##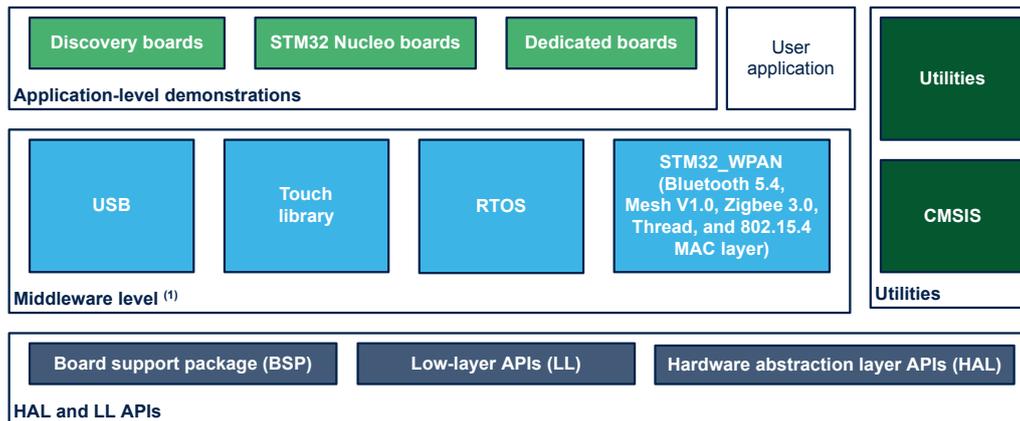 STM32Cube embedded software for STM32WB series including LL/HAL drivers, Bluetooth® 5.4, Mesh V1.0, Zigbee and Thread® libraries, RTOS, touch sensing

Product link
STM32CubeWB

Features

- Consistent and complete embedded software offer that frees the user from dependency issues
- Maximized portability between all STM32 series supported by STM32Cube
- Hundreds of examples for easy understanding
- HAL and LL APIs, developed in compliance with MISRA C®:2012 guidelines, and elimination of possible runtime errors with Synopsys® Coverity® static analysis tool
- STM32WB middleware: USB, STMTouch (STM32 touch sensing library), FatFS and FreeRTOS™ kernel
  - The following USB Device classes are provided with examples: HID, CDC (PSTN subprotocol) and DFU
- STM32WB-specific middleware: STM32_WPAN (Bluetooth® 5.4 profiles and services, OpenThread services, 802.15.4 MAC services)
- STM32WB Bluetooth® 5.4 and HCI stacks, Mesh V1.0 compliant with Bluetooth® SIG release
- Zigbee® 3.0 stack and clusters
- OpenThread stack, certified v.1
- 802.15.4 MAC
- Free user-friendly license terms
- Update mechanism with new-release notification capability
- Published on GitHub in addition to *www.st.com* to propagate bug fixes and improvements faster, open for pull requests and issues to facilitate user contributions and direct feedback

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For further information, contact your local STMicroelectronics sales office.

www.st.com

1 Description

STM32Cube is an STMicroelectronics original initiative to make developer' life easier by reducing development effort, time and cost. STM32Cube covers the whole STM32 portfolio.

STM32Cube includes STM32CubeMX, a graphical software configuration tool that allows the generation of C initialization code using graphical wizards.

It also comprises the STM32CubeWB MCU Package composed of the STM32Cube hardware abstraction layer (HAL) and the low-layer (LL) APIs, a consistent set of middleware components such as USB Device, STMTouch, STM32_WPAN (Bluetooth® 5.4 profiles and services, OpenThread and 802.15.4 MAC services), FatFS and FreeRTOS™ kernel, plus Bluetooth® 5.4 and Mesh V1.0 profiles and services, Zigbee® 3.0 stack and clusters, OpenThread, Concurrent Bluetooth® 5.4/Thread®, HCI and 802.15.4 MAC connectivity services. All embedded software utilities are delivered with a full set of examples running on STMicroelectronics boards.

The STM32Cube HAL is an STM32 embedded software layer that ensures maximized portability across the STM32 portfolio, while the LL APIs make up a fast, light-weight, expert-oriented layer which is closer to the hardware than the HAL. HAL and LL APIs can be used simultaneously with a few restrictions.

