

# Application Notes

PKoB4 is a Microchip Technology debugger platform that is intended to be integrated into a hardware/firmware application demonstration board.

DGI, CDC Interface of PKoB4 is not used. MCP2200 is used for providing USB to UART conversion with Hardware Flow Control. MCP2200 can support baud rates from 300k to 1000k.

Voltage to WBZ451 is fixed by default to 3V derived from the USB connection from the debugger or Battery. It can also be powered by the application external power supply header (1.9V-3.6V) For application power supply for device to operate with PKoB4 and MCP2200, translators are added for PKoB4 and MCP2200.

# Revision History

Revision 1.0:  
PKoB4 Based on MPLAB Snap (03-10381-R1).

Revision 2.0:  
Fixes and improvements

Revision 3.0:  
D3, LED Footprint  
MikroBus UART Rx,Tx  
Pull up resistors

Revision 4.0:  
3.3V regulator for WBZ451 modified to 3V


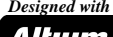
Revision 5.0:  
D6 LED :MPN changed

LABEL1

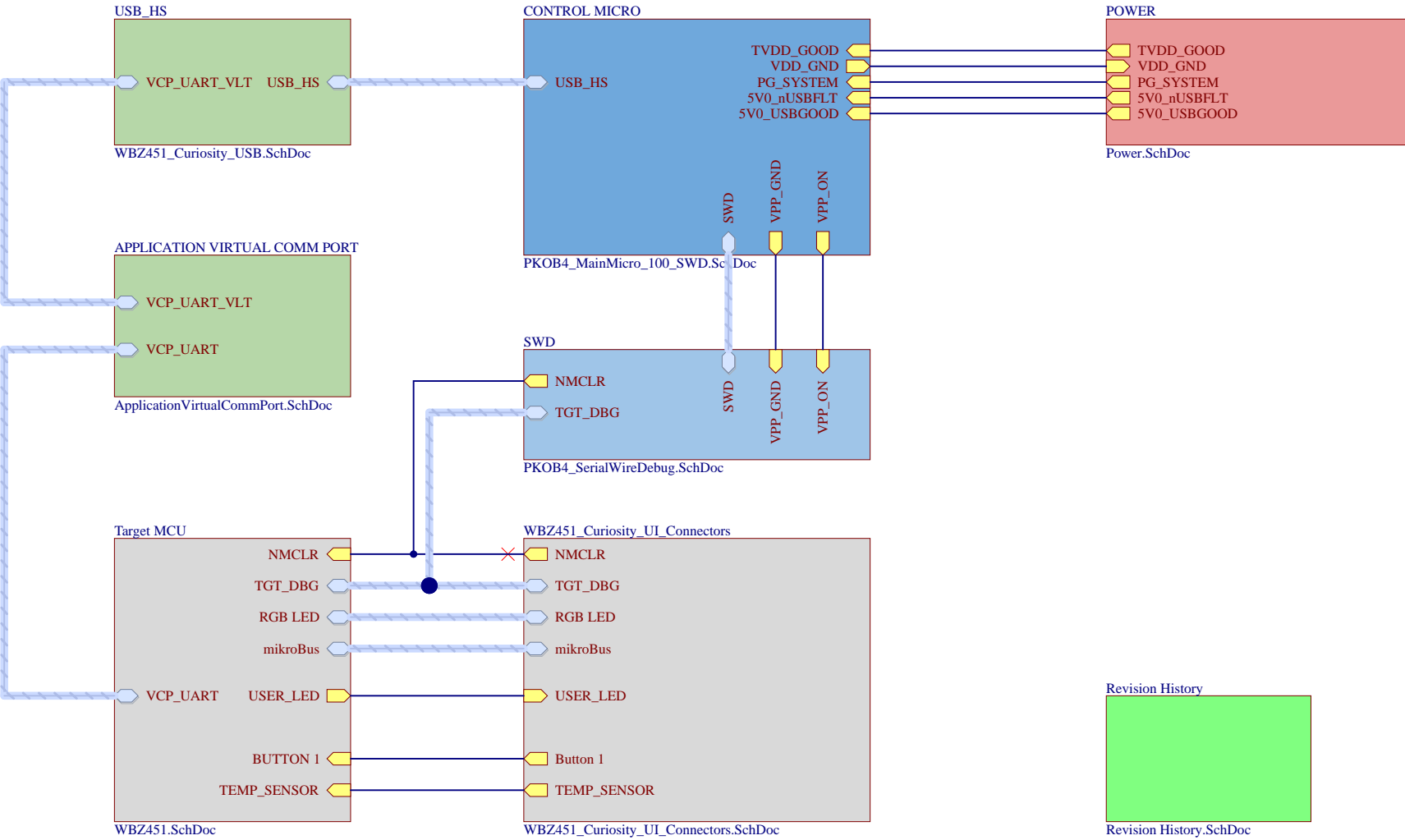
[DATE yyyy.mm.dd]  
SN: [SERIAL]  
[ASSY# / REV]



PCBA LABEL 18X6mm

PAD1 PAD2

Project Owner: RINU CLEETUS		 <b>MICROCHIP</b>			
PCB Layout Contact: BALAJI NARAYANA					
PartNumber: EV96B94A	Project Title WBZ451 CURIOSITY BOARD	Variant: [No Variations]			
Sheet Title Revision History		<div>Designed with</div>  <a href="http://Altium.com">Altium.com</a>			
Size B	SCH #: 03-00307			Rev: 5.0	Date: 5/19/2022
	PCB #: 04-11423			Rev: 5.0	Sheet 1 of 10
File: Revision History.SchDoc					

# Main System Interconnect



Project Owner: RINU CLEETUS		 <b>MICROCHIP</b>	
PCB Layout Contact: BALAJI NARAYANA			
PartNumber: EV96B94A	Project Title <b>WBZ451 CURIOSITY BOARD</b>	Variant: [No Variations]	
Sheet Title <b>WBZ451 Curiosity Board Top Level</b>		<div>Designed with  <a href="https://www.altium.com">Altium.com</a></div>	
Size B	SCH #: 03-00307		
	PCB #: 04-11423	Rev: 5.0	Sheet 2 of 10
File: WBZ451_Curiosity_TopLevel.SchDoc			

### Power Distribution Switch for PKoB4

**Power Distribution Switch for PKoB4**

The schematic shows a power distribution switch circuit for PKoB4. The input is 5V0\_nUSBFLT, which is connected to the EN pin of the MIC2042. The output is 5V0\_USBGOOD, which is connected to the VOUT pin of the MIC2042. The MIC2042 is configured with VBIAS, VIN, EN, SLEW, UVLOIN, ILIM, and GND pins. The output VOUT is connected to the 5V0\_USBGOOD line. A 3ms slew rate is noted.

