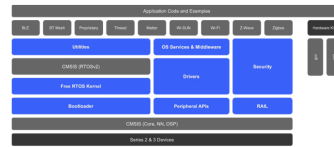


SILICON LABS Proprietary Flex SDK 3.8.0.0 GA Simplicity SDK Suite 2024.6.0



SILICON LABS Proprietary Flex SDK 3.8.0.0 GA Simplicity SDK Suite 2024.6.0 User Manual

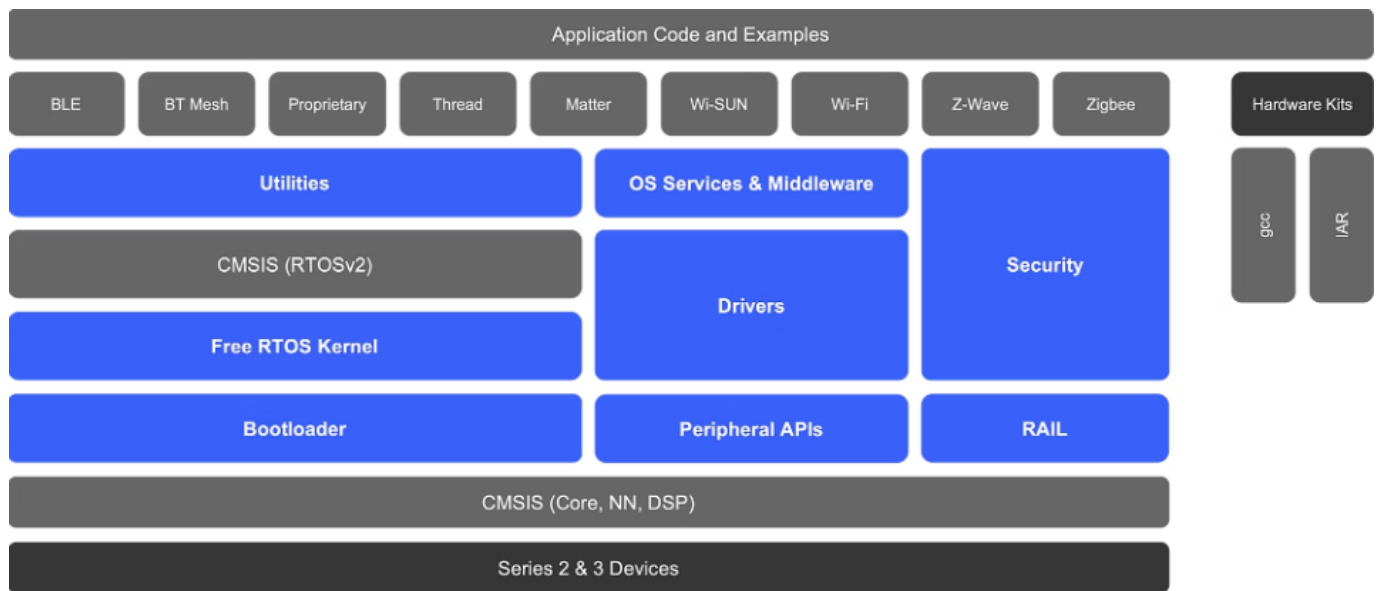
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SILICON LABS Proprietary Flex SDK 3.8.0.0 GA Simplicity SDK Suite 2024.6.0



Specifications

- **Proprietary Flex SDK Version:** 3.8.0.0 GA
- **Simplicity SDK Suite Version:** 2024.6.0 June 5, 2024
- **Supported Wireless Protocols:** Silicon Labs RAIL and Silicon Labs Connect (IEEE 802.15.4-based)
- **Frequency Bands:** Sub-GHz and 2.4 GHz
- **Targeted Network Topologies:** Simple
- **Compiler Compatibility:** GCC version 12.2.1

Product Information

The Proprietary Flex SDK is a comprehensive software development suite tailored for proprietary wireless applications. It provides two implementation options:

1. Utilizes Silicon Labs RAIL for customizable radio interface layer supporting both proprietary and standards-based wireless protocols.
2. Employs Silicon Labs Connect, an IEEE 802.15.4-based networking stack for broad-based proprietary wireless solutions in sub-GHz or 2.4 GHz bands.

