Gecko Platform 2.6.4.0 GA
19Q2 Gecko SDK Suite
November 9, 2019

The Gecko Platform provides infrastructure support for applications developed with higher-level protocols, and it provides an interface with the underlying hardware. It is composed of the following modules:

EMLIB is a low-level peripheral support library that provides a unified API for all Silicon Labs EFM32, EZR32 and EFR32 MCUs and SoCs. EMLIB modules are provided for all peripherals and core features.

EMDRV is the Gecko Platform driver library for EFM32, EZR32 and EFR32 on-chip peripherals. Drivers are typically DMA-based and use all available low-energy features.

RAIL (Radio Abstraction Interface Layer) provides a customizable radio interface layer that supports proprietary or standards-based wireless protocols. RAIL use by application protocols such as Silicon Labs Zigbee or Silicon Labs Connect is managed through the stack library. Direct RAIL use is exposed through the Flex SDK.

NVM3 (Non-Volatile Memory Version 3) is a data storage driver that provides a means to read and write data objects (key/value pairs) stored in flash memory. NVM3 can be used with the Bluetooth, Zigbee, Thread, and Connect protocol stacks.

mbed TLS provides an SSL library that makes it easy to use cryptography and SSL/TLS in your applications. mbed TLS is open source software licensed by ARM Limited.

This document aggregates information that was – in previous releases – spread across multiple documents. In earlier versions of the Gecko SDK, this content would have been found in: 32-bit MCU SDK Release Notes, RAIL Library Release Notes, and EmberZNet SDK Release Notes.

These release notes cover SDK version(s):

Gecko SDK 2.6.4.0 GA released November 9, 2019.
Gecko SDK 2.6.3.0 GA released September 13, 2019.
Gecko SDK 2.6.2.0 GA released August 16, 2019.
Gecko SDK 2.6.1.0 GA released July 19, 2019.
Gecko SDK 2.6.0.0 GA released June 7, 2019.

KEY FEATURES

EMLIB
- Added support for PLFRCO on EFR32xG13 Rev D devices using the em_cmu API

RAIL Library
- Added support for synchronizing the RAIL time base to the PLFRCO on EFR32xG13 Rev D devices
- Improved the configuration switch time in dynamic multiprotocol applications
- Added a new Packet Trace (PTI) message for switching protocols in dynamic multiprotocol applications
- Improved the LQI value returned for IEEE 802.15.4-based PHYs

NVM3
- If the data object exists with the same length, its old content is compared with the new and only if the new content is different from the old it will be written.

mbed TLS
- Added TRNG support for EFR32xG13 Rev. D devices

Contents

1 EMLIB

1.1 New Items

Added in release 2.6.1.0

The SE_OTPInit_t-struct has been expanded to include the options to apply narrow and full-page locks. The documentation of the existing struct-members has been improved.

Added in release 2.6.0.0

Added AES PCBC mode to em_crypto.

Added support for PLFRCO on EFR32xG13 Rev D devices using the em_cmu API. This oscillator is supported on some Rev D devices. Note that using PLFRCO on previous revisions will result in an assertion error, and code trying to enable this oscillator will block and not return.

Added support for LFRCO precision configuration for Series 2.

Added LETIMER_CounterGet() and LETIMER_CounterSet() functions to em_letimer.

Added TIMER_SyncWait() function to em_timer.

1.2 Improvements

Changed in release 2.6.0.0

Updated handling of SYNCBUSY for EMLIB modules. Added waiting for SYNCBUSY when disabling peripherals on Series 2.

The return type of CAN_ReadMessage() has been changed from void to Boolean. This is to catch if the message object stored in RAM is both new (i.e., was not read earlier) and valid. The message object in RAM is read only if the message stored in it is new and valid. This is done by reading DATAVALID bit. and the function returns accordingly.

1.3 Fixed Issues

Fixed in release 2.6.1.0

ID #	Description
405356	em_letimer: Previously, when calling LETIMER_Init() with comp0Top=true, the code would always write to the COMP0 or TOP register even if topValue was zero. This has now been changed so that the COMP0 or TOP register is written only if the topValue is != 0. This is to preserve backwards compatibility with applications that call LETIMER_CompareSet() before LETIMER_Init().

Fixed in release 2.6.0.0

ID #	Description
385681	Corrected GPIO port D pin count for EFR32xG13, EFR32xG14 and xGM13 devices.
391269	In the license example for SLSTK3402A_EFM32PG12, reorder calls to ACMP_Init and ACMP_VASetup in order to avoid ACMP_Init overwriting registers set by ACMP_VASetup.
394568	Fixed GPIO availability info in CMSIS device header files for Series 2.
375136	Added a workaround for EFM32ZG and EFM32HG devices that deals with a problem reported in errata EMU_E107. (EMU_E107: An HF-IRQ received during EM2 or EM3 entry would cause the EMU to ignore the SLEEPDEEP-flag.)

1.4 Known Issues

None

1.5 Deprecated Items

None

1.6 Removed Items

None

2 EMDRV

2.1 New Items

Added in release 2.6.0.0

Added support for PLFRCO in RTCDRV.

