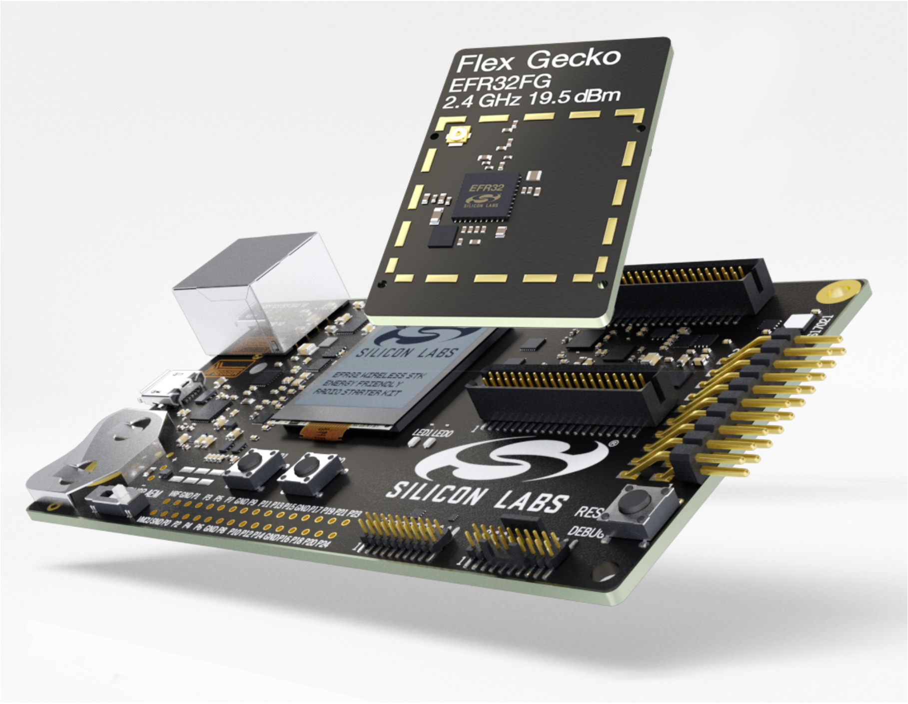
UG153: EFR32 Flex Gecko 2.4 GHz Wireless Starter Kit SLWSTK6066A User's Guide

The SLWSTK6066A is an excellent starting point to get familiar with the EFR32 Wireless System-on-Chip.

The Wireless Starter Kit Mainboard contains sensors and peripherals demonstrating some of the Flex Gecko's many capabilities. The kit provides all necessary tools for developing a Silicon Labs wireless application.



KIT FEATURES

- Ethernet and USB connectivity
- Advanced Energy Monitor
- Virtual COM Port
- Packet Trace Interface support
- SEGGER J-Link on-board debugger
- Debug Multiplexer supporting external hardware as well as radio board
- Silicon Labs' Si7021 Relative Humidity and Temperature sensor
- Ultra low power 128x128 pixel Memory LCD
- User LEDs / Pushbuttons
- 20-pin 2.54 mm header for expansion boards
- Breakout pads for direct access to all radio I/O pins
- Power sources includes USB and CR2032 coin cell holder.

RADIO BOARD FEATURES

- EFR32 Flex Gecko Wireless SoC with 256 kB Flash and 32 kB RAM. (EFR32FG1P132F256GM48)
- Inverted-F PCB antenna (2.4 GHz band)

SOFTWARE SUPPORT

- Simplicity Studio
- Energy Profiler
- Network Analyzer

1. Introduction

1.1 Description

The SLWSTK6066A Wireless Starter Kit provides a complete development platform for Silicon Labs EFR32 Flex Gecko Wireless System-on-Chips. The core of the SLWSTK6066A is the Wireless Starter Kit Mainboard which features an on-board J-Link debugger, an Advanced Energy Monitor for real-time current and voltage monitoring, a virtual COM port interface, and access to the Packet Trace Interface (PTI).

The WSTK Mainboard is paired with an EFR32FG 2.4 GHz 19.5 dBm radio board that plugs directly into the mainboard. The radio board features the EFR32 itself and the RF interface. All debug functionality, including AEM, VCOM and PTI, can also be used towards an external target instead of the included radio board. To further enhance the WSTK usability, the WSTK Mainboard contains sensors and peripherals demonstrating some of the Wireless SoC's many capabilities.

1.2 Kit Contents

The following items are included in the box:

- 2x BRD4001A Wireless Starter Kit Mainboards
- 2x BRD4252A EFR32FG 2.4 GHz 19.5 dBm Radio Boards
- 2x CR2032 Lithium batteries
- 2x AA Battery holders
- 2x USB Type A <-> USB Mini-B cables

Please refer to the Reference Manual for the included radio boards for detailed specifications and RF performance figures.

1.3 Getting Started

Detailed instructions for how to get started with your new Wireless Starter Kit can be found on the Silicon Labs Simplicity web pages:

http://www.silabs.com/start-efr32fg

2. Kit Hardware Layout

The layout of the EFR32 Flex Gecko 2.4 GHz Wireless Starter Kit is shown below.

