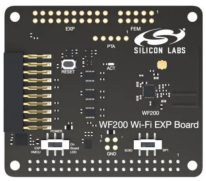

SILICON LABS Wi-SUN SDK Wireless Smart Ubiquitous Network User Guide

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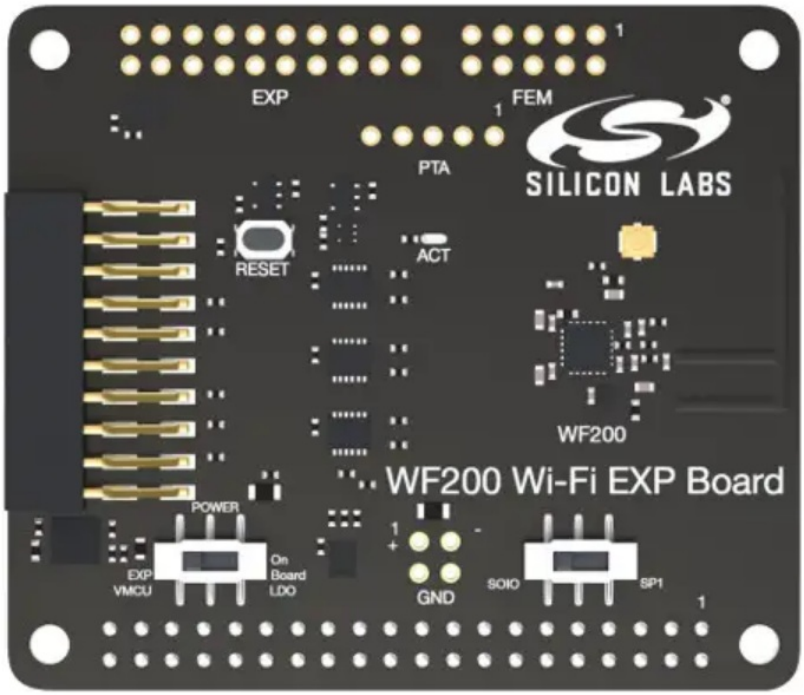


Wireless Smart Ubiquitous Network (Wi-SUN) is the leading IPv6 sub-GHz mesh technology for smart city and smart utility applications. Wi-SUN brings Smart Ubiquitous Networks to service providers, utilities, municipalities/local government, and other enterprises, by enabling interoperable, multi-service, and secure wireless mesh networks. Wi-SUN can be used for large-scale outdoor IoT wireless communication networks in a wide range of applications covering both line-powered and battery-powered nodes.

Silicon Labs' Wi-SUN hardware is certified by the Wi-SUN Alliance, a global industry association devoted to seamless LPWAN connectivity. Wi-SUN builds upon open standard internet protocols (IP) and APIs, enabling developers to extend existing infrastructure platforms to add new capabilities. Built to scale with longrange

capabilities, high-data throughput and IPv6 support, Wi-SUN simplifies wireless infrastructure for industrial applications and the evolution of smart cities.

These release notes cover SDK versions:
1.7.2.0 released March 13, 2024
1.7.1.0 released October 9, 2023
1.7.0.0 released July 26, 2023
1.6.0.0 released June 7, 2023

KEY FEATURES

Wi-SUN Stack

- EFR32FG28 support
- Connection time improvements
- LFN support improvements

Wi-SUN Applications

- Firmware over-the-air update
- Wi-SUN configurator update

Contents

Compatibility and Use Notices

For information about security updates and notices, see the Security chapter of the Gecko Platform Release notes installed with this SDK or on the TECH DOCS tab on **https://www.silabs.com/developers/wi-sun-protocol-stack**. Silicon Labs also strongly recommends that you subscribe to Security Advisories for up-to-date information. For instructions, or if you are new to the Silicon Labs Wi-SUN SDK, see Using This Release.

Compatible Compilers:

IAR Embedded Workbench for ARM (IAR-EWARM) version 9.20.4

- Using wine to build with the IarBuild.exe command line utility or IAR Embedded Workbench GUI on macOS or Linux could result in incorrect files being used due to collisions in wine's hashing algorithm for generating short file names.
- Customers on macOS or Linux are advised not to build with IAR outside of Simplicity Studio. Customers who do should carefully verify that the correct files are being used.

GCC (The GNU Compiler Collection) version 10.3-2021.10, provided with Simplicity Studio.

Wi-SUN Stack

New Items

Added in release 1.7.2.0

- Added support for FAN1.1 Indian PHY configuration.

Added in release 1.7.0.0

- LFN devices are now able to enter in Energy Mode 2 (EM2) if the application allows it. For more information about the power management and the different energy modes, refer to the Power Manager section of the Gecko Platform documentation on **docs.silabs.com**.
- Added support for PAN-Wide IE
- Adapted EDFE support for FAN 1.1.
- Adapted MPL support for FAN 1.1.

