UG172: Wizard Gecko Wi-Fi® Module Wireless Starter Kit SLWSTK6120A User's Guide

The SLWSTK6120A is an excellent starting point to get familiar with the WGM110 Wi-Fi Module.

The Wireless Starter Kit Mainboard contains sensors and peripherals demonstrating some of the WGM110's many capabilities. The kit provides all necessary tools for developing Wi-Fi wireless applications.

ORDERING INFO

- SLWSTK6120A

RADIO BOARD FEATURES

- WGM110 Wizard Gecko Wi-Fi Module
  - 1 MB Flash
  - 128 kB RAM
  - P/N WGM110
- Integrated high performance chip antenna
- Transmit power +16 dBm
- CPU core 32-bit ARM Cortex-M3

SOFTWARE SUPPORT

- Wizard Gecko Wi-Fi Software
- Wizard Gecko Wi-Fi SDK
- Example applications for the kit

1. Introduction

1.1 Description

SLWSTK6120A provides a complete development platform for Silicon Labs' Wizard Gecko WGM110Wi-Fi Module. The core of the SLWSTK6120A is the Wireless Starter Kit Mainboard which features an on-board J-Link debugger, a virtual COM port interface, an LCD display and a humidity/temperature sensor and through-holes to access all the pins of the Wizard Gecko Wi-Fi Module. The Mainboard also contains two push-buttons and LEDs which can be used in user application testing. The WSTK Mainboard is paired with an Wizard Gecko WGM110 Wi-Fi Module Radio Board that plugs directly into the Mainboard. The Radio Board includes the WGM110 Module with a built-in high performance chip antenna, a microSD card slot and a USB interface for data transfer and power supply connection enabling stand-alone testing.

WSTK6120A Wireless Starter Kit is also supplied with an Expansion Board (BRD8006A Add-on Board) that can be connected to the WSTK Mainboard expansion header. The Expansion Board contains additional peripherals such as an accelerometer, buttons, LEDs, a joystick and pads for I2C expansion.

To support software development with SLWSTK6120A for the Wizard Gecko WGM110 Wi-Fi Module Silicon Labs also offers a free SDK. The SDK includes BGTool™ which can be used to configure the WGM110 Module and test its functionality.

1.2 Kit Contents

The following items are contained in the Wizard Gecko Wi-Fi Wireless Starter Kit box:

- 1 x BRD4001A Wireless Starter Kit Mainboard
- 1 x BRD4320A Wizard Gecko WGM110 Wi-Fi Module Radio Board
- 1 x Expansion Board
- 1 x battery holder for 2 x AA batteries (batteries not included)
- 1 x USB Type A <-> USB Mini-B cable
- 1 x USB Type A <-> USB Micro-B cable

Please refer to *Wizard Gecko WGM110 Wi-Fi® Module Radio Board BRD4320A Reference Manual* for features of the included BRD4320A Radio Board.

1.3 Getting Started

Detailed instructions for how to get started with your new Wizard Gecko Wi-Fi Wireless Starter Kit can be found on the Silicon Labs web pages:

http://www.silabs.com/start-wgm

2. Kit Hardware Layout

The layout of the Wizard Gecko Wi-Fi Module Wireless Starter Kit is shown below.
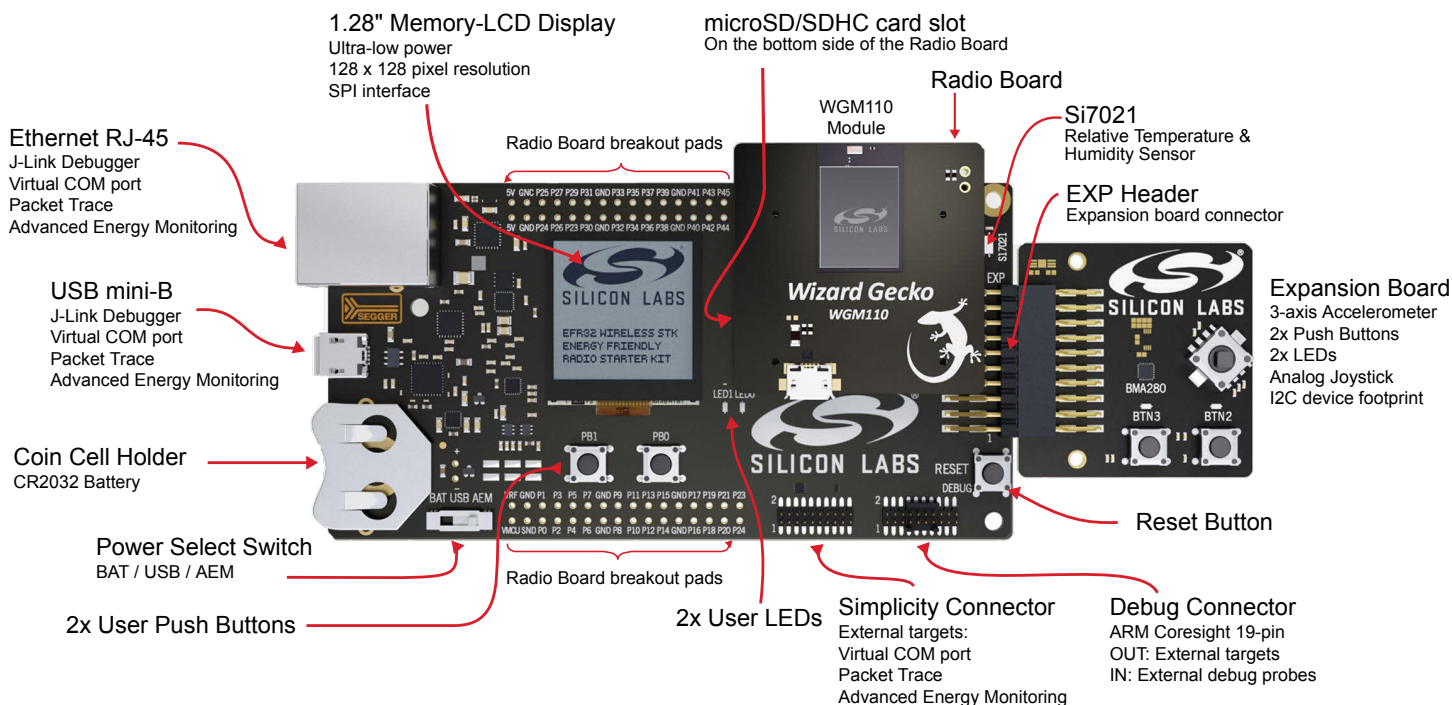

Figure 2.1   SLWSTK6120A Hardware Layout

Note: Some of the features and/or connections described in the above figure are not supported when using the WSTK with the WGM110 Module. For more details see later sections in this document.

