

Introduction

The WFI32-IoT 2.0 board is a compact, stand-alone and easy-to-use board that helps the user to develop the Internet-of-Things (IoT) applications with the WFI32E03PC module, a highly integrated Wi-Fi[®] MCU module that supports smart Wi-Fi functionalities and premium MCU features. The WFI32E03PC module has a PCB antenna and Trust&GO hardware secure element, which is pre-provisioned to popular cloud platforms.

The WFI32-IoT 2.0 board:

- Provides an easy way to connect the embedded application to cloud IoT platforms, such as AWS and Azure
- Includes a PICKit[™] On-board 4 (PKOB4) debugger interface and requires no external hardware to program and debug the WFI32E03PC module
- Includes a mikroBUS[™] Click[™] header, which helps the users to expand the functionalities by connecting to various MikroElektronika mikroBUS Click adapter boards
- Requires only a Micro-USB cable to power up and program the board

Features

- Certified WFI32E03PC – Wi-Fi Single Band (2.4 GHz) Module
- Four User LEDs
- Two User Configurable Switch
- One Reset Switch
- On-Board USB-to-UART Serial Converter Based on the MCP2200
- On-Board Temperature Sensor
- On-Board Light Sensor
- 32-Mbit External SPI Flash Memory
- PICKit On-Board 4 (PKOB4) Support
- mikroBUS Socket to Expand Functionality Using MikroElektronika Click Boards
- Li-Ion/LiPo Battery Charger with Power Path Management
- On-Board 32 KHz Secondary Oscillator

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1. Quick References

1.1 Reference Documentation

For further details, refer to the following:

- *MCP1727 1.5A, Low Voltage, Low Quiescent Current LDO Regulator Data Sheet* ([DS21999](#))
- *MCP9808 $\pm 0.5^{\circ}\text{C}$ Maximum Accuracy Digital Temperature Sensor* ([DS20005095](#))
- *MPLAB[®] XC32 C/C++ Compiler User's Guide* ([DS50001686](#))
- *MPLAB[®] X IDE User's Guide* ([DS50002027](#))
- *MPLAB[®] Snap In-Circuit Debugger User's Guide* ([DS50002787](#))
- *MPLAB[®] PICkit[™] 4 In-Circuit Debugger User's Guide* ([DS50002751](#))
- *PIC32MZ W1 MCU and WFI32 Module with Wi-Fi[®] and Hardware-Based Security Accelerator Data Sheet* ([DS70005425](#))
- *PIC32MZ W1 MCU and WFI32 Module with Wi-Fi[®] and Hardware-based Security Accelerator Errata* ([DS80000912](#))
- *PIC32MZ-W1 Reference Design Evaluation Board* ([DS50003205](#))
- *PIC32MZ W1 Software User's Guide* ([DS50003034](#))
- *SST26VF032B/SST26VF032BA 2.5V/3.0V 32-Mbit Serial Quad I/O[™] (SQI[™]) Flash Memory Data Sheet* ([DS20005218](#))
- *Stand-Alone System Load Sharing and Li-Ion/Li-Polymer Battery Charge Management Controller Data Sheet* ([DS20002090](#))
- *Universal Serial Bus Specification and Associated Documents* (www.usb.org)
- *mikroBUS[™] Specification* (www.mikroe.com/mikrobus)

1.2 Hardware Prerequisites

- EV80S51A (WFI32-IoT 2.0 board) kit

1.3 Software Prerequisites

- MPLAB[®] Integrated Development Environment ([MPLAB X IDE](#)) tool (version 6.20 or later)
- [MPLAB XC32](#) Compiler (version 4.00 or later)
- MPLAB Snap – www.microchip.com/PG164100
- [Out of Box \(OOB\) demo](#)

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
CVD	Capacitive Voltage Divider
DNP	Do Not Populate
GPIO	General Purpose Input Output
I ² C/I ² C	Inter-Integrated Circuit
ICSP [™]	In-Circuit Serial Programming [™]
IoT	Internet of Things

.....continued

Acronyms and Abbreviations	Description
JTAG	Joint Test Action Group
LDO	Low-Dropout
LED	Light Emitting Diode
MCU	Microcontroller Unit
NC	Not Connected
OOB	Out of Box
OTG	On-The-Go
PCB	Printed Circuit Board
PKOB	PICKit™ On-Board
PPS	Peripheral Pin Select
PTA	Packet Traffic Arbitration
PWM	Pulse Width Modulation
RMII	Reduced Media Independent Interface
RTCC	Real-Time Clock and Calendar
RTOS	Real-Time Operating System
RX	Receiver
SCL	Serial Clock
SDA	Serial Data
SMD	Surface Mount
SoC	System-on-Chip
SPI	Serial Peripheral Interface
TX	Transmitter
UART	Universal Asynchronous Receiver-Transmitter
USB	Universal Serial Bus

2. Kit Overview

The WFI32-IoT 2.0 board has a single-chip Wi-Fi module that supports rapid prototyping of IoT devices and demonstrates cloud connectivity.

The WFI32-IoT 2.0 board:

- Offers various types of on-board sensors, such as a temperature sensor and ambient light sensor for the user to build their own applications
- Provides on-board sensors that help the user to collect the sensor data and transmit to the cloud
- Provides the WFI32E03PC module, which has a built-in cryptographic device that helps to make a secure and authenticated cloud connection