**Component Values:**

- Capacitors: C56 (10uF, 25V, 0603), C59 (0.1uF, 10V, 0402), C55 (0.1uF, 10V, 0402), C75 (0.1uF, 10V, 0402), C60 (10000pF, 50V, 0402), C76 (22uF, 16V, 0805).
- Resistors: R80 (95.3k, 1%, 0402), R78 (10k, 5%, 0402), R77 (10k, 5%, 0402), R82 (5.62k, 1%, 0402), R83 (270R, 5%, 0402), R79 (442k, 1%, 0402), R81 (24.3k, 1%, 0402), R84 (10k, 5%, 0402).

**Notes:**

- 3ms slew rate
- 1.5A output current,  $R83=CLF/ILIM=395/1.5=263.3\text{ohms}$  (22% tolerance)
- 4.4V power good threshold,  $VOUT(GOOD)=0.23*(1+R79/R83)=0.23*(1+442k/24.3k)=4.41V$
- 4.1V undervoltage in shutdown threshold,  $VUVTH=0.23*(1+95.3k/5.62k)=4.13V$

**A** SEL Pin Low: From USB Port, input current limit governed by USB specs, PROG2= High, ILIMITUSB=500mA  
SEL Pin High: ILIMITAC = 1.65A  
PROG1 = 1000V/IREG=  
1000/100m=10k, IREG = 100mA  
PROG3=1000V/ITERMINATION=1000  
V/10mA= 100k

**PROB 3.3V Regulator**

**Components:**

- U13: MCP1727 3.3V
- R126: 0R 0805
- R35: 10k 0402 5%
- R38: 100k 0402 5%
- C34: 4.7uF 10V 0402
- C36: 1000pF 50V 0402
- C37: 4.7uF 10V 0402

**Formulas:**

$$C = (140na/.42v) * t$$

$$t = (C*.042)/140na = 3ms$$

**Labels:** 5V0, 3V3 PKOB, PG\_SYSTEM, Power Class, TP8, GND.

The schematic diagram shows a power plane with two capacitors, C36 and C37, connected to ground (GND). Capacitor C36 is a 1000pF capacitor (50V, 0402) connected to the power plane. Capacitor C37 is a 4.7uF capacitor (10V, 0402) connected to the power plane. The power plane is labeled "Power Class" and "3V3 TRGB".

DNP

R36  
1R

0402

1%

J6  
HDR-2.54 Male 1x2

TGT\_VDD

TVDD

JP1  
Shunt 2.54mm 1x2 Handle

VBAT\_OUT

R116 10k 0402 5%

C53 4.7uF 10V 0402

GND

U10 MCP1727/3V

VIN VIN

SHDN

PWRGD

VOUT

SENSE

CDELAY

EP

GND

Power Class

3V3

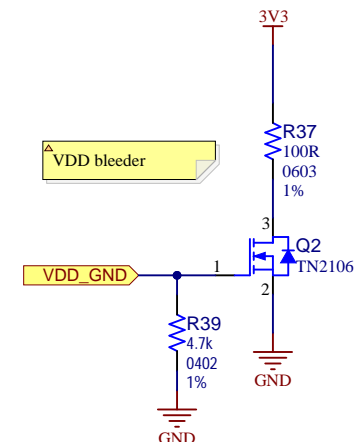
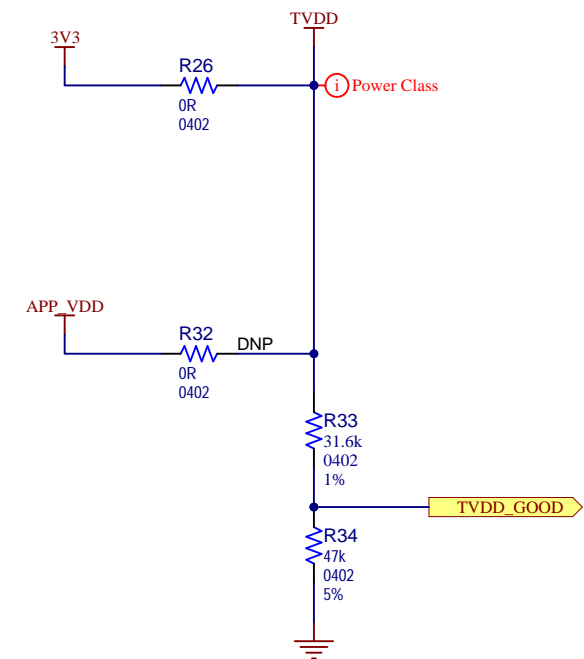
C65 1000pF 50V 0402