2.2 Improvements

None

2.3 Fixed Issues

None

2.4 Known Issues

None

2.5 Deprecated Items

None

2.6 Removed Items

None

3 RAIL Library

3.1 New Items

Added in release 2.6.2.0

Added support for new xGM210L lighting module radio boards.

Added two new events, RAIL_EVENT_RX_SCHEDULED_RX_MISSED and RAIL_EVENT_TX_SCHEDULED_TX_MISSED, which inform the user when scheduled Rx/Tx are missed after waking from RAIL_Sleep(). This can happen if the specified wakeup time is not long enough.

Added in release 2.6.1.0

Added RAIL_TX_POWER_LEVEL_MAX, which can be used to set the max PA power level across PA's. RAIL_TX_POWER_LEVEL_INVALID was added in 2.7.0 as the value 255. Some customers were using 255 to set max power across PA's with RAIL_SetTxPower, which previously worked, but will now return an error.

Added in release 2.6.0.0

Added new 802.15.4 RAIL APIs – RAIL_IEEE802154_EnableEarlyFramePending() and RAIL_IEEE802154_EnableDataFramePending() – to support Thread 1.2 enhanced frame pending feature.

Added new 802.15.4 RAIL APIs – RAIL_IEEE802154_ConfigGOptions() and RAIL_IEEE802154_ConfigEOptions() – for configuring certain 802.15.4E-2012 and G-2012 features needed by GB868.

Added support for Z-Wave node ID based packet filtering via the RAIL_ZWAVE_OPTION_NODE_ID_FILTERING option.

Added support to RAIL_Sleep() for the PLFRCO on EFR32xG13 Rev D parts.

Added information to packet trace for every protocol switch in dynamic multiprotocol, telling the user what protocol we have changed to, as well the radio event that triggered this switch. This information is visible in Network Analyzer for better debugging of DMP applications.

Added support for the radio sending an ACK packet automatically when in Z-Wave mode as long as node ID filtering and Auto_Ack features are enabled and a packet requesting an ACK is sent to the device.

Added a new API – RAIL_UseDma() – which can be used to enhance RAIL startup speed, if called before RAIL_Init().

3.2 Improvements

Changed in release 2.6.3.0

Improved interoperability with many common devices for the Viterbi 1Mbps Bluetooth Low Energy PHY on EFR32xG13 chips. For best interoperability we recommend using the RAIL_BLE_ConfigPhy1Mbps() standard PHY.

Changed in release 2.6.0.0

Reduced switch time overhead for dynamic multiprotocol applications. The new switch times as well as information about them are documented in the rail_multiprotocol page.

Changed the LQI metric for the 2.4GHz IEEE802.15.4 PHY configurations to be scaled from 0 - 255 and to include more data to make it more stable. This can impact existing applications that are using the LQI values returned in prior RAIL versions.

In RAILTest, if receive was entered because of a transmit state transition, we would not change the channel when calling setChannel and would ignore calls to `rx 1` to enter normal receive mode.

Improved documentation of RAIL_RxPacketStatus_t values and their corresponding RAIL_Events_t events.

Use of the unsafe enum GPIO_Port_TypeDef within RAIL aggregate types RAIL_PtiConfig_t and RAIL_AntennaConfig_t has been replaced by safe uint8_t.

Clarified that RAIL_EVENT_TX_BLOCKED and RAIL_EVENT_TX_CHANNEL_BUSY leave the TX FIFO intact without consuming any of its packet data.

3.3 Fixed Issues

Fixed in release 2.6.4.0

ID #	Description
436215	Fixed an issue on the EFR32xG13 parts that caused the 2Mbps BLE IFS time to be incorrect when receiving very short packets.

Fixed in release 2.6.3.0

ID #	Description
405430	Fixed an issue where the EFR32xG13 platform could become stuck while receiving a frame. The radio would become unresponsive when receiving in Bluetooth Low Energy 1 Mbps or 2 Mbps modes.
431229	Fixes an issue on EFR32xG1x devices that could cause the transmit power level to be incorrect when using the low power 2.4GHz PA (RAIL_TX_POWER_MODE_2P4_LP).

Fixed in release 2.6.2.0

ID #	Description
421410	Fixed an issue (introduced in Patch 1) concerning Tx PTI on the EFR32xG13 Wireless Gecko, which appended an extra byte of information that confused the network analyzer.

Fixed in release 2.6.1.0

ID	Description
337468	Fixed an issue where calling RAIL_Sleep() when no RAIL events are pending would not stop and synchronize the clock source as requested, but instead it would return success indicating that it had. The clock source will now be properly stopped and synchronized even if there are no events pending, and it will be the user's responsibility to wake up on time.
337468	Fixed an issue where calling RAIL_Wake() without first successful calling RAIL_Sleep() could cause the clock source to drift even when using RAIL_SLEEP_CONFIG_TIMERSYNC_ENABLED.
389462	Fixed an issue with RAIL_Calibrate() in multiprotocol, which would return RAIL_STATUS_INVALID_STATE if it is called with an inactive railHandle. Now, RAIL_Calibrate() will make the given railHandle active, if not already, and perform calibration.
389462	Fixed an issue with RAIL_Calibrate() where after completing calibration the radio would no longer be able to receive any packets, sometimes, until it was reset.

