



# Bluetooth<sup>®</sup> LE SDK 8.1.0.0 GA

## Simplicity SDK Suite 2024.6.1

### July 24, 2024

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 5.4-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.

These release notes cover SDK version(s):

8.1.0.0 GA released July 24, 2024

This revision, dated August 28, 2024, to the release notes of 8.1.0.0 now excludes six Known Issues from the version of July 24, 2024, which were erroneously included in the document. Those known issues have now been addressed. Fixed Issue 1267376 is now also included.

8.0.0.0 GA released June 5, 2024



#### KEY FEATURES

##### Bluetooth

- Auto-connect feature to enable connecting to any device on the accept list
- Common Memory and Clock Manager integration
- Electronic Shelf Label (ESL) related improvements
- Removed support for Series 0/1

##### Multiprotocol

- Alpha support for OpenWRT on host processor of multiprotocol RCP solution
- Alpha support for Concurrent Zigbee and Matter over OpenThread, with DMP BLE

## 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 on <https://www.silabs.com/developers/bluetooth-low-energy>. Silicon Labs also strongly recommends that you subscribe to Security Advisories for up-to-date information. For instructions as well as notes on using Secure Vault features, or if you are new to the Silicon Labs Bluetooth 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 should carefully verify that the correct files are being used.

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

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## 1 New Items

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 \(silabs.com\)](#).

### 1.1 New Features

#### Added in release 8.0.0.0

##### **Auto connection establishment procedure**

The GAP auto connection establishment procedure is supported by the bluetooth stack when component `bluetooth_feature_accept_list` is included by the application. Use command `sl_bt_connection_open_with_accept_list` to connect any device in the accept list.

##### **PTI support in Apploader**

The AppLoader plugin for Gecko Bootloader now supports PTI.

##### **Common Memory Manager Used by Bluetooth stack**

The Bluetooth stack now uses the platform common memory manager component for memory management. See the common memory manager documentation for the design details of the component.

##### **Clock Initializations for Bluetooth**

The Bluetooth stack no longer requires the `device_init` component for initializing clocks. The new platform component Clock Manager supersedes the clock initializations of `device_init` and is used by Bluetooth sample applications since this release.

### 1.2 New APIs

#### Added in release 8.0.0.0

**`sl_bt_system_reboot()` command:** Reboot the system into user application mode.

**`sl_bt_connection_get_remote_address()` command:** Get the remote Bluetooth address of a connection.

**`sl_bt_user_cs_message_to_target()` command:** Send a message from the NCP host to the Channel Sounding service component on target device.

**`sl_bt_evt_user_cs_message_to_host()` event:** Send a message from the Channel Sounding service component on target device to the NCP host.

## 2 Improvements

### 2.1 Changed Items

#### Changed in release 8.0.0.0

ID #	Description
725079	Scanning on the primary channel is continued if auxiliary packets of a received primary channel extended advertising packet have been scheduled to be received far in the future.
1187823	App Timer has been made interrupt-safe.
1231096	Increased maximum acceptance list size from 32 to 127.
1234652	The EAD Core component now takes over the role of storing the key material. The necessary new API has been created and implemented. The way the key material is stored in ESL Core has changed. Now, the EAD Core component is responsible for the storage, and the necessary new API has been introduced in EAD and used in ESL.
1245103	Bluetooth host examples require pkg-config tool for external dependencies like openssl, libmosquitto or libcup.
1297425	Channel sounding: max procedure count changed to 1.

### 2.2 Changed APIs

#### Changed in release 8.0.0.0

sl\_bt\_evt\_connection\_opened event: Parameter 'master' is renamed to 'role'.

### 2.3 Intended Behavior

#### Changed in release 8.0.0.0

None.

### 3 Fixed Issues

#### Fixed in release 8.1.0.0

ID #	Description
1267376	Fixed an issue where RSSI based measurement data was not logged by the Bluetooth CS host example. It is now always logged, and the optional '-r' command line parameter has been removed.
1295837	Fixed a bug that may lead to asserts during new peripheral connections. This issue only presents on Bluetooth SDK version 7.1.1 and 8.0.0.
1296939	Fixed an issue where not including the Connection component in certain projects may lead to a hard fault.
1319377	Fixed an issue in the Filter Accept List feature configuration GUI where the filter accept list size was limited to 32 instead of 127.