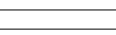
C79 4.7uF 10V 0402

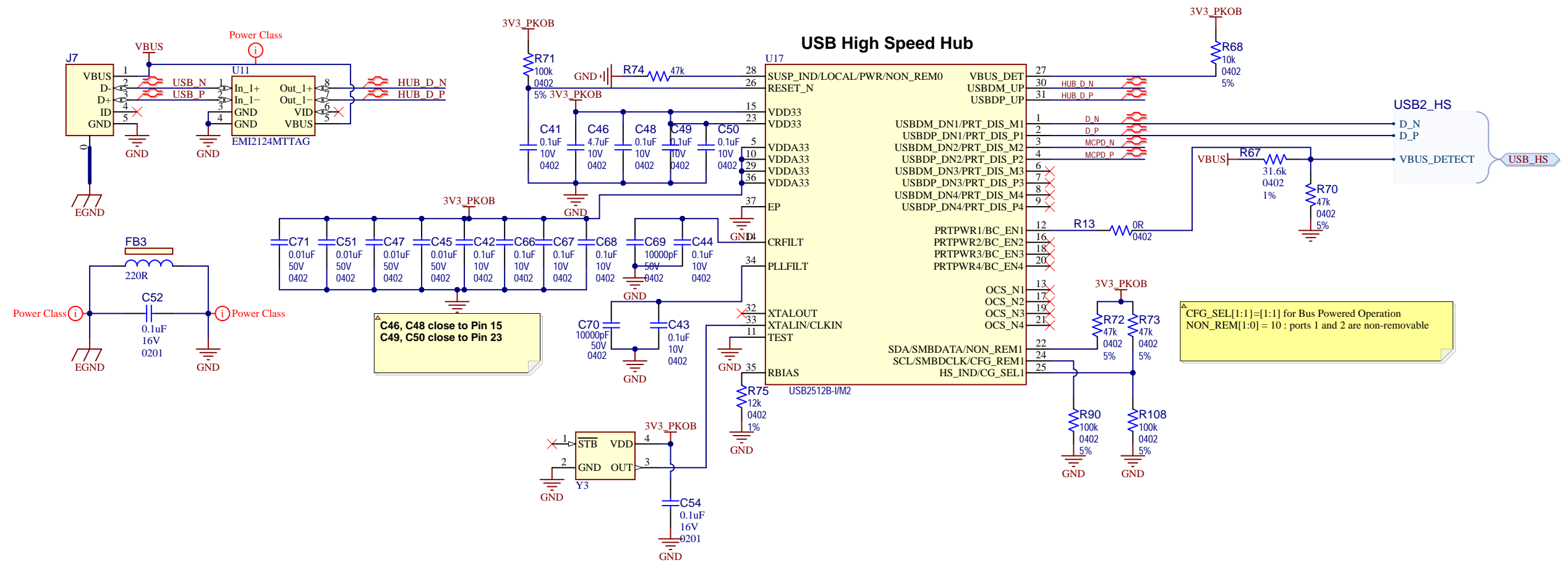
GND

GND

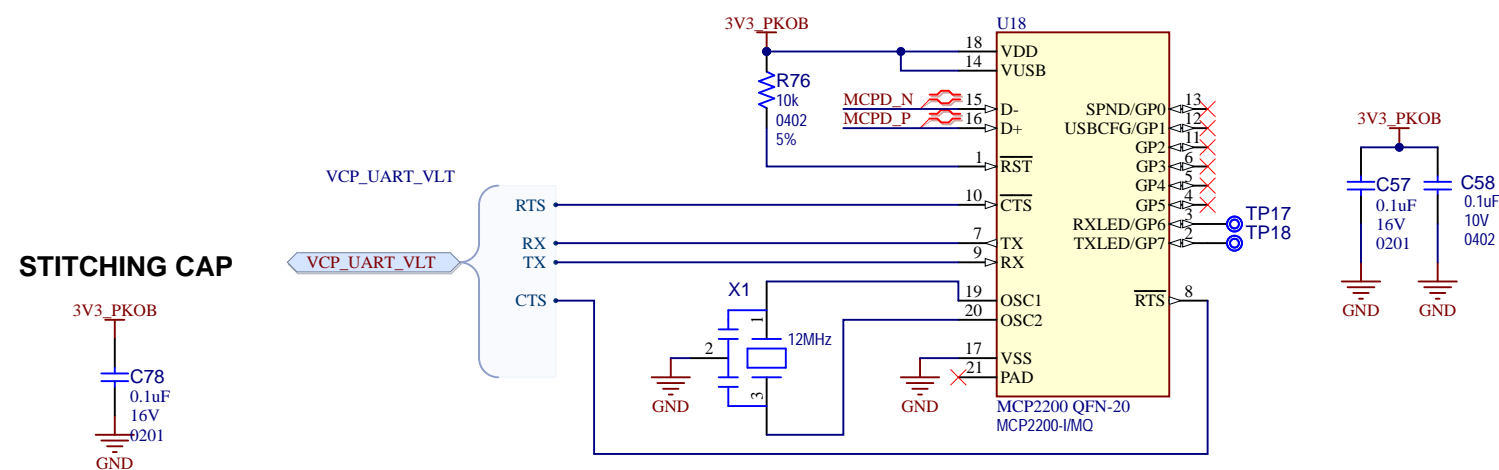
$t = (C \cdot 0.42) / 140na$





Project Owner: RINU CLEETUS		 MICROCHIP			
PCB Layout Contact: BALAJI NARAYANA					
PartNumber: EV96B94A	Project Title WBZ451 CURIOSITY BOARD	Variant: [No Variations]			
Sheet Title Power		<div>Designed with</div>  <div>Altium.com</div>			
Size B	SCH #: 03-00307			Rev: 5.0	Date: 5/19/2022
	PCB #: 04-11423			Rev: 5.0	Sheet 3 of 10
