



# Gecko Platform 2.7.6.0 GA

## Gecko SDK Suite 2.7

### May 27, 2020

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:

**CMSIS and EMLIB** are low-level core and peripheral support libraries. EMLIB provides a complete peripheral API for all Silicon Labs EFM32, EZR32 and EFR32 MCUs and SoCs.

**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.

The **Gecko Bootloader** is a code library configurable through Simplicity Studio's IDE to generate bootloaders that can be used with a variety of Silicon Labs protocol stacks. The Gecko Bootloader can be used with EFM32 and EFR32 Series 1 and later devices.

This document aggregates information that in previous releases was 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 the Gecko Bootloader change log.

These release notes cover SDK version(s):

- Gecko Platform 2.7.6.0 GA released May 27, 2020
- Gecko Platform 2.7.5.0 GA released May 1, 2020
- Gecko Platform 2.7.4.0 GA released April 22, 2020
- Gecko Platform 2.7.3.0 GA released March 20, 2020
- Gecko Platform 2.7.2.0 GA released February 21, 2020
- Gecko Platform 2.7.1.0 GA released January 24, 2020
- Gecko Platform 2.7.0.0 GA released December 13, 2019



#### KEY FEATURES

##### CMSIS

- Bug fixes

##### EMLIB

- Bug fixes and deprecations

##### EMDRV

- Bug fixes and deprecations

##### RAIL Library

- Added support for a mode to select the best PA for a given power level
- Added support for new IEEE 802.15.4G-2012 features

##### NVM3

- Fixed data corruption bug

##### mbed TLS

- Added AES-GCM support for Series-2
- Updated mbed TLS library to version 2.7.12

##### Gecko Bootloader

- Added certificate support
- Added EZSP GPIO plugin
- Added UART driver

##### Other Gecko Platform Software

- Updated LwIP Package to version 2.1.2

Contents

- 1 CMSIS ..... 4
  - 1.1 New Items..... 4
  - 1.2 Improvements..... 4
  - 1.3 Fixed Issues ..... 4
  - 1.4 Known Issues in the Current Release ..... 4
  - 1.5 Deprecated Items ..... 4
  - 1.6 Removed Items ..... 4
- 2 EMLIB..... 5
  - 2.1 New Items..... 5
  - 2.2 Improvements..... 5
  - 2.3 Fixed Issues ..... 5
  - 2.4 Known Issues in the Current Release ..... 6
  - 2.5 Deprecated Items ..... 6
  - 2.6 Removed Items ..... 6
- 3 Platform Driver/EMDRV..... 7
  - 3.1 New Items..... 7
  - 3.2 Improvements..... 7
  - 3.3 Fixed Issues ..... 7
  - 3.4 Known Issues in the Current Release ..... 7
  - 3.5 Deprecated Items ..... 7
  - 3.6 Removed Items ..... 7
- 4 RAIL Library ..... 8
  - 4.1 New Items..... 8
  - 4.2 Improvements..... 9
  - 4.3 Fixed Issues ..... 9
  - 4.4 Known Issues in the Current Release ..... 11
  - 4.5 Deprecated Items ..... 11
  - 4.6 Removed Items ..... 11
- 5 NVM3 (Non-Volatile Memory Version 3)..... 12
  - 5.1 New Items..... 12
  - 5.2 Improvements..... 12
  - 5.3 Fixed Issues ..... 12
  - 5.4 Known Issues in the Current Release ..... 12
  - 5.5 Deprecated Items ..... 12
  - 5.6 Removed Items ..... 12
- 6 mbed TLS..... 13