#### Fixed in release 8.0.0.0

ID #	Description
777299	SoC Throughput sample app TX power initialization fixed.
1217945	Fixed an issue in HCI application that could cause thread priority inversion and decrease Bluetooth connection reliability with FreeRTOS if the FreeRTOS timer task has been configured to have a lower priority than the Bluetooth tasks.
1224439	Channel Sounding initiator now logs reason for aborting.
1242491	Eliminated dependency on crypto dlls coming from Mosquito installer that caused build failures in Bluetooth AoA host examples. From this fix on, Mosquito has to be installed using the MSYS2 package manager tool, pacman.
1245534	Fixed an issue with address resolving that can cause bonding to fail if remote device changes its RPA and the RPA is resolved again before bonding is completed.
1279821	Fixed an issue where the Periodic Advertiser did not include the TX power value in the periodic advertising packet when configured by the host/application.
1282707	If central device has lost bonding keys and peripheral has bonding confirmations enabled to allow re-bonding the connection, client supported features, settings, and subscriptions to notifications and indications are no longer erased.
1286177	Fixed an issue in Bluetooth host stack that anonymous advertising is allowed on scannable or connectable advertising.
1288445	Fixed an issue where PAWR didn't properly notify host of failed transmit
1289325	Added Power Manager logging support in the Bluetooth host stack library.
1298199	Fixed a problem in the simple_com UART component where a few bytes could be lost in high throughput edge cases.

## 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 <https://www.silabs.com/developers/bluetooth-low-energy> in the Tech Docs tab.

ID #	Description	Workaround
361592	The sync_data event does not report TX power.	None
368403	If setting CTE interval to 1, a CTE request should be sent in every connection interval. But it is sent only in every second connection interval.	None
641122	The Bluetooth stack component does not provide a configuration for RF antenna path.	This is an issue specifically for BGM210P. One workaround is to manually update the configuration in <code>sl_bluetooth_config.h</code> in text edit mode. If the OTA with Apploader is used, include the <code>bluetooth_feature_ota_config</code> component in application project. Call command <code>sl_bt_ota_set_rf_path()</code> to set the RF path for OTA mode.
650079	LE 2M PHY on EFR32[B M]G12 and EFR32[B M]G13 doesn't work with smartphones using the Mediatek Helio chip due to an interoperability issue.	No workaround exists. For application development and testing, the disconnection can be avoided by disabling 2M PHY with <code>sl_bt_connection_set_preferred_phy()</code> or <code>sl_bt_connection_set_default_preferred_phy()</code> .
682198	The Bluetooth stack has an interoperability issue on the 2M PHY with a Windows PC.	No workaround exists. For application development and testing, the disconnection can be avoided by disabling 2M PHY with <code>sl_bt_connection_set_preferred_phy()</code> or <code>sl_bt_connection_set_default_preferred_phy()</code> .
730692	4-7% packet error rate is observed on EFR32M BG13 devices when RSSI is between -25 and -10 dBm. The PER is nominal (as per the datasheet) both above and below this range.	None
756253	The RSSI value on a Bluetooth connection returned by the Bluetooth API is incorrect on EFR32M B1, EFR32M B12, EFR32M B13, and EFR32M B21 devices. On EFR32M B21 devices. It is about 8~10 dBm higher than the actual value, according to a measurement.	Install the "RAIL Utility, RSSI" component in the application project. This component provides a default RSSI offset for the chip that is applied at the RAIL level and can help to achieve more accurate RSSI measurements.
845506	When the <code>Bluetooth_feature_afh</code> component for AFH is included, the feature initialization always enables AFH.	To include the component but not to enable AFH at device boot, change the parameter value from 1 to 0 in the function call of <code>sl_btctrl_init_afh()</code> in <code>sl_bt_stack_init.c</code> .
1031031	Changing the configuration in the <code>bt_aoa_host_locator</code> application results in the application crashing.	None
1227955	<code>amazon_aws_soc_mqtt_over_ble</code> and <code>amazon_aws_soc_gatt_server</code> examples don't advertise after booting up.	Increase <code>configTIMER_TASK_STACK_DEPTH</code> to 600 or above in <code>config/FreeRTOSConfig.h</code> in the project.