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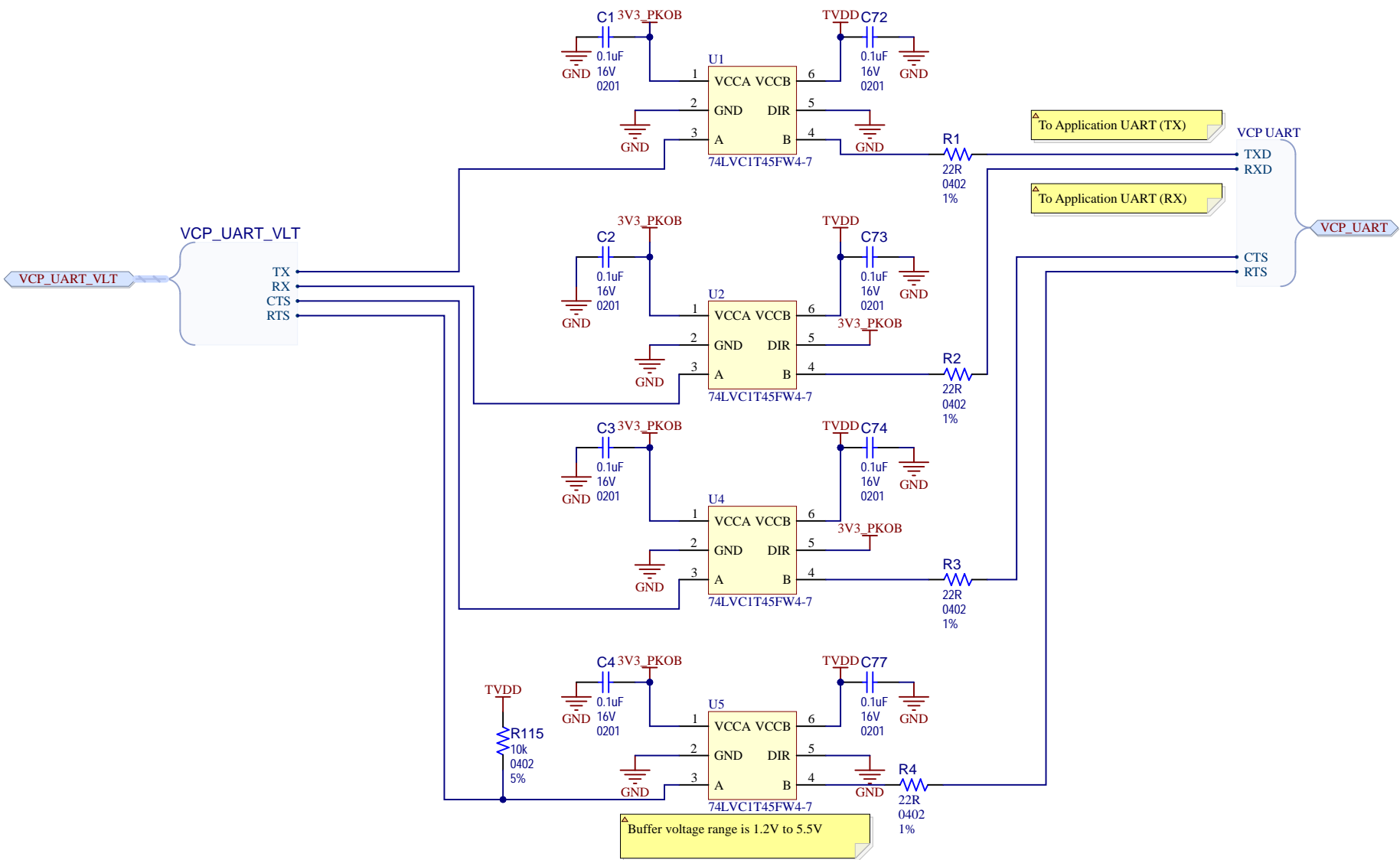
### MCP2200 USB UART Converter



Project Owner: RINU CLEETUS		 <b>MICROCHIP</b>	
PCB Layout Contact: BALAJI NARAYANA			
PartNumber: EV96B94A	Project Title <b>WBZ451 CURIOSITY BOARD</b>	Variant: [No Variations]	
Sheet Title <b>WBZ451_Curiosity_USB</b>		 <i>Designed with</i> <b>Altium</b> <a href="#">Altium.com</a>	
Size B	SCH #: 03-00307		
	PCB #: 04-11423	Rev: 5.0	Sheet 4 of 10
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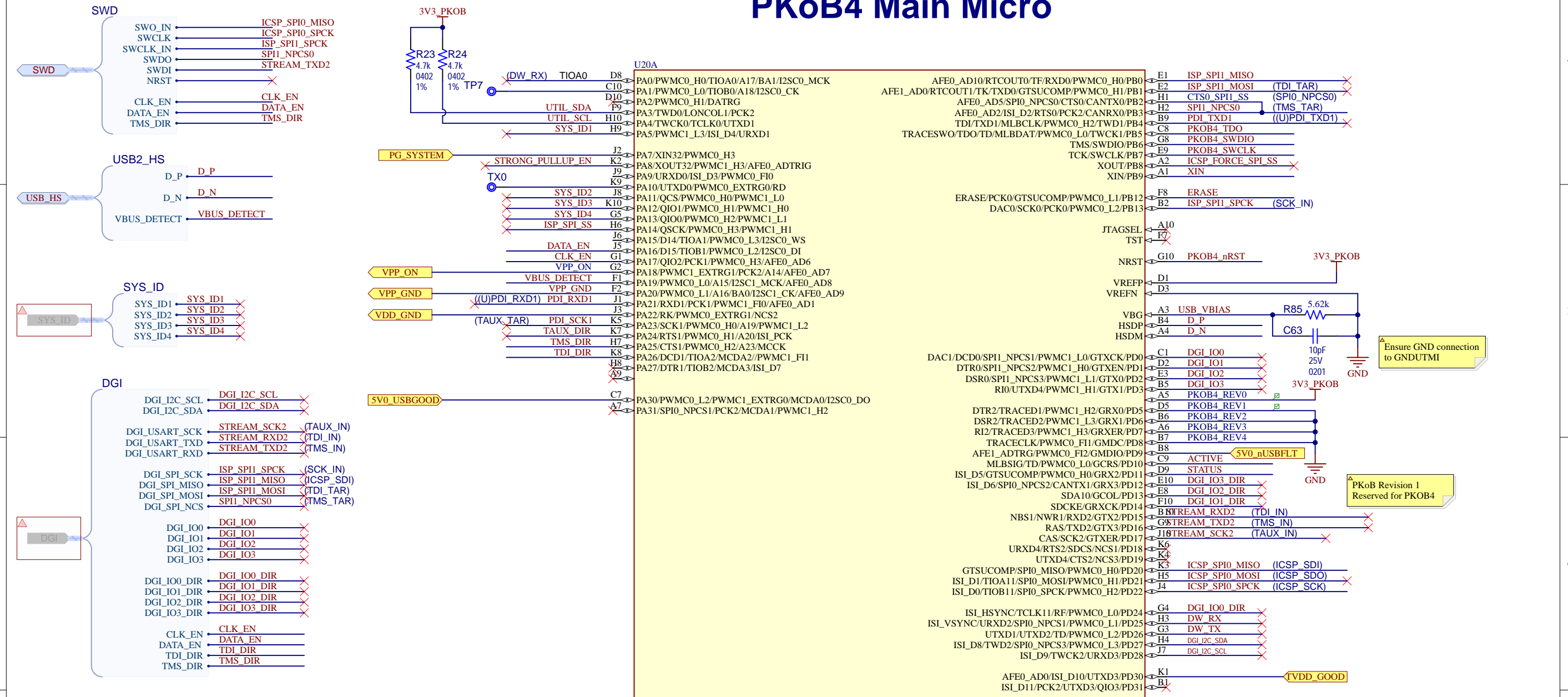



