



EV64F02A
Mixed Signal Data Capture
Evaluation 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 (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® 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 EV64F02A Mixed Signal Data Capture Evaluation Board. Items discussed in this chapter include:

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

DOCUMENT LAYOUT

This document describes how to use the EV64F02A Mixed Signal Data Capture Evaluation Board to emulate and debug firmware on a target board. The manual layout is as follows:

- **Chapter 1. “Product Overview”** – Important information about the EV64F02A Mixed Signal Data Capture Evaluation Board.
- **Chapter 2. “Installation and Operation”** – Includes instructions on how to get started with the EV64F02A Mixed Signal Data Capture Evaluation Board.
- **Chapter 3. “Hardware Description”** – Detailed information about the EV64F02A Mixed Signal Data Capture Evaluation Board.
- **Appendix A. “Schematic and Layouts”** – Shows the schematic and layout diagrams for the EV64F02A Mixed Signal Data Capture Evaluation Board.
- **Appendix B. “Bill of Materials (BOM)”** – Lists the parts used to build the EV64F02A Mixed Signal Data Capture Evaluation 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	#define START
	Filenames	autoexec.bat
	File paths	c:\mcc18\h
	Keywords	_asm, _endasm, static
	Command-line options	-Opa+, -Opa-
	Bit values	0, 1
	Constants	0xFF, 'A'
Italic Courier New	A variable argument	<i>file.o</i> , where <i>file</i> can be any valid filename
Square brackets []	Optional arguments	mcc18 [options] <i>file</i> [options]
Curly brackets and pipe character: { }	Choice of mutually exclusive arguments; an OR selection	errorlevel {0 1}
Ellipses...	Replaces repeated text	var_name [, var_name...]
	Represents code supplied by user	void main (void) { ... }

RECOMMENDED READING

This user's guide describes how to use the EV64F02A Mixed Signal Data Capture Evaluation Board. The following Microchip documents is available and recommended as a supplemental reference resource.

- **MCHP USB-to-TCP Bridge Service User's Guide (DS50003749)**

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- Local Sales Office
- Embedded System Engineer (ESE)
- Technical Support

Customers should contact their distributor, representative or field application engineer (FAE) 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 (September 2024)

- Initial release of this document.

Chapter 1. Product Overview

1.1 INTRODUCTION

The EV64F02A Mixed Signal Data Capture Board provides a flexible platform for communicating with sensors using the I²C, SPI and SQI protocols.

The EV64F02A has a USB connector to connect to a computer for device communication. The Mixed Signal Data Capture Board device contains a PIC32MZ micro able to communicate to two MikroE Click headers via SPI or I²C as well as a SQI header. An onboard Power monitor, the PAC1944, allows the user to monitor the 3.3V and 5V rails powering the Click and QSPI headers.

The EV64F02A is delivered with a bootloader that allows the user to program the MCU via the MCHP USB to TCP Bridge Service. The Bridge Service software and user's guide is available on the Microchip website: www.microchip.com.

1.2 MIXED SIGNAL DATA CAPTURE BOARD DEVICE FEATURES

The Mixed Signal Data Capture Board is a system to evaluate mixed signal devices using I²C, SPI or SQI protocols. The platform also allows for easily changing the firmware via a bootloader to evaluate different products.

The data capture board is powered by either USB or an external 5V supply. A PIC32MZ controller is used to communicate to two MikroE Click bus headers, a SQI header and a PAC1944 power monitor device.

1.3 EV64F02A EVALUATION BOARD FOR MIXED SIGNAL DATA CAPTURE BOARD

1.3.1 Hardware Overview

The EV64F02A Evaluation Board consists of multiple headers for communication and to supply power to the board. An ICD header is also available should the user need to program an alternative firmware, bypassing the internal bootloader.

See [Chapter 3. “Hardware Description”](#) for more details.

1.4 SOFTWARE AND SYSTEM CONTROL OVERVIEW

The EV64F02A provides quick path to communicate to mixed signal products using the MikroE click headers. The board, however, is delivered to the user with only a bootloader, no additional software is provided with the board.

A GUI is available to take advantage of this and provide an easy visualization and control setup and is linked to on the product page. FW is available via the GUI or through other links on the product page.

While the GUI provides a quick and easy bring up for any generic I²C or SPI product, further development will be done using alternate firmware for various Microchip products in the future. All these capabilities will be linked to on the EV64F02A product page.

1.5 EVALUATION BOARD KIT CONTENTS

The Mixed Signal Data Capture Board Evaluation Board Kit contains:

- The EV64F02A Mixed Signal Data Capture Evaluation Board
- USB cable
- Important Information Sheet

Chapter 2. Installation and Operation

2.1 GETTING STARTED

This section describes how to power-up and interface with the EV64F02A Mixed Signal Data Capture Evaluation Board. Items discussed in this chapter include:

- System requirements
- Installing the driver

2.2 SYSTEM REQUIREMENTS

The EV64F02A Mixed Signal Data Capture Evaluation Board is designed to be used with a personal computer (desktop or laptop) running Microsoft® Windows® 7 or later. For USB connectivity, the minimal physical requirement for the PC is a standard type-A USB 2.0 port.

2.3 INSTALLING THE DRIVER

The Mixed Signal Data Capture board requires a “Windows Driver”. The firmware implements the Windows Compatible ID (WCID) mechanism to auto-select the WinUSB driver and in normal cases no further action is needed.

