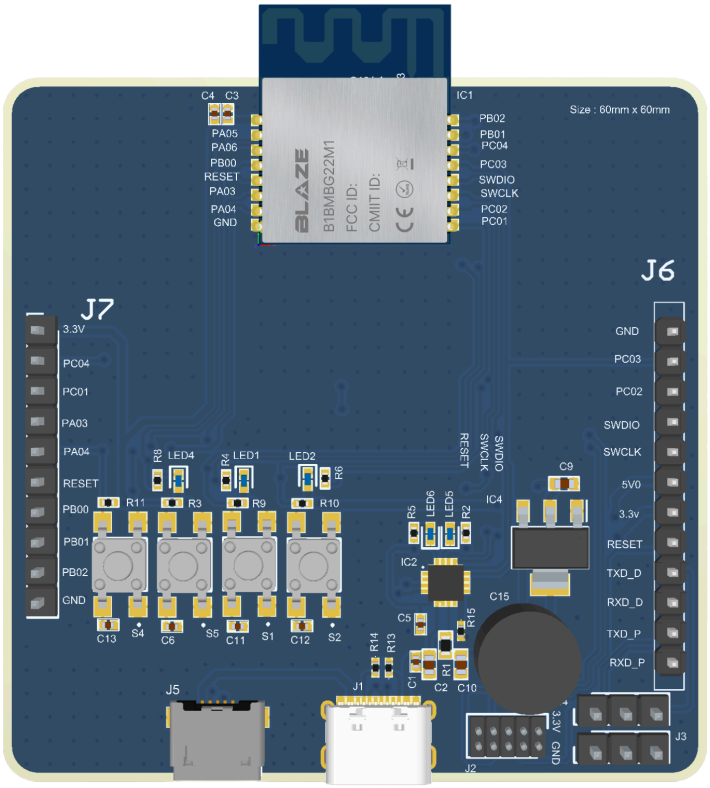
BLE Dev Kit User guide

The BLE DEV Board is a compact and cost-effective development and evaluation platform designed for Bluetooth Low Energy (BLE) applications. It offers a rich set of features and connectivity options, enabling quick prototyping and testing for IoT devices. The board includes two key modules: B1BMBG22M1/B1BMBG22M2/B1BMBG22M3 modules, providing versatile wireless capabilities. It also features user-friendly components such as switches, LEDs, and various input/output pins, allowing for flexible interaction with external devices. Equipped with both USB Type-C and USB Type-B connectors, along with a built-in USB-to-UART IC, the BLE DEV Board supports seamless debugging, programming, and power management.



TARGET DEVICES

- EFR32 Wireless Gecko System-on-Chip (EFR32BG22C112F352GM32-C, EFR32BG22C222F352GM32-C and EFR32BG22C224F512GM32-C)
- High-performance 2.4 GHz radio
- 32-bit ARM® Cortex®-M33 core with 38.4 MHz maximum operating frequency (EFR32BG22C112F352GM32-C)
- 32-bit ARM® Cortex®-M33 core with 76.8 MHz maximum operating frequency (EFR32BG22C222F352GM32-C and EFR32BG22C224F512GM32-C)
- Up to 352 kB of flash and 32 kB of RAM (EFR32BG22C112F352GM32-C)
- Up to 512 kB m6of flash and 32 kB of RAM (EFR32BG22C222F352GM32-C and EFR32BG22C224F512GM32-C

KIT FEATURES

- User LEDs and Switches
- 2.54mm Headers
- SEGGER J-Link on-board debugger
- USB Type- B powered
- USB Type-C powered
- Dual module support
- GPIOs

SOFTWARE SUPPORT

- Simplicity studio

Table of contents

1. Introduction

The Dev kit is designed to provide customers with dual BLE-based modules, allowing them to test different end-use cases using Silicon Labs SoC chips, specifically the EFR32BG22C112F352GM32-C, EFR32BG22C222F352GM32-C, and EFR32BG22C224F512GM32-C types of modules. The dev board includes 4 buttons, of which one is the reset button and the others are for development purposes, and contains 3 LEDs. The debug interfaces are flexible with USB to type B and USB to type C connectors as the debugging interfaces.