# Application Virtual Comm Port






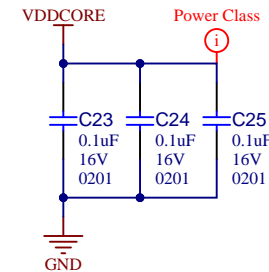
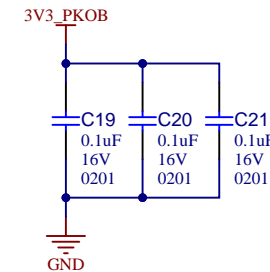
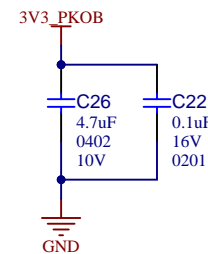
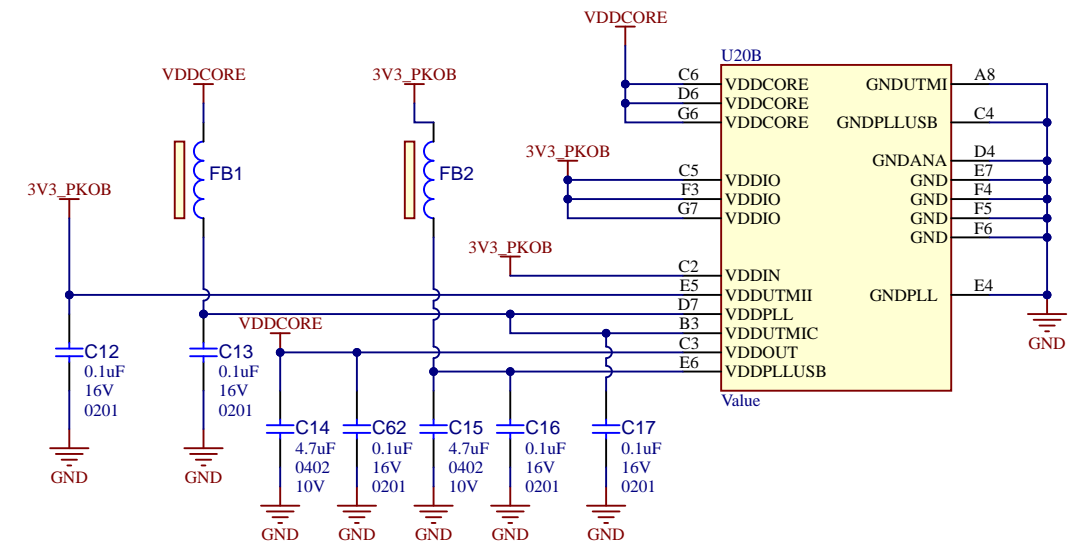
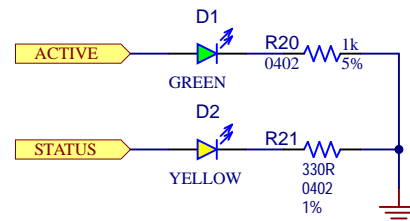
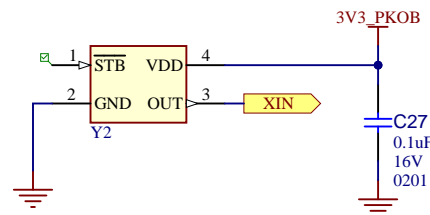
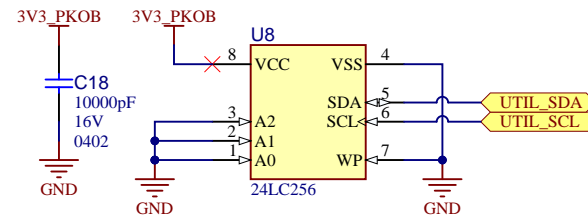
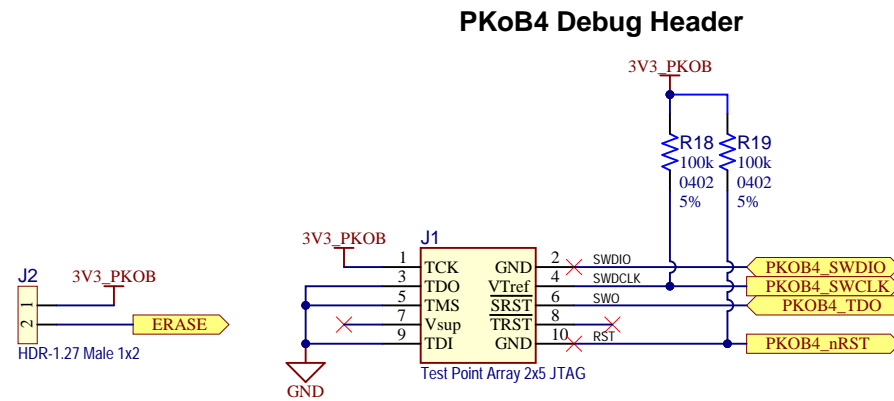
PKoB4 Main Micro