In case manual installation of the driver is required, please follow the steps:

1. Go to Device Manager.
2. Under the “Other Devices” category double-click the “PIC32MZ Generic USB Bridge” device.
3. Select the “Driver” Tab and click the “Update Driver” button.
4. Select “Browse my computer for drivers”.

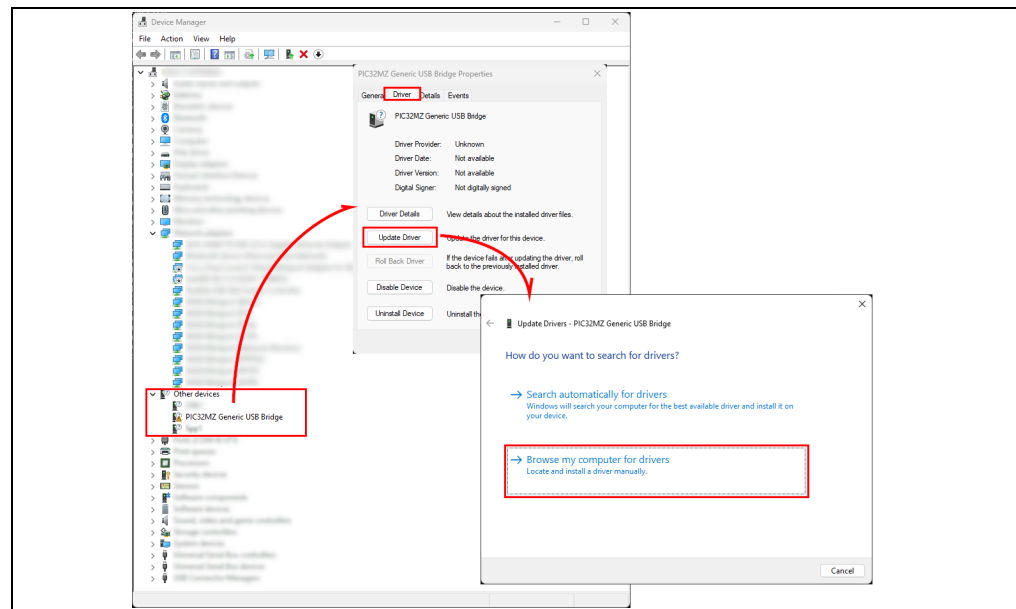


FIGURE 2-1: Driver Installation.

5. Select “Let me pick from a list of available drivers on my computer”.
6. From the list, select “Universal Serial Bus devices”.
7. Click the “Next” Button.

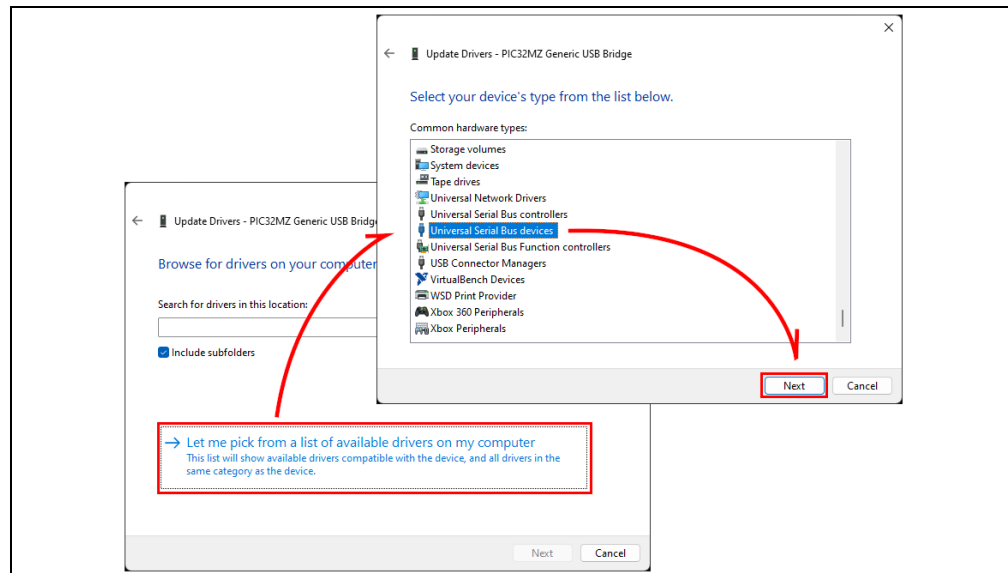


FIGURE 2-2: Device Driver Selection.

8. From the “Manufacturer” List select “WinUsb Device”.
9. From the “Model” List select “WinUsb Device”.
10. Click the “Next” button and acknowledge the compatibility warning.

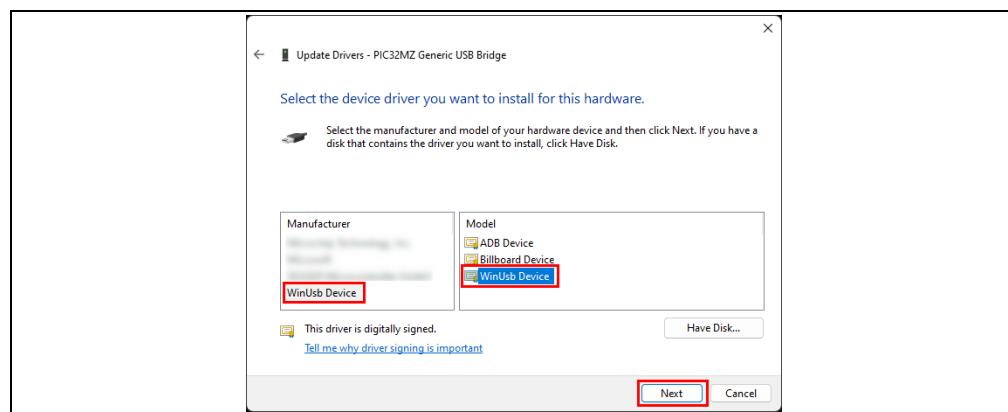


FIGURE 2-3: Device Driver Selection.

