Z-Wave and Z-Wave Long Range 700/800 SDK 7.20.2.0 GA

Gecko SDK Suite 4.3
October 9, 2023

Z-Wave and Z-Wave Long Range 700/800 are designed to meet the demands of the future smart home, where increasing needs for more sensors and battery-operated devices require both long range and low power. Context-aware environments are the next evolution in the smart home market, and they require technologies that have been optimized specifically for these applications.

100% Interoperable: Every product in the Z-Wave ecosystem works with every other product, regardless of type, brand, manufacturer or version. No other smart home/IoT protocol can make this claim.

Best-In-Class Security: Z-Wave's Security 2 (S2) framework provides end-to-end encryption and the most advanced security for smart home devices and controllers. Homes with S2 Z-Wave devices are virtually un-hackable.

SmartStart Easy Installation: SmartStart radically simplifies the installation of smart devices by using QR code scans for uniform, trouble-free setup. Devices and systems can be pre-configured dramatically easing deployments.

Backwards-Compatible: Z-Wave certification mandates backward-compatibility. The first Z-Wave devices on the market, more than ten years old, still perform as intended in networks with the latest Z-Wave technologies.

For more information about the certification status of Z-Wave and Z-Wave Long Range 700/800 SDK v7.20.2.0 Pre-Certified GA, see section 11 Product Life Cycle and Certification.

These release notes cover SDK version(s):

7.20.2.0 GA released October 9, 2023
7.20.1.0 GA released July 26, 2023
7.20.0.0 Pre-Certified GA released June 7, 2023

KEY FEATURES

- ZG28-based radio boards BRD4401B/C supported
- Z-Wave FLiRS inclusion performance improved in large networks
- Z-Wave Long Range wakeup beam performance improved
- Simplified application development by moving logic from the Apps to ZAF
- 800 DevKit (BRD2603) includes new applications and Multilevelsensor extended with new features
- Improved documentation to better support development from idea to certification
- Z-Wave Simulator available for Z-Wave Alliance members
- Z-Wave PC-based Zniffer v4.67 released

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 Z-Wave 700/800 SDK, see section 10 Using This Release.

Contents

1 Supported Radio Boards

This section describes the radio boards supported by the certified and pre-certified applications for the 700 and 800 Series, respectively.

Table 1-1. Supported Radio Boards

Series	Radio Board	Description	Applications
800	BRD2603A	ZGM230SB: ZW-LR, SiP, 14 dBm & Secure Vault High.	Applications using BRD2603A
800	BRD2705A	EFR32xG28 Explorer Kit	Applications using BRD2705A
800	BRD4204A	EFR32ZG23A: ZW-LR, SoC, 14 dBm & Secure Vault Mid	Serial API using BRD4002A
800	BRD4204B	EFR32ZG23: ZW-LR, SoC, 14 dBm & Secure Vault Mid	Serial API using BRD4002A
800	BRD4204C	EFR32ZG23: ZW-LR, SoC, 14 dBm & Secure Vault High	Serial API using BRD4002A
800	BRD4204D	EFR32ZG23: ZW-LR, SoC, 14 dBm, Secure Vault High & external 32kHz crystal mounted	Serial API using BRD4002A
800	BRD4205A	ZGM230SA: ZW-LR, SiP, 14 dBm & Secure Vault Mid	Applications using BRD4002A/BRD8029A
800	BRD4205B	ZGM230SB: ZW-LR, SiP, 14 dBm & Secure Vault High.	Applications using BRD4002A/BRD8029A
800	BRD4210A	EFR32ZG23: ZW-LR, SoC, 20 dBm & Secure Vault High	Applications using BRD4002A/BRD8029A
800	BRD4400C	EFR32ZG28B: ZW-LR, SoC, 14 dBm & Secure Vault High	Applications using BRD4400C/BRD8029A
800	BRD4401B	EFR32ZG28B: ZW-LR, SoC, 20 dBm & Secure Vault High	Applications using BRD4401B/BRD8029A
800	BRD4401C	EFR32ZG28B: ZW-LR, SoC, 20 dBm & Secure Vault High	Applications using BRD4401B/BRD8029A
700	BRD4200A	ZGM130S: SiP & 14 dBm	Applications using BRD4002A/BRD8029A
700	BRD4201A	EFR32ZG14: SoC & 14 dBm	Serial API using BRD4002A
700	BRD4202A	ZGM130S: SiP, 14 dBm & no SAW filters	Applications using BRD4002A/BRD8029A
700	BRD4206A	EFR32ZG14: ZW-LR, SoC & 14 dBm	Serial API using BRD4002A
700	BRD4207A	ZGM130S: ZW-LR, SiP & 14 dBm	Applications using BRD4002A/BRD8029A
700	BRD4208A	EFR32ZG14: ZW-LR, SoC & 20 dBm	Serial API using BRD4002A
700	BRD4209A	ZGM130S: ZW-LR, SoC & 20 dBm	Applications using BRD4002A/BRD8029A