- 6.1 New Items..... 13
- 6.2 Improvements..... 13
- 6.3 Fixed Issues ..... 13
- 6.4 Known Issues in the Current Release ..... 13
- 6.5 Deprecated Items ..... 13
- 6.6 Removed Items ..... 13
- 7 Gecko Bootloader..... 14
  - 7.1 New Items..... 14
  - 7.2 Improvements..... 14
  - 7.3 Fixed Issues ..... 14
  - 7.4 Known Issues in the Current Release ..... 14
  - 7.5 Deprecated Items ..... 14
  - 7.6 Removed Items ..... 14
- 8 Other Gecko Platform Software Components ..... 15
  - 8.1 New Items..... 15
  - 8.2 Improvements..... 15
  - 8.3 Fixed Issues ..... 15
  - 8.4 Known Issues in the Current Release ..... 16
  - 8.5 Deprecated Items ..... 16
  - 8.6 Removed Items ..... 16
- 9 Hardware Support ..... 17
- 10 Legal..... 18
  - 10.1 Disclaimer..... 18
  - 10.2 Trademark Information ..... 18

# 1 CMSIS

## 1.1 New Items

### Added in release 2.7.2.0

- Added CMSIS device files for BGM22 and MGM22 families

## 1.2 Improvements

None

## 1.3 Fixed Issues

### Fixed in release 2.7.4.0

| ID #   | Description   |
|--------|---|
| 471098 | Value of LFRCO_PRECISION_MODE changed from false/true to 0/1. |

### Fixed in release 2.7.0.0

| ID #   | Description   |
|--------|---|
| 334234 | SystemHFClockGet() in CMSIS system file now accounts for HFRCODIV2 (Series-1 only).   |
| 426081 | Fixed handling of USHFRCO frequency in SystemHFClockGet(). CMSIS system now keeps track of the frequency and EMLIB CMU works in concert with CMSIS system. This applies to EFM32HG, EFM32GG11 and EFM32GG12 families. |

## 1.4 Known Issues in the Current Release

None

## 1.5 Deprecated Items

None

## 1.6 Removed Items

None

## 2 EMLIB

### 2.1 New Items

#### Added in release 2.7.4.0

- An errata EMU\_E220 and subsequent product change notification (PCN) will be published by May 2020. This covers a problem where systems operating with core voltage scaling can infrequently experience a decouple voltage brown out (DECBOD) reset when waking from EM2 or EM3. A workaround is included in this release. However, the workaround increases the wakeup time by 2.7  $\mu$ s only when waking up from EM2->EM0 or EM3->EM0 while using voltage scaling. If this is unacceptable, the customer can use the macro ERRATA\_FIX\_EMU\_E220\_DECBOD\_IGNORE to remove the errata fix, and the code will behave like it used to.

#### Added in release 2.7.3.0

- Added MSC\_WriteWordDma() function in em\_msc. With this function the application is able to write to the flash memory using the DMA on series 1 and series 2 devices. This function should be used in order to achieve optimal flash write speeds.
- Added functions to read EMU internal temperature sensor on Series-1 and 2 products.
- Added support for new IADC result alignment options and IADC digital averaging on device families with hardware support for this.
- Added defines for more SE error codes to em\_se.h.

#### Added in release 2.7.2.0

- A version check has been added to guard against use of Secure Boot with Anti-rollback on products with (V)SE version lower than v1.2.1.
- Added function to check if any (W)TIMER instance supports Dead Time Insertion (DTI) and added configuration support for Dead Time Insertion (DTI) on other timers than TIMER0.

#### Added in release 2.7.0.0

- MSC\_MassErase() function is added for Series-2 devices.
- Add remote frame support in EMLIB CAN.

### 2.2 Improvements

#### Fixed in release 2.7.2.0

Improved HFLE clock branch handling for Series-1.

### 2.3 Fixed Issues

#### Fixed in release 2.7.4.0

| ID #   | Description   |
|--------|---|
| 471165 | An errata EMU_E220 and subsequent product change notification (PCN) will be published by May 2020. This covers a problem where systems operating with core voltage scaling can infrequently experience a decouple voltage brown out (DECBOD) reset when waking from EM2 or EM3. A workaround is included in this release. However, the workaround increases the wakeup time by 2.7 $\mu$ s only when waking up from EM2->EM0 or EM3->EM0 while using voltage scaling. If this is unacceptable, the customer can use the macro ERRATA_FIX_EMU_E220_DECBOD_IGNORE to remove the errata fix, and the code will behave like it used to. |
| 479597 | Added missing enable of re-calibration in errata fix EMU_E220   |
| 464458 | CMU_LFRCOSetPrecision must check PLFRCO_DEFEAT before setting HIGHPRECEN. Precision mode is defeatured on some Lynx OPNs.   |

