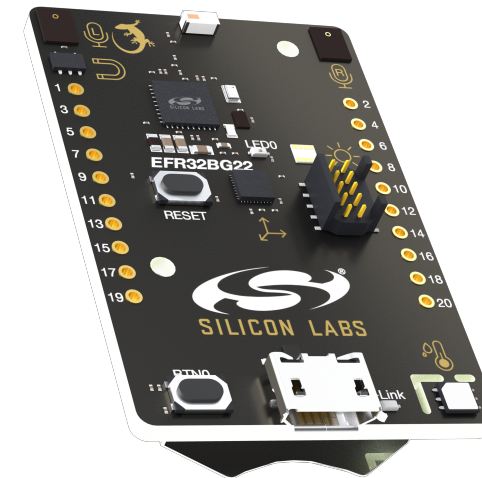


Tech Talks LIVE Schedule – Presentation will begin shortly

Silicon Labs LIVE:

Wireless Connectivity Tech Talks

How to Measure and Debug Network Performance - Using Silicon Labs Network Analyzer	Thursday, May 7
RF Regulatory and Qualification Testing for Bluetooth, Zigbee & Z-Wave	Tuesday, May 12
Simplicity Studio Tips & Tricks: Our FAEs Know All The Tricks - Improve Your Life in Simplicity Studio	Thursday, May 14
Wireless Module vs Wireless SoC Tradeoffs and Decision Making Criteria	Tuesday, May 19
Thunderboard BG22 Unboxing. You Have Our Kit... What Can You Do With It?	Thursday, May 21
Designing in Bluetooth using Bluetooth Xpress Modules with Minimal Code Writing	Tuesday, May 26
Overview of Silicon Labs Wi-Fi Solutions (Including Redpine Signals Wi-Fi Solutions)	Thursday, May 28



Find Past Recorded Sessions at:

<https://www.silabs.com/support/training>



WELCOME



Silicon Labs LIVE:

Wireless Connectivity Tech Talks

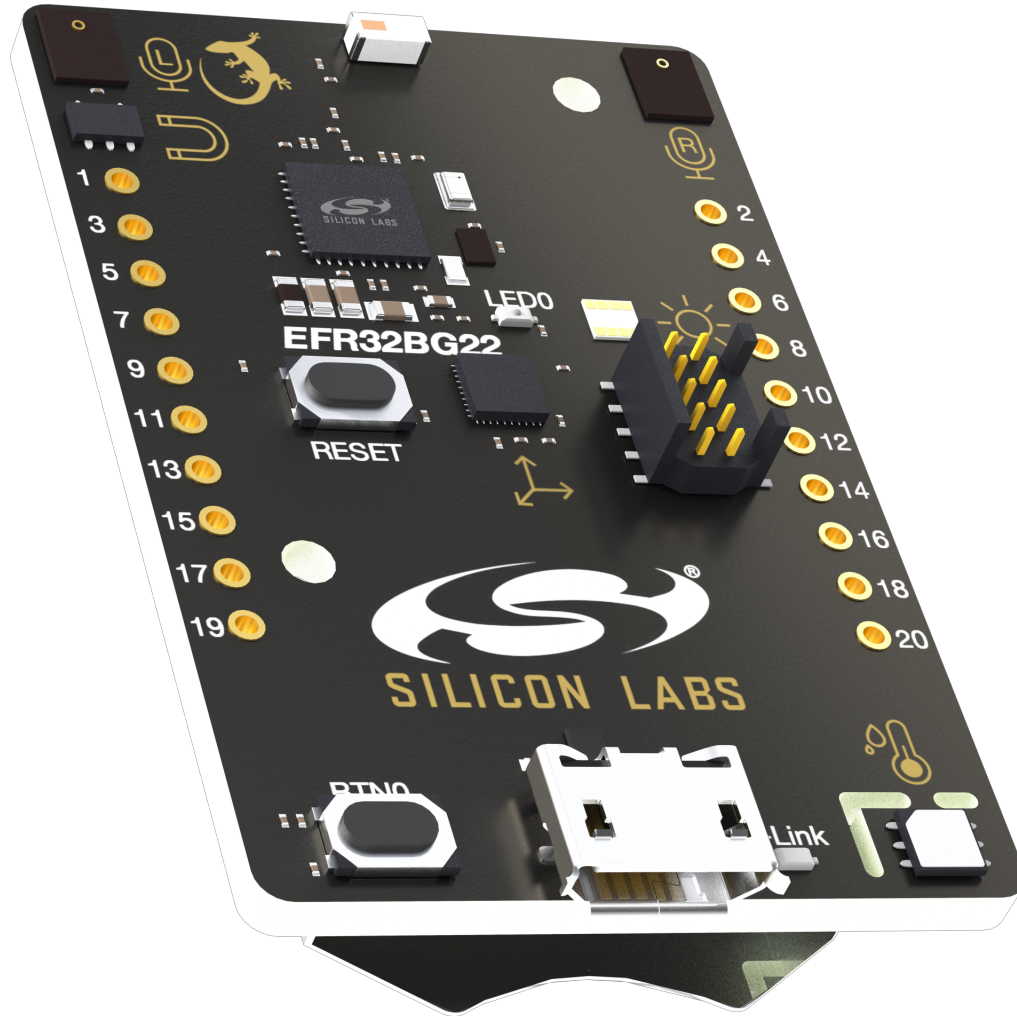


Thunderboard BG22 unboxing. You have our kit, now what can you do with it?