Figure 2-1. WFI32-IoT 2.0 Board (EV80S51A) – Top View

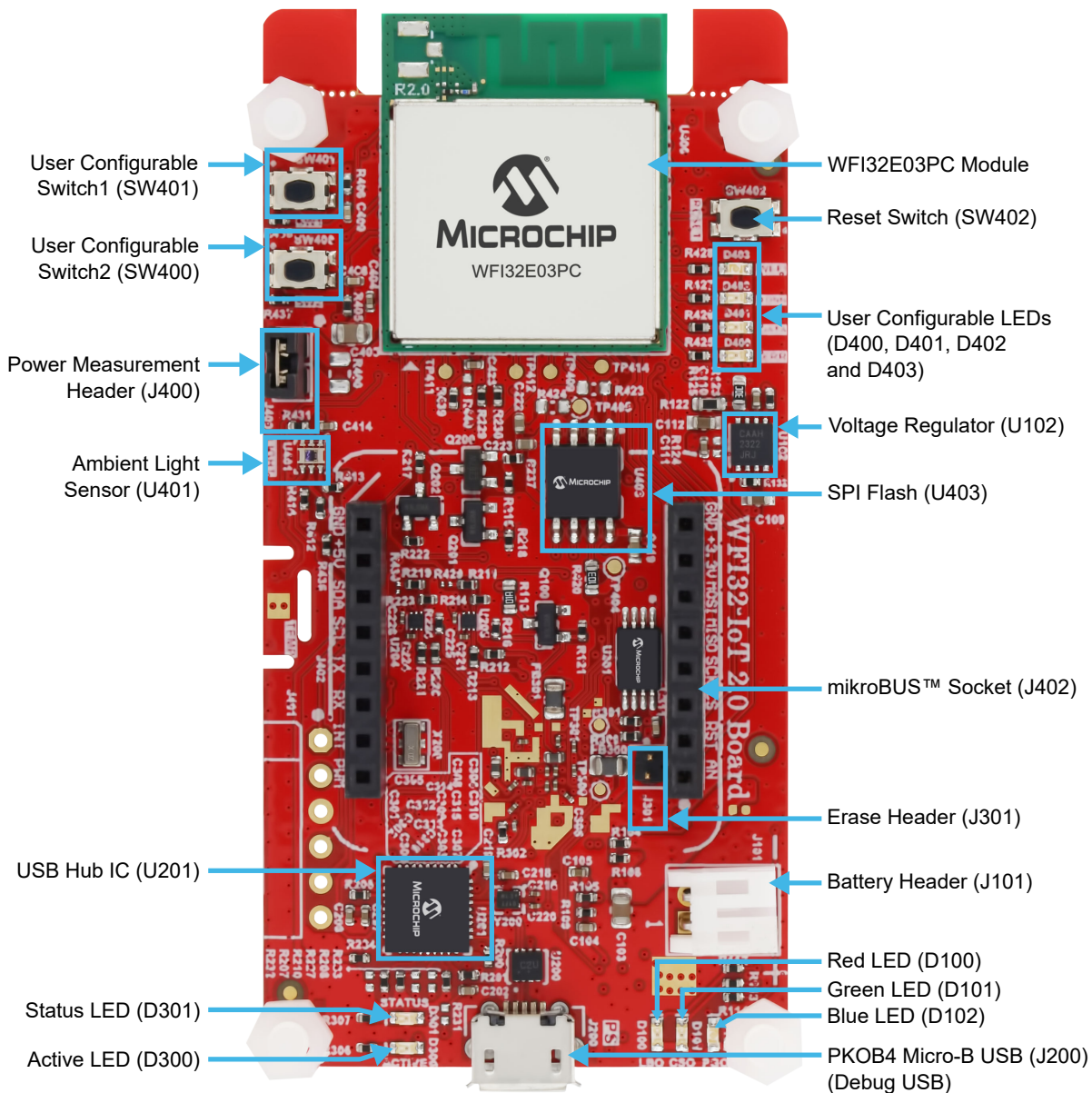
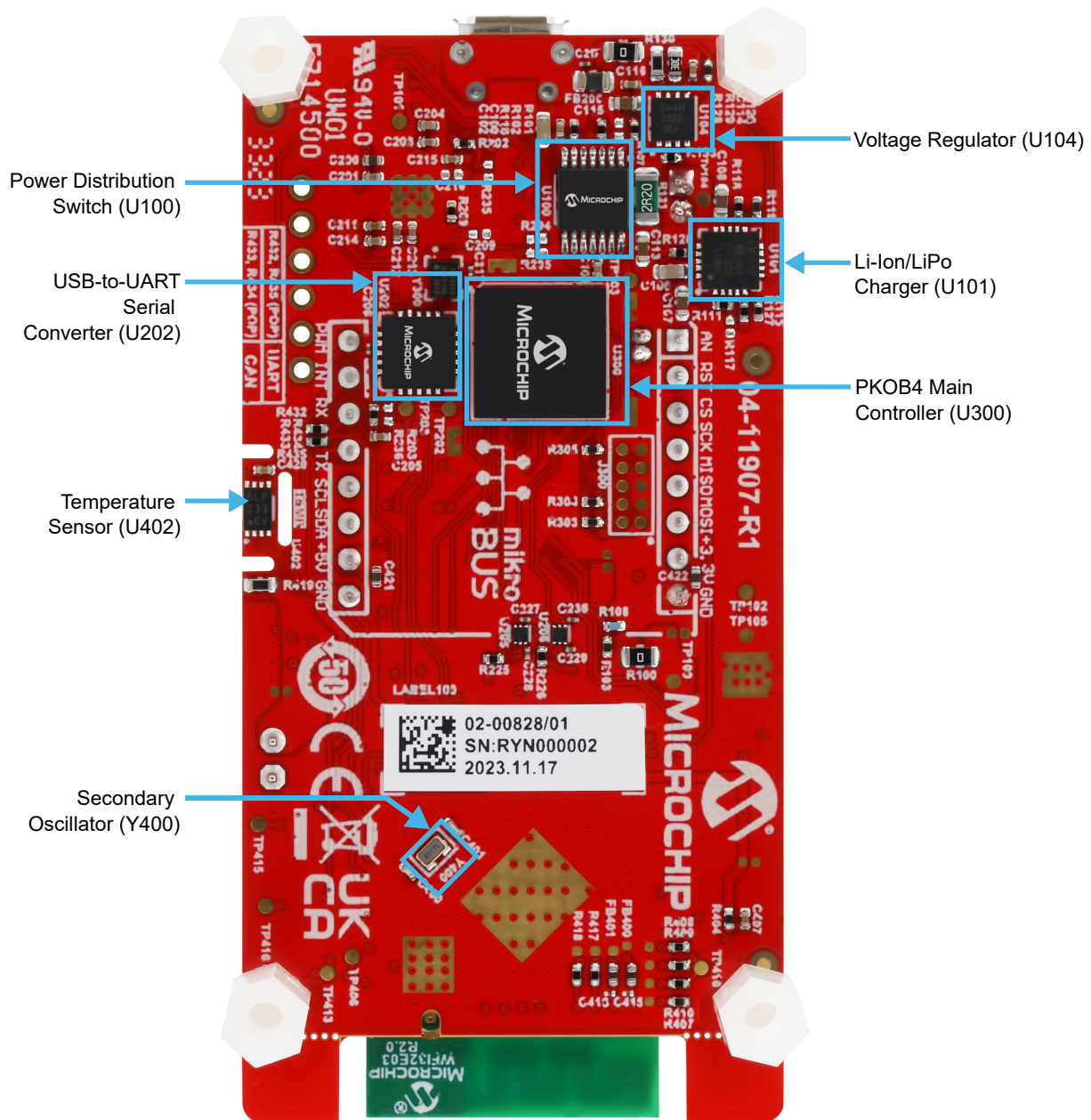


Figure 2-2. WFI32-IoT 2.0 Board (EV80S51A) – Bottom View



2.1 Kit Contents

The EV80S51A (WFI32-IoT 2.0 board) kit contains the following:

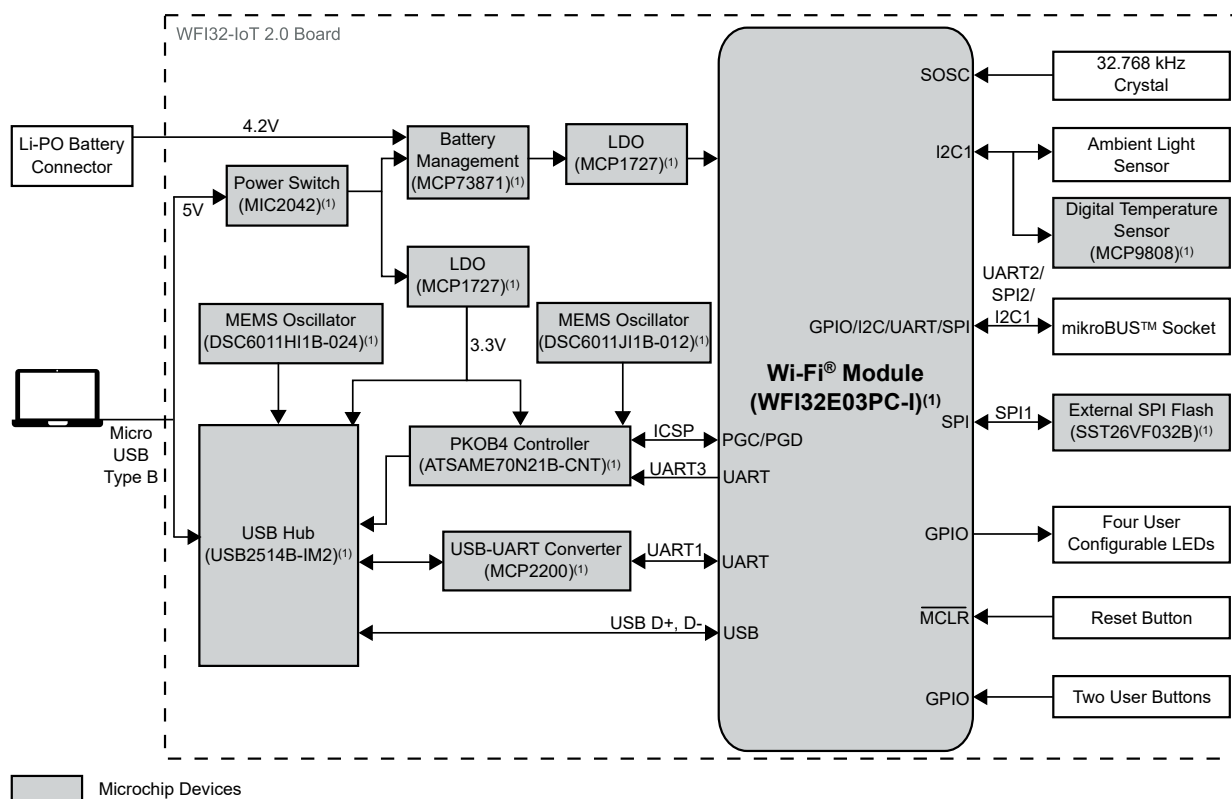
- A WFI32E03PC module mounted on the WFI32-IoT 2.0 board
- A USB Type-A male to Micro-B USB cable

Note: If any of the above items are missing in the kit, go to support.microchip.com or contact your local Microchip Sales office. In this user guide, there is a list of Microchip offices for sales and services provided on the last page.

