Silicon Labs is a leading vendor in Bluetooth hardware and software technologies, used in products such as sports and fitness, consumer electronics, beacons, and smart home applications. The core SDK is an advanced Bluetooth 5-compliant stack that provides all of the core functionality along with multiple API to simplify development. The core functionality offers both standalone mode allowing a developer to create and run their application directly on the SoC, or in NCP mode allowing for the use of an external host MCU.

Extensions to the SDK include Bluetooth Mesh and Apple® HomeKit® for customers seeking the additional capabilities.

These release notes cover SDK version(s):

2.13.0.0 released on December 13, 2019

**Compatibility and Use Notices**

If you are new to the Silicon Labs Bluetooth SDK, see Using This Release.

**Compatible Compilers:**

IAR Embedded Workbench for ARM (IAR-EWARM) version 8.30.1

- Usingwine 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 7.2.1, provided with Simplicity Studio.
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1 New Items

1.1 New Features

Added in release 2.13.0.0

NVM3 support on EFR32xG1x devices

NVM3 is now supported on EFR32xG1x devices in addition to PS Store. These two data stores cannot be used simultaneously. The sample applications in the Bluetooth SDK continue to use PS Store by default. To replace PS Store with NVM3 please refer to AN1135: Using Third Generation NonVolatilie Memory (NVM3) Data Storage.

Usage of NVM3 on EFR32xG1x devices is recommended only for new designs as there is no migration mechanism from PS to NVM3, when a new firmware is flashed via OTA or UART DFU. Doing DFU from PS to NVM3 will cause all PS data to be lost, which includes e.g., bonding information.

Sleep Timer

The sleep timer (sl_sleeptimer.h) is a platform component providing single-shot and periodic timer services. It also has APIs for reading current tick count and conversions between ticks and milliseconds.

A Bluetooth application must initialize sleep timer because it is also needed by the Bluetooth stack for deep sleep. In addition, application must configure the timer frequency divider to 1 (SL_SLEEPTIMER_FREQ_DIVIDER in sl_sleeptimer_config.h). For more details of the initialization and configuration, please refer to a Bluetooth SDK example, e.g., the soc-empty.

1.2 New APIs

For additional documentation and command descriptions please refer to the Bluetooth Software API Reference Manual.

Added in release 2.13.0.0

- cmd_gatt_server_get_mtu
- cmd_le_connection_read_channel_map
- cmd_coex_set_parameters
2 Improvements

2.1 Changed APIs

Changed in release 2.13.0.0

`cmd_system_linklayer_configure`

New configuration key `system_linklayer_config_key_set_priority_table` is added for changing task priorities at run time.

`cmd_sm_store_bonding_configuration`

The default maximum allowed bonding count is changed to 13.
# Fixed Issues

## Fixed in release 2.13.0.0

<table>
<thead>
<tr>
<th>ID #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>234520</td>
<td>In <code>cmd_gatt_read_characteristic_value_by_uuid</code> command, if multiple characteristic values are received, an <code>evt_gatt_characteristic_value</code> event is generated for each value. Previously only one event is generated for this case.</td>
</tr>
<tr>
<td>281984</td>
<td>First advertisement packet is now sent with the right timing in dynamic multi-protocol use cases.</td>
</tr>
<tr>
<td>335894</td>
<td>Documentation fix to the lolen field in a BGAPI command header binary. The field specifies the minimal number of bytes the parameters take. It does not include the array data length if the command has an array type parameter.</td>
</tr>
<tr>
<td>347844</td>
<td>Event <code>evt_user_message_to_host</code> can now be sent during user command handling in NCP target application.</td>
</tr>
<tr>
<td>358171</td>
<td>Fix a random advertising hang issue which was observed when the application optimization build option was disabled or the device was exposed to low temperature.</td>
</tr>
<tr>
<td>408097</td>
<td>Extended advertising now works in dynamic multi-protocol use cases.</td>
</tr>
<tr>
<td>415583</td>
<td>The stack now returns out of memory error if the application sends a characteristic notification to all connections in low memory situation. Previously wrong state error was returned.</td>
</tr>
<tr>
<td>420866</td>
<td>Improves robustness when streaming large data packets to and from a device which does not support data length extension.</td>
</tr>
<tr>
<td>421731</td>
<td>When sending a characteristic value notification to all connections using <code>cmd_gatt_server_send_characteristic_notification</code> command, the stack now returns success if devices are connected but none has enabled the notification. Previously wrong state error was returned.</td>
</tr>
<tr>
<td>425187</td>
<td>SL_BT_prefix is added into the include guard in bg_version.h.</td>
</tr>
<tr>
<td>425532</td>
<td>Fix whitelisting when an extended advertising packet does not contain an auxiliary pointer.</td>
</tr>
<tr>
<td>430225</td>
<td>Fix CTUNE control using PS key on EFR32xG2x devices.</td>
</tr>
<tr>
<td>430752</td>
<td>Fix an issue that the stack may lose a periodic advertising synchronization because the scanner uses highest priority for secondary tasks. This was solved by lowering the priority.</td>
</tr>
<tr>
<td>434406</td>
<td>Remove the use of variable length array in the stack.</td>
</tr>
<tr>
<td>436243</td>
<td>Fix a HW initialization issue in the soc-dtm example that causes incorrect timeout for incoming data.</td>
</tr>
<tr>
<td>441445</td>
<td>Fix an advertisement data update race condition which causes no advertisement is sent out.</td>
</tr>
<tr>
<td>445627</td>
<td>Repeated bonding attempts handling is now connection specific. After first failed attempt there is cool down period of 1 s. After second attempt this is doubled to 2 s then to 4 s etc. The maximum wait time is 64 s.</td>
</tr>
<tr>
<td>450515</td>
<td>Fix an issue that causes BGTool does not run on Linux.</td>
</tr>
</tbody>
</table>
4 Known Issues in the Current Release