MAY 2020 | RYAN ORTON



Thunderboard BG22 (SLTB010A)



- EFR32BG22 in QFN40
- On-board Debugger
 - J-Link Pro
 - Packet Trace (PTI) over UART
 - Virtual COM with HW Flow Control
- User Interface
 - 1x Button (w/ EM2 wake-up)
 - 1x LED
- Sensors
 - RHT: Si7041 or Si7021
 - UV and ambient light sensor: Si1133
 - Hall effect sensor: Si7210
 - 6-axis IMU: InvenSense ICM-20648
- Power-save features
 - Controllable and separate power domain(s) for sensors
- Expansion headers for easy I/O access

BG22: Optimized Battery Powered Bluetooth LE

Optimized



Secure Bluetooth 5.2 SoCs for High-Volume Products

Radio

Bluetooth 5.2
+6 dBm TX
-106.7 dBm RX (125Kbps)
AoA & AoD

Ultra-Low Power

3.5 mA TX (radio)
2.6 mA RX (radio)
1.4 μ A EM2 with 32 kB RAM
0.5 μ A w/ RTC in EM4

World Class Software

Bluetooth 5.2
Bluetooth mesh LPN
Direction Finding
Apple HomeKit

Compact Size

5x5 QFN40 (26 GPIO)
4x4 QFN32 (18 GPIO)
4x4 TQFN32 (18 GPIO)

ARM Cortex-M33 with TrustZone

76.8 MHz
FPU and DSP
352/512 kB of flash
32kB RAM

Peripherals Fit for Purpose

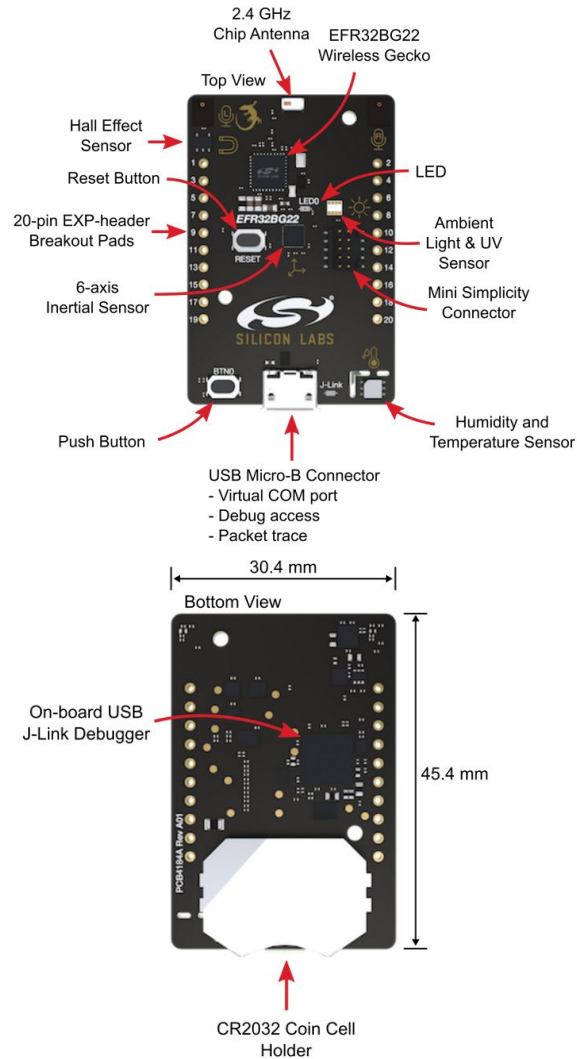
2x USART, 2x I2C, 2x PDM and GPIO
12-bit ADC (16 channels)
Built-in temperature sensor with ± 1.5 $^{\circ}$ C
32 kHz, 500ppm PLFRCO eliminates crystal

