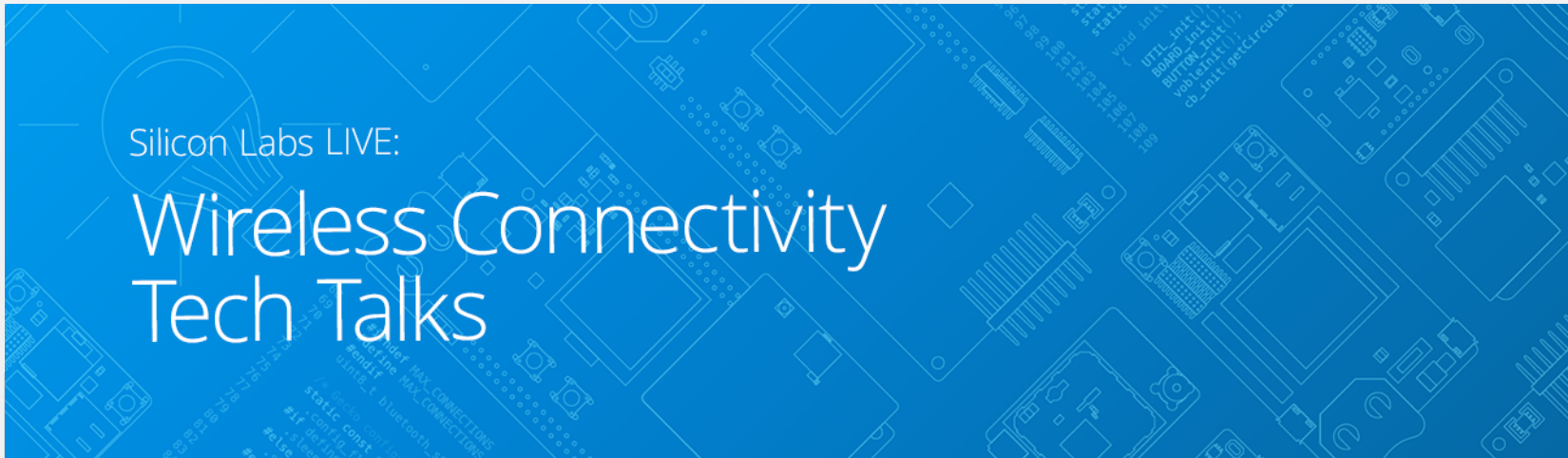
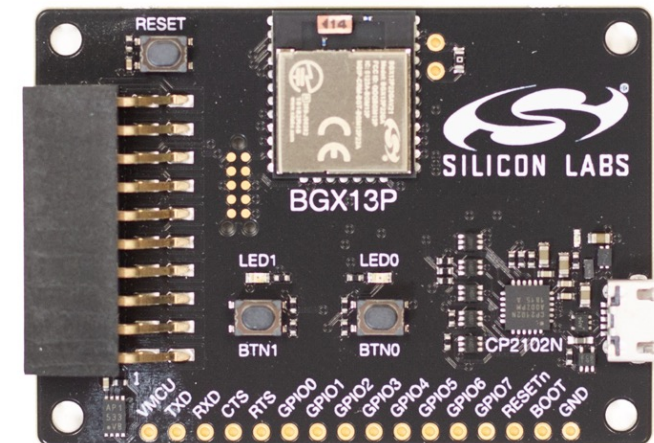


Tech Talks LIVE Schedule – Presentation will begin shortly



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

A blue background with a pattern of white circuit board traces and code snippets. The code includes comments like '/* Bluetooth connection */' and '/* UART connection */', and function names like 'BTTL_Init()', 'BOARD_Init()', 'BUTTON_Init()', 'void Init()', 'void InitUART()', and 'void InitBluetooth()'. There are also some numbers like '100' and '4'.

