




LEGAL NOTICE:
SILICON LABORATORIES INC. ("SILICON LABS") AND/OR ITS LICENSORS DO NOT WARRANT THE ACCURACY OR COMPLETENESS OF THIS SCHEMATIC OR ANY INFORMATION CONTAINED WITHIN THIS SCHEMATIC. IT IS PROVIDED "AS-IS" FOR REFERENCE ONLY. SILICON LABS DOES NOT WARRANT THAT THIS DESIGN WILL MEET THE SPECIFICATIONS, BE SUITABLE FOR YOUR APPLICATION OR FIT FOR ANY PARTICULAR PURPOSE, OR WILL OPERATE IN YOUR IMPLEMENTATION. SILICON LABS AND ITS LICENSORS DO NOT WARRANT THAT THE DESIGN IMPLIED IN THIS SCHEMATIC IS PRODUCTION-WORTHY. YOU SHOULD COMPLETELY VALIDATE AND TEST YOUR DESIGN IMPLEMENTATION TO CONFIRM SYSTEM FUNCTIONALITY FOR YOUR APPLICATION.



Wireless Pro Kit Mainboard	
Board Function	Page
Title Page	1
Radio Board Interface	2
User Interface	3
EXP Header & Breakout Signals	4
Advanced Energy Monitor	5,6
Voltage Regulators	7
Debug Interface	8
Simplicity Interface	9
Logic Analyzer Front End	10
Board Controller I/O	11
Board Controller Power & Misc.	12
Board Controller USB & Ethernet	13

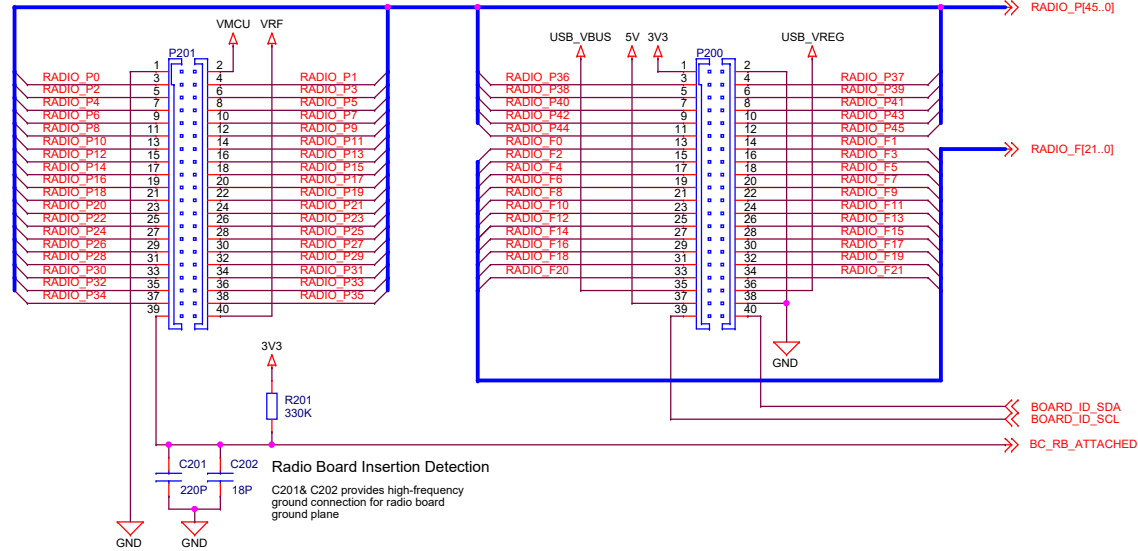
Revision History	
Rev.	Description
A05	Initial release.
A06	Changes to SW102, R746 & R784.
A07	Changed P/N to NX3008NBKV, 74LVC2G14GS, 74LVC2G17GS and DMP58D1LV.

 SILICON LABS		Board Name	
		Wireless Pro Kit Mainboard	
Designed HEL		Approved RGU	
Size A3	Sheet Modified Date Wednesday, January 10, 2024	Board Number BRD4002A	Revision A07
COPYRIGHT SILICON LABORATORIES INC. 2023 CONFIDENTIAL – SUBJECT TO TERMS OF USE			Sheet 1 of 14

Radio Board Socket

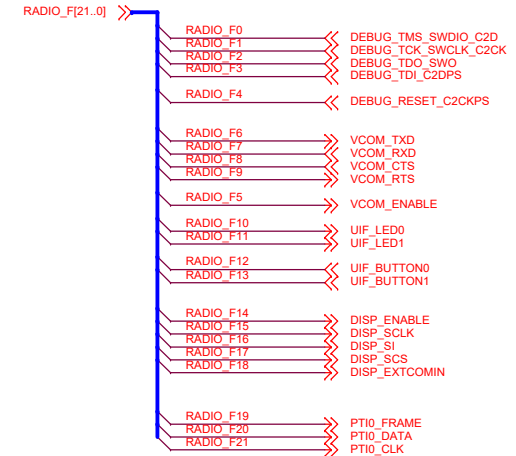
Lower connector

Upper connector

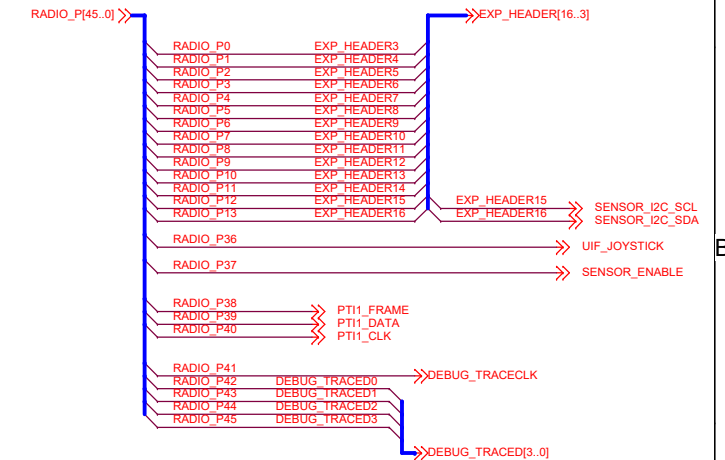


Radio Board Signal Assignments

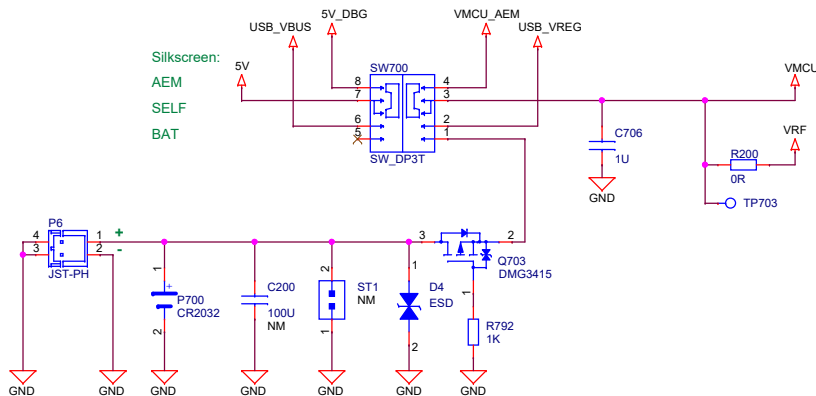
Dedicated Mainboard Functions



Shared Connections

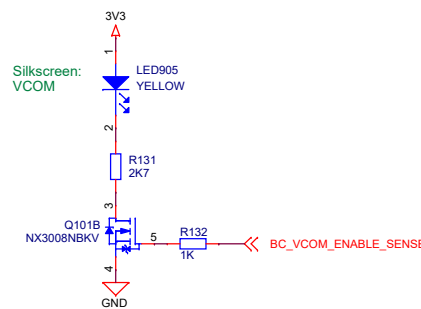


Radio Board Power Selection Switch



Switch Pos.	VMCU Source	5V Source
AEM	AEM output	5V_DBG from debug USB
SELF	USB_VREG pin on radio board	USB_VBUS pin on radio board
BAT	Coin cell battery, P6 or ST1	Not connected

VCOM Enable Indicator LED



		Board Name	
		Wireless Pro Kit Mainboard	
Designed HEL		Page Title	
		Radio Board Interface	
Size A3		Board Number	
		BRD4002A	
Sheet Modified Date Wednesday, January 10, 2024		Revision	
		A07	
COPYRIGHT SILICON LABORATORIES INC. 2023		CONFIDENTIAL – SUBJECT TO TERMS OF USE	
		Sheet 2 of 14	

Memory LCD-TFT Display & Multiplexer

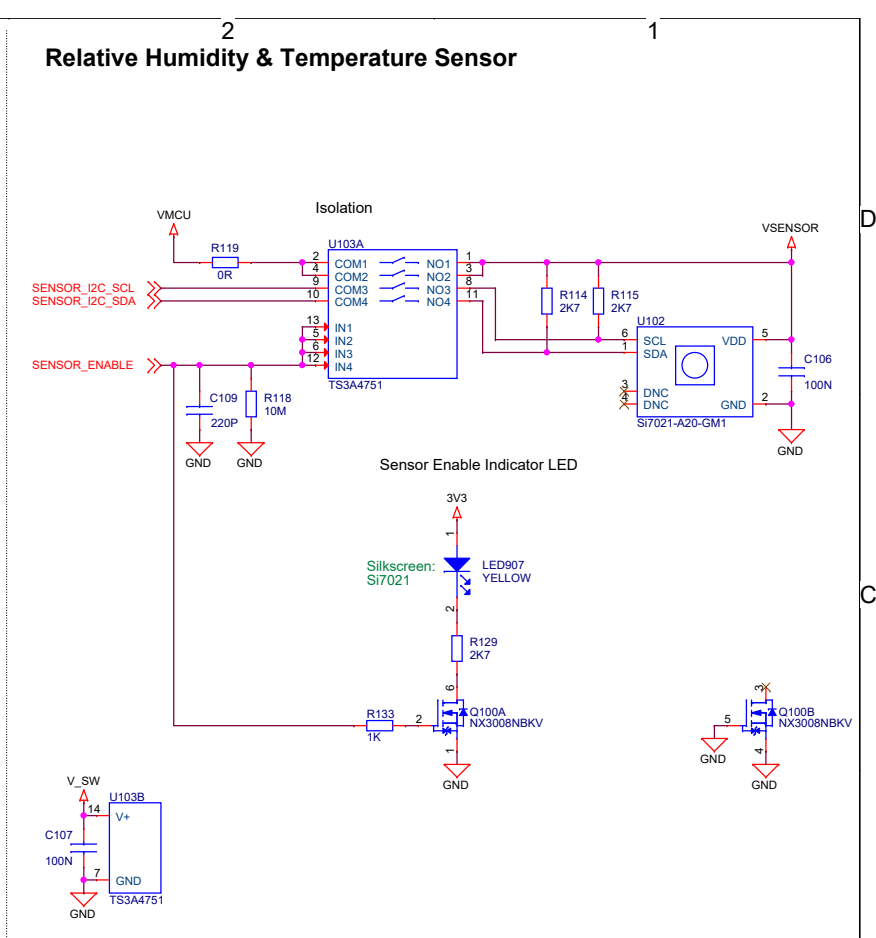
The schematic diagram illustrates the electrical connections for the Memory LCD-TFT Display & Multiplexer. Key components and connections include:

- Power and Ground:** 3V3 and VMCU supply rails are connected to the circuit. Ground connections are shown for various pins and components.
- Control Signals:**
 - From Board Controller:** BC_DISP_PWR_EN, BC_DISP_SCLK, BC_DISP_SI, BC_DISP_CS, BC_DISP_COM, and BC_DISP_AVAILABLE.
 - From Radio Board:** DISP_SCLK, DISP_SI, DISP_SCS, DISP_EXTCOMIN, and DISP_ENABLE.
- Multiplexers and Buffers:** TS3A44159 multiplexers (U100A, U101A) and buffers (U100B, U101B) are used to manage the display data and control signals.
- Display:** The display (DISP1) is an L-KLS1-2420-1.2-10.
- Indicator LED:** A yellow LED (LED906 YELLOW) is used as a Display Enable Indicator.
- Mounting:** The display is mounted on a tape with M4 and M5 screws.