Security

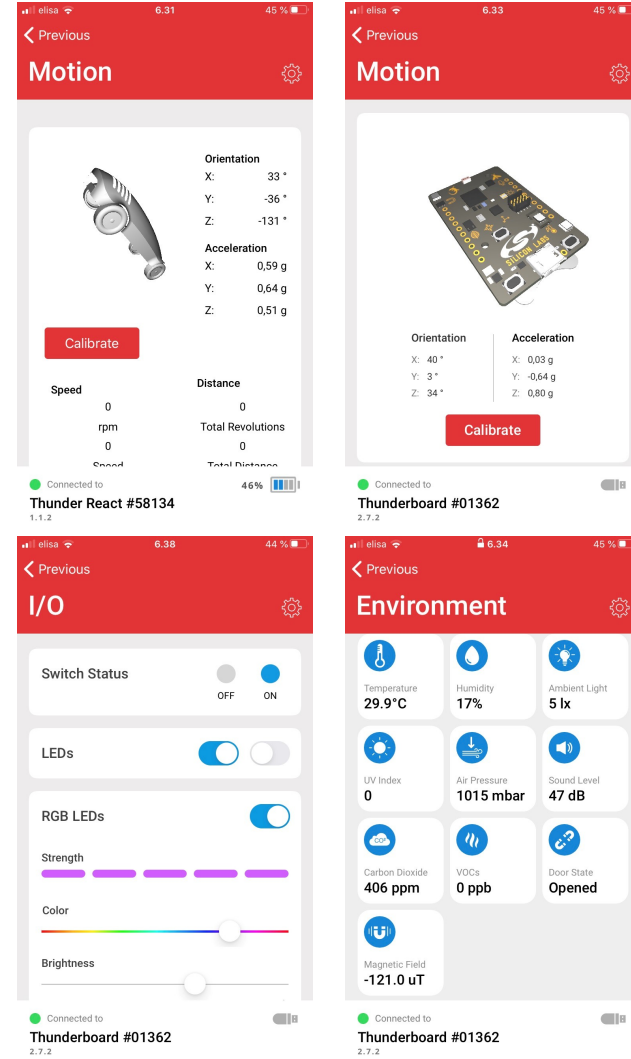
AES128/256, SHA-1, SHA-2 (256-bit)
ECC (up to 256-bit), ECDSA and ECDH
True Random Number Generator (TRNG)
Secure boot with RTSL
Secure debug with lock/unlock

Thunderboards Sense 2/BG22 – From demo to development

Hardware

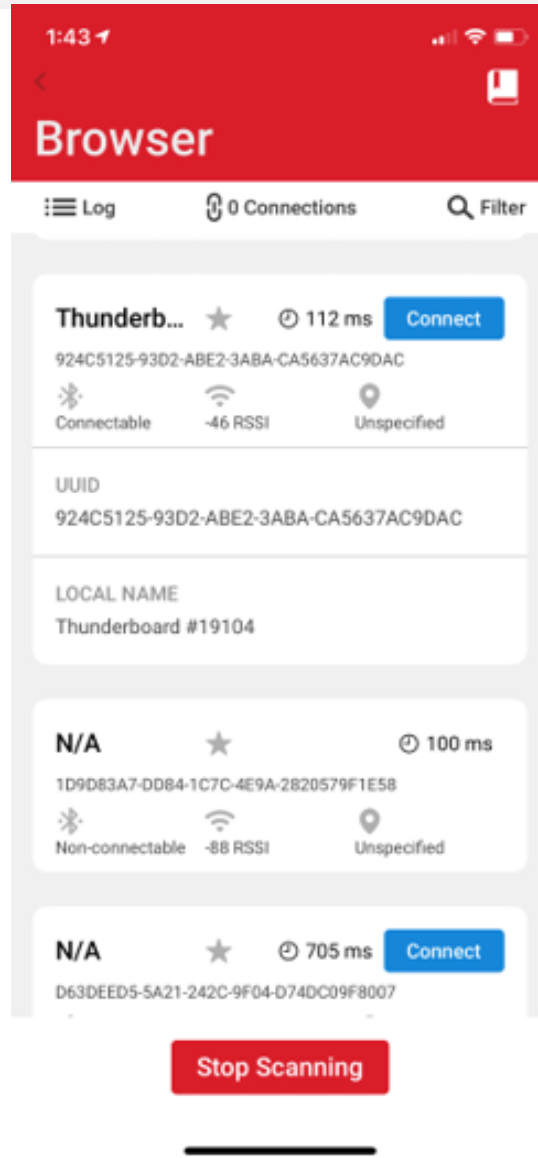


Mobile App



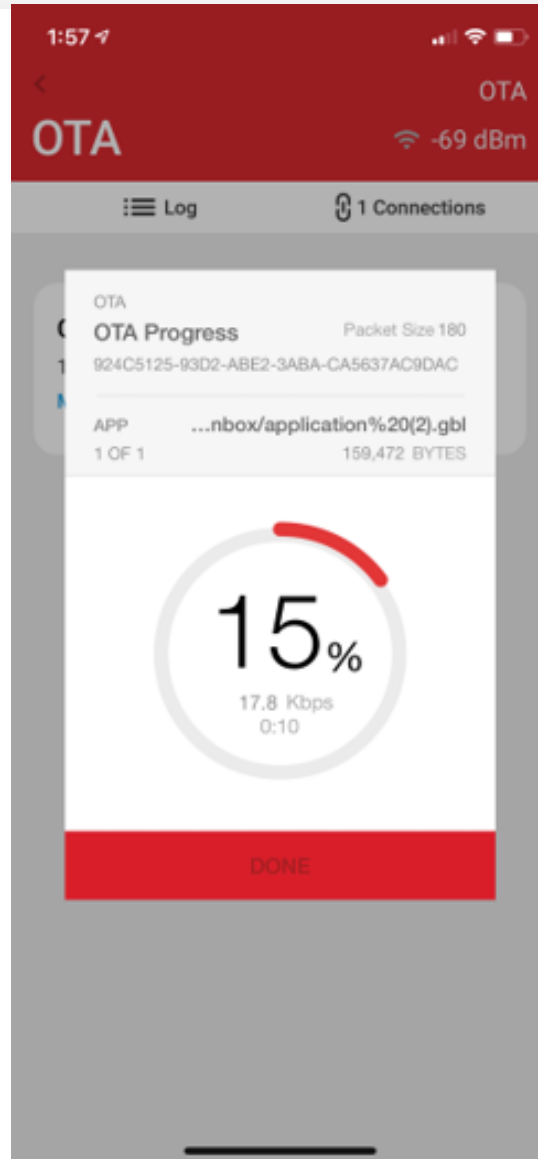
- Pre-programmed with demo firmware
 - Plug-and-play experience
- Small form factor with USB interface
 - EXP compatible breakouts
- On-board board controller
 - J-Link debugger
 - SWD interface
 - Packet Trace Interface (PTI)
 - VCOM with hardware flow-control
 - DX Value: Seamless integration with studio and SDKs
- On-board sensors, buttons and LEDs
- Coin cell battery holder
- Mini Simplicity Connector with access to
 - AEM
 - PTI
 - VCOM
 - SWD