Added in release 1.6.0.0

- Added a new API sl_wisun_set_lfn_parameters() that configures all the LFN-specific settings.
- Added a new API sl_wisun_set_lfn_support() that sets the maximum number of LFNs that can be connected to a single FFN.
- Added a new API sl_wisun_set_mode_switch() that supersedes sl_wisun_set_mode_switch().The old API is still available but it is recommended to move to the more recent one.
- Add a new API sl_wisun_set_pti_state() that enable the Packet Trace Interface (PTI). For more information about the PTI in the context of Wi-SUN, refer to Wi-SUN's Getting Started section on docs.silabs.com.
- Implemented LFN LGTK rotation
- Added support for a non-standard OFDM 64QAM PHY.
- Added support for EFR32FG28

Improvements

Changed in release 1.7.0.0

- Major refactoring of the stack internal timekeeping. It used to be based on a global periodic tick timer relying on a very short expiration period. That tick timer was preventing sleepy devices to remain in EM2 for a long period.

Changed in release 1.6.0.0

- Optimized the reconnection of routers to an existing network: if configured to do so, the routers will now try to skip the scanning and authenticated step of the joining procedure.

Fixed Issues

Fixed in release 1.7.2.0

ID #	Description
1215083	Fixed an invalid UDP socket closure when receiving a packet with an empty payload.
1199103	Fixed EDFE frames forwarding. A regression was causing conformance test UNICAST-FWD-EDFE-1 to fail.
1199108	Fixed an issue causing DHCPv6 Identity Association ID (IAID) to be inconsistent across restarts.
1202249	Fixed LFN key exchange ending condition. It was considered completed before the reception of the last acknowledge, causing LPCS packet to be sent too early.
1202254	Fixed LFN broadcast interval starting time estimation.
1203458	Fixed LPC packets source address using the PAN ID.

Fixed in release 1.7.1.0

ID #	Description
1182990	Fixed an issue causing LFN LGTK and frame counter recovery from NVM after a reboot to be skipped.
11838171184251	Fixed an invalid memory access when receiving a multicast packet with a full neighbor table.
1192678	Fixed LFN parent timeout. It was still partially relying on the FFN timeout mechanism.
1192678	Fixed LFN address renewal.
11994591182571	Fixed an invalid memory access in the RCP. It could either trigger an assert “ref_counter <= 0″ or call free() on an invalid memory section.
1187522	Fixed an issue causing a mis-calculation of the ETX.
1171702	Fixed an issue causing an invalid memory access when starting the SoC border router with an invalid PHY configuration
1169705	Added missing Node Role KDE. Routers not supporting LFN parenting were missing the information element and were considered as FAN1.0 devices by Silicon Labs border routers.
1182342	Fixed an interoperability issue when using JP regulatory domain.
1182584	Fixed a race between FHSS and ND causing an invalid memory access when disconnecting itself or an LFN child.
1183110	Fixed FFN LGTK acquisition. FFN were performing a full 4-way handshake instead of a shorter 2-way handshake.
1185038	Fixed an issue causing DHCP lease renewal to happen too often.
1194089	Fixed an issue causing an invalid memory access when starting the stack without any certificate.

Fixed in release 1.7.0.0

ID #	Description
1146094	Frame counters were not increased on retries.
1112287	Fixed an issue causing UDP packets to be silently dropped. This was caused by an inappropriate management of fragmented packets.
1116119	Fixed an issue causing a suitable neighbor to be refused as a potential parent. Data packets missing a US-IE were refused when they should have been accepted. The stack was not keeping track of the US-IE received during the authentication process. This was causing interoperability issues with Nissin System routers.
1157424	Fixed an improper stack initialization when used outside of a project generated with SLC.
1151086	Fixed an issue causing a memory corruption when disconnecting LFN.

Fixed in release 1.6.0.0

ID #	Description
1120635	Fixed an issue that could cause acknowlges to be sent to the wrong channel.
11137731130990	Fixed several issues that could cause an assert after a call to sl_wisun_disconnect().
1110318	Fixed an issue that could cause a mutex to be kept for an undefined period of time. It was causing devices to be indefinitely stalled.

Known Issues in the Current Release

Issues in bold were added since the previous release.

ID #	Description	Workaround
1119464	Packets sent when FSK FEC is enabled can infringe ARIB regulation.	Until this problem has been addressed correctly, the stack will refuse to start if both ARIB enforcement and FEC are enabled.
1067978	Packets sent using a PHY with a bandwidth larger than the base PHY's bandwidth can infringe ARIB regulation.	Limit the communications when using mode switch with ARIB enforcement enabled
1176014	FG25 asserts with a RAIL_ASSERT_FAILED_RTCC_SYNC_STALE_DATA error code when entering EM2	Do not allow the power manager to go to EM2 by adding a requirement on EM1 in the application.