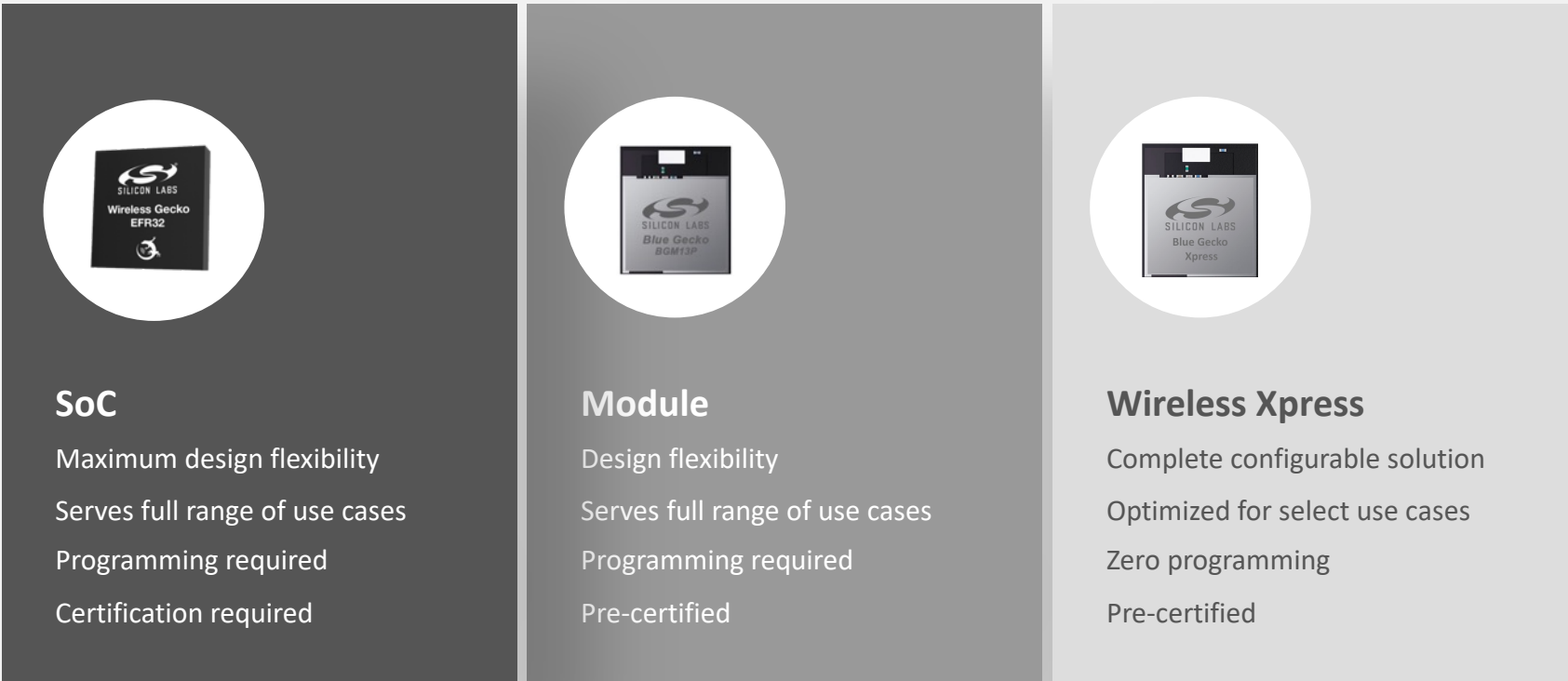


Bluetooth Design with Minimal Code Writing using Bluetooth Xpress Modules

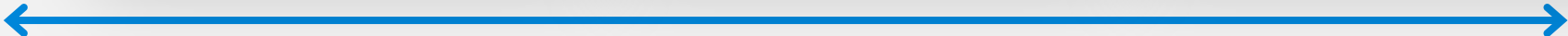
MAY 2020



A Silicon Labs Bluetooth Solution For Every Customer



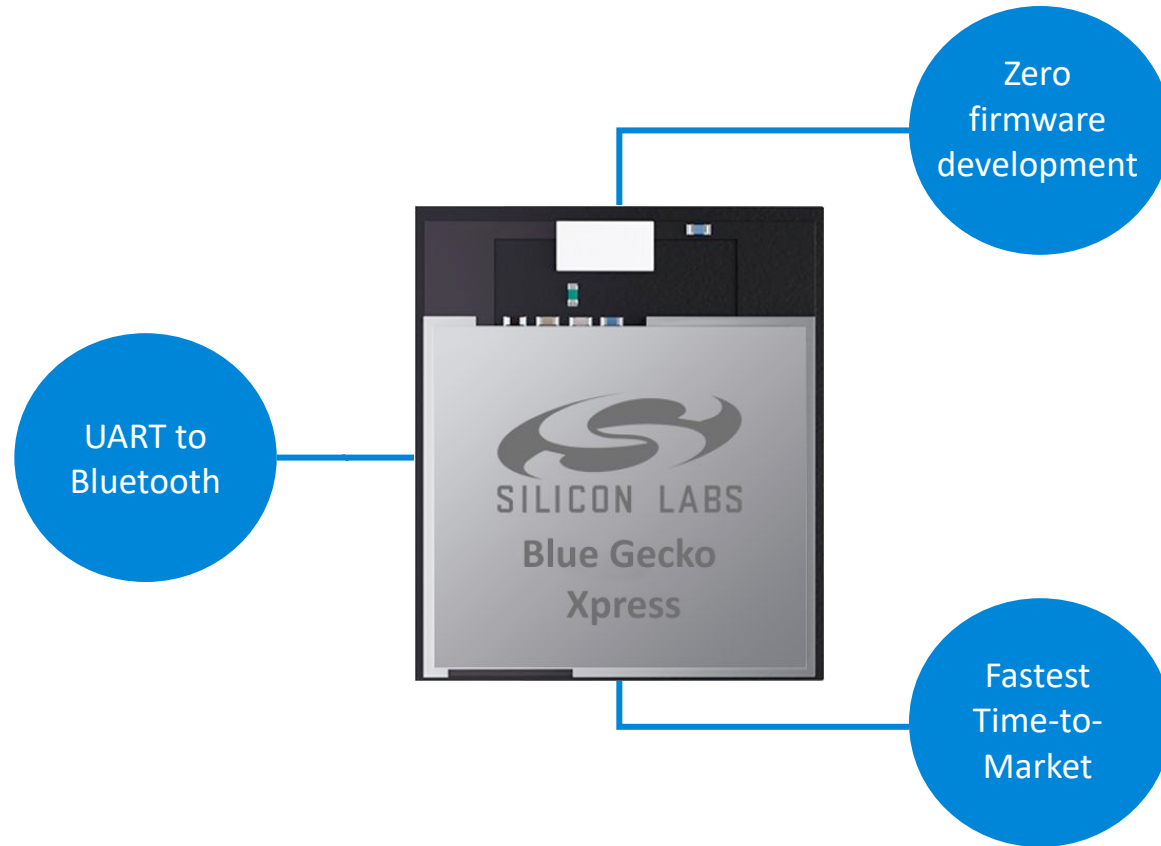
Design flexibility



Time-to-market

Blue Gecko Xpress - Introducing BGX13S and BGX13P

Bluetooth that just works.



- **BGX13P and BGS13S**

- **Bluetooth LE features**

- Bluetooth 5: 1M, 2M, LR Coded PHY (125K/500K)
- Multiset advertising
- LE Secure connections and privacy
- Xpress Streaming service for data
- Operates in either central or peripheral role
- Transmit at +8 dBm

- **Interface functionality**

- UART with flow control for data streaming
- Xpress command API for configuration and control
- Additional pins for connection state control
- Configurable BLE performance, GPIO and status LEDs
- NEW: I2C master support
- NEW: Event Monitoring and User Functions

Bluetooth Xpress Modules

- Fully integrated
 - Blue Gecko Xpress silicon
 - RF Matching + Shield + Antenna
- Pre-certified (FCC, IC, CE)
 - Fast time-to-market
 - Reduced development cost
- SiP and PCB modules
 - SiP offers industry-smallest form factor
 - PCB module for easiest manufacturing option



	BGX13P	BGX13S
Description	Bluetooth 5 PCB module	Bluetooth 5 SiP module
Size	12.9 × 15.0 × 2.2 mm	6.5 × 6.5 × 1.4 mm