EFR Connect



- Thermometer Demo
- BLE Browser - scan results with rich data set
 - Connectable/non-connectable
 - Beacon type
 - Advertisement interval
 - RSSI
 - Bluetooth address
- Free download on Apple store and Google Play store
- Source code available on github

OTA Firmware Upgrade



- Over the air firmware upgrade
 - For reliability
 - For speed
 - Configurable MTU and connection interval
- CRC to validate image
- Optional compression to reduce OTA upgrade time



Simplicity Studio 4

- **Simplicity Studio IDEs**
 - Free eclipse based IDE with code editing, compilation and debug for Windows, OSX and Linux
 - Pre-compiled demos, source code and documentation
- **Value-add tools include**
 - Graphical hardware configurator
 - Graphical Bluetooth GATT Editor
 - Energy Profiler – visual energy analysis
 - Network Analyzer – packet capture & decode
- **Example applications in source code**
 - Bluetooth 5 beaconing and connections
 - Bluetooth mesh light and switch
 - Voice capture
 - NCP and more
- **Compiler support**
 - GCC 7.2.1 or IAR 7.80.4

Simplicity Studio – Getting Started

The screenshot displays the Simplicity Studio IDE interface. The top menu bar includes File, Edit, Source, Refactor, Navigate, Search, Project, Run, Window, and Help. Below the menu is a toolbar with icons for various functions, including a search bar and a dropdown menu showing 'ryan.orton@silabs.com'. The main workspace is divided into several panes:

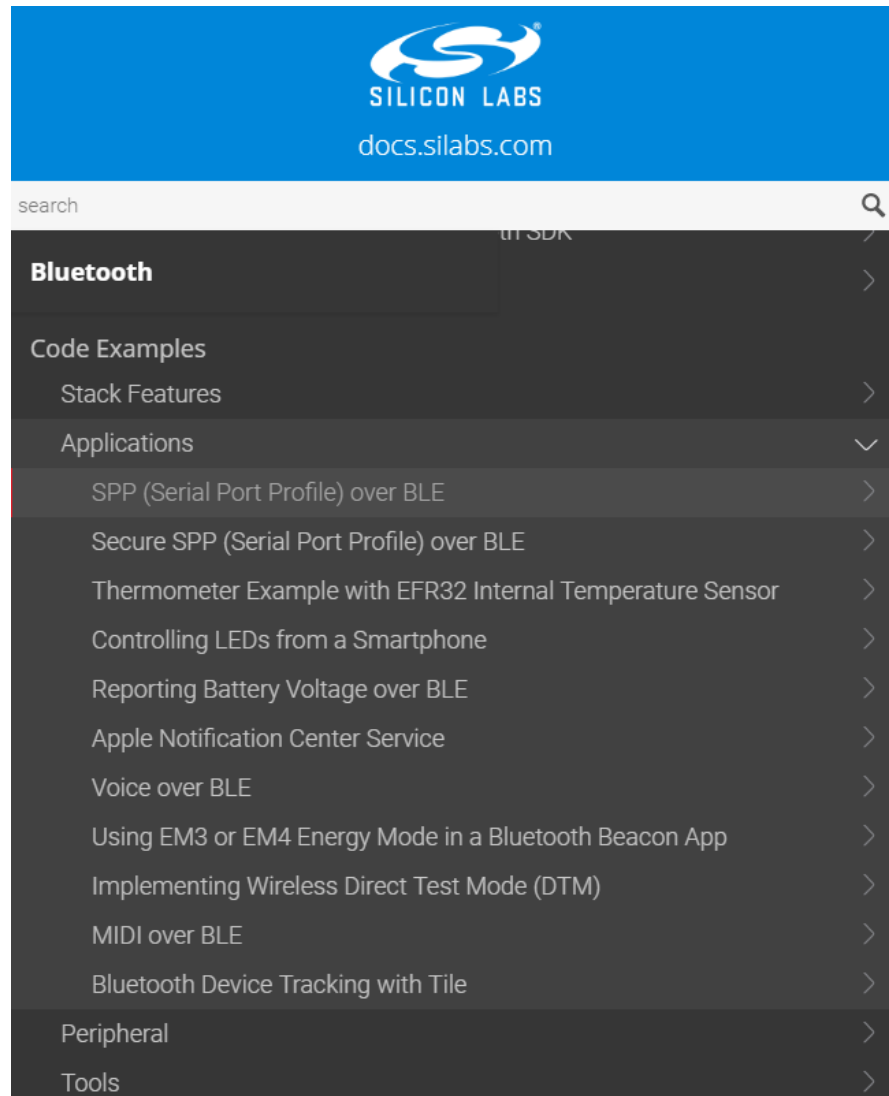
- Debug Adapters:** A tree view showing 'J-Link Silicon Labs (440174291)' and 'Thunderboard EFR32BG22 (SLTB010A)'.
- My Products:** A list of products with a search bar 'Enter product name'. The list includes various Gecko modules and kits, such as 'BGM111 Blue Gecko Module Radio Board (BRD4300A Rev A03)' and 'Thunderboard EFR32BG22 (SLTB010A)'.
- Thunderboard EFR32BG22 (SLTB010A) Project Page:** This pane shows the project details for the selected board. It includes the preferred SDK (Gecko SDK Suite v2.7.5), a link to change the SDK, and buttons for 'New Project' and 'Recent Projects'. Below these are tabs for 'Getting Started', 'Documentation', 'Compatible Tools', and 'Resources'. The 'Getting Started' tab is active, showing a list of demos and software examples.