3. Kit Block Diagram

An overview of the Wizard Gecko Wi-Fi Module Wireless Starter Kit is shown in the figure below.
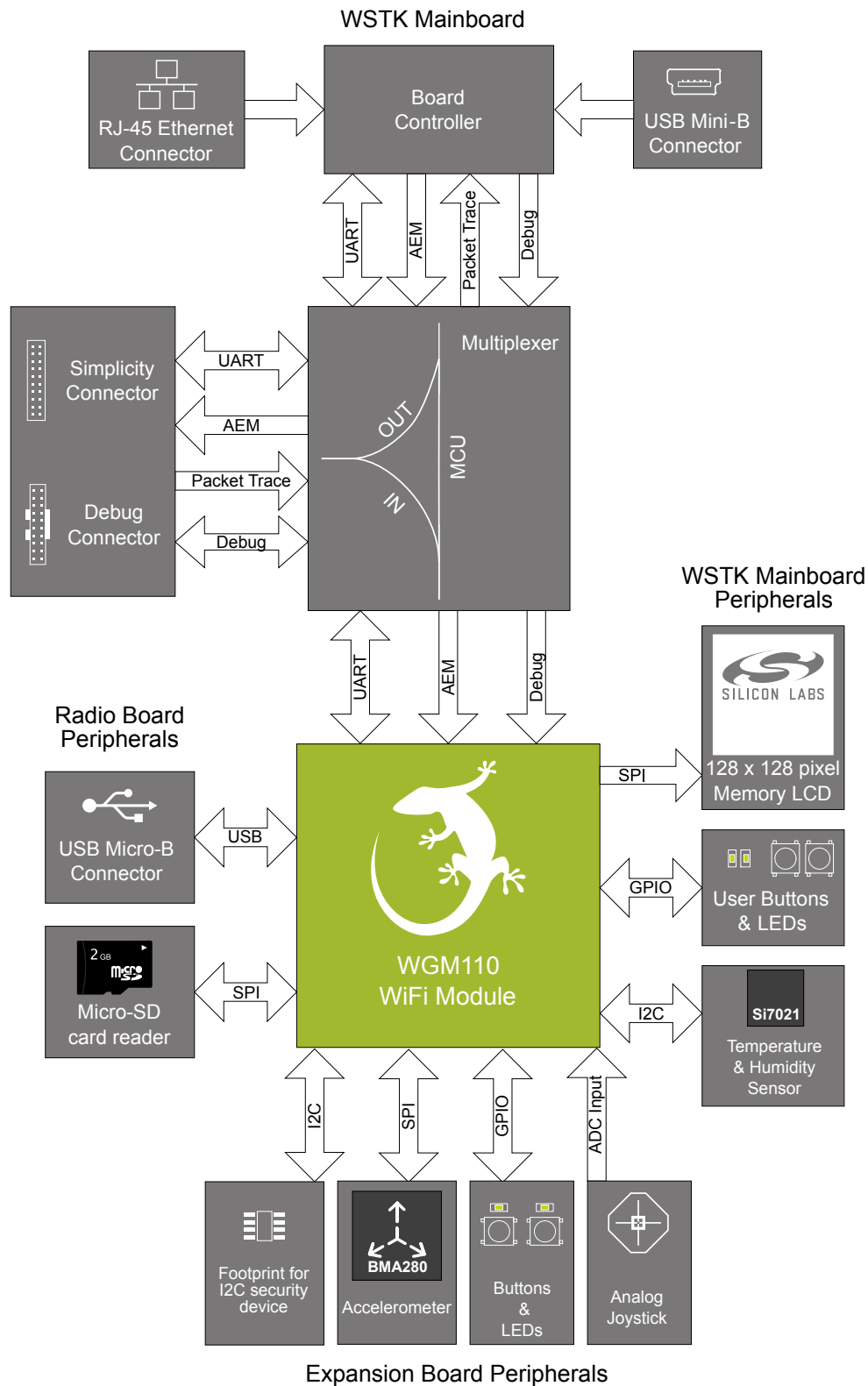

Figure 3.1   SLWSTK6120A Block Diagram

4. Connectors

This chapter gives you an overview of the Wireless Starter Kit Mainboard connectivity. The placement of the connectors can be seen in the figure below.
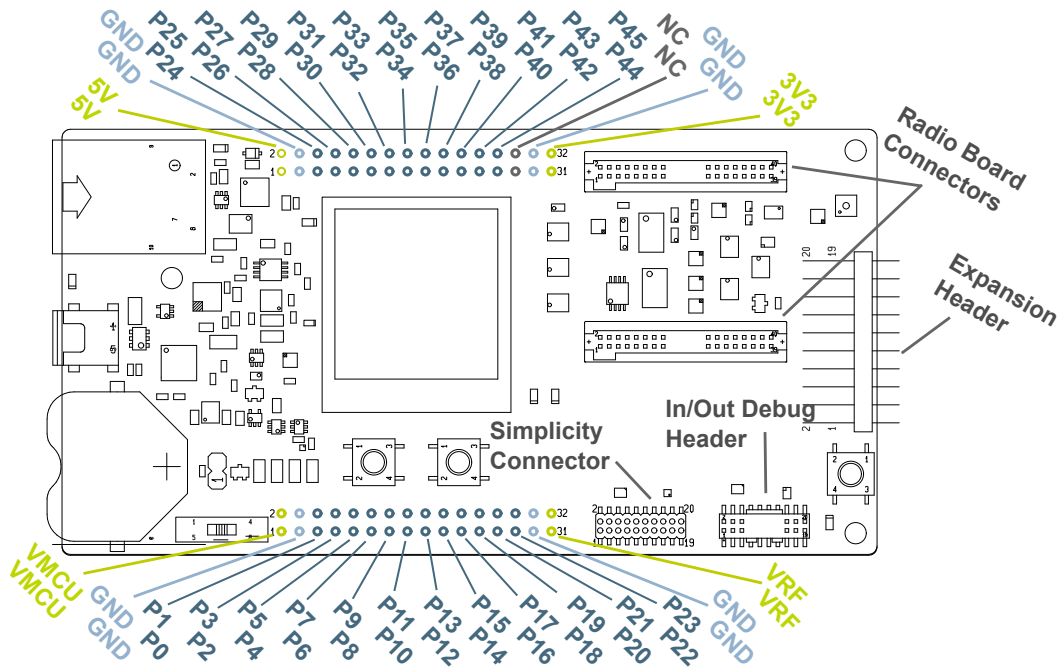

Figure 4.1 Connector Layout

4.1 Breakout pads

Most of the WGM110's pins are routed from the Radio Board to breakout pads at the top and bottom edges of the Wireless Starter Kit Mainboard. A 2.54 mm pitch pin header can be soldered on for easy access to the pins. The figure below shows you how the pins of the WGM110 map out to the pin numbers printed on the breakout pads. To see the available functions on each, please refer to the WGM110 Data Sheet.

J101

VMCU	o o	VMCU
GND	o o	GND
PB11 / P0	o o	P1 / PD0 / SD_MOSI / DISP_SI
PB12 / P2	o o	P3 / PD1 / SD_MISO
PE14 / P4	o o	P5 / PD2 / SD_CLK / DISP_SCLK
PE15 / P6	o o	P7 / PD3
VCOM_CTS / PE12 / P8	o o	P9 / PD4
VCOM_RTS / PE13 / P10	o o	P11 / PD5
I2C_SCL / PE1 / P12	o o	P13 / PE0 / I2C_SDA
BUTTON0 / PA2 / P14	o o	P15 / NC
BUTTON1 / PA6 / P16	o o	P17 / NC
LED0 / PC0 / P18	o o	P19 / NC
LED1 / PC1 / P20	o o	P21 / NC
VCOM_EN / PE2 / P22	o o	P23 / NC
GND	o o	GND
VRF	o o	VRF

J102

5V	o o	5V
GND	o o	GND
WIFI_MISO / P24	o o	P25 / PE10 / VCOM_TX
WIFI_MOSI / P26	o o	P27 / PE11 / VCOM_RX
WIFI_CLK / P28	o o	P29 / PD6 / SD_CD
WIFI_CS / P30	o o	P31 / PD7 / SD_CS
NC / P32	o o	P33 / PC13 / DISP_EN
NC / P34	o o	P35 / PC14 / DISP_SCS
NC / P36	o o	P37 / PC9 / SENSOR_EN
NC / P38	o o	P39 / PC15 / DISP_COM
NC / P40	o o	P41 / NC
NC / P42	o o	P43 / NC
NC / P44	o o	P45 / NC
NC	o o	NC
GND	o o	GND
3V3	o o	3V3

Figure 4.2 Radio Board Pin Mapping on Breakout Pads

4.2 Expansion Header

On the right hand side of the board an angled 20-pin expansion header is provided to allow connection of peripherals or plug-in boards. The connector contains a number of I/O pins that can be used with most of the WGM110 Wizard Gecko's features. Additionally, the VMCU, 3V3 and 5V power rails are also exported.