Bluetooth Xpress Key Specs

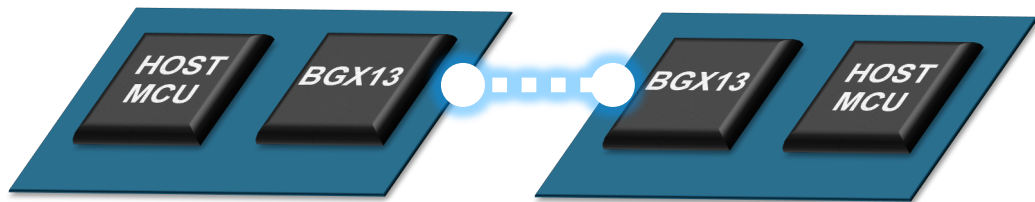
- Key link specifications
 - Encrypted communication only
 - Configure to enable/disable/clear bonds
 - Selectable advertising on 1M and/or LE Coded PHY
 - Preferred PHY configurable to 1M/2M/125K/500K
 - Adjustable scan/connection intervals
 - Just works and passkey pairing
 - Adjustable TX power
 - Current specs
 - Sleep mode, radio off: 2.8 uA
 - Sleep mode, advertising interval 500 ms: 90 uA
 - Connected, baud 9600, interval 1 s: 16 uA
 - Connected, baud 9600, interval 7.5 ms: 1.3 mA
 - Connected, baud >9600, interval 7.5 ms: 4.0 mA

Link type	Max throughput (ack/noack)
BGX-to-BGX	131/1000 kbits/s (2M PHY)
BGX-to-Android	87/1000 kbits/s (2M PHY)
BGX-to-iOS	48/575 kbits/s (2M PHY)

Throughput measurements
(full characterization at <https://docs.silabs.com/gecko-os/1/bgx/latest/throughput>)

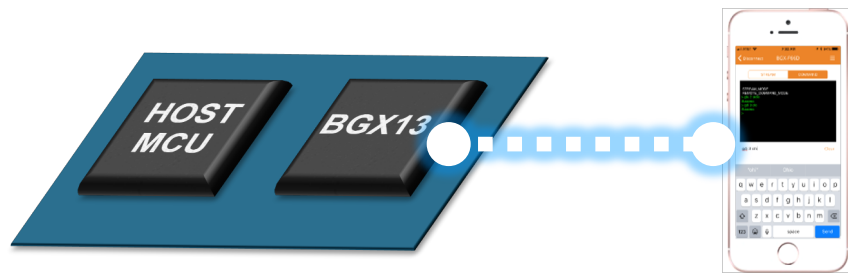
Note: as of version 1.2, no-ack transfers provide in-channel acknowledgement to prevent packet loss

Use case 1: Cable replacement with BGX13



- Embedded UART-to-BLE
 - Host MCU only needs a UART
 - Optional flow control
- Wireless cable replacement
 - BGX13 end-to-end BLE support
 - Configurable as central or peripheral
- Central role simplified
 - Scan and connect in two commands
 - Data stream identical for peripheral and central

Use case 2: Easy BLE smartphone connections with BGX

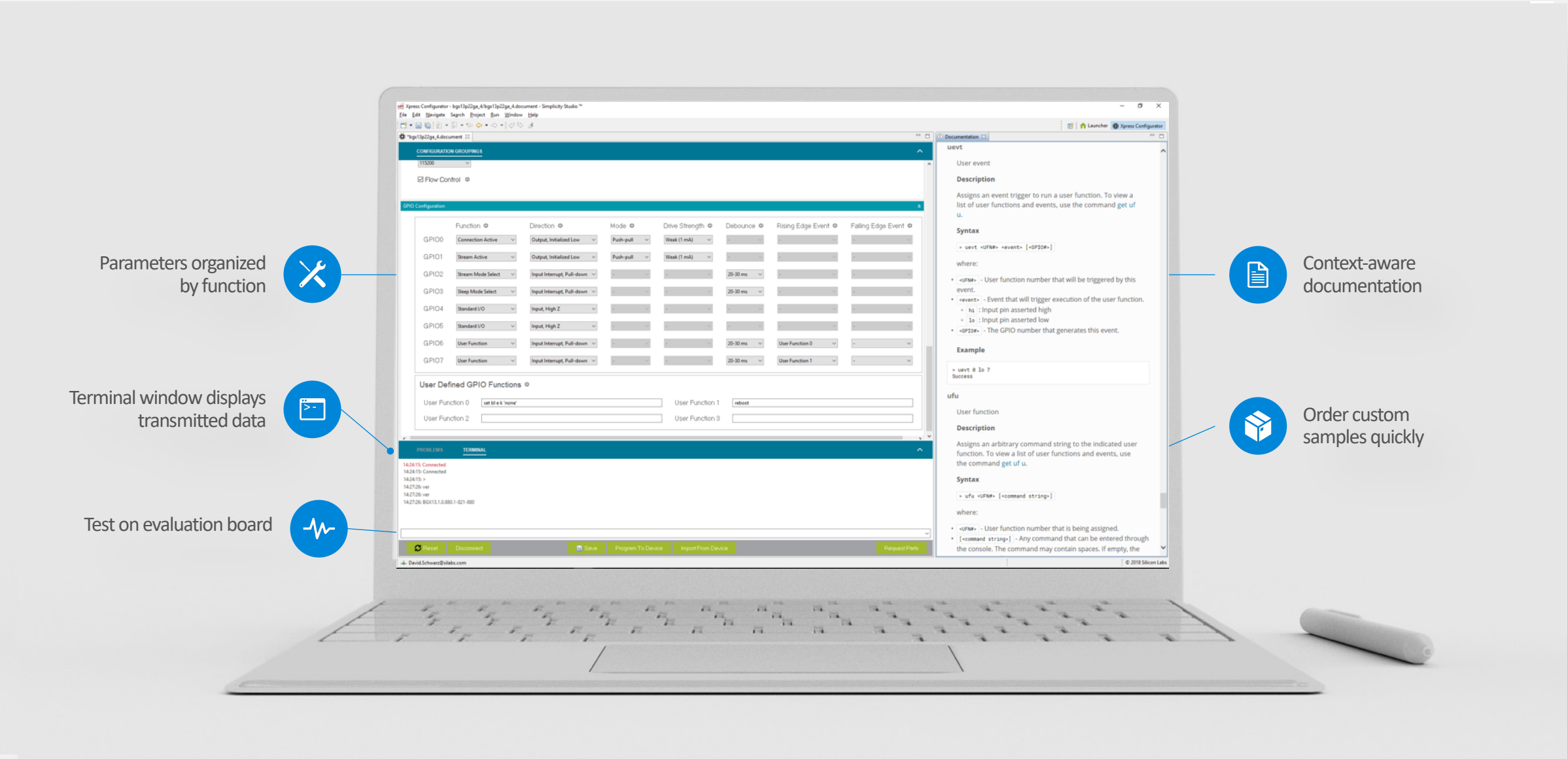


- Low-level BLE controlled by BGX
 - BGX13 handles advertising and connection
 - Optional control I/O and command interface
- Mobile app development simplified
 - iOS and Android Mobile Xpress library
 - Mobile framework API to connect and communicate