3. Hardware

This chapter describes the hardware features of the WFI32-IoT 2.0 board.

Figure 3-1. WFI32-IoT 2.0 Block Diagram



Note:

- 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 WFI32-IoT 2.0 boards. For more details, go to support.microchip.com or contact your local Microchip Sales office.

Table 3-1. Microchip Components used in WFI32-IoT 2.0 Board

S.No	Designator	Manufacturer Part Number	Description
1	Q100, Q201, Q202	TN2106K1-G	MCHP Analog MOSFET N-CH TN2106 60V 280 mA 360 mW 2.5R SOT23-3
2	U100	MIC2042-1YTS	MCHP Analog Power Switch 5.5V 3A MIC2042-1YTS TSSOP-14
3	U101	MCP73871-2CCI/ML	MCHP Analog Battery Charger MCP73871-2CCI/ML QFN-20
4	U102, U104	MCP1727T-ADJE/MF	MCHP Analog LDO 0.8V-5V MCP1727T-ADJE/MF DFN-8
5	U201	USB2514B-I/M2	MCHP Interface USB 2.0 HS HUB CTRLR USB2514B-I/M2 SQFN-36
6	U202	MCP2200-I/MQ	MCHP Interface USB UART MCP2200-I/MQ QFN-20
7	U300	ATSAME70N21B-CNT	MCHP MCU 32-BIT 300 MHz 2MB 384K x 8 ATSAME70N21B-CNT TFBGA-100
8	U301	24LC256T-E/ST	MCHP Memory Serial EEPROM 256k I2C 24LC256T-E/ST TSSOP-8
9	U400	WFI32E03PC	Wi-Fi® Module with 2 MB Flash, PCB antenna and Trust&Go
10	U402	MCP9808T-E/MC	MCHP Analog Temperature Sensor -40°C to +125°C MCP9808T-E/MC DFN-8

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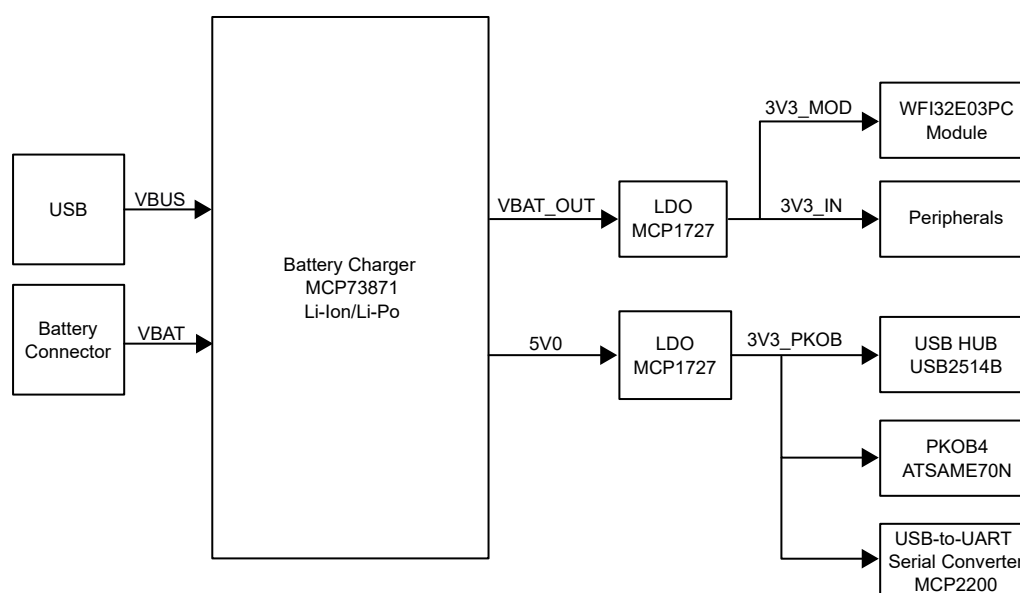
S.No	Designator	Manufacturer Part Number	Description
11	U403	SST26VF032B-104I/SM	MCHP Memory Serial Flash SST26VF032B-104I/SM SOIJ-8
12	Y200	DSC6011HI1B-024.0000	MCHP CMOS Oscillator 24 MHz DSC6011HI1B-024.0000 SMD VFLGA-4
13	Y300	DSC6011JI1B-012.0000	MCHP Clock Oscillator Single 12.000 MHZ DSC6011JI1B-012.0000 VLGA

3.1 Power Supply

The following are the power supply sources to power the WFI32-IoT 2.0 board (see the following figure):

- PKOB4 Micro-B USB (Debug USB) (J200)
- Battery Header (J101)

Figure 3-2. WFI32-IoT 2.0 Board Power Supply Block Diagram



PKOB4 Micro-B USB (Debug USB) (J200)

The Debug USB (J200) supplies power to the WFI32-IoT 2.0 board from the host PC using USB Type-A male to Micro-B USB cable.

Note: The maximum available current from the Debug USB (J200) is limited to 500 mA. The current is shared between charging the external battery (if connected) and the target application section.

Battery Header (J101)

Connect a 4.2V Li-ion/Li-Po battery to the battery header (J101).

Notes:

1. The 4.2V Li-ion/Li-Po battery is not a part of the EV80S51A kit.
2. The minimum recommended battery capacity is 400 mAh with a battery charge voltage of 4.2V.
3. Uses a standard battery connector, which is a 2 pin, 2 mm pitch and right angle male battery header.
4. The user must take the polarity of the battery terminals and battery header (J101) into consideration. Pin 1 of the battery header (J101) is a positive terminal.

3.1.1 Li-ion/Li-Po Battery Charger (U101)

The WFI32-IoT 2.0 board features an on-board MCP73871 Li-ion/Li-Po battery charger. 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 the target application section. For more details on the MCP73871 Li-ion/Li-Po battery charger, refer to the *Stand-Alone System Load Sharing and Li-Ion/Li-Polymer Battery Charge Management Controller Data Sheet* ([DS20002090](#)).

Note: The charger is configured to limit the charge current to 100 mA to prevent the overcharging of small capacity batteries.

**WARNING**

The MCP73871 offers a battery charging voltage of 4.2V. The user must use the appropriate battery.

3.1.2 Voltage Regulators (U102 and U104)

The following are the two on-board MCP1727 voltage regulators on the WFI32-IoT 2.0 board that generate +3.3V power supply:

- **U102** – Generates +3.3V that powers the WFI32E03PC module along with the associated circuits
- **U104** – Generates +3.3V that powers the USB hub IC ([U201](#)), USB-to-UART converter ([U202](#)), PKOB4 micro controller ([U300](#)), along with the associated circuits that connect the PKOB4 debugger to a host PC

For more details on the U102 and U104 voltage regulators, refer to the *MCP1727 1.5A, Low Voltage, Low Quiescent Current LDO Regulator Data Sheet* ([DS21999](#)).

3.1.3 Power Measurement Header (J400)

The current measurement header ([J400](#)) helps the user to measure the total current consumed by the WFI32E03PC module using a multimeter. To measure the total current consumption of the WFI32E03PC module, remove the jumper (JP401) from the header (J400), mount 1Ω resistor ([R400](#)), and connect a voltmeter across its pins. This setup provides a one-to-one relationship between the voltage drop and current consumption. By default, the resistor (R400) is not populated on the board.

For the direct current measurement, use a jumper wire to short the J400 pin 1-2 and connect a current clamp probe, for example, the TEKTRONIX TCP0030A current probe. The normal probes with long wires can add a load to the current path and introduce a voltage drop, which leads to incorrect readings.

For the current measurement in terms of voltage, mount the resistor (R400) with 0.1Ω resistor for Active mode and 1Ω resistor for Sleep mode current consumption using a voltage probe or multimeter.

3.2 MPLAB PICKit On-Board 4 (PKOB4)

The MPLAB PICKit On-Board 4 (PKOB4) is a new generation of in-circuit debugger. The MPLAB PKOB4 programs faster than its predecessor and is designed to use a high-speed USB 2.0 interface, providing a feature-rich debugging experience via one USB cable. The MPLAB PKOB4 is intended to support the programming and debugging interface. For more details on the MPLAB PKOB4, refer to the *MPLAB Snap In-Circuit Debugger User's Guide* ([DS50002787](#)).