11. Acknowledge all windows.
12. The device should now appear under “Universal Serial Bus Devices”.

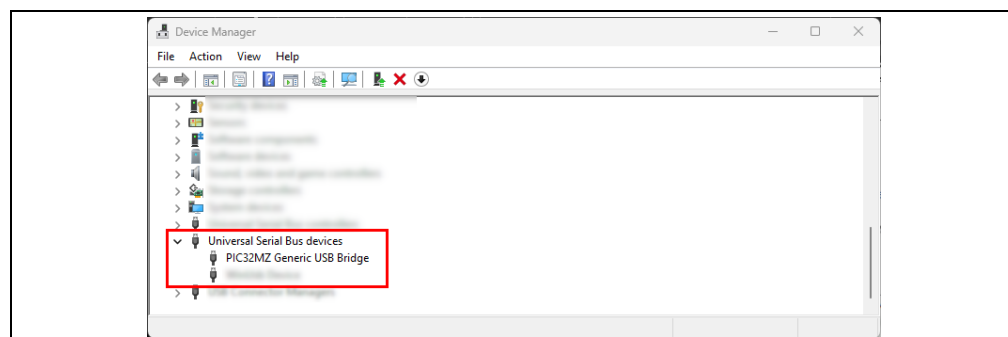


FIGURE 2-4: Device Driver Installed As Shown in Device Manager.

2.4 INSTALLING THE SOFTWARE

The Mixed Signal Data Capture board is delivered with only the bootloader programmed to the microcontroller. This bootloader communicates via the Bridge Service to allow various firmware to be programmed to memory.

A GUI that is available for generic control of the Mixed Signal Data Capture card will also program the necessary firmware needed for it to communicate to the hardware, and a link is provided is on the product page.

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Chapter 3. Hardware Description

3.1 HARDWARE

The PIC32MZ is located in the center of the board with MikroE Click headers to either side. A MicroUSB connector is provided on the top of the board while a 5V external connection is available on the right side of the board. The SCL header is to the left on the edge of the board, while a standard PICKit™ Serial connector (UART + I²C) is provided on the right side of the board. A PAC1944 (U4) is connected to the PIC32MZ on its own bus, allowing the user to measure the power into the MikroE Click headers or the SCL connector.

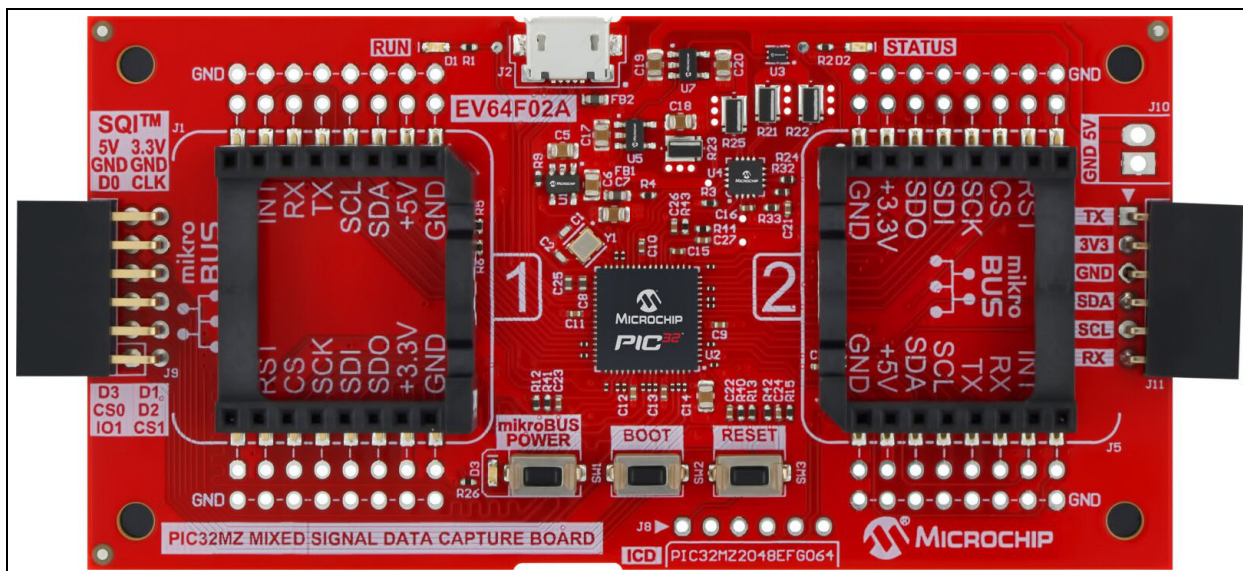


FIGURE 3-1: EV64F02A Evaluation Board.