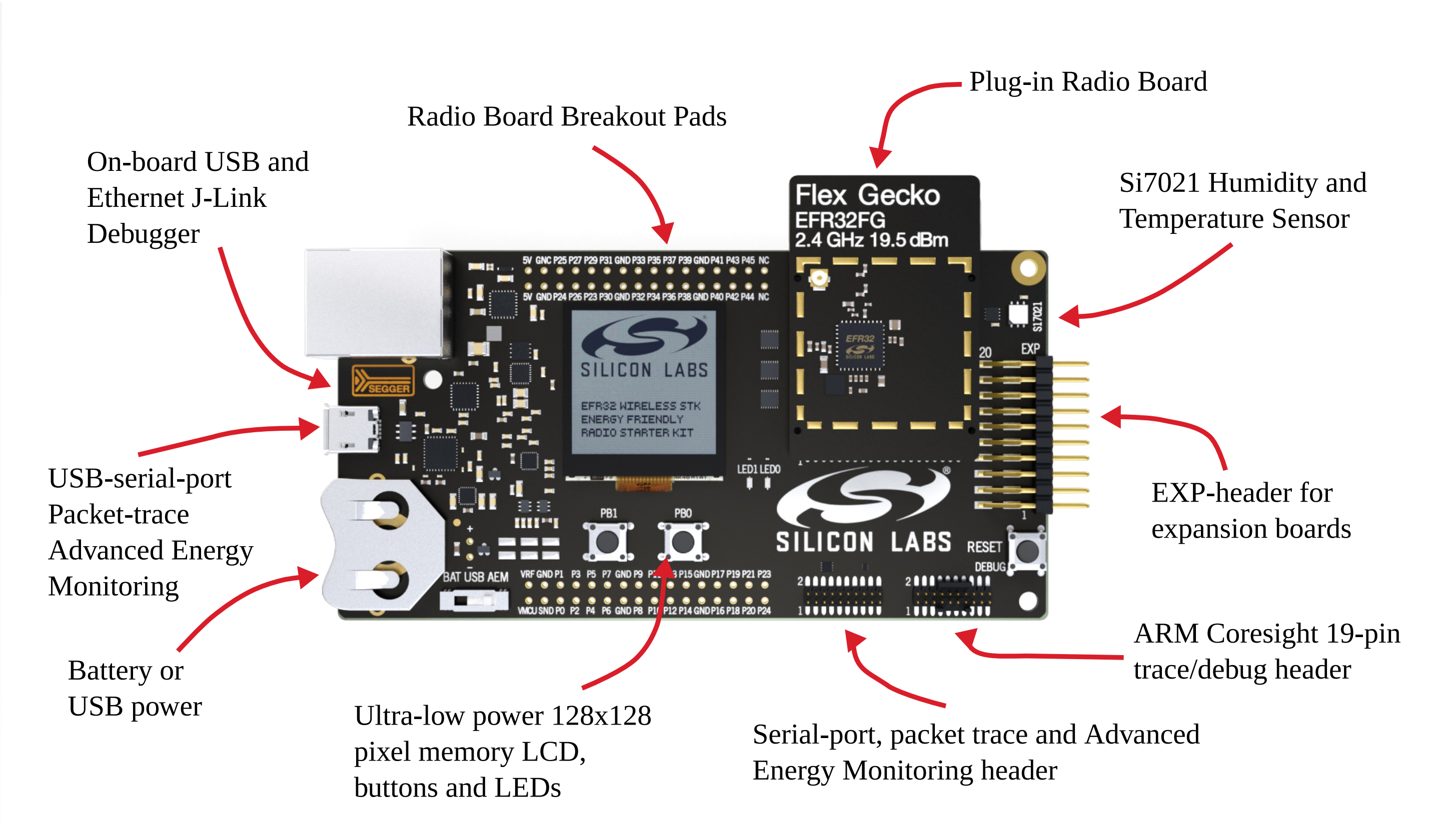


Figure 2.1 SLWSTK6066A Hardware Layout

3. Kit Block Diagram

An overview of the EFR32 Flex Gecko 2.4 GHz Wireless Starter Kit is shown in the figure below.

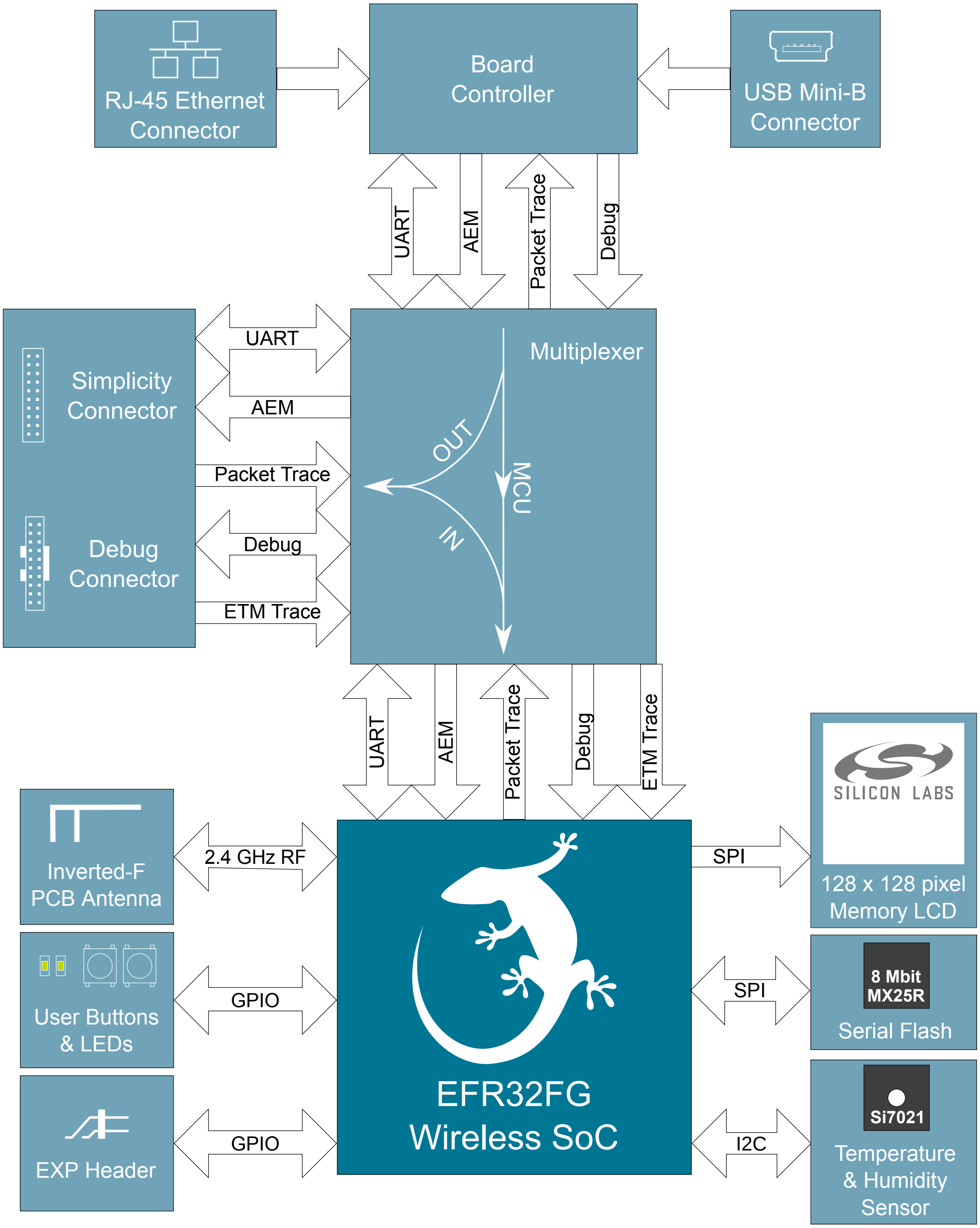


Figure 3.1 SLWSTK6066A Block Diagram

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.