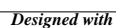
Project Owner: <b>RINU CLEETUS</b>		 <b>MICROCHIP</b>	
PCB Layout Contact: <b>BALAJI NARAYANA</b>			
PartNumber: <b>EV96B94A</b>	Project Title <b>WBZ451 CURIOSITY BOARD</b>	Variant: [No Variations]	
Sheet Title <b>PKoB4_Main Micro_100_SW</b>			
Size <b>B</b>	SCH #: 03-00307	Rev: 5.0	Date: 5/19/2022
	PCB #: 04-11423	Rev: 5.0	Sheet 6 of 10
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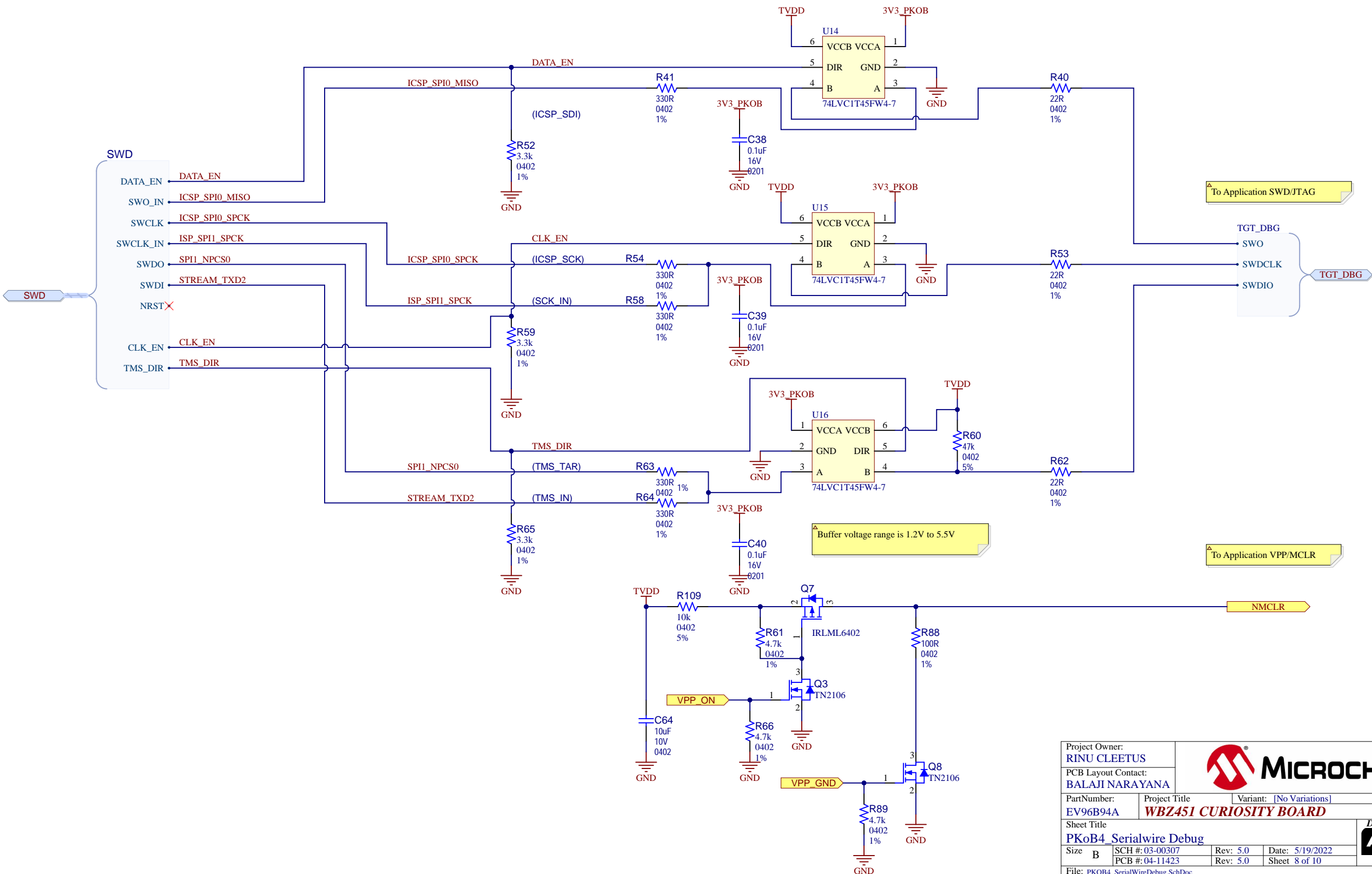
## PKOB4 MISC





ATSAME70N21B-CNT

Project Owner: RINU CLEETUS		 MICROCHIP			
PCB Layout Contact: BALAJI NARAYANA					
PartNumber: EV96B94A	Project Title WBZ451 CURIOSITY BOARD	Variant: [No Variations]			
Sheet Title PKoB4 Main Micro_100 Misc.		<div>Designed with</div>  <div>Altium.com</div>			
Size B	SCH #: 03-00307			Rev: 5.0	Date: 5/19/2022
	PCB #: 04-11423			Rev: 5.0	Sheet 7 of 10
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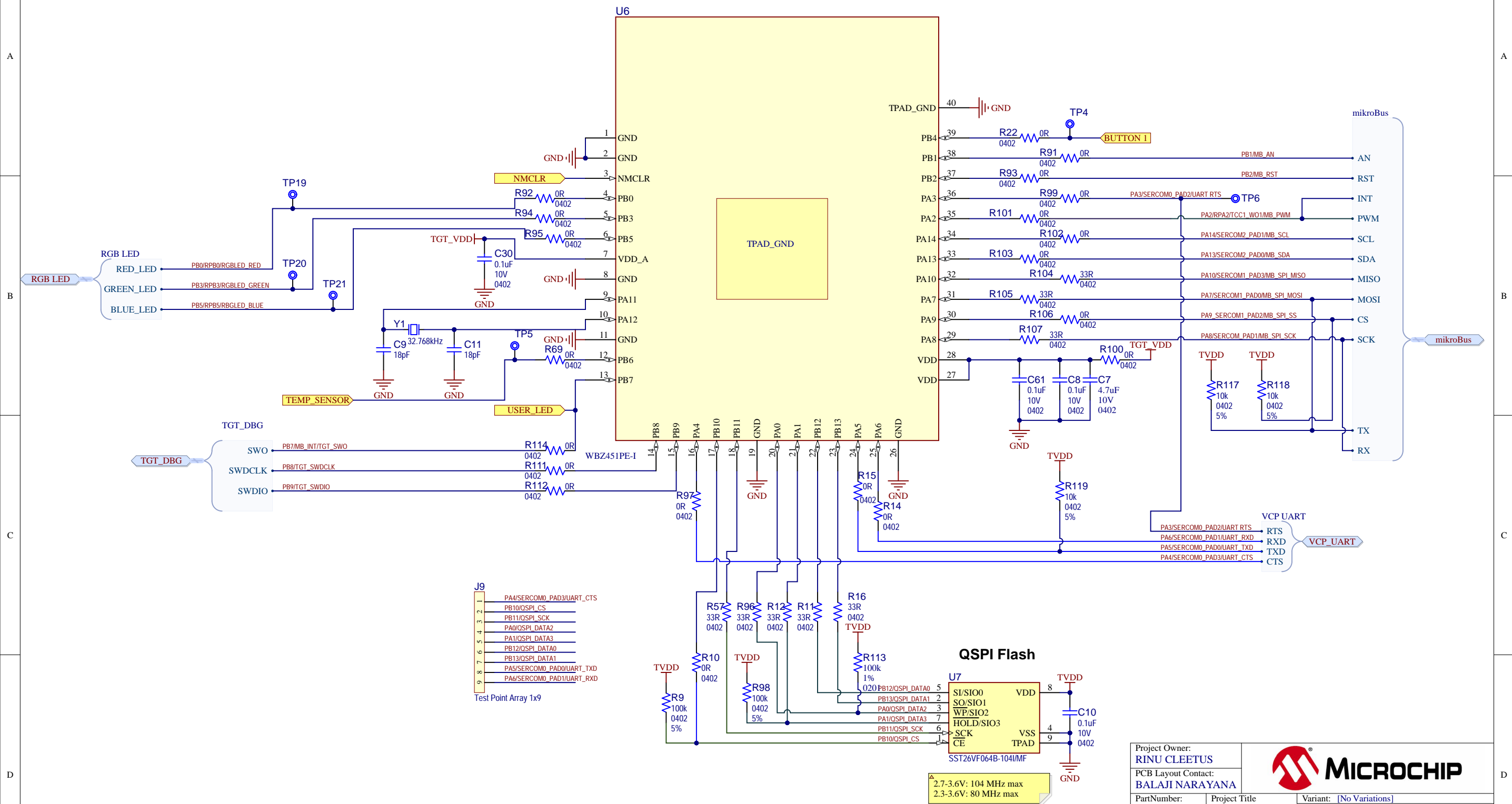
# Serial Wire Debug