#### Fixed in release 2.7.3.0

| ID #   | Description  |
|--------|--|
| 465887 | Fixed issue where calling LETIMER_Reset() could cause BusFault when called on a disabled LETIMER peripheral.             |
| 467724 | The MSC clock in CMU->CLKEN1 is now enabled by MSC write functions for devices where this clock can be enabled/disabled. |

**Fixed in release 2.7.2.0**

| ID #   | Description  |
|--------|--|
| 464465 | EMLIB version defines <code>_EMLIB_VERSION_x</code> added back to <code>em_version.h</code> with deprecation notice. Note that the version represented by the defines is actually the 32-bit MCU SDK version. The version of EMLIB follows Gecko Platform. A new version for EMLIB and Gecko Platform will be introduced in a later release. |
| 456751 | Fixed issue where <code>GPIO_EM4EnablePinWakeup()</code> sometimes did not clear interrupts, causing an immediate wakeup from EM4.   |

**Fixed in release 2.7.0.0**

| ID #   | Description   |
|--------|---|
| 415819 | <code>CHIP_Init()</code> sets <code>HFRCOEM23</code> clock as <code>TRACECLK</code> .   |
| 447797 | EMLIB IADC: The definition of <code>`iadcNegInputGnd`</code> has been modified to set <code>PINNEG</code> to 1. This prevents a polarity error when performing IADC conversions between supply pins and ground. |
| 370421 | Fixed conversion of raw data in <code>IADC_ConvertRawDataToResult()</code> .  |
| 428960 | Fixed issue that could cause <code>dcdcEm01LoadCurrent_mA</code> , a parameter of <code>EMU_DCDCOptimizeSlice()</code> , to be used before value assignment.  |

**2.4 Known Issues in the Current Release**

None

**2.5 Deprecated Items****Notified in version 2.7.0.0**

Functions in `em_msc` are placed in flash for Series-0 and Series-1 devices, except for the EFM32G. `MSC_WriteWordFast()` function is deprecated. Calling the `MSC_WriteWordFast()` function will have the same effect as calling `MSC_WriteWord()`.

**2.6 Removed Items****Removed in version 2.7.4.0**

The `CMU_LFRCOSetPrecision()` function is now only available on devices that actually have the precision LFRCO feature.

## 3 Platform Driver/EMDRV

### 3.1 New Items

#### Added in release 2.7.0.0

SPIDRV is now using Sleptimer instead of RTCDRV for time keeping in slave mode.

### 3.2 Improvements

None

### 3.3 Fixed Issues

#### Fixed in release 2.7.3.0

| ID #   | Description  |
|--------|--|
| 465334 | Fixed an issue where TEMPDRV_GetTemp() could return incorrect temperature results if not called immediately following a temperature interrupt. |

### 3.4 Known Issues in the Current Release

None

### 3.5 Deprecated Items

#### Notified in version 2.7.0.0

RTCDRV driver is marked as deprecated and will be removed in a later release.

### 3.6 Removed Items

None

## 4 RAIL Library

### 4.1 New Items

#### Added in release 2.7.6.0

- Some radio configurations on the EFR32XG22 are not usable with RAIL address filtering and RAIL 802.15.4 filtering. Add an assert to catch those cases.

#### Added in release 2.7.4.0

- Added new RAIL\_BLE\_ConfigAoxAntenna API to configure which GPIO pins are used for Bluetooth LE AoX.

#### Added in release 2.7.3.0

- Revamped Features and rail\_features.h, providing runtime RAIL\_SupportsSomeFeature() APIs for each of the features as some features may be restricted to certain chips within a family. Also added more consistent RAIL\_SUPPORTS\_ compile-time synonyms for the features while retaining the existing RAIL\_FEAT\_ defines for backwards compatibility. These defines can now be used in C code and not just preprocessor #if statements.
- Added support for new BGM220 modules.