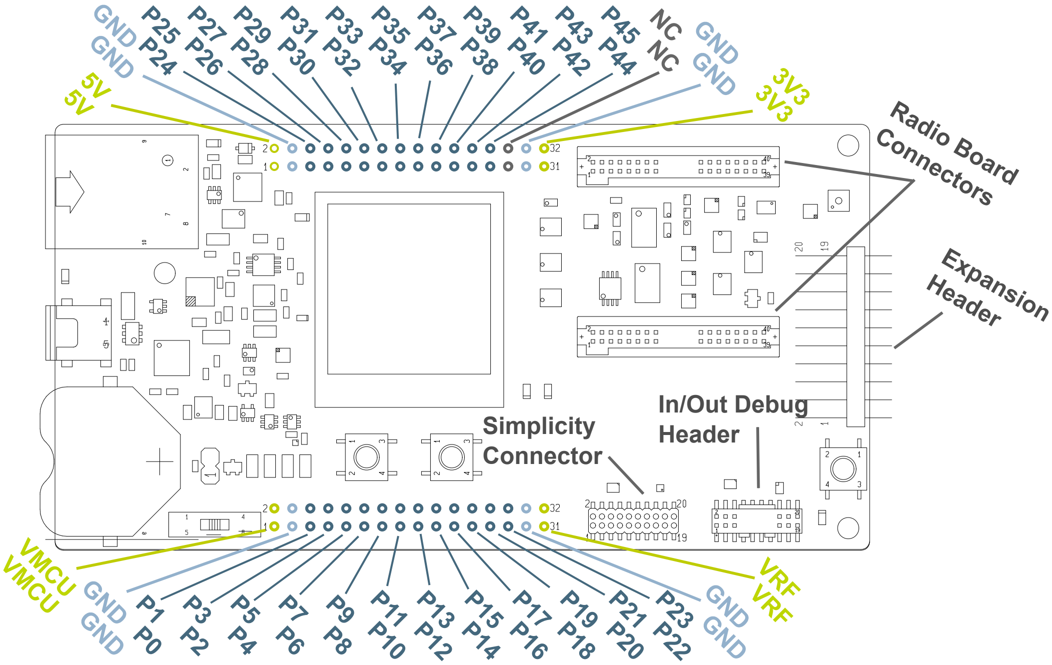


Figure 4.1 Connector Layout

4.1 Breakout Pads

Most of the EFR32'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 EFR32 maps to the pin numbers printed on the breakout pads. To see the available functions on each, please refer to the EFR32FG1P132F256GM48 Data Sheet.

J101

VMCU	VMCU
GND	GND
VCOM.#CTS_SCLK / PA2 / P0	P1 / PC6 / DISP_SI
VCOM.#RTS_#CS / PA3 / P2	P3 / PC7
FLASH_SCS / PA4 / P4	P5 / PC8 / DISP_SCLK
PD10 / P6	P7 / PC9
PD11 / P8	P9 / PA0 / VCOM.TX_MOSI
DEBUG.TDI / PF3 / P10	P11 / PA1 / VCOM.RX_MISO
SENSOR_I2C_SCL / PC10 / P12	P13 / PC11 / SENSOR_I2C_SDA
NC / P14	P15 / NC
VCOM_ENABLE / PA5 / P16	P17 / NC
PTI.CLK / PB11 / P18	P19 / NC
PTI.DATA / PB12 / P20	P21 / NC
PTI.SYNC / PB13 / P22	P23 / NC
GND	GND
VRF	VRF

J102

5V	5V
GND	GND
DEBUG.TCK_SWCLK / PF0 / P24	P25 / NC
DEBUG.TMS_SWDIO / PF1 / P26	P27 / NC
DEBUG.TDO_SWO / PF2 / P28	P29 / PD12
LED0 / PF4 / P30	P31 / PD13 / DISP_EXTCOMIN
LED1 / PF5 / P32	P33 / PD14 / DISP_SCS
BUTTON0 / PF6 / P34	P35 / PD15 / DISP_ENABLE
BUTTON1 / PF7 / P36	P37 / tied high / SENSOR_ENABLE
NC / P38	P39 / NC
NC / P40	P41 / NC
NC / P42	P43 / NC
NC / P44	P45 / NC
NC	NC
GND	GND
3V3	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 plugin boards. The connector contains a number of I/O pins that can be used with most of the EFR32 Flex 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 IO. 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 EFR32 Flex Gecko 2.4 GHz Wireless Starter Kit. Because of limitations in the number of available GPIO pins, some of the expansion header pins are shared with kit features.

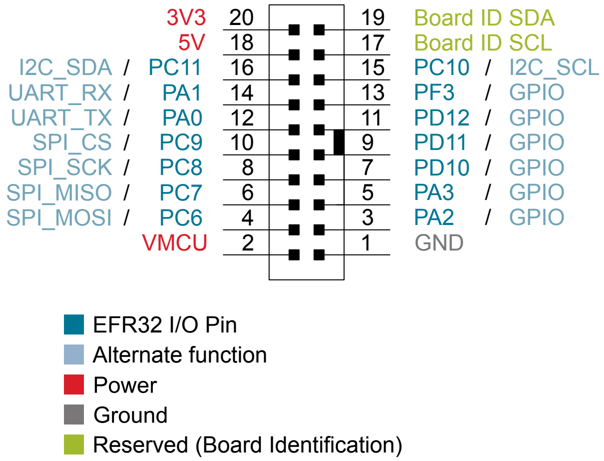


Figure 4.3 Expansion Header

The pin-routing on the EFR32 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. Table 4.1 Expansion Header Pinout on page 5 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
20	3V3	Board controller supply		
18	5V	Board USB voltage		
16	PC11	I2C_SDA	SENSOR_I2C_SDA	I2C1_SDA #16
14	PA1	UART_RX	VCOM_RX_MISO	USART0_RX #0
12	PA0	UART_TX	VCOM_TX_MOSI	USART0_TX #0
10	PC9	SPI_CS		USART1_CS #11
8	PC8	SPI_SCLK	DISP_SCLK	USART1_CLK #11
6	PC7	SPI_MISO		USART1_RX #11
4	PC6	SPI_MOSI	DISP_MOSI	USART1_TX #11
2	VMCU	EFR32 voltage domain, included in AEM measurements.		
19	BOARD_ID_SDA	Connected to Board Controller for identification of add-on boards.		
17	BOARD_ID_SCL	Connected to Board Controller for identification of add-on boards.		
15	PC10	I2C_SCL	SENSOR_I2C_SCL	I2C1_SCL #14

Pin	Connection	EXP Header function	Shared feature	Peripheral mapping
13	PF3	GPIO	DBG_TDI	
11	PD12	GPIO		
9	PD11	GPIO		
7	PD10	GPIO		
5	PA3	GPIO	VCOM_RTS_CS	USART0_CS #0
3	PA2	GPIO	VCOM_CTS_SCLK	USART0_CLK #0
1	GND	Ground		

Please note that pin PF3 is used for DBG_TDI in JTAG mode only. When Serial Wire Debugging is used, PF3 can be used for other purposes.