The 'Getting Started' tab displays three columns of links:

- Demos:**
 - Bluetooth SDK 2.13.5.0
 - Bluetooth (SoC) Basic
 - Thunderboard
- Software Examples:**
 - Bluetooth SDK 2.13.5.0
 - Bluetooth (SoC) Basic
 - Thunderboard
 - Gecko Bootloader 1.10.3
 - Gecko Bootloader Examples
- SDK Documentation:**
 - Bluetooth SDK 2.13.5.0
 - > Start Here
 - API References
 - Additional Resources
 - Application Notes
 - Fundamentals
 - Quick Start Guides
 - Release Notes
 - User's Guides
 - Gecko Bootloader 1.10.3
 - API References

The bottom right corner of the IDE shows the copyright notice: © 2020 Silicon Labs.

Docs.silabs.com example applications

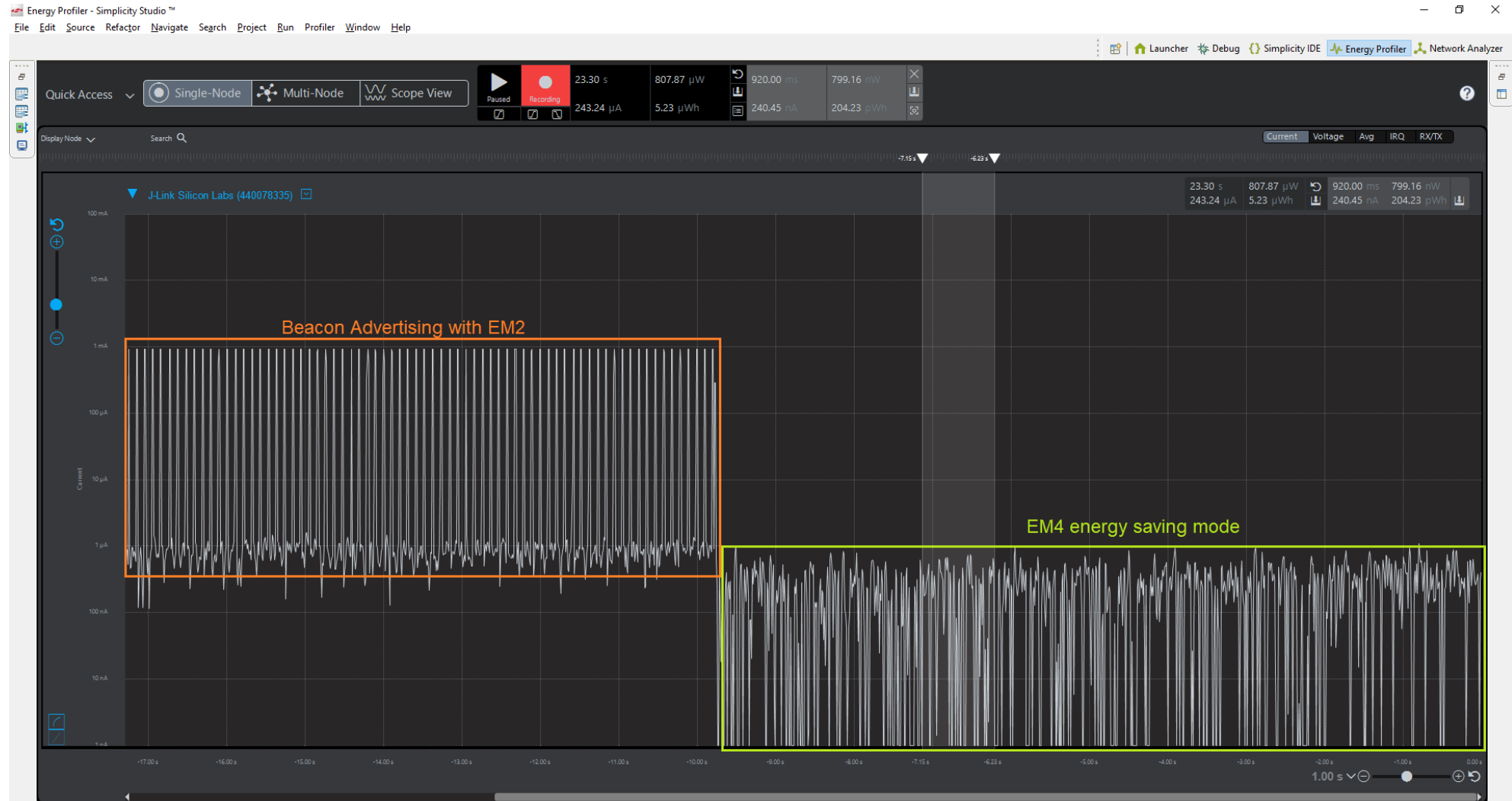


- Create new “SoC-Empty” skeleton project for target device and SDK
- Copy over app.c and app.h source files (also GATT files, if needed)
- Generate, build and flash to target

SPP over BLE



Beacon advertising in EM3/4



Github Peripheral Examples

Branch: master

peripheral_examples / series2 /

Create new file

Find file

History

Austin Goodwin Fixes GitHub Issue #40

Latest commit c+f5587c 8 days ago

..

acmp	ACMP Readme project descriptions made more pin-generic for future Ser...	12 months ago
burtc/burtc_em4_buram	Add EFR32xG22 and migrate AN0012 examples	2 months ago
cryptoacc	Adds cryptoacc examples. Fixes build error in se_ecdsa project.	2 months ago
emu	Add EFR32xG22 and migrate AN0012 examples	2 months ago
euart	Add EFR32xG22 and migrate AN0012 examples	2 months ago
gpio	Merge pull request #74 in PA_MCU_EXTERNAL_PROJECTS/mcu_peripheral_exa...	15 days ago