BGX can switch between BGX-to-phone and BGX-to-BGX in the same design

Example: BGX-to-BGX star network design with phone app for product configuration

Xpress Configurator Makes Wireless Connectivity Easy



Parameters organized by function



Terminal window displays transmitted data



Test on evaluation board



Context-aware documentation



Order custom samples quickly

BGX Xpress command interface simplifies control

- BGX13 provides a simple interface for key BLE connect and communicate features

Xpress command mode connection in 2 steps

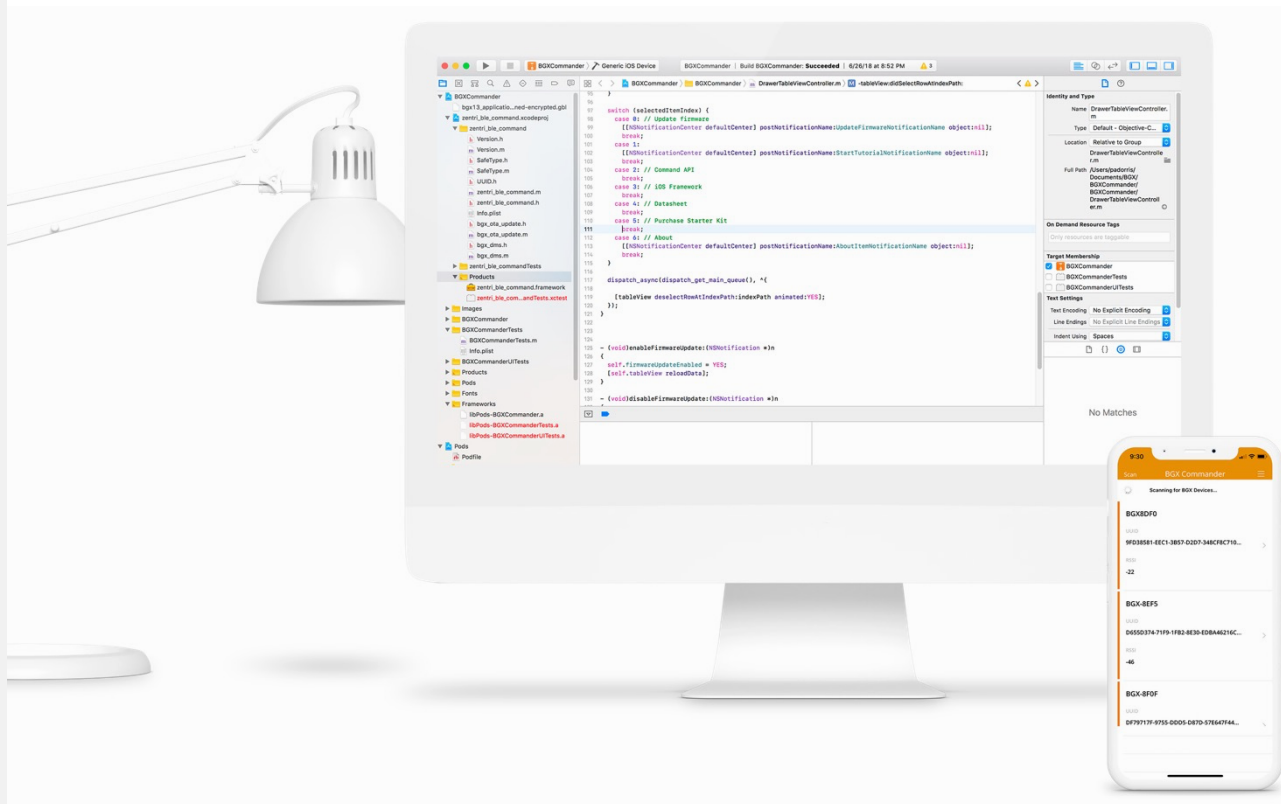
```
Host → scan
Success
BGX ← > ! # RSSI BD_ADDR Device Name
# 1 -50 d0:cf:5e:82:8e:53 BGX-8E53
# 2 -38 d0:cf:5e:82:8d:fd BGX-8DFD
Host → con 1
BGX ← Success
> STREAM_MODE
```

BGX stream mode App-specific communication

```
Host 1 → enable sensor
Host 2 ← sensor: enabled
Host 1 → read sensor value
Host 2 ← value: 23.4
```

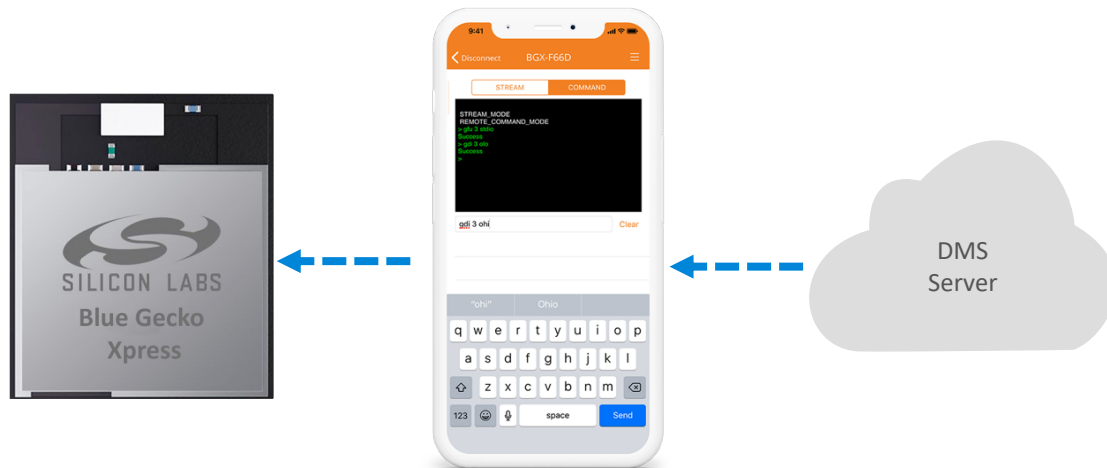
- BGX13 provides a robust and reliable link that just works
- Application specific wireless communication made easy
- Command API documentation available at docs.silabs.com