4.3 Debug Connector (DBG)

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 EFR32. 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.

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. Note that even though the connector has support for both JTAG and ETM Trace in addition to Serial Wire Debug, it does not necessarily mean that the kit or the on-board target device supports this.

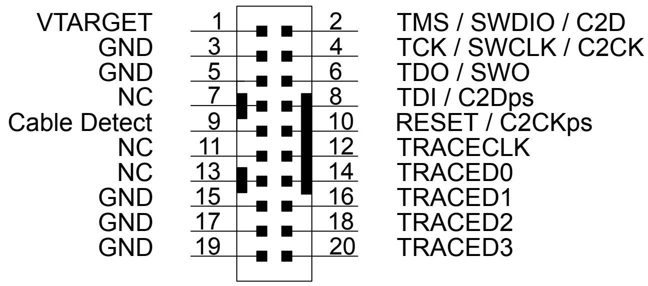


Figure 4.4 Debug Connector

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	Not connected
14	TRACED0	Not connected
16	TRACED1	Not connected
18	TRACED2	Not connected
20	TRACED3	Not connected
9	Cable detect	Connect to ground
11, 13	NC	Not connected
3, 5, 15, 17, 19	GND	

4.4 Simplicity Connector

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.

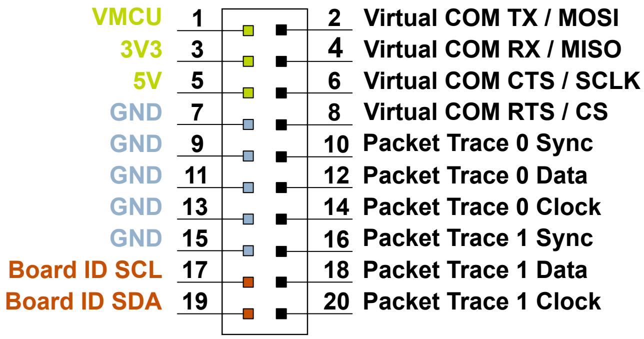


Figure 4.5 Simplicity Connector

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 WSTK Radio Board from the WSTK Mainboard to avoid that the Radio Board current consumption is 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

5.1 Radio Board Power Selection

The EFR32 on a Wireless Starter Kit can be powered by one of these sources:

- the debug USB cable; or
- a 3V coin cell battery; or
- a USB regulator on the Radio Board (for devices with USB support only).

The power source for the radio board is selected with the slide switch in the lower left corner of the Wireless STK Mainboard. Figure 5.1 Power Switch on page 9 shows how the different power sources can be selected with the slide switch.

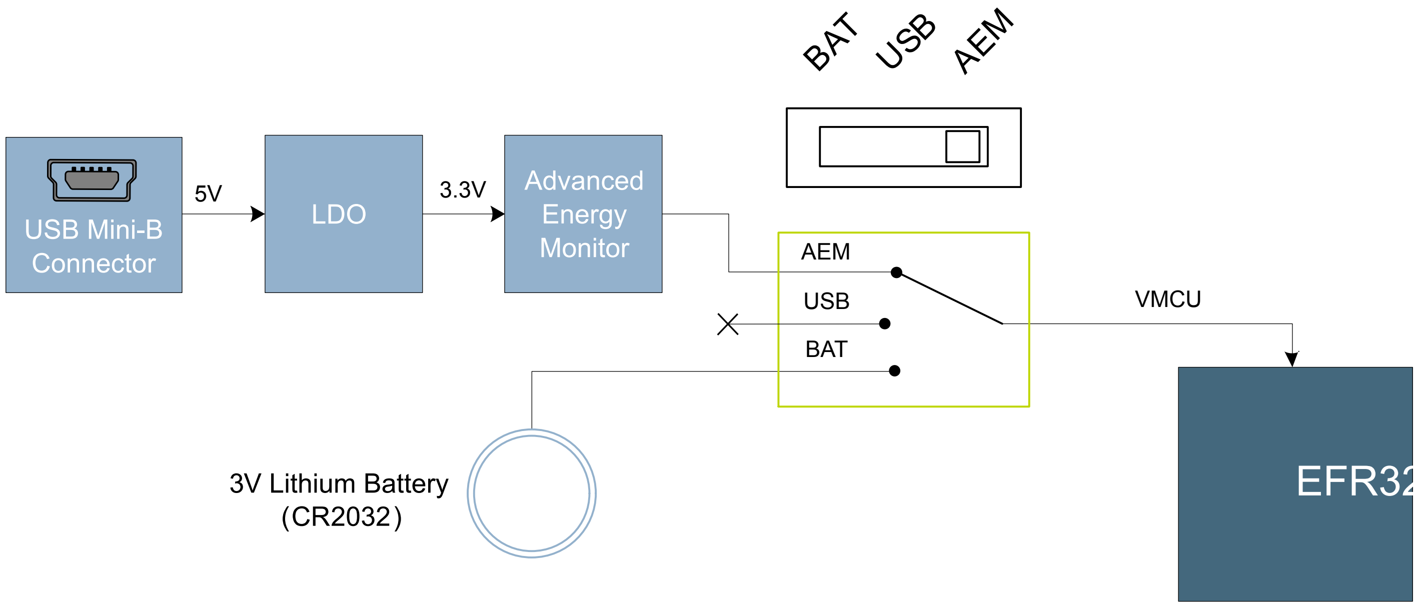


Figure 5.1 Power Switch

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. The Advanced Energy Monitor is now also connected in series, allowing accurate high speed current measurements and energy debugging/profiling.

With the switch in the *USB* position, radio boards with USB-support can be powered by a regulator on the radio board itself. BRD4252A does not contain an USB regulator, and setting the switch in the *USB* postition will cause the EFR32 to be unpowered.

Finally, with the switch in the *BAT* position, a 20 mm coin cell battery in the CR2032 socket can be used to power the device. With the switch in this position no current measurements are active. This is the recommended switch position when powering the radio board with an external power source.

Note: Please be aware that the current sourcing capabilities of a coin cell battery might be too low to supply certain wireless applications.

Note: The Advanced Energy Monitor can only measure the current consumption of the EFR32 when the power selection switch is in the *AEM* position.

5.2 Board Controller Power

The board controller is responsible for important features such as the debugger and the Advanced Energy Monitor, and is powered exclusively through the USB port in the top left corner of the board. 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 to the Board Controller is removed.

The board controller power domain is exclusively supplied by the J-Link USB cable, 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 EFR32 device will continue to operate in the *USB* and *BAT* modes.