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Figure 3-2 shows the block diagram of the EV64F02A displaying how the board can be powered, as well as the different communication rails.

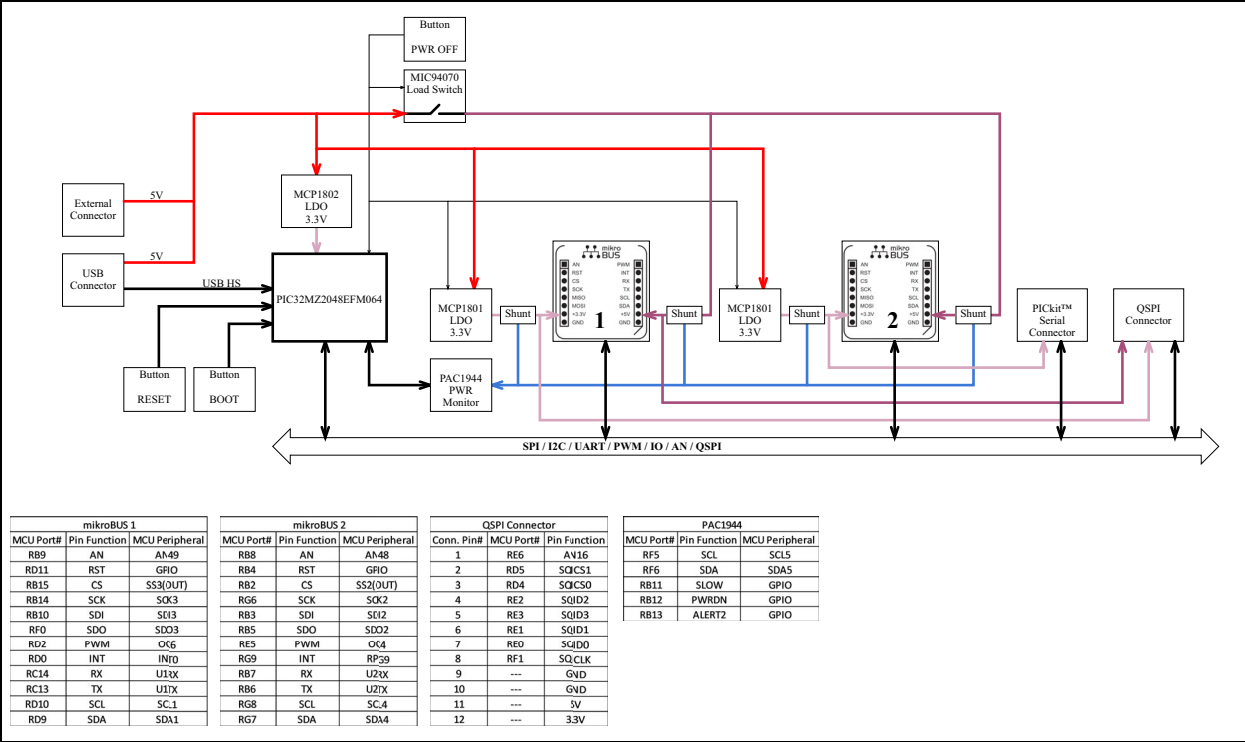


FIGURE 3-2: Block Diagram of the Mixed Signal Data Capture Board.

3.2 BUTTON DESCRIPTIONS

There are three buttons on the EV64F02A Mixed Signal Data Capture Evaluation Board board that are intended to help with development.

- SW1 is a MikroE Bus Power button which when pressed will cut power to both 3.3V and 5V rails of the MikroE sockets, allowing for easy reset/POR of the connected devices.
- SW2 is the BOOT button: this button when held down during power up (plug in the micro-USB or external power supply) will start the firmware in bootloader mode. This allows easy reprogram of the firmware.
- SW3 is the RESET button: this button resets the onboard microcontroller.