DISP_ENABLE	Display Controller	VDISP source	BC_DISP_AVAILABLE
1	Radio Board	VMCU	0
0	Control MCU	BC_DISP_PWR_EN	1

The radio board always controls ownership of the display using the DISP_ENABLE signal.

The radio board always controls ownership of the display using the DISP_ENABLE signal



User Buttons & Joystick

Diagram A: User Buttons

Two push buttons, **BTN0** and **BTN1**, are shown. Each button is connected to **VMCU** through a resistor (**R101** and **R102**, both 1M) and to **GND** through a resistor (**R100** and **R103**, both 100R). A 1N capacitor (**C100** and **C101**) is connected between the button pin and **GND**. The buttons are labeled **SW100** and **SW101** respectively.

Diagram B: Joystick

A joystick is connected to **VMCU** through a resistor (**R128**, 10K). The joystick has five pins: **JS_COMM** (5), **JS_C** (center), **JS_D** (down), **JS_B** (right), and **JS_A** (left). Each pin is connected to **GND** through a resistor: **R124** (15K) for **JS_D**, **R123** (100R) for **JS_C**, **R125** (10K) for **JS_A**, **R126** (33K) for **JS_B**, and **R127** (60K4) for **JS_D**. A 1N capacitor (**C108**) is connected between the joystick pin and **GND**. The joystick is labeled **SW105**.

The diagram shows two separate circuit sections. The left section, titled 'User LEDs', shows two LEDs (LED101 and LED100, both yellow) connected to a common ground. LED101 is connected to the UIF_LED0 pin through a 2K7 resistor (R107). LED100 is connected to the UIF_LED1 pin through a 2K7 resistor (R108). The right section, titled 'Reset Pushbutton', shows a pushbutton (SW102, PTS810) connected to the DEBUG_RESET_C2CKPS pin. The button is connected to the RESET pin through a 100R resistor (R111). The button is also connected to ground.

Reset Pushbutton

Silkscreen:
RESET

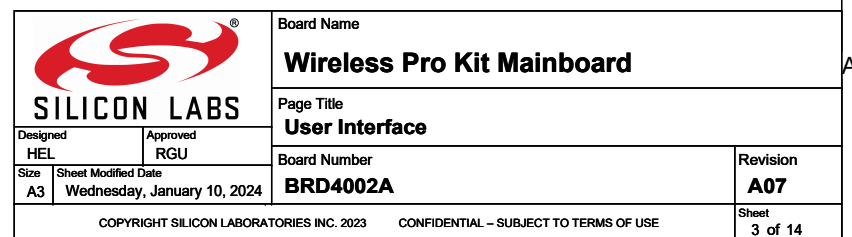
DEBUG_RESET_C2CKPS

1 2 3 4

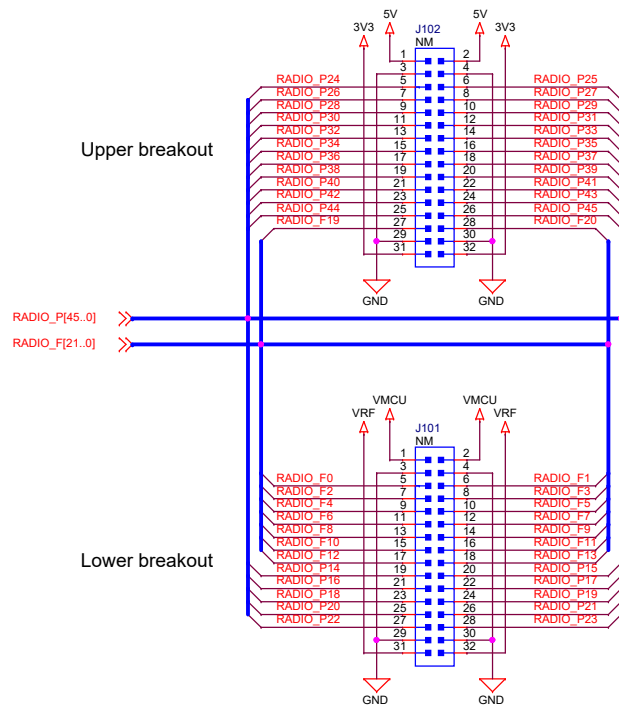
SW102
PTS810

R111
100R

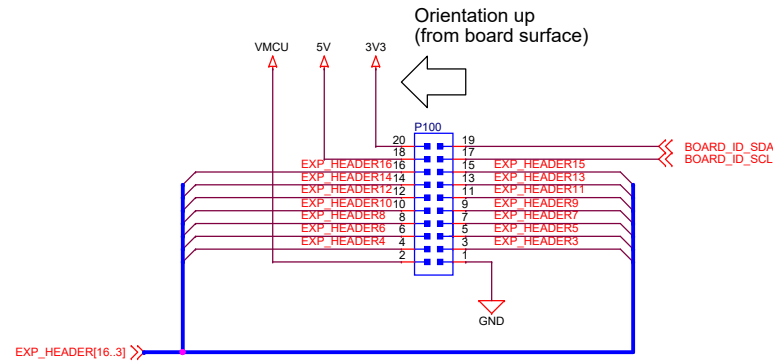
GND



Radio Board Breakout Connections




EXP Header



EXP header functionality

1	GND
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	I2C_SCL
15	
16	Reserved for EXP Board ID
17	
18	Reserved for EXP Board ID
19	
20	

2	VMCU
4	SPI_MOSI
6	SPI_MISO
8	SPI_SCLK
10	SPI_CS
12	UART_TX
14	UART_RX
16	I2C_SDA
18	5V
20	3V3

<div></div> <div>SILICON LABS</div>		Board Name	
		Wireless Pro Kit Mainboard	
Page Title			
EXP Header & Breakout Signals			
Designed HEL		Approved RGU	
Size A3	Sheet Modified Date Wednesday, January 10, 2024		Board Number BRD4002A
			Revision A07
COPYRIGHT SILICON LABORATORIES INC. 2023 CONFIDENTIAL – SUBJECT TO TERMS OF USE			Sheet 4 of 14