5.3 EFR32 Reset

The EFR32 Wireless SoC can be reset by a few different sources:

- 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 EFR32 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 EFR32 Flex Gecko in situations where powering the kit from a wired USB connection is impractical, for instance during range-tests, the kit is supplied with a battery holder for 2 AA batteries.

To use the battery holder, first set the power switch in the BAT position. Then attach the cable to pin 1 and 2 on the expansion header, orienting the connector so the black cable cable goes down towards pin 1, and the red cable up towards pin 2.

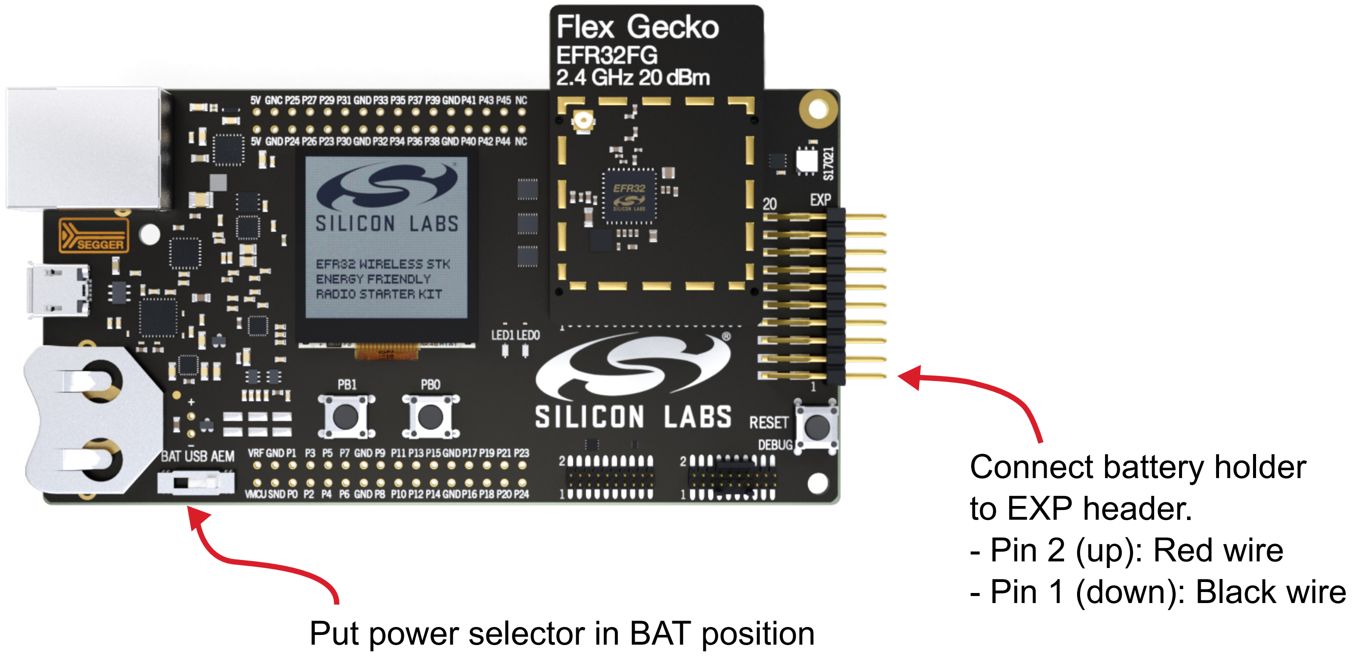


Figure 5.2 Battery Holder Connection

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 starter kit has a set of peripherals that showcase some of the features of the EFR32.

Be aware that most EFR32 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 application.

6.1 Push Buttons and LEDs

The kit has two user push buttons marked PB0 and PB1. They are connected directly to the EFR32, and are debounced by RC filters with a time constant of 1 ms. The buttons are connected to pins PF6 and PF7.

The kit also features two yellow LEDs marked *LED0* and *LED1*, that are controlled by GPIO pins on the EFR32. The LEDs are connected to pins PF4 and PF5 in an active-high configuration.

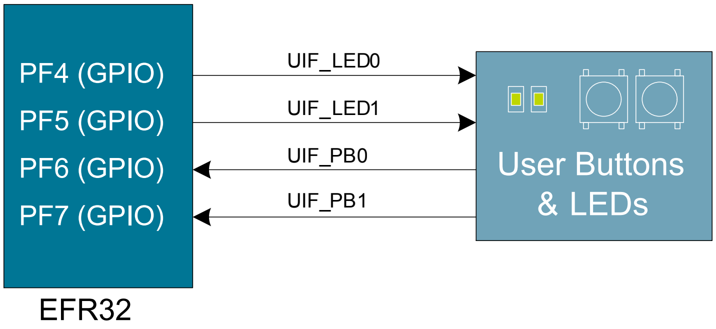


Figure 6.1 Buttons and LEDs

6.2 Memory LCD-TFT Display

A 1.28-inch SHARP Memory LCD-TFT is available on the kit to enable interactive applications to be developed. The display has a high resolution of 128 by 128 pixels, and consumes very little power. It is a reflective monochrome display, so each pixel can only be light or dark, and no backlight is needed in normal daylight conditions. Data sent to the display is stored in the pixels on the glass, which means no continous refreshing is required to maintain a static image.

The 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 kit Board Controller, allowing the Board Controller application to display useful information when the user application is not using the display. The user application always controls ownership of the display with the DISP_ENABLE line:

- 0: The Board Controller has control of the display
- 1: The user application (EFR32) has control of the display

Power to the display is sourced from the target application power domain when the EFR32 controls the 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 display application information for details on driving the display:

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

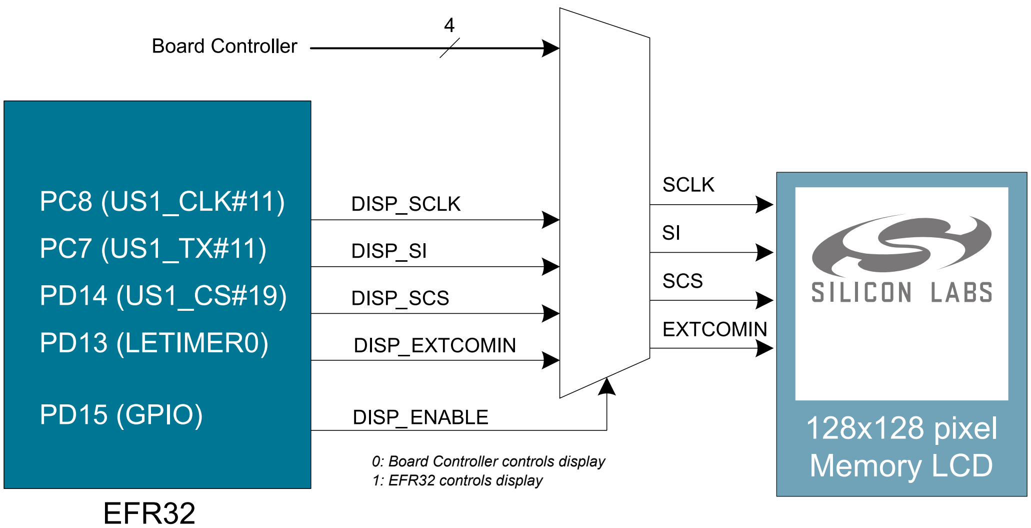


Figure 6.2 128x128 Pixel Memory LCD

6.3 Serial Flash

The BRD4252A radio board is equipped with an 8 Mbit Macronix MX25R SPI flash that is connected directly to the EFR32 Flex Gecko. Figure 6.3 Radio Board Serial Flash on page 13 shows how the serial flash is connected to the EFR32.