Features

- Connects to a Computer Through a Micro-B USB Cable
- Programs Devices Using MPLAB X IDE or MPLAB X IPE
- Supports Multiple Hardware and Software Breakpoints, Stopwatch and Source Code File Debugging

- Debugs the Application in Real Time
 - Sets Breakpoints Based on Internal Events
 - Monitors Internal File Registers
 - Debugs at Full Speed
 - Configures Pin Drivers
 - Field-Upgradeable Through an MPLAB X IDE Firmware Download
 - Adds New Device Support and Features by Installing the Latest Version of MPLAB X IDE
- Note:** The MPLAB X IDE is available for free at www.microchip.com/mplab-x-ide.
- Indicates Debugger Status Using On-Board LEDs

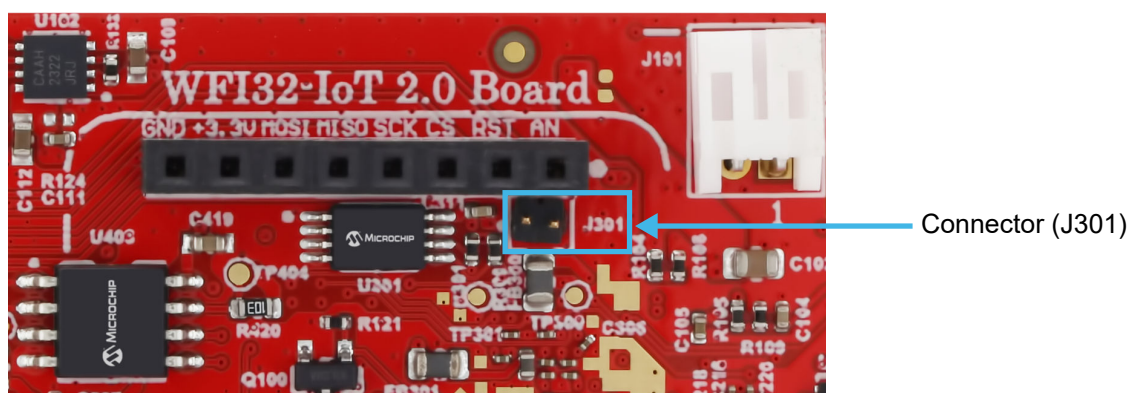
3.2.1 Recovery Method

When the MPLAB PKOB4 is unresponsive, use the MPLAB X IDE tool to recover the WFI32-IoT 2.0 board through the following recovery method:

1. Short the pin1 and pin2 of the connector (J301) for approximately 15 seconds (see the following figure).

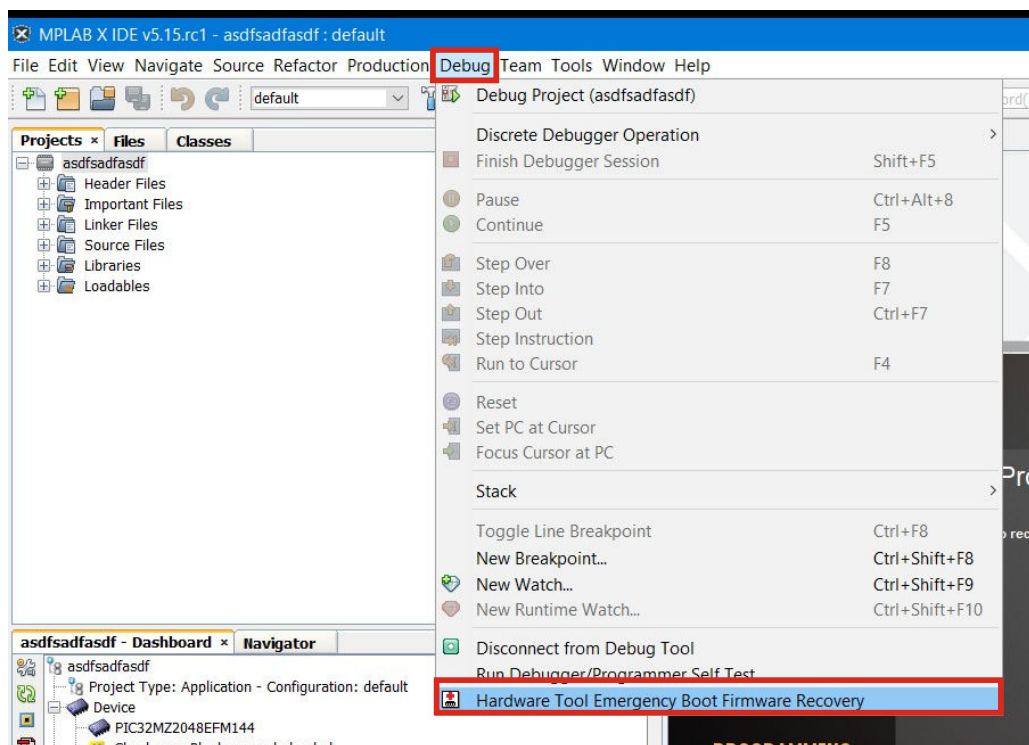
Note: Ensure that the WFI32-IoT 2.0 board is turned ON to perform the recovery method.

Figure 3-3. WFI32-IoT 2.0 Board (EV80S51A) – Recovery Method



2. Open the latest version of MPLAB X IDE.
3. The following figure illustrates the opening window of the MPLAB X IDE. From the “Debug” drop-down list, select Hardware Tool Emergency Boot Firmware Recovery.

Figure 3-4. MPLAB® X IDE Opening Window



- Follow the instructions shown in the preceding figure to bring the tool back to factory condition. 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](#)).

3.3 USB Connectivity

The WFI32E03PC module has an integrated full-speed USB peripheral. This feature enables the user to implement USB functionality through the Micro-B USB connector ([J200](#)) on the WFI32-IoT 2.0 board.

3.4 mikroBUS Socket (J402)

A mikroBUS socket ([J402](#)) expands the functionality of the WFI32-IoT 2.0 board using the MikroElektronika mikroBUS Click adapter boards. The mikroBUS connector consists of the following:

- Serial Peripheral Interface (SPI)
- Inter-Integrated Circuit (I²C)
- Universal Asynchronous Receiver-Transmitter (UART)
- Reset (GPIO)
- Pulse Width Modulation (PWM)
- Analog and interrupt lines
- 3.3V and 5V power lines

Table 3-2. mikroBUS™ Socket Pinout Details (J402)

Pin Number	Pin on mikroBUS™ Socket	Pin Description of mikroBUS Socket	Pin on WFI32E03PC Module ⁽¹⁾
J402-1	AN	Analog input	AN14/ANN0/CVD14/CVDR14/RPA14/RA14
J402-2	RST	Reset	ETH_CLK_OUT/CVDT10/RPC12/RC12

.....continued

Pin Number	Pin on mikroBUS™ Socket	Pin Description of mikroBUS Socket	Pin on WFI32E03PC Module ⁽¹⁾
J402-3	CS	SPI2 Chip Select	CVDT13/ETXD0/RPC15/RC15
J402-4	SCK	SPI2 Clock	SCK2/RPA11/RA11
J402-5	MISO	SPI2 Host Input Client Output	PTA_WLAN_ACTIVE/RPK5/RK5
J402-6	MOSI	SPI2 Host Input Client Input	BT_CLK_OUT/RPK4/RK4
J402-7	+3.3V	3.3V power	+3.3V
J402-8	GND	Ground	GND
J402-9	GND	Ground	GND
J402-10	+5V	5V power	5V0
J402-11	SDA	I ² C Data	SDA1/RPA5/RA5
J402-12	SCL	I ² C Clock	SCL1/RPA4/RA4
J402-13	TX	UART transmit	PTA_BT_ACTIVE/RPK7/RK7
J402-14	RX	UART receive	TDI/PGD4/AN9/CVD9/CVDR9/ RPB9/RB9
J402-15	INT	Hardware interrupt	ANN1/CVD15/CVDR15/RPA13/RA13
J402-16	PWM	PWM output	ANA0/RPB12/RB12

Notes:

- For more details on the WFI32E03PC module pins, refer to the *PIC32MZ W1 MCU and WFI32 Module with Wi-Fi® and Hardware-Based Security Accelerator Data Sheet* ([DS70005425](#)).
- To have a fully functional UART click board, the R432 and R435 (default) resistors are populated on the WFI32-IoT 2.0 board.
- To have a fully functional CAN click board, populate the resistors (R433 and R434) and remove the resistors (R423 and R435) on the WFI32-IoT 2.0 board.
- To have a fully functional OLED click board, depopulate the R436 resistor on the WFI32-IoT 2.0 board.