The connector follows a standard which ensures that commonly used peripherals such as an SPI, a UART and an I2C bus are available on fixed locations in the connector. The rest of the pins are used for general purpose I/O. This allows the definition of expansion boards that can plug into a number of different Silicon Labs Starter Kits.

The figure below shows the pin assignment of the expansion header for the Wizard Gecko Wi-Fi Module Wireless Starter Kit. Because of limitations in the number of available GPIO pins, some of the expansion header pins are shared with kit features.
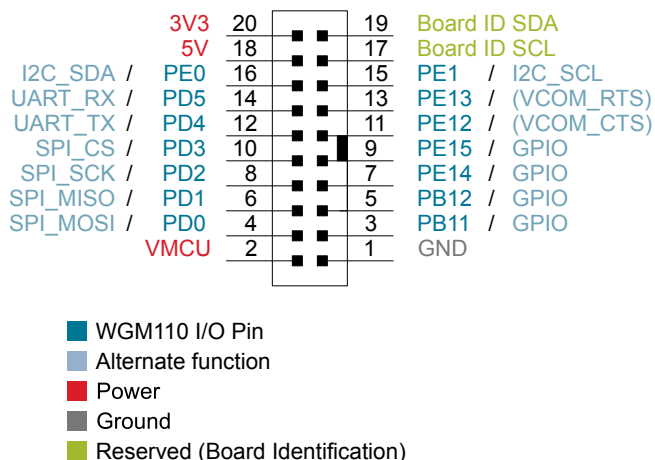

Figure 4.3 Expansion Header

The pin-routing available on the WGM110 Module is very flexible, so most peripherals can be routed to any pin. However, many pins are shared between the Expansion Header and other functions on the Wireless STK Mainboard. includes an overview of the mainboard features that share pins with the Expansion Header.

Table 4.1. Expansion Header Pinout

Pin	Connection	EXP Header function	Shared feature	Peripheral mapping
4	PD0	SPI_MOSI	SD_MOSI / DISP_SI	USART1 TX Location 1
6	PD1	SPI_MISO	SD_MISO	USART1 RX Location 1
8	PD2	SPI_SCLK	SD_CLK / DISP_SCLK	USART1_CLK Location 1
10	PD3	SPI_CS		USART1_CS Location 1
12	PD4	UART_TX		USART0_TX Location 0
14	PD5	UART_RX		USART0_RX Location 0
16	PE0	I2C_SDA	SENSOR_I2C_SDA	I2C1_SDA Location 2
3	PB11	GPIO		
5	PB12	GPIO		
7	PE14	GPIO		
9	PE15	GPIO		
11	PE12	GPIO	VCOM_CTS	
13	PE13	GPIO	VCOM_RTS	
15	PE1	I2C_SCL	SENSOR_I2C_SCL	I2C1_SCL Location 2

4.3 Debugging

Note: The Wireless Starter Kit Mainboard does not support this feature when used together with the Wizard Gecko WGM110 Module; however, BGTool can be used to debug BGAPI commands and error situations.

Note: For more information on BGTool go to Silicon Labs web page http://www.silabs.com/start-wgm and download the *UG160: Wizard Gecko BGTool™ User's Guide*.

The Debug Connector serves a dual purpose. Based on the "debug mode", which can be set up using Simplicity Studio. In the "Debug IN" mode this connector allows an external debug emulator to be used with the on-board WGM110. In the "Debug OUT" mode this connector allows the kit to be used as a debugger towards an external target. In the "Debug MCU" (default) mode this connector is isolated from the debug interface of both the Board Controller and the on-board target device.

"The Debug Connector has three 'debug modes,' which are set using Simplicity Studio. The 'Debug MCU' mode is default and the two other modes ('Debug IN' and 'Debug OUT') are set using Simplicity Studio.

Because this connector is automatically switched to support the different operating modes, it is only available when the Board Controller is powered (J-Link USB cable connected). If debug access to the target device is required when the Board Controller is unpowered, this should be done by connecting directly to the appropriate breakout pins.

The pinout of the connector follows that of the standard ARM Cortex Debug+ETM 19-pin connector. The pinout is described in detail below.
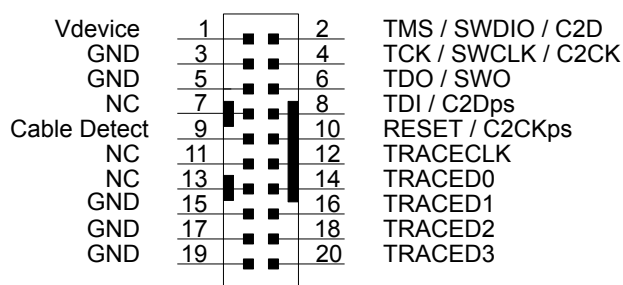

Figure 4.4 Debug Connector

Note that the pin-out matches the pin-out of an ARM Cortex Debug+ETM connector, but these are not fully compatible as pin 7 is physically removed from the Cortex Debug+ETM connector. Some cables have a small plug that prevent them from being used when this pin is present. If this is the case, remove the plug, or use a standard 2x10 1.27 mm straight cable instead.

Table 4.2. Debug Connector Pin Descriptions

Pin number(s)	Function	Note
1	VTARGET	Target voltage on the debugged application.
2	TMS / SDWIO / C2D	JTAG test mode select, Serial Wire data or C2 data
4	TCK / SWCLK / C2CK	JTAG test clock, Serial Wire clock or C2 clock
6	TDO/SWO	JTAG test data out or Serial Wire Output
8	TDI / C2Dps	JTAG test data in, or C2D "pin sharing" function
10	RESET / C2CKps	Target device reset, or C2CK "pin sharing" function
12	TRACECLK	ETM Trace Clock
14	TRACED0	ETM Trace Data 0
16	TRACED1	ETM Trace Data 1
18	TRACED2	ETM Trace Data 2
20	TRACED3	ETM Trace Data 3

Pin number(s)	Function	Note
9	Cable detect	This signal must be pulled to ground by the external debugger or application for cable insertion detection.
11, 13	NC	Not connected
3, 5, 15, 17, 19	GND	

4.4 Simplicity Connector

Note: The Wireless Starter Kit Mainboard does not support this feature when used together with the Wizard Gecko WGM110 Module.

The Simplicity Connector featured on the Wireless Starter Kit Mainboard allows the Virtual COM port interface to be used towards an external target. The pinout is illustrated in the figure below.

The Simplicity Connector featured on the Wireless Starter Kit Mainboard enables advanced debugging features such as the AEM, the Virtual COM port and the Packet Trace Interface to be used towards an external target. The pinout is illustrated in the figure below.
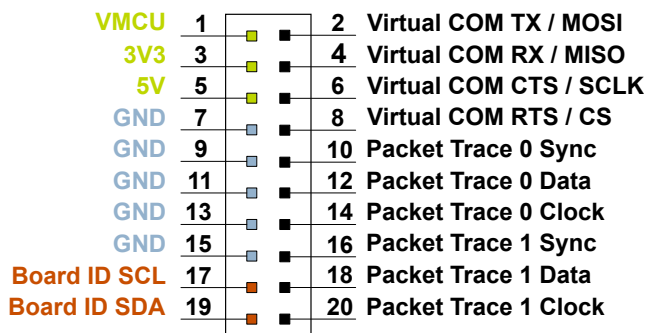
Figure 4.5 Simplicity Connector

Current drawn from the VMCU voltage pin is included in the AEM measurements, while the 3V3 and 5V voltage pins are not. To monitor the current consumption of an external target with the AEM, unplug the BRD4320A Radio Board from the WSTK Mainboard to avoid having the Radio Board current consumption added to the measurements.