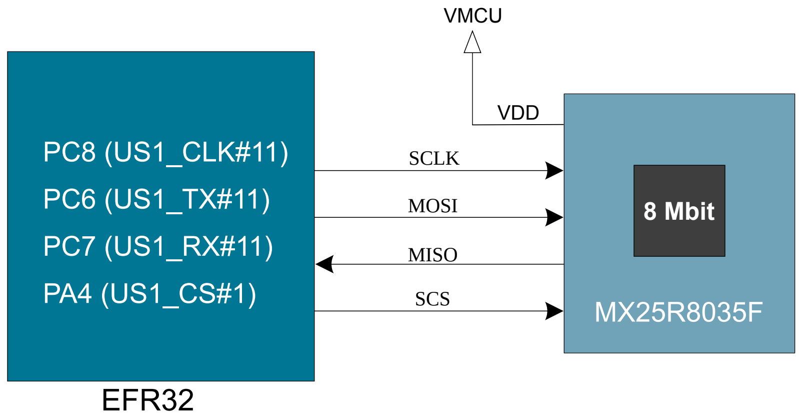


Figure 6.3 Radio Board Serial Flash

The MX25R series are ultra low power serial flash devices, so there is no need for a separate enable switch to keep current consumption down. However, it is important that the flash is always put in deep power down mode when not used. This is done by issuing a command over the SPI interface. In deep power down, the MX25R typically adds approximately 100 nA to the radio board current consumption.

6.4 Si7021 Relative Humidity and Temperature Sensor

The Si7021 I^2C 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 I^2C 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 I^2C bus used for the Si7021 is shared with the Expansion Header. The temperature sensor is normally isolated from the I^2C line. To use the sensor, SENSOR_ENABLE (tied high) must be set high. When enabled, the sensor's current consumption is included in the AEM measurements.

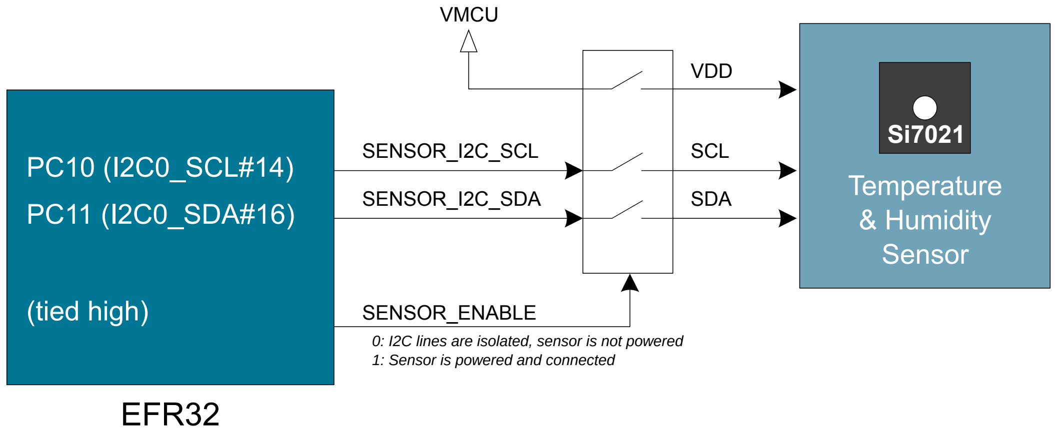


Figure 6.4 Si7021 Relative Humidity and Temperature Sensor

7. Advanced Energy Monitor

7.1 Introduction

Any embedded developer seeking to make his embedded code spend as little energy as the underlying architecture supports, needs tools to easily and quickly discover inefficiencies in the running application.

This is what the Simplicity Energy Profiler is designed to do. It will in real-time graph and log current as a function of time while correlating this to the actual target application code running on the EFR32. There are multiple features in the profiler software that allows for easy analysis, such as markers and statistics on selected regions of the current graph or aggregate energy usage by different parts of the application.

7.2 Advanced Energy Monitor - Theory of Operation

The AEM circuitry on the board is capable of measuring current signals in the range of 0.1 µA to 95 mA, which is a dynamic range of alomst 120 dB. It can do this while maintaining approximately 10 kHz of current signal bandwidth. This is accomplished through a combination of a highly capable current sense amplifier, multiple gain stages and signal processing within the kit's board controller before the current sense signal is read by a host computer for display and/or storage.

The current sense amplifier measures the voltage drop over a small series resistor, and the gain stage further amplifies this voltage with two different gain settings to obtain two current ranges. The transition between these two ranges occurs around 250 µA.

The current signal is combined with the target processor's Program Counter (PC) sampling by utilizing a feature of the ARM CoreSight debug architecture. The ITM (Instrumentation Trace Macrocell) block can be programmed to sample the MCU's PC at periodic intervals (50 kHz) and output these over SWO pin ARM devices. When these two data streams are fused and correlated with the running application's memory map, an accurate statistical profile can be built over time, that shows the energy profile of the running application in real-time.

At kit power-up or on a power-cycle, and automatic AEM calibration is performed. This calibration compensates for any offset errors in the current sense amplifiers.

