



Proprietary Flex SDK 3.4.0.0 GA

Gecko SDK Suite 4.1

June 8, 2022

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 operates 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 source code within the Flex SDK sample applications.

These release notes cover SDK version(s):

3.4.0.0 GA released June 8, 2022



RAIL APPS AND LIBRARY KEY FEATURES

- EFR32xG24 GA with Antenna Diversity support
- FGM230S proprietary module GA
- Secure Vault integration to Connect stack
- BGM220 Range Test + DMP pre-compiled demo with EFR Connect Mobile Application

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/flex-sdk-connect-networking-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 9.20.4

- 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.

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1 Connect Applications

1.1 New Items

Added in release 3.4.0.0

- PSA Crypto API usage
- Major update of Connect - SoC ECDH Key Exchange

1.2 Improvements

None

1.3 Fixed Issues

None

1.4 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) - SoC Switch Example" | |

1.5 Deprecated Items

None

1.6 Removed Items

None

2 Connect Stack

2.1 New Items

Added in release 3.4.0.0

- All of the crypto operations are now made through ARM PSA Crypto API, enabling the storage of the network security key in the Secure Vault.
- Added a new API `emberSetPsaSecurityKey()` that indicates which PSA Crypto key handler has to be used by the stack. It is the application's responsibility to create the key. The old `emberSetSecurityKey()` no longer designates the key used by the network. It can be used to erase an old key from its previous location in NVM.
- Added a new API `emberRemovePsaSecurityKey()` that cancels the effects of `emberSetPsaSecurityKey()`. It does not erase the key. It is the application's responsibility to destroy the key.

2.2 Improvements

None

2.3 Fixed Issues

Fixed in release 3.4.0.0

| ID # | Description |
|--------|---|
| 833232 | Fixed an error the was causing Connect Application Framework IPC to write to the address 0. |

2.4 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/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 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. | |

2.5 Deprecated Items

None

2.6 Removed Items

None

3 RAIL Applications

3.1 New Items

Added in release 3.4.0.0

- EFR32xG24 support
- FGM230S support
- RAIL Bluetooth DMP - SoC Range Test BLE and IEEE802.15.4 demos for some XGM210 boards

3.2 Improvements

None

3.3 Fixed Issues

None

3.4 Known Issues in the Current Release

None

3.5 Deprecated Items

None

3.6 Removed Items

None

4 RAIL Library

4.1 New Items

Added in release 3.4.0.0

- The RAIL channel of a received packet is now available in the packet's `RAIL_RxPacketDetails_t::channel` field. This can be of value when scanning or hopping across multiple channels while letting packets accumulate in the receive FIFO for later processing.
- Added the `RAIL_ConfigPaAutoEntry` API to allow for easier configuration of PA auto mode operation in RAIL.
- Added the `RAIL_SetRssiDetectThreshold` API to allow the user to detect when the RSSI is at or above a configurable threshold. Once configured, the `RAIL_EVENT_DETECT_RSSI_THRESHOLD` event can be used to detect when this happens.
- Added support for the MGM240L022RNF module.
- Added support for the FGM230SA27HGN and FGM230SBHGN modules.
- Added the `RAIL_GetChannelAlt` API. This function returns the channel the radio is currently using. If using DMP and run on the inactive protocol it returns the channel that will be used when next switching to that protocol. When using channel hopping, mode switch, and other features that change channels dynamically this may be different than what is returned by `RAIL_GetChannel`, as this function will track what channel the radio is actually on at that moment and not what it started on.

4.2 Improvements

Changed in release 3.4.0.0

- The "RAIL Utility, PTI" component will now validate that the correct set of pins are in use for the desired PTI mode.
- RAIL will now error if attempting to start a CSMA or LBT transmit while a scheduled RX is still in progress or vice versa.
- Added PA curves for BGM240P and MGM240P modules.
- Restricted the `SL_RAIL_UTIL_PA_RAMP_TIME_US` to 10us on some EFR32 modules to match the certification conditions.

4.3 Fixed Issues

Fixed in release 3.4.0.0

| ID # | Description |
|--------|--|
| 376658 | Fixed an issue with the Bluetooth LE coded PHY on EFR32xG21 where a packet received with a corrupt coding indicator would result in an invalid start-of-packet timestamp. |
| 759793 | Fixed an issue with Bluetooth LE long-range reception on EFR32xG21 that corrupted packet data and tripped <code>RAIL_ASSERT_FAILED_UNEXPECTED_STATE_RX_FIFO</code> . |
| 772769 | Fixed an issue when running IR Calibration on the EFR32xG23 using <code>RAIL_CalibrateIrAlt</code> where we could compute an invalid IRCAL value for certain PHYs and chips. |
| 777427 | Fixed support for using the signal identifier CCA modes simultaneously with a user-enabled signal identifier trigger event. |
| 819644 | Fixed an issue with frame-type decoding PHYs running at more than 500 kbps on EFR32xG22 and later. |
| 825083 | Fixed an issue on EFR32xG23 and EFR32xG24 where PTI could merge multiple receive packets into the same transaction when interrupt latency is significant. |
| 829499 | Fixed an issue where <code>RAIL_GetRadioStateDetail</code> would not report the correct state information when frame detection was disabled or during an LBT operation. |
| 830214 | Ensure that the <code>RAIL_RadioConfigChangedCallback_t</code> is called for all RAIL handles in a dynamic multiprotocol application where multiple handles use the same underlying PHY configuration. |
| 835299 | Fixed an issue with dynamic handling of whitening and FCS in FSK when only <code>RAIL_IEEE802154_E_OPTION_GB868</code> was enabled. |
| 844600 | Fixed an issue of not being able to receive packets during a <code>RAIL_ScheduleRx</code> configured with a zero relative start time when Power Manager sleep is enabled and configured with an EM2 or lower energy requirement. |

4.4 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. | |
| 732659 | On EFR32xG23: <ul style="list-style-type: none"> • 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 | |
| 819544 | Rx duty cycle mode does not work reliably on the EFR32xG24 platform. | |
| 818707 | BLE CTE timings are sometimes slightly off when using the EFR32xG24 with a 38.4MHz crystal. | |

4.5 Deprecated Items

None

4.6 Removed Items

None

5 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 Gecko Platform. The Gecko 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. Gecko Platform components include EMLIB, EMDRV, RAIL Library, NVM3, and mbedTLS. Gecko 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](#).

5.1 Installation and Use

The Proprietary Flex 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\<<NAME>\SimplicityStudio\SDKs\gecko_sdk
- (MacOS): /Users/<NAME>/SimplicityStudio/SDKs/gecko_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 is available on <https://docs.silabs.com/>.

5.2 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.

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5.3 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>.

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