PIC32-BZ6 Curiosity Board User's Guide

PIC32-BZ6

Introduction

The PIC32-BZ6 Curiosity Board is a versatile development platform designed to facilitate rapid prototyping and showcase the features of Microchip's PIC32WM-BZ6204UE Module, which supports Bluetooth® Low Energy (BLE) and IEEE® 802.15.4 wireless communication. Below is a summary of its core capabilities and applications:

Core Capabilities:

- **Integrated Debugging and Programming:**
  - Includes the PICkit™ On-board 4 (PKOB4) debugger interface for seamless programming and debugging.
  - Requires only a USB Type-C™ cable for power and programming.
- **Expansion and Connectivity Options:**
  - mikroBUS™ Click™ sockets
  - Xplained Pro (XPRO) header
  - Reduced Media-Independent Interface (RMII) header
  - Microchip Low-cost Controllers (LCC) adapter connector
- **u.FL Connector:**
  - Allows connection to an external antenna using a u.FL connector on the PIC32WM-BZ6204UE Module.
- **Rapid Prototyping:**
  - Enables rapid prototyping utilizing the PIC32WM-BZ6204UE Module.

Supported Applications

- Wireless Lighting
- Home Automation (Door locks and alarm sensors)
- Internet of Things (IoT) (Wall switches and thermostats)
- Industrial Automation

The PIC32-BZ6 Curiosity Board is ideal for developers looking to create and test wireless communication solutions for IoT, home automation, and industrial applications. Its rich set of features and connectivity options make it a powerful tool for prototyping and development.

Features

- On-board PIC32WM-BZ6204UE, to be Certified Wireless Module and Qualified for Bluetooth® Low Energy 6.0 Specifications
- USB or External 5V Power Supply or Li-Po Battery Powered
- On-board Programmer/Debug Circuit Using PKOB4 Based on Microchip SAME70 MCU
- Microchip MCP73871 Li-Ion/LiPo Battery Charger with Power Path Management
- On-board USB-To-UART Serial Converter with Hardware Flow Control Based on Microchip MCP2200

- Two MikroBUS™ Socket to Expand Functionality Using MikroElektronika Click™ Adapter Boards and Microchip Add On-boards
- One XPRO Header to Interface with QT7/T9 XPRO Kits to Evaluate and Demonstrate the PIC32WM-BZ6204UE Module's Touch Capabilities
- RGB LED Connected to Pulse Width Modulation (PWM)
- One Reset Switch
- Two User Configurable Buttons
- One User LED
- 32.768kHz SOSC Crystal for the PIC32WM-BZ6204UE Module
- Microchip SST26VF064B-104I/MF, 64-Mbit External QSPI Flash Memory
- Microchip MCP9700A, Low Power Analog Voltage Temperature Sensor
- RMII Enables Ethernet Connectivity via the Microchip PHY Daughter Board.
- Microchip LCC Adapter Connector Supports Graphical User Interface Development.
- Quadrature Encoder Interface (QEI) Support
- Controller Area Network (CAN) Support
- USB Type-C™ Interface to Demonstrate USB Full-Speed and Low-Speed Support on PIC32WM-BZ6204UE Module
- 8-Pin Header for External Programmer/Debugger

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1. Quick References

1.1. Reference Documentation

For further details, refer to the following:

- *Highly Integrated Wireless MCU with CAN FD, Ethernet, USB, Motor Control, Graphics, Touch and Enhanced Security Product Brief* (DS00005996)
- *Highly Integrated Wireless MCU with CAN FD, Ethernet, USB, Motor Control, Graphics, Touch and Enhanced Security Data Sheet* (DS00005998)
- *MPLAB® XC32 C/C++ Compiler User's Guide* (DS50001686)
- *MPLAB® X IDE User's Guide* (DS50002027)
- *MPLAB® Snap In-Circuit Debugger Information Sheet* (DS50002787)
- *MCP1727 1.5A, Low Voltage, Low Quiescent Current LDO Regulator Data Sheet* (DS21999)
- *SST26VF064B/SST26VF064BA, 2.5V/3.0V 64-Mbit Serial Quad I/O™ (SQI™) Flash Memory Data Sheet* (DS20005119)
- *MCP73871, Stand-Alone System Load Sharing and Li-Ion/Li-Polymer Battery Charge Management Controller Data Sheet* (DS20002090)
- *MCP9700A, Low-Power Linear Active Thermistor IC Data Sheet* (DS20001942)
- *Universal Serial Bus Specification and Associated Documents* (www.usb.org)
- *mikroBUS™ Specification* (www.mikroe.com/mikrobus)
- PIC32CX-BZ6/PIC32WM-BZ6204 Application Developer's Guide
- *MIC33153 4 MHz 1.2A Internal Inductor PWM Buck Regulator with HyperLight Load® and Power Good* (DS20006223)
- *MIC94325/45/55 500 mA LDO with Ripple Blocker Technology* (DS20006524)

1.2. Hardware Prerequisites

- PIC32-BZ6 Curiosity Board (EA81W68A)
- USB Type-C™ cable
- Li-ion Polymer Battery – 4.2V for battery-powered application
- Bluetooth®-enabled Smartphone:
  - Android™ device
  - iOS – iPhone®
- QT7 Xplained Pro Extension Kit (ATQT7-XPRO)
- LAN8720A PHY Daughter Board (AC320004-3)
- ATA6571 Click Board™ (MIKROE-4381)
- 332 LCD Adapter Graphics Card (AC42G34A)

1.3. Software Prerequisites

- MPLAB® Integrated Development Environment (MPLAB X IDE) tool
- MPLAB XC32 Compiler
- Out-of-Box (OOB) demo (ble_sensor)

1.4. Acronyms and Abbreviations

Table 1-1. Acronyms and Abbreviations

Acronyms and Abbreviations	Description
ADC	Analog-to-Digital Converter
BOM	Bill of Material
CAN	Controller Area Network
DBG	Debug
DNP	Do Not Populate
GPIO	General Purpose Input Output
ICD	In-Circuit Debugger
I^2C	Inter-Integrated Circuit
IoT	Internet of Things
LED	Light Emitting Diode
LCC	Low-cost Controllers
LDO	Low-Dropout
MCU	Microcontroller
NC	Not Connected
OOB	Out-of-Box
PPS	Peripheral Pin Select
PTC	Peripheral Touch Controller
PKOB	PICKit™ On-Board
PCB	Printed Circuit Board
PWM	Pulse Width Modulation
QEI	Quadrature Encoder Interface
QSPI	Quad Serial Peripheral Interface
RTCC	Real Time Clock and Calendar
RX	Receiver
RMII	Reduced Media-Independent Interface
SCL	Serial Clock
SDA	Serial Data
SPI	Serial Peripheral Interface
SWD	Serial Wire Debug
SMD	Surface Mount Device
SoC	System-on-Chip
TX	Transmitter
UVLO	Under Voltage Lockout
UART	Universal Asynchronous Receiver-Transmitter
USB	Universal Serial Bus
$\overline{WP}$	Write Protect

2. Kit Overview

The PIC32-BZ6 Curiosity Board contains a PIC32WM-BZ6204UE Module. All the signals from the PIC32WM-BZ6204UE Module are connected to on-board features of the Curiosity Board for flexibility and rapid prototyping.

Figure 2-1. PIC32-BZ6 Curiosity Board (EA81W68A) – Top View

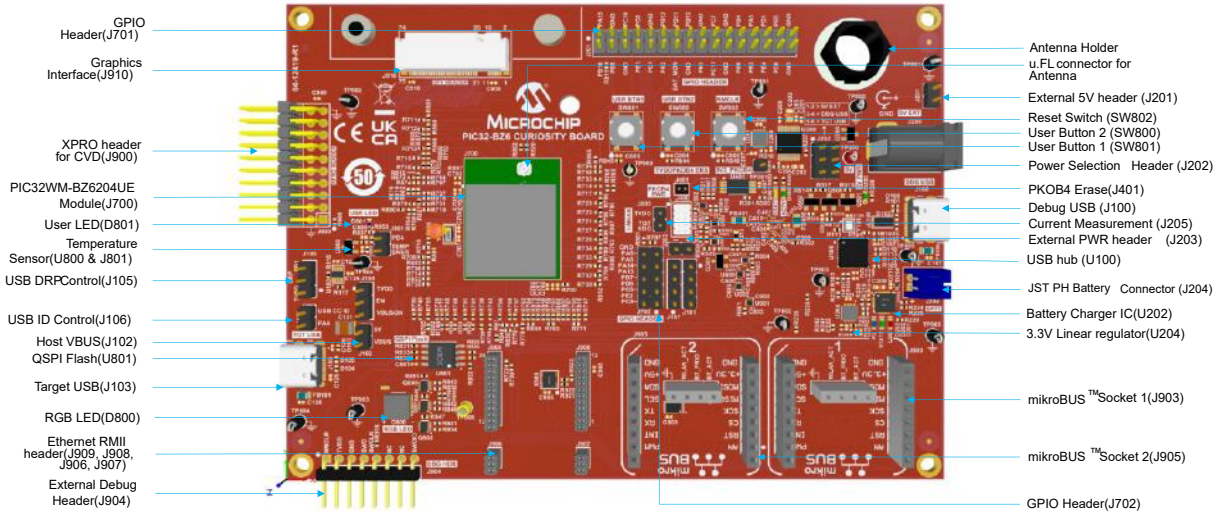
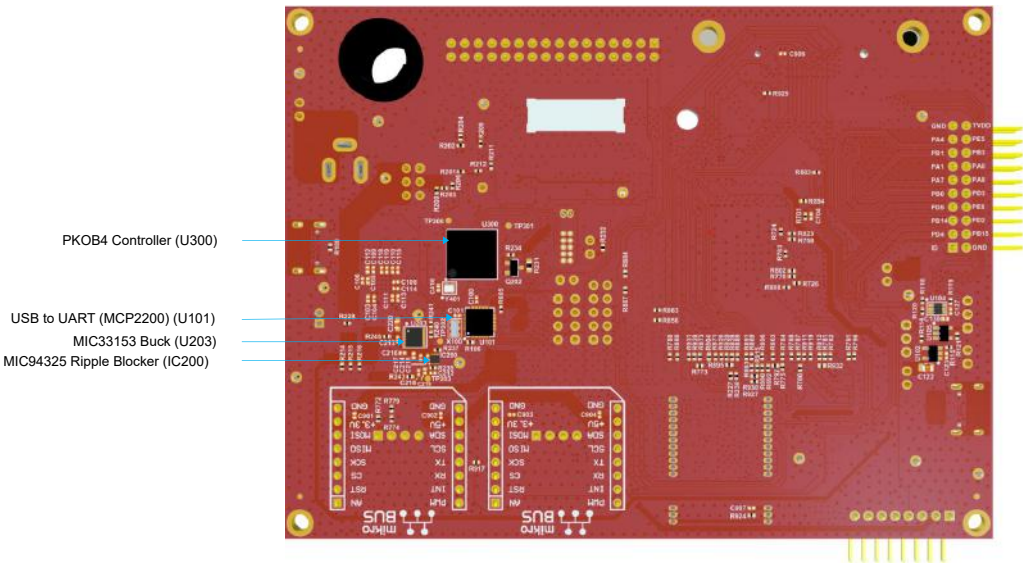


Figure 2-2. PIC32-BZ6 Curiosity Board (EA81W68A) – Bottom View



2.1. Kit Contents

The PIC32-BZ6 Curiosity Board kit contains the following:

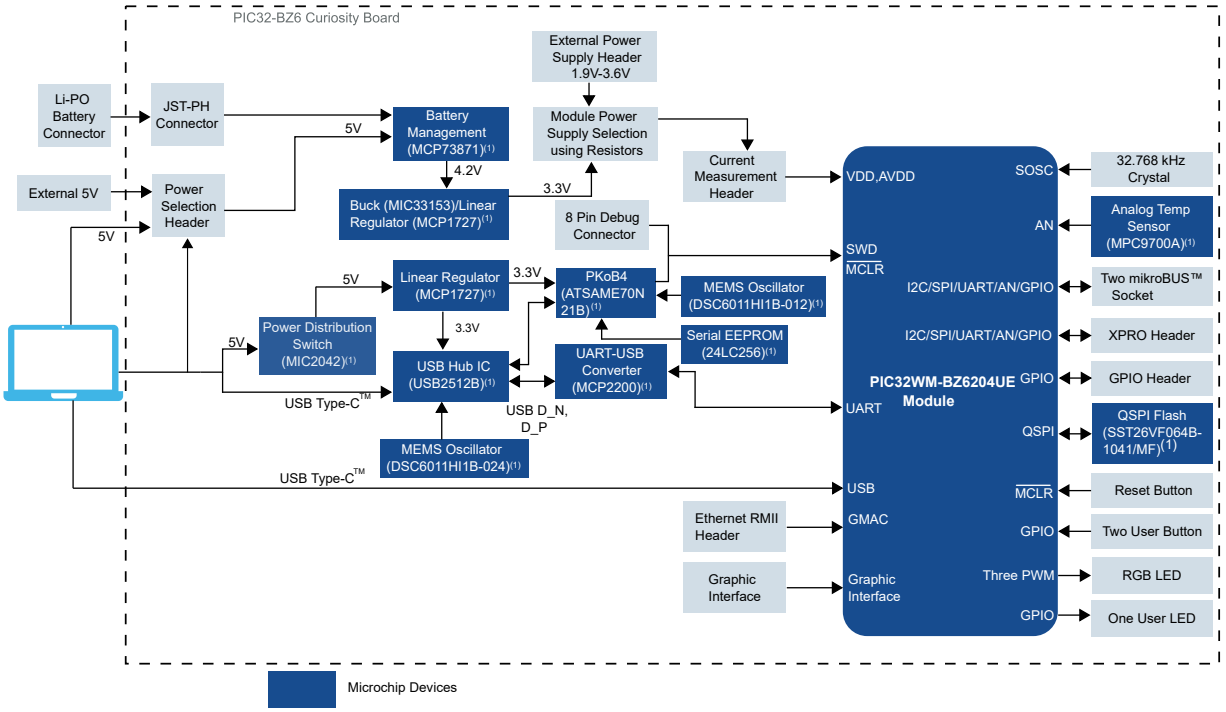
- A PIC32WM-BZ6204UE Module mounted on the PIC32-BZ6 Curiosity Board
- A Type-A male to USB Type-C™ cable
- Aristotle RFA-02-L2H1 2 dBi 2.4 GHz External Antenna

Note: If any of the above items are missing in the kit, go to support.microchip.com or contact your local Microchip Sales office.

3. Hardware

This chapter describes the hardware features of the PIC32-BZ6 Curiosity Board.

Figure 3-1. PIC32-BZ6 Curiosity Board Block Diagram



Note:

1. Using Microchip's total system solution, which includes complementary devices, software drivers and reference designs, is highly recommended to ensure the proven performance of the PIC32-BZ6 Curiosity Boards. For more details, go to support.microchip.com or contact your local Microchip Sales office.