The applications in the above table need a radio board in combination with BRD4002A – Wireless Starter Kit Mainboard (WSTK) and BRD8029A – Buttons and LEDs Expansion Board. Notice that BRD4002A is compatible with the old BRD4001A mainboard that is going to be deprecated. The Serial APIs in the above table only need a radio board and a BRD4002A – Wireless Starter Kit Mainboard (WSTK). Refer to INS14278: How to Use Certified Apps and INS14816: How to Use Pre-Certified Apps, for details.

ZW-LR indicates that the radio board supports both Z-Wave and Z-Wave Long Range. 14/20 dBm indicates the transmit power of the radio board. Secure Vault is an industry-leading suite of state-of-the-art security features that address escalating Internet of Things (IoT) threats.

Please note that the radio board BRD2603A is supplied in an independent development kit called the Z-Wave 800 Series Development Kit.

Table 1-2. Radio Boards versus OPNs.

Series	Radio Board	OPN Description
800	BRD2603A	ZGM230SB27HGN3
800	BRD2705A	EFR32ZG28B312F1024IM48-A
800	BRD4204A	EFR32ZG23A010F512GM48
800	BRD4204B	EFR32ZG23A010F512GM48
800	BRD4204C	EFR32ZG23B010F512IM48
800	BRD4204D	EFR32ZG23B010F512IM48
800	BRD4205A	ZGM230SA27HNN0
800	BRD4205B	ZGM230SB27HGN2
800	BRD4210A	EFR32ZG23B020F512IM48
800	BRD2603A	ZGM230SB27HGN3
800	BRD4400C	EFR32ZG28B312F1024IM68-A
800	BRD4401B	EFR32ZG28B322F1024IM68-A
800	BRD4401C	EFR32ZG28B322F1024IM68-A
700	BRD4200A	ZGM130S037HGN2
700	BRD4201A	EFR32ZG14P231F256GM32
700	BRD4202A	ZGM130S037HGN2
700	BRD4206A	EFR32ZG14P231F256GM32
700	BRD4207A	ZGM130S037HGN2
700	BRD4208A	EFR32ZG14P731F256GM32
700	BRD4209A	EFR32ZG13P531F512GM48

The table above shows the Radio Boards and OPN relation. This table can be used to clarify the compatibility of the prebuilt binaries offered in the GSDK. The prebuilt binaries are built targeting boards and not OPNs. More OPNs are available than the ones listed above. For those OPNs the prebuilt binaries will not work. The desired application must be built targeting the specific OPN instead.

2   Z-Wave Protocol

Be aware that 800 products based on SDK v7.17.x do not support upgrade of Secure Element firmware over the air (OTA). However, a migration path exists to upgrade both main bootloader and Secure Element firmware to enable support of this feature. See *INS14895: Instruction for How to Use Tiny App* regarding the upgrade path. The 800-based SDK v7.18.x supports upgrade of Secure Element firmware over the air (OTA).