Table 4.3. Simplicity Connector Pin Descriptions

Pin number(s)	Function	Note
1	VMCU	3.3 V power rail, monitored by the AEM
3	3V3	3.3 V power rail
5	5V	5 V power rail
2	VCOM_TX_MOSI	Virtual COM Tx/MOSI
4	VCOM_RX_MISO	Virtual COM Rx/MISO
6	VCOM_CTS_#SCLK	Virtual COM CTS/SCLK
8	VCOM_#RTS_#CS	Virtual COM RTS/CS
10	PTI0_SYNC	Packet Trace 0 Sync
12	PTI0_DATA	Packet Trace 0 Data
14	PTI0_CLK	Packet Trace 0 Clock
16	PTI1_SYNC	Packet Trace 1 Sync
18	PTI1_DATA	Packet Trace 1 Data
20	PTI1_CLK	Packet Trace 1 Clock
17	EXT_ID_SCL	Board ID SCL
19	EXT_ID_SDA	Board ID SDA
7, 9, 11, 13, 15	GND	

5. Power Supply and Reset

This section explains the power supply options and reset functionalities of the WSTK.

5.1 Radio Board Power Selection

The WGM110 Module on the Wireless Starter Kit can be powered by either one of the three sources listed below:

- USB Debug cable
- 2 x AA sized batteries using the external battery holder supplied with the WSTK
- USB Connector on the BRD4320A Radio Board

Selecting the power source is done with the slide switch in the lower left corner of the WSTK Mainboard. Figure 5.1 SLWSTK6120A Power Switch on page 9 shows how the different power sources can be selected with the slide switch.
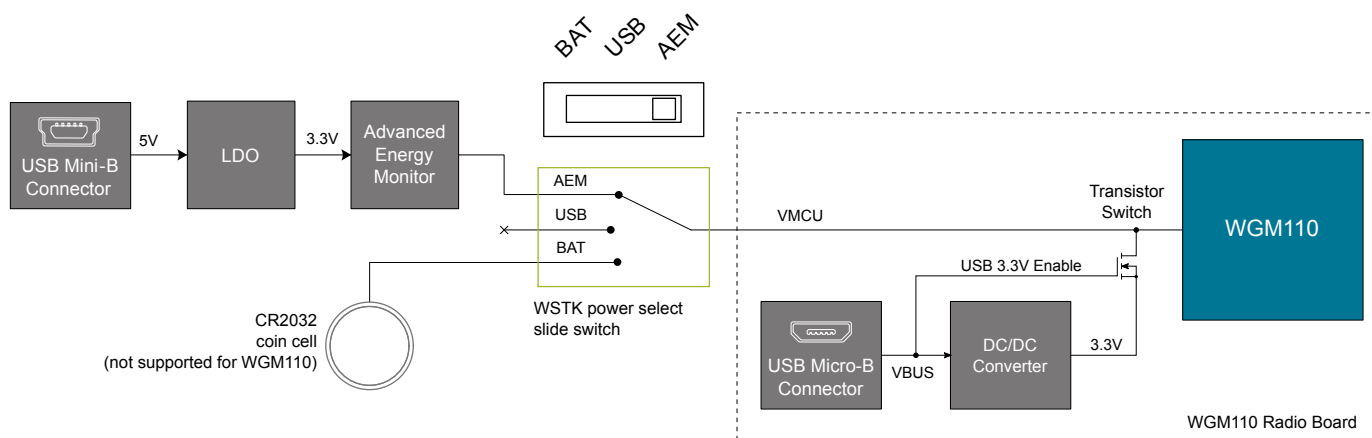
Figure 5.1 SLWSTK6120A Power Switch

With the switch in the *AEM* position, a low noise 3.3 V LDO on the WSTK Mainboard is used to power the Radio Board. This LDO is again powered from the Debug USB cable.

With the WGM110 radio board, the *USB* position of the power switch is disconnected. Instead, a transistor switch on the radio board itself connects the on-board regulator to the module power supply when the target USB cable is inserted. Please note that this happens regardless of the power switch position, so the power switch should be set to *USB* or *BAT* when using the radio board USB connector to avoid conflict. The transistor switch allows the radio board to be powered by a USB cable even when removed from the WSTK mainboard.

With the switch in the *BAT* position, the WGM110 Module is powered by 2 x AA sized batteries. This requires that the external battery holder with 2 x AA batteries is connected to the Expansion Header (after removing the Expansion Board).

The *BAT* switch position is the recommended position when powering the Radio Board with an external power source, as it disconnects the internal LDO.

Note: Please be aware that the current sourcing capabilities of a coin cell battery is too low in practical cases to supply Wi-Fi based wireless applications.

Note: The Advanced Energy Monitor functionality is not supported when using the BRD4320A Radio Board with WSTK.

5.2 Board Controller Power

The Board Controller is responsible for important features such as the debugger and is powered exclusively through the USB port located in the middle left side of the WSTK Mainboard. This part of the kit resides on a separate power domain, so a different power source can be selected for the target device while retaining debugging functionality. This power domain is also isolated to prevent current leakage from the target power domain when power from the Board Controller is removed.

The Board Controller power domain is exclusively supplied by the J-Link USB port, and is not influenced by the position of the power switch.

The kit has been carefully designed to keep the Board Controller and the target power domains isolated from each other as one of them powers down. This ensures that the target WGM110 device will continue to operate in the *USB* and *BAT* modes.

5.3 Wi-Fi Module Reset

The WGM110 Wi-Fi Module can be reset by the following methods:
* A user pressing the RESET button.
* The on-board debugger pulling the *#RESET* pin low.
* An external debugger pulling the *#RESET* pin low.

In addition to the reset sources mentioned above, the Board Controller will also issue a RESET to the WGM110 Module when booting up. This means that removing power to the Board Controller (plugging out the J-Link USB cable) will not generate a RESET, but plugging the cable back in will, as the Board Controller boots up.

5.4 Battery Holder

In radio applications with high output power, peak current consumption will exceed the current sourcing capacity of a coin-cell battery. To support evaluation of the Wizard Gecko WGM110 Module in situations where powering the kit from a wired USB connection is impractical, for instance during range-tests, the WSTK is supplied with an external battery holder for 2 AA batteries.

To use the battery holder, first set the power switch to the *BAT* position. Then attach the cable to **Pin 1** and **Pin 2** on the expansion header, orienting the connector so that the black wire is connected to the bottom pin (**Pin 1**) and the red wire to the top pin (**Pin 2**).
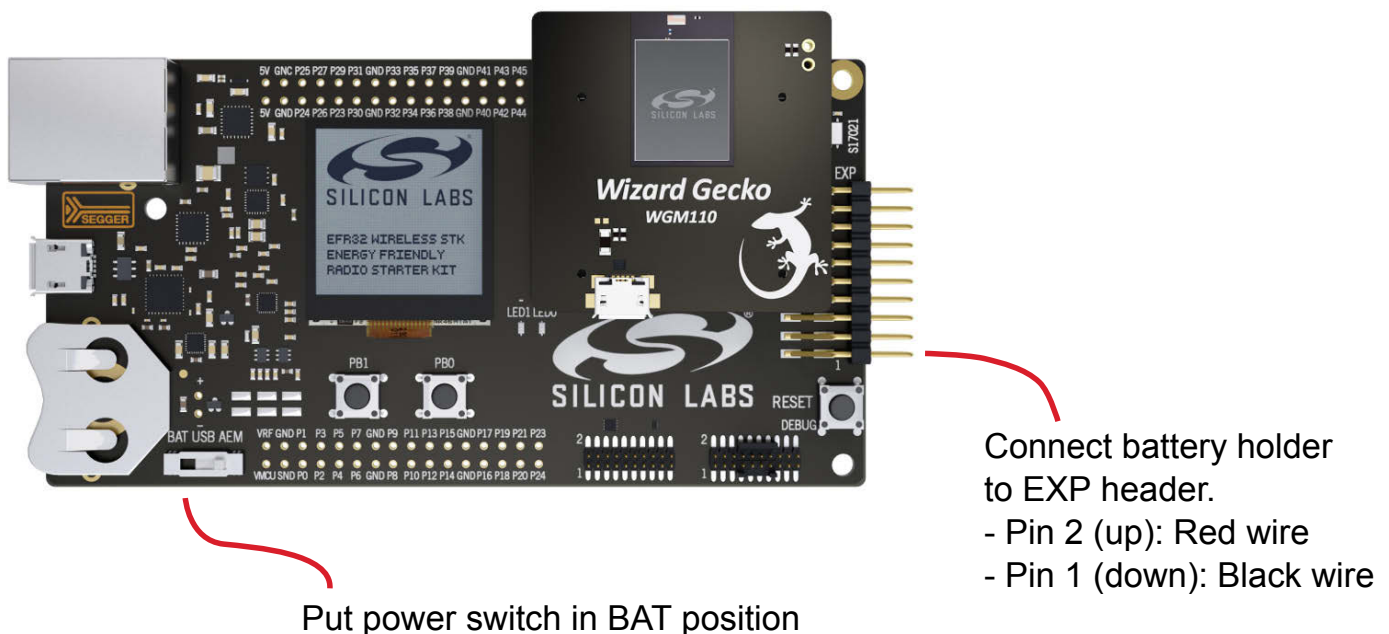