Advanced Energy Monitor

Input Voltage

Sense resistors, switch circuit and pass elements

Load Switch

Output Voltage

Error Amplifier

Buffered feedback network

Reference Voltage Set

Current Limiter

Current Range Detection

5V_DBG

5V_AEM

5V_AEM_FILT

VAEM_SENSEH

VAEM_SENSEM

VAEM_SENSEL

VAEM

VMCU_AEM

EA_OUT

EA_IN_P

EA_IN_N

AEM_CTRL_SET_VOLTAGE

AEM_CTRL_COMP_IN

3V3

5V_AEM

U700

U733A

U733B

U733C

U704B

U734B

U731B

Q704

Q709

Q708

Q710

Q721A

Q721B

Q720A

Q720B

Q712

Q713A

Q713B

R717

R720

R721

R719

R726

R760

R776

R775

R761

R766

R740

R703

R741

R754

R749

R795

R796

R748

R797

R798

R799

R701

R702

R703

R704

R705

R706

R707

R708

R709

R710

R711

R712

R713

R714

R715

R716

R717

R718

R719

R720

R721

R722

R723

R724

R725

R726

R727

R728

R729

R730

R731

R732

R733

R734

R735

R736

R737

R738

R739

R740

R741

R742

R743

R744

R745

R746

R747

R748

R749

R750

R751

R752

R753

R754

R755

R756

R757

R758

R759

R760

R761

R762

R763

R764

R765

R766

R767

R768

R769

R770

R771

R772

R773

R774

R775

R776

R777

R778

R779

R780

R781

R782

R783

R784

R785

R786

R787

R788

R789

R790

R791

R792

R793

R794

R795

R796

R797

R798

R799

C703

C702

C714

C716

C715

C722A

C722B

C720A

C720B

C710

C759

C751

C760

C765

C766

C767

C768

C769

C770

C771

C772

C773

C774

C775

C776

C777

C778

C779

C780

C781

C782

C783

C784

C785

C786

C787

C788

C789

C790

C791

C792

C793

C794

C795

C796

C797

C798

C799

U704A

U731A

U731B

U732A

U732B

U732C

U733A

U733B

U733C

U734A

U734B

U735A

U735B

U735C

U736A

U736B

U736C

U737A

U737B

U737C

U738A

U738B

U738C

U739A

U739B

U739C

U740A

U740B

U740C

U741A

U741B

U741C

U742A

U742B

U742C

U743A

U743B

U743C

U744A

U744B

U744C

U745A

U745B

U745C

U746A

U746B

U746C

U747A

U747B

U747C

U748A

U748B

U748C

U749A

U749B

U749C

U750A

U750B

U750C

U751A

U751B

U751C

U752A

U752B

U752C

U753A

U753B

U753C

U754A

U754B

U754C

U755A

U755B

U755C

U756A

U756B

U756C

U757A

U757B

U757C

U758A

U758B

U758C

U759A

U759B

U759C

U760A

U760B

U760C

U761A

U761B

U761C

U762A

U762B

U762C

U763A

U763B

U763C

U764A

U764B

U764C

U765A

U765B

U765C

U766A

U766B

U766C

U767A

U767B

U767C

U768A

U768B

U768C

U769A

U769B

U769C

U770A

U770B

U770C

U771A

U771B

U771C

U772A

U772B

U772C

U773A

U773B

U773C

U774A

U774B

U774C

U775A

U775B

U775C

U776A

U776B

U776C

U777A

U777B

U777C

U778A

U778B

U778C

U779A

U779B

U779C

U780A

U780B

U780C

U781A

U781B

U781C

U782A

U782B

U782C

U783A

U783B

U783C

U784A

U784B

U784C

U785A

U785B

U785C

U786A

U786B

U786C

U787A

U787B

U787C

U788A

U788B

U788C

U789A

U789B

U789C

U790A

U790B

U790C

U791A

U791B

U791C

U792A

U792B

U792C

U793A

U793B

U793C

U794A

U794B

U794C

U795A

U795B

U795C

U796A

U796B

U796C

U797A

U797B

U797C

U798A

U798B

U798C

U799A

U799B

U799C

U800A

U800B

U800C

U801A

U801B

U801C

U802A

U802B

U802C

U803A

U803B

U803C

U804A

U804B

U804C

U805A

U805B

U805C

U806A

U806B

U806C

U807A

U807B

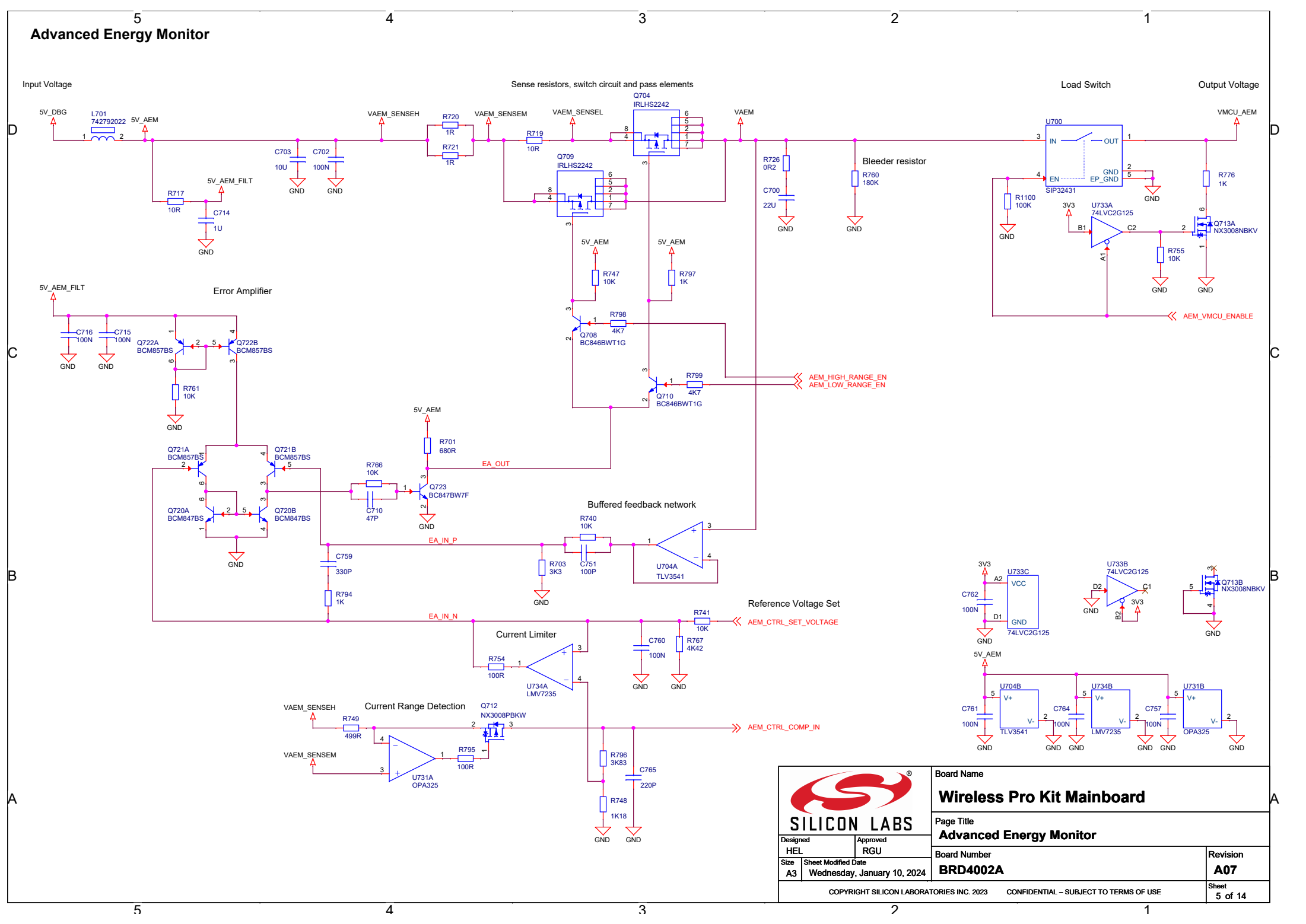
U807C


U808A

U808B

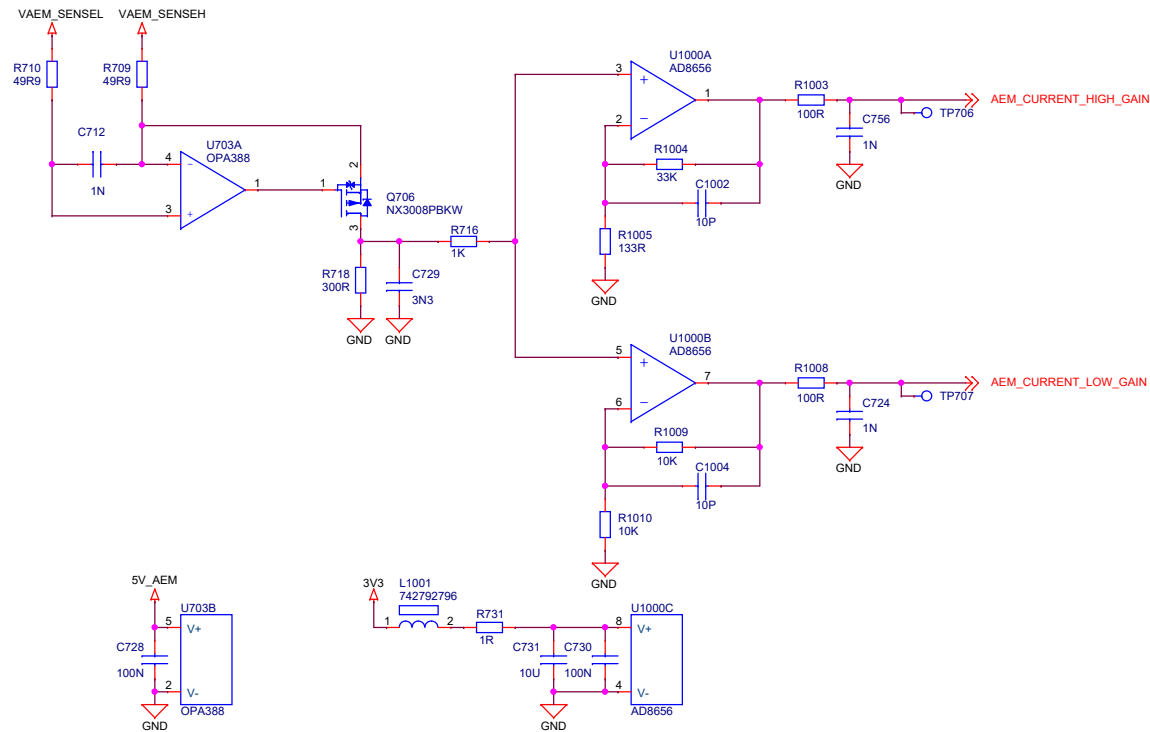
U808C

<

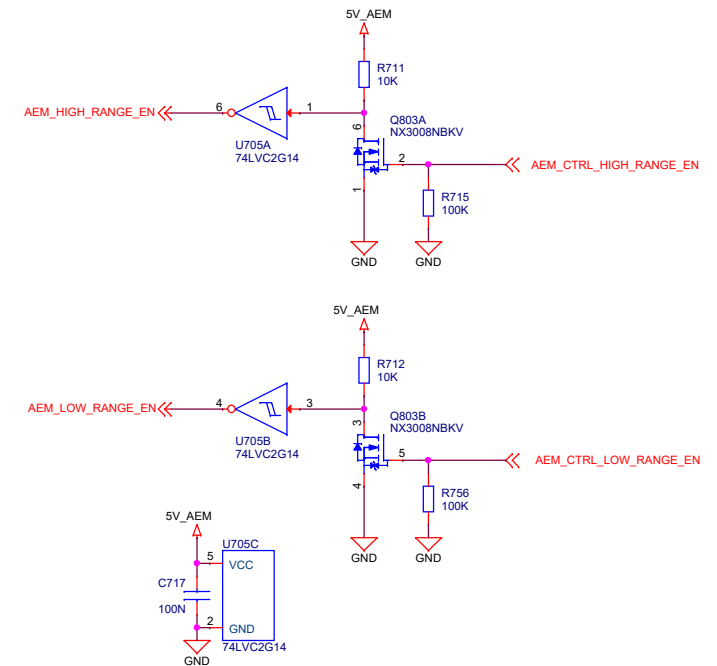


 SILICON LABS		Board Name	
		Wireless Pro Kit Mainboard	
		Page Title	
		Advanced Energy Monitor	
Designed HEL		Approved RGU	
Size A3	Sheet Modified Date Wednesday, January 10, 2024		Board Number BRD4002A
			Revision A07
COPYRIGHT SILICON LABORATORIES INC. 2023			CONFIDENTIAL – SUBJECT TO TERMS OF USE Sheet 5 of 14

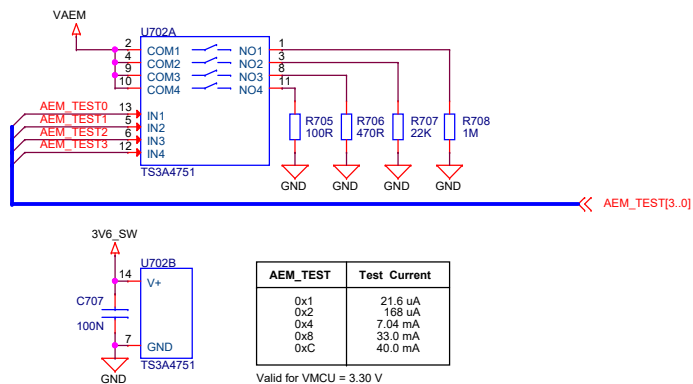
AEM Current Sense



AEM Range Control



AEM Test Circuit

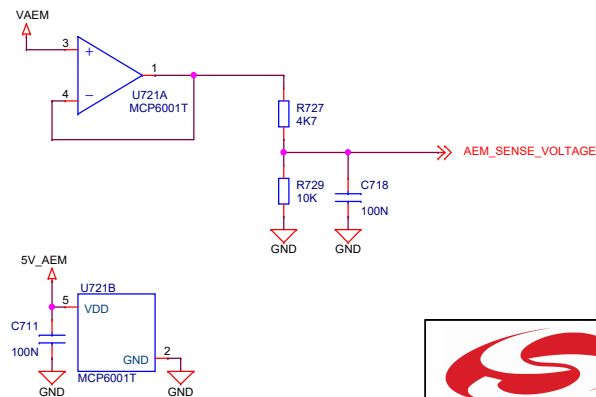


AEM_TEST	Test Current
0x1	21.6 uA
0x2	168 uA
0x4	7.04 mA
0x8	33.0 mA
0xC	40.0 mA

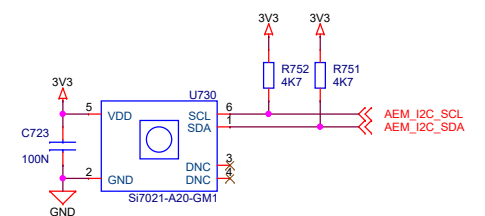
Valid for VMCU = 3.30 V

Current from bleeder resistor R760 is included.

AEM Voltage Sense

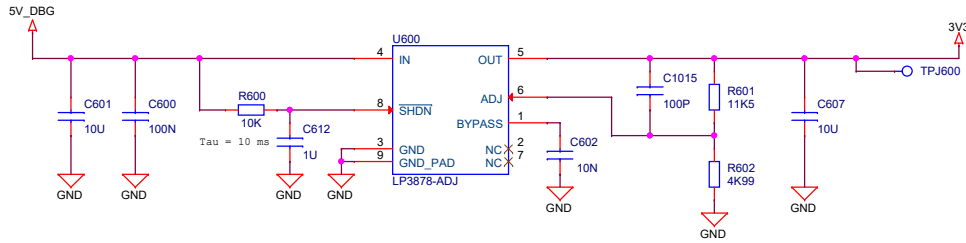


AEM Temperature Sensor

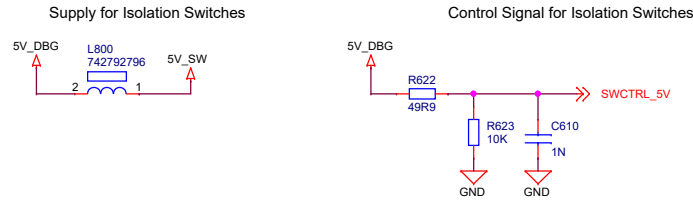


		Board Name	
		Wireless Pro Kit Mainboard	
Designed HEL		Page Title	
Size A3		AEM Range Selection	
Sheet Modified Date Wednesday, January 10, 2024		Board Number	Revision
		BRD4002A	A07
COPYRIGHT SILICON LABORATORIES INC. 2023		CONFIDENTIAL – SUBJECT TO TERMS OF USE	
		Sheet 6 of 14	

