Proprietary Wireless

Proprietary Wireless Overview

When a standard protocol does not fit your use case or your design has unique requirements, proprietary wireless networks can be the right solution. Proprietary protocols offer customizability thus allowing customers to configure data rates, security, and power profiles to meet exact application needs.

Operating in both the 2.4 GHz and Sub-GHz bands, a 2.4 GHz network allows for operation on a license-free band around the world, which means applications can be deployed at a lower cost. Sub-GHz networks offer longer range and better obstacle penetration but lack the worldwide coverage of 2.4 GHz. This means that multiple hardware configurations must be considered if a product is to be used in multiple regions. Sub-GHz networks are also immune to the growing amount of 2.4 GHz interference allowing for use in more operational critical applications.

Generally, proprietary networks are naturally more secure than other standards-based protocols due to the hidden nature of the data rates, modulation, and packet structure. These parameters are more widely known for standard protocol networks, making them more vulnerable to security threats. Deployment of a proprietary network can also be simpler than that of standards-based solutions by removing the burden of standards body certification.

Silicon Labs' Proprietary Wireless SoC and RF Transceiver Solutions

Silicon Labs is a leading expert in proprietary wireless networks, with an extensive portfolio of Wireless SoC and RF transceivers solutions allowing developers to choose the best solution for their design. With versions optimized for 2.4 GHz (FG22), sub-GHz spectrums (FG23, FG25), and dual-band operation (FG28), Silicon Labs has a wireless SoC solution for most proprietary applications.

With a smaller memory footprint and package options, the FG22 and FG23 are great for small form factor and less resource-intensive designs without sacrificing superior RF performance. Optimized for line-powered devices, the FG25 is a perfect fit for applications that need leading-edge network features like high data rate OFDM, concurrent detection of OFDM and FSK modulations for mixed-use networks, or more robust wired peripherals like USB. Whether it is a need to provision a sub-GHz device using a smart phone or a need to operate both on a local Bluetooth sensor network while supporting long-range LPWAN connectivity, the FG28 opens up multi-protocol use cases that have not previously been supported with EFR32. If there is no need for a more integrated wireless SoC solution, Silicon Labs has a robust portfolio of transceiver solutions to address even the most complex sub-GHz applications. With support for worldwide frequency bands, most standard modulation schemes, and an easy-to-use configuration tool, the Si4xxx family of devices gives users a highly configurable easy-to-use solution.

AI/ML on the Edge Device

Several distinct factors are driving AI processing to the edge device today. Privacy, security, cost, latency, and bandwidth are all being considered when evaluating data center versus edge processing needs. Applications such as speech recognition on smart speakers generate privacy concerns and keeping AI processing on the edge device circumvents these privacy concerns while avoiding the bandwidth, latency, and cost concerns of cloud computing. The Silicon Labs AI/ML Hardware Accelerator speeds up ML inferencing and offloads the calculations from the CPU, leading to faster operation times at lower power. Adding AI/ML features also brings in new applications like predictive maintenance based on condition monitoring and anomaly detection.

Silicon Labs offers a robust toolset for AI/ML applications regardless of a designer's experience or AI/ML knowledge. Partnerships with industry leaders Edge Impulse, SensiML, and Micro AI provide users with platforms to develop end-to-end solutions quickly and easily. From data gathering to model creation and validation, these partners help beginners lower the barrier of entry for AI/ML at the edge. The Silicon Labs Machine Learning Tool Kit (MLTK) gives advanced users the ability to utilize Python scripts to create, train, and validate their machine-learning models.

EFR32FG28 SoC Key Features (Series 2)

EFR32FG28 Flex Gecko SoC is the first sub-GHz proprietary wireless solution offering dual band support for Sub-GHz + 2.4 BLE. Some of its core features includes. FG28 unique.

- 32-bit ARM® Cortex®-M33 core with 78 MHz maximum operating frequency
- Up to 1024 kB of flash and 256 kB of RAM
- Energy-efficient radio core with low active and sleep currents
- Integrated PAs with up to 20 dBm for sub-GHz and 10 dBm for BLE transmit power.
- Robust peripheral set and up to 49 GPIO
- Secure Vault™ (Highest level of IoT security feature) which includes PSA3, TRNG
- Operational temperatures up to 125 °C
- QFN48 and QFN56 package options

Software and Tools - Proprietary Wireless Software Development

The Simplicity Studio IDE includes a powerful suite of tools for energy profiling, Radio configurator, and wireless network analysis, as well as demos, software examples, documentation, technical support, and community forums and making it a compelling choice for IoT developers and manufacturers. The Gecko SDK (GSDK) gives users a single software package to work with regardless of their network needs. Included in the GSDK, the Flex SDK, Amazon Sidewalk SDK, and Wi-SUN SDK provide users with a proven, ready to use platform on which to build their end applications. This common platform approach allows users to focus on building their products rather than worrying about the underlying connectivity standard. When combined with our flexible wireless SoC portfolio, a single hardware design can support multiple Sub-GHz wireless protocols with a simple firmware change. This simplified design process streamlines SKU management, lowers the overall development cost, and gives users a single toolset and code base regardless of their

EFR32FG28 Key Differentiators

The following are the characteristics that make the

- **Dual-Band (Sub-GHz + 2.4 GHz BLE) Support with Series 2 Performance:** Increased processor performance over FG1x devices including AI/ML hardware accelerator.
- **Multiprotocol Support:** Support for static and dynamic multiprotocol use cases for select Sub-GHz and Sub-GHz + Bluetooth scenarios.
- **Broader Ecosystem Support for Low- power Devices:** Full support for Wi-SUN LFN low-power nodes and Support for both Bluetooth LE and FSK PHYs for Amazon Sidewalk
- **Up to 49 GPIOs for Better System Integration:** Eliminate system complexity by incorporating more into FG28 (QFN68)
- **Migration Path from Earlier FG Devices:** Footprint compatible path from FG12 (QFN68) and FG23 (QFN48)
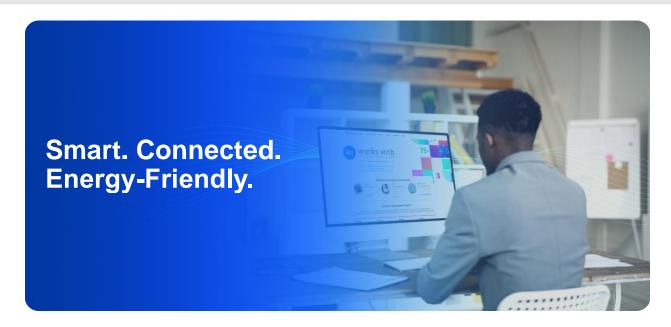

Hardware KITS Example

EFR32xG28 2.4 GHz BLE +14 dBm Radio Board

EFR32FG28 Pro Kit

	EFR32FG22	EFR32FG23	EFR32FG25	EFR32FG28
Supported Protocols	Proprietary CONNECT	Proprietary M-Bus amazon sidewalk mioty CONNECT	Proprietary Wi-SUN CONNECT	Proprietary Wi-SUN amazon sidewalk M-Bus Bluetooth LE CONNECT
Supported Frequencies (MHz)	2400 - 2483.5	110-970	470-928.1	169.4- 928.1
Core type and Max Frequency	Cortex®-M33 @38.4 MHz	Cortex®-M33 @78 MHz	Cortex®-M33 @97.5 MHz	Cortex®-M33 @78 MHz
Max Flash (in kB)	512	512	1920	1024
Max RAM (in kB)	32	64	512	256
GPIOs	26	31	37	49

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