Connect battery holder to EXP header.
- Pin 2 (up): Red wire
- Pin 1 (down): Black wire

Put power switch in BAT position

Figure 5.2 Battery Holder Connection to the WSTK Mainboard

Warning: There is no reverse voltage protection on the VMCU pin! Ensure that the battery holder is connected the right way. Failure to do so may result in damage to the radio board and its components.

6. Peripherals

The SWTK Mainboard has a set of peripherals which can be used to demonstrate some of the features of the WGM110 Module.

Be aware that most WGM110 I/O routed to peripherals are also routed to the breakout pads. This must be taken into consideration when using the breakout pads for your own applications.

6.1 Push Buttons and LEDs

The WSTK Mainboard has two user programmable push buttons marked on the Mainboard as **PB0** and **PB1**. They are connected directly to the WGM110 Module, and are debounced by RC filters with a time constant of 1 ms. These buttons are connected to WGM110 Module pins PA2 and PA6 correspondingly.

The WSTK Mainboard also features two user programmable yellow LEDs marked **LED0** and **LED1**, which are controlled by the GPIO pins on the WGM110 Module. These LEDs are connected to WGM110 Module pins PC0 and PC1 correspondingly (active-high configured).
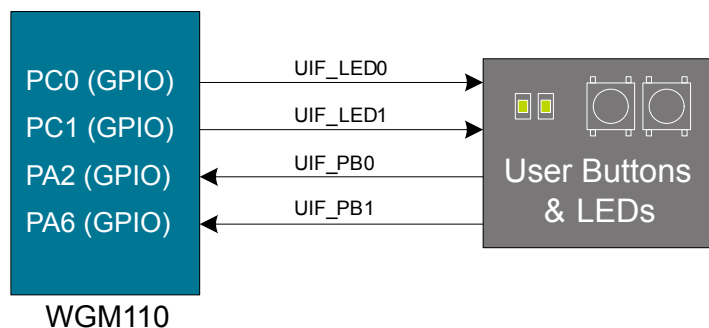
Figure 6.1 Connection between WGM110 Module I/O Pins and WSTK Mainboard Push Buttons and LEDs
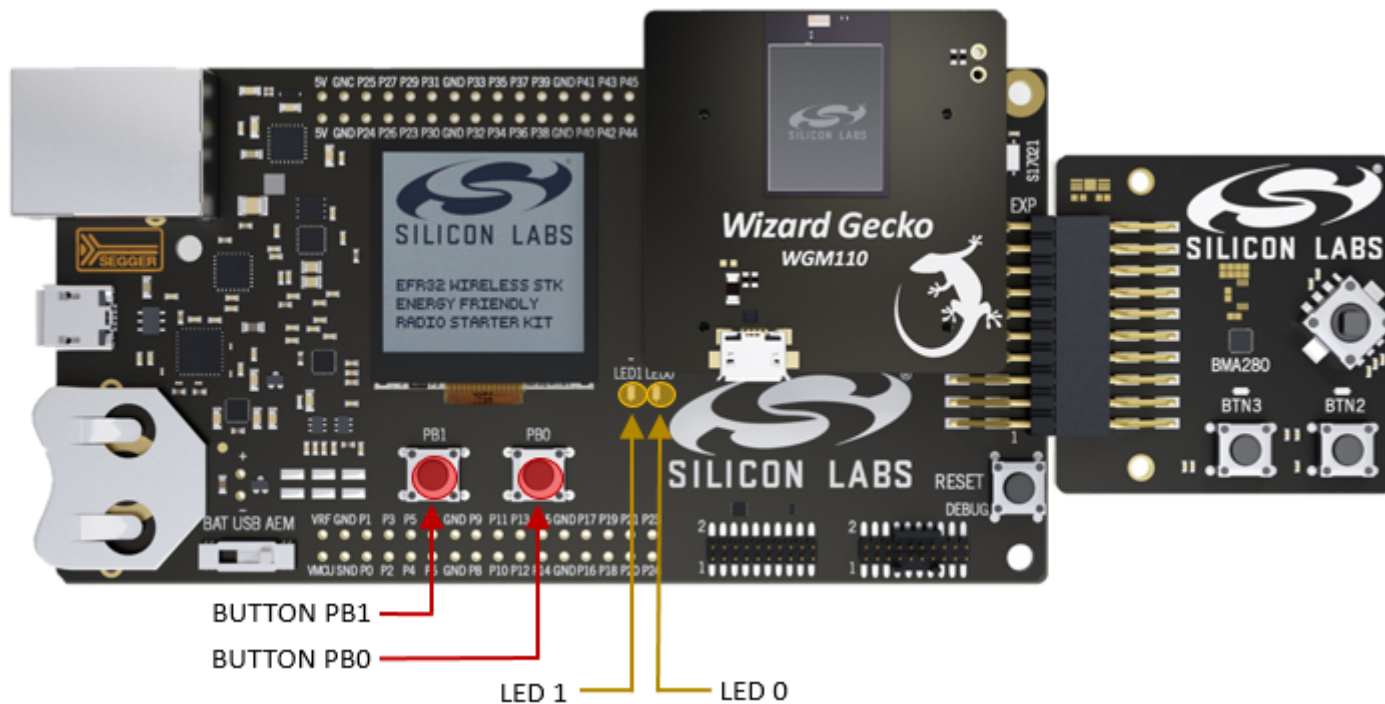
Figure 6.2 Location of Push Buttons and LEDs on the WSTK Mainboard

6.2 Memory LCD-TFT Display

A 1.28-inch SHARP Memory LCD-TFT is available on the WSTK Mainboard which enables the development of interactive applications. This high resolution 128 by 128 pixels display consumes very little power. It is a reflective monochrome display, so each pixel can only be light or dark, no backlight is needed in normal daylight conditions. Data sent to the display is stored in the pixels on the glass, which means that static images can be displayed with no need for continous refreshing.

The LCD display interface consists of an SPI-compatible serial interface and some extra control signals. Pixels are not individually addressable, instead data is sent to the display one line (128 bits) at a time.

The Memory LCD-TFT display is shared with the WSTK Board Controller, allowing the Board Controller application to display useful information such as software revision information etc. when the user application is not using the display. The user application can always control the ownership of the display by using the DISP_ENABLE line as follows:

• 0: Board Controller has control of the display
• 1: User application (WGM110 Module) has control of the display

Power to the LCD display is sourced from the target application power domain when the WGM110 Module controls the LCD display, and from the Board Controller's power domain when the DISP_ENABLE line is low. Data is clocked in on DISP_MOSI when DISP_CS is high, and the clock is sent on DISP_SCLK. The maximum supported clock speed is 1.1 MHz.