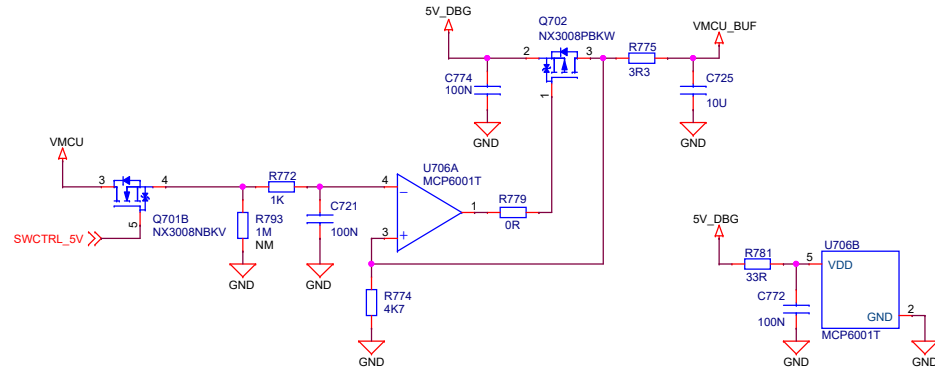
3V3 Regulator



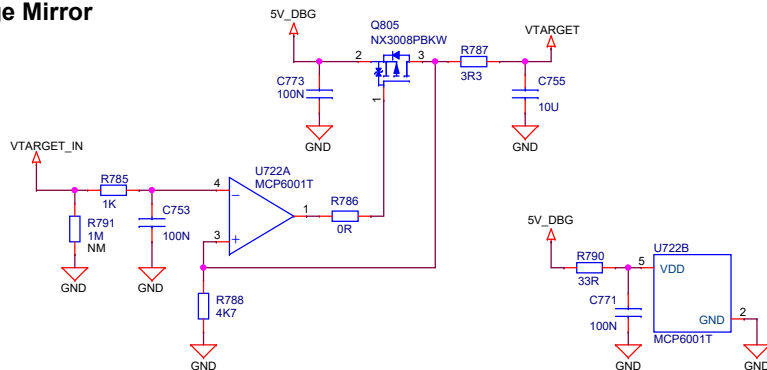
5V Misc.



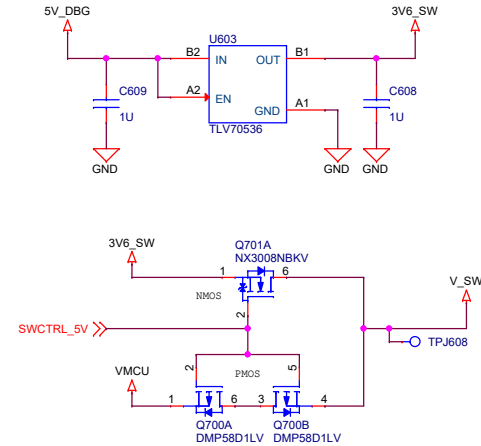
VMCU Voltage Mirror



VTARGET Voltage Mirror



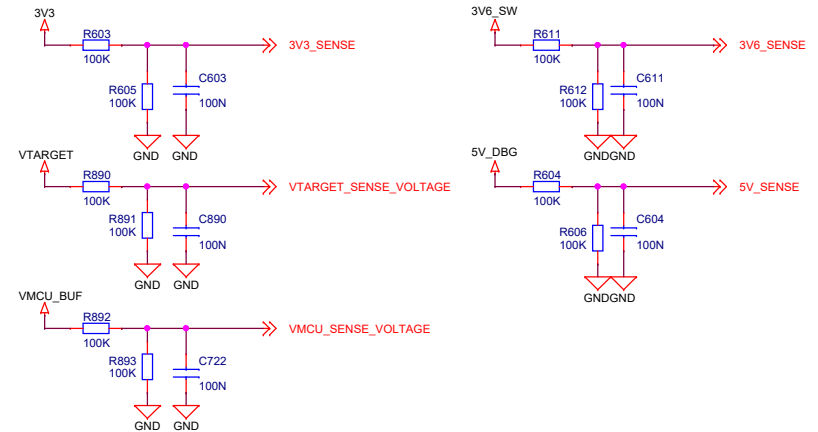
Power Supply for Isolation Switches



J-Link USB Cable	Q700 State	Q701A State	V_SW	VMCU_SENSE
Connected	OFF	ON	3.6V	VMCU
Disconnected	ON	OFF	VMCU	Isolated

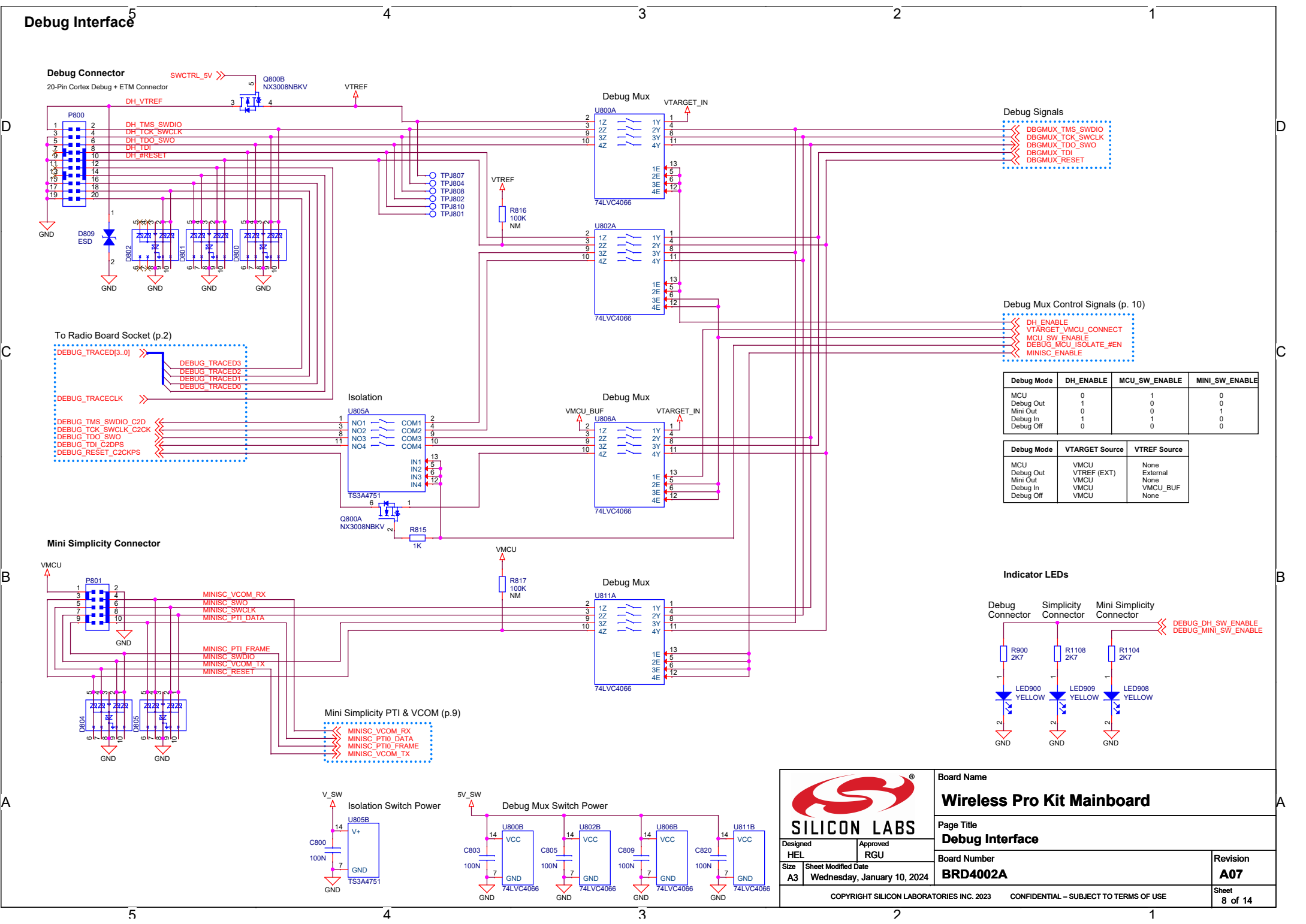
Isolation switches are powered by 3V6_SW when the USB cable is connected, otherwise by VMCU.

Voltage Sensing



 SILICON LABS		Board Name Wireless Pro Kit Mainboard	
		Page Title Voltage Regulators	
Designed HEL	Approved RGU	Board Number BRD4002A	Revision A07
Size A3	Sheet Modified Date Wednesday, January 10, 2024	Copyright Silicon Laboratories Inc. 2023 CONFIDENTIAL – SUBJECT TO TERMS OF USE	
			Sheet 7 of 14

Debug Interface



Debug Signals

- DBGMUX_TMS_SWDIO
- DBGMUX_TCK_SWCLK
- DBGMUX_TDO_SWO
- DBGMUX_TDI
- DBGMUX_RESET

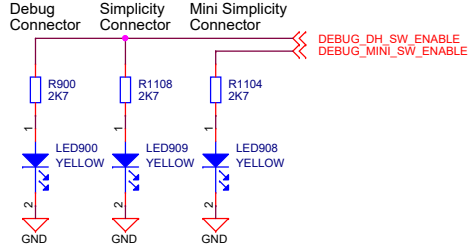
Debug Mux Control Signals (p. 10)


- DH_ENABLE
- VTARGET_VMCU_CONNECT
- MCU_SW_ENABLE
- DEBUG_MCU_ISOLATE_EN
- MINISC_ENABLE

Debug Mode	DH_ENABLE	MCU_SW_ENABLE	MINI_SW_ENABLE
MCU	0	1	0
Debug Out	1	0	0
Mini Out	0	0	1
Debug In	1	1	0
Debug Off	0	0	0

Debug Mode	VTARGET Source	VTREF Source
MCU	VMCU	None
Debug Out	VTREF (EXT)	External
Mini Out	VMCU	None
Debug In	VMCU	VMCU_BUF
Debug Off	VMCU	None