Xpress Mobile Framework Speeds App Development



- Available for iOS and Android
- Mobile framework API includes:
 - **Connect:** `connect()` / `disconnect()`
 - **Write:** `writeData()`
 - **Read:** `dataReadDelegate()`
 - **Modify port pins:** `writeCommand()`
- APIs for over-the-air updates
- Supports Xpress interface I2C read/write commands
- Source code for apps available on Github:
 - [Github.com/SiliconLabs/wireless-xpress](https://github.com/SiliconLabs/wireless-xpress)

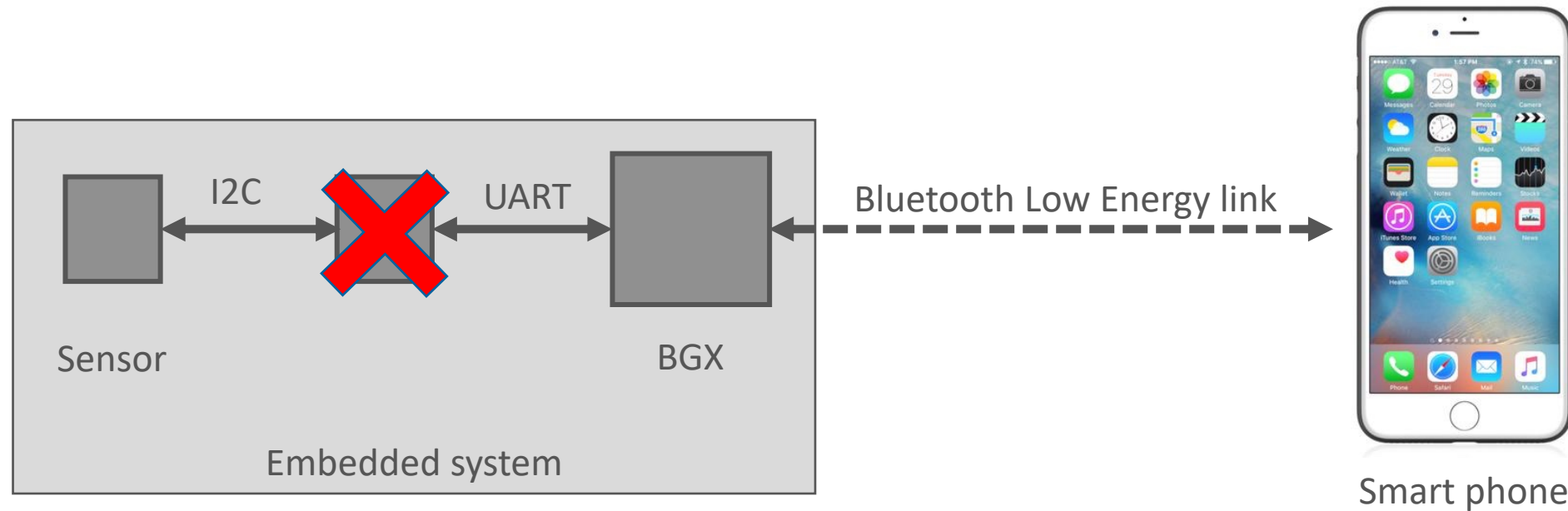
BGX Firmware and OTA Updates



<https://docs.silabs.com/gecko-os/1/bgx/latest/release-notes>

- Bluetooth Xpress run a closed firmware image
- BGX Modules are debug locked and can only run firmware images signed and encrypted by Silicon Labs
- BGX Modules can be updated using the BGX Commander smartphone application
- Custom User applications can also access firmware updates using the Xpress Mobile Framework

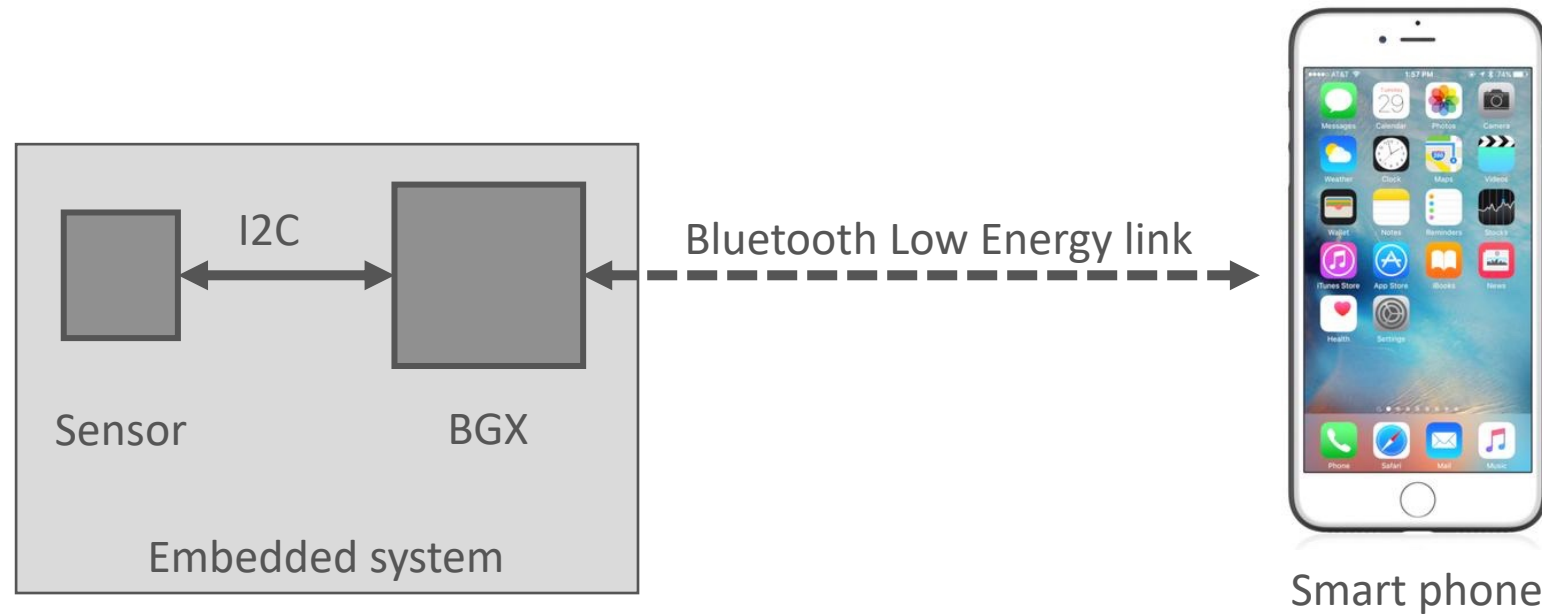
Bluetooth Xpress operation without an embedded host in some cases