#### Added in release 2.7.1.0

- Added the new RAIL\_STREAM\_10\_STREAM RAIL\_StreamMode\_t to allow you to send a 1010 stream for debugging.
- Added a new function, RAIL\_StartTxStreamAlt, which allows the specific antenna to be specified for a stream transmit.
- Added new RAIL\_RX\_PACKET\_HANDLE\_OLDEST\_COMPLETE packet handle to allow the user to get a reference to the oldest unreleased complete packet.
- Added a new External\_Thermistor interface to RAIL. This allows access the user to connect and read the impedance of an external thermistor on supported chips.
- Added RAIL\_IEEE802154\_ConvertRssiToEd() and RAIL\_IEEE802154\_ConvertRssiToLqi() to assist Zigbee 802.15.4 certification testing.

#### Added in release 2.7.0.0

- Added a new PA mode which will attempt to automatically choose the PA which consumes the least amount of current to reliably produce the requested output power. See RAIL\_EnablePaAutoMode() for details.
- On EFR32xG12 thru EFR32xG14, added support for 802.15.4G-2012 SUN PHY dynamic frame payload whitening on reception and transmit based on the PHY header's Data Whitening flag setting. This feature is automatically enabled when RAIL\_IEEE802154\_ConfigGOptions()' RAIL\_IEEE802154\_G\_OPTION\_GB868 is enabled, and assumes the radio configuration specifies the appropriate whitening algorithm and settings.
- On EFR32xG12 thru EFR32xG14, added support for 802.15.4G-2012 SUN PHY dynamic frame payload 2/4-byte FCS (CRC) on reception and transmit based on the PHY header's FCS Type flag setting. This feature is automatically enabled when RAIL\_IEEE802154\_ConfigGOptions()' RAIL\_IEEE802154\_G\_OPTION\_GB868 is enabled. The radio configuration's (single) CRC algorithm settings are ignored, overridden by RAIL.
- On EFR32xG12 thru EFR32xG14, 802.15.4 AutoACK behavior has also been updated so transmitted immediate ACKs reflect the Whitening and 2/4-byte FCS of the received frame being acknowledged.
- Added two new APIs, RAIL\_GetSyncWords and RAIL\_ConfigSyncWords(), to allow getting and setting the sync word configuration of your PHY at runtime.
- Added RAIL\_TX\_OPTION\_CCA\_ONLY to just perform CCA (CSMA/LBT), stopping short of automatically transmitting when the channel is clear.
- Added support for a new RAIL\_EVENT\_TX\_STARTED, triggered when the first preamble bit is about to go on-air. Also included the ability to retrieve the equivalent RAIL\_PACKET\_TIME\_AT\_PREAMBLE\_START timestamp of that event from the event's handler via RAIL\_GetTxTimePreambleStart(). Note: This new event shifted the bit positions of some events in RAIL\_Events\_t.
- Added an API, RAIL\_StopInfinitePreambleTx, that can stop an infinite preamble on PHYs configured to use infinite preambles.



- Added additional information to the packet trace stream for the Z-Wave protocol to indicate what region is currently active to help with decoding.
- Added support for RFSense Selective (OOK) mode for supported chips, which currently includes only EFR32xG22 devices. Please refer to RAIL internal chip specific documentation for more details.

## 4.2 Improvements

### Changed in release 2.7.4.0

- Relax constraints in RAIL to allow calling RAIL\_SetRxTransitions, RAIL\_SetTxTransitions, RAIL\_ScheduleRx, and all of the RAIL\_BLE\_ConfigPhy before the radio is completely IDLE.

### Changed in release 2.7.3.0

- Updated the pa\_customer\_curve\_fits.py helper script to work with Python 3 as well as Python 2.
- Calling RAIL\_ConfigSleep() with RAIL\_SLEEP\_CONFIG\_TIMERSYNC\_ENABLED on chips that use the PRORTC for synchronization (EFR32xG13 and newer) will now only configure the choose the LF clock source if the PRORTC IRQ is disabled. This allows for other code to safely configure the PRORTC like the Silicon Labs generic sleep timer.