Indicator LEDs





SILICON LABS

Designed: HEL
Approved: RGU

Size: A3
Sheet Modified Date: Wednesday, January 10, 2024

COPYRIGHT SILICON LABORATORIES INC. 2023
CONFIDENTIAL – SUBJECT TO TERMS OF USE

Board Name

Wireless Pro Kit Mainboard

Page Title

Debug Interface

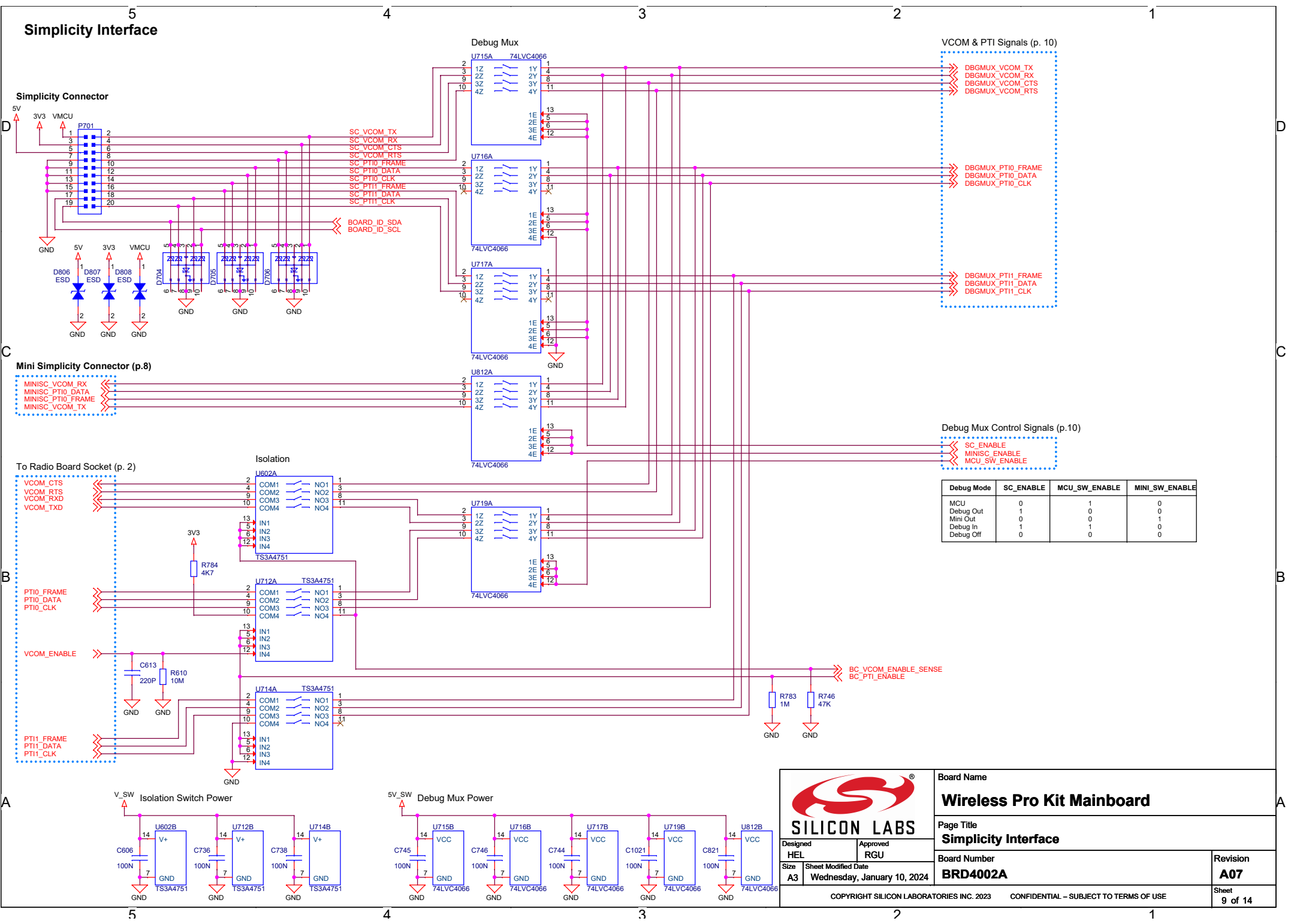
Board Number


BRD4002A

Revision

A07

Sheet 8 of 14





SILICON LABS

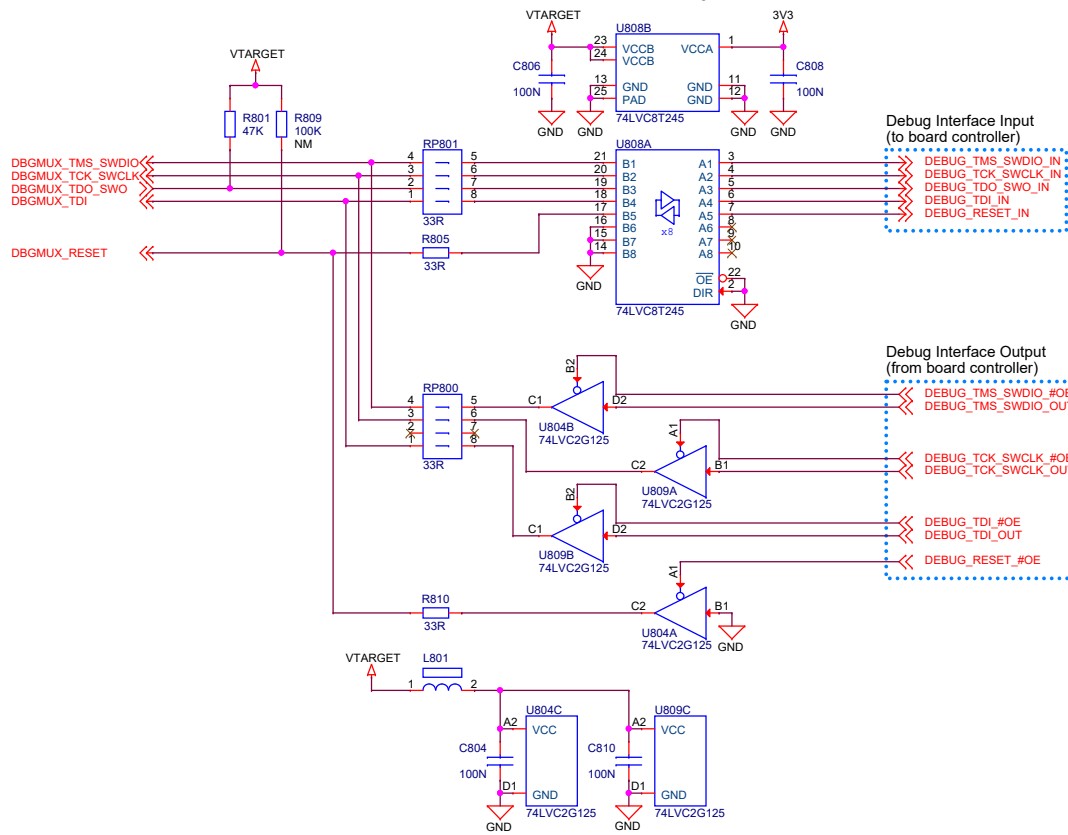
Designed HEL		Approved RGU	
Size A3	Sheet Modified Date Wednesday, January 10, 2024		

Board Name Wireless Pro Kit Mainboard	
Page Title Simplicity Interface	
Board Number BRD4002A	Revision A07

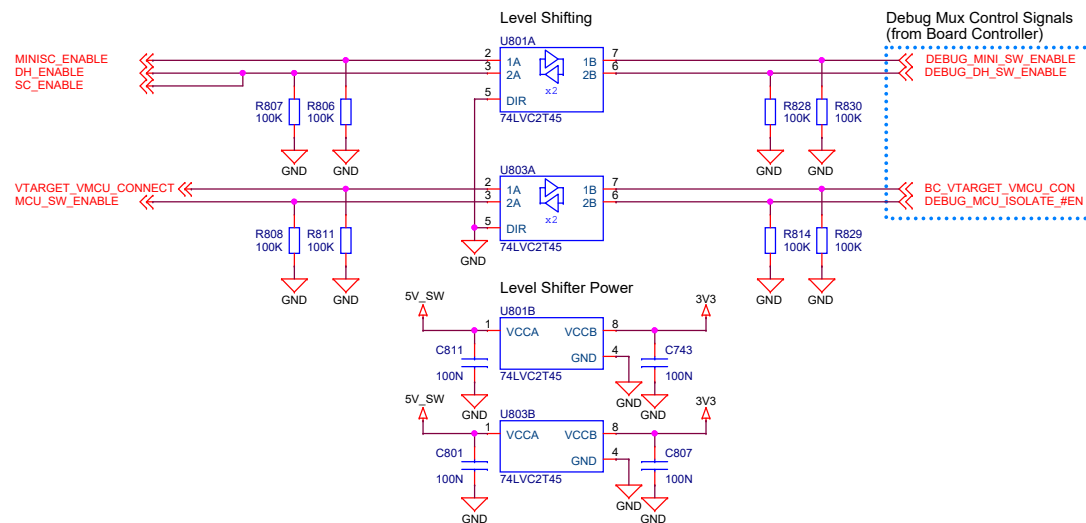
COPYRIGHT SILICON LABORATORIES INC. 2023 CONFIDENTIAL – SUBJECT TO TERMS OF USE

Sheet
9 of 14

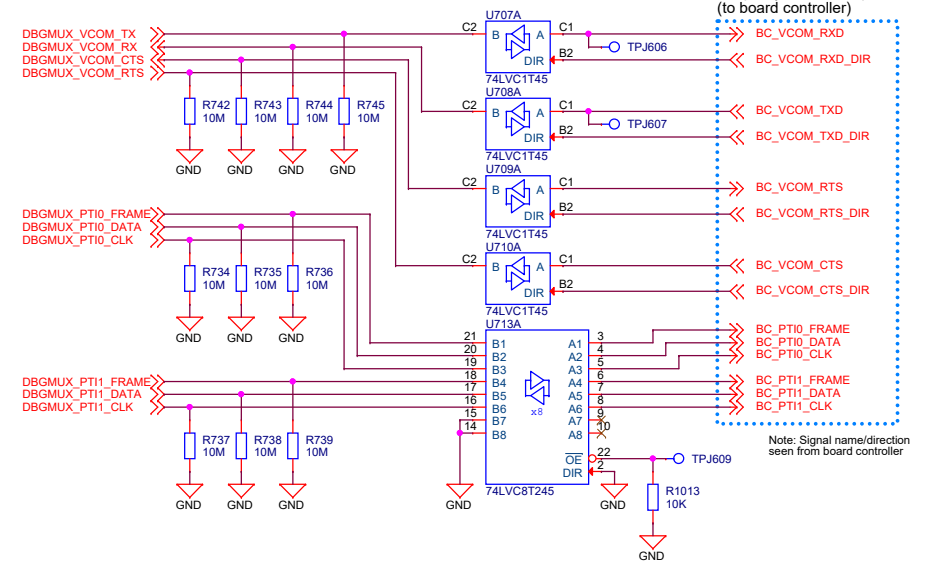
Debug Interface Level Shifting



Debug Mux Control Signal Level Shifting



Simplicity Interface Level Shifting



Debug Mode	BC_VCOM_TX_DIR	BC_VCOM_RX_DIR
MCU	1	0
Debug Out	1	0
Mini Out	1	0
Debug In	0	0
Debug Off	0	0

Debug Mode	BC_VCOM_RTS_DIR	BC_VCOM_CTS_DIR
MCU	1	0
Debug Out	1	0
Mini Out	1	0
Debug In	0	0
Debug Off	0	0