- Before version 1.2, all Bluetooth Xpress use cases required an embedded host
- With I2C and event monitoring in version 1.2, the embedded host isn't always need

Version 1.2 features enable Bluetooth Xpress to function without an embedded host

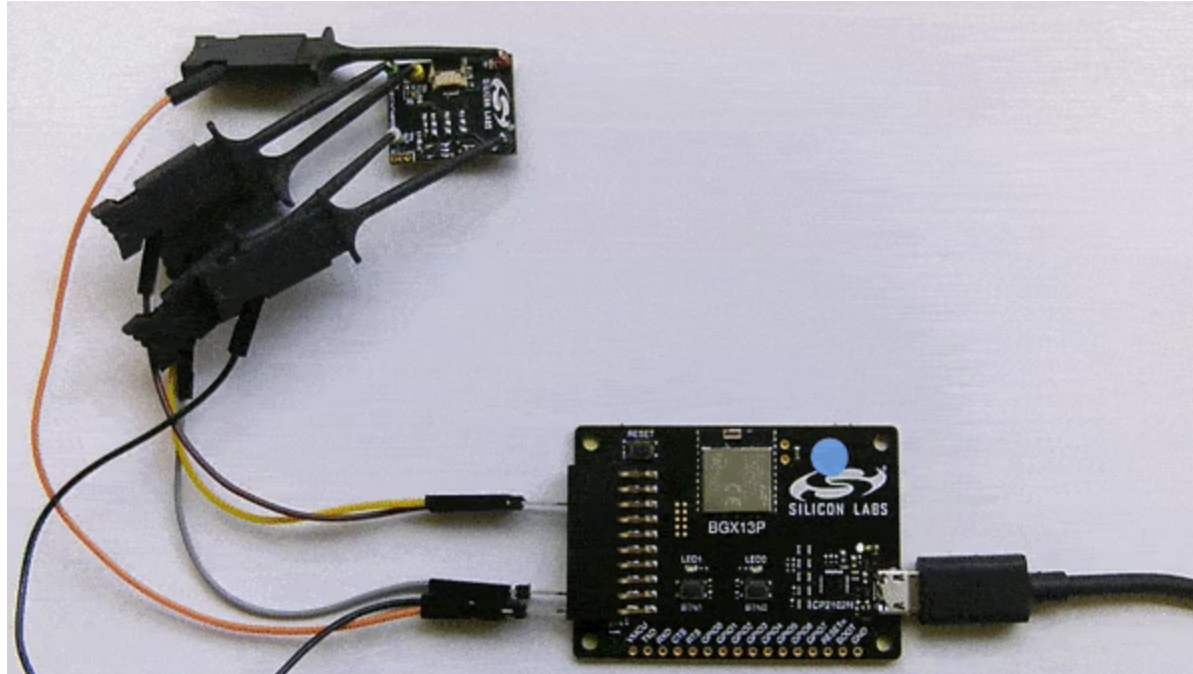
Bluetooth Xpress operation without an embedded host in some cases



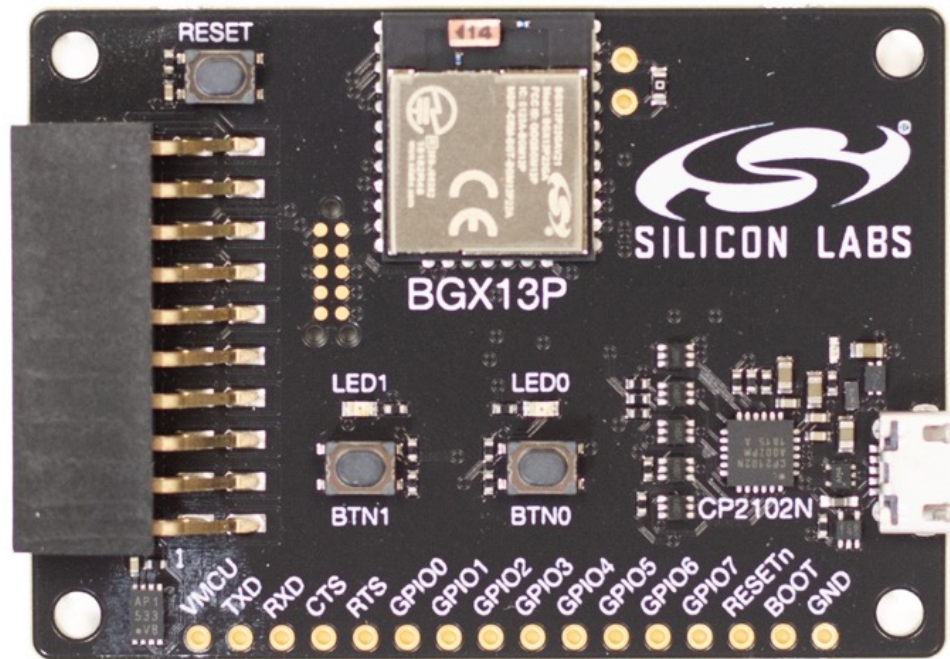
- Before version 1.2, all Bluetooth Xpress use cases required an embedded host
- With I2C and event monitoring in version 1.2, the embedded host isn't always need

Version 1.2 features enable Bluetooth Xpress to function without an embedded host

BLE-enabled Hall Effect Sensor Demo using Si7210



Get Started with Bluetooth Xpress Development



- Purchase Bluetooth Xpress evaluation kit
- Download BGX commander app for Android and iOS
- Install latest version of Simplicity Studio to get Xpress Configurator
- Explore docs.silabs.com/bgx/ demos such as:
 - BGX-to-phone temperature sensor
 - BGX-to-BGX long range PHY controller
 - Contact sensor interface with BGX I2C
 - Xpress connect feature overview