The 8 kB reduction of the Z-Wave protocol NVM3 file system has an impact when making OTA firmware update on 800-based applications deployed on version 7.17.2 and earlier. To make an OTA firmware update from 7.17.2 to 7.18.1/2 requires that 7.18.1/2 is modified to keep the same NVM3 protocol size as 7.17.2. This can be configured by the define NVM3_DEFAULT_NVM_SIZE when building 7.18.1/2.

The 800 series based end device will hang in a boot loop if security keys are manually written in Manufacturer Tokens.
Note that due to the introduction of Secure Key Storage on the 800 series, having externally supplied key pairs is no longer supported. To ensure that security is not compromised, keys are generated internally on first boot and kept only in secure storage. The public key and the QR code can be read out in production.

2.1   New Items

None

2.2   Improvements

None

2.3   Fixed Issues

Fixed in release 7.20.2 GA

ID #	Description
1183365	Fixed uninitialized structure field that caused CSR_LifelineReportTriggeredByZWave and CSR_LifelineReportToMultipleNodes CTT tests failures.
1203641	Fixed failed S2_SupportedCCRequirement_Rev02 CTT test: COMMAND_CLASS_SECURITY is missing from Multichannel Capability Report, when the US-LR DUT is included NONE securely with US region.

Fixed in release 7.20.1 GA

ID #	Description
1129529	Failed CTT test case on Sensor PIR - S2_UniqueAuthLearnModeECDHKeyPair_Rev01.

Fixed in release 7.20.0 Pre-Certified GA

ID #	Description
1131765	End device assert or unresponsive for some time if an OTA firmware update is aborted shortly after it was initiated.
1112625	Occasional long wakeup beams (up to 9 seconds) on Z-Wave Long Range devices.
1112282	Enhanced frame verifications.
1111658	Register the Application Status CC (using the REGISTER_CC_V4(...)) and include the device securely, then the Node Info Frame (NIF) does not contain this CC.
1109024	Controller can receive INIF frame from a foreign network without the RECEIVE_STATUS_FOREIGN_HOMEID bit in the ApplicationControllerUpdate callback.
753759	The end device radio can become unresponsive during an OTA firmware update if a message is transmitted during the OTA transactions.

2.4   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 Silicon Labs Release Notes page

ID #	Description	Workaround
753756	Network Wide Inclusion (NWI) of 500-based apps doesn't work through 700/800 repeaters.	NWI works at second attempt.
1171840	Serial API controller unable to update to 7.20	The defines ZAF_CONFIG_GENERIC_TYPE and ZAF_CONFIG_SPECIFIC_TYPE in config/zaf_config.h should be changed to the value 0.

2.5   Deprecated Items

None

2.6   Removed Items

None

3 Z-Wave Plus V2 Application Framework

3.1 New Items

Z-Wave workspaces introduced solutions in Simplicity Studio 5, where the application and the bootloader projects can be handled together within solutions.

Improved Ux/Dx, simplified the sample applications by moving logic from the Apps to ZAF and Command Classes.

The LED Bulb application has been removed from the Certified Applications and moved to Pre-Certified Applications.

3.2 Improvements

For a detailed description of application development using the Z-Wave Plus V2 Framework, refer to INS14259: Z-Wave Plus V2 Application Framework GSDK.

A porting guide is also available for customers who want to migrate 800 hardware. The guide contains a detailed example of how to port a non-component/700-based Switch On/Off App (7.16.3) to a component/800-based Switch On/Off App (7.17.0). See *APL14836: Application Note for Porting Z-Wave Appl. SW from 700 to 800 hardware.*

More mandatory logic was moved from the application to ZAF. This contributed to bringing down the total number of lines in the application. This should decrease time to market for new products.

3.3 Fixed Issues

Fixed in release 7.20.2 GA.

ID #	Description
1196755	Fixed failed CSR_LifelineMandatoryReports_Rev03 CTT test: If any setting in Door Lock Config Set is a fit to the DUT capability it is handled and reported on lifeline accordingly, regardless of whether there are other settings in the command that do not match the capabilities.