SILICON LABS

Designed
HEL

Approved
RGU

Size
A3

Sheet Modified Date
Wednesday, January 10, 2024

Board Name
Wireless Pro Kit Mainboard

Page Title
Debug Mux Level Shifting

Board Number
BRD4002A

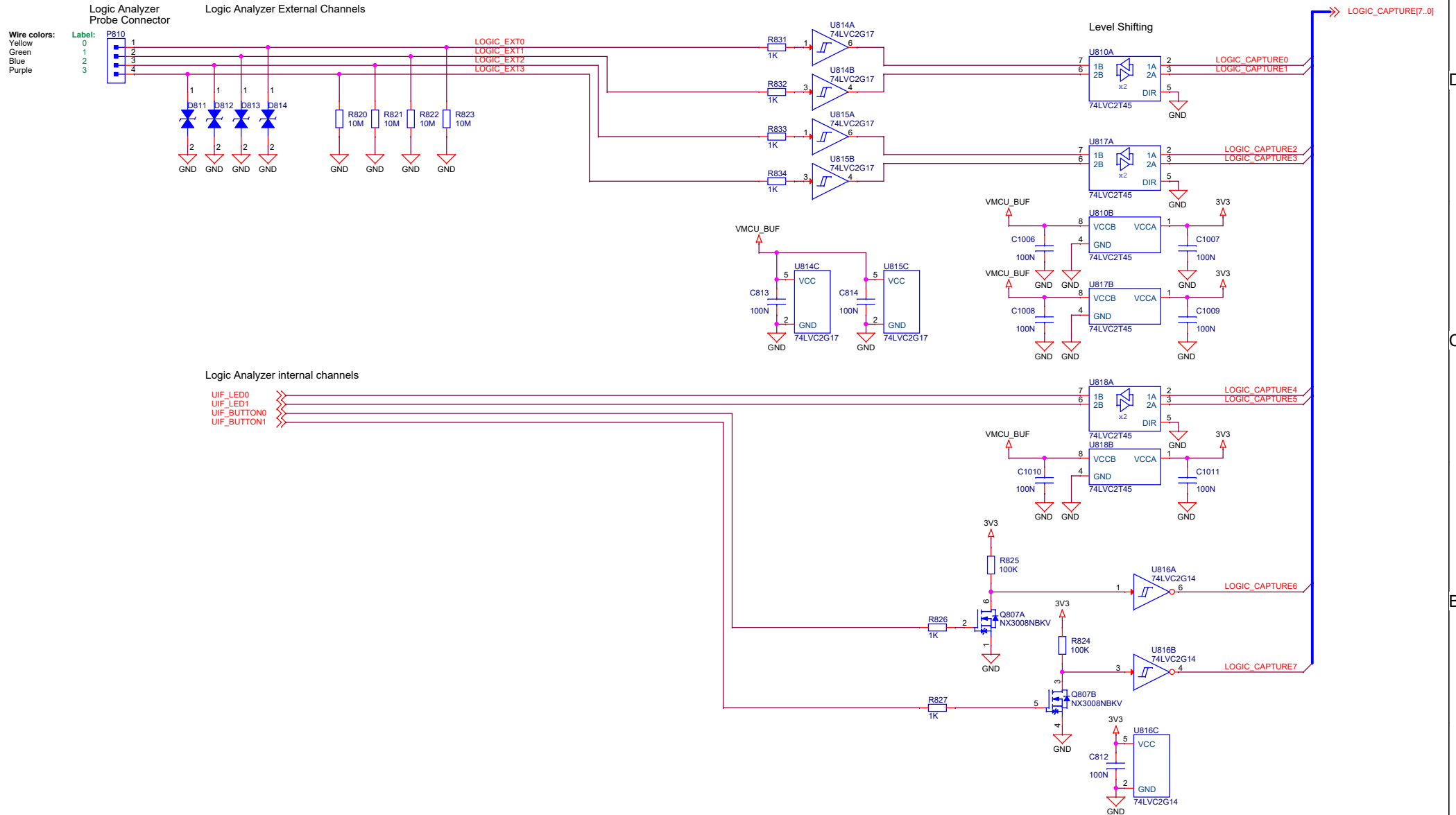
Revision
A07


COPYRIGHT SILICON LABORATORIES INC. 2023

CONFIDENTIAL – SUBJECT TO TERMS OF USE

Sheet
10 of 14

Logic Analyzer Front End



 SILICON LABS		Board Name	
		Wireless Pro Kit Mainboard	
Designed HEL		Page Title	
Approved RGU		Logic Analyzer Front End	
Size A3	Sheet Modified Date Wednesday, January 10, 2024	Board Number BRD4002A	Revision A07
COPYRIGHT SILICON LABORATORIES INC. 2023 CONFIDENTIAL – SUBJECT TO TERMS OF USE			Sheet 11 of 14