Table 3-1. Microchip Components used in PIC32-BZ6 Curiosity Board

S.No.	Designator	Manufacturer Part Number	Description
1	Q202, Q502	TN2106K1-G	MCHP Analog MOSFET N-CH TN2106 60V 280 mA 360 mW 2.5R SOT23-3
2	U800	MCP9700AT-E/TT	MCHP Analog Temperature Sensor -40°C to +150°C MCP9700AT-E/TT SOT-23-3
3	J700	PIC32WM-BZ6204UE-I	Wireless Module Bluetooth® Low Energy/IEEE® 802.15.4 PIC32WM-BZ6204UE-I, with u.FL connector for external Antenna
4	U801	SST26VF064B-104I/MF	MCHP Serial Flash SST26VF064B-104I/MF WDFN-8
5	U401	24LC256T-E/ST	MCHP Memory Serial EEPROM 256k I2C 24LC256T-E/ST TSSOP-8
6	U201, U204	MCP1727T-ADJE/MF	MCHP Analog LDO 0.8-5V MCP1727TADJE/MF DFN-8
7	U202	MCP73871-2CCI/ML	MCHP Analog Battery Charger MCP73871-2CCI/ML QFN-20
8	U100	USB2512B-I/M2	MCHP Interface USB 2.0 Hub Controller USB2512B-I/M2 SQFN-36
9	U101	MCP2200-I/MQ	MCHP Interface USB UART MCP2200- I/MQ QFN-20

Table 3-1. Microchip Components used in PIC32-BZ6 Curiosity Board (continued)

S.No.	Designator	Manufacturer Part Number	Description
10	U200	MIC2042-1YTS	MCHP Analog Power Switch 5.5V 3A MIC2042-1YTS TSSOP-14
11	U300	ATSAME70N21B-CNT	MCHP MCU 32-BIT 300 MHz 2 MB 384K x 8 ATSAME70N21B-CNT TFBGA-100
12	Y401	DSC6011HI1B-012.0000	MCHP CMOS Oscillator 12 MHz DSC6011HI1B-012.0000 SMD VFLGA-4
13	Y101	DSC6011HI1B-024.0000	MCHP CMOS Oscillator 24 MHz DSC6011HI1B-024.0000 SMD VFLGA-4
14	IC200	MIC94325YMT-TR	MCHP ANALOG LDO ADJ MIC94325YMT-TR TDFN-6
15	U102	MIC2005A-1YM5-TR	MCHP ANALOG POWER SWITCH 5.5V 500 mA MIC2005A-1YM5-TR SOT-23-5
16	U203	MIC33153YHJ-TR	MCHP ANALOG SWITCHER Buck 0.6V to 3.6V MIC33153YHJ-TR VFDFN-14

3.1. Power Supply

The PIC32-BZ6 Curiosity Board can be powered using any of the following sources:

1. A host PC can power the PIC32-BZ6 Curiosity Board over USB using a Type-A-to-Type-C™ USB cable connected to a Type C Debug USB connector (J100).
2. A host PC can power the PIC32-BZ6 Curiosity Board over USB using a Type-A-to-Type-C USB cable connected to a Type C Target USB connector (J103).
3. External 5V according to +/- marking on the board using 1x2 Male header (J201).
4. 4.2V Lithium battery (Li-ion/Li-Po) kit as follows:
   - Connected to battery header (J204), JST PH, 2-pin, 2 mm pitch and right-angle male battery header
   - Crimp-style connector ensures battery polarity according to ± marking on the Curiosity Board
   - Battery is not included in the kit
   - Minimum recommended battery capacity is 400 mAh, with a battery charge voltage of 4.2V

For selecting between power supply options 1,2 and 3 use Jumper caps as per below table.

Table 3-2. Jumper Option (J202) to Select the PIC32WM-BZ6204UE Module Power Supply

J202 Jumper cap position	Power Supply
J202 Pin 1 and Pin 2	External 5V supply from J201
J202 Pin 3 and Pin 4	Debug USB supply from J100
J202 Pin 5 and Pin 6	Target USB supply from J103

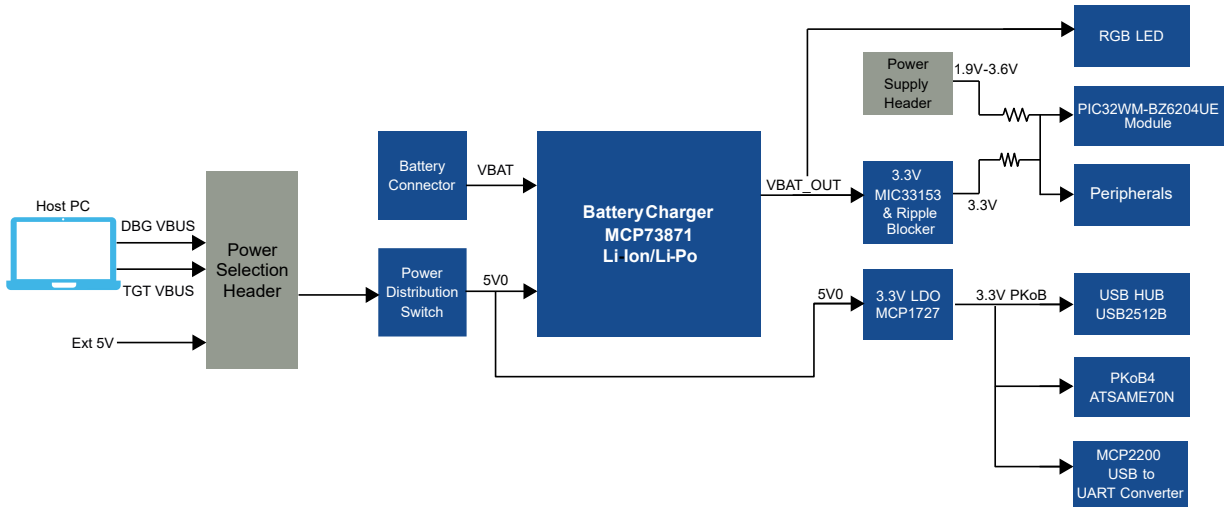
Battery management circuit automatically handles selection between USB power supply and battery supply.

The following are the three on-board voltage regulators on the PIC32-BZ6 Curiosity Board that power the circuitry on-board.

- **Buck Voltage regulator (U203) and Ripple blocker (IC200):** MIC33153 Buck Regulator (U203) together with Ripple blocker (MIC94325), generates 3.3V that powers the PIC32WM-BZ6204UE Module along with the associated circuits
- **Linear Voltage regulator (U204):** Curiosity board also has MCP1727 (U204) to provide power from Linear regulator if necessary. Depopulate R243 and populate R244 to use this option.
- **Linear Voltage regulator (U201):** Generates 3.3V that powers the USB hub IC (U201), PKOB4 main controller (U300), along with the associated circuits that connect the PKOB4 debugger to a host PC and MCP2200 USB to UART converter

For more details on the U203 and U204 voltage regulators, refer to the *MIC33153 4 MHz 1.2A Internal Inductor PWM Buck Regulator with HyperLight Load® and Power Good* (DS20006223) and *MCP1727 1.5A, Low Voltage, Low Quiescent Current LDO Regulator Data Sheet* (DS21999).

Figure 3-2. PIC32-BZ6 Curiosity Board Power Supply Block Diagram



The PIC32WM-BZ6204UE Module and associated peripherals can also be powered from:

- External power supply header (J203) using external power supply (1.9-3.6V) for testing at different voltage levels apart from the default supply of 3.3V from the on-board regulator. To use the external power supply header, disconnect the on-board 3.3V supply according to the following table:

Table 3-3. Resistor Option to Select the PIC32WM-BZ6204UE Module Power Supply

On-board 3.3V Regulator	External Power Supply
Mount shunt resistor (R213) (default configuration) and remove shunt resistor (R217)	Remove shunt resistor (R213) (default configuration) and mount shunt resistor (R217)

Note: The maximum available current from the Debug USB Type-C connector (J100) is limited to 500 mA. The current is shared between charging the external battery (if connected) and powering the target application.

3.2. Lithium Battery Charger (U202)

A 4.2V, lithium battery connected to the 2-pin, 2 mm pitch right-angle male battery header can be charged using lithium battery charger (MCP73871-2CC) (U202) from the USB power supply at 100 mA fast charge current.

The battery management circuit automatically handles the selection between the USB power supply and battery supply. The current is shared between charging the battery (if connected) and powering the target application. For more details on the MCP73871 Lithium battery charger, refer to the *Stand-Alone System Load Sharing and Li-Ion/Li-Polymer Battery Charge Management Controller Data Sheet* (DS20002090).

Table 3-4. Battery Charger Status LED

LED Color	Function
Red (D201)	• Connected to pin 8 (STAT1)/($\overline{LBO}$) (active low signal) of MCP73871 • STAT1 – Charge status indication. The LBO feature indicates when the battery is running low while operating with battery only. Triggered, if the voltage is < 3.1V. • The STA1/LBO is also connected to PIC32WM-BZ6204UE (PA3) to signal the battery charge status to the PIC32WM-BZ6204UE Module.
Blue (D203)	• Connected to pin 6 Power Good ($\overline{PG}$) (active low signal) of MCP73871 • The PG output is low whenever the input to the MCP73871 is above the Under Voltage Lockout (UVLO) threshold and greater than the battery voltage.
Green (D202)	• Connected to pin 7 (STAT2) of MCP73871 • Indicates when the battery is fully charged

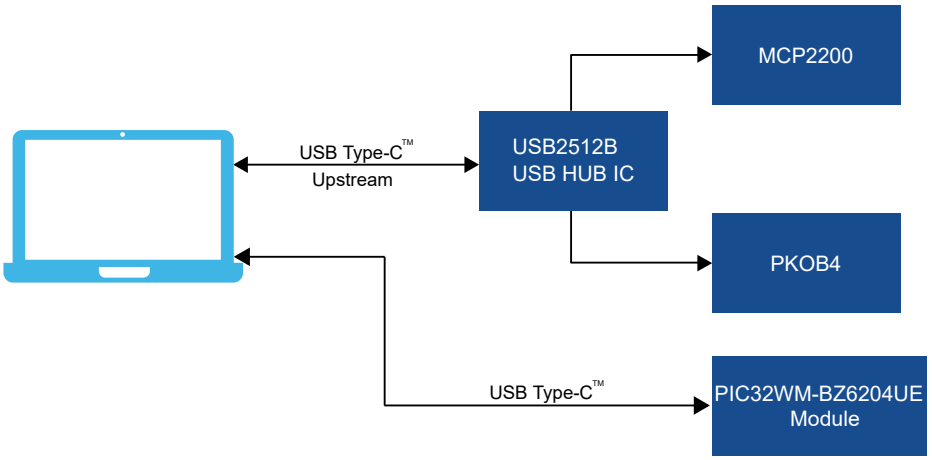
3.3. Power Measurement Header (J205)

To measure the power input to the PIC32WM-BZ6204UE Module, 1x2, 2.54 mm male pin header with shunt connector (I-MEAS, J205) is provided. Remove the jumper (JP201) from J205 and connect an ammeter across its pins to measure the current. An optional shunt resistor (R232) is available but not mounted by default (DNP). For current profiling, in terms of voltage using a voltage probe, mount R232 and measure the voltage drop across the shunt resistor.
Note: JP201 must be mounted for normal operation.

3.4. USB Connectivity using Microchip USB 2.0 Hub Controller

The PIC32-BZ6 Curiosity Board has three USB end device. PKOB4,MCP2200 and PIC32WM-BZ6204UE Module integrated USB peripheral that supports both low speed and full speed modes.

Figure 3-3. USB Connectivity using Hub Controller

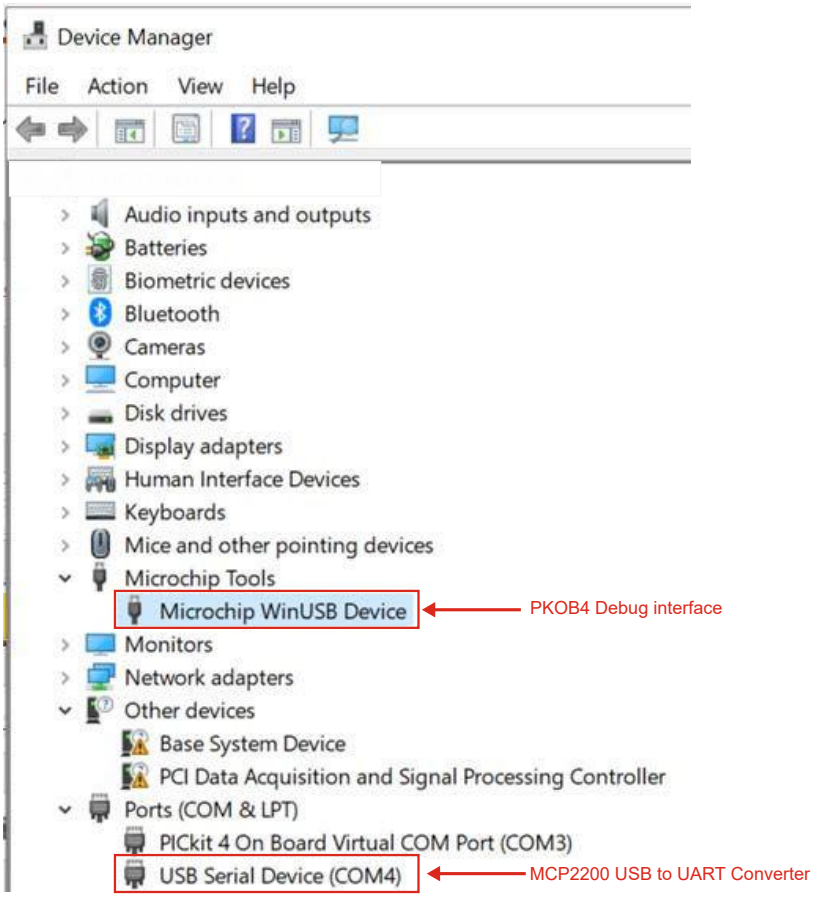


3.4.1. PKOB4 and MCP2200

PKOB4 and MCP2200 USB devices are accessible to the upstream PC via a common USB connector (J100) using the Microchip USB 2.0 High Speed Hub Controller USB2512B providing the user with more ease of use.

After plugging the PIC32-BZ6 Curiosity Board into the upstream PC using a USB cable, device enumeration is as illustrated in the following figure for the PKOB4 and MCP2200

Figure 3-4. Device Manager



3.4.2. PIC32WM-BZ6204 Integrated USB Controller with LS/FS Support

PIC32WM-BZ6204 Module has an integrated USB peripheral that supports both low-speed and full- speed modes. This feature enables the user to implement USB functionality through the USB Type-C™ connector (J103) on the PIC32-BZ6 Curiosity Board. Connect the board using any one of these modes:

- Device mode:
  a. The user must power-up the PIC32-BZ6 Curiosity Board using any of the power sources before using the USB interface. For more details, refer to Power Supply.
  b. Connect the host PC to the Type-C connector (J103) using a male USB Type-A cable to Type C USB cable.

  Note: Do not place the jumper on the Target USB VBUS Power Selection header (J102).
- Host mode:
  a. The user must power-up the PIC32-BZ6 Curiosity Board using any of the power sources other than J103 before using the USB interface. For more details, refer to Power Supply.
  b. Place a jumper in the CC pin header J106.
  c. Place a jumper in the Target USB VBUS Power Selection header (J102) to drive the VBUS line in the Host mode.
  d. Place a jumper in the USB VBUSON Pin selection header (J104) to drive the pin in the VBUS hard enable mode (Pin 1-2 position) or VBUSON pin control from PIC32WM-BZ6204 (Pin 2-3 position)

e. Connect the USB device to the Type C connector (J103) using a USB Type-A to Type C adapter USB cable or direct plugin for Type C USB device.

3.5. PICkit™ On-Board 4 (PKOB4) and Debugger/Programmer Selection (U300)

The PIC32-BZ6 Curiosity Board includes an integrated programmer and debugger MPLAB® PICkit™ On-Board 4 (PKOB4). This new generation of In-Circuit Debugger (ICD), requires no additional programming/debugging tool to get started.

Features and Capabilities of PKOB4:

- Connects to a Computer Through High-Speed USB 2.0 (480 Mbits/s) Cable
- Programs the Device Using MPLAB X IDE or MPLAB IPE
- Supports Multiple Hardware and Software Breakpoints, Stopwatch and Source code File Debugging
- Debugs the Application in Real Time
- Sets Breakpoints Based on the Internal Events
- Monitors the Internal File Registers
- Debugs at Full Speed
- Configures the Pin Drivers
- Field-Upgradeable Through an MPLAB X IDE Firmware Download
- Indicates Debugger Status Through On-Board LEDs, Demonstrating the Development Board's Functionality and Features

The PKOB4 on the PIC32-BZ6 Curiosity Board is intended to support programming and debugging the target device (PIC32WM-BZ6204UE Module) through the USB Type-C™ connector (J100) from the host PC. The PIC32-BZ6 Curiosity Board does not use the other PKOB4 features, such as data gateway and PICKIT 4 on-board virtual COM.