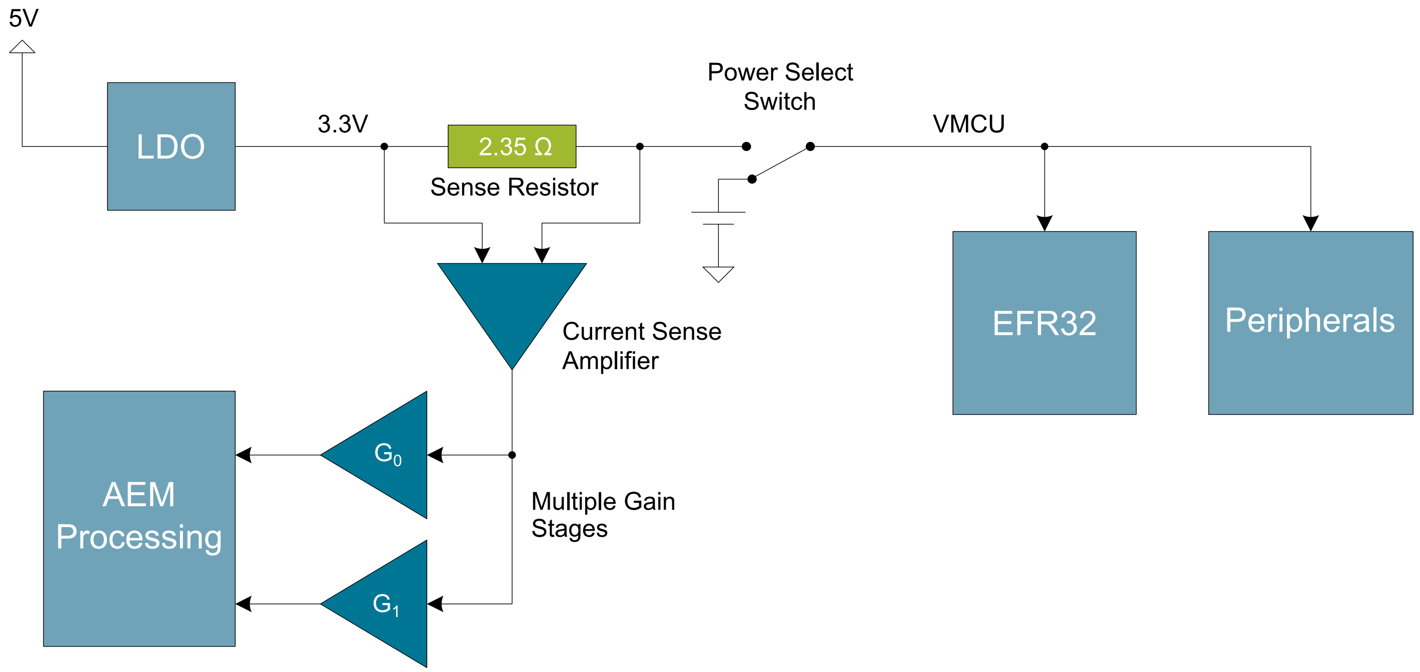


Figure 7.1 Advanced Energy Monitor

7.3 AEM Accuracy and Performance

The Advanced Energy Monitor is capable of measuring currents in the range of 0.1 µA to 95 mA. For currents above 250 µA, the AEM is accurate within 0.1 mA. When measuring currents below 250 µA, the accuracy increases to 1 µA. Even though the absolute accuracy is 1 µA in the sub 250 µA range, the AEM is able to detect changes in the current consumption as small as 100 nA.

The AEM current sampling rate is 10 kHz.
Note: The AEM circuitry only works when the kit is powered and the power switch is in the AEM position.

7.4 Usage

The AEM (Advanced Energy Monitor) data is collected by the board controller and can be displayed by the Energy Profiler, available through Simplicity Studio. By using the Energy Profiler, current consumption and voltage can be measured and linked to the actual code running on the EFR32 in realtime.

8. Debugging

The SLWSTK6066A contains an integrated debugger, which can be used to download code and debug the EFR32. In addition to programming the EFR32 on the kit, the debugger can also be used to program and debug external Silicon Labs EFM32, EFM8, EZR32 and EFR32 devices.

The debugger supports three different interfaces used with Silicon Labs devices:

- Serial Wire Debug, is used with all EFM32, EFR32 and EZR32 devices
- JTAG, which can be used with some newer EFR32 and EFM32 devices
- C2 Debug, which is used with EFM8 devices

In order for debugging to work properly, make sure you have the approriate debug interface selected that works with your device. The debug connector on the board supports all three of these modes.

8.1 Debug Modes

Programming external devices is done by connecting to a target board through the provided Debug IN/OUT Connector, and by setting the debug mode to [**Out**]. The same connector can also be used to connect an external debugger to the EFR32 MCU on the kit, by setting the debug mode to [**In**]. A summary of the different supported debug modes is given in Table 8.1 Debug Modes on page 17.

Table 8.1. Debug Modes

Mode	Description
Debug MCU	In this mode the on-board debugger is connected to the EFR32 on the SLWSTK6066A.
Debug In	In this mode, the on-board debugger is disconnected, and an external debugger can be connected to debug the EFR32 on the SLWSTK6066A.
Debug Out	In this mode, the on-board debugger can be used to debug a supported Silicon Labs device mounted on a custom board.

Selecting the active debug mode is done with a drop-down menu in the Kit Manager tool, which is available through Simplicity Studio.

8.2 Debugging during battery operation

When the EFR32 is powered by battery and the J-Link USB is still connected, the on-board debug functionality is available. If the USB power is disconnected, the Debug In mode will stop working.

If debug access is required when the target is running of another energy source such as a battery, and the board controller is powered down, the user should make direct connections to the GPIO used for debugging. This can be done by connecting to the approriate pins of the breakout pads. Some Silicon Labs kits provide a dedicated pin header for this purpose.

9. Virtual COM Port

When enabling virtual serial communication (VCOM), the board controller makes communication possible on the following interfaces:

- Virtual USB COM port using a CDC driver.
- TCP/IP, by connecting to the Wireless STK on port 4901 with a telnet client.

The VCOM functionality can operate in two different modes:

- Transparent mode allows the target to communicate using a regular serial driver. The board controller forwards the raw byte stream to its interfaces.
- BSP-mode is initiated by a BSP call in the target application. This mode enables the target to use all BSP functionality, while having access to VCOM over USB and Ethernet.

10. Board Controller

The kit contains a board controller that is responsible for performing various board-level tasks, such as handling the debugger and the Advanced Energy Monitor. An interface is provided between the EFR32 and the board controller in the form of a UART connection. The connection is enabled by setting the VCOM_ENABLE (PA5) line high, and using the lines VCOM_TX (PA0) and VCOM_RX (PA1) for communication.

Specific library functions have been provided in the kit Board Support Package that support various requests to be made to the board controller, such as quering AEM voltage or current.

Note:

The board controller is only available when USB power is connected.

11. Kit Manager and Upgrades

The Kit Manager is a program that comes with Simplicity Studio. It can perform various kit and EFR32 specific tasks.

11.1 Kit Manager Operation

This utility gives the ability to program the EFR32, upgrade the kit, lock and unlock devices and more. Some of the features will only work with Silicon Labs kits, while other will work with a generic J-Link debugger connected.