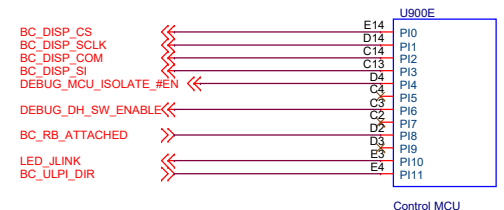
D

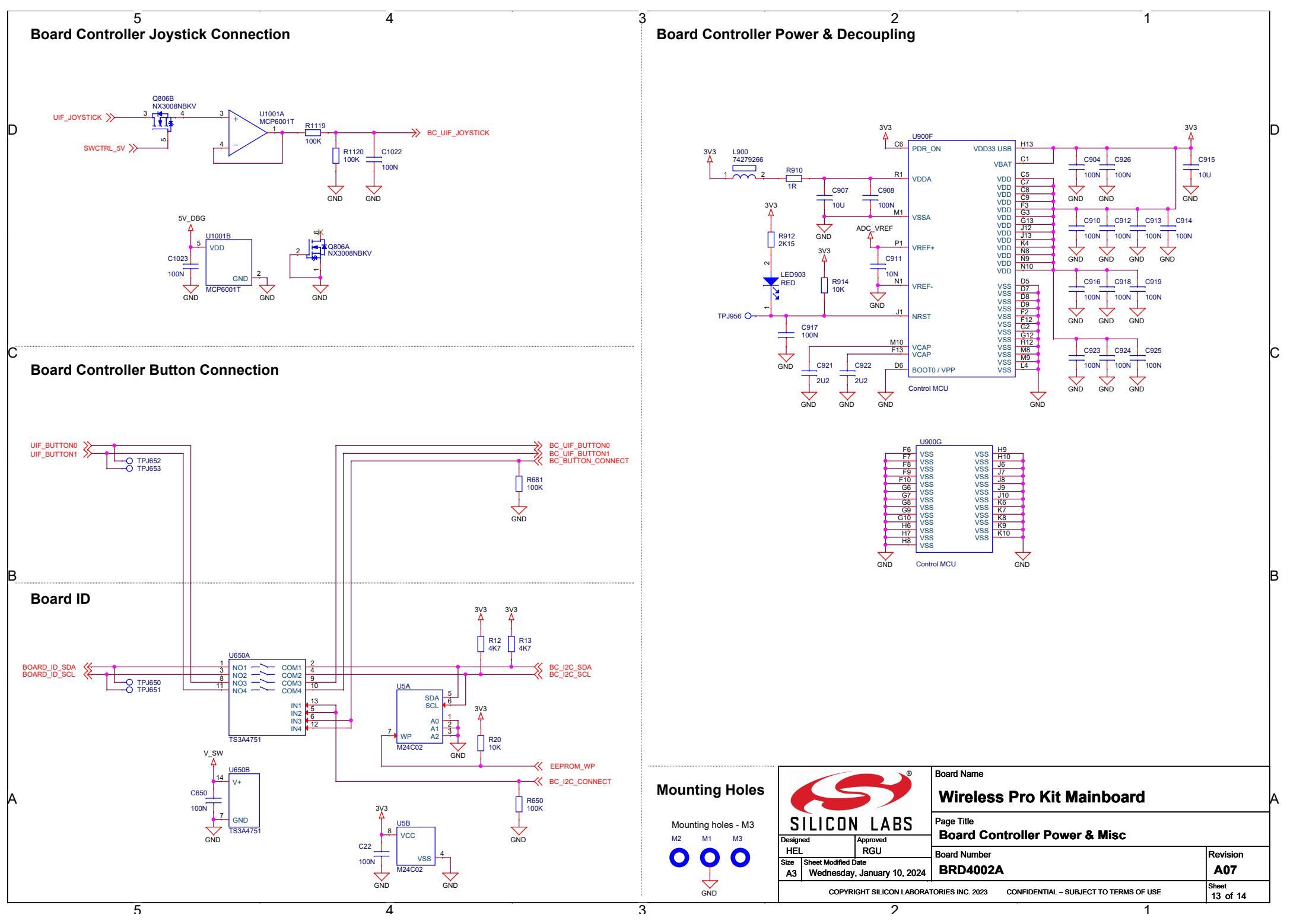
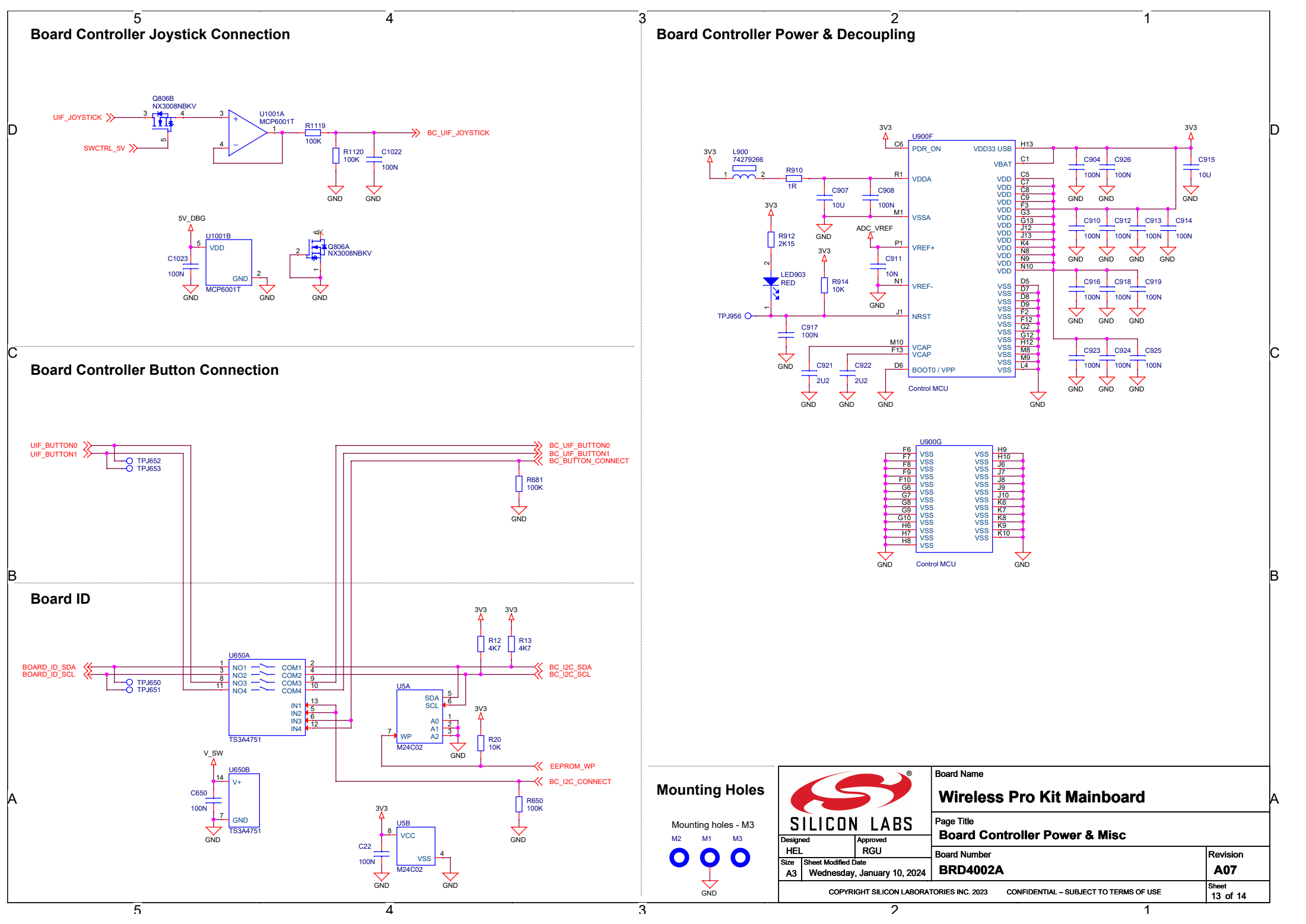
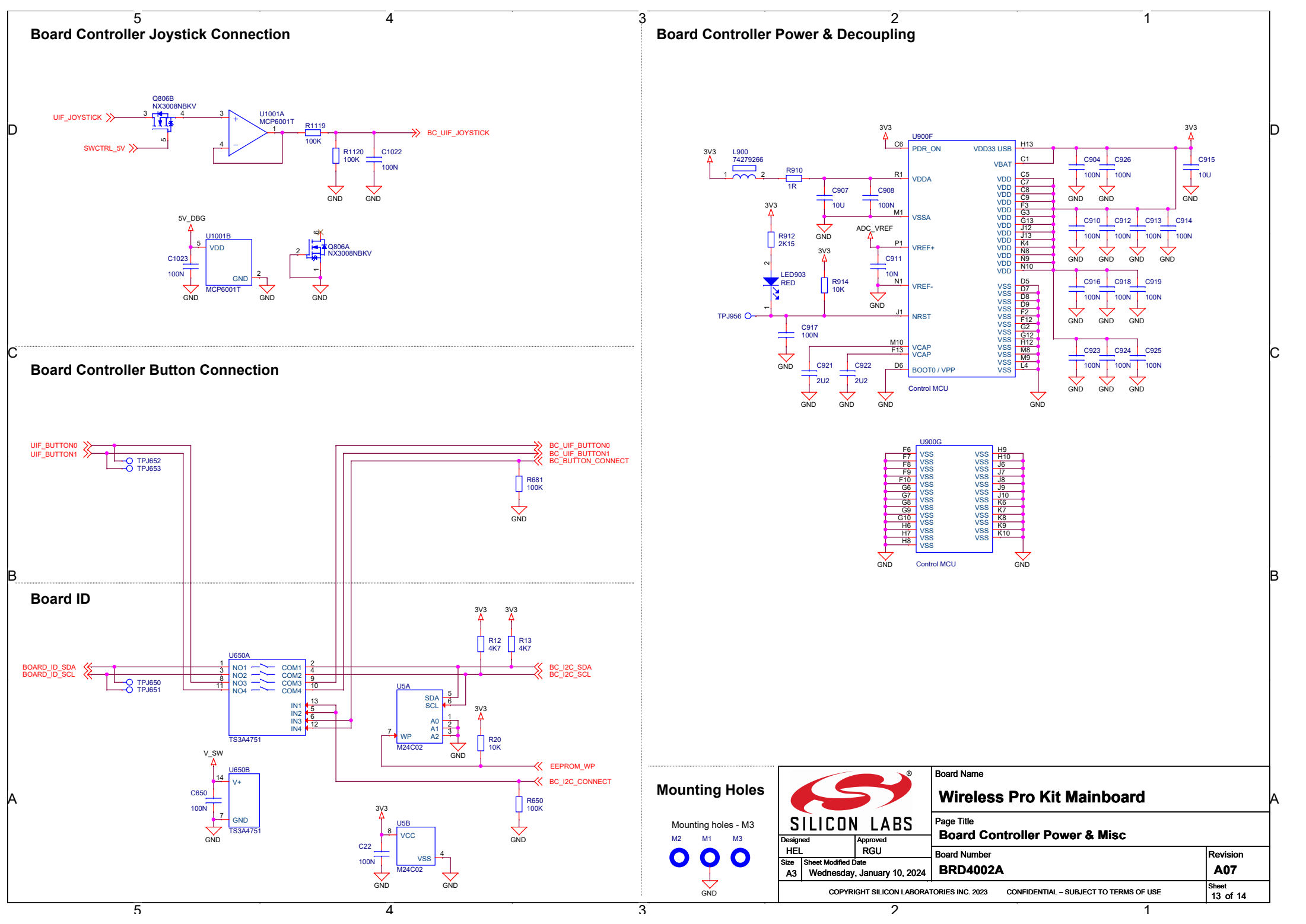
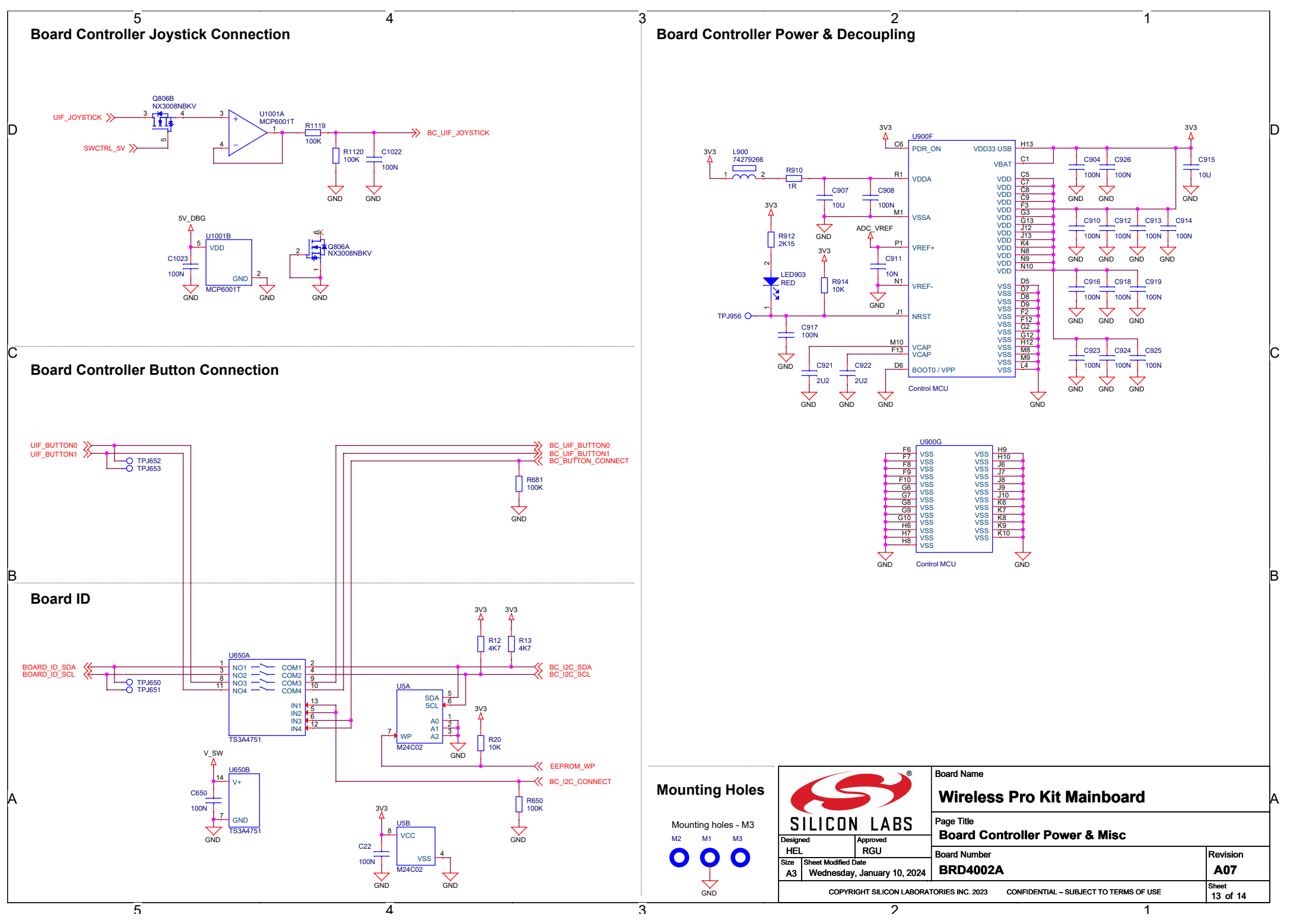
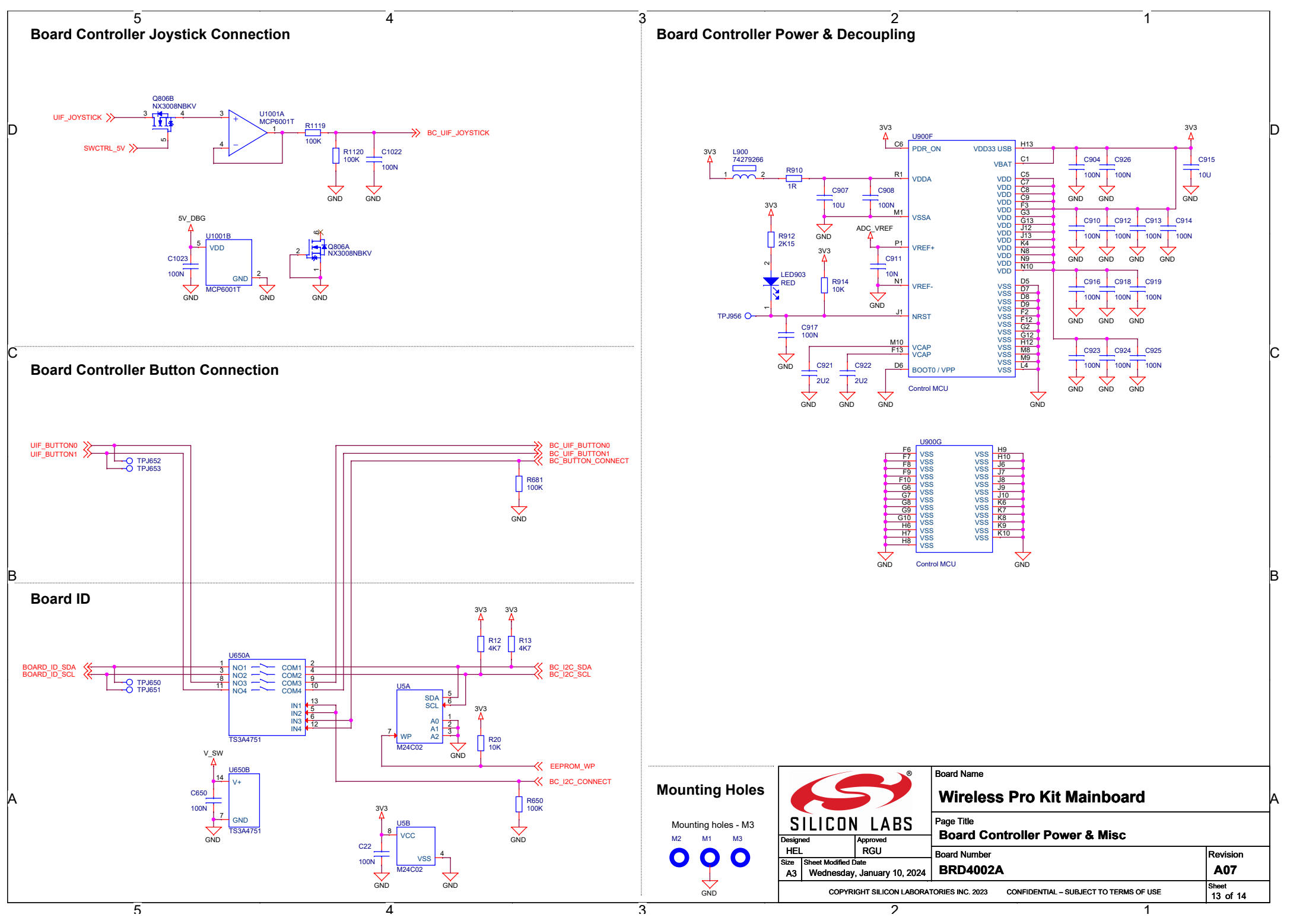
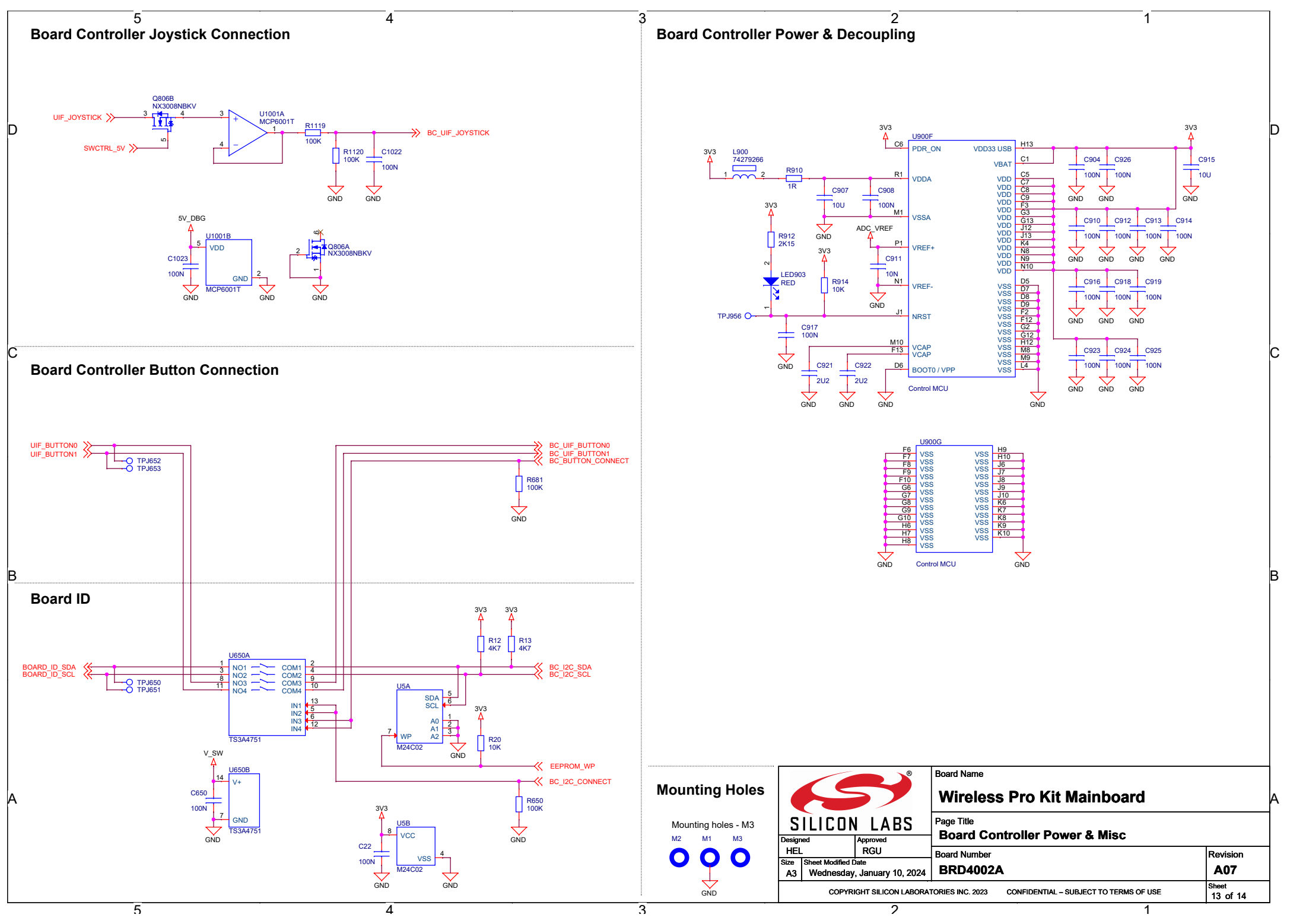
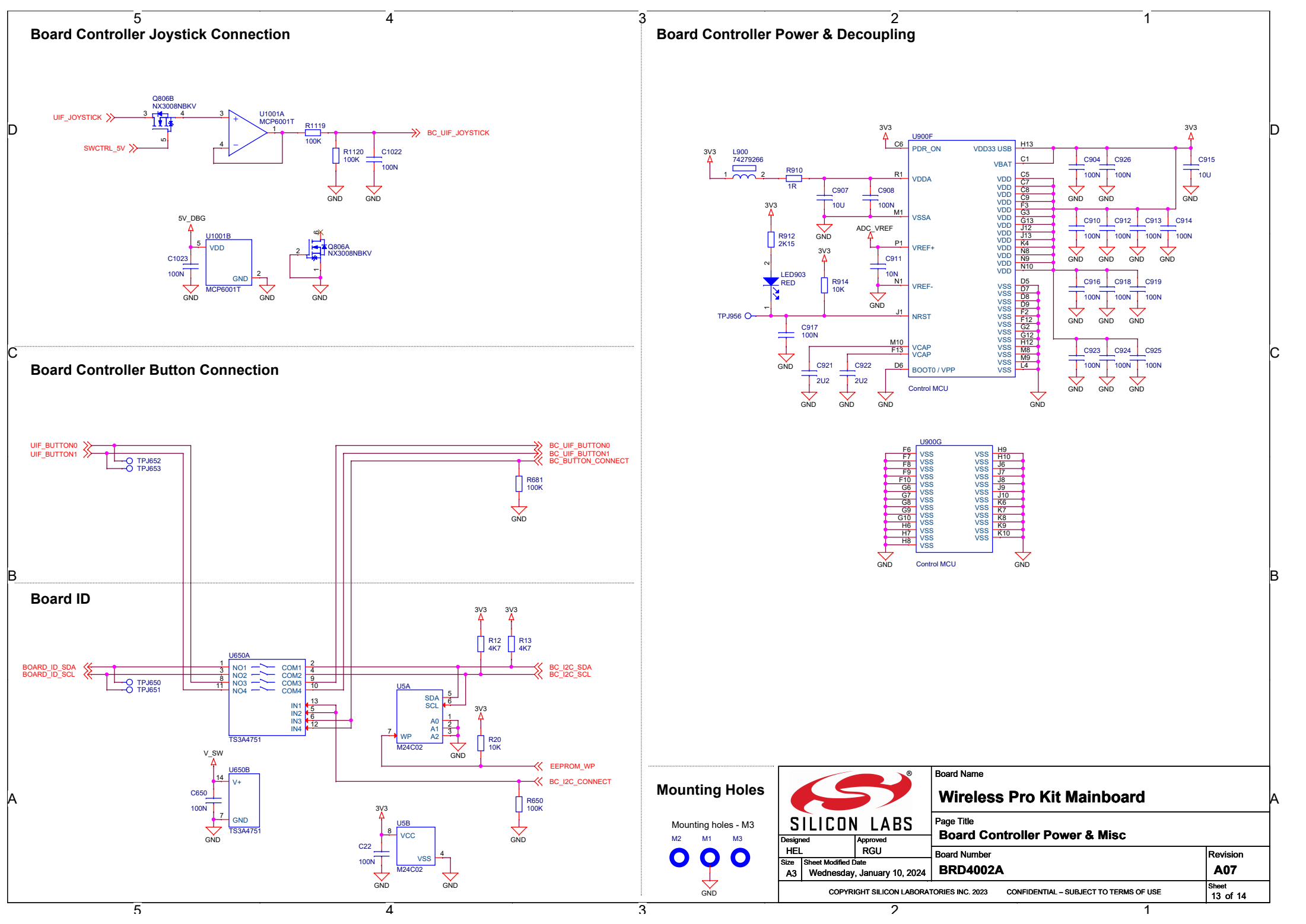