Get started at silabs.com/start-bgx

MCU Host Examples in Simplicity Studio

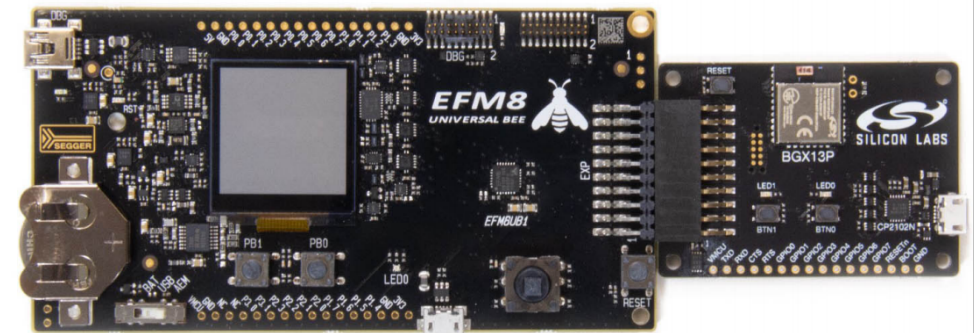
EFM8UB1 Universal Bee Starter Kit (SLSTK2000A)

Preferred SDK: 8051 SDK v4.1.7.0

Click [here](#) to change the preferred SDK.


The screenshot shows the Simplicity Studio interface with the following elements:

- Buttons: "New Project" and "Recent Projects" (dropdown).
- Navigation tabs: "Getting Started", "Documentation", "Compatible Tools", "Resources".
- Section: "Demos" with expand/collapse icons.
- Section: "Software Examples" with expand/collapse icons.
- Under "Demos", "8051 SDK v4.1.7.0" is expanded to show:
 - ADC
 - BGX
 - EFM8UB1 BGX Demo** (highlighted with a play button icon). Description: "This example demonstrates the stream and command functionality of the BGX in Peripheral and command functionality of the BGX in Peripheral and".
 - Blinky
 - CPT_Demo
 - General
 - USB
- Under "Software Examples", "8051 SDK v4.1.7.0" is expanded to show:
 - ADC
 - Blinky
 - Bootloaders
 - Demos
 - EFM8UB1 BGX** (highlighted with a plus icon). Description: "Create the EFM8UB1 BGX project for the BRD5000A."



Get started at silabs.com/start-bgx

Bluetooth Xpress Online Resources



docs.silabs.com

search

- BGX-1.x**
- Command API Reference
 - Commands
 - Variables
- Application Examples
 - BGX to Phone
 - BGX to BGX
 - Xpress Connect and UFU
- I2C**
- Revision History
 - Document Revisions
 - Release Notes
- BGXpress Host Software
 - Overview
 - Commander Overview
 - Android
 - iOS
- More Documentation

BGX13-1.x Command Reference

This page provides a list of Bluetooth Xpress API commands with a full description of how to use each command.

Command Editing

The Bluetooth Xpress command mode is very simple. The backspace erases characters, but no other editing is provided. Backspace operation requires vt100 terminal emulation or similar.

Documentation Format

Many of the Bluetooth Xpress responses shown in the examples on this page were captured with system print level (`sy p`) = all, and system command header enabled (`sy c h`) = true. These settings are provided to make it easy for a host microcontroller to parse responses by examining response headers. See [Serial Interface](#), [Response Format](#).

Documentation for each command is provided in the format shown below.

command

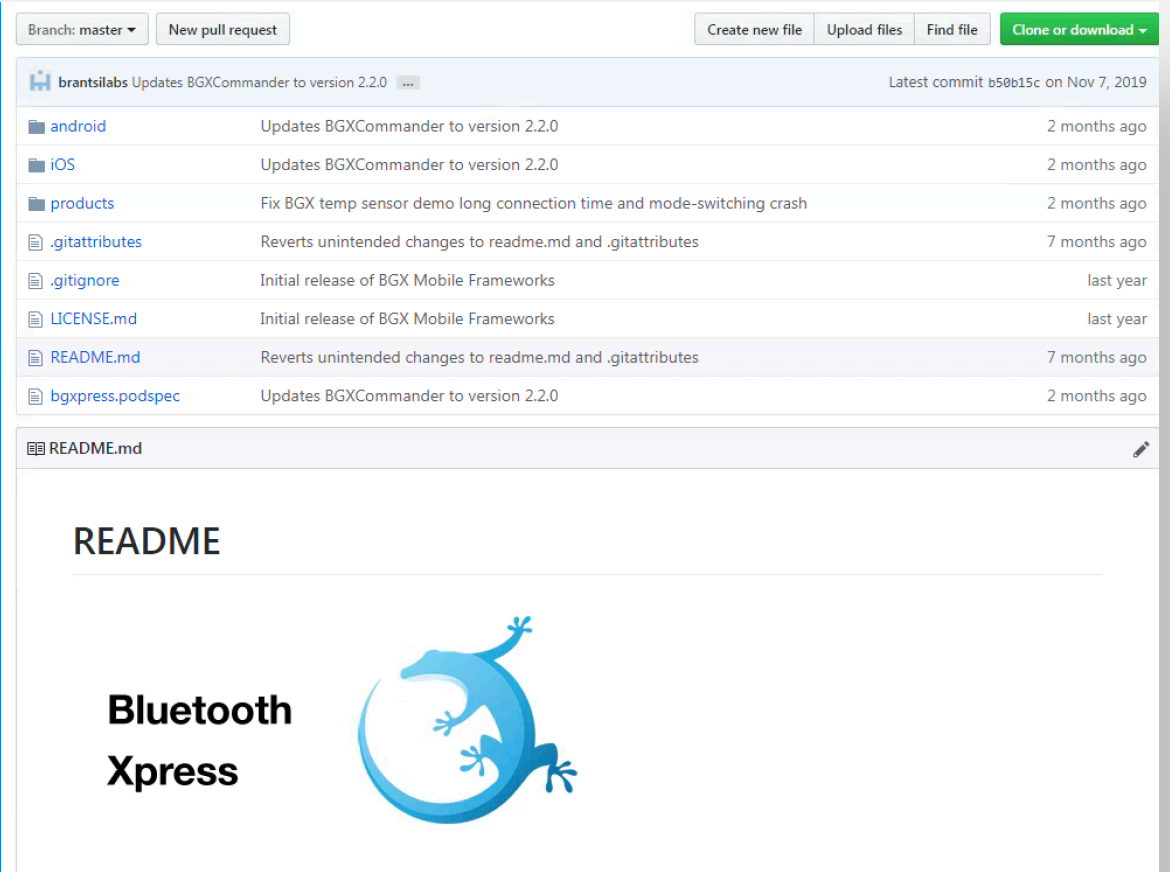
Brief description

Description

A description of how to use the command, together with notes about available options and arguments.