Both the HAL and LL drivers have been developed in compliance with V-Model requirements for design, implementation, and tests. Furthermore, the STMicroelectronics-specific validation process adds a deeper qualification level, such as compliance with MISRA C®:2012 guidelines, and elimination of possible runtime errors with the Synopsys® Coverity® static analysis tool. Reports are available on demand.

The STM32CubeWB gathers in one single package all the generic embedded software components required to develop an application on STM32WB microcontrollers. Following STM32Cube initiative, this set of components is highly portable, not only within the STM32WB series but also to other STM32 series. In addition, the low-layer APIs provide an alternative, high-performance, low-footprint solution to the STM32CubeWB HAL at the cost of portability and simplicity.

HAL and LL APIs are available in open-source BSD license for user convenience.

2 General information

The STM32CubeWB MCU Package runs on STM32 microcontrollers based on the Arm® Cortex® processor.

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arm

2.1 Ordering information

STM32CubeWB is available for free download from *www.st.com*.

2.2 What is STM32Cube?

STM32Cube is an STMicroelectronics original initiative to improve designer productivity significantly by reducing development effort, time, and cost. STM32Cube covers the whole STM32 portfolio.

STM32Cube includes:

- A set of user-friendly software development tools to cover project development from conception to realization, among which are:
    - STM32CubeMX, a graphical software configuration tool that allows the automatic generation of C initialization code using graphical wizards
    - STM32CubeIDE, an Eclipse®-based IDE, providing code edition, compilation, programming, and debugging capabilities
    - STM32CubeCLT, an all-in-one command-line development toolset with code compilation, board programming, and debug features
    - STM32CubeIDE for Visual Studio Code (STM32VSCode), a complete IDE based on VS Code® platform
    - STM32CubeProgrammer (STM32CubeProg), a programming tool available in graphical and command-line versions
    - STM32CubeMonitor (STM32CubeMonitor, STM32CubeMonPwr, STM32CubeMonRF, STM32CubeMonUCPD), powerful monitoring tools to fine-tune the behavior and performance of STM32 applications in real time
    - STM32CubeWiSE (STM32CubeWiSEcg, STM32CubeWiSEre), graphical tools designed to evaluate and test the capabilities of sub-GHz radios and protocols
- STM32Cube MCU and MPU Packages, comprehensive embedded-software platforms specific to each microcontroller and microprocessor series (such as STM32CubeWB for the STM32WB series), which include:
    - STM32Cube hardware abstraction layer (HAL), ensuring maximized portability across the STM32 portfolio
    - STM32Cube low-layer APIs, ensuring the best performance and footprints with a high degree of user control over hardware
    - A consistent set of middleware components such as RTOS, USB Device, touch library, FAT file system, and STM32_WPAN (Bluetooth®, Mesh V1.0, Zigbee®, OpenThread, and 802.15.4 MAC layer)
    - All embedded software utilities with full sets of peripheral and applicative examples
- STM32Cube Expansion Packages, which contain embedded software components that complement the functionalities of the STM32Cube MCU and MPU Packages with:
    - Middleware extensions and applicative layers
    - Examples running on some specific STMicroelectronics development boards

3 License

STM32CubeWB is delivered under the SLA0048 software license agreement and its Additional License Terms.

Revision history

Table 1. Document revision history

Date	Version	Changes
18-Feb-2019	1	Initial release.
19-Mar-2020	2	Removed STM32Cube trademark. Added Mesh V1.0 and Zigbee stack and clusters. Changed all Ultimate Liberty licenses into SLA0044 in License.
06-Jul-2022	3	In the whole document, changed Bluetooth 5 into Bluetooth 5.3. Updated Section Features and License. Added publication on GitHub in Section Features.
04-Aug-2023	4	Changed Bluetooth 5.3 into Bluetooth 5.4.
23-Feb-2026	5	Updated Features and Description. Added Section 2: General information and Section 2.2: What is STM32Cube?. Minor text changes.

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