DISP_COM is the "COM Inversion" line. It must be pulsed periodically to prevent static build-up in the display itself. Please refer to the LCD display manufacturers application information for details on driving the display:

http://www.sharpmemorylcd.com/1-28-inch-memory-lcd.html

Note: Please note that the WGM110 Module Wi-Fi Software stack does not include a driver for the LCD display.
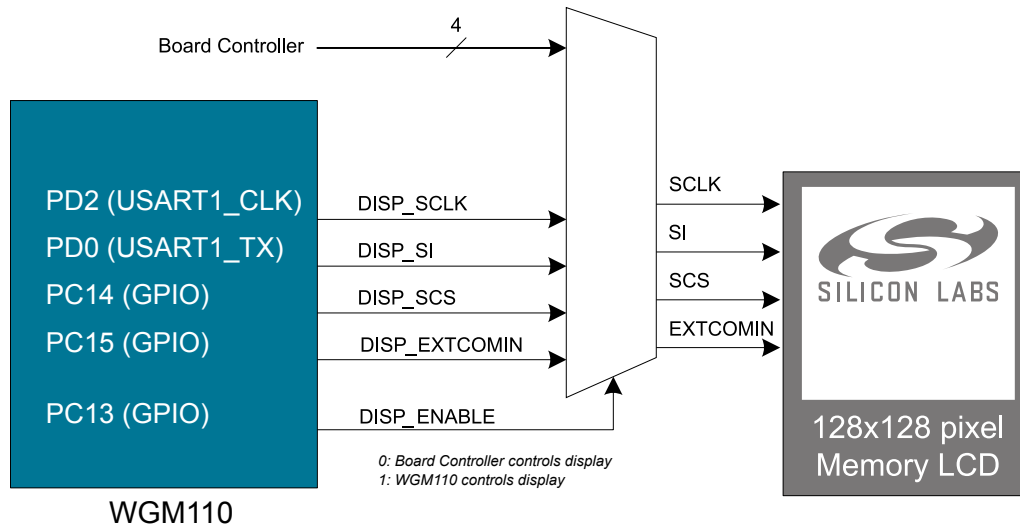
Figure 6.3 Connection of the 128x128 Pixel Memory LCD to WGM110 Module I/O Pins

6.3 Si7021 Relative Humidity and Temperature Sensor

The Si7021 I2C relative humidity and temperature sensor is a monolithic CMOS IC integrating humidity and temperature sensor elements, an analog-to-digital converter, signal processing, calibration data, and an I2C interface. The patented use of industry-standard, low-K polymeric dielectrics for sensing humidity enables the construction of low-power, monolithic CMOS Sensor ICs with low drift and hysteresis, and excellent long term stability.

The humidity and temperature sensors are factory-calibrated and the calibration data is stored in the on-chip non-volatile memory. This ensures that the sensors are fully interchangeable, with no recalibration or software changes required.

The Si7021 is available in a 3x3 mm DFN package and is reflow solderable. It can be used as a hardware- and software-compatible drop-in upgrade for existing RH/ temperature sensors in 3x3 mm DFN-6 packages, featuring precision sensing over a wider range and lower power consumption. The optional factory-installed cover offers a low profile, convenient means of protecting the sensor during assembly (e.g., reflow soldering) and throughout the life of the product, excluding liquids (hydrophobic/oleophobic) and particulates.

The Si7021 offers an accurate, low-power, factory-calibrated digital solution ideal for measuring humidity, dew-point, and temperature, in applications ranging from HVAC/R and asset tracking to industrial and consumer platforms.

The I2C bus used for the Si7021 is shared with the Expansion Header. The temperature sensor is normally isolated from the I2C line. To use the sensor, SENSOR_ENABLE (SENSOR_ENABLE (PC9)) must be set high. When enabled, the sensor's current consumption is included in the AEM measurements.

Note: Simplicity Studio AEM functionality is not supported when using WSTK with WGM110 Module.
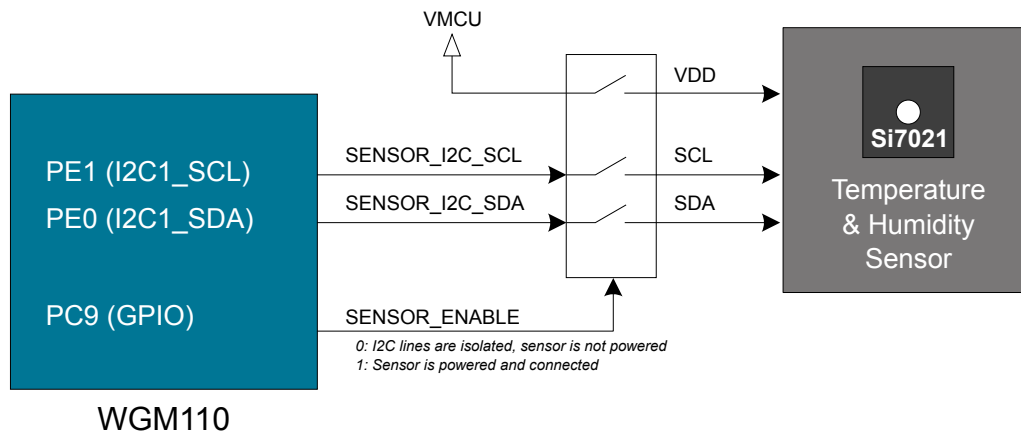
Figure 6.4 Connection of the Si7021 Relative Humidity and Temperature Sensor with WGM110 Module I/O Pins

6.4 USB Micro-B Connector

The WSTK Radio Board is equipped with a USB Micro-B connector that is connected directly to the WGM110 Module's USB port. The Radio Board operates only in USB Device mode. The figure below shows how the USB lines are connected to the WGM110 Module.
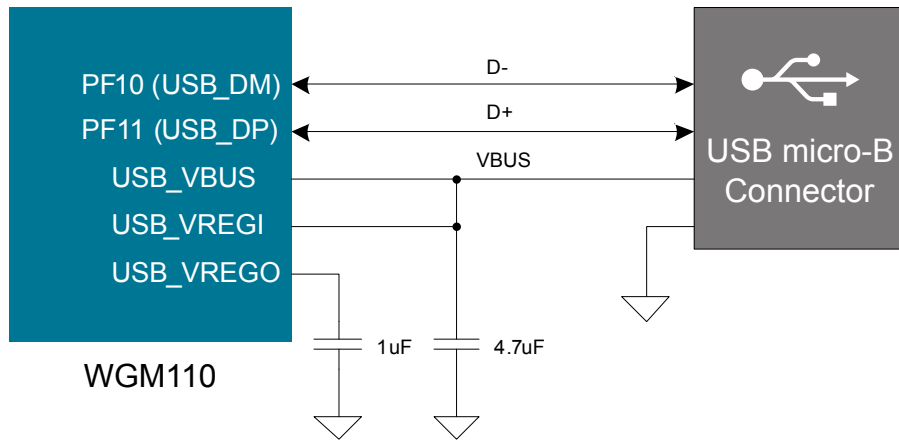
Figure 6.5 Connection between the Radio Board USB Connector and WGM110 Module Pins

7. Expansion Board

The Expansion Board included with the WSTK includes the following features:

- 1x 3-axis accelerometer (Bosch Sensortech BMA280)
- 1x Joystick with 9 measureable positions
- 2x Push button and 2x LEDs sharing the same I/O pins