It facilitates the 10-pin connector for flashing the firmware into both chips. Besides that, the 6 pins are to change modes between flashing and debugging. The first two pins of the two rows are shorted with jumpers for enabling the flashing mode, and the user can flash the application, and the last two pins of the two rows are shorted for enabling the debug mode.

The B1BMBG22M1/B1BMBG22M2/B1BMBG22M3 modules have the GPIO pin in & pin outs on the left side and right side.

1.1 Kit contents

1. 1 BLE dev Board is included in the box
2. 2 Jumpers

1.2 Hardware contents

These are the following key hardware contents are included with the dev kit:

1. 3 LEDs
2. 3 Buttons
3. 1 Reset button
4. USB type B connector
5. USB Type-C connector
6. 6-pin header
7. 10 Pin header
8. Module region for B1BMBG22M1/B1BMBG22M2/B1BMBG22M3
9. GPIO Pin headers

1.3 Kit Hardware layout

The BLE Dev Kit hardware layout is shown below.

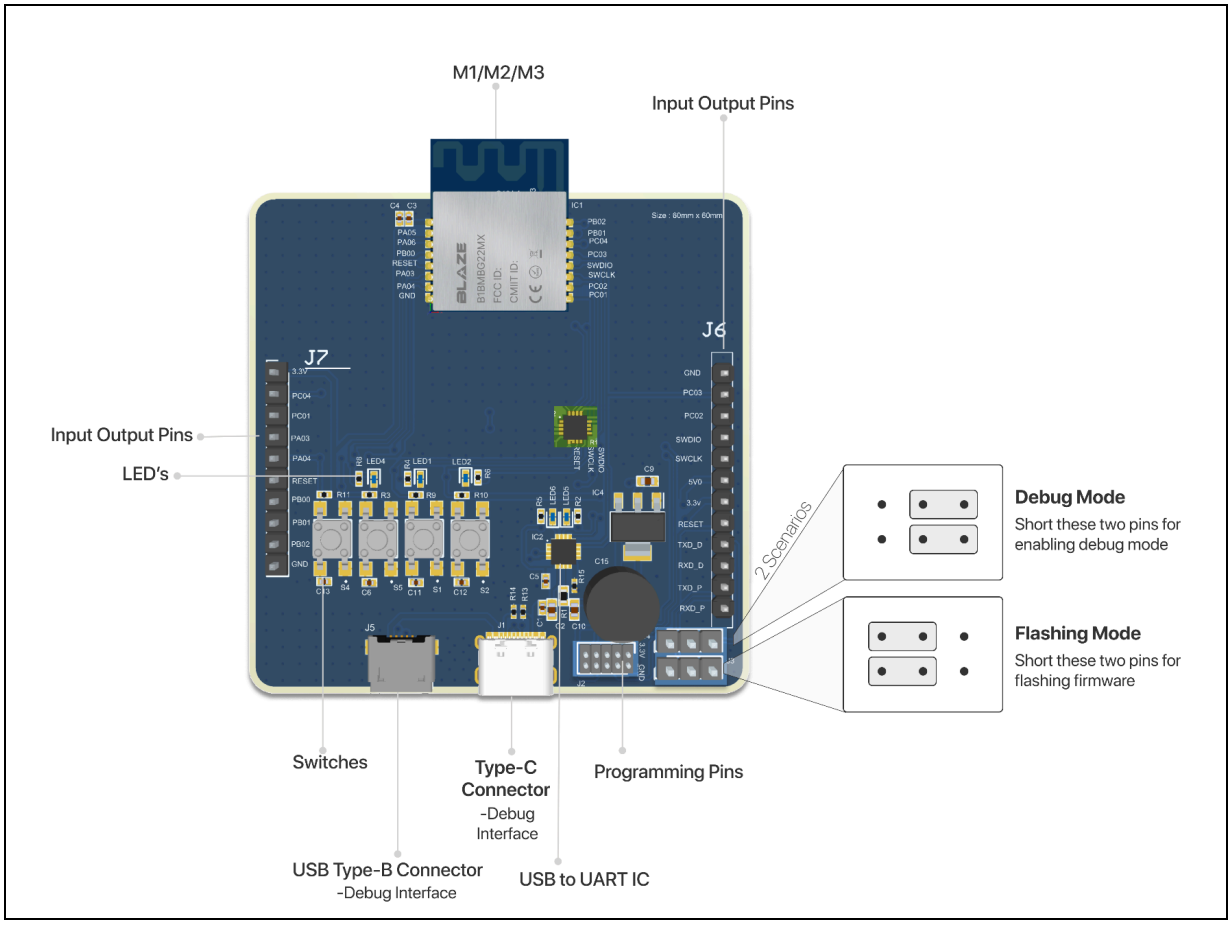


Figure 1.1 BLE Dev kit hardware layout

2. Hardware

The core of the Dev Kit is the EFR32BG22x Wireless Gecko System-on-Chip. Three variants are used, which are:

- EFR32BG22C112F352GM32-C
- EFR32BG22C222F352GM32-C
- EFR32BG22C224F512GM32-C

The dev kit contains peripherals of LEDs and buttons; refer to the section Kit Hardware Layout for placement of these peripherals.

2.1 Block diagram

An Overview of the BLE Dev Kit is depicted in the block diagram below

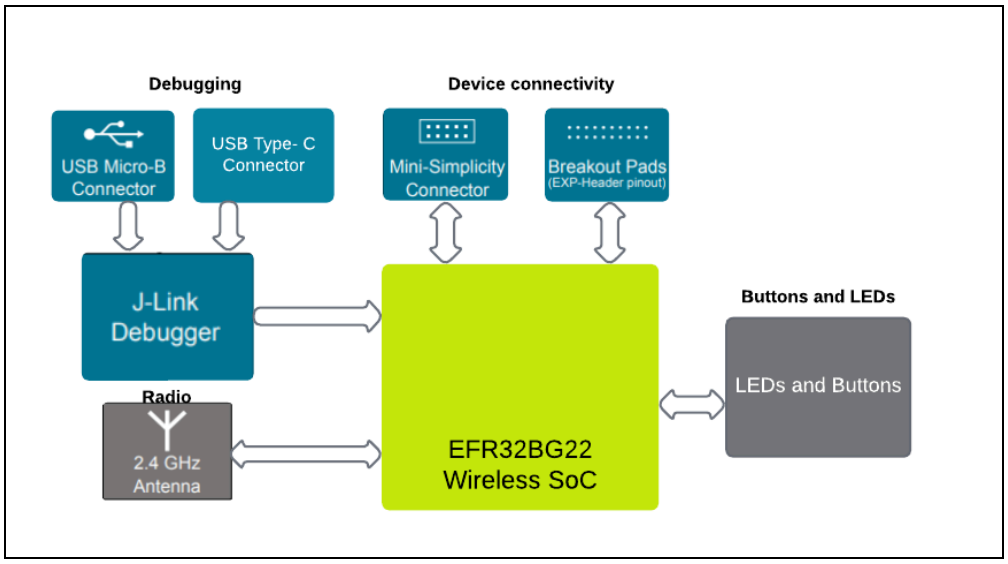


Figure 2.1 Kit Block diagram

2.2 Power supply

The kit can be powered through one of these interfaces as follows:

- USB Micro B
- USB Type-C
- 10 Pin mini connector

The power supply architecture from these three interfaces is shown in the figure below.