The Flex SDK includes extensive documentation, sample applications, and source code examples within the SDK.

Product Usage Instructions

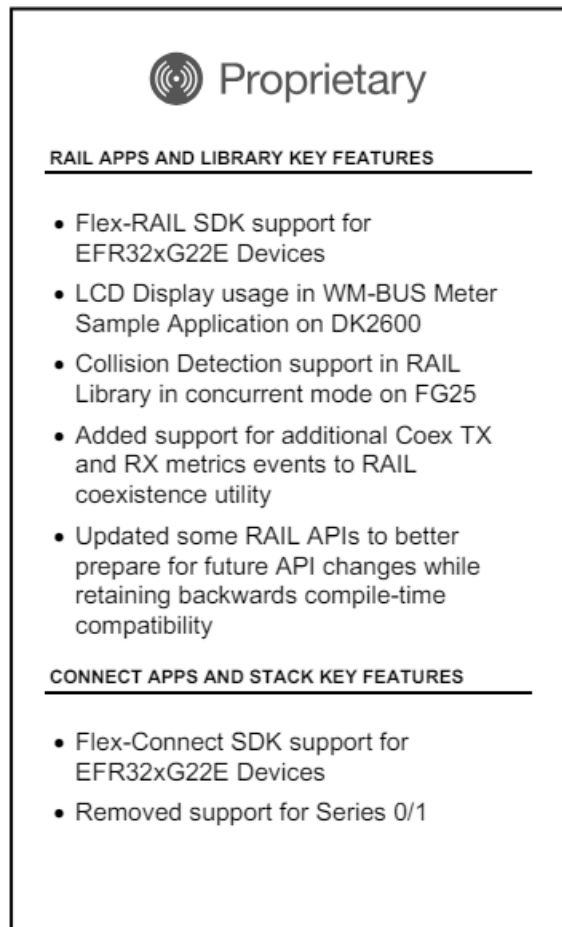
Using Proprietary Flex SDK

1. Choose the implementation option based on your wireless application requirements.
2. Refer to the provided documentation for detailed guidance on utilizing RAIL or Connect.
3. Explore the sample applications to understand the implementation of proprietary wireless functionalities.

Compiler Compatibility

Ensure you are using GCC version 12.2.1 provided with Simplicity Studio for compiling your Flex SDK projects.

- The Proprietary Flex SDK is a complete software development suite for proprietary wireless applications. Per its namesake, Flex offers two implementation options.
- The first uses Silicon Labs RAIL (Radio Abstraction Interface Layer), an intuitive and easily customizable radio interface layer designed to support both proprietary and standards-based wireless protocols.
- The second uses Silicon Labs Connect, an IEEE 802.15.4-based networking stack designed for customizable broad-based proprietary wireless networking solutions that require low power consumption and operate in either the sub-GHz or 2.4 GHz frequency bands. The solution is targeted towards simple network topologies.
- The Flex SDK is supplied with extensive documentation and sample applications. All examples are provided in the source code within the Flex SDK sample applications.
- These release notes cover SDK version(s): 3.8.0.0 GA released June 5, 2024.



Compatibility and Use Notices

For information about security updates and notices, see the Security chapter of the Platform Release Notes installed with this SDK or on the TECH DOCS tab at <https://www.silabs.com/developers/flex-sdk-connect-net-working-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 Flex SDK, see Using This Release.

Compatible Compilers:

IAR Embedded Workbench for ARM (IAR-EWARM) version 9.40.1

- 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 so should carefully verify that the correct files are being used.

GCC (The GNU Compiler Collection) version 12.2.1, provided with Simplicity Studio.

Connect Applications

Simplicity SDK is an embedded software development platform for building IoT products based on our Series 2 and Series 3 wireless and MCU devices. It integrates wireless protocol stacks, middleware, peripheral drivers, a bootloader, and application examples – a solid framework for building power-optimized and secure IoT devices.

The Simplicity SDK offers powerful features such as ultra-low power consumption, strong network reliability, support for a large number of nodes, and abstraction of complex requirements like multiprotocol and pre-certification. Additionally, Silicon Labs provides over-the-air (OTA) software and security updates to remotely update devices, minimize maintenance costs, and enhance the end-user product experience.