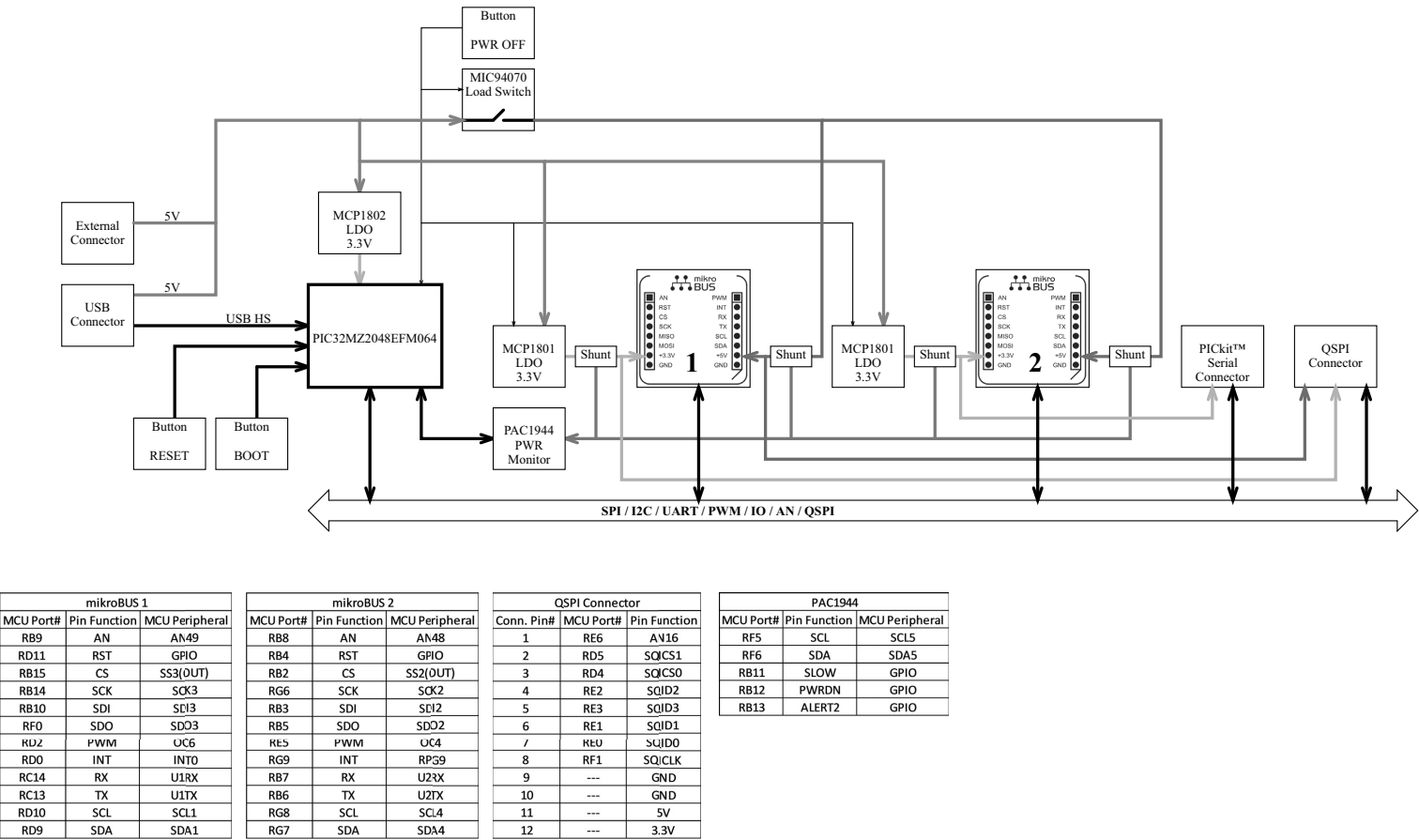
Appendix A. Schematic and Layouts

A.1 INTRODUCTION

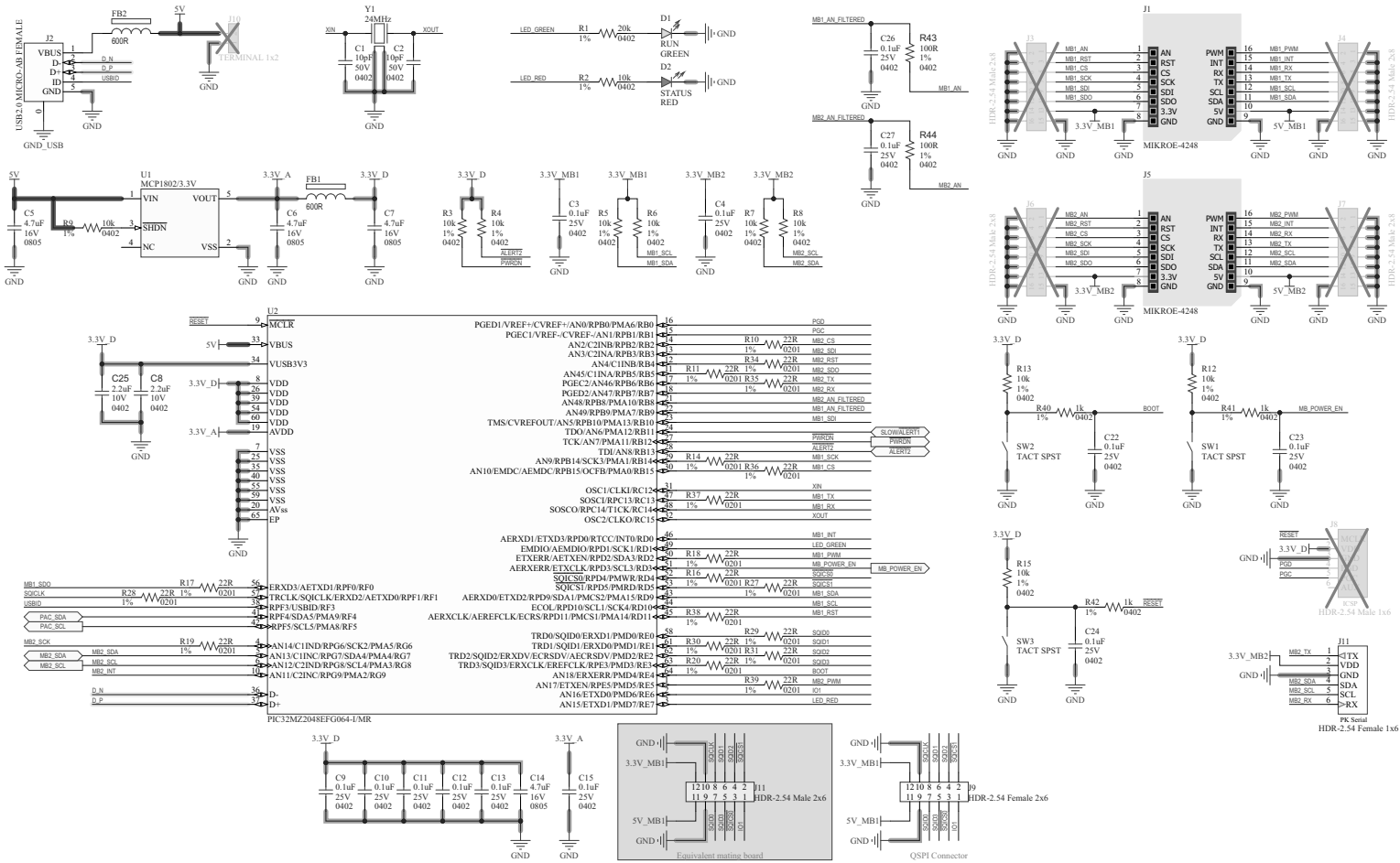
This appendix contains the following schematics and layouts for the EV64F02A Mixed Signal Data Capture Evaluation Board:

- [Board – Schematic 1](#)
- [Board – Schematic 2](#)
- [Board – Schematic 3](#)
- [Board – Top Assembly](#)
- [Board – Bottom Assembly](#)

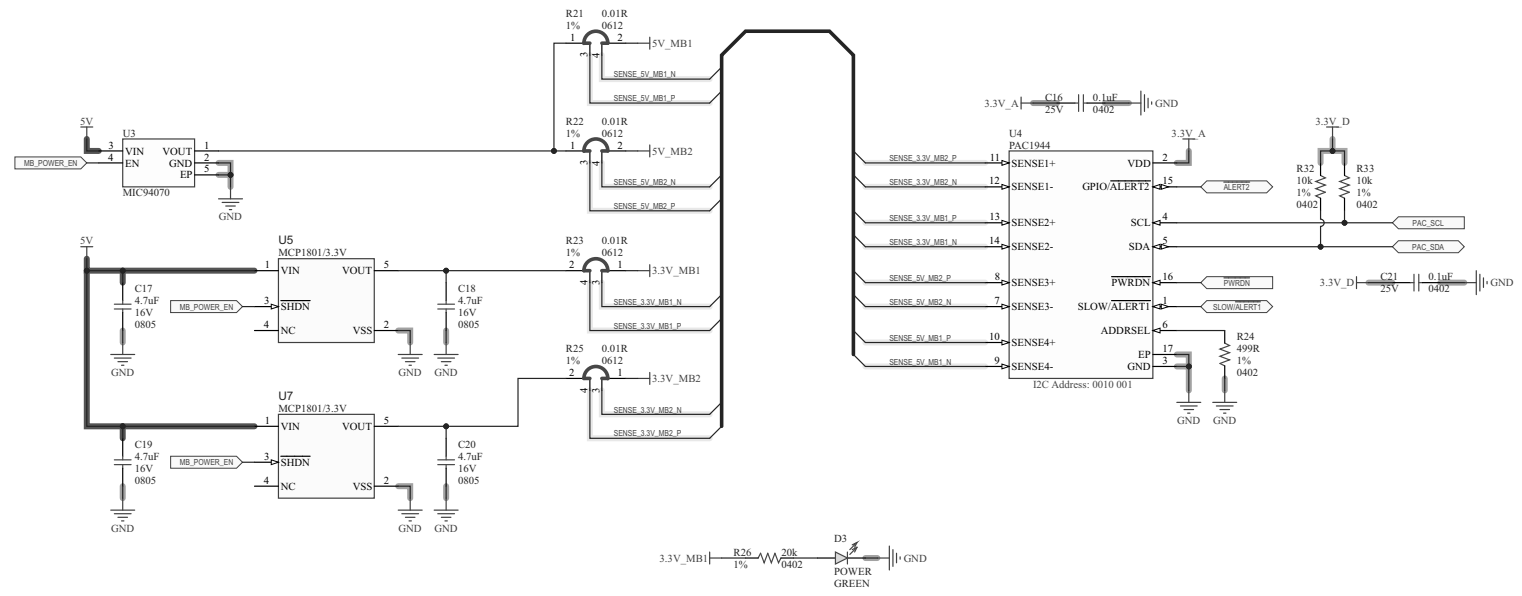
A.2 BOARD – SCHEMATIC 1



A.3 BOARD – SCHEMATIC 2



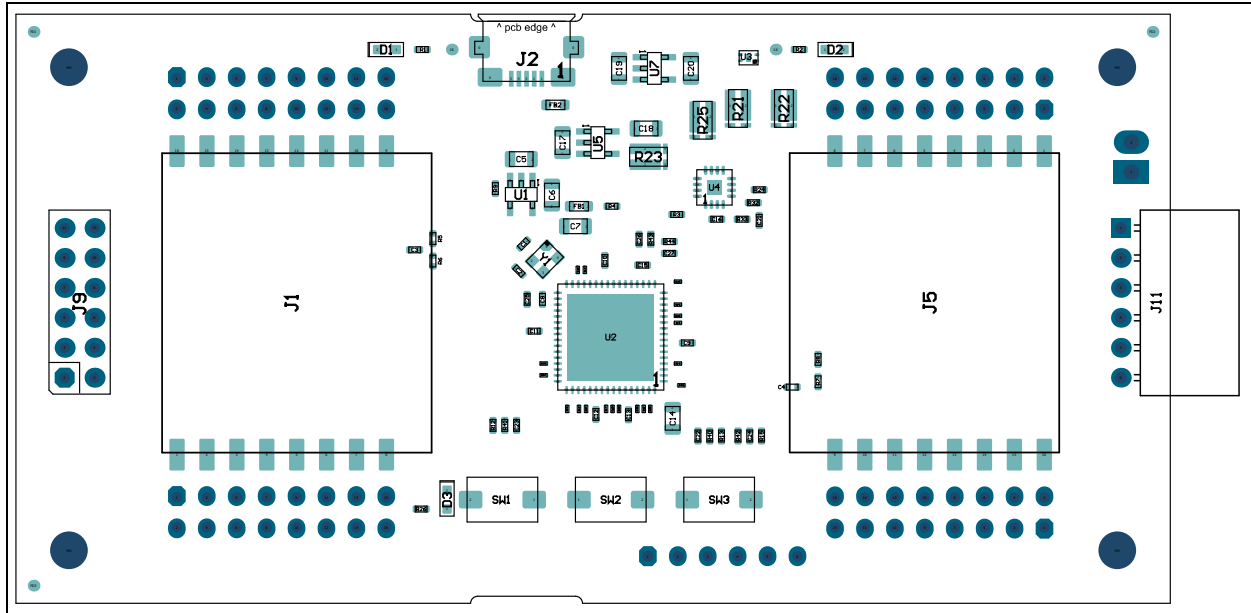
A.4 BOARD – SCHEMATIC 3



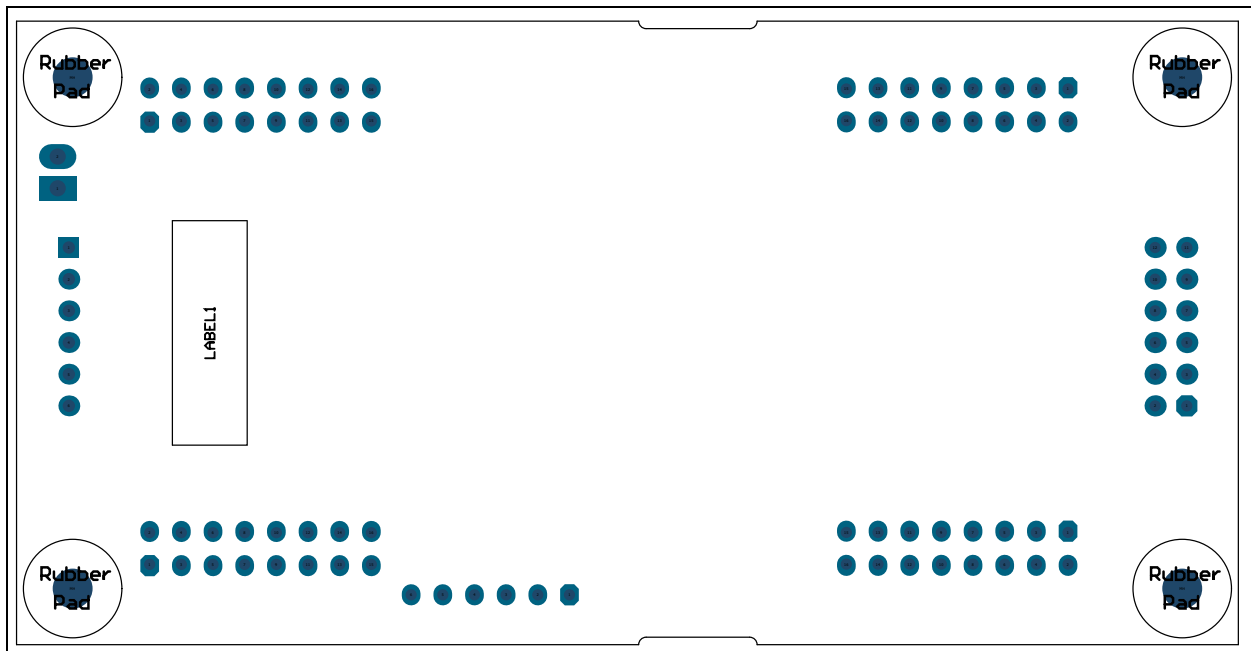
- PAD1
Rubber Pad Cyl D7.9H5.3
- PAD2
Rubber Pad Cyl D7.9H5.3
- PAD3
Rubber Pad Cyl D7.9H5.3
- PAD4
Rubber Pad Cyl D7.9H5.3



A.5 BOARD – TOP ASSEMBLY



A.6 BOARD – BOTTOM ASSEMBLY



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Appendix B. Bill of Materials (BOM)

TABLE B-1: BILL OF MATERIALS (BOM)