### Changed in release 2.7.1.0

- The RAIL\_GetRadioEntropy() API will now ensure a valid radio configuration has been loaded using RAIL\_ConfigChannels() since it can cause problems if the radio is used before this.
- Changed the value of RAIL\_FREQUENCY\_OFFSET\_INVALID from -1 to -32768 since -1 is a reasonable frequency offset to pass to RAIL\_SetFreqOffset(). Also added convenience definitions RAIL\_FREQUENCY\_OFFSET\_MIN and RAIL\_FREQUENCY\_OFFSET\_MAX to specify the valid range of offset values the radio supports.

### Changed in release 2.7.0.0

- Changed RAIL\_GetRxTimePreambleStartAlt(), RAIL\_GetRxTimeSyncWordEndAlt(), and RAIL\_GetRxTimeFrameEndAlt() to properly update its pPacketDetails' RAIL\_PacketTimeStamp\_t::timePosition to reflect the adjusted RAIL\_PacketTimeStamp\_t::packetTime rather than leaving it as RAIL\_PACKET\_TIME\_DEFAULT.
- Enforced and clarified that RAIL\_Init() should not be called more than once per protocol.
- Clarified documentation of the RAIL\_EVENT\_RX\_ACK\_TIMEOUT event and RAIL\_AutoAckConfig\_t::ackTimeout period which extends only to packet sync word detection of an expected ACK, not packet completion of that ACK.
- Documented RAIL's internal 16-packet metadata FIFO which exists on EFR32 platforms supplementing the receive FIFO of packet data. Refer to Data\_Management and efr32\_main for details. Included is support for a new RAIL\_EVENT\_RX\_FIFO\_FULL, triggered with any packet completion event in which the receive FIFO or packet metadata FIFO are full. This tells the application it must free up the oldest packets/data ASAP to reduce the chance of RAIL\_EVENT\_RX\_FIFO\_OVERFLOW (however, overflow may already have occurred). Note: This new event shifted the bit positions of some events in RAIL\_Events\_t.

## 4.3 Fixed Issues

### Fixed in release 2.7.6.0

| ID #   | Description   |
|--------|---|
| 484374 | Fixed regression from 2.7.1 on EFR32xG21 where BLE did not include packet sync word on PTI. |

### Fixed in release 2.7.4.0

| ID #   | Description   |
|--------|---|
| 465096 | Fixed an issue where RAIL_Idle() was not properly terminating an ongoing RAIL_StartAverageRssi() process.   |
| 467589 | Updated default dynamic multiprotocol (DMP) transition timings to make them work with Zigbee and Bluetooth LE DMP applications. The previously suggested workaround of adding 30 $\mu$ s to the default transition time using RAIL_SetTransitionTime() is no longer required. |

| ID #   | Description   |
|--------|---|
| 471373 | Fixed an issue on the EFR32xG22 where loading IEEE 802.15.4 and BLE PHYs without a reset would cause an assert with error code RAIL_ASSERT_CACHE_CONFIG_FAILED. |
| 471955 | Fixed an issue with BGM220 modules that caused an assert, RAIL_ASSERT_INVALID_MODULE_ACTION, when using them in previous releases.                              |

**Fixed in release 2.7.3.0**

| ID #   | Description   |
|--------|---|
| 464735 | Closed tiny timing window on EFR32xG13 that might corrupt PTI appended info when idling the radio.  |
| 469015 | Fixed an issue on the EFR32xG21 that could cause the RAIL_GetRadioEntropy() function to return the same first 4 bytes when called with the radio off after a reset. |

**Fixed in release 2.7.2.0**

| ID #   | Description  |
|--------|--|
| 456338 | Fixed an issue with RAIL state transitions where an internal timer wrapping could cause incorrect transition times. This error would previously affect a maximum of one packet every 15 minutes.                                       |
| 460062 | Fixed a RAIL_ScheduleRx() issue where RAIL_EVENT_RX_SCHEDULED_RX_END might not be posted when the Rx RAIL_StateTransitions_t::error transition is to RAIL_RF_STATE_IDLE and the Rx window ended during receipt of an erroneous packet. |