Issues in bold were added since the previous release.

<table>
<thead>
<tr>
<th>ID #</th>
<th>Description</th>
<th>Workaround</th>
</tr>
</thead>
<tbody>
<tr>
<td>243009</td>
<td>With certain events, GCC breakpoints cannot be set.</td>
<td>Change optimization level to none in project settings.</td>
</tr>
<tr>
<td>337467</td>
<td>MGM12P has poor signal strength when doing OTA with Apploader.</td>
<td>None</td>
</tr>
<tr>
<td>360313</td>
<td>Default RAIL assertion (RAILCb_AssertFailed) enters an infinite loop causing the stack not responsive.</td>
<td>Override RAIL assertion function in application space following these instructions.</td>
</tr>
<tr>
<td>361592</td>
<td>The sync_data event does not report TX power.</td>
<td>None</td>
</tr>
<tr>
<td>368798</td>
<td>Example project soc-thunderboard_sense_2 does not print float values correctly.</td>
<td>In project C/C++ settings, enable the printf float option.</td>
</tr>
<tr>
<td>396308</td>
<td>In NCP, BGAPI may be out of sync between the host and target when the target is reset in the middle of sending a BGAPI message to host. The out of sync issue could cause the host unable to communicate with the target.</td>
<td>In NCP target, add a delay to flush NCP Tx queue after a system reset command is received.</td>
</tr>
<tr>
<td>431452</td>
<td>When the requested TX Power is above 0 dBm, the actual transmit power may deviate randomly.</td>
<td>None</td>
</tr>
<tr>
<td>444469</td>
<td>When the data buffer for Bluetooth connections is full, cmd_le_connection_close command returns success but the connection is not really disconnected.</td>
<td>Data buffer full typically could happen in cases of intensive data streaming over connections using cmd_gatt_write_characteristic_value_without_response or cmd_gatt_server_send_characteristic_notification command. In this case, stop data streaming, and disconnect the connection after a small delay.</td>
</tr>
<tr>
<td>446074</td>
<td>The stack may be unable to establish new connections after multiple connection drops due to weak signal.</td>
<td>None</td>
</tr>
<tr>
<td>450903</td>
<td>When application compiles mbedTLS from source for using AES with padding, mdebTLS context objects in Bluetooth stack may be corrupted causing hard faults.</td>
<td>None</td>
</tr>
<tr>
<td>450922</td>
<td>Use of GPCRC in Bluetooth stack is not thread safe. When GPCRC is also used in other threads, GPCRC configuration in the stack may be corrupted causing incorrect results.</td>
<td>None</td>
</tr>
</tbody>
</table>
5 Deprecated Items

None
6 Removed Items

None
7 Using This Release

This release contains the following:

- Silicon Labs Bluetooth stack library
- Bluetooth sample applications

For more information about the Bluetooth SDK see QSG139: Getting Started with Bluetooth® Software Development. If you are new to Bluetooth see UG103.14: Bluetooth LE Fundamentals.

7.1 Installation and Use

A registered account at Silicon Labs is required in order to download the Silicon Labs Bluetooth SDK. You can register at https://siliconlabs.force.com/apex/SL_CommunitiesSelfReg?form=short.

Stack installation instruction are covered in QSG139: Getting Started with Bluetooth® Software Development.

Use the Bluetooth SDK with the Silicon Labs Simplicity Studio V4 development platform. Simplicity Studio ensures that most software and tool compatibilities are managed correctly. Install software and board firmware updates promptly when you are notified.

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/.

7.2 Support

Development Kit customers are eligible for training and technical support. You can use the Silicon Labs Bluetooth LE web page to obtain information about all Silicon Labs Bluetooth products and services, and to sign up for product support.

You can contact Silicon Laboratories support at http://www.silabs.com/support.
8 Legal

8.1 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.

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