3.5 Switches

The following are the available switches on the WFI32-IoT 2.0 board:

- User-configurable switches – ([SW400](#)) and ([SW401](#))
- Reset switch ([SW402](#)) – Connected with the $\overline{\text{MCLR}}$ signal of the WFI32E03PC module

In the Idle state, the level of the user-configurable switch is pulled high (+3.3V) and, when the switch is pressed, it drives the I/O line to low (GND).

Table 3-3. Switches Description

Switch Name	Description	Pin on WFI32E03PC Module
SW400	User configurable switch2	PGC4/TCK/AN8/CVD8/CVDR8/RPB8
SW401	User configurable switch1	INT0/AN17/CVD17/CVDR17/RPA10
SW402	Reset switch	$\overline{\text{MCLR}}$

3.6 LEDs

The WFI32-IoT 2.0 on-board LEDs are categorized into three types:

- Power LEDs
 - Green ([D101](#)) – Charge indicator
 - Red ([D100](#)) – Low battery indicator
 - Blue ([D102](#)) – Power indicator
- PKOB4 LEDs

- Green (D300) – ACTIVE indicator
- Yellow (D301) – STATUS indicator
- LEDs related to the WFI32E03PC module:
 - Red LED (D400)
 - Yellow LED (D401)
 - Green LED (D402)
 - Blue LED (D403)

The following table lists the LEDs that can be turned ON or OFF using the connected GPIO pins.

Table 3-4. LEDs Description

LED Name	Description	Pin on WFI32E03PC Module
Red LED (D400)	User configurable LED1	ERXDV/CVDT14/RPK12
Yellow LED (D401)	User configurable LED2	EMDIO/CVDT15/RPK13
Green LED (D402)	User configurable LED3	EMDC/CVDT16/RPK14
Blue LED (D403)	User configurable LED4	ERXERR/CVDT7/RPC9

3.7 Temperature Sensor

The MCP9808 digital temperature sensor helps the user to measure temperatures between -40°C and +125°C to a digital word with $\pm 0.25^\circ\text{C}/\pm 1^\circ\text{C}$ (typical/maximum) accuracy. For more details, refer to the *MCP9808 $\pm 0.5^\circ\text{C}$ Maximum Accuracy Digital Temperature Sensor* (DS20005095).

The MCP9808 temperature sensor is connected to the WFI32E03PC Module through I2C1 and a GPIO for the user-configurable alert.

Note: 7-bit I²C address – 0x18

Table 3-5. MCP9808

Pin Name	Description	Pin on WFI32E03PC Module
SDA	I ² C Data	SDA1/RPA5
SCL	I ² C Clock	SCL1/RPA4
Alert	ASYN external interrupt	TDO/AN7/CVD7/CVDR7/CVDT0/RPB7

3.8 Ambient Light Sensor

A OPT3001 is a sensor that measures the intensity of visible light. The light sensor is mounted on the WFI32-IoT 2.0 board for measuring the light intensity.

The WFI32E03PC module connects to the OPT3001 ambient light sensor through I2C1 and uses a GPIO pin for the user-configurable alert function.

Table 3-6. Light Sensor

Pin Name	Description	Pin on WFI32E03PC Module
SDA	I ² C Data	SDA1/RPA5
SCL	I ² C Clock	SCL1/RPA4
INT	Interrupt output open-drain	TMS/AN6/CVD6/CVDR6/CVDT1/RPB6

3.9 Serial Flash

The WFI32-IoT 2.0 board has an on-board 32-Mbit external SPI Flash (SST26VF032B) memory for the storage of data. For more details on the serial Flash, refer to the *SST26VF032B/SST26VF032BA 2.5V/3.0V 32-Mbit Serial Quad I/O™ (SQI™) Flash Memory Data Sheet* (DS20005218). The following table describes the details of the serial Flash pin connection.

Table 3-7. Serial Flash Pin Description

Pin Number	Pin on Serial Flash (SST26VF032B)	Pin Description of Serial Flash	Pin on WFI32E03PC Module ⁽¹⁾
1	CE	Chip Enable	SPITCS/RPA1/RA1
2	SO	Serial Data Output for SPI mode	SDI1/RPC7/RC7
3	WP	Write-Protect	Not connected
4	VSS	Ground	GND
5	SI	Serial Data Input for SPI mode	SDO1/RPC8/RC8
6	SCK	Serial Clock	SCK1/RPC6/RC6
7	HOLD	Hold	Not connected
8	VDD	Input power supply	VDD

Note:

- For more details on the WFI32E03PC Module pins, refer to the *PIC32MZ W1 MCU and WFI32 Module with Wi-Fi® and Hardware-Based Security Accelerator Data Sheet* ([DS70005425](#)).

3.10 Secondary Oscillator

The WFI32-IoT 2.0 board includes an on-board secondary oscillator ([Y400](#)) that is connected to the SOSCO/PK15 and SOSCI/PB15 pins of the WFI32E03PC module, primarily for the RTCC application.

3.11 WFI32E03PC Module

For more details on the WFI32E03PC module pinout details, refer to the *PIC32MZ W1 MCU and WFI32 Module with Wi-Fi® and Hardware-Based Security Accelerator Data Sheet* ([DS70005425](#)).

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

4. WFI32-IoT 2.0 Board Out of Box Demo

The WFI32-IoT 2.0 board's Out of the Box (OOB) demo is preloaded with a firmware image that enables the user to quickly connect and send data to the AWS cloud using the on-board temperature and light sensors. The users can easily build their own custom projects with software libraries and example codes provided in Harmony v3 framework. The OOB demo connects to the cloud and allows the user to control the WFI32-IoT 2.0 board via a web-based interface.

For more details about the code and documentation related to the OOB demo, go to [EV80S51A \(WFI32-IoT 2.0 board\) OOB Demo](#).