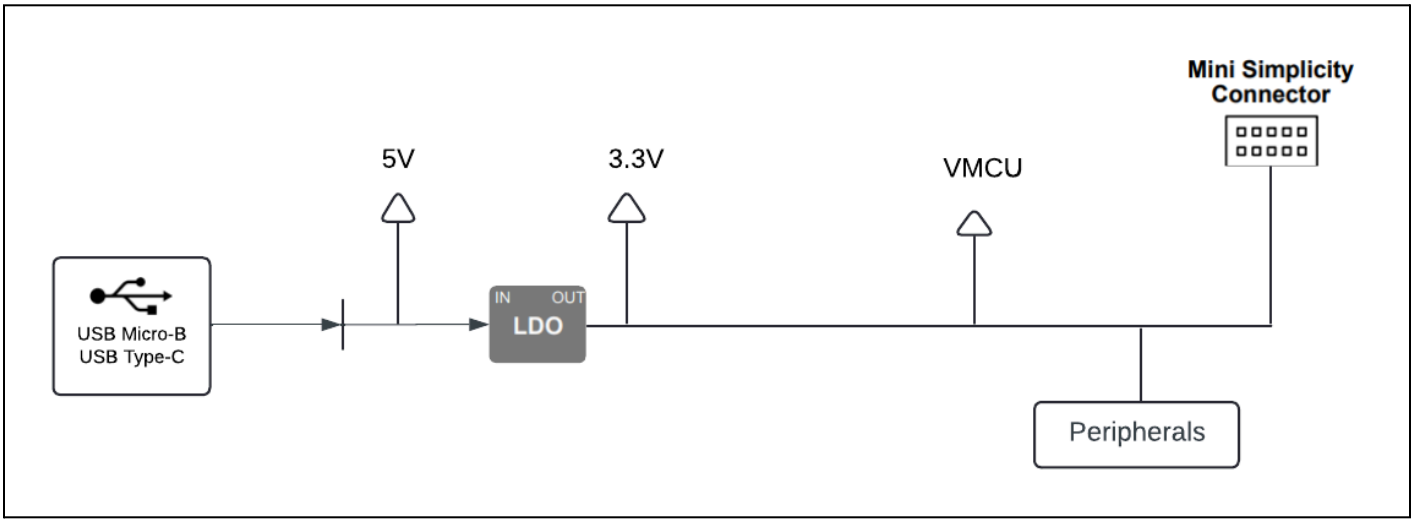


Figure 2.2 BLE Dev Kit power architecture

The power supply can be applied through the micro USB type B or USB type C connector, also the 10-pin mini connector has a 3.3V supply. The USB will convert the 5V from the AC power supply and supply 3.3V to the module.

Find the table below for different power supply options.

Table 2.1 BLE Dev Kit power options

Supply mode	Typical input voltage	VMCU Source	3V3	5V0
Micro USB B	5V	Onboard regulator	Onboard regulator	USB VBUS
USB type C	5V	Onboard regulator	Onboard regulator	USB VBUS
Mini Simplicity	3.3V	Debugger dependent	Disconnected	No Voltage present

2.3 Peripherals

The BLE Dev Kit offers three LED and four button peripherals that the EFR32BG22x can control. Each peripheral includes an enable signal, allowing it to be fully deactivated when not in use or set to a low-power mode to reduce energy consumption in applications.

The EFR32BG22x has access to the following peripherals:

- 3 LEDs
- 4 push buttons

Table 2.2 LED Pinouts

LEDs	GPIOs	M1/M2/M3
LED1	PB02	Enabled
LED2	PC04	Enabled
LED3	PB00	Enabled

Table 2.3 Switch Pinouts

Switches	GPIOs	M1/M2/M3
S1	PB01	Enabled
S2	PC01	Enabled
S3	RESET	Enabled
S4	PA04	Enabled

The illustration below shows the layout of the LEDs and buttons connected to the EFR32BG22x. Some peripherals share the same interfaces and enable signals. Since these signals lack built-in pull-down resistors, it is recommended to actively set them to either a high or low state in the application code to prevent them from floating.

Figure 2.3 Peripherals

2.4 Onboard debugging

The BLE Dev Kit includes a dedicated microcontroller, separate from the EFR32BG22x SoC, that functions as an onboard J-Link debugger accessible via the USB Micro-B port and USB to Type-C connector. This microcontroller, known as the "onboard debugger," is non-programmable by the user. When the USB cable is disconnected, the onboard debugger enters a very low-power shutoff mode (EM4S).

The diagram below illustrates the connections between the onboard debugger and the target EFR32BG22x device. It also shows the Mini Simplicity Connector and its connection to the same I/O pins.

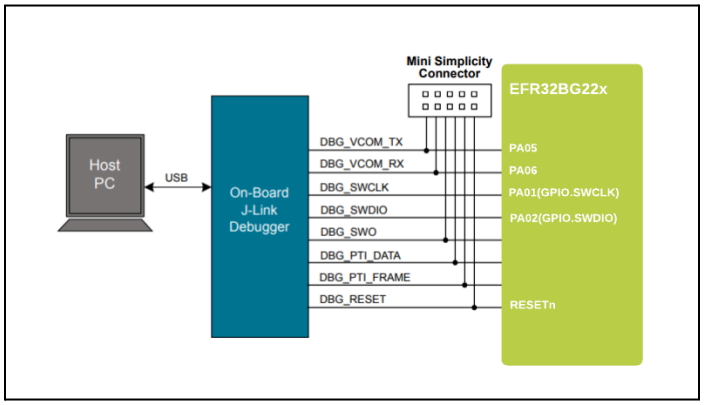


Figure 2.4 Onboard debugging connections

2.5 Connectors

The BLE Dev Kit includes a Mini Simplicity Connector, a USB Micro-B and USB to Type-C connector, and 46 breakout pads. These connectors are located on the top side of the board, as shown in the figure below.