Syntax

Formal command syntax with a listing of all available options and arguments.




Branch: master | New pull request | Create new file | Upload files | Find file | Clone or download

brantsilabs Updates BGXCommander to version 2.2.0 ... Latest commit b50b15c on Nov 7, 2019

android	Updates BGXCommander to version 2.2.0	2 months ago
iOS	Updates BGXCommander to version 2.2.0	2 months ago
products	Fix BGX temp sensor demo long connection time and mode-switching crash	2 months ago
.gitattributes	Reverts unintended changes to readme.md and .gitattributes	7 months ago
.gitignore	Initial release of BGX Mobile Frameworks	last year
LICENSE.md	Initial release of BGX Mobile Frameworks	last year
README.md	Reverts unintended changes to readme.md and .gitattributes	7 months ago
bgxpress.podspec	Updates BGXCommander to version 2.2.0	2 months ago

README.md

README



Bluetooth Xpress

GitHub for interfacing code examples

■ <https://docs.silabs.com/gecko-os/1/bgx/latest/>

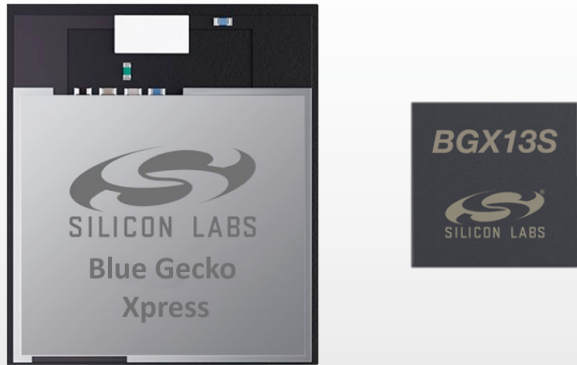
■ <https://github.com/SiliconLabs/wireless-xpress>

BGX Live Demo



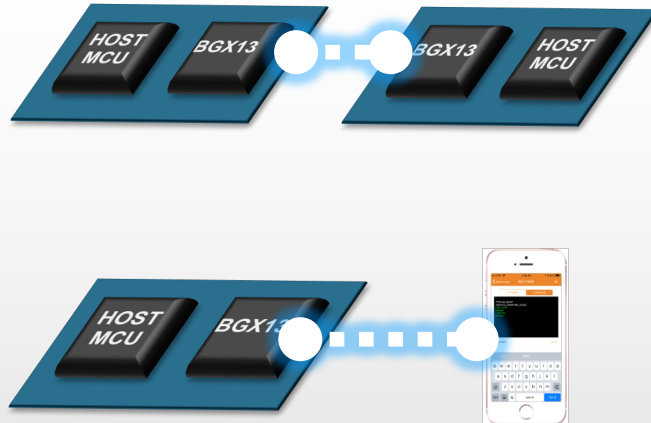
BGX: In Summary

EASY HARDWARE DESIGN



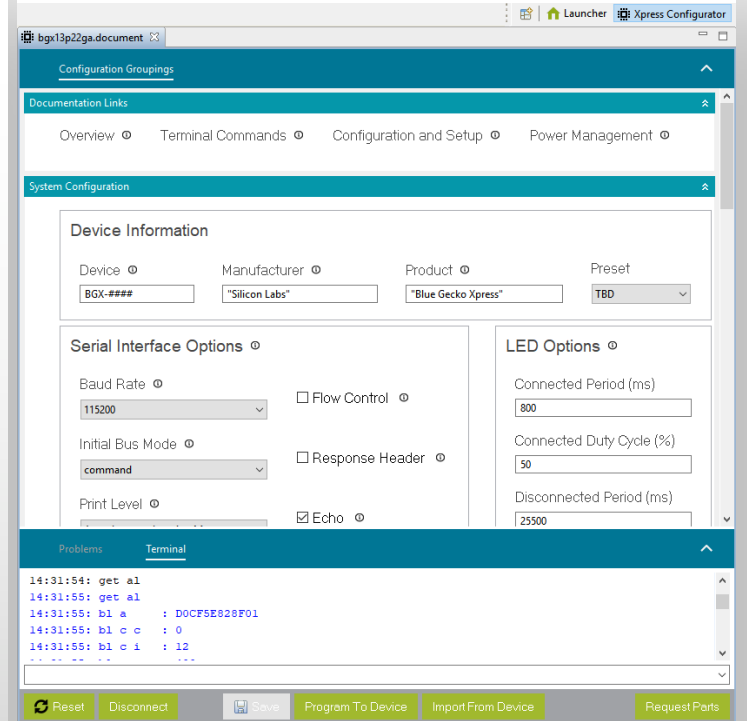
PCB and SIP Modules
Easy PCB Layout
Regulatory Certification

COMMON USE CASES



Wire Replacement
BGX-to-BGX
BGX-to-Phone

NO FIRMWARE DEVELOPMENT



Xpress Configurator
Xpress Streaming Service
Xpress Mobile Framework
Event Monitoring

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 shopping carts. On the right side, there is a large white shopping cart icon with three curved lines above it representing a Wi-Fi signal. The text is arranged as follows:

- SILICON LABS** logo at the top left.
- PANEL DISCUSSION** in yellow text below the logo.
- What's the Future of Smart Retail?** in large white text.
- WEDNESDAY MAY 27TH 10AM CDT** in yellow text.
- Logos for **SILICON LABS**, **rainus**, **Ziide**, and **Quoppa** at the bottom left.
- A white button with the text **Register Now** at the bottom right.

Register at
silabs.com/applications/smart-industry



Questions?

WWW.SILABS.COM



Useful Links

- <https://www.silabs.com/start-bgx>
- <https://docs.silabs.com/gecko-os/1/bgx/latest/>
- <https://www.silabs.com/documents/public/application-notes/an1157-developing-prod-using-bluetooth-xpress.pdf>
- <https://www.silabs.com/documents/public/quick-start-guides/qsg161-bgx13p-22ga-quick-start-guide.pdf>
- <https://github.com/SiliconLabs/wireless-xpress>
- <https://docs.silabs.com/bluetooth/latest/>