Qty.	Reference	Description	Manufacturer	Part Number
2	C1, C2	Capacitor, ceramic, 10 pF, 50V, 5%, NP0, SMD, 0402	Kyocera AVX®	04025A100JAT2A
15	C3, C4, C9, C10, C11, C12, C13, C15, C16, C21, C22, C23, C24, C26, C27	Capacitor, ceramic, 0.1 µF, 25V, 10%, X7R, SMD, 0402	TDK Corporation	C1005X7R1E104K050BB
8	C5, C6, C7, C14, C17, C18, C19, C20	Capacitor, ceramic, 4.7 µF, 16V, 10%, X7R, SMD, 0805	Murata Electronics®	GRM21BR71C475KE51L
2	C8, C25	Capacitor, ceramic, 2.2 µF, 10V, 10%, X7S, SMD, 0402	Murata Electronics	GRM155C71A225KE11J
1	CBL1	Mechanical, hardware, cable, USB, male, A to USB, male, Micro-B, 0.91M	Qualtek Electronics Corp.	3025030-03
2	D1, D3	Diode, LED, green, 3.2V, 30 mA, 430 mcd, clear, SMD, 0603	Würth Elektronik	150060GS75000
1	D2	Diode, LED, red, 2V, 20 mA, 250 mcd, clear, SMD, 0603	Kingbright Electronic Co., Ltd.	KPT-1608SURCK
2	FB1, FB2	Ferrite, 600R@100 MHz, 1A, SMD, 0603	Bourns®, Inc.	MH1608-601Y
2	J1, J5	Socket, mikroBUS, host, SMD	MikroElektronika	MIKROE-4248
1	J2	Connector, USB, 2.0, MICRO-AB, female, SMD, R/A	Hirose Electric Co., Ltd.	ZX62-AB-5PA(31)
0	J3, J4, J6, J7	Connector, header-2.54, male, 2x8, gold, 5.84MH, TH, vertical – Do Not Populate	Amphenol ICC (FCI)	68602-116HLF
0	J8	Connector, header-2.54, male, 1x6, gold, 5.84MH, TH, R/A – Do Not Populate	Würth Elektronik	61300611021
1	J9	Connector, header-2.54, female, 2x6, gold TH, RA	Würth Elektronik	613012243121
0	J10	Connector, header-2.54, 1x2, female, 30-18AWG, 6A, TH, R/A – Do Not Populate	Würth Elektronik	691210910002
1	J11	Connector, header-2.54, female, 1x6, gold, TH, R/A	Samtec, Inc.	SSW-106-02-F-S-RA
1	LABEL1	Label, PCBA, 18x6 mm, Datamatrix, Assy# / Rev / Serial / Date	ACT Logimark AS	505462
4	PAD1, PAD2, PAD3, PAD4	Mechanical, hardware, rubber pad, cylindrical, D7.9, H5.3, black	3M™	SJ61A11

Note 1: The components listed in this Bill of Materials are representative of the PCB assembly. The released BOM used in manufacturing uses all RoHS-compliant components.

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TABLE B-1: BILL OF MATERIALS (BOM) (CONTINUED)

Qty.	Reference	Description	Manufacturer	Part Number
1	PCB1	Printed Circuit Board – EV64F02A Mixed Signal Data Capture Evaluation Board	Microchip Technology Inc.	04-11805-R4
2	R1, R26	Resistor, TKF, 20 kΩ, 1%, 1/16W, SMD, 0402	Yageo Corporation	RC0402FR-0720KL
13	R2, R3, R4, R5, R6, R7, R8, R9, R12, R13, R15, R32, R33	Resistor, TKF, 10 kΩ, 1%, 1/16W, SMD, 0402	TE Connectivity - Neohm	CRG0402F10K
19	R10, R11, R14, R16, R17, R18, R19, R20, R27, R28, R29, R30, R31, R34, R35, R36, R37, R38, R39	Resistor, TKF, 22R, 1%, 1/20W, SMD, 0201	Yageo Corporation	RC0201FR-0722RL
4	R21, R22, R23, R25	Resistor, shunt, TF, 0.01R, 1%, 1W, SMD, 0612	Susumu Co., Ltd.	KRL3216T4A-M-R010-F-T5
1	R24	Resistor, TKF, 499R, 1%, 1/10W, SMD, 0402	Panasonic® – ECG	ERJ-2RKF4990X
3	R40, R41, R42	Resistor, TKF, 1k, 1%, 1/10W, SMD, 0402	Panasonic – ECG	ERJ-2RKF1001X
2	R43, R44	Resistor, TKF, 100R, 1%, 1/16W, SMD, 0402	Yageo Corporation	RC0402FR-07100RL
3	SW1, SW2, SW3	Switch, tactical, SPST, 24V, 50 mA, KSR231GLFS, SMD, 6X3.5 mm	TE Connectivity Alcoswitch	147873-2
1	U1	Microchip, Analog, LDO 3.3V, MCP1802T-3302I/OT, SOT-23-5	Microchip Technology Inc.	MCP1802T-3302I/OT
1	U2	Microchip, MCU 32-bit, 200 MHz, 2048 kB, 512 kB, PIC32MZ2048EFG064-I/MR, QFN-64	Microchip Technology Inc.	PIC32MZ2048EFG064-I/MR
1	U3	Microchip, Analog, power switch, 1.7V to 5.5V, 1.2A, MIC94070YMT-TR MLF-4	Microchip Technology Inc.	MIC94070YMT-TR
1	U4	Microchip, Analog, Power Current Sense Monitor, PAC1944T-E/4MX, QFN-16	Microchip Technology Inc.	PAC1944T-E/4MX
2	U5, U7	Microchip, Analog, LDO, 3.3V, MCP1801T-3302I/OT, SOT-23-5	Microchip Technology Inc.	MCP1801T-3302I/OT
1	Y1	Microchip, crystal, 24 MHz, 10 pF, VXM8-9016-24M000000, SMD, L2.5W2H0.55	Microchip Technology Inc.	VXM8-9016-24M000000

Note 1: The components listed in this Bill of Materials are representative of the PCB assembly. The released BOM used in manufacturing uses all RoHS-compliant components.

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