5. Appendix A: Reference Circuit

5.1 WFI32-IoT 2.0 Board Schematics

Figure 5-1. Power Distribution Switch for PKoB4

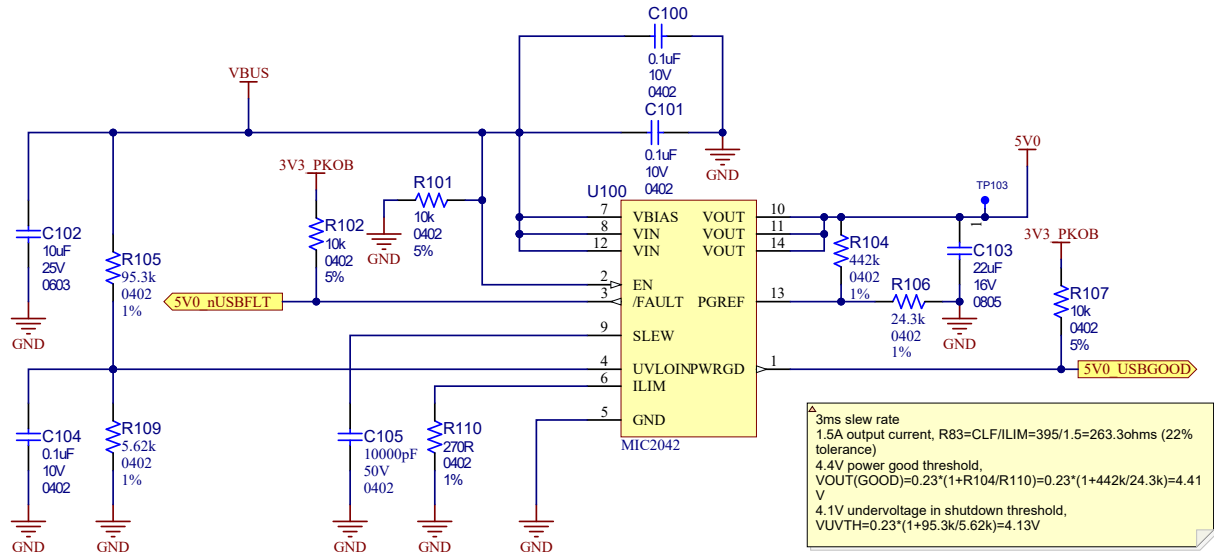


Figure 5-2. Li-Po Battery Connector/Charger

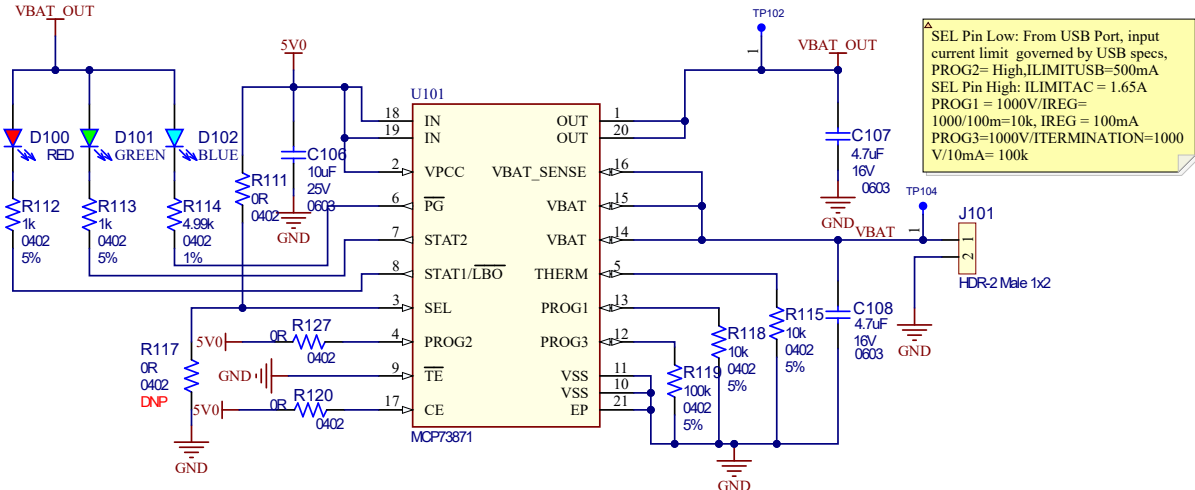


Figure 5-5. MCP2200 USB UART Converter

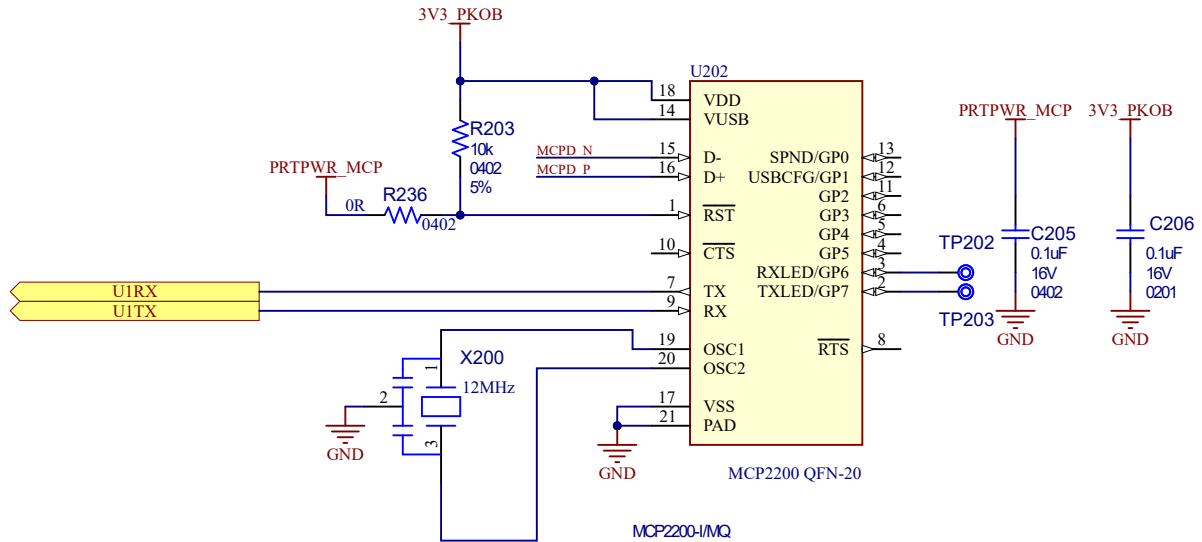
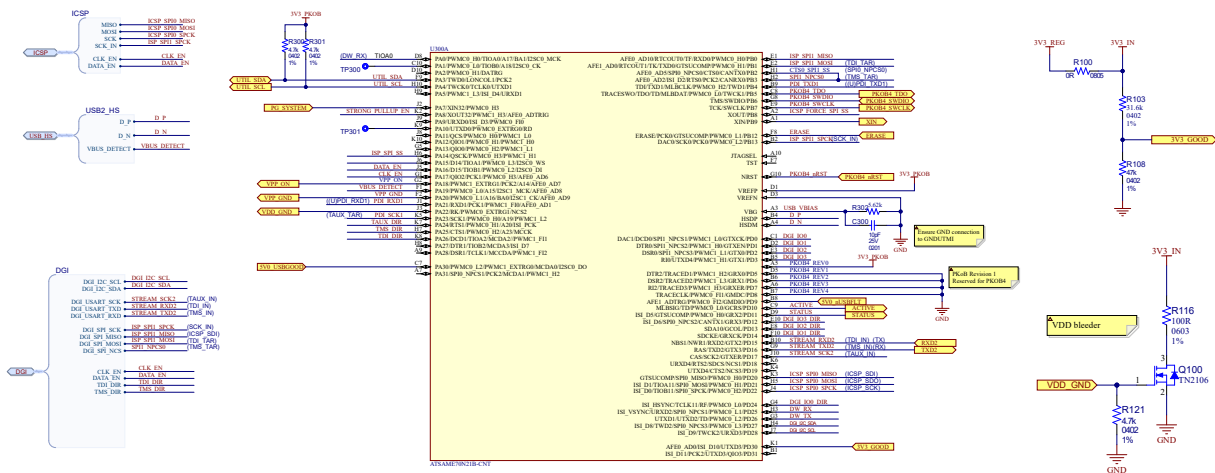


Figure 5-6. PKOB4 Main Micro



The schematic diagram for the PCoB4 Debug Header shows the following components and connections:

- J301:** HR1127 Mole 1x2 connector. Pin 1 is connected to 3V3_PKB0B and pin 2 to GND. An "ERASE" signal is shown at pin 1.
- J300:** HR1127 Mole 2x6 connector. Pins 1-6 are connected to 3V3_PKB0B. Pins 7-12 are connected to GND. Pins 13-18 are connected to SWDIO, SWCLK, SWD, and RST. Pins 19-24 are connected to PK0B4 SWDIO, PK0B4 SWCLK, PK0B4 TDO, and PK0B4 nRST.
- U301:** 24LC256 I2C EEPROM. VCC is connected to 3V3_PKB0B, VSS to GND, A2 to SCL, A1 to SDA, A0 to WP, and WP to GND. It is labeled "UTIL SDA" and "UTIL SCL".
- Y300:** DSC6011J1B-012.0000 crystal. Pin 1 (STB) is connected to 3V3_PKB0B, pin 2 (GND) to GND, pin 3 (OUT) to XIN, and pin 4 (VDD) to 3V3_PKB0B.
- Capacitors:**
 - C311: 10000pF, 16V, 0402, connected to 3V3_PKB0B and GND.
 - C317: 0.1uF, 16V, 0201, connected to 3V3_PKB0B and GND.
 - C309, C310, C312, C313, C314, C315, C316: Various values (0.1uF, 4.7uF, 10V, 16V, 0201) connected to VDDCORE and GND.
 - C301, C302: 4.7uF, 16V, 0402, 10V, connected to 3V3_PKB0B and GND.
 - C303, C304, C305: 0.1uF, 16V, 0201, connected to 3V3_PKB0B and GND.
 - C306, C307, C308: 0.1uF, 16V, 0201, connected to VDDCORE and GND.
- Other components:**
 - R306: 1k, 0402, 5%, connected to 3V3_PKB0B and GND.
 - R307: 470R, 0402, 5%, connected to 3V3_PKB0B and GND.
 - D300: GREEN LED, connected to 3V3_PKB0B and GND.
 - D301: YELLOW LED, connected to 3V3_PKB0B and GND.

