SILICON LABS 5.0.3.0 GA Bluetooth Mesh SDK User Guide

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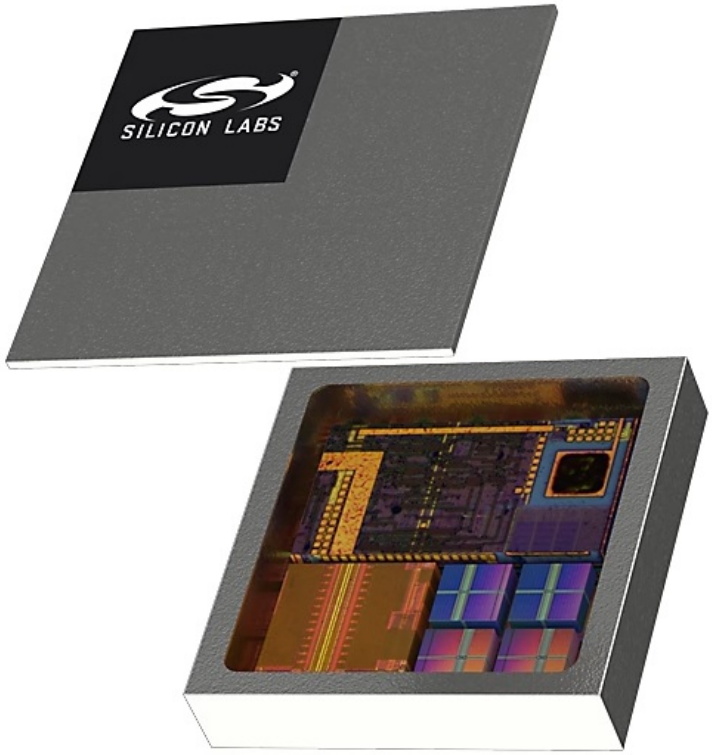


Bluetooth mesh is a new topology available for Bluetooth Low Energy (LE) devices that enables many-to-many (m:m) communication. It's optimized for creating large-scale device networks, and is ideally suited for building automation, sensor networks, and asset tracking. Our software and SDK for Bluetooth development supports Bluetooth Mesh and Bluetooth 5.3 functionality. Developers can add mesh networking communication to LE devices such as connected lights, home automation, and asset tracking systems. The software also supports Bluetooth beaconing, beacon scanning, and GATT connections so Bluetooth mesh can connect to smart phones, tablets, and other Bluetooth LE devices. This release includes features supported by the Bluetooth mesh specification version 1.1.

These release notes cover SDK versions:

- 5.0.3.0-released March 13, 2024
- 5.0.2.0-released October 9, 2023
- 5.0.1.0-released July 26, 2023
- 5.0.0.0-released June 7, 2023

KEY FEATURES

- Support for Mesh Protocol 1.1
- Support for Mesh Model 1.1
- Support for Mesh Binary Large Object Transfer
- Support for Mesh Device Firmware Up-date

Compatibility and Use Notices

For more information about security updates and notices, see the Security chapter of the Gecko Platform Release Notes installed with this SDK or on the Silicon Labs Release Notes page. 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 Bluetooth mesh 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 so should carefully verify that the correct files are being used. GCC (The GNU Compiler Collection) version 10.3-2021.10, provided with Simplicity Studio.
- Link-time optimization feature of GCC has been disabled, resulting in a slight increase of image size.

New Items

New Features

Added in release 5.0.1.0 New Example Support
Added support for BRD4194A and BRD4187C radio boards for BT Mesh IOP Test Demos

Added in release 5.0.0.0 New Hardware Support
Support was added for the EFR32xG27 product family and BG24 WLCSP Radio Boards. Support was added for EFR32xG22 Revision D. Support was added for EFR32xG21, Revision C and later.

New APIs
None

Improvements

Changed in release 5.0.0.0

- Code size optimization of stack and example applications.
- Example applications and SLC Components were optimized for No-Code and Low-Code development.

Fixed Issues

Fixed in release 5.0.3.0

ID #	Description
1194020	Issues with application use of coded PHY after scanner component change.
1194443	DFU distributor application is currently not able to handle more than 60 nodes successfully.
1198887	Private beacon random advertiser address is the same for all subnets while it should be diffe rent.
1202088	Btmesh_soc_switch_ctl example compiles on all boards with the IAR compiler.
1206620	Fixed problems caused by missing BGAPI events during high load to correct firmware verific ation problems.
1206714	Proxy server should emit a beacon over the proxy connection when a subnet is added to the proxy server.
1206715, 121101 2, 1211022	Support for device composition data page 2, 129, and 130 should be present in the configura tion server model as well as large composition data server model when remote provisioning i s supported.
1211017	Periodic publishing of location information should alternate between global and local location s when both are known.
1212373	Resource leak in proxy connection handling after several hundred proxy connections have b een opened and closed.
1212854	Pull mode MBT transfer to an LPN does not complete successfully.
1226000	Extended Provisioner BGAPI function for checking node identity to also check private node i dentity.
1230833	Fixed friend subsystem deinitialization so that reinitialization works without resetting the devi ce.
1243565	Fixed crash that could occur if provisioner initialization failed, for example, because of a malf ormed DCD.
1244298	Fixed reporting of spurious extra octets in the Register Status event of the Scene Client mod el.