The connections between the Expansion Board and the WGM110 Module are shown in the figure below:
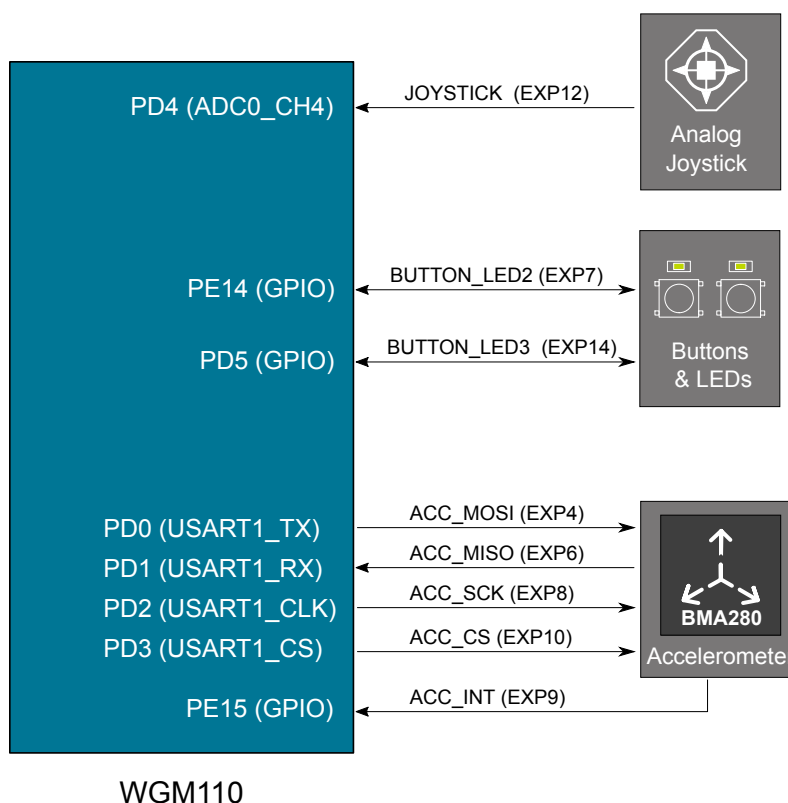
Figure 7.1 Connection between the Expansion Board and the WGM110 Module I/O Pins

The following sections contain more detailed information about each feature.

7.1 Accelerometer

The Expansion Board contains a Bosch Sensortec BMA280 triaxial, low-power, low-g accelerometer sensor with SPI interface. It features 14- bit digital resolution and allows very low-noise measurement of acceleration in 3 perpendicular axes and can therefore sense tilt, motion, shock and vibration.

Please refer to Bosch Sensortec's product page for a detailed datasheet of this sensor: http://www.bosch-sensortec.com/bst/products/all_products/bma280

7.2 Push Buttons and LEDs

The Expansion Board contains two push buttons (marked BTN2 and BTN3 on the PCB) and two LEDs (LED2 and LED3 not marked but placed correspondingly above the push button markings correspondingly). The push buttons and LEDs share the same two module I/O pins. Each push button is connected to a LED through a transistor, allowing both I/O's to be used either as an input (for reading the push button state) or as an output (to control the LED state on or off).

When configured as an input, **"0"** indicates that the button is being pressed and **"1"** that the push button is not being pressed. Likewise, when configured as an output, **"0"** will turn the LED on and **"1"** will turn it off.

Pressing a push button will also light up the corresponding LED because the LED is controlled by the same line (state) regardless of whether it is the Module or the push button that pulls the line low.

The push buttons are debounced by RC filters with a time constant of about 1 ms. Pressing the push button while having the pin configured as an output in high state (**"1"**) will not cause damage, but will cause extra current to flow.
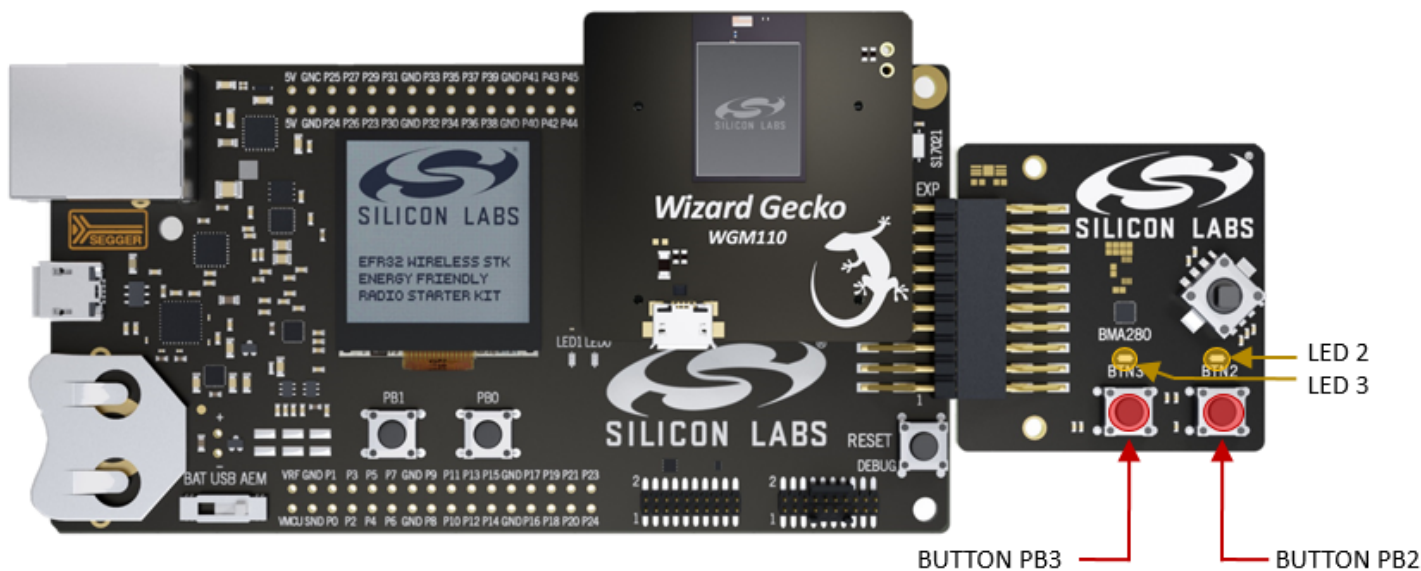
Figure 7.2 Location of Push Buttons and LEDs on the WSTK Mainboard

7.3 Joystick

The WSTK has an analog joystick with 9 measureable positions. This joystick is connected to the WGM110 Module pin **PD4** and uses different resistor values to create voltages measurable by the internal ADC on the WGM110 Module. The joystick output is connected to AD Channel 0 (**ADC0**). The figure below shows the connection between the joystíck and the WGM110 Module.
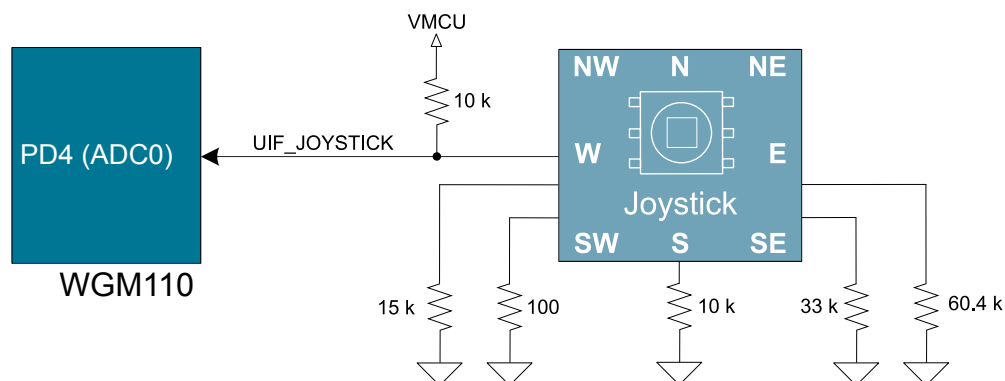
Figure 7.3 Connection between the Expansion Board Joystick and WGM110 Module AD Channel 0.

The table below lists the expected output voltage from the joystick in correspondence with the 9 defined main directions.

