, Inc.	RMCF0603FT15R0

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