Project Owner: RINU CLEETUS		 <b>MICROCHIP</b>	
PCB Layout Contact: BALAJI NARAYANA			
PartNumber: EV96B94A	Project Title WBZ451 CURIOSITY BOARD	Variant: [No Variations]	
Sheet Title PKoB4_Serialwire Debug		<div>Designed with  Altium.com</div>	
Size B	SCH #: 03-00307 PCB #: 04-11423		
File: PKoB4_SerialWireDebug.SchDoc			



# WBZ451



Project Owner: RINU CLEETUS		 <b>MICROCHIP</b>	
PCB Layout Contact: BALAJI NARAYANA			
PartNumber: EV96B94A	Project Title WBZ451 CURIOSITY BOARD	Variant: [No Variations]	
Sheet Title WBZ451		<div>Designed with</div>  <div>Altium.com</div>	
Size B	SCH #: 03-00307 PCB #: 04-11423		
File: WBZ451.SchDoc			

A

B

C

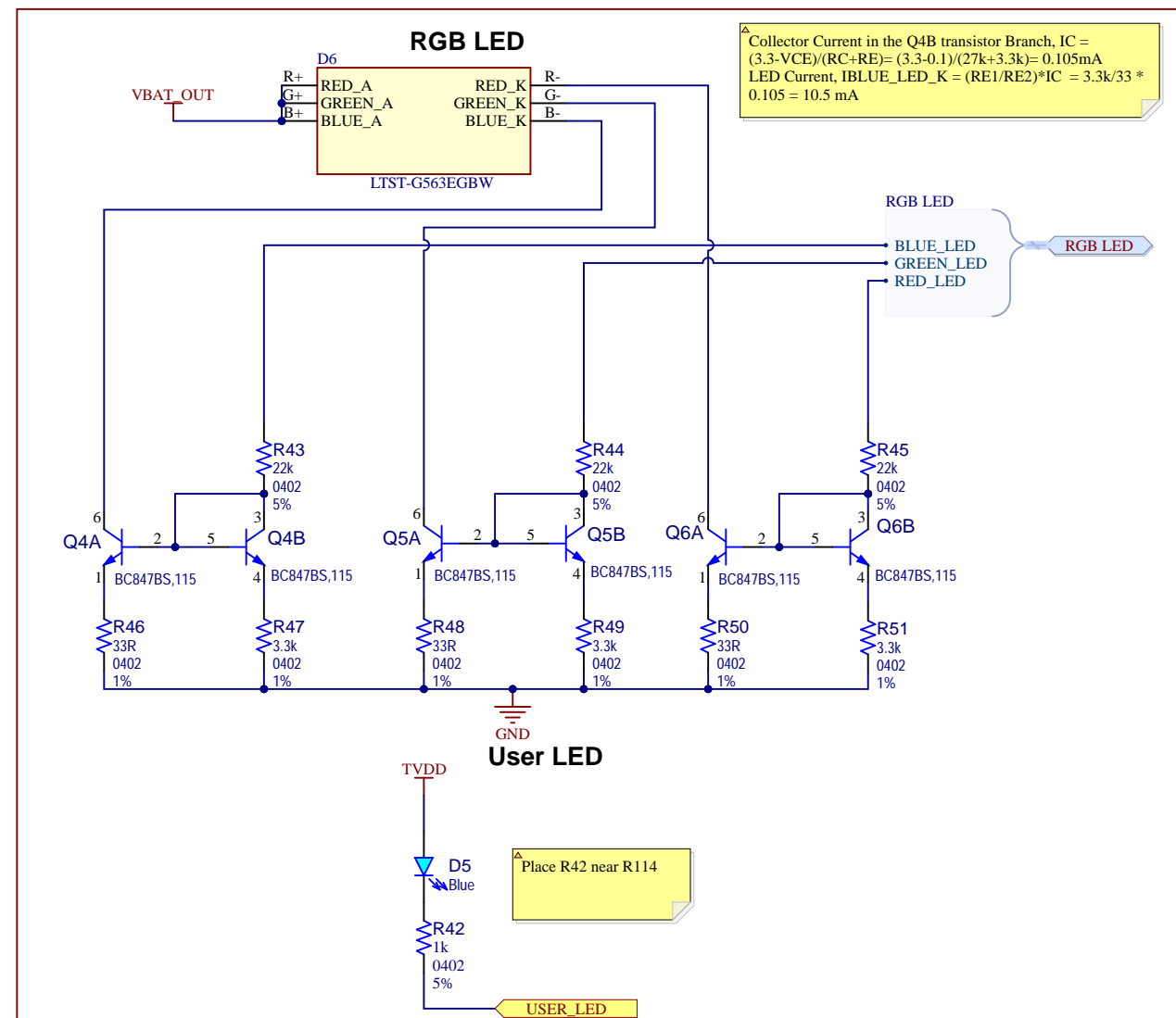
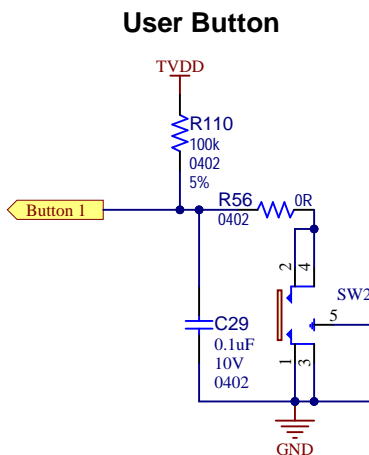