401826	Fixed several issues and race conditions with RAIL_ScheduleRx() window-end handling and event reporting to conform to its intended design:
	• When the RX window ends with no RAIL_EVENTS_RX_COMPLETION imminent, RAIL_EVENT_RX_SCHEDULED_RX_END is posted.
	• When the RX window is implicitly ended by one of the RAIL_EVENTS_RX_COMPLETION – for example, because it results in an RX transition to Idle or because RAIL_ScheduleRxConfig_t::rxTransitionEndSchedule is non-zero – the event(s) posted depend on that setting:
	   o When zero, both events are posted simultaneously.
	   o When non-zero, only the appropriate RAIL_EVENTS_RX_COMPLETION is posted, unless that event is not enabled, in which case RAIL_EVENT_RX_SCHEDULED_RX_END is substituted instead.
	• When the RX window ends while receiving a packet, it is deferred to the expected RX completion event (which includes aborting that packet when RAIL_ScheduleRxConfig_t::hardWindowEnd is non-zero). Event(s) reported at that time are the same as in the previous case.

406276	Restored ability for RAIL_StartCcaCsmaTx() and RAIL_StartCcaLbtTx() to perform an immediate transmit when their respective RAIL_CsmaConfig_t::csmaTries or RAIL_LbtConfig_t::lbtTries is 0.This functionality was improperly removed in 2.6.0.
406302	Resolved multiple compilation issues related to building with HAL_COEX_RUNTIME_PHY_SELECT and HAL_ANTDIV_RX_RUNTIME_PHY_SELECT macros enabled.
407047	Fixed an EFR32xG21 issue where CSMA/LBT CCA durations were significantly shorter than specified.
408096	Fixed the 802.15.4 ACK turnaround time on the EFR32xG21 platform. Due to a calculation error this was actually 18us too short which could cause interoperability problems.

Fixed in release 2.6.0.0

ID	Description
360371	Fixed an issue where calling RAIL_GetTxPowerDbm prior to calling RAIL_SetTxPower would return -500 (i.e., -50dBm). As a part of the fix, we now return an invalid dBm value, RAIL_TX_POWER_MIN, if RAIL_SetTxPower was not called before calling RAIL_GetTxPowerDbm or if RAIL_SetTxPower it returns an error status.
370805	Fixed an issue with the EFR32xG21 reporting a phantom packet on PTI after reset.
376229	Fixed an issue with Rx antenna diversity operation that prevented CCA from working, causing CSMA failures.
392350	Corrected an issue where the radio might be left in receive after a RAIL_EVENT_TX_BLOCKED or RAIL_EVENT_TX_CHANNEL_BUSY when the transmit RAIL_StateTransitions_t::error is RAIL_RF_STATE_IDLE.
400303	Corrected an issue where RAIL_EVENT_TX_CHANNEL_BUSY due to RAIL_CsmaConfig_t::csmaTimeout or RAIL_LbtConfig_t::lbtTimeout would prevent further transmits.
400303	Corrected an issue where an invalid RAIL_CsmaConfig_t::ccaDuration or RAIL_LbtConfig_t::lbtDuration too large for the radio configuration to handle would not fail the respective transmit; this now returns RAIL_STATUS_INVALID_PARAMETER.

3.4 Known Issues

None

3.5 Deprecated Items

<u>Deprecated in release 2.6.0.0</u>

Use of the RAIL_BLE_Coding_t values RAIL_BLE_Coding_125kbps_DSA and RAIL_BLE_Coding_500kbps_DSA is deprecated. These should be replaced with the more generic RAIL_BLE_Coding_125kbps and RAIL_BLE_Coding_500kbps values respectively. For now, choosing either value will result in the same underlying behavior.

3.6 Removed Items

None

4 NVM3 (Non-Volatile Memory Version 3)

4.1 New Items

Added in release 2.6.0.0

Added two new functions: nvm3_enumDeletedObjects and nvm3_countDeletedObjects.

4.2 Improvements

Added in release 2.6.4.0

The nvm3_writeData function has got a new data compare feature. If the data object exists with the same length, its old content is compared with the new and only if the new content is different from the old it will be written.

4.3 Fixed Issues

None

4.4 Known Issues

None

4.5 Deprecated Items

None

4.6 Removed Items

None

5   mbed TLS

5.1   New Items

Added in release 2.6.0.0

Added TRNG support for EFR32xG13 and xGM13 revD devices.

5.2   Improvements

Changed in release 2.6.0.0

Upgraded to mbed TLS 2.7.10.

5.3   Fixed Issues

Fixed in release 2.6.0.0

ID	Description
396073	Fixed an issue where hardware accelerated implementations were not removed if not included through configuration. Hardware accelerated implementations are now excluded if the corresponding *_C define is not present in the configuration file.

5.4   Known Issues

ECDSA curve P224 is not supported for xG21 and xGM21 products.

5.5   Deprecated Items

None

5.6   Removed Items

None

6 Legal

6.1 Disclaimer

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