Fixed in release 7.20.1 GA.

ID #	Description
1145454	CTT Test: CCN_PowerlevelCmdClassTestNode_Rev01 test case failed.
1148476	CTT Test: ZWavePlusInfoCmdClassV2_Rev08_Orig testcase failed.
1148478	CTT Test: DoorLockCmdClassV4_Rev08_Orig testcase failed.
1148479	CTT Test: BinarySwitchCmdClassV2_Rev10_Orig testcase failed.
1148619	CTT Test: MultiChannelCmdClassV4_Rev05_Orig testcase failed.
1148626	CTT Test: CentralSceneCmdClassV3_Rev06_Orig testcase failed.
1150623	CTT Test: PowerStrip ZWavePlusInfo EP2.
1174728	Don't advertise S0 in Multi-Channel Capability Report on LR.
1176935	Certification: Transport CC must not be present in Multi-Channel Capability Report for EP0
1086946	Z-Wave ZAF Component does not display the default setting for Icon Type and Device Type.
1130584	List of Command Classes for Endpoints is incomplete in PC Controller.
1131528	LED Bulb: default values of Multilevel Switch and Color Switch.
1124411	Same header guards in multiple header files.
1160192	Sensor PIR has no demo on BRD2603A.
1106238	cc_configuration_set returns ok in out-of-range value case.
1174729	Power Strip doesn't advertise S0 security level in case of long-range network.

3.4 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 the Silicon Labs Release Notes page

ID #	Description	Workaround
369430	All S2 multicast frames are sent using verified delivery S2_TXOPTION_VERIFY_DELIVERY whether or not a response is expected.	Change source code depending on the frame sent.
1086946	The Z-Wave ZAF Component does not display the default setting for Icon Type and Device Type.	Currently not available.
1062482	OTA firmware update gets stuck when a Timer interrupt is triggered to toggle a GPIO frequently.	Currently not available.
1080416	The ASSERT macro does not print the file and line when it is used in the ApplicationTask function.	Prints after disabling all interrupts.
711346	Sensor PIR throws some undefined garbage to the connected port.	Currently not available.
1172849	On series 800, sleep will no longer take advantage of EM1P current savings.	Currently not available.

3.5 Deprecated Items

None

3.6 Removed Items

None

4 Certified Applications

The certified applications based on v7.x.1+ will be formally certified by a certification house. However, the first release (v7.x.0) will only contain pre-certified applications based on a certification test using CTT v3. Refer to INS14278: How to Use Certified Apps for details.

The LED Bulb application has been removed from the Certified Applications and moved to Pre-Certified Applications.

4.1 Door Lock Key Pad

4.1.1 New Items

None

4.1.2 Improvements

None

4.1.3 Fixed Issues

None

4.1.4 Known Issues in the Current Release

None

4.1.5 Deprecated Items

None

4.1.6 Removed Items

None

4.2 Power Strip

4.2.1 New Items

None

4.2.2 Improvements

None

4.2.3 Fixed Issues

None

4.2.4 Known Issues in the Current Release

None

4.2.5 Deprecated Items

None

4.2.6 Removed Items

None

4.3 Sensor PIR

4.3.1 New Items

None

4.3.2 Improvements

None

4.3.3 Fixed Issues

None

4.3.4 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 the Silicon Labs Release Notes page

ID #	Description	Workaround
1065157	Multilevel Sensor can't send Multilevel Sensor Report based on auto report timer.	Currently not available.

4.3.5 Deprecated Items

None

4.3.6 Removed Items

None

4.4 Switch On/Off

4.4.1 New Items

None

4.4.2 Improvements

None

4.4.3 Fixed Issues

None

4.4.4 Known Issues in the Current Release

None

4.4.5 Deprecated Items

None

4.4.6 Removed Items

None

4.5   Wall Controller

4.5.1 New Items

None

4.5.2 Improvements

None

4.5.3 Fixed Issues

None

4.5.4 Known Issues in the Current Release

None

4.5.5 Deprecated Items

None

4.5.6 Removed Items

None

5 Pre-Certified Applications

The pre-certified applications will not be formally certified, but certification tests have been performed based on CTT v3. Refer to INS14816: How to Use Pre-Certified *Apps* for details.