Deprecated Items

None

Removed Items

None

Wi-SUN Applications

New Items

Added in release 1.6.0.0

- Wi-SUN DFU
  - FTP/TFTP
  - CoAP status notification service
  - Gecko bootloader
- Settings for LFN devices
- Collectors pull LFN Meters data based on a configurable schedule

Improvements

Changed in release 1.6.0.0

- Network Analyzer: SUN OFDM Support
- Wi-SUN Configurator
  - LFN support
  - Certification generation
- CLI can be turned ON/OFF completely
- Socket handler refactor
- Memory Optimization
- Aligned the router's and border router's CLI commands

Fixed Issues

Fixed in release 1.7.2.0

ID #	Description
1210967	Border Router SoC: Fixed an error causing a hard fault when connecting more than 22 routers directly to the border router SoC.

Fixed in release 1.7.1.0

ID #	Description
1148156	Removed the device_type setting from the SoC Border Router application. It can only be start ed as a border router.

Fixed in release 1.6.0.0

ID #	Description
1106878	Applications override ping task stack size.
1106861	Race condition in recvfrom().
1099841	Stack overflow in Ping component.
1134408	Event flag handling for FreeRTOS.
1099260	Wi-SUN – SoC Empty + app_core + app_setting – connection failed status:35.

Known Issues in the Current Release

Issues in bold were added since the previous release.

ID #	Description	Workaround
1067236	The border router RCP SPI interface is unstable when used with a throughput higher than 1 Mbytes/s	The use of border router RCP SPI interface is not recommended for t he time being.
	Simplicity Studio – Network Analyzer: • Wi-SUN Encrypted Packets are not supported • Undecoded frames (only after Ack) according to PTI issu es on Series 2	

Deprecated Items
None

Removed Items
None

Using This Release

This release contains the following

- Wi-SUN stack library
- Wi-SUN sample applications
- Wi-SUN border router pre-compiled demos
- Documentation-*

If you are a first time user, see **https://docs.silabs.com/wisun/latest/wisun-getting-started-overview/**

Installation and Use

The Wi-SUN SDK is provided as part of the Gecko SDK (GSDK), the suite of Silicon Labs SDKs. To quickly get started with the GSDK, install Simplicity Studio 5, which will set up your development environment and walk you through GSDK installation. Simplicity Studio 5 includes everything needed for IoT product development with Silicon Labs devices, including a resource and project launcher, software configuration tools, full IDE with GNU

toolchain, and analysis tools. Installation instructions are provided in the online Simplicity Studio 5 User's Guide.

Alternatively, Gecko SDK may be installed manually by downloading or cloning the latest from GitHub. See https://github.com/SiliconLabs/gecko_sdk for more information.

Simplicity Studio installs the GSDK by default in:

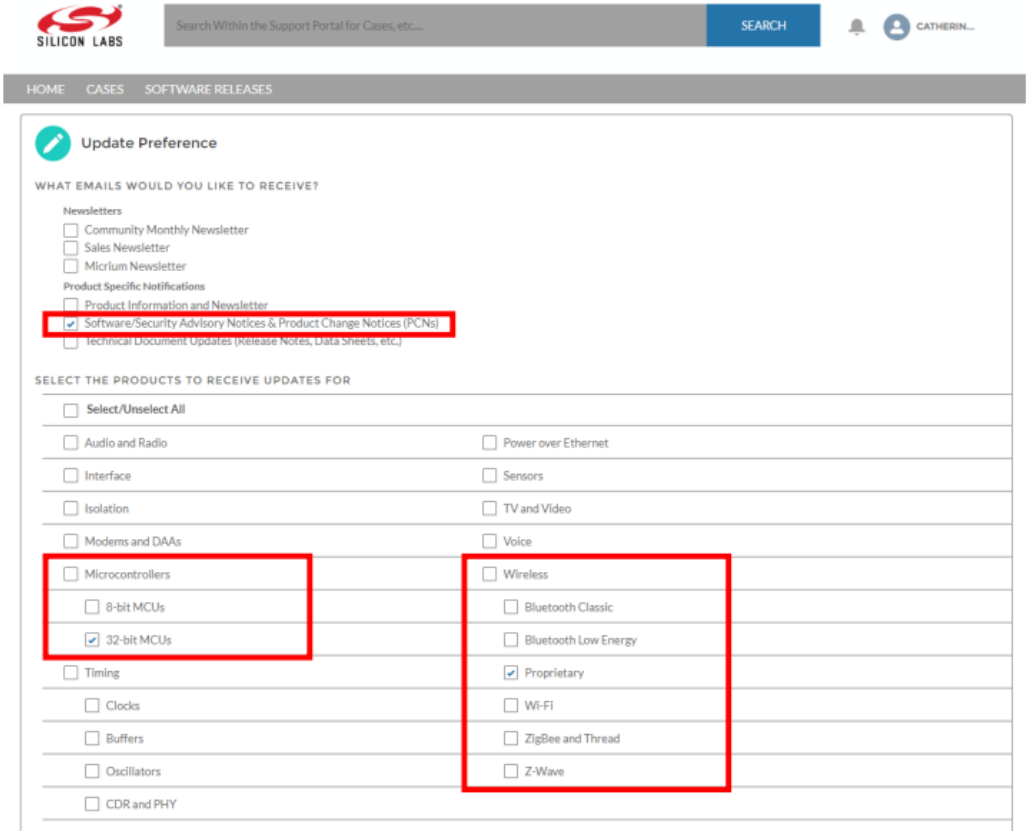
- **(Windows):** C:\Users\\SimplicityStudio\SDKs\gecko_sdk
- **(MacOS):** /Users//SimplicityStudio/SDKs/gecko_sdk