Table 7.1. Joystick Resistor Combinations and Expected Output Voltages in 9 Main Directions

Direction	Resistor combinations [kohm]	Expected joystick output voltage [V][1]
Center press	0.1 / (0.1 + 10)	0.033
Up (N)	60.4 / (60.4 + 10)	2.831
Up-Right (NE)	{(N // E) / {(N // E) + 10 } = 21.34 / (21.34 + 10)	2.247
Right (E)	33 / (33 + 10)	2.533
Down-Right (SE)	(S // E) / {(S // E) + 10)} = 7.67 / (7.67 + 10)	1.433
Down (S)	10 / (10 + 10)	1.650
Down-Left (SW)	(S // W) / {(S // W) + 10)} = 6 / (6 + 10)	1.238
Left (W)	15 / (15 + 10)	1.980
Up-Left (NW)	(N // W) / {(N // W) + 10)} = 12.01 / (12.01 + 10)	1.801
Note: 1) These calculated values assume a VMCU of 3.3V.		

8. Kit Features

The kit contains a Board controller which is responsible for performing various board-level tasks. An interface is provided between the WGM110 Module and the Board controller in the form of a UART connection. The connection is enabled by setting the VCOM_ENABLE (PE2) line high, and using the lines VCOM_TX (PE10) and VCOM_RX (PE11) for communication.

Note: The WSTK Board controller is only available when USB power is connected through the WSTK Main Board USB connector.

8.1 Virtual COM Port

After enabling Virtual Serial Communication (VCOM), the Board controller makes communication possible using the following interfaces:

• Virtual USB COM Port using a CDC driver.
• TCP/IP by connecting to WSTK using **Port 4901** with a telnet client.

The VCOM functionality allows the target to communicate using a regular serial driver. The Board controller forwards the raw byte stream to its interfaces.

9. Kit Revision History and Errata

9.1 Revision History

The kit revision can be found printed on the box label of the kit, as outlined in the figure below.
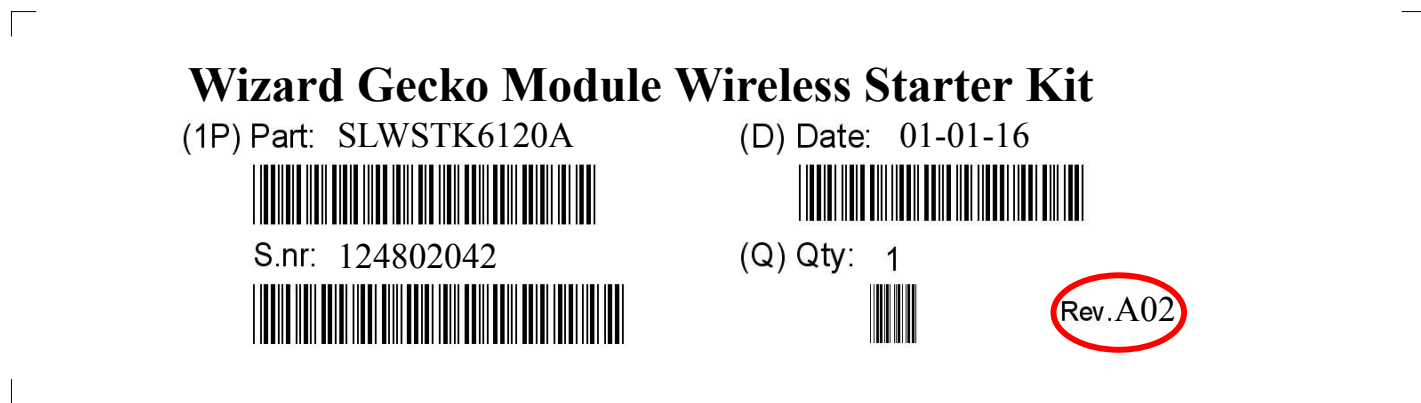
Figure 9.1 Revision info

Table 9.1. Kit Revision History

Kit Revision	Released	Description
A02	22.02.2016	Initial kit release.

9.2 Errata

There are no known errata at present.

10. Revision History

10.1 Revision 1.0

Feb. 22, 2016

Initial release.

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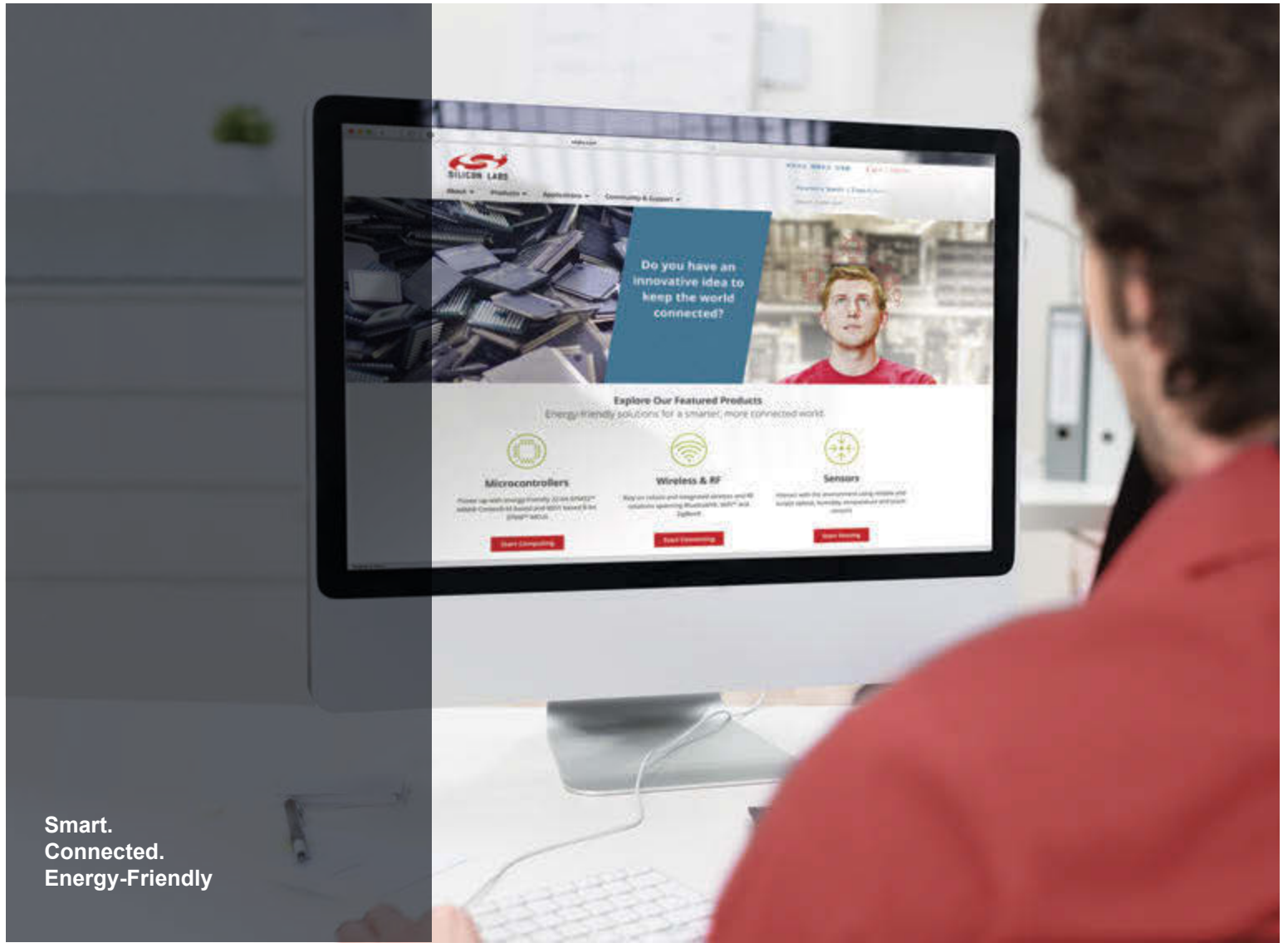
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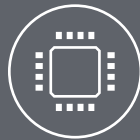
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