Simplicity SDK is a follow-on from our popular Gecko SDK, which will continue to be available providing long-term support for our Series 0 and Series 1 devices. For additional information on the Series 0 and Series 1 devices please reference: [Series 0 and Series 1 EFM32/EZR32/EFR32 device \(silabs.com\)](https://www.silabs.com/developers/gecko-sdk-connect-networking-stack).

- **New Items**

Added in release 3.8.0.0

Support for EFR32xG22E Devices

- **Improvements**

Changed in release 3.8.0.0

None.

- **Fixed Issues**

Fixed in release 3.8.0.0

None.

Known Issues in the Current Release

Issues in bold were added since the previous release. If you have missed a release, recent release notes are available on the TECH DOCS tab on <https://www.silabs.com/developers/flex-sdk-connect-networking-stack>.

ID #	Description	Workaround
652925	EFR32XG21 is not supported for “Flex (Connect) – SoC Light Example DMP” and “Flex (Connect) – So C Switch Example”	
1139850	DMP instabilities with XG27	

Deprecated Items

Deprecated in release 3.8.0.0 None.

Removed Items

Removed in release 3.8.0.0 None.

Connect Stack

New Items

Added in release 3.8.0.0

- Added a new API `emberSetUnencryptedPacketsAcceptance()` that can be called to enable the filtering of unencrypted data packets. If enabled, all unencrypted data will be ignored by the stack and won't be visible from the application layer.

Improvements

Changed in release 3.8.0.0

None.

Fixed Issues

Fixed in release 3.8.0.0

ID #	Description
1294620	Called Silicon Labs thread-safe malloc wrapper instead of the standard malloc. Current dynamic memory allocation could cause memory corruption.

Known Issues in the Current Release

Issues in bold were added since the previous release. If you have missed a release, recent release notes are available on the TECH DOCS tab at <https://www.silabs.com/developers/gecko-software-development-kit>.

ID #	Description	Workaround
	When running the RAIL Multiprotocol Library (used for example when running DMP Connect+BLE), IR Calibration is not performed because of a known issue in the RAIL Multiprotocol Library. As a result, there is an RX sensitivity loss in the order of 3 or 4 dBm.	
501561	In the Legacy HAL component, the PA configuration is hard-coded regardless of the user or board settings.	Until this is changed to properly pull from the configuration header, the file <code>ember-phy.c</code> in the user's project will need to be modified by hand to reflect the desired PA mode, voltage, and ramp time.
711804	Connecting multiple devices simultaneously may fail with a timeout error.	

Deprecated Items

Deprecated in release 3.8.0.0 None

Removed Items

Removed in release 3.8.0.0 None

RAIL Applications

New Items

Added in release 3.8.0.0

- Support for EFR32xG22E Devices

- RAIL – SoC Wireless M-bus Meter:
 - CLI support
 - Three different sensors can be used:
 - Wireless M-bus virtual water meter sensor
 - Wireless M-bus thermometer sensor
 - Wireless M-bus button pulse counter
 - DK2600 7-segment LCD support

Improvements

Changed in release 3.8.0.0

- RAIL – SoC Range Test BLE and IEEE802.15.4: Channels number can be set in real-time both for the BLE and the 15.4 PHYs according to standard.
- RAIL – SoC Mode Switch: The mode switch can be triggered by BTN1.

Fixed Issues

Fixed in release 3.8.0.0

None.

Known Issues in the Current Release

ID #	Description	Workaround
1268208 1268301	The power consumption of <i>DK2600</i> can't be optimized if configuration time for EM2 if UART is used, as the value of <i>SL_IOSTREAM_USART_{instance}_BAUDRATE</i> doesn't take effect. The default value used instead is 115200 bps. <i>The typical</i> use case is the RAIL – SoC Wireless M-bus Meter with DK2600 board.	Update UART baud rate to 9600 bps at Simplicity Studio Admin Console. This is necessary for EM2.

Deprecated Items

Deprecated in release 3.8.0.0 None.

Removed Items

Removed in release 3.8.0.0 None.

RAIL Library

New Items

Added in release 3.8.0.0

- Added support of collision detection for concurrent PHYs on the EFR32xG25 parts.
- Added support for additional Coex TX and RX metrics events to the “RAIL Utility, Coexistence” component.