The LED Bulb application has been removed from the Certified Applications and moved to Pre-Certified Applications.

5.1 Multilevel Sensor

5.1.1 New Items

None

5.1.2 Improvements

None

5.1.3 Fixed Issues

None

5.1.4 Known Issues in the Current Release

None

5.1.5 Deprecated Items

None

5.1.6 Removed Items

None

5.2 LED Bulb

5.2.1 New Items

None

5.2.2 Improvements

None

5.2.3 Fixed Issues

None

5.2.4 Known Issues in the Current Release

None

5.2.5 Deprecated Items

None

5.2.6 Removed Items

None

5.3 Key Fob Controller

This application is new as of 7.18.x. It offers an example of how to create a key fob that is able to include and control other Z-Wave nodes. One use case could be a kit consisting of a key fob and a battery-driven shade. As the key fob can add more devices to its network, it opens the possibility for adding additional shades.

5.3.1 New Items

None

5.3.2 Improvements

None

5.3.3 Fixed Issues

None

5.3.4 Known Issues in the Current Release

None

5.3.5 Deprecated Items

None

5.3.6 Removed Items

None

6 Serial API Applications

Beginning with version 7.16, when backing up and restoring a SerialAPI via the FUNC_ID_NVM_BACKUP_RESTORE, the SerialAPI will automatically upgrade the protocol non-volatile memory (NVM) to the latest version. Any backup made of a 7.16 or later SerialAPI can be restored to its original version or to a later version of the SerialAPI without any manual upgrade of the protocol NVM being necessary.

The serial interface is unchanged in version 8.

As of SDK version 7.18.x, Serial API is available as source code as well as binary. This opens the possibility for building customized versions of Serial API with different pin configuration or additional hardware utilization. A use case might be to use SPI instead of UART for serial communication.

No application using Serial API End Device is available in the GSDK.

6.1   Serial API Controller

6.1.1 New Items

None

6.1.2 Improvements

None

6.1.3 Fixed Issues

None

6.1.4 Known Issues in the Current Release

None

6.1.5 Deprecated Items

None

6.1.6 Removed Items

None

7   800 SDK – BRD2603

800 SDK improvements:

- MultilevelSensor App improved by supporting ambient light sensor and motion sensor. The periodic timer for sensor data reports is configurable.

- Supported new apps on 800 DevKit: SensorPIR, WallController, PowerStrip, Zniffer

- Improved the usage of the 800 DevKit demo with the Unify Portable Environment by adding the ability to identify the application firmware on the boards. This makes preparation of the Dev Kit for the demo simpler and faster.

8 Important Changes

Starting in version 7.19, API-breaking changes have been documented in the document "Important_changes.md" available in GSDK. Please check it for a detailed description of changes introduced in the latest release.

HTML documentation has been added to GSDK and can be found in Simplicity Studio, Documentation section, under "Z-Wave zipped doxygen documentation". Location of this document is <SDK>/protocol/z-wave/studio-docs/z-wave-html-docs.zip.

9 Open Source Software

Z-Wave is using FreeRTOS as the underlying OS, and it is based on FreeRTOS Kernel V10.4.3.

10 Using This Release

This release contains the following

- Z-Wave Plus V2 Application Framework
- Z-Wave Certified Applications for a broad range of smart home applications
- Z-Wave Protocol and Serial API Applications

If you are a first-time user, Z-Wave documentation is installed with the SDK. See INS14280: Z-Wave Getting Started for End Devices, INS14278: How to Use Certified Apps in Z-Wave, and INS14281: Z-Wave Getting Started for Controller Devices for instructions.