By default, the on-board debugger (PKOB4) is connected to the programming pins (SWDIO and SWDCLK) of the PIC32WM-BZ6204UE Module.

The voltage level translators are provided on signals between the PKOB4 and PIC32WM-BZ6204UE Module for supporting target voltage from 1.9-3.6V.

Two PKOB4 LEDs indicates:

- Green (D400): ACTIVE indicator
- Yellow (D401): STATUS indicator

In addition, the Curiosity Board supports external debuggers, such as MPLAB ICD5 by connecting to the Program/Debug Connector (J904).

The program/debug connector (J904) follows the standard MPLAB PICKIT 5 1x8 interface (see Figure 2-1). Connect the MPLAB ICD5 to the debug header using the debugger adapter board (AC102015). For more details, refer to the AC102015 Product page.

Table 3-5. SWD Debug Connector Details

Pin Number of DBG Header	Pin Name	Description
1	NMCLR	PIC32WM-BZ6204 Reset NMCLR pin
2	VDD_VIOREF	TVDD
3	GND	Ground
4	SWO	PB7, optional trace output
5	SWCLK	PB8, SWD programming clock
6	NC	No connection

Table 3-5. SWD Debug Connector Details (continued)

Pin Number of DBG Header	Pin Name	Description
7	NC	No connection
8	SWDIO	PB9, SWD programming data

Note: PB9 is also shared between User Button 1 and mikroBUS™ 2 SPI Chip Select.

3.6. USB-UART Serial Converter (U101)

The PIC32-BZ6 Curiosity Board has an on-board MCP2200 that acts as a USB-to-UART serial converter (U101) with hardware flow control support. It enables the user to connect to the Host PC through the USB Type-C™ connector (J100). MCP2200 supports UART baud rates from 300-1000 kbps. Voltage level translators are provided on signals between the MCP2200 and PIC32WM-BZ6204UE Module for supporting target voltage from 1.9-3.6V when powered externally.

Table 3-6. USB Serial Converter Pin Assignment

Pin on MCP2200	Pin on PIC32WM-BZ6204UE Module	Description
TX	PA6, SERCOM0_PAD1	UART RX pin of the PIC32WM-BZ6204UE Module
RX	PA5, SERCOM0_PAD0	UART TX pin of the PIC32WM-BZ6204UE Module
RTS	PB4(1), UART_CTS	UART CTS pin of the PIC32WM-BZ6204UE Module
CTS	PA3, UART_RTS	UART RTS pin of the PIC32WM-BZ6204UE Module

Note: PB4 is shared between Graphic interface data line and UART CTS. By default, the PB4 is connected to the Graphic Interface (J910). To use UART_CTS, the user must populate resistor R602.

3.7. mikroBUS™ Socket (J903 and J905)

A mikroBUS™ socket (J903 and J905) expands the functionality of the PIC32-BZ6 Curiosity Board using the MikroElektronika Click™ adapter boards and Microchip Add-on Boards.

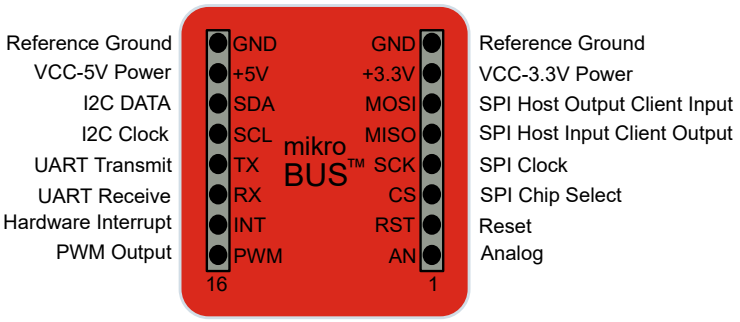
The mikroBUS connector consists of:

- Pair of 1x8 female headers with proprietary pin configuration and silkscreen markings
- The pinout consists of three groups of communications pins:
  - Serial Peripheral Interface (SPI)
  - Universal Asynchronous Receiver/Transmitter (UART)
  - Inter-Integrated Circuit (I^2C)
- Two power groups
  - 3.3V, Ground power line
  - 5V, Ground power line
- Four additional pins
  - Pulse Width Modulation (PWM)
  - Reset Pin (RST)
  - Interrupt
  - Analog

Note: For a complete listing of the Click boards, refer to www.mikroe.com/click.

The GPIO pins for the mikroBUS sockets are assigned to route I²C, SPI peripherals and other GPIO pins as follows. Same SPI is used between the two mikroBUS Sockets with different Chip Select lines.

Figure 3-5. mikroBUS™ Pinout Diagram



Note: The mikroBUS pinout diagram is reversed to align with the PIC32-BZ6 Curiosity Board

Table 3-7. mikroBUS™ Socket 1 Pinout Details (J903)

Pin Number	Pin Name	Pin on PIC32WM-BZ6204UE Module	Description
1	AN	AN0/MIKRO1_AN/RPB10	Analog-to-Digital Converter (ADC) analog input
2	$\overline{RST}$	MIKRO1_RST/RPA15	General purpose I/O pin
3	$\overline{CS}$	SERCOM4_PAD2/SPI_CS/RPA10	Client select pin for SPI/General purpose I/O pin
4	SCK	SERCOM4_PAD1/SPI_SCK/RPE5	SPI clock
5	MISO	SERCOM4_PAD0/SPI_DI/USBID/ RPA4	SPI host input client output
6	MOSI	SERCOM4_PAD3/SPI_DO/ COEX_BT_STATE_2/RPA9(1)	SPI host output client input
7	+3.3V	+3V	3V power
8	GND	GND	Ground
9	GND	GND	Ground
10	+5V	+5V	5V power
11	SDA	SERCOM1_PAD0/SDA/VBUSON/ RPA7(2)	I²C data
12	SCL	SERCOM1_PAD1/SCL/ SERCOM1_PAD1/SCL/ COEX_WLAN_ACT_2/RPA8(3)	I²C clock
13	TX	CAN1_TX/MIKRO1_UART_TX/ GFX_LCDD2/RPB2(4)	CAN TX/UART TX
14	RX	QSPI_DATA3/CAN1_RX/ MIKRO1_UART_RX/RPA2(5)	CAN RX/UART RX
15	INT	MIKRO1_INT/RPE4	Interrupt pin/General purpose I/O pin
16	PWM	MIKRO1_PWM/RPD1	PWM pin/General purpose I/O pin

Notes:

1. PA9 is shared between SPI DO and PTA COEX BT STATE (option 2).
2. PA7 is shared between SDA and USB Host mode VBUSON
3. PA8 is shared between SCL and COEX BT STATE (option 2)
4. PB2 is shared between CAN TX/UART TX and Graphic LCD Data 2.
5. PA2 is shared between CAN RX/UART RX and QSPI DATA3.

Table 3-8. mikroBUS™ Socket 2 Pinout Details (J905)

Pin Number	Pin Name	Pin on PIC32WM-BZ6204UE Module	Description
1	AN	MIKRO2_AN/GFX_LCDD5/RPB5(1)	Analog-to-Digital Converter (ADC) analog input
2	$\overline{RST}$	GREEN_LED/MIKRO2_RST/ GFX_GPIO4/RPC10(2)	General purpose I/O pin
3	$\overline{CS}$	INT0/BTN1/MIKRO2_CS/SWDIO/ RPB9(3)	Client select pin for SPI/General purpose I/O pin
4	SCK	SERCOM4_PAD1/SPI_SCK/RPE5	SPI clock
5	MISO	SERCOM4_PAD0/SPI_DI/USBID/ RPA4	SPI host input client output
6	MOSI	SERCOM4_PAD3/SPI_DO/ COEX_BT_STATE_2/RPA9	SPI host output client input
7	+3.3V	+3V	3V power
8	GND	GND	Ground
9	GND	GND	Ground
10	+5V	+5V	5V power
11	SDA	SERCOM1_PAD0/SDA/VBUSON/ RPA7	I2C data
12	SCL	SERCOM1_PAD1/SCL/ COEX_WLAN_ACT_2/RPA8	I2C clock
13	TX	QSPI_DATA0/SERCOM5_PAD0/ MIKRO2_UART_TX/ XPRO_UART_TX/RPA0(4)	UART TX
14	RX	QSPI_SCK/SERCOM5_PAD3/ MIKRO2_UART_RX/ XPRO_UART_RX/RPA1(5)	UART RX
15	INT	MIKRO2_INT/BTN2/ GFX_LCDVSYNC/RPE3(6)	Interrupt pin/General purpose I/O pin
16	PWM	RMII_EN/MIKRO2_PWM/GFX_IRQ3/ RPC11	PWM pin/General purpose I/O pin

Notes:

1. PB5 is shared between AN, Battery Monitor and Graphic LCD Data 5.
2. PC10 is shared between Green LED, MIKRO 2 RST and Graphic GPIO4
3. PB9 is shared between User Button 1, mikroBUS 2 SPI Chip Select and SWDIO.
4. PA0 is shared between QSPI_DATA0, UART for mikroBUS 2 and XPRO.
5. PA1 is shared between QSPI SCK, UART for mikroBUS 2 and XPRO.
6. PE3 is shared between Graphic LCDVSYNC, mikroBUS 2 INT and Button 2.

3.8. PTA Co-existence Header

The PIC32WM-BZ6204 includes two PTA headers (J901 and J902) for each of mikroBUS™ headers as per the below pin out. User can chose Option 2 if Option 1 is used for shared functions.

Table 3-9. PTA Co-existence Header Pinout Details

Pin on J901 and J902	Pin on PIC32WM-BZ6204 Module (Option 1)	Pin on PIC32WM-BZ6204 Module (Option 2)
1	COEX_BT_STATE/BLUE_LED/RPE0 (Remove R772 for Option 2)	SERCOM4_PAD3/SPI_DO/COEX_BT_STATE_2/ RPA9(Not connected by default. Mount R773 to connect)
2	SERCOM0_PAD2/UART_RTS/COEX_RF_ACT/RPA3	SERCOM0_PAD2/UART_RTS/COEX_RF_ACT/RPA3
3	QSPI_DATA2/COEX_WLAN_ACT/RPB11 (Remove R775 for Option 2)	SERCOM1_PAD1/SCL/COEX_WLAN_ACT_2/RPA8(Not connected by default. Mount R776 to connect)

Table 3-9. PTA Co-existence Header Pinout Details (continued)

Pin on J901 and J902	Pin on PIC32WM-BZ6204 Module (Option 1)	Pin on PIC32WM-BZ6204 Module (Option 2)
4	GND	GND

3.9. XPRO Header (J900)

The PIC32-BZ6 Curiosity Board includes one XPRO standard extension male header (XPRO header) (J900) to connect to the Microchip QT7/T9 Xplained Pro kit. The Microchip QT7 Xplained Pro kit is an extension board that enables the evaluation of self-capacitance touch using the Peripheral Touch Controller (PTC) module. For more details, refer to the *QT7 Xplained Pro Extension Kit* (ATQT7-XPRO).

The following table provides details about the pinout definition.

Table 3-10. XPRO Header

Pin Number	Function QT7	Function T9	Description on QT7	Pin on PIC32WM-BZ6204 Module XPRO Header 1 (J900)
1	ID	ID	Communication line to ID chip	PKOB4 Sys ID Pin
2	GND	GND	Ground	—
3	Y-Line-5	Not Connected	Y-line 5 – Connected to driven Shield	CVD10/TempSensor/RPD4
4	Y-Line-1	Not Connected	Y-line 1 – Connected to button 1	CVD17/RPB15
5	LED 0	LED 2	Touch status LED for slider	CVD18/RPB14
6	LED 6	LED 1	Touch status LED for button 1	CVD16/RPD2
7	Y-Line-2	Y-Line-1	Y-line – Connected to slider/ button	CVD11/RPD5
8	Y-Line-3	Y-Line-2	Y-line – Connected to slider/ button	CVD14/RPE6
9	Y-Line-4	Y-Line-4	Y-line – Connected to slider/ button	CVD4/FAULT_CTRL/RPB0
10	Y-Line-0	Y-Line-3	Y-line – Connected to button 2	CVD9/RPD3
11	LED 7	Not connected	Touch status LED for button 2	SERCOM1_PAD0/SDA/VBUSON/ RPA7
12	LED 1	Not connected	Touch status LED for slider	SERCOM1_PAD1/SCL/ COEX_WLAN_ACT_2/RPA8
13	Not connected	Not connected	UART RX	QSPI_SCK/SERCOM5_PAD3/ MIKRO2_UART_RX/ XPRO_UART_RX/RPA1
14	Not connected	Not connected	UART TX	QSPI_DATA0/SERCOM5_PAD0/ MIKRO2_UART_TX/ XPRO_UART_TX/RPA0
15	LED 2	LED 3	Touch status LED for slider	CVD5/RMII_WAKE/DRP_CTRL/RPB1
16	LED 3	LED 4	Touch status LED for slider	CVD7/RPB3
17	LED 4	Not connected	Touch status LED for slider	SERCOM4_PAD0/SPI_DI/USBID/ RPA4
18	LED 5	Not connected	Touch status LED for slider	SERCOM4_PAD1/SPI_SCK/RPE5
19	GND	GND	Ground	Ground
20	VCC	VCC	Target supply voltage	3.3V

Table 3-10. XPRO Header (continued)

Pin Number	Function QT7	Function T9	Description on QT7	Pin on PIC32WM-BZ6204 Module XPRO Header 1 (J900)

Notes:

1. PD4 is shared between Temperature Sensor and XPRO header.
2. PA0 is shared between QSPI_DATA0 and UART for mikroBUS 2 and XPRO.
3. PA1 is shared between QSPI SCK and UART for mikroBUS 2 and XPRO.
4. PB1 is shared between USB DRP control and XPRO.
5. PA4 is shared between XPRO 17 and SPI DI
6. PE5 is shared between XPRO 18 and SPI SCK

3.10. Graphics Connectors or GFX Card Interface

The PIC32-BZ6 Curiosity board is designed to have a modular graphics interface. This interface enables the use of several different graphics cards, which allows for expandability and different use cases. AC42G34A 24-bit to 8-bit pass though card is required with the kit , this board passes parallel data through, and can be configured to an 8-bit LCC mode. For the pin description, refer to the following table.