**Fixed in release 2.7.1.0**

| ID #   | Description   |
|--------|---|
| 444205 | Fixed a transmit-from-idle issue with RAIL_StartCcaCsmaTx() or RAIL_StartCcaLbtTx(), which would always fail when the RAIL_StateTiming_t::idleToRx is configured below the minimum the radio is capable of achieving (typically 65-100 microseconds depending on platform). |
| 452628 | Fixed an issue where idling the radio from an Rx antenna diversity mode would consume extra power.  |
| 452690 | Fixed an issue where Rx antenna diversity could be left enabled after switching to a radio configuration that lacks diversity support.  |

**Fixed in release 2.7.0.0**

| ID #   | Description   |
|--------|---|
| 197573 | Suppressed extraneous RAIL_EVENT_TX_START_CCA events that might occur during long CCA durations. Now only one such event should occur per CCA try.  |
| 411498 | RAIL_StartAverageRssi() now returns RAIL_STATUS_INVALID_STATE if called when the radio is not idle, enforcing its documented behavior.  |
| 417340 | Fixed an issue where RAIL_RxPacketDetails_t::isAck would incorrectly be set true for non-ACK or unexpected ACK packets received successfully (e.g. when RAIL_IEEE802154_ACCEPT_ACK_FRAMES is enabled) or aborted while waiting for the expected ACK. Note that when RAIL_RX_OPTION_IGNORE_CRC_ERRORS is in effect, an expected ACK includes one that fails CRC, and will have isAck set true.   |
| 418493 | RAIL_ConfigRadio will now return RAIL_STATUS_INVALID_STATE if called from the inactive config in dynamic multiprotocol instead of returning success but not applying the change.  |
| 427934 | Fixed a race condition that could cause a device to not re-enable frame detection after an Rx overflow event if the overflow was processed and cleared very quickly.  |
| 430081 | Fixed an issue where the first Clear Channel Assessment (CCA) of a CSMA/LBT transmit from radio idle state would consistently fail when the RAIL_CsmaConfig_t::ccaBackoff or RAIL_LbtConfig_t::lbtBackoff time is smaller than the RAIL_StateTiming_t::idleToRx time.   |
| 436163 | Fixed a post-receive transition timing issue for received packets that were on the air longer than 32 milliseconds. AutoACK turnaround timing should now behave properly at low data rates.   |
| 437054 | Fixed an issue with the pa_customer_curve_fits.py that caused values below -12 to not be considered when computing the fit. Re-generated default, Silicon Labs-provided curves to consume this fix, resulting in minor changes to the lowest-power segment in curve-fit based PA's. If using a custom power curve created using the documentation in AN1127 customers should re-run the script on the already collected output data to get slightly more accurate curves. |
| 441635 | Return the correct RAIL_TxPowerMode_t value of RAIL_TX_POWER_MODE_NONE from RAIL_GetTxPowerConfig if called before RAIL_ConfigTxPower.  |

| ID #   | Description   |
|--------|---|
| 446289 | Fixed RAIL_IDLE_ABORT to idle the radio sooner when in RAIL_RF_STATE_RX, especially now that RAIL_RxChannelHoppingConfigEntry_t::delay can extend the time in that state.   |
| 447578 | Fixed an issue where setting a transmit power over the maximum allowed for a given channel would result in no change in the output power instead of using the maximum allowed value.                                    |
| 450187 | Fixed an issue where calling RAIL_Idle() with RAIL_IDLE_FORCE_SHUTDOWN while in receive with channel hopping enabled could corrupt some internal channel hopping state and trigger a bus fault or other radio problems. |

#### 4.4 Known Issues in the Current Release

Issues in bold were added since the previous release.

| ID #          | Description  | Workaround   |
|---------------|--|--|
| <b>475184</b> | <b>On the EFR32xG22 the receiver is not automatically re-calibrated if temperature changes significantly while sitting in receive. This could cause the radio to go deaf if temperature changes significantly while in receive. The calibration will run on every entry to receive so protocols that do not sit in receive will not be largely impacted by this.</b> | <b>Avoid long running receives or call RAIL_Calibrate(railHandle, NULL, RAIL_CAL_TEMP) periodically to force a re-calibration while in a long running receive until this is fixed.</b> |