Improvements

Changed in release 3.8.0.0

- Updated a few APIs to return `RAIL_Status_t` which were previously returning void.

- Updated RAIL_IEEE802154_WriteEnhAck and RAIL_WriteAutoAckFifo() which formerly took the uint8_t ackDataLen parameter now take the uint16_t ackDataLen parameter.
- Added missing runtime equivalent API RAIL_SupportsPathDiversity() of RAIL_SUPPORTS_PATH_DIVERSITY.

Fixed Issues

Fixed in release 3.8.0.0

ID #	Description
1242662	Fixed incorrect default values for SL_RAIL_UTIL_PA_CALIBRATION_ENABLE on the EFR32xG24 and EFR32xG25 parts, along with an issue where Power Amplifier calibrations were not properly disabled when SL_RAIL_UTIL_PA_CALIBRATION_ENABLE was disabled.
1255524	Fixed a dynamic multiprotocol issue where RAIL_BLE_Init() was called (which implicitly establishes the BLE 1Mbps PHY), but after a protocol switch returns to BLE, its RAIL_BLE_ConfigChannelRadioParams() settings were not being properly reapplied.
1256045	Fixed an issue where Signal Identifier options were being errantly displayed in Simplicity Studio for the “RAIL Utility, Coexistence” component on platforms that don’t support the Signal Identifier feature.
1265376	Fixed an issue in the UC components where the RAIL power manager support could be initialized after the radio was started in certain example applications. This would lead to radio state and power mode requirements being improperly tracked, as you must initialize power manager support before any radio operations.
1266003	Fixed an issue where RAIL_BLE_ConfigChannelRadioParams() was improperly overriding the BLE Quppa PHY whitening configuration.

Known Issues in the Current Release

Issues in bold were added since the previous release.

ID #	Description	Workaround
	Using direct mode (or IQ) functionality on EFR32xG23 requires a specifically set radio configuration that is not yet supported by the radio configurator. For these requirements, reach out to technical support who could provide that configuration based on your specification	
641705	Infinite receive operations where the frame’s fixed length is set to 0 are not working correctly on the EFR32xG23 series chips.	

ID #	Description	Workaround
732659	On EFR32xG23: Wi-SUN FSK mode 1a exhibits a PER floor with frequency offsets around ± 8 to 10 KHz Wi-SUN FSK mode 1b exhibits a PER floor with frequency offsets around ± 18 to 20 KHz	

Deprecated Items

- The RAIL 2. x API is planned for deprecation in the 24Q4-GA release (December 2024). At that time, the new RAIL 3.0 API will be released for all supported chips along with a RAIL 2. x compatibility layer and the migration guide.
 - The goal of this new API is to get rid of some unused features, add better support for concurrent listening use cases, and simplify channel and PA configurations.
 - The migration is intended to be straightforward for the majority of customers. However, in some cases, manual help might be required to ease this transition.

Removed Items

None.

Using This Release

This release contains the following:

- Radio Abstraction Interface Layer (RAIL) stack library
- Connect Stack Library
- RAIL and Connect Sample Applications
- RAIL and Connect Components and Application Framework

This SDK depends on the Simplicity Platform. The Simplicity Platform code provides functionality that supports protocol plugins and APIs in the form of drivers and other lower-layer features that interact directly with Silicon Labs chips and modules. Simplicity Platform components include EMLIB, EMDRV, RAIL Library, NVM3, and mbedTLS. Simplicity Platform release notes are available through Simplicity Studio's Documentation tab.

For more information about the Flex SDK v3.x see [UG103.13: RAIL Fundamentals](#) and [UG103.12: Silicon Labs Connect Fundamentals](#). If you are a first-time user, see [QSG168: Proprietary Flex SDK v3.x Quick Start Guide](#).

Installation and Use

The Proprietary Flex SDK is provided as part of the Simplicity SDK, the suite of Silicon Labs SDKs. To quickly get started with the Simplicity SDK, install [Simplicity Studio 5](#), which will set up your development environment and walk you through Simplicity SDK 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, Simplicity SDK may be installed manually by downloading or cloning the latest from GitHub. See

https://github.com/Sili-conLabs/simplicity_sdk for more information.