Table 3-11. Graphics Connectors or GFX Card Interface

J901 Pin No	Name	Description	Pin on PIC32WM-BZ6204 Module
1	GND	Ground	GND
2	GND	Ground	GND
3	MCLR	Host Clear, Controlled by the debuggers. Allows for a complete system reboot.	MCLR of PIC32WM-BZ6204 & Target Reset Control from Debugger
4	IRQ1 (LCD Touch)	Interrupt request line for cap touch device	CVD16/GFX_IRQ_LCDTOUCH//RPD2
5	5.0V VCC	5.0V	5V from USB or external power.
6	IRQ2 (Q Touch)	Interrupt request line for Q touch devices	—
7	LCDEN	LCD Data Enable	CVD18/GFX_LCD_EN/RPB14
8	IRQ3 (Display Controllers)	Interrupt request line for external display controllers	RMII_EN/MIKRO2_PWM/GFX_IRQ3/ RPC11 (By default not connected. Mount R862 to connect)
9	LCDHSYNC/NCS3	LCD Horizontal Sync	QSPI_CS/GFX_LCDHSYNC/RPB13
10	IRQ4 (Resistive touch)	Interrupt request line for resistive touch controllers	—
11	LCDVSYNC/nWE	LEC Vertical Sync or Write enable (active-low)	MIKRO2_INT/BTN2/GFX_LCDVSYNC/ RPE3
12-19	—	—	—
20	5.0V VCC	+5.0V	5V from USB or external power.
21	LCDPCK/nRD	LCD pixel Clock or Read Enable (active-low)	CVD9/GFX_LCDPCK/RPD3
22	I2C SDA	Data line for I2C interface. Always implemented, bus type.	SERCOM1_PAD0/SDA/VBUSON/RPA7
23	LCD D0	LCD Data bit 0	CVD4/FAULT_CTRL/GFX_LCDD0/RPB0
24	I2C SCL	Clock line for I2C interface. Always implemented, bus type.	SERCOM1_PAD1/SCL/ COEX_WLAN_ACT_2/RPA8
25	LCD D1	LCD Data bit 1	CVD5/RMII_WAKE/DRP_CTRL/ GFX_LCDD1/RPB1
26	SPI SCK	Clock for serial peripheral interface. Always implemented, bus type.	SERCOM4_PAD1/SPI_SCK/RPE5

Table 3-11. Graphics Connectors or GFX Card Interface (continued)

J901 Pin No	Name	Description	Pin on PIC32WM-BZ6204 Module
27	LCD D2	LCD Data bit 2	CAN1_TX/MIKRO1_UART_TX/ GFX_LCDD2/RPB2
28	SPI MOSI	Host Out Client In (MOSI) line of Serial Peripheral Interface.	SERCOM4_PAD3/SPI_DO/ COEX_BT_STATE_2/RPA9
29	LCD D3	LCD Data bit 3	CVD7//GFX_LCDD3/RPB3
30	SPI MISO	Host In Client Out (MISO) line of Serial Peripheral Interface.	SERCOM4_PAD0/SPI_DI/USBID/RPA4
31	LCD D4	LCD Data bit 4	SERCOM0_PAD3/UART_CTS/GFX_LCDD4/ RPB4
32	SPI SS	SPI Client Select	CVD11/GFX_SPICS/RPD5
33	LCD D5	LCD Data bit 5	MIKRO2_AN/BAT_MON/GFX_LCDD5/ RPB5
34	UART RX	Receiver line of target device UART	—
35	LCD D6	LCD Data bit 6	GFX_LCDD5/RPB6
36	UART TX	Transmitter line of target device UART.	—
37	LCD D7	LCD Data bit 7	SWO/USER_LED/GFX_LCDD7/RPB7
38	UART RTS	UART Ready To Send	—
39	LCD D8	LCD Data bit 8	—
40	UART CTS	UART Clear To Send	—
41	LCD D9	LCD Data bit 9	—
42	LCD PWM	LCD PWM back light control	CVD14/GFX_LCDPWM/RPE6
43	LCD D10	LCD Data bit 10	—
44	PWM2	Pulse-Width Modulation,	RED_LED/RMII_INT/GFX_PWM2/RPC7
45	LCD D11	LCD Data bit 11	—
46	GPIO1	General purpose I/O	GMAX_GCRS_DV/GFX_GPIO1/RPE2(Not connected by default. Mount R883 to connect)
47	LCD D12	LCD Data bit 12	—
48	GPIO2	General purpose I/O	GMAC_GMDC/GFX_GPIO2/RPD7 (Not connected by default. Mount R884 to connect)
49	LCD D13	LCD Data bit 13	—
50	GPIO3	General purpose I/O	CVD17/GFX_GPIO3/RPB15
51	LCD D14	LCD Data bit 14	—
52	STBY/RST/GPIO4	Standby/Reset or general purpose I/O. For resetting devices attached to the GFX connector.	GREEN_LED/MIKRO2_RST/GFX_GPIO4/ RPC10
53	LCD D15	LCD Data bit 15	—
54	STBY/RST/GPIO5	Standby2/Reset2 or general purpose I/O	GMAC_GMDIO/GFX_LCD_GPIO5/RPD6
55	LCD D16	LCD Data bit 16	—
56	ID pin	Communication line to the ID chip on an extension board	PKOB4 SYS ID
57	LCD D17	LCD Data bit 17	—
58	ADC 0	Analog-to-Digital Converter to MCU	—
59	LCD D18	LCD Data bit 18	—
60	ADC1	Analog-to-Digital Converter to MCU	—
61	LCD D19	LCD Data bit 19	—
62	ADC2	Analog-to-Digital Converter to MCU	—

Table 3-11. Graphics Connectors or GFX Card Interface (continued)

J901 Pin No	Name	Description	Pin on PIC32WM-BZ6204 Module
63	LCD D20	LCD Data bit 20	—
64	ADC3	Analog-to-Digital Converter to MCU	—
65	LCD D21	LCD Data bit 21	—
66	ADC4	Analog-to-Digital Converter to MCU	—
67	LCD D22	LCD Data bit 22	—
68	ADC5	Analog-to-Digital Converter to MCU	—
69	LCD D23	LCD Data bit 23	—
70	ADC6	Analog-to-Digital Converter to MCU	—
71	3.3V VCC	+3.3V VCC	+3.3V VCC
72	ADC7	Analog-to-Digital Converter to MCU	—
73	GND	Ground	Ground
74	3.3V VCC	+3.3V VCC	+3.3V VCC
75	GND	Ground	Ground
M1	GND TAB	Mounting Tab	Ground
M2	GND TAB	Mounting Tab	Ground

Note: Graphic connector signals are shared with other functions on board. refer to the notes in other sections for more information on this sharing.

3.11. Ethernet

The PIC32-BZ6 Curiosity board has a modular Ethernet PHY system using RMII headers that enables different PHYs to be plugged into the board. This interface is setup to use a RMII. The following table describes the Ethernet PHY header configuration.

Table 3-12. Ethernet PHY Daughter Board Header Pin Description J908 and J909

Pin	Pin on RMII header	Pin Description of Ethernet PHY Daughter Board Header	Pin on PIC32WM-BZ6204UE Module
J908-1	TX_EN	Ethernet Transmit Enable	GMAC_GTXEN/RPC9
J908-2	TXDO	Ethernet Transmit Data 0	GMAC_GTX0/RPC0
J908-3	TXD1	Ethernet Transmit Data 1	GMAC_GTX1/RPE1
J908-4	NC	Not connected	NC
J908-5	NC	Not connected	NC
J908-6	GND	Ground	GND
J908-7	XTALI	Clock output	NC
J908-8	CLK_IN	Clock input	GMAC_GREFCLKOUT/RPC1
J908-9	GND	Ground	GND
J908-10	+3V3	Input power supply	VDD
J908-11	NC	Not connected	NC
J908-12	NC	Not connected	NC
J909-13	WAKE	Wake	CVD5/RMII_WAKE/DRP_CTRL/ GFX_LCDD1/RPB1 (Not connected by default. Mount R724 to connect)
J909-14	NC	Not connected	NC
J909-15	RXD1	Ethernet Receive Data 1	GMAC_GRX1/RPA13
J909-16	RXD0	Ethernet Receive Data 0	GMAC_GRX0/RPA14
J909-17	RX_ER	Ethernet Receive Error	GMAC_GRXER/RPC8
J909-18	CRS_DV	Ethernet Rx Data Valid Input	GMAX_GCRS_DV/GFX_GPIO1/RPE2

Table 3-12. Ethernet PHY Daughter Board Header Pin Description J908 and J909 (continued)

Pin	Pin on RMII header	Pin Description of Ethernet PHY Daughter Board Header	Pin on PIC32WM-BZ6204UE Module
J909-19	MDC	Ethernet Management Data Clock Output	GMAC_GMDC/GFX_GPIO2/RPD7
J909-20	MDIO	Ethernet Management Data Input Output	GMAC_GMDIO/GFX_LCD_GPIO5/RPD6
J909-21	INT	Interrupt output	RED_LED/RMII_INT/GFX_PWM2/RPC7 (Not connected by default. Mount R726 to connect)
J909-22	$\overline{RST}$	System Reset	RMII_RST/LBO/RPD0
J909-23	EN	Enable	RMII_EN/MIKRO2_PWM/GFX_IRQ3/RPC11 (Not connected by default. Mount R722 to connect)
J909-24	NC	Not connected	NC

Notes:

1. These are Peripheral Pin Select (PPS) pins. The user can configure them for any of the supported peripheral functions based on the end user application.
2. Pin PE2, PD7, PD6 are shared between Ethernet RMII and Graphic Connector

3.12. GPIO Header (J701 & J702)

The PIC32-BZ6 Curiosity Board includes two GPIO standard male header (XPRO header) (J701 and J702) to access PIC32WM-BZ6204UE Module signals. The following table provides details about the pinout definition

Table 3-13. GPIO Header 1 Pinout Details (J701)

Pin on J701	Pin on PIC32WM-BZ6204UE Module
1	MIKRO1_RST/RPA15
2	AN0/MIKRO1_AN/RPB10
3	GND
4	MIKRO2_AN/BAT_MON/GFX_LCDD5/RPB5
5	GREEN_LED/MIKRO2_RST/GFX_GPIO4/RPC10
6	GND
7	GMAC_GTX0/RPC0(Not connected by default. Mount R795 to connect)
8	GMAC_GTX1/RPE1(Not connected by default. Mount R786 to connect)
9	GND
10	GMAC_GREFCLKOUT/RPC1(Not connected by default. Mount R798 to connect)
11	COEX_RF_ACTIVE/QSPI_DATA1/RPB12
12	QSPI_DATA3/CAN1_RX/MIKRO1_UART_RX/RPA2
13	QSPI_DATA2/COEX_WLAN_ACT/RPB11
14	BAT_MON
15	QSPI_CS/GFX_LCDHSYNC/RPB13
16	GND
17	GND
18	MIKRO2_INT/BTN2/GFX_LCDVSYNC/RPE3
19	RED_LED/RMII_INT/GFX_PWM2/RPC7
20	RMII_EN/MIKRO2_PWM/GFX_IRQ3/RPC11
21	GND

Table 3-13. GPIO Header 1 Pinout Details (J701) (continued)

Pin on J701	Pin on PIC32WM-BZ6204UE Module
22	GND
23	SERCOM0_PAD3/UART_CTS/GFX_LCDD4/RPB4
24	GFX_LCDD5/RPB6
25	SERCOM0_PAD2/UART_RTS/COEX_RF_ACT/RPA3
26	CAN1_TX/MIKRO1_UART_TX/GFX_LCDD2/RPB2
27	MIKRO1_PWM/RPD1
28	MIKRO1_INT/RPE4
29	COEX_BT_STATE/BLUE_LED/RPE0
30	RMII_RST/LBO/RPD0
31	GND
32	GND

Table 3-14. GPIO Header 2 Pinout Details (J702)

Pin on J702	Pin on PIC32WM-BZ6204UE Module
1	GMAX_GCRS_DV/GFX_GPIO1/RPE2 (Not connected by default. Mount R790 to connect)
2	GMAC_GTXEN/RPC9 (Not connected by default. Mount R812 to connect)
3	GMAC_GMDIO/GFX_LCD_GPIO5/RPD6 (Not connected by default. Mount R789 to connect)
4	GMAC_GRXER/RPC8 (Not connected by default. Mount R808 to connect)
5	GMAC_GRX1/RPA13 (Not connected by default. Mount R805 to connect)
6	GMAC_GMDC/GFX_GPIO2/RPD7 (Not connected by default. Mount R793 to connect)
7	SERCOM0_PAD0/MCP2200_UART_TX/RPA5
8	GMAC_GRX0/RPA14(1)
9	GND
10	SERCOM0_PAD1/MCP2200_UART_RX/RPA6

Note:
1. Not connected by default. Mount R807 to connect

3.13. Switches

The following switches are available on the PIC32-BZ6 Curiosity Board:

- Reset switch (SW802)
- User button 1 (SW801)
- User button 2 (SW800)

In the Idle state, the level of the Reset switch is pulled high using the external pull-up resistor and, when the switch is pressed, it drives the level of the switch to low and resets the PIC32WM-BZ6204UE Module.

The user-configurable switch is also pulled high using the external pull-up resistor. When the switch is pressed, it drives the level of the switch to low.

Table 3-15. Switches Description

Switch Name	Pin on PIC32WM-BZ6204UE Module	Description
Reset (SW802)	NMCLR	Reset switch (SW802) connected to NMCLR pin of the PIC32WM-BZ6204UE Module

Table 3-15. Switches Description (continued)

Switch Name	Pin on PIC32WM-BZ6204UE Module	Description
User Button 1 (SW801)	INT0/BTN1/MIKRO2_CS/SWDIO/RPB9	User-configurable button (SW801); configured to wake-up PIC32WM-BZ6204UE Module from Power-down mode(s)
User Button 2 (SW800)	MIKRO2_INT/BTN2/GFX_LCDVSYNC/ RPE3	User Configurable button (SW800)

3.14. LEDs

3.14.1. User LED (D801)

One user-programmable blue indicator LED (D801) is available on the PIC32-BZ6 Curiosity Board, and this LED can be turned ON/OFF using the connected GPIO pin PB7. Drive the pin to a high level to turn OFF the LED and drive the pin to a low level to turn ON the LED.

Important: PB7 also functions as an SWO pin on the PIC32WM-BZ6204UE Module. During a programming/debug session with MPLAB X IDE, this pin is always driven low by the PIC32WM-BZ6204UE Module, thus, causing the user LED to turn ON during the entire DEBUG session. When the DEBUG session is exited, this pin resumes normal operation.

3.14.2. RGB LED (D800)

Three PWM signals from the PIC32WM-BZ6204UE Module are connected to RGB LED (D800) on the PIC32-BZ6 Curiosity Board.

Table 3-16. RGB LED Pin Description

Color	Pin on PIC32WM-BZ6204UE Module
Red	RED_LED/RMII_INT/GFX_PWM2/RPC7
Green	GREEN_LED/MIKRO2_RST/GFX_GPIO4/RPC10
Blue	COEX_BT_STATE/BLUE_LED/RPE0
Note: PC7, PC10 and PE0 are multiplexed with other functions on board such as Graphic, mikroBUS™ and PTA.	

3.15. Temperature Sensor (U800)

The temperature sensor (2.3-5.5V Microchip MCP9700A) (U800) is connected to PD4 (AN10) of the PIC32WM-BZ6204UE Module. Mount jumper cap on J801 to use temperature sensor. For more details, refer to the *MCP9700A,Low-Power Linear Active Thermistor IC Data Sheet* (DS20001942).

Note: PD4 is also shared with XPRO CVD. Remove Jumper cap on J801 to use CVD.

3.16. QSPI Serial Flash

The PIC32-BZ6 Curiosity Board has an on-board 64-Mb, 2.3-3.6V Serial Quad I/O (SQI) Flash (SST26VF064B-104I/MF) (U801) memory for storage of data. A default SST26VF064B-104I/MF at power-up enables the Write Protect ($\overline{WP}$) and $\overline{HOLD}$ pins and disables the SIO2 and SIO3 pins allowing for SPI protocol operations without register configuration. Register configuration is required to switch to Quad I/O operation with QSPI.

Table 3-17. QSPI Flash Pin Description

QSPI Flash	Pin on PIC32WM-BZ6204UE Module	Description
$\overline{CE}$	PB13, QSPI_CS	QSPI chip select

Table 3-17. QSPI Flash Pin Description (continued)

QSPI Flash	Pin on PIC32WM-BZ6204UE Module	Description
SO/SIO1	PB12, QSPI_DATA1	QSPI data channel 1
$\overline{WP}$/SIO2	PB11, QSPI_DATA2	QSPI data channel 2
VSS	GND	Ground
SI/SIO0	PA0, QSPI_DATA0	QSPI data channel 0
SCK	PA1, QSPI_SCK	QSPI clock
$\overline{HOLD}$/SIO3	PA2, QSPI_DATA3	QSPI data channel 3
VDD	VDD	VDD

Note: QSPI function is not enabled by default on board and shared with other functions. To use QSPI Flash, mount 0Ω series resistors R739, R742, R744, R746, R749, R752.

3.17. 32.768 kHz Secondary Oscillator

The 32.768 kHz crystal is connected to SOSC pins (SOSCI and SOSCO) of the PIC32WM-BZ6204UE Module.

3.18. PIC32WM-BZ6204UE Module

For more details on the PIC32WM-BZ6204UE Module pinout, refer to the *PIC32CX-BZ3 and WBZ35x Family Data Sheet* (DS70005541).

Note: The user can configure the Peripheral Pin Select (PPS) pins for any of the supported peripheral functions based on the end user application.