This SDK depends on a Gecko Platform. The Gecko Platform code provides functionality that supports protocol plugins and APIs in the form of drivers and other lower layer features that interact directly with Silicon Labs chips and modules. Gecko Platform components include EMLIB, EMDRV, RAIL Library, NVM3, PSA, and mbedTLS. Gecko Platform release notes are available through Simplicity Studio's Launcher Perspective.

10.1 Installation and Use

Order a Z-Wave Wireless Starter kit. The kit offers the easiest and fastest way to start evaluation and development of your own Z-Wave mesh application. It provides a single world-wide development kit for both end devices and gateways with multiple radio boards, with which developers can create a mesh network and evaluate the Z-Wave module.

The Z-Wave and Z-Wave Long Range 700/800 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/SiliconLabs/gecko_sdk for more information.

Simplicity Studio installs the GSDK by default in:

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

To implement a specific application, Silicon Labs recommends starting with one of the existing pre-certified apps with the desired Role Type.

10.2 Security Information

Secure Vault Integration

This version of the stack are using secure vault interface for key management of asymmetric keys (ECC Curve 25519) and Symmetric keys (AES).

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.

10.3 Support

Development Kit customers are eligible for training and technical support.

See support resources and contact Silicon Laboratories support at https://www.silabs.com/support.

11 Product Life Cycle and Certification

Silicon Labs will add new features based on market requirements and continuously improve the Z-Wave Protocol to position the Z-Wave Ecosystem. The Z-Wave Protocol Life Cycle is a process to provide rapid innovation, new features and robust matured protocol release to Z-Wave Partners. The Z-Wave Protocol Life Cycle defines the maturation process of Z-Wave Protocol generations and consist of three phases divided in five Life Cycle stages. A change in the Z-Wave SDK utilized for a specific device does require recertification; however, the type of certification required, the amount of testing needed, and the associated fees depend on the scope of the change. Refer to Z-Wave Alliance home page https://z-wavealliance.org/ for details.

Table 11-1. Z-Wave SDK Release History

Series	SDK Version	Release Date [DD-MMM-YYYY]
700/800	7.20.2 GA	9-OCT-2023
700/800	7.20.1 GA	26-JUL-2023
700/800	7.20.0 Pre-Certified GA	07-JUN-2023
700/800	7.19.3 GA	03-MAY-2023
700/800	7.19.2 GA	08-MAR-2023
700/800	7.19.1 GA	01-FEB-2023
700/800	7.19.0 Pre-Certified GA	14-DEC-2022
700/800	7.18.8 GA	13-SEP-2023
700/800	7.18.6 GA	28-JUN-2023
700/800	7.18.4 GA	18-JAN-2023
700/800	7.18.3 GA	19-OCT-2022
700/800	7.18.2 GA	28-SEP-2022
700/800	7.18.1 GA	17-AUG-2022
700/800	7.18.0 Pre-Certified GA	08-JUN-2022
700/800	7.17.2 GA	09-MAR-2022
700/800	7.17.1 Pre-Certified GA	28-JAN-2022
700/800	7.17.0 Pre-Certified GA	08-DEC-2021
700	7.16.3 GA	13-OCT-2021
700	7.16.2 GA	08-SEP-2021
700	7.16.1 GA	21-JUL-2021
700	7.16.0 Pre-Certified GA	16-JUN-2021
700	7.15.4 GA	07-APR-2021
700	7.15.2 Pre-Certified GA	27-JAN-2021
700	7.15.1 Pre-Certified GA	09-DEC-2020
700	7.14.3 GA	14-OCT-2020
700	7.14.2 GA	09-SEP2020
700	7.14.1 GA	29-JUL-2020
700	7.14.0 Beta	24-JUN-2020
700	7.13.12 GA	21-SEP-2023
700	7.13.11 GA	02-NOV-2022
700	7.13.10 GA	18-AUG-2021
700	7.13.9 GA	03-MAR-2021
700	7.12.2 GA	26-NOV-2019

Series	SDK Version	Release Date [DD-MMM-YYYY]
700	7.12.1 GA	20-SEP-2019

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