Fixed in release 5.0.2.0

ID #	Description
1166409	Fully corrected the use of multicast delay in Firmware Update Server responses
1169206	Updated Mesh Proxy Solicitation service UUID to the adopted value
1172590	Implemented storing of SAR configuration model state persistently
1178876	Fixed an issue in handling missing responses to certain configuration model requests on xG 24 and xG27
1182605	Fixed a problem in storing more than 127 subscriptions for a model
1187455	Updated the DCD of DFU example apps to match the adopted specification requirements
1187639	Updated the DFU API to match the adopted specification terminology
1196510, 1187916, 1187304	IOP Testing stability issues fixed
1193472	Provisioned component has the config option to enable/disable automatic reset when a node reset arrives.

Fixed in release 5.0.1.0

ID #	Description
1164433	Fixed an issue with Firmware Update Server and BLOB Transfer Server models using a too-short randomized delay when responding to multicast requests

Fixed in release 5.0.0.0

ID #	Description
1102630	Optimizations to Device Firmware Update over GATT proxy
1086169, 1113729, 1117608	Multiple fixes to BLOB transfer models
1123776	Fixed an issue with private network beacons sent over the GATT proxy
1125121	Corrected handling of an invalid firmware deletion message

ID #	Description
1133103, 1134497	Multiple fixes for remote provisioning
1134494, 1134495	Multiple fixes to Large Composition Data models

Known Issues in the Current Release

Issues in bold were added since the previous release.

ID #	Description	Workaround
401550	No BGAPI event for segmented message handling failure.	The application needs to deduce failure from timeout/lack of application layer response; for vendor models, an API has been provided.
454059	A large number of key refresh state change events are generated at the end of KR process, and that may flood NCP queue.	Increase NCP queue length in the project.
454061	Slight performance degradation compared to 1.5 in round-trip latency tests was observed.	
624514	Issue with re-establishing connectable advertising if all connections have been active and GATT proxy is in use.	Allocate one more connection than is needed.
841360	Poor performance of segmented message transmission over GATT bearer.	Ensure that the underlying BLE connection's Connection interval is short; ensure that ATT MTU is large enough to fit a full Mesh PDU; tune the minimum connection event length to allow multiple LL packets to be transmitted per connection event.
1121605	Rounding errors may cause scheduled events to trigger at very slightly different times than expected.	
1202073	Btmesh_ncp_empty example does not have enough RAM on BRD4182 with GCC compiler.	Free some RAM or disable an unnecessary component.

Deprecated Items

- None

Removed Items

- None

Using This Release

This release contains the following

- Silicon Labs Bluetooth mesh stack library
- Bluetooth mesh sample applications

If you are a first time user, see QSG176: Silicon Labs Bluetooth Mesh SDK v2.x Quick-Start Guide.

Installation and Use
The Bluetooth mesh 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/Sili-conLabs/gecko_sdk** for more information.
The GSDK default install location has changed with Simplicity Studio 5.3 and higher.

- Windows: C:\Users\<NAME>\SimplicityStudio\SDKs\gecko_sdk
- MacOS: /Users/<NAME>/SimplicityStudio/SDKs/gecko_sdk