3.19. Limitations of Using Battery and External Power Supply

Battery Power:

The battery management circuit is designed for a 4.2V battery going to a downstream 3.3V regulator. When the battery voltage is near to the required minimum input voltage of the regulator, it may affect the regulated output. It is recommended to use a fully-charged battery for evaluation and recharge the battery as soon as the low battery output indicator is turned ON at 3.1V.

External Power Supply Header:

The PIC32-BZ6 Curiosity Board is designed to evaluate the PIC32WM-BZ6204UE Module and associated peripherals with an on-board 3.3V regulator by default. The following limitations apply to the circuitry if the PIC32WM-BZ6204UE Module and associated circuitry is powered from external power supply header at other voltages:

- QSPI Serial Flash (SST26VF064B-104I/MF) (U7): Standard operating voltage for the QSPI serial Flash is 2.3-3.6V.
- Temperature Sensor (MPC9700A) (U3): Standard operating voltage for the temperature sensor is 2.3-3.6V.
- User LED (D5): Designed for 3.3V operation, LED brightness at lower voltages will be dull or no glow. To increase the emitted light level, the value of the series resistor (R42) can be lowered.
- RGB Lighting LED (D6): RGB lightning LED is powered from VBAT net. It requires either a USB or battery power supply to be functional.

4. PIC32-BZ6 Curiosity Board Out of Box Demo

The ble_sensor demo application is pre-programmed on the Curiosity board.

The Microchip Bluetooth Data (MBD) smartphone application has the capability to scan for Bluetooth® Low Energy advertisements from the PIC32WM-BZ6204 Module and establish a connection. The scan operation monitors the temperature sensor and the status of the green LED of the RGB LED (D800) (ON/OFF). Establishing a Bluetooth low energy connection with the PIC32WM-BZ6204 Module enables users to control the status and brightness of the green LED of the RGB LED (D800).

For more details of the Out-of-Box (OOB) demo source code and demo guide, refer to the Pre-programmed Demo Software.