Figure 5-9. PKOB4 – UART

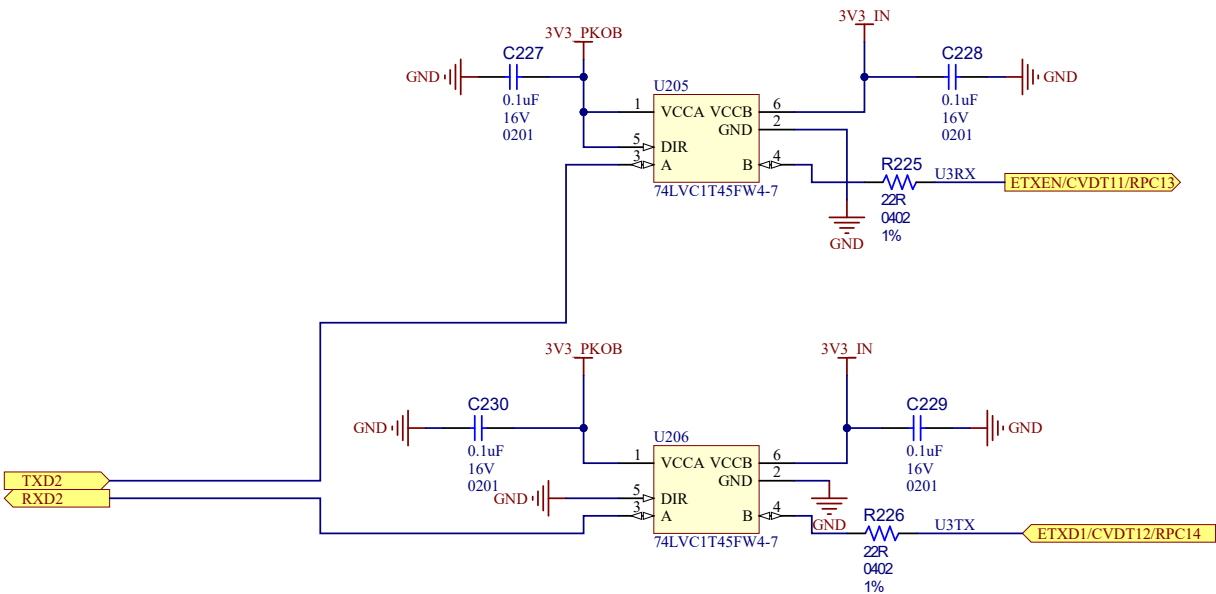


Figure 5-10. VPP Switch

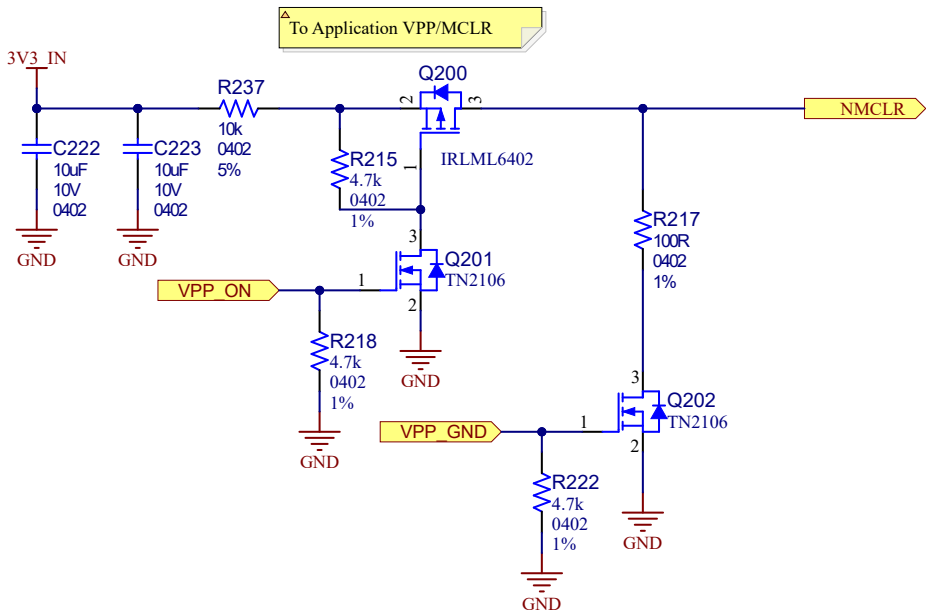


Figure 5-11. WFI32E03 Module

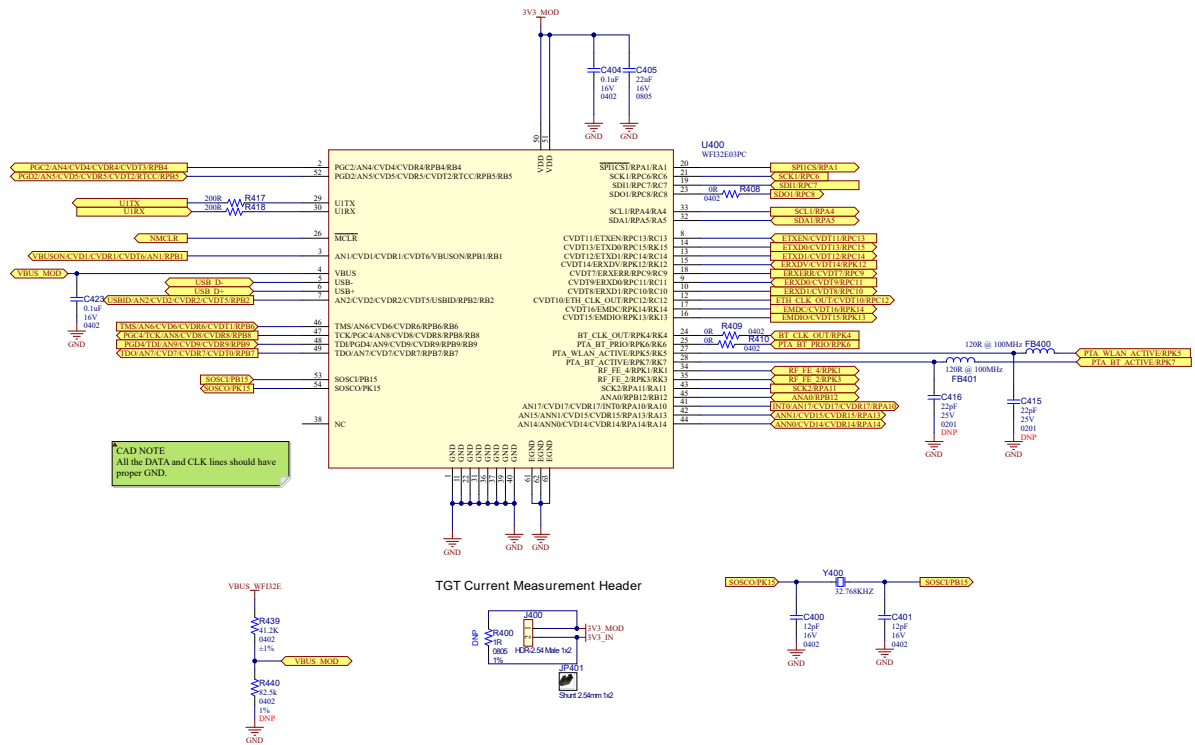


Figure 5-12. User Buttons

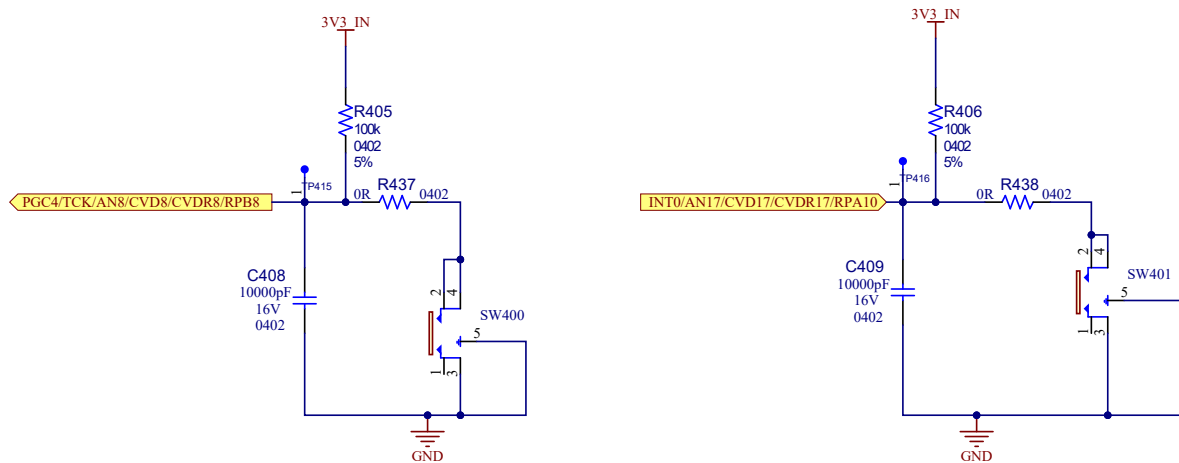


Figure 5-13. Reset Switch

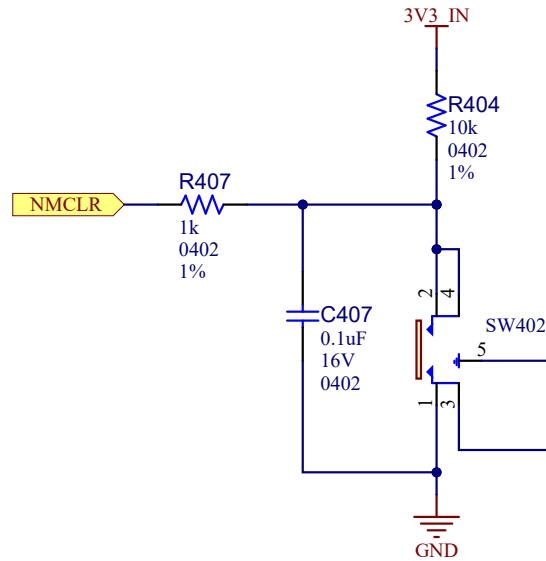


Figure 5-14. Ambient Light Sensor

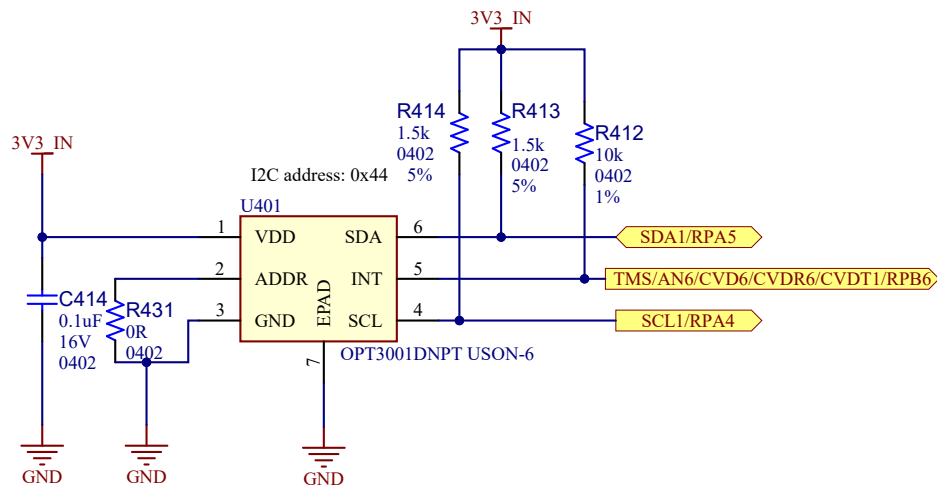


Figure 5-18. User LEDs

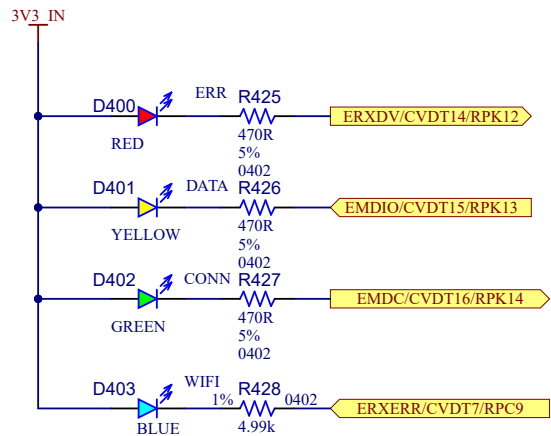


Figure 5-19. Test Points

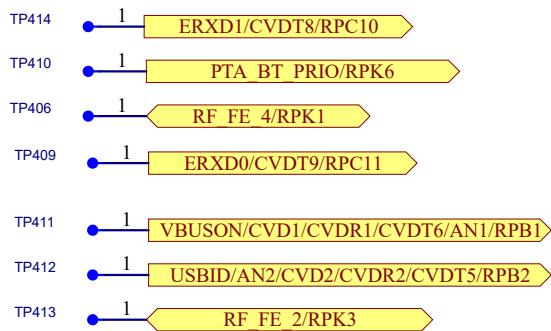


Figure 5-20. ICSP Header

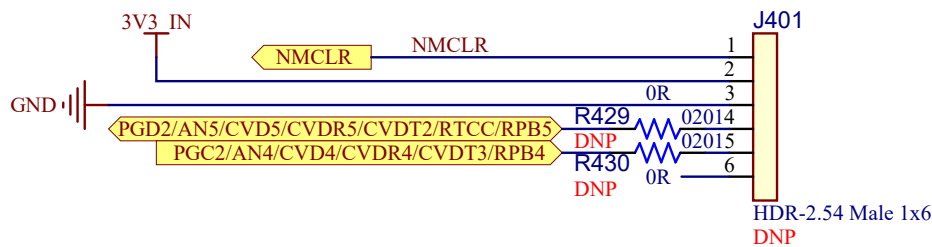


Figure 5-21. USB Cable and Mechanicals/Miscellaneous

5.2 WFI32-IoT 2.0 Board Bill of Materials

For the Bill of Materials (BOM) of the WFI32-IoT 2.0 board, go to the [EV80S51A](#) product web page.

6. Appendix B: Regulatory Approval

This equipment (WFI32-IoT 2.0 Board/EV80S51A) is an evaluation kit and not a finished product. It is intended for laboratory evaluation purposes only. It is not directly marketed or sold to the general public through retail; it is only sold through authorized distributors or through Microchip. Using this requires a significant engineering expertise towards understanding of the tools and relevant technology, which can be expected only from a person who is professionally trained in the technology.

Regulatory compliance settings have to follow the WFI32E03PC module certifications. The following regulatory notices are to cover the requirements under the regulatory approval.

6.1 United States

The WFI32-IoT 2.0 Board (EV80S51A) contains the WFI32E03PC module, which has received Federal Communications Commission (FCC) CFR47 Telecommunications, Part 15 Subpart C “Intentional Radiators” single-modular approval in accordance with Part 15.212 Modular Transmitter approval.

Contains FCC ID: 2ADHKWFI32E01

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.



Important: FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for uncontrolled environment. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 8 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. This transmitter is restricted for use with the specific antenna(s) tested in this application for certification.