B

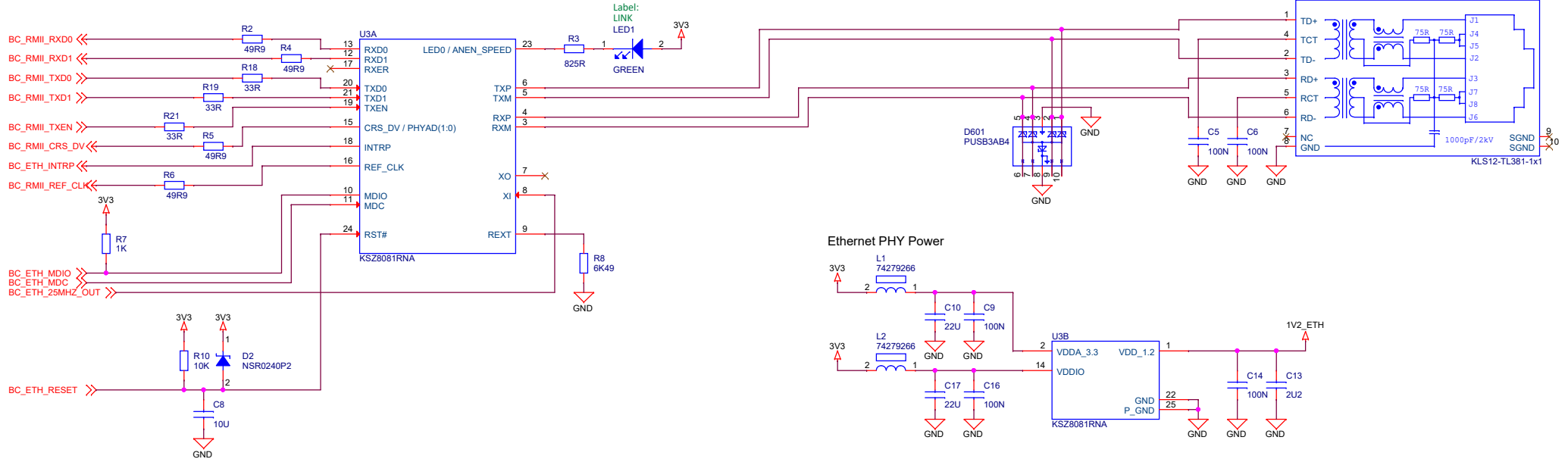


1

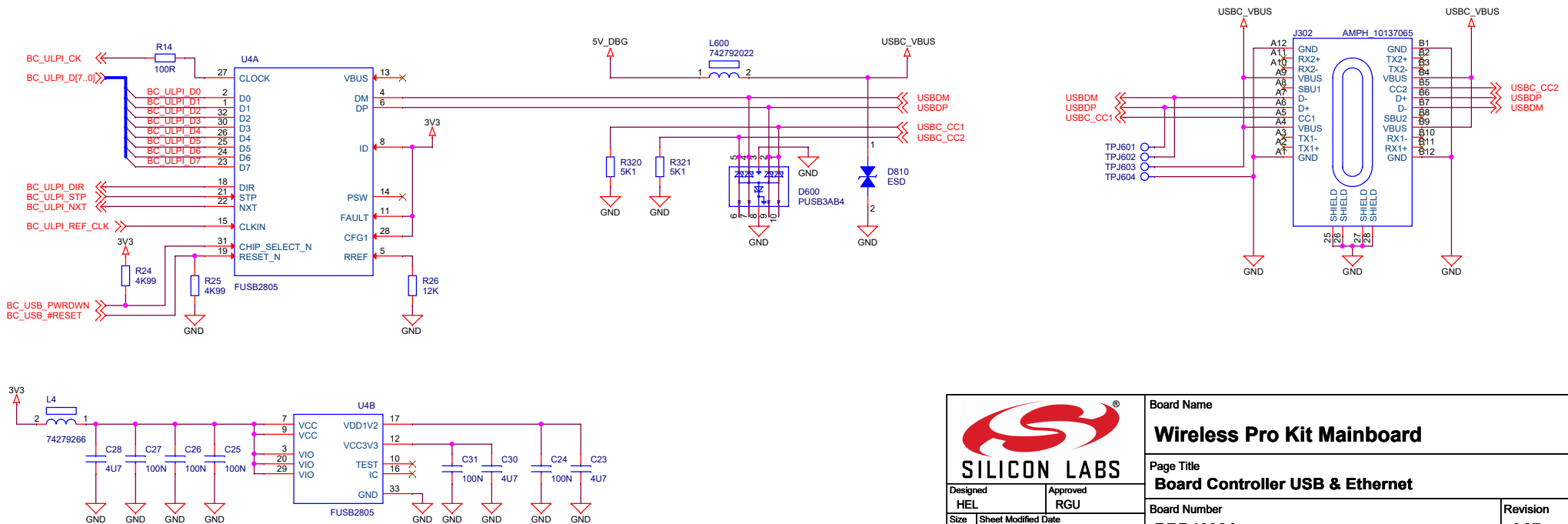


[illegible][illegible][illegible][illegible][illegible][illegible]

10/100 Mbit Ethernet PHY



USB High Speed



 SILICON LABS		Board Name	
		Wireless Pro Kit Mainboard	
Designed HEL		Page Title	
Size A3		Board Controller USB & Ethernet	
Sheet Modified Date Wednesday, January 10, 2024		Board Number	Revision
		BRD4002A	A07
COPYRIGHT SILICON LABORATORIES INC. 2023 CONFIDENTIAL – SUBJECT TO TERMS OF USE			
			Sheet 14 of 14