#### 4.5 Deprecated Items

None

#### 4.6 Removed Items

None

## 5 NVM3 (Non-Volatile Memory Version 3)

### 5.1 New Items

None

### 5.2 Improvements

None

### 5.3 Fixed Issues

#### Fixed in release 2.7.1.0

| ID #   | Description  |
|--------|--|
| 453206 | Fixed an issue in NVM3 that could cause an error in the content of an existing data object after firmware upgrade from GSDK 2.4.0 to GSDK 2.5.0 or higher. The problem is related to the fact that NVM3 released in GSDK 2.4.0 and earlier could write data objects in a format that was off spec. Although the format was incorrect, all functions handled the format correctly. From GSDK 2.5.0 this format issue was fixed, but as a side effect, repacking data written with GSDK 2.4.0 or earlier could unintentionally cause data error. The fix ensures that both the pre- and the post-GSDK 2.5.0 formats are handled correctly. |

### 5.4 Known Issues in the Current Release

None

### 5.5 Deprecated Items

None

### 5.6 Removed Items

None

## 6 mbed TLS

### 6.1 New Items

#### Added in release 2.7.3.0

Added a routine that validates if public-key is on the curve in `mbedtls_ecdh_compute_shared` for Series 2 products.

#### Added in release 2.7.0.0

Added hardware-acceleration plugin for AES-GCM on EFR32xG21 products.

### 6.2 Improvements

#### Changed in release 2.7.1.0

Updated mbed TLS library to version 2.7.12

### 6.3 Fixed Issues

#### Fixed in release 2.7.0.0

| ID     | Description   |
|--------|---|
| 445608 | Hardware-accelerated AES-GCM on EFR32xG22 parts was not adhering to mbedTLS API contract. |

### 6.4 Known Issues in the Current Release

| ID #   | Description  | Workaround |
|--------|--|------------|
| 429985 | ECDSA curve P224 is not supported for xG21 and xGM21 products. | None       |

### 6.5 Deprecated Items

None

### 6.6 Removed Items

None

## 7 Gecko Bootloader

### 7.1 New Items

#### Added in release 2.7.4.0

- `bootloader_secureBootEnforced()` is added to check if signature verification on the application is enforced before every boot.

#### Added in release 2.7.3.0

- Added a new internal storage bootloader sample application `bootloader-storage-internal-single-352k` for devices with 352kB internal flash.
- Added certificate support for secure boot and GBL image parser for EFR32xG22.
- The size of `ParserContext_t` for Series-2 devices has been increased to 524 bytes to support certificate-based authentication of GBL images.

#### Added in release 2.7.2.0

- Added a function `bootloader_getCertificateVersion` for reading certificate version of the bootloader for Series 2 products.
- `BOOTLOADER_STORAGE_VERIFICATION_CONTEXT_SIZE` is added to `btl_interface_storage.h`, which indicates the size required to store verification context.

#### Added in release 2.7.0.0

- Added an AppBuilder plugin option `APPLICATION_VERIFICATION_SKIP_EM4_RST` to skip verification of the application only if the device has been to EM4.
- Added certificate support for secure boot and GBL image parser for EFR32xG21.
- Added first stage binaries for xG13 and xG14 devices that works with the second stage bootloader placed in the main flash.
- Added EZSP GPIO plugin.
- Added EUART driver.

### 7.2 Improvements

#### Changed in release 2.7.1.0

- The RMU reset level for soft resets is configured to be `EXTENDED` on Series-1 devices

#### Changed in release 2.7.0.0

- The size of `ParserContext_t` for EFR32xG21 has been increased to 524 bytes to support certificate boot chain.