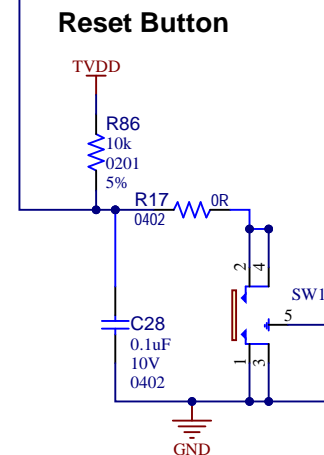
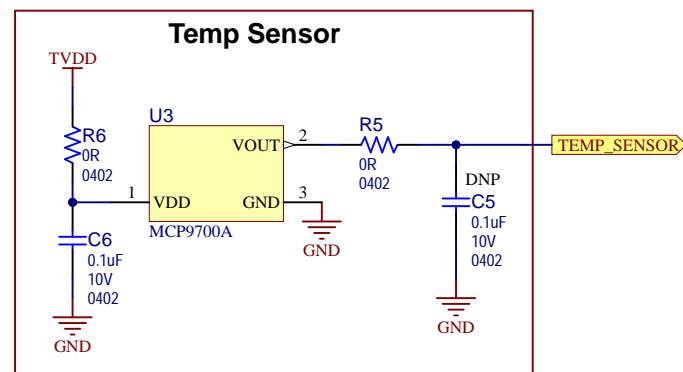
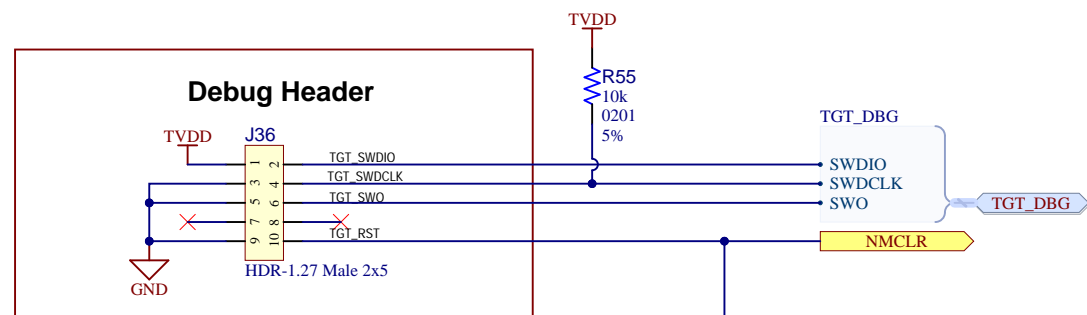
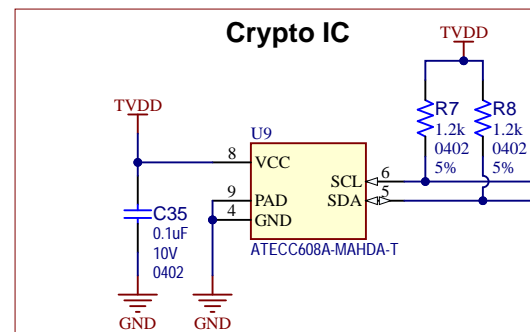
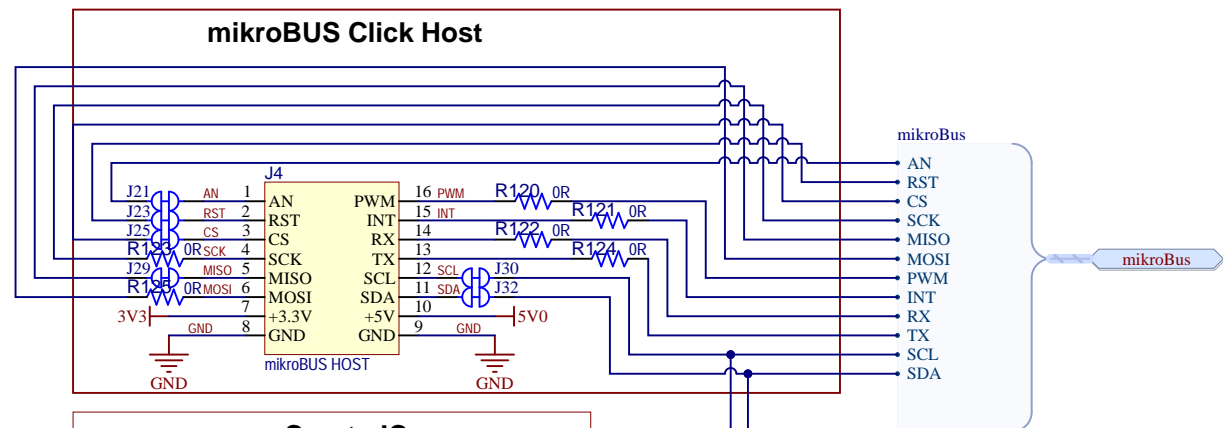
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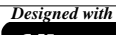
A

B

C

D



Project Owner: RINU CLEETUS		 <b>MICROCHIP</b>			
PCB Layout Contact: BALAJI NARAYANA					
PartNumber: EV96B94A	Project Title <b>WBZ451 CURIOSITY BOARD</b>	Variant: [No Variations]			
Sheet Title WBZ451_Curiosity_UI_Conn		<div>Designed with</div>  <div>Altium.com</div>			
Size B	SCH #: 03-00307			Rev: 5.0	Date: 5/19/2022
	PCB #: 04-11423			Rev: 5.0	Sheet 10 of 10
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