## 5 Deprecated Items

### Deprecated in release 8.0.0.0

sl\_bt\_system\_reset command

sl\_bt\_sm\_set\_bonding\_key command

## 6 Removed Items

### Removed from release 8.0.0.0

Feature `bluetooth_feature_whitelisting`

API types without the prefix "sl\_bt" or "SL\_BT"

`sl_bt_advertiser_connection_mode_t` type

`sl_bt_advertiser_non_connectable` type

`sl_bt_advertiser_connectable_scannable` type

`sl_bt_advertiser_scannable_non_connectable` type

`sl_bt_advertiser_connectable_non_scannable` type

`sl_bt_advertiser_broadcast` type

`sl_bt_advertiser_user_data` type

`sl_bt_advertiser_set_phy()` command

`sl_bt_advertiser_set_configuration()` command

`sl_bt_advertiser_clear_configuration()` command

`sl_bt_advertiser_set_data()` command

`sl_bt_advertiser_set_long_data()` command

`sl_bt_advertiser_start()` command

`sl_bt_advertiser_start_periodic_advertising()` command

`sl_bt_advertiser_stop_periodic_advertising()` command

`sl_bt_sync_set_parameters()` command

`sl_bt_sync_open()` command

`sl_bt_scanner_set_timing()` command

`sl_bt_scanner_set_mode()` command

`sl_bt_ota_set_device_name()` command

`sl_bt_ota_set_advertising_data()` command

`sl_bt_ota_set_configuration()` command

`sl_bt_ota_set_rf_path()` command

`sl_bt_gap_enable_whitelisting()` command

`sl_bt_sm_add_to_whitelist()` command

`sl_bt_evt_scanner_scan_report` event

`sl_bt_evt_system_hardware_error` event

`sl_bt_evt_sync_opened` event

`sl_bt_evt_sync_transfer` event

`sl_bt_evt_sync_data` event



## 7 Multiprotocol Gateway and RCP

### 7.1 New Items

#### Added in release 8.0.0.0

OpenWRT alpha support has been added for zigbeed, OTBR and Z3Gateway applications. Zigbeed and OTBR are now provided in IPK package format as well. See AN1333: *Running Zigbee, OpenThread, and Bluetooth Concurrently on a Linux Host with a Multiprotocol Co-Processor* for details.

### 7.2 Improvements

#### Changed in release 8.1.0.0

The `zb_ble_dmp_print_ble_connections()` API is defined in the `zigbee_ble_event_handler` component and referenced in the `zigbee_ble_dmp_cli` component. For applications that use the `zigbee_ble_dmp_cli` component, but NOT the `zigbee_ble_event_handler`, you will need to add an empty stub for this function in your `app.c` file as follows:

```
void zb_ble_dmp_print_ble_connections(void)
```

```
{
}
```

#### Changed in release 8.0.0.0

None.

### 7.3 Fixed Issues

#### Fixed in release 8.1.0.0

ID #	Description
1300848	An issue were fixed where Z3Gateway in OpenWRT environment couldn't start EZSP communication caused by mismatching termios control characters running on OpenWRT and other environments.

#### Fixed in release 8.0.0.0

ID #	Description
1231021	Avoid an OTBR assert by recovering the RCP rather than passing unhandled transmit errors to the sub mac.
1242948	Removed spurious test asserts from zigbeed.
1244459	Fixed issue where MAC-retried Indirect transmissions via RCP can result in a source match table entry for child being removed despite messages pending.
1245988	Fixed an issue where Zigbeed did not restart when performing a Trust Center Backup and Restore Reset Node action.
1282264	Fixed issue that could have interrupted radio transmit operations by clearing the transmit fifo prematurely, causing underflow.
1288653	Zigbee/OT/BLE SOC app will now print connection info upon receiving the CLI command "plugin ble gap print-connections".
1292537	Zigbee/BLE NCP application is now properly showing up in Simplicity Studio UI.
1252365	Added Coexistence plugin back into Zigbee NCP/OpenThread RCP sample application.
1293853	Reduced RAM footprint for <code>zigbee_ncp-ot_rcp-spi</code> and <code>zigbee_ncp-ot_rcp_uart</code> on MG21.
1124140	Fixed an issue where setting <code>SL_OPENTHREAD_RADIO_RX_BUFFER_COUNT</code> to a value other than 1 caused <code>z3-light_ot-ftd_soc</code> to not send Zigbee beacons after the OpenThread network is up.