5. Appendix A: Reference Circuit

5.1. PIC32-BZ6 Curiosity Board Reference Schematics

Figure 5-1. Power Distribution Switch for PKoB4

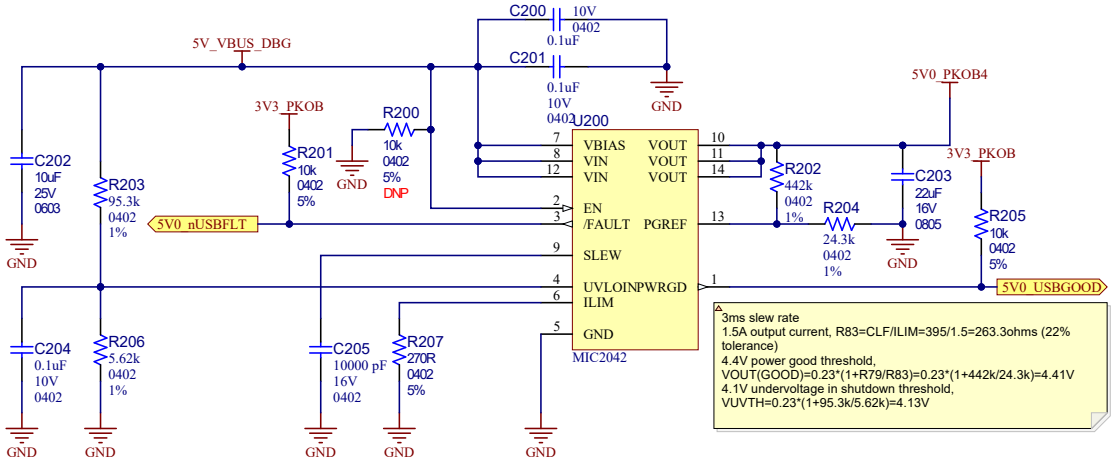


Figure 5-2. PKOB 3.3V Regulator

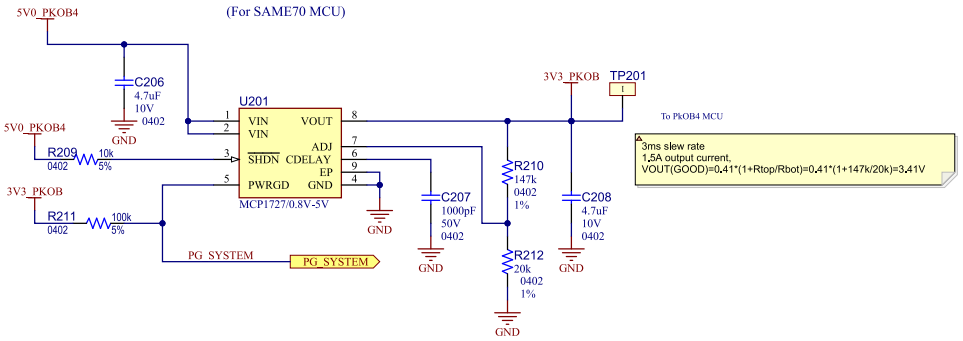


Figure 5-3. External Power Supply

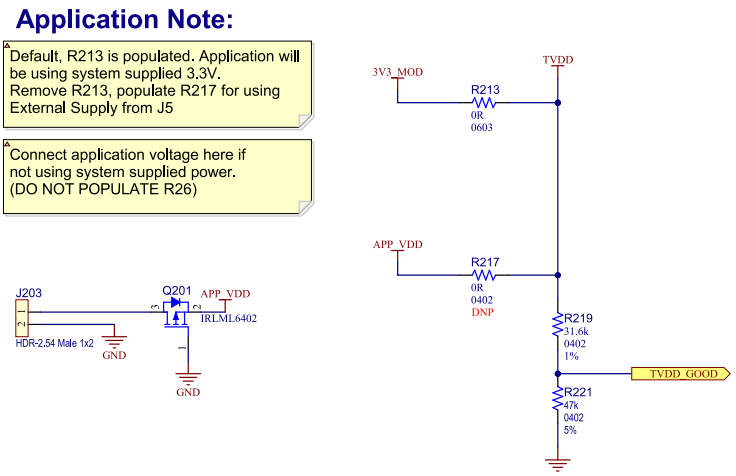


Figure 5-4. TGT Current Measurement Header

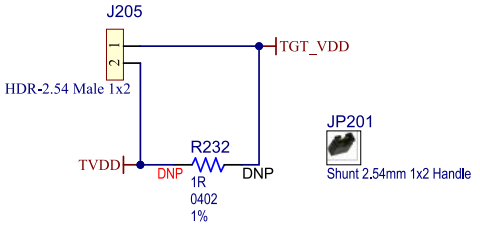


Figure 5-5. USB High Speed Hub

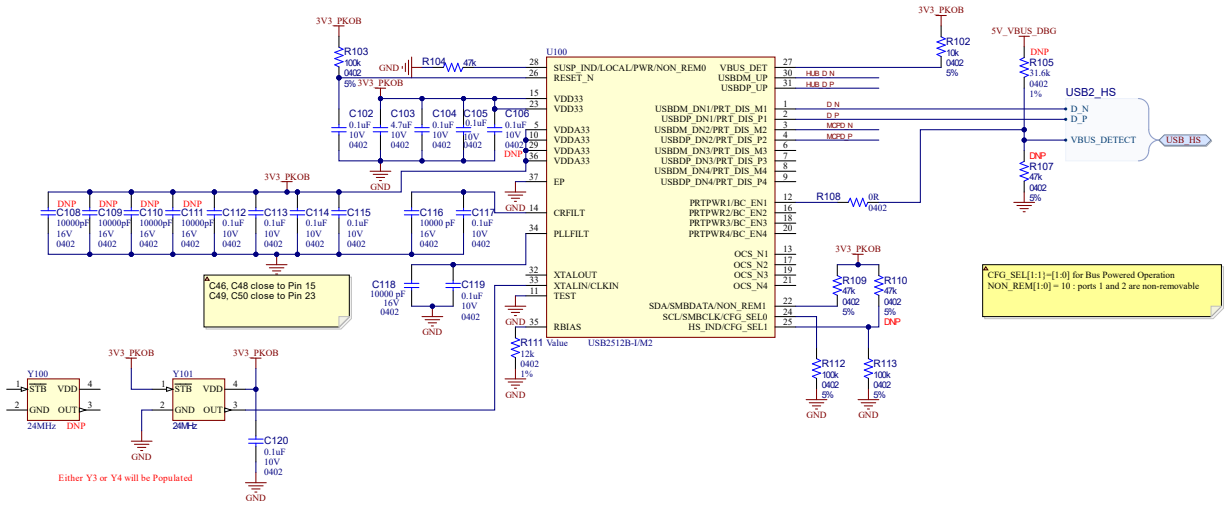


Figure 5-6. MCP2200 USB UART Converter

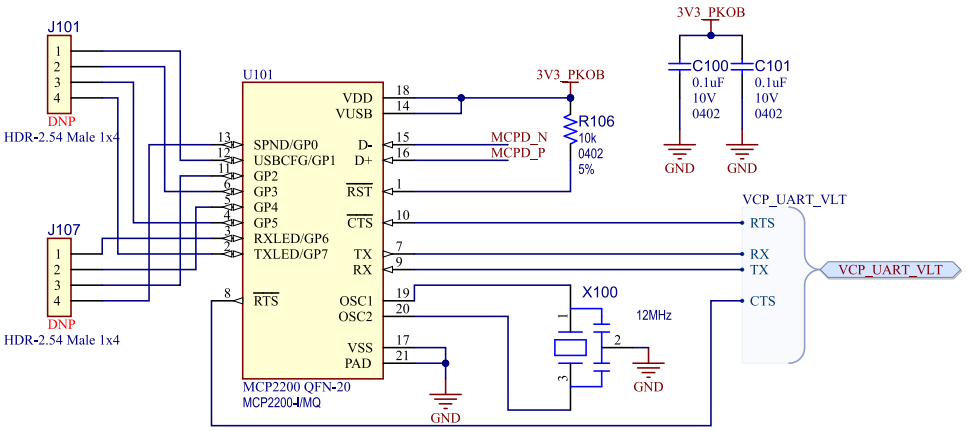


Figure 5-7. Application Virtual Comm Port

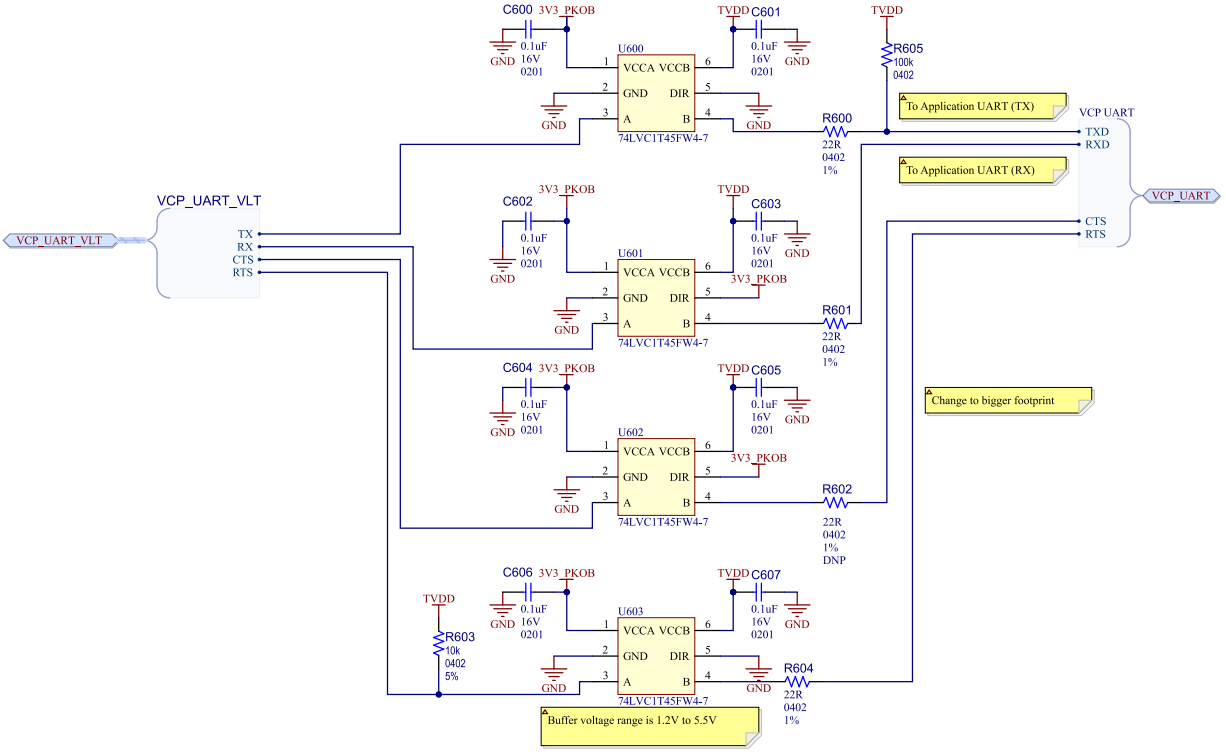


Figure 5-8. PKoB4 Main Macro

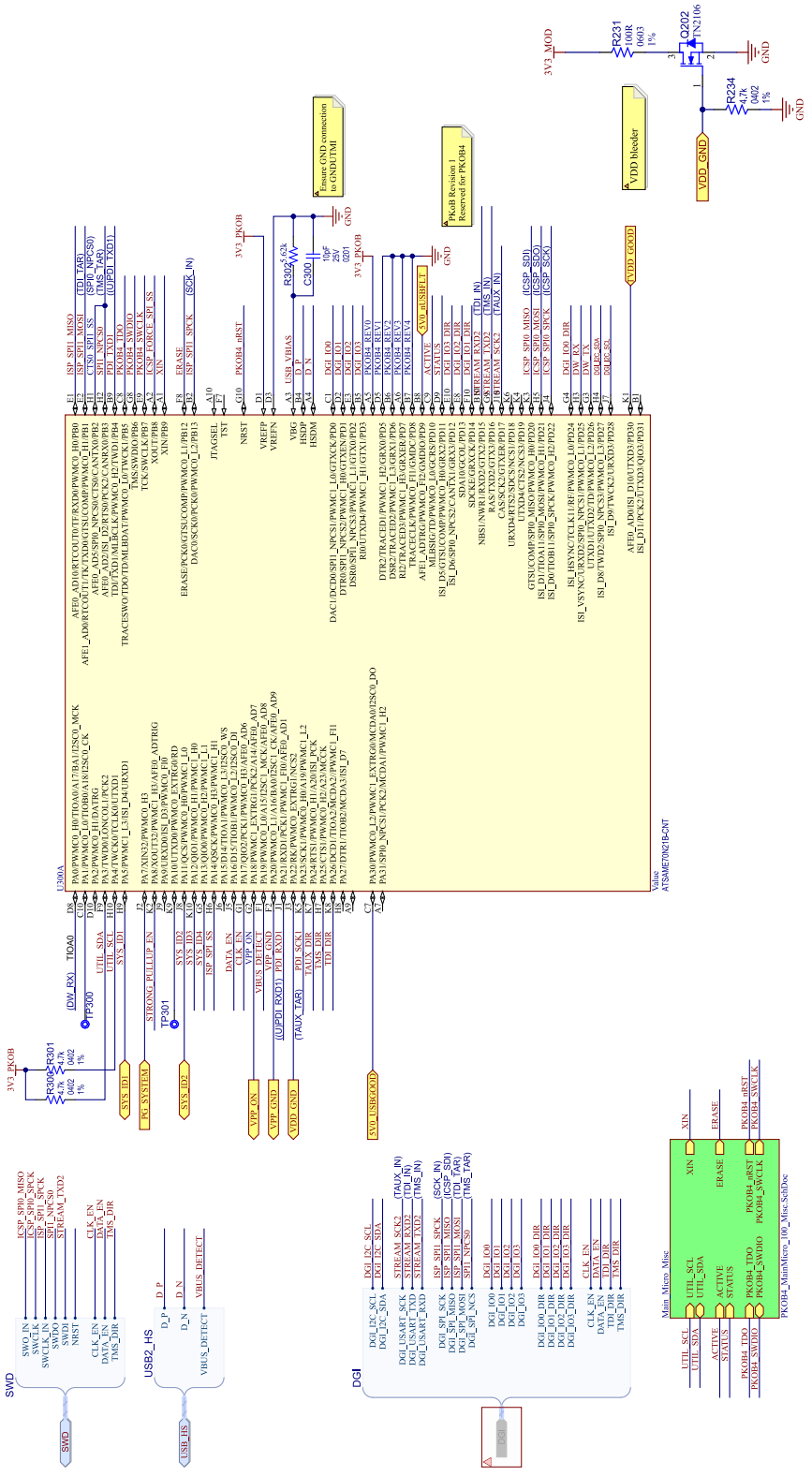


Figure 5-9. PKOB4 MISC

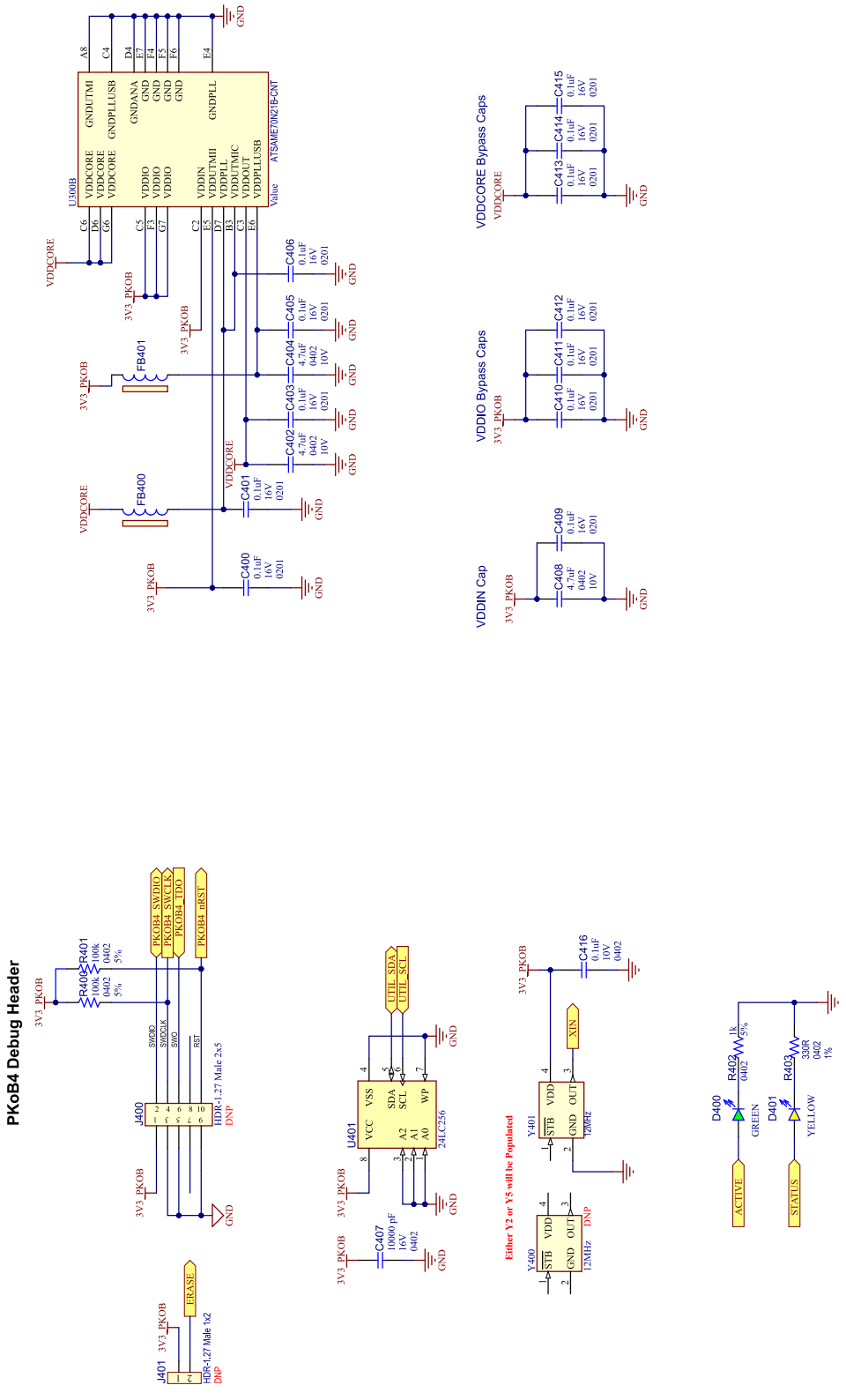


Figure 5-10. Serial Wire Debug

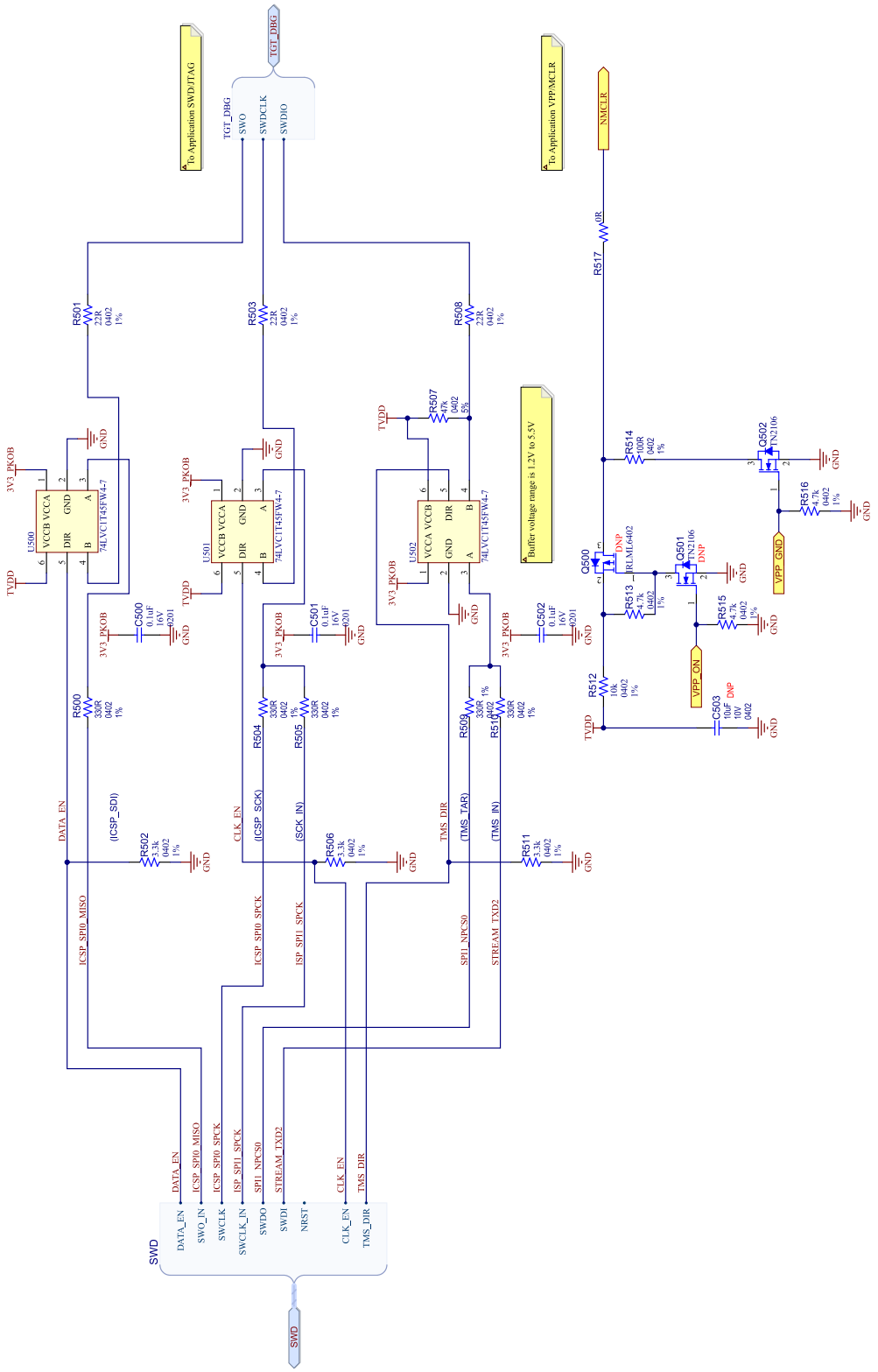


Figure 5-11. mikroBUS™

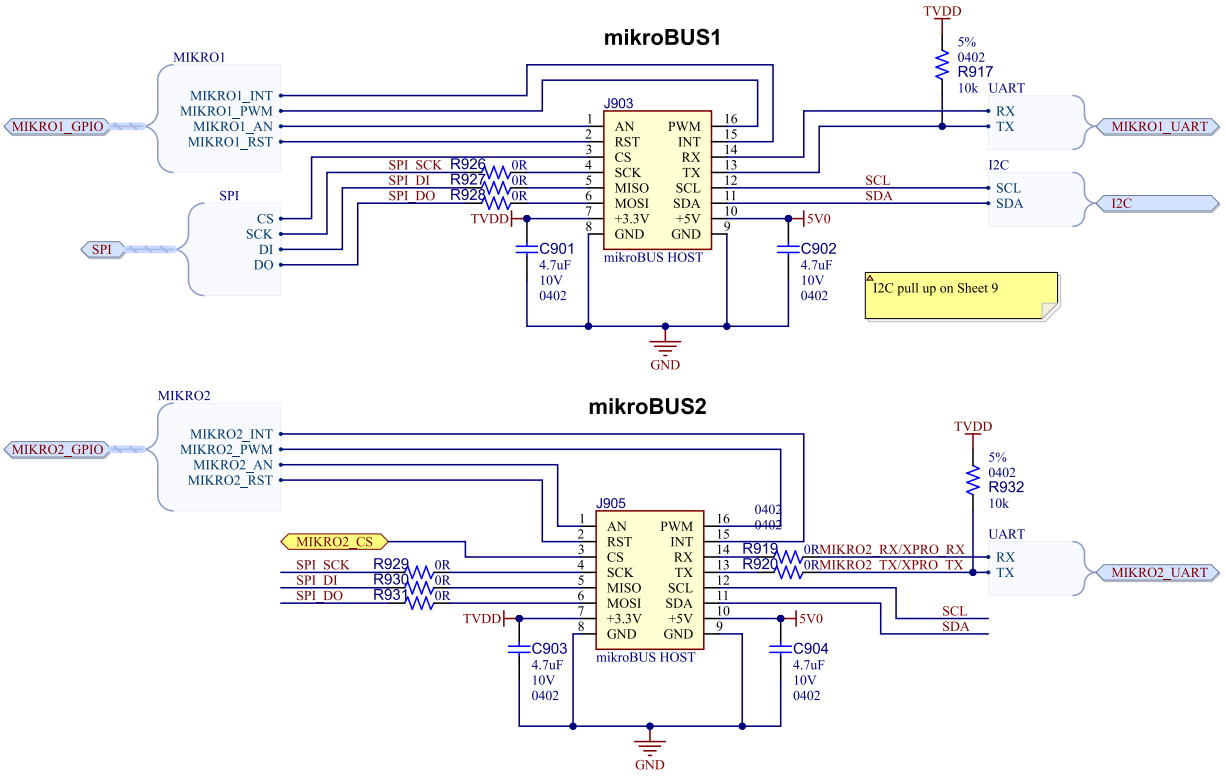


Figure 5-12. RGB LED

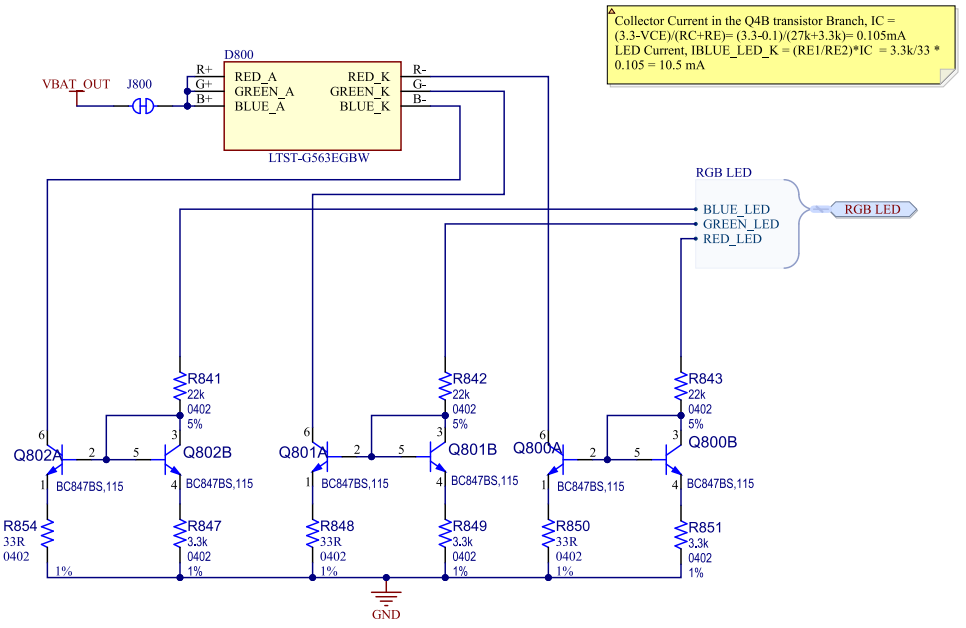


Figure 5-13. User LED

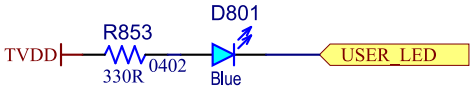


Figure 5-14. Temperature Sensor

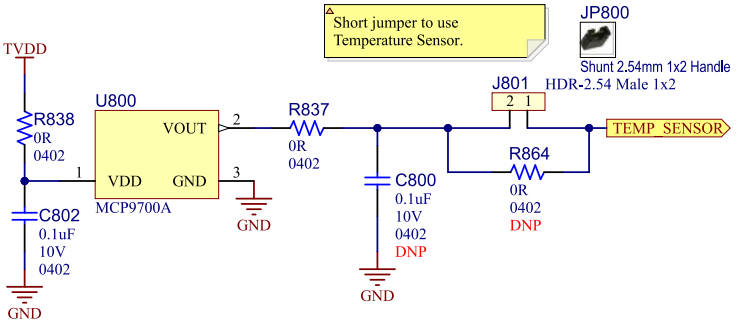


Figure 5-15. Crypto IC

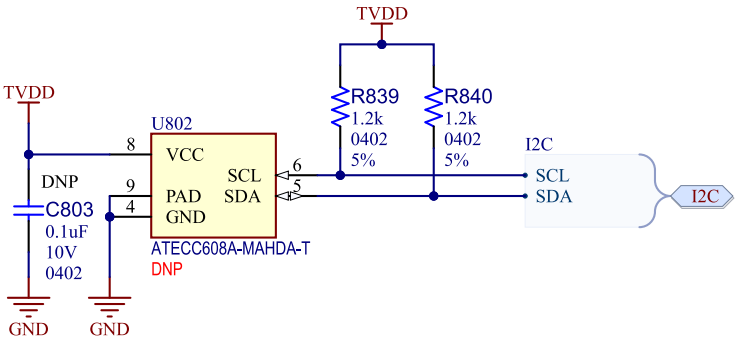


Figure 5-16. Debug USB

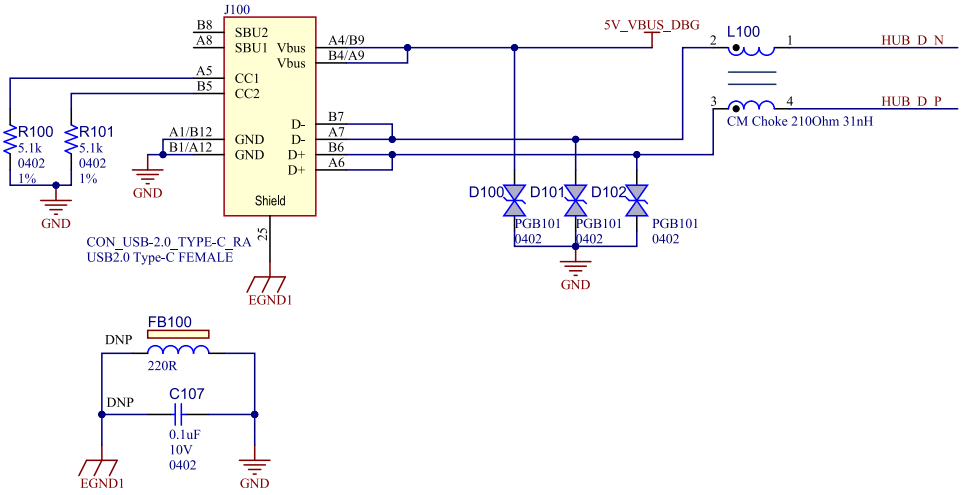


Figure 5-17. Graphic Interface

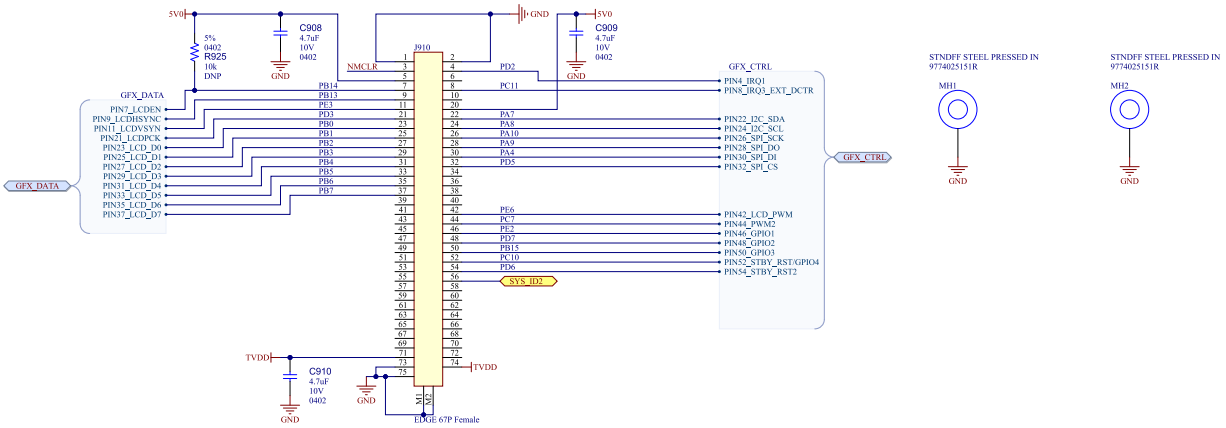