CAUTION

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

6.2 Canada

The WFI32-IoT 2.0 Board (EV80S51A) contains the WFI32E03PC module, which has been certified for use in Canada under Innovation, Science and Economic Development Canada (ISED, formerly Industry Canada) Radio Standards Procedure (RSP) RSP-100, Radio Standards Specification (RSS) RSS-Gen and RSS-247.

Contains IC: 20266-WFI32E01

This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's license-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference;
2. This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. L'appareil ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.



WARNING

This equipment complies with radio frequency exposure limits set forth by Innovation, Science and Economic Development Canada for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the device and the user or bystanders.

Cet équipement est conforme aux limites d'exposition aux radiofréquences définies par d'Innovation, Sciences et Développement économique Canada pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre le dispositif et l'utilisateur ou des tiers.

6.3 Europe

This equipment (EV80S51A) has been assessed under the Radio Equipment Directive (RED) for use in European Union countries. The product does not exceed the specified power ratings, antenna specifications and/or installation requirements as specified in the user manual. A Declaration of Conformity is issued for each of these standards and kept on file as described in Radio Equipment Directive (RED).

Simplified EU Declaration of Conformity

Hereby, Microchip Technology Inc. declares that the radio equipment type [EV80S51A] is in compliance with Directive 2014/53/EU.

The full text of the EU declaration of conformity is available at [EV80S51A](#) (See *Conformity Documents*).

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	04/2024	Document	Initial Revision

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