i2c	Fixes GitHub Issue #40	8 days ago
idac	Fixes Github issues #32, #34, #35 and #37	18 days ago
ldma	Add EFR32xG22 and migrate AN0012 examples	2 months ago
letimer	Add EFR32xG22 and migrate AN0012 examples	2 months ago
msc	Add EFR32xG22 and migrate AN0012 examples	2 months ago
pdm	Add EFR32xG22 and migrate AN0012 examples	2 months ago
prs/prs_logic_unit	Add EFR32xG22 and migrate AN0012 examples	2 months ago
rtcc/rtcc_interrupt	Add EFR32xG22 and migrate AN0012 examples	2 months ago
se	Adds cryptoacc examples. Fixes build error in se_ecdsa project.	2 months ago
timer	Add EFR32xG22 and migrate AN0012 examples	2 months ago
usart	Add EFR32xG22 and migrate AN0012 examples	2 months ago
wdog/wdog_led_toggle	Add EFR32xG22 and migrate AN0012 examples	2 months ago

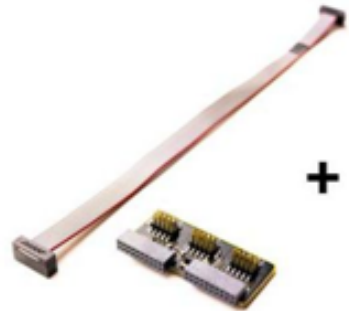
- Demonstrate isolated peripheral functionality
- Examples can be cloned to Simplicity Studio Install path
- Easily imported into IDE
 - Analog Comparator
 - Backup Domain RTC
 - Crypto Engine
 - Energy Management unit
 - GPIO
 - I2C
 - SPI
 - DMA
 - Timers
 - Peripheral Reflex system
 - Watchdog timer
 - others

Energy Profiler



- WSTK base board features AEM circuitry
- Enables real-time current consumption monitoring
- Validate datasheet specs and application behavior
- Optimize power consumption

Simplicity Debug Adapter Board



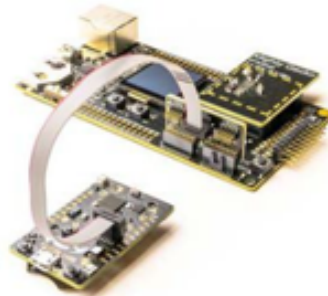
Simplicity Debug Adapter Board
with 10-pin ribbon cable
(included)

+



Simplicity Debug Adapter Board
connected to a Wireless Starter kit
(not included)