Figure 5-18. GPIO Headers

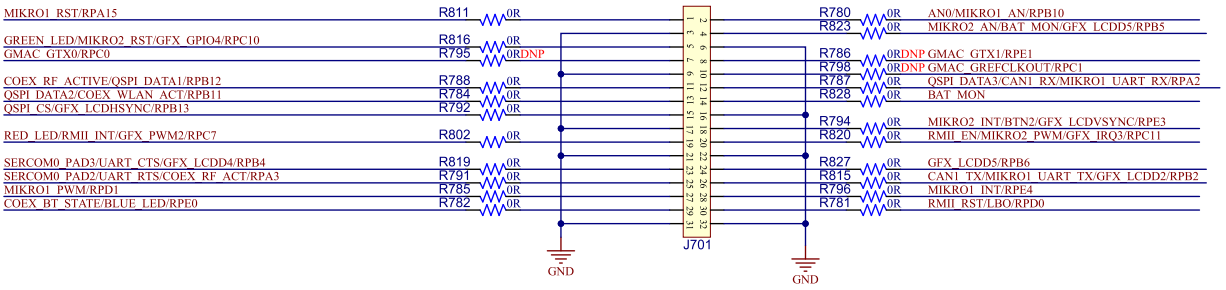


Figure 5-19. Voltage Regulator for Module/Peripherals

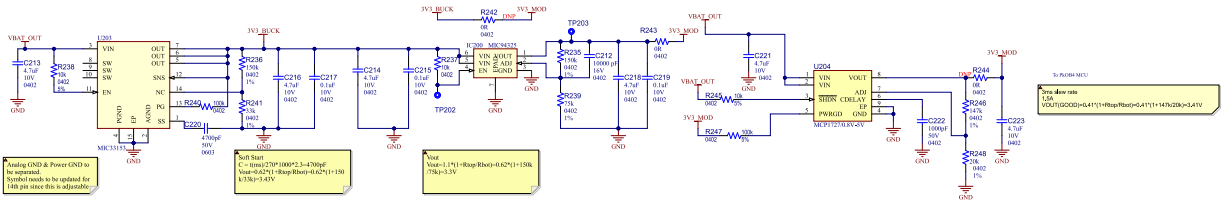


Figure 5-20. Module Pinout

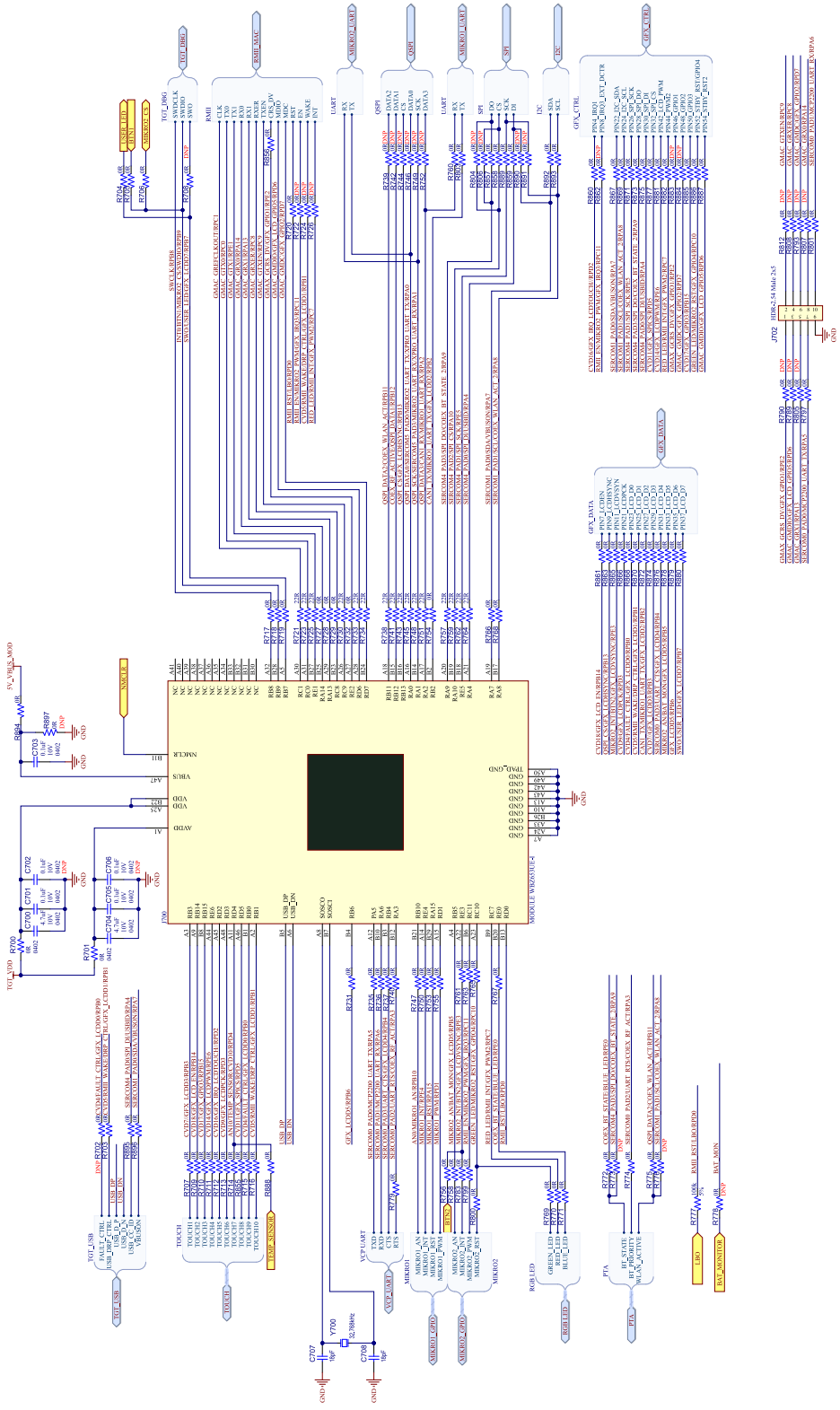


Figure 5-21. PHY Daughter Board RMII HDRs

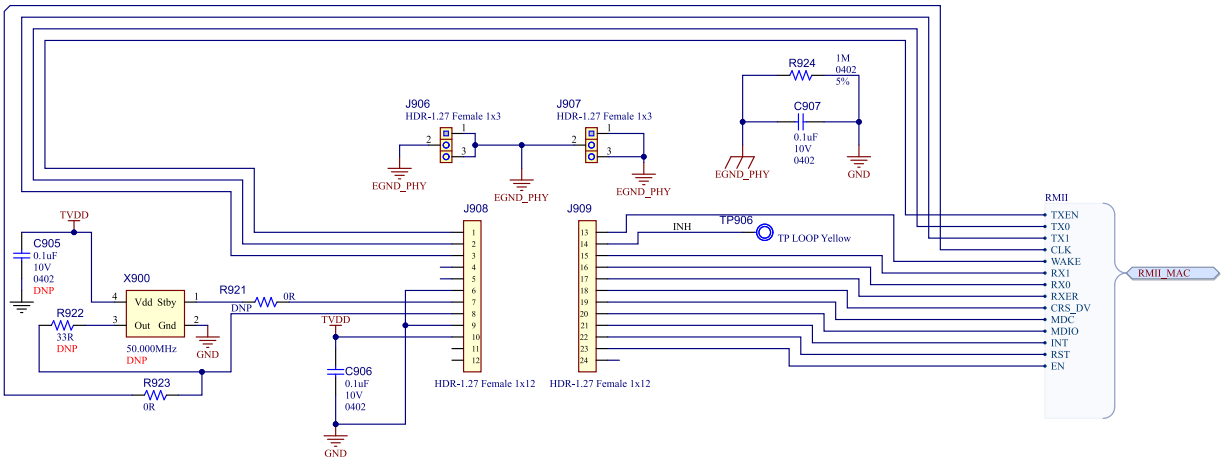


Figure 5-22. Power Distribution Switch for PKoB4

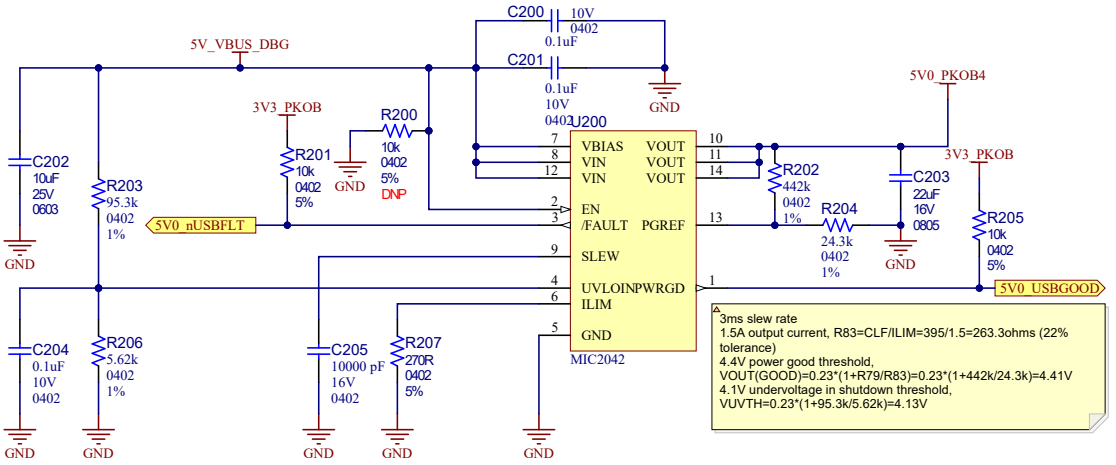


Figure 5-23. Battery Management for Module/Peripherals

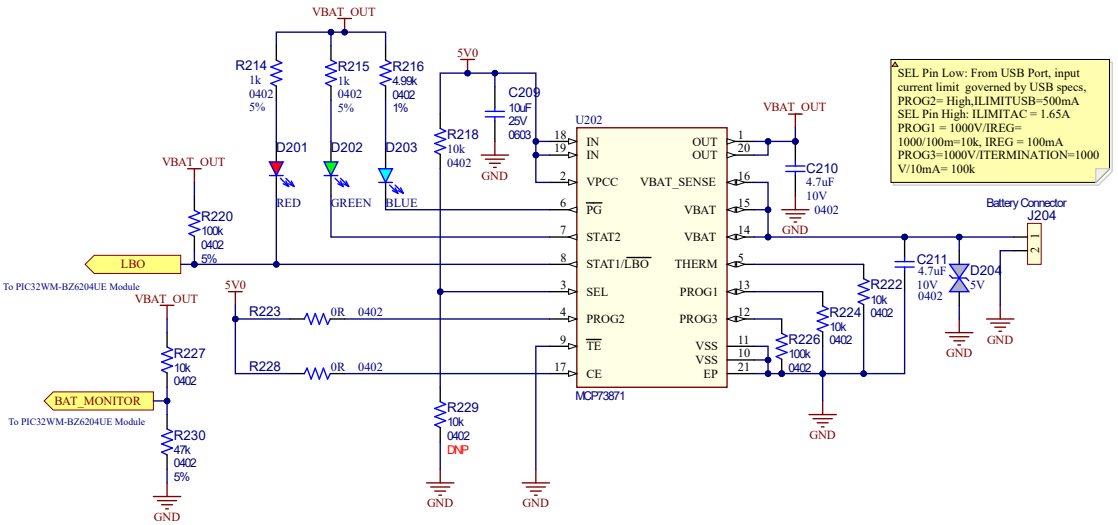


Figure 5-24. Programming Header

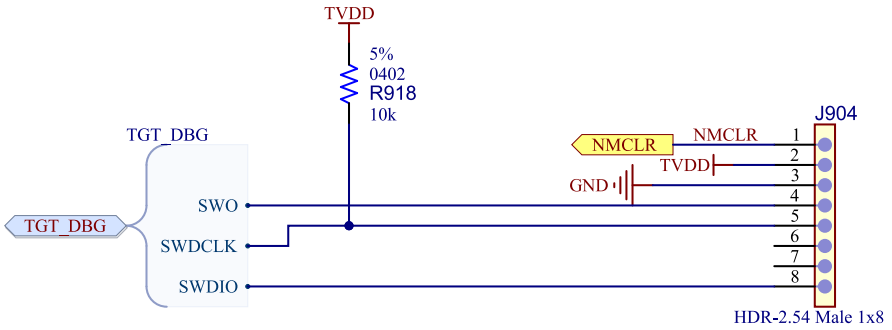


Figure 5-25. PTA header for Wi-Fi coexistence

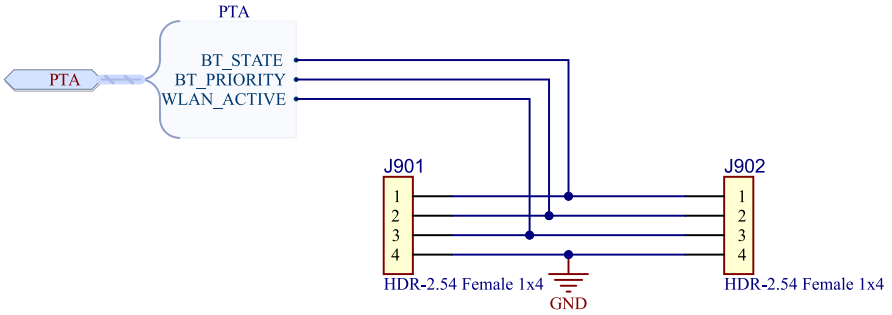


Figure 5-26. QSPI Flash

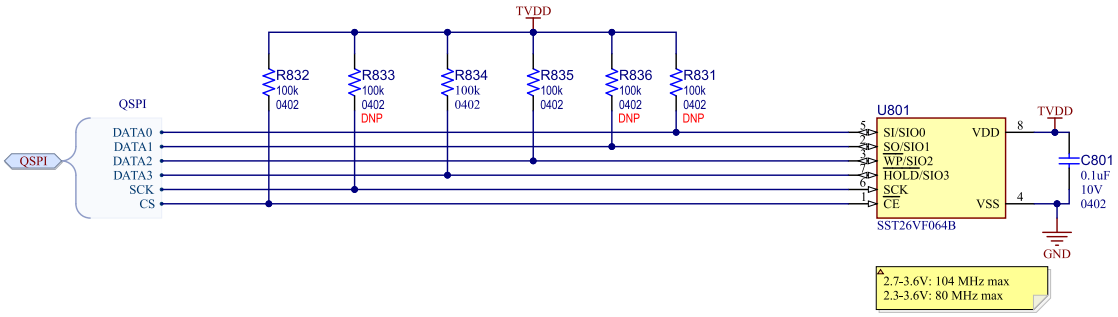


Figure 5-27. Switches

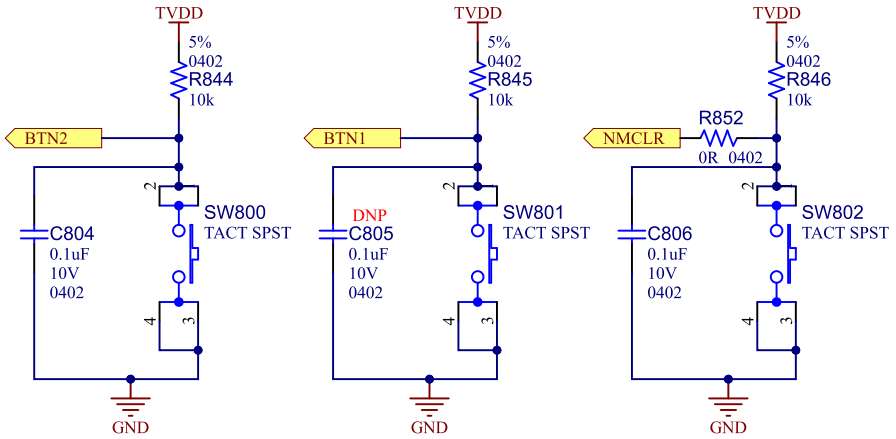


Figure 5-28. Target USB

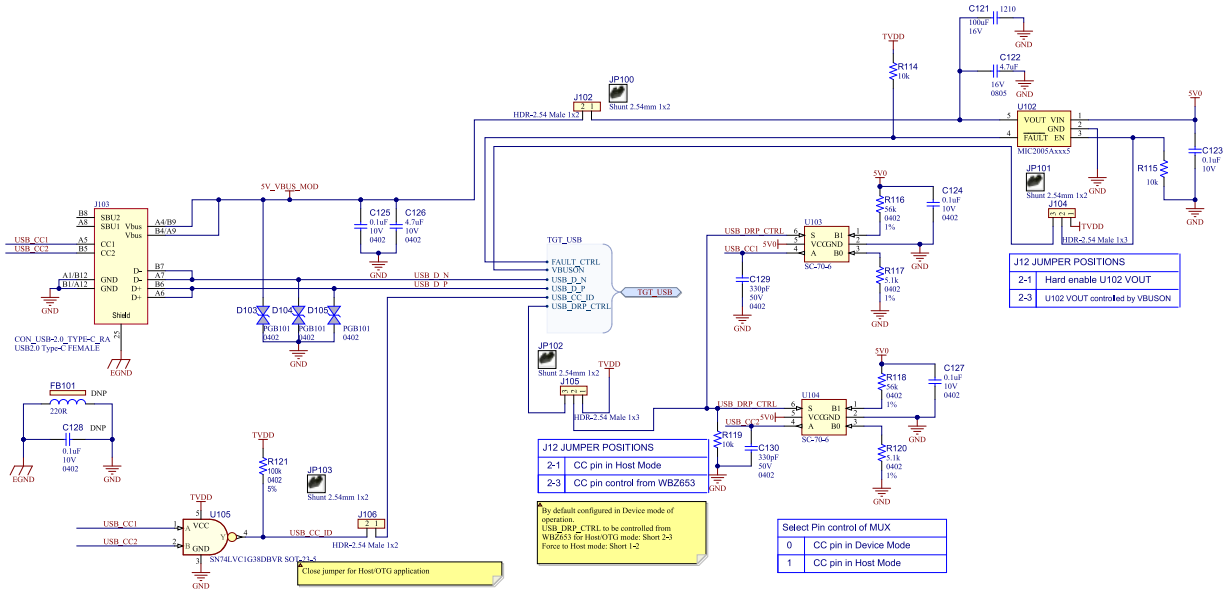


Figure 5-29. Test Point

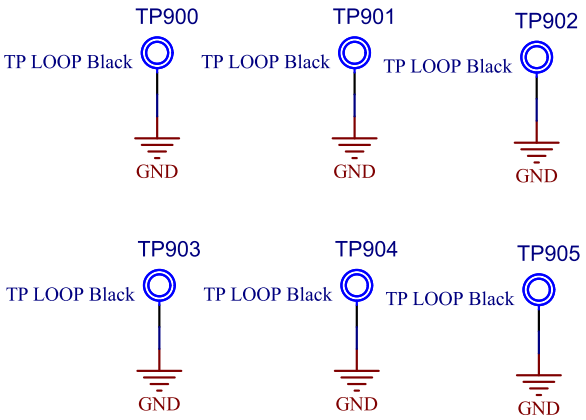


Figure 5-30. Test Point

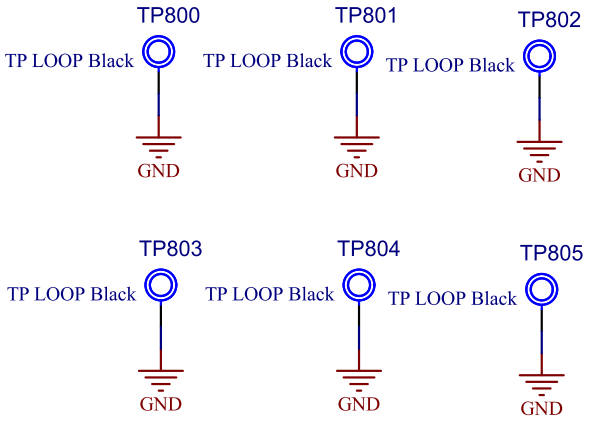


Figure 5-31. 5V Power Selection

J12 JUMPER POSITIONS	
2-1	External 5V (J200/J201)
4-3	VBUS Debug Type C(J100)
5-6	VBUS Module Type C(J103)

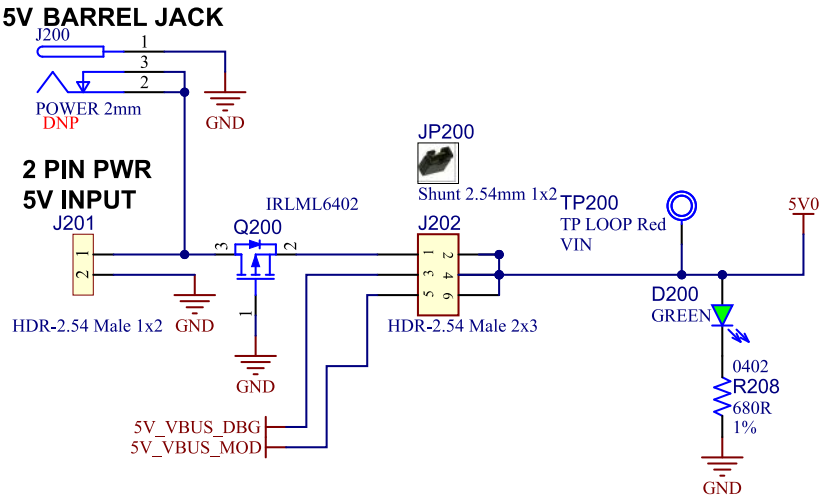
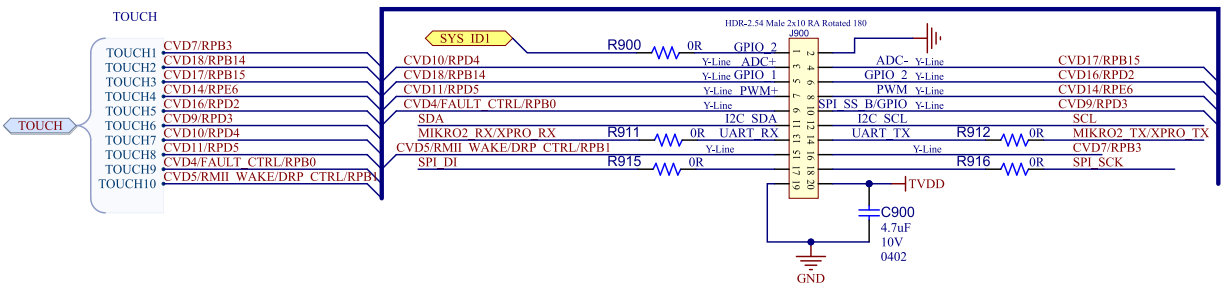


Figure 5-32. Xplained Pro Header for CVD Support



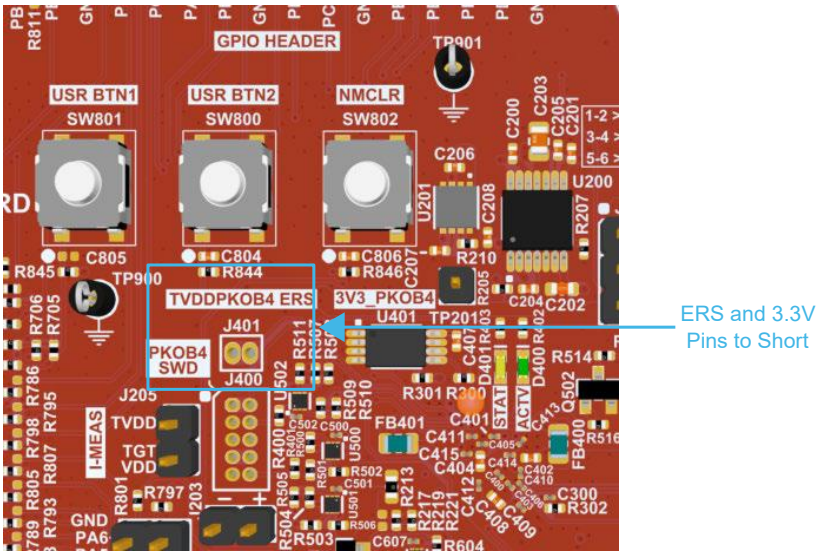
6. Appendix B: PKOB4 Recovery Method