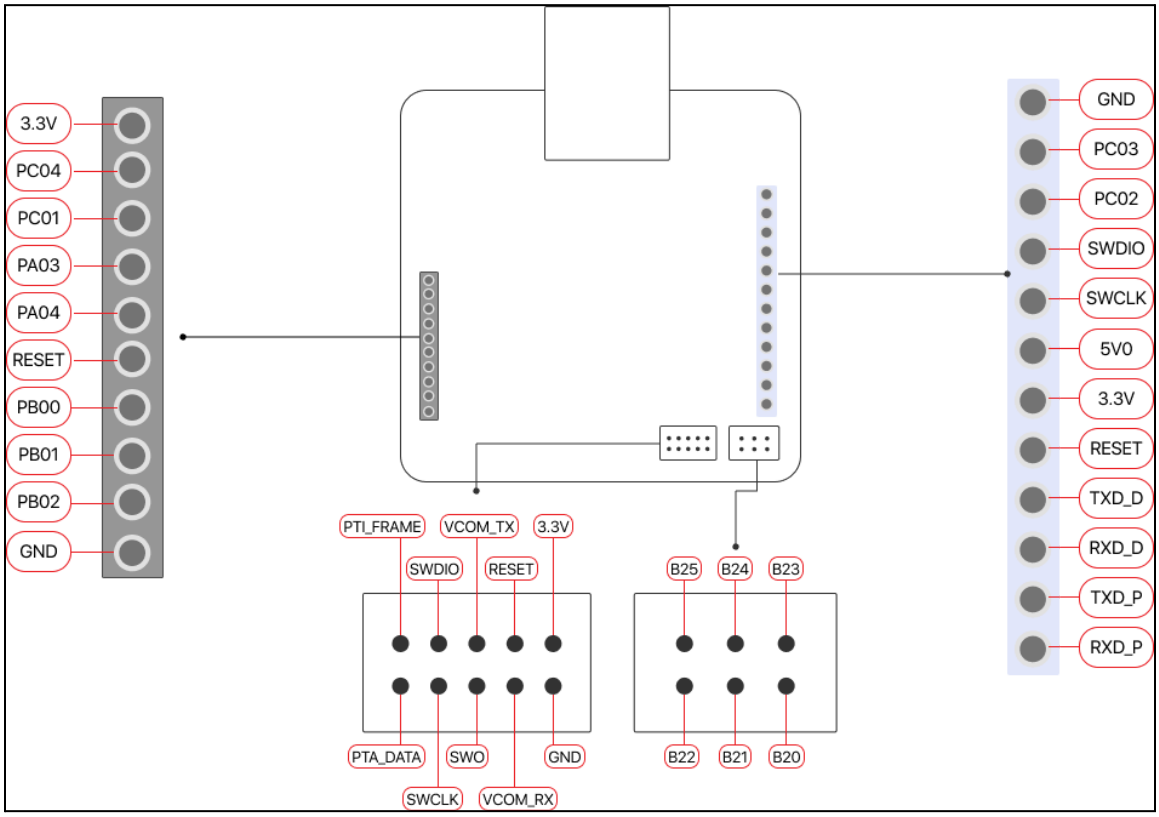


Figure 2.5 BLE Dev Kit Connectors

3. Debugging

For debugging the device, you need to set the dev kit to debugging mode as shown in figure 1.1, then debug it either with the mini simplicity or the two USB connectors.

4. Document Revision history

Revision 1.3

September 18, 2025

- Added the new module design images.
- Updated the GPIO table 2.2 & 2.3

Revision 1.2

March 18, 2025

- Replaced the new Dev kit design images.
- Added the tables 2.2 and 2.3

Revision 1.1

November 11, 2024

- Initial release