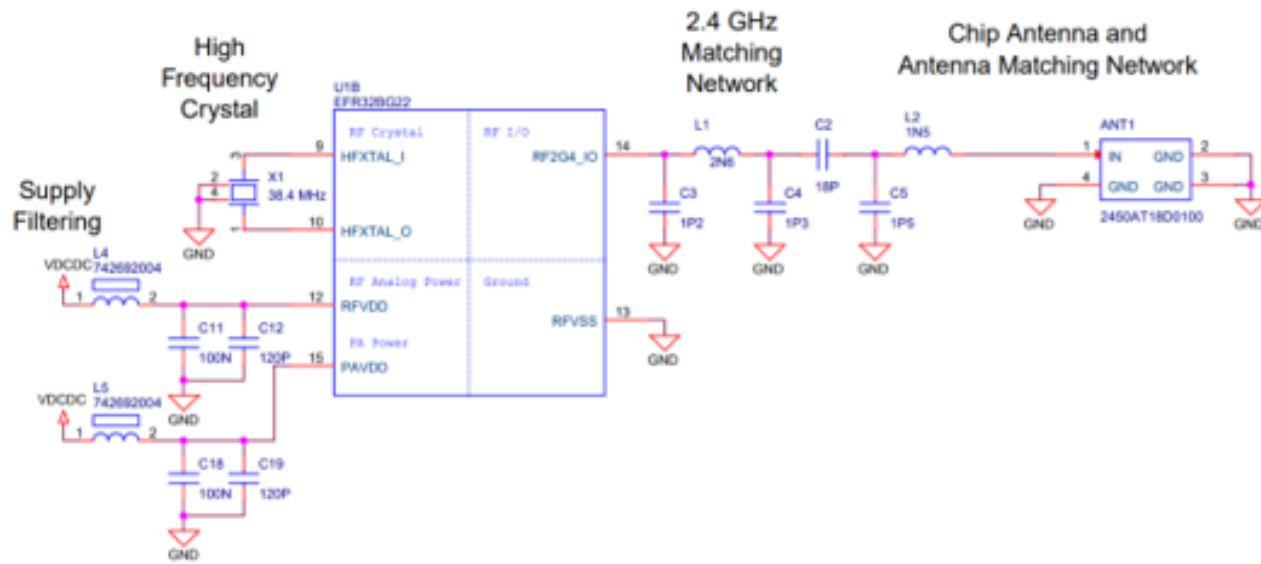
=



Simplicity Debug Adapter Board,
Wireless Starter Kit
and Target Board

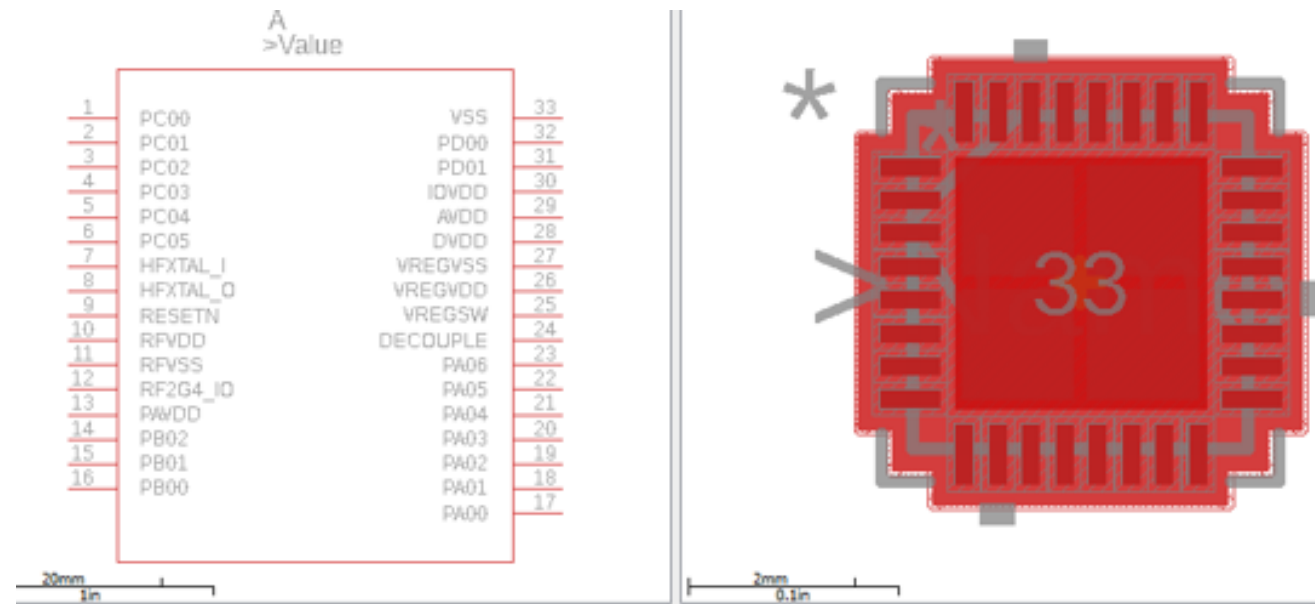
- Turn your WSTK baseboard into a debugger
- Recommend including simplicity connector on PCB during development
- SWD, PTI, VCOM, AEM
- Thunderboard lacks AEM circuitry

Design Files



- Schematic, layout and BOM all available in Studio
- Thunderboard is also a reference design
- We recommend copying RF portion as closely as possible

Ultra Librarian



- We provide Ultra Librarian schematic symbols and PCB footprints
- Ultra Librarian free software allows you to export to the CAD tools of your choice
- <https://www.silabs.com/support/resources/cad-cae-schematic-footprints-and-symbols>

BG22 Virtual Workshop



Learn how to develop and deploy more powerful, efficient, and secure IoT products with your own BG22 Thunderboard – free for all registrants!