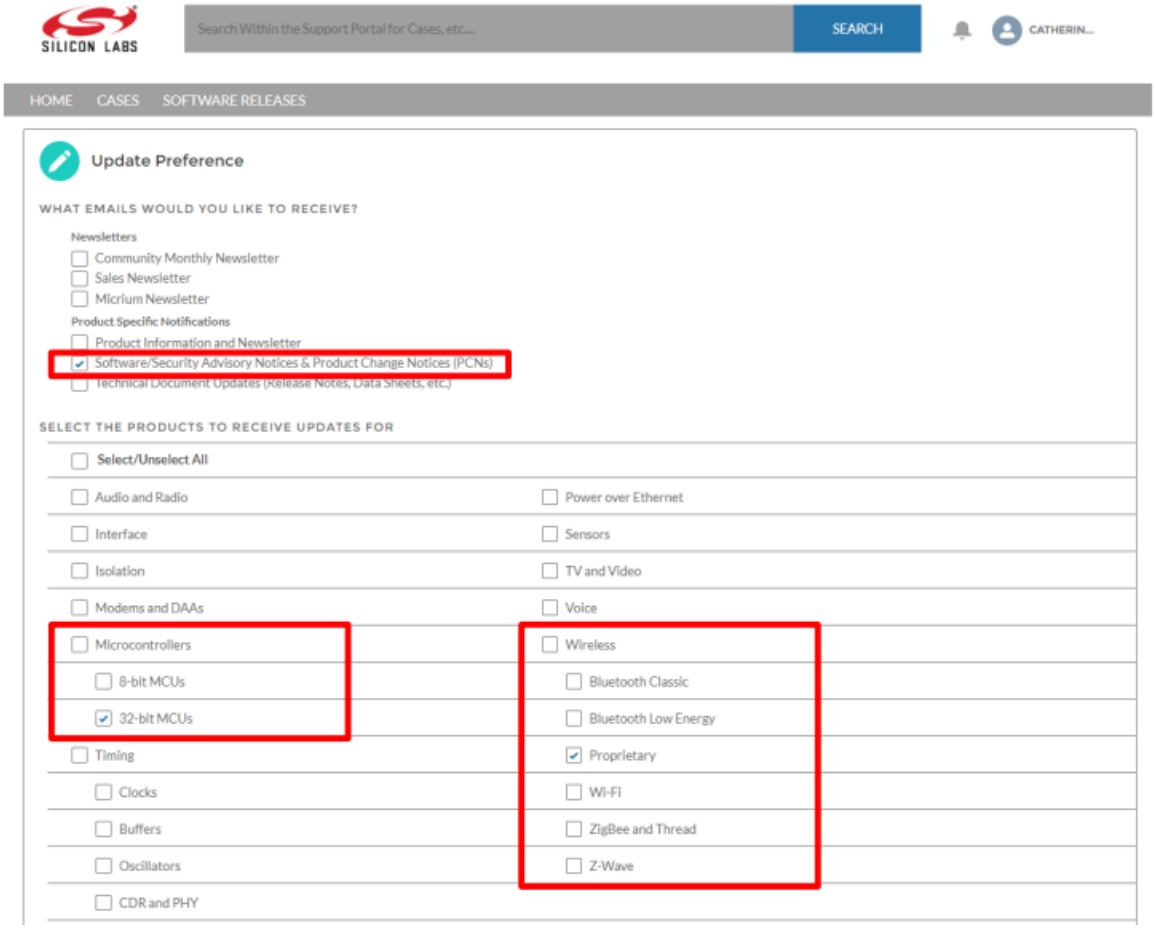
  Documentation specific to the SDK version is installed with the SDK. Additional information can often be found in the knowledge base articles (KBAs). API references and other information about this and earlier releases is available on **https://docs.silabs.com/**.

Security Information
Secure Vault Integration
This version of the stack is integrated with Secure Vault Key Management. When deployed to Secure Vault High devices, mesh encryption keys are protected using the Secure Vault Key Management functionality. The table below shows the protected keys and their storage protection characteristics.

Key	Exportability on a node	Exportability on Provisioner	Notes
Network key	Exportable	Exportable	Derivations of the network key exist only in R AM while network keys are stored on flash
Application ke y	Non-exportable	Exportable	
Device key	Non-exportable	Exportable	In Provisioner's case, applied to Provisionerr's own device key as well as other devices' keys

Keys that are marked as "Non-Exportable" can be used but cannot be viewed or shared at runtime. 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.



Support
Development Kit customers are eligible for training and technical support. Use the Silicon Labs Bluetooth mesh web page to obtain information about all Silicon Labs Bluetooth products and services, and to sign up for product support. 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!

- **IoT Portfolio**
  - www.silabs.com/IoT
- **SW/HW**
  - www.silabs.com/simplicity
- **Quality**
  - www.silabs.com/quality
- **Support & Community**
  - www.silabs.com/community

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 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 the 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 the use of a Silicon Labs product in such unauthorized applications. Note: This content may contain offensive terminology that is now obsolete. Silicon Labs is replacing these terms with inclusive language wherever possible. For more information, visit **www.silabs.com/about-us/inclusive-lexicon-project**

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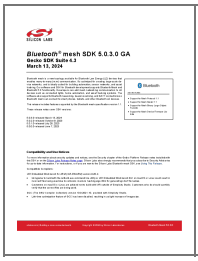
Documents / Resources

	**SILICON LABS 5.0.3.0 GA Bluetooth Mesh SDK** [pdf] User Guide 5.0.3.0 GA Bluetooth Mesh SDK, 5.0.3.0 GA, Bluetooth Mesh SDK, Mesh SDK, SDK

References

- **Silicon Labs**
- **Silicon Labs**
- **About Us - Silicon Labs**
- **Silicon Labs Community**
- **Internet of Things (IoT) - Silicon Labs**

- Quality - Silicon Labs
- Simplicity Studio - Silicon Labs
- Technical Support - Silicon Labs
- Software Developer Docs - Silicon Labs
- Overview - latest - Simplicity Studio 5 Users Guide Silicon Labs
- GitHub - SiliconLabs/gecko_sdk: The Gecko SDK (GSDK) combines all Silicon Labs 32-bit IoT product software development kits (SDKs) based on Gecko Platform into a single, integrated SDK.
- Silicon Labs Community
- Simplicity Studio - Silicon Labs
- Bluetooth Mesh Software Development Kit - Silicon Labs
- User Manual