Documentation specific to the SDK version is installed with the SDK.

Security Information

Secure Vault Integration
This version of the stack does not integrate Secure Vault Key Management.

Security Advisories
To subscribe to Security Advisories, log in to the Silicon Labs customer portal, then select Account Home. Click HOME to go to the portal home page and then click the Manage Notifications tile. Make sure that 'Software/Security Advisory Notices & Product ChangeNotices (PCNs)' is checked, and that you are subscribed at minimum for your platform and protocol. Click Save to save any changes.



Support

Development Kit customers are eligible for training and technical support. Contact Silicon Laboratories support at http://www.silabs.com/support.

Simplicity Studio
One-click access to MCU and wireless tools, documentation, software, source code libraries & more. Available for

Windows, Mac and Linux!

 **IoT Portfolio**
www.silabs.com/IoT

 **SW/HW**
www.silabs.com/simplicity

 **Quality**
www.silabs.com/quality

 **Support & Community**
www.silabs.com/community

Disclaimer

Silicon Labs intends to provide customers with the latest, accurate, and in-depth documentation of all peripherals and modules available for system and software implementers using or intending to use the Silicon Labs products. Characterization data, available modules and peripherals, memory sizes and memory addresses refer to each specific device, and "Typical" parameters provided can and do vary in different applications. Application examples described herein are for illustrative purposes only. Silicon Labs reserves the right to make changes without further notice to the product information, specifications, and descriptions herein, and does not give warranties as to the accuracy or completeness of the included information. Without prior notification, Silicon Labs may update product firmware during the manufacturing process for security or reliability reasons. Such changes will not alter the specifications or the performance of the product. Silicon Labs shall have no liability for the consequences of use of the information supplied in this document. This document does not imply or expressly grant any license to design or fabricate any integrated circuits. The products are not designed or authorized to be used within any FDA Class III devices, applications for which FDA premarket approval is required or Life Support Systems without the specific written consent of Silicon Labs. A "Life Support System" is any product or system intended to support or sustain life and/or health, which, if it fails, can be reasonably expected to result in significant personal injury or death. Silicon Labs products are not designed or authorized for military applications. Silicon Labs products shall under no circumstances be used in weapons of mass destruction including (but not limited to) nuclear, biological or chemical weapons, or missiles capable of delivering such weapons. Silicon Labs disclaims all express and implied warranties and shall not be responsible or liable for any injuries or damages related to use of a Silicon Labs product in such unauthorized applications.
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Documents / Resources

	SILICON LABS Wi-SUN SDK Wireless Smart Ubiquitous Network [pdf] User Guide Wi-SUN SDK Wireless Smart Ubiquitous Network, Wi-SUN SDK, Wireless Smart Ubiquitous Network, Smart Ubiquitous Network, Ubiquitous Network, Network

References

- Software Developer Docs - Silicon Labs
- Silicon Labs
- Silicon Labs
- About Us - Silicon Labs
- Silicon Labs Community
- Internet of Things (IoT) - Silicon Labs
- Quality - Silicon Labs
- Simplicity Studio - Silicon Labs
- Technical Support - Silicon Labs
- Introduction - latest - Wi-SUN Silicon Labs
- GitHub - SiliconLabs/gecko_sdk: The Gecko SDK (GSDK) combines all Silicon Labs 32-bit IoT product software development kits (SDKs) based on Gecko Platform into a single, integrated SDK.
- Wi-SUN Protocol Stack - Silicon Labs
- User Manual