## 7.4 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 <https://www.silabs.com/developers/simplicity-software-development-kit>.

ID #	Description	Workaround
937562	Bluetoothctl 'advertise on' command fails with rcp-uart-802154-blehci app on Raspberry Pi OS 11.	Use btmgmt app instead of bluetoothctl.
1074205	The CMP RCP does not support two networks on the same PAN id.	Use different PAN ids for each network. Support is planned in a future release.
1122723	In a busy environment, the CLI may become unresponsive in the z3-light_ot-ftd_soc app.	No known workaround.
1209958	The ZB/OT/BLE RCP on MG24 and MG21 can stop working after a few minutes when running all three protocols.	Will be addressed in a future release.
1221299	Mfglib RSSI readings differ between RCP and NCP.	Will be addressed in a future release.

## 7.5 Deprecated Items

None.

## 7.6 Removed Items

### Removed in release 8.0.0.0

None.

## 8 Using This Release

This release contains the following

- Silicon Labs Bluetooth stack library
- Bluetooth sample applications

For more information about the Bluetooth SDK see <https://docs.silabs.com/bluetooth/latest/>. If you are new to Bluetooth see [UG103.14: Bluetooth LE Fundamentals](#).

### 8.1 Installation and Use

The Bluetooth 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 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, Simplicity SDK may be installed manually by downloading or cloning the latest from GitHub. See [https://github.com/SiliconLabs/simplicity\\_sdk](https://github.com/SiliconLabs/simplicity_sdk) for more information.

Simplicity Studio installs the Simplicity 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 is available on <https://docs.silabs.com/>.

### 8.2 Security Information

#### Secure Vault Integration

When deployed to Secure Vault High devices, sensitive keys such as the Long Term Key (LTK) are protected using the Secure Vault Key Management functionality. The table below shows the protected keys and their storage protection characteristics.

Wrapped Key	Exportable / Non-Exportable	Notes
Remote Long Term Key (LTK)	Non-Exportable	
Local Long Term Key (legacy only)	Non-Exportable	
Remote Identity Resolving Key (IRK)	Exportable	Must be Exportable for future compatibility reasons
Local Identity Resolving Key	Exportable	Must be Exportable because the key is shared with other devices.

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.

The following figure is an example:

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<input type="checkbox"/> Microcontrollers	<input type="checkbox"/> Wireless
<input type="checkbox"/> 8-bit MCUs <input checked="" type="checkbox"/> 32-bit MCUs	<input type="checkbox"/> Bluetooth Classic <input type="checkbox"/> Bluetooth Low Energy <input checked="" type="checkbox"/> Proprietary
<input type="checkbox"/> Timing	<input type="checkbox"/> Wi-Fi
<input type="checkbox"/> Clocks	<input type="checkbox"/> ZigBee and Thread
<input type="checkbox"/> Buffers	<input type="checkbox"/> Z-Wave
<input type="checkbox"/> Oscillators	
<input type="checkbox"/> CDR and PHY	

## 8.3 Support

Development Kit customers are eligible for training and technical support. 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>.

# Simplicity Studio

One-click access to MCU and wireless tools, documentation, software, source code libraries & more. Available for Windows, Mac and Linux!



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## 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. Silicon Labs reserves the right to make changes without further notice to the product information, specifications, and descriptions herein, and does not give warranties as to the accuracy or completeness of the included information. Without prior notification, Silicon Labs may update product firmware during the manufacturing process for security or reliability reasons. Such changes will not alter the specifications or the performance of the product. Silicon Labs shall have no liability for the consequences of use of the information supplied in this document. This document does not imply or expressly grant any license to design or fabricate any integrated circuits. The products are not designed or authorized to be used within any FDA Class III devices, applications for which FDA premarket approval is required or Life Support Systems without the specific written consent of Silicon Labs. A "Life Support System" is any product or system intended to support or sustain life and/or health, which, if it fails, can be reasonably expected to result in significant personal injury or death. Silicon Labs products are not designed or authorized for military applications. Silicon Labs products shall under no circumstances be used in weapons of mass destruction including (but not limited to) nuclear, biological or chemical weapons, or missiles capable of delivering such weapons. Silicon Labs disclaims all express and implied warranties and shall not be responsible or liable for any injuries or damages related to use of a Silicon Labs product in such unauthorized applications.

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