### 7.3 Fixed Issues

None

### 7.4 Known Issues in the Current Release

None

### 7.5 Deprecated Items

None

### 7.6 Removed Items

None

## 8 Other Gecko Platform Software Components

### 8.1 New Items

None

### 8.2 Improvements

#### Changed in release 2.7.4.0

- Added caching mechanism in Sleep Timer to avoid re-querying the frequency at which the hardware timer runs once the initialization is done.

#### Changed in release 2.7.3.0

- Created a new port for Sleep Timer that allows to use the Radio internal real-time clock as the hardware timer and hence free up RTCC for application's usage. In order to select this port, the configuration `SL_SLEEPTIMER_PERIPHERAL` in `sl_sleep-timer_config.h` must be set to `SL_SLEEPTIMER_PERIPHERAL_PRORTC`.
- Improvement of the round-robin scheduling mechanism. We now only restart a round-robin timer in the switching context hook. Timing should now be more accurate by being reset at the end of a context switch. Stopping the round-robin only happens if a context switch is needed.
- Reduced the number of conversions between the Sleep Timer ticks and the Micrium OS Kernel ticks, in the Kernel.
- Modified internal Sleep Timer tick count data types so tick count cannot overflow before 272 years.

#### Changed in release 2.7.0.0

- Updated LwIP package to version 2.1.2.

### 8.3 Fixed Issues

#### Fixed in release 2.7.6.0

| ID     | Description   |
|--------|---|
| 486079 | Fixed a potential issue in Sleep Timer where, in very specific conditions, there could have been undesirable behavior when creating a timer and going to sleep. |
| 482920 | Fixed a bug where there was a chance a null pointer could be de-referenced in some rare occasions.  |

#### Fixed in release 2.7.5.0

| ID     | Description   |
|--------|---|
| 483020 | Fixed a bug where the value returned by <code>sl_sleeptimer_get_tick_count64()</code> could be incorrect. |

#### Fixed in release 2.7.4.0

| ID     | Description  |
|--------|--|
| 477471 | In the MPU, fixed a bug where, in some cases, we would not be covering the entirety of the main RAM. |
| 472312 | In Micrium OS Kernel, fixed a bug if <code>OS_CFG_MAX_PRIO</code> was smaller or equal to 8.         |
| 475327 | Add fix for potential bug with some compiler optimization in slists.                                 |

#### Fixed in release 2.7.3.0

| ID     | Description  |
|--------|--|
| 465205 | In the Sleep Timer, fixed a bug where, under some circumstances, a timer could expire too early. |
| 467213 | Fixed a bug where an ISR stack underflow could occur when FPU was used.                          |
| 467599 | Fixed some static analysis issue in the Micrium OS Kernel and in Micrium OS LIB String module.   |

| ID     | Description   |
|--------|---|
| 462961 | Added checks in <code>OSTimeDlyHMSM()</code> to make sure there could be no overflow occurring. |
| 461249 | Fixed issues with round-robin and Time Quantats in Micrium OS Kernel.                           |

**Fixed in release 2.7.2.0**

| ID     | Description   |
|--------|---|
| 459690 | Fixed bug in EFP driver <code>sl_se_init()</code> function. This function could return <code>SL_STATUS_OK</code> even though an error was detected. |
| 452516 | Fixed problem when using the MPU that prevented LDREX and STREX instructions from working properly.   |

**Fixed in release 2.7.0.0**

| ID     | Description  |
|--------|--|
| 340730 | GLIB now offers a <code>GLIB_invertBitmap()</code> function, which inverts every bit in the bitmap.                  |
| 340726 | GLIB: Bugfix in optimized drawing of bitmaps for inverse monochrome displays.  |
| 340053 | GLIB now supports characters wider than 16 pixels.   |
| 451076 | <code>DMD_writeData</code> now consistently treats a bit value of 1 as white and 0 as black for monochrome displays. |

**8.4 Known Issues in the Current Release**

None

**8.5 Deprecated Items**

None

**8.6 Removed Items**

None



## 9 Hardware Support

### Added in version 2.7.4.0

- Added board support for BRD4183B.

### Added in version 2.7.3.0

- Added board support for BRD4184 and BRD4184A.

## 10 Legal

### 10.1 Disclaimer

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