New Sessions Opening in June

10:00AM –11:30 AM CST - T, W, Th

(Other sessions available for Asia Pacific and Europe)

Register today! <https://www.silabs.com/about-us/events/virtual-bluetooth-workshop>

Join Us: “What’s the Future of Smart Retail” Panel



The banner features a blue background with a repeating pattern of white shopping carts. A white border frames the central text area. The Silicon Labs logo is in the top left. The title 'What's the Future of Smart Retail?' is in large white font. The date and time 'WEDNESDAY MAY 27TH 10AM CDT' are in yellow. A white shopping cart icon with a Wi-Fi signal is on the right. At the bottom left, logos for Silicon Labs, rainus, Ziiide, and Quuppa are shown. A 'Register Now' button is on the bottom right.

SILICON LABS

PANEL DISCUSSION

What's the Future of Smart Retail?

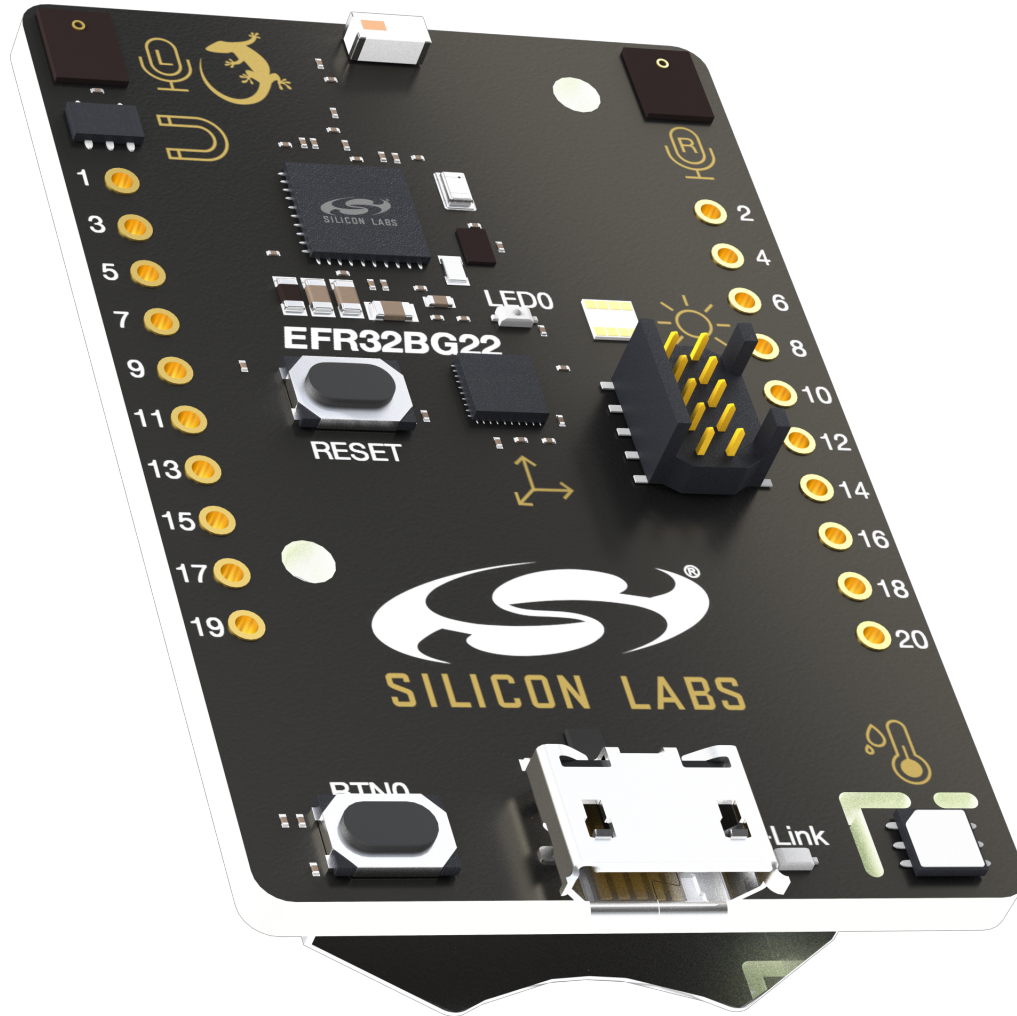
WEDNESDAY MAY 27TH 10AM CDT

SILICON LABS rainus Ziiide Quuppa

Register Now

Register at
silabs.com/applications/smart-industry

Wrap-Up



- BG22 Thunderboard
 - Demo and development platform
 - Thunderboard and EFR Connect mobile apps
 - Extensive firmware examples
 - Hardware design files available

Live Demo



- Thunderboard Mobile app
 - I/O
 - Environmental sensors
 - Motion



Questions?

WWW.SILABS.COM



Useful Links

- <https://www.silabs.com/products/development-tools/software/simplicity-studio>
- <https://www.silabs.com/documents/public/user-guides/ug415-sltb010a-user-guide.pdf>
- https://github.com/SiliconLabs/peripheral_examples
- <https://docs.silabs.com/bluetooth/latest/>
- <https://www.silabs.com/support/resources/cad-cae-sche>
- <https://www.silabs.com/products/development-tools/software/bluetooth-low-energy/mobile-apps/efr-connectmatic-footprints-and-symbols>