Simplicity Studio installs the GSDK by default in:

- **(Windows):** C:\Users\<NAME>\SimplicityStudio\SDKs\simplicity_sdk
- **(MacOS):** /Users/<NAME>/SimplicityStudio/SDKs/simplicity_sdk

Documentation specific to the SDK version is installed with the SDK. Additional information can often be found in the knowledge base articles (KBAs). API references and other information about this and earlier releases are available at <https://docs.silabs.com/>.

Security Information

Secure Vault Integration

When deployed to Secure Vault High devices, sensitive keys are protected using the Secure Vault Key Management functionality. The following table shows the protected keys and their storage protection characteristics.

Wrapped Key	Exportable / Non-Exportable	Notes
Thread Master Key	Exportable	Must be exportable to form the TLVs
PSKc	Exportable	Must be exportable to form the TLVs
Key Encryption Key	Exportable	Must be exportable to form the TLVs
MLE Key	Non-Exportable	
Temporary MLE Key	Non-Exportable	
MAC Previous Key	Non-Exportable	
MAC Current Key	Non-Exportable	
MAC Next Key	Non-Exportable	

- Wrapped keys that are marked as “Non-Exportable” can be used but cannot be viewed or shared at runtime.
- Wrapped keys that are marked as “Exportable” can be used or shared at runtime but remain encrypted while stored in Flash.
- For more information on Secure Vault Key Management functionality, see [AN1271: Secure Key Storage](#).

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 Change Notices (PCNs)’ is checked, and that you are subscribed at minimum for your platform and protocol. Click Save to save any changes.



Update Preference

WHAT EMAILS WOULD YOU LIKE TO RECEIVE?

Newsletters

- ☐ Community Monthly Newsletter
- ☐ Sales Newsletter
- ☐ Micrium Newsletter

Product Specific Notifications

- ☐ Product Information and Newsletter
- ☒ Software/Security Advisory Notices & Product Change Notices (PCNs)
- ☐ Technical Document Updates (Release Notes, Data Sheets, etc.)

SELECT THE PRODUCTS TO RECEIVE UPDATES FOR

☐ Select/Unselect All

☐ Audio and Radio

☐ Power over Ethernet

☐ Interface

☐ Sensors

☐ Isolation

☐ TV and Video

☐ Modems and DAAs

☐ Voice

☐ Microcontrollers

☐ Wireless

☐ 8-bit MCUs

☐ Bluetooth Classic

☒ 32-bit MCUs

☐ Bluetooth Low Energy

☐ Timing

☒ Proprietary

☐ Clocks

☐ Wi-Fi

☐ Buffers

☐ ZigBee and Thread

☐ Oscillators

☐ Z-Wave

☐ CDR and PHY

Support

Development Kit customers are eligible for training and technical support. Use the [Silicon Labs Flex web page](#) to obtain information about all Silicon Labs Thread products and services, and to sign up for product support. You can 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/loT

- SW/HW

www.silabs.com/simplicity

- Quality

www.silabs.com/quality

- Support & Community

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Silicon Laboratories Inc.

400 West Cesar Chavez Austin, TX 78701
USA

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FAQ

- **Q: What are the key features of the RAIL Apps and Library?**

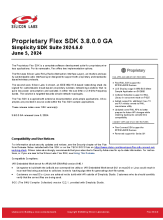
- A: The RAIL Apps and Library offer intuitive and customizable radio interface layer functionalities to support both proprietary and standards-based wireless protocols.

- **Q: What are the main features of the Connect Apps and Stack?**

- A: The Connect Apps and Stack provides an IEEE 802.15.4-based networking stack for customizable

proprietary wireless networking solutions operating in sub-GHz or 2.4 GHz frequency bands, targeted towards simple network topologies.

Documents / Resources

	SILICON LABS Proprietary Flex SDK 3.8.0.0 GA Simplicity SDK Suite 2024.6.0 [pdf] User Manual Proprietary Flex SDK 3.8.0.0 GA Simplicity SDK Suite 2024.6.0, Flex SDK 3.8.0.0 GA Simplicity SDK Suite 2024.6.0, 3.8.0.0 GA Simplicity SDK Suite 2024.6.0, Simplicity SDK Suite 2024.6.0, SDK Suite 2024.6.0, Suite 2024.6.0, 2024.6.0
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References

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