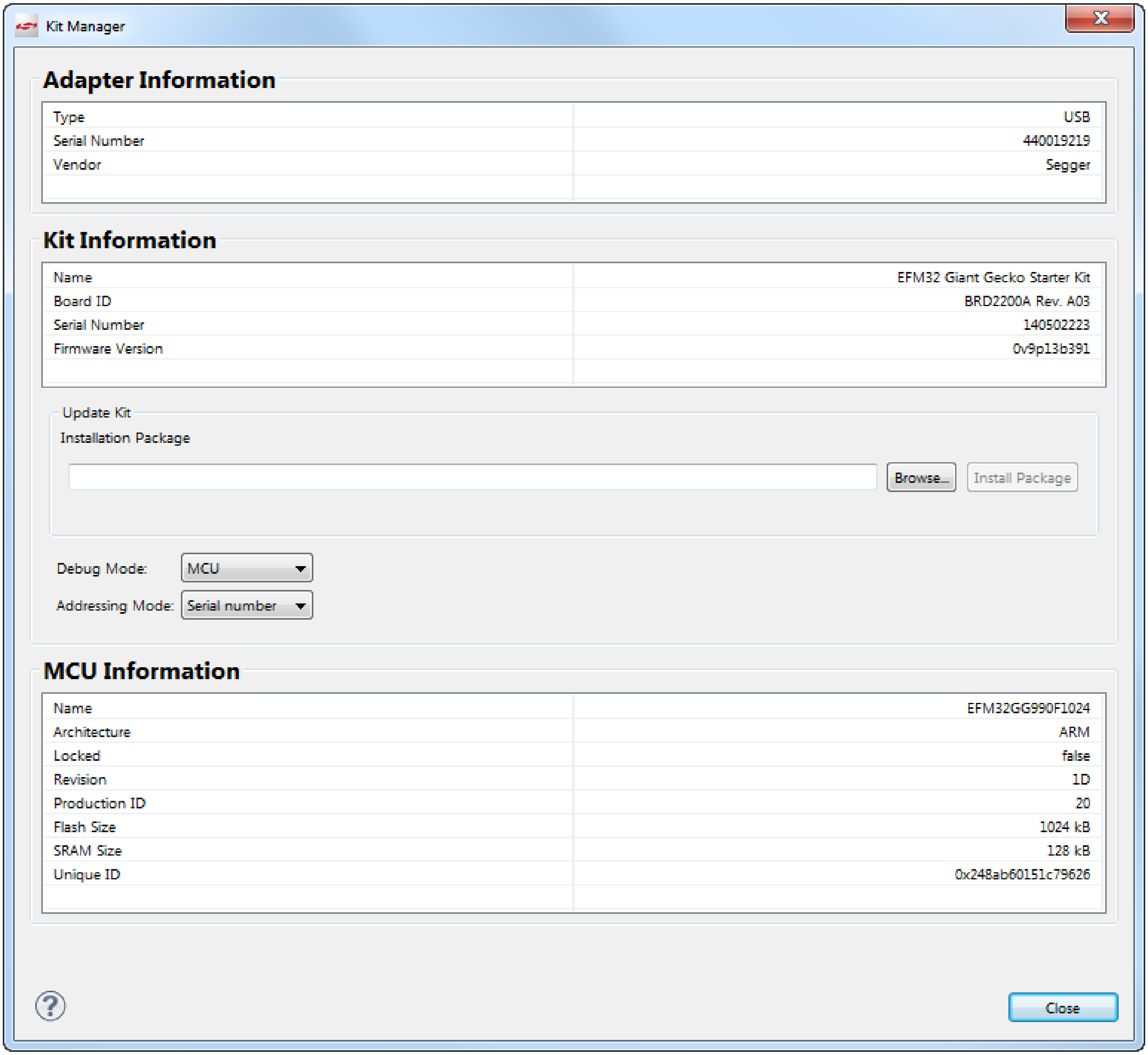


Figure 11.1 Kit Manager

11.2 Firmware Upgrades

Upgrading the kit firmware is done through Simplicity Studio. Simplicity Studio will automatically check for new updates on startup.

You can also use the Kit Manager for manual upgrades. Click the [**Browse**] button in the [**Update Kit**] section to select the correct file ending in ".emz". Then, click the [**Install Package**] button.

12. Schematics, Assembly Drawings and BOM

The schematics, assembly drawings and bill of materials (BOM) for the EFR32 Flex Gecko 2.4 GHz Wireless Starter Kit board are available through Simplicity Studio when the kit documentation package has been installed.

13. Kit Revision History and Errata

13.1 Revision History

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

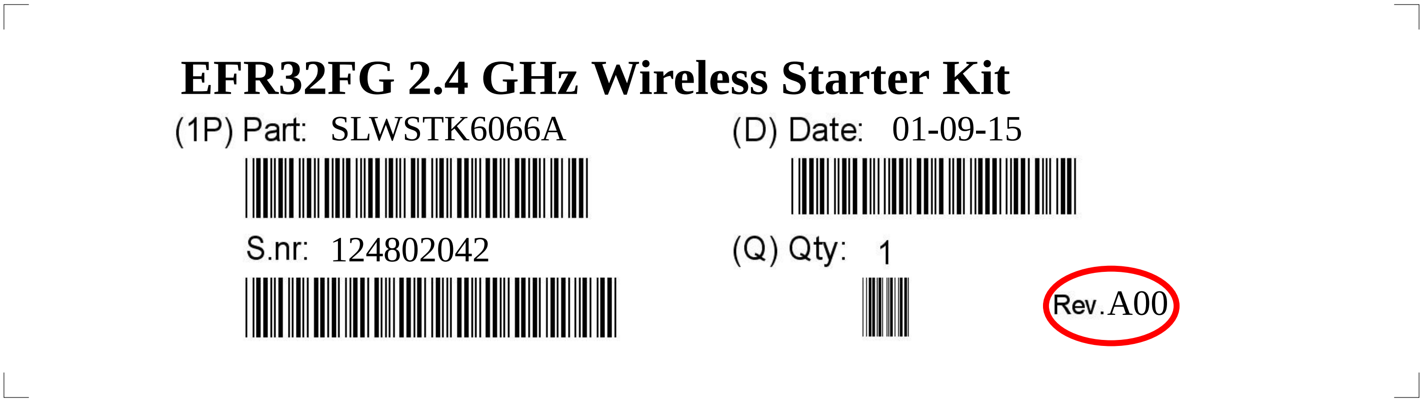


Figure 13.1 Revision info

Table 13.1. Kit Revision History

Kit Revision	Released	Description
A01	30.09.2015	Initial kit release.

13.2 Errata

There are no known errata at present.

14. Document Revision History

Table 14.1. Document Revision History

Revision Number	Effective Date	Change Description
1.10	18.11.2015	Added section on battery holder.
1.00	30.10.2015	Initial version.

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