When the MPLAB PICkit On-Board 4 is not responding, in rare cases, the user can recover its operation by following these steps:

WARNING Only use this utility to restore the hardware tool boot firmware to its factory state. Use only if the hardware tool no longer functions on any machine.

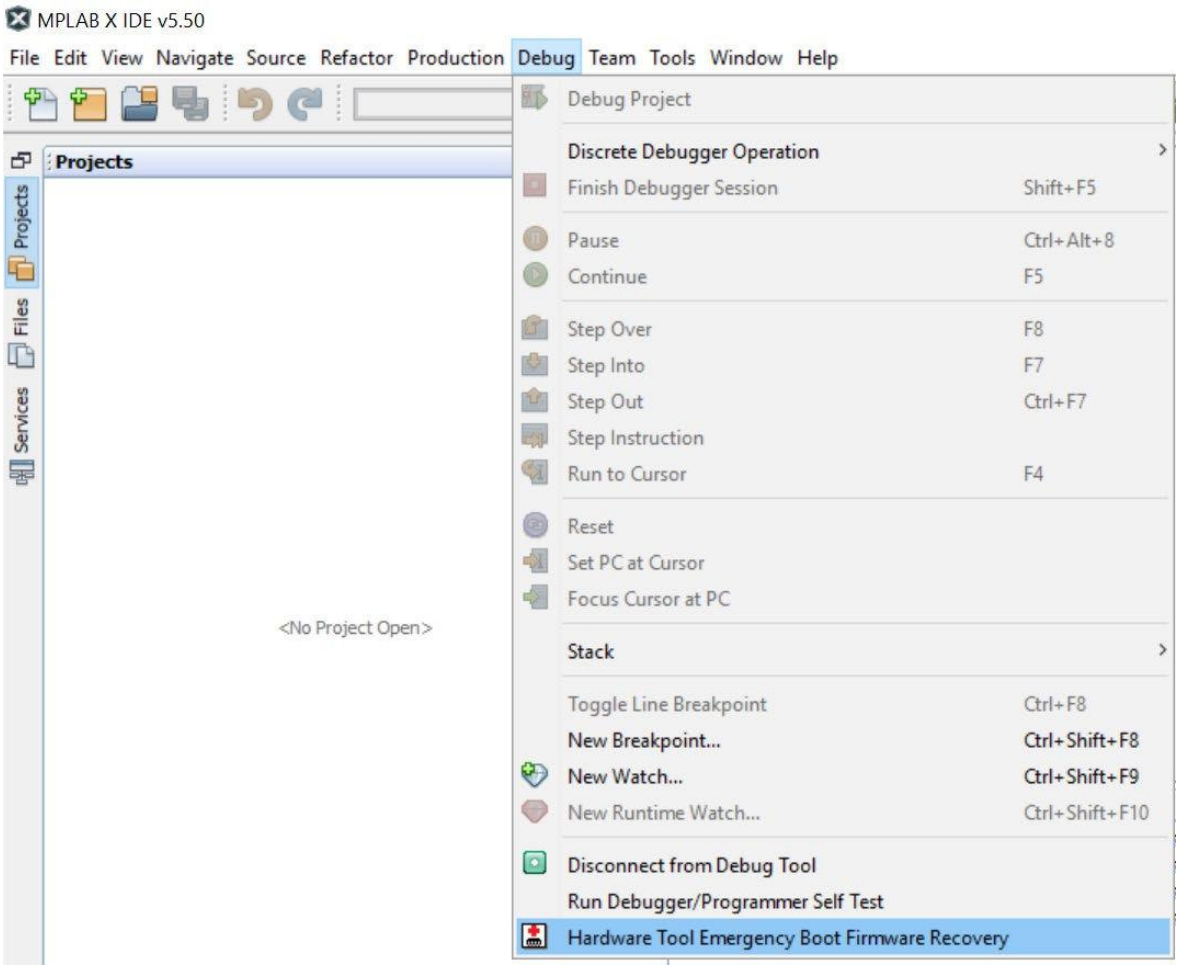
1. With the PIC32-BZ6 Curiosity Board still being powered, short the two pads for approximately ten seconds.

Figure 6-1. Location of Pads to Short



2. Open the latest version of MPLAB X. For more details, refer to Software Prerequisites.
3. Navigate to *Debug>Hardware Tool Emergency Boot Firmware Recovery*.

Figure 6-2. Hardware Tool Emergency Boot Firmware Recovery



4. Follow the directions on the screen. This resets the tool back to the factory conditions.
   Note: For additional information on the MPLAB PKOB4, refer to the *MPLAB® PICkit™ 4 In-Circuit Debugger User's Guide* (DS50002751) and *MPLAB® Snap In-Circuit Debugger User's Guide* (DS50002787).

7. Document Revision History

The revision history describes the changes that were implemented in the document. The changes are listed by revision, starting with the most current publication.

Table 7-1. Document Revision History

Revision	Date	Section	Description
A	06/2025	Document	Initial revision

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