#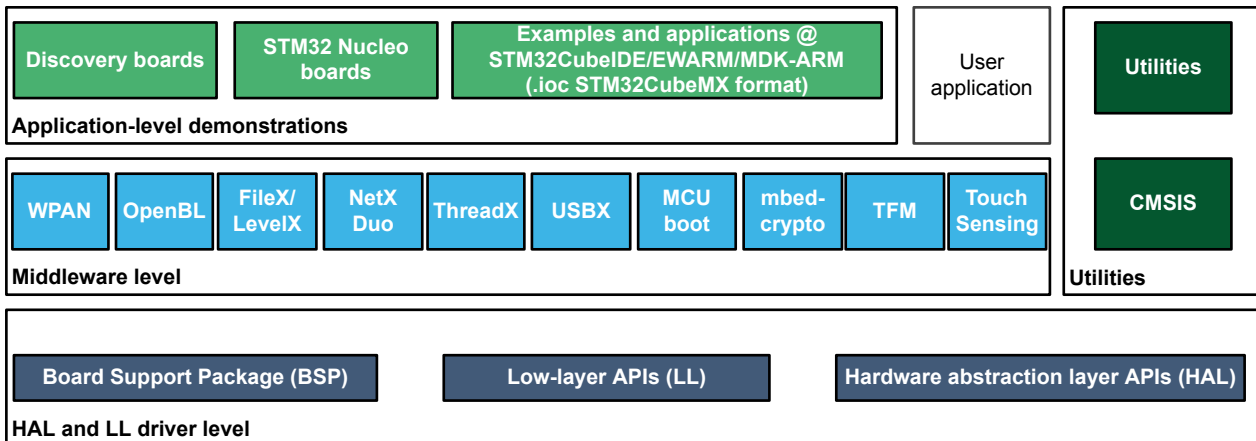 STM32Cube embedded software for STM32WBA series including LL/HAL drivers, Bluetooth®, Thread, Zigbee®, RTOS, and touch sensing

Product status link
STM32CubeWBA

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
- High-quality low-layer (LL) APIs and HAL checked with Synopsys® Coverity® static analysis tool, and developed in compliance with MISRA C® guidelines
- Consistent set of middleware components, such as ThreadX, FileX, LevelX, NetX Duo, FreeRTOS™, USBX, touch library, mbed-crypto, TFM, MCUboot, OpenBL, and STM32_WPAN (including Bluetooth® LE profiles and services, Mesh, Zigbee®, OpenThread, Matter, and 802.15.4 MAC layer).
- 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 the life of the developer easier by reducing development effort, time, and cost. STM32Cube covers the entire 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 STM32CubeWBA MCU Package, composed of the STM32Cube hardware abstraction layer (HAL) and the low-layer (LL) APIs, a consistent set of middleware components, such as ThreadX, FileX, LevelX, NetX Duo, FreeRTOS™, USBX, touch library, mbed-crypto, TFM, MCUboot, OpenBL, and STM32_WPAN (including Bluetooth® LE profiles and services, Mesh, Zigbee®, OpenThread, Matter, and 802.15.4 MAC layer), and HCI 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 APIs are production-ready and have been developed in compliance with CodeSonar®, MISRA C®:2012 guidelines and ISO/TS 16949. Furthermore, STMicroelectronics specific validation processes add a deeper-level qualification.

STM32CubeWBA gathers in one single package all generic embedded software components required to develop an application on STM32WBA series microcontrollers. Following STM32Cube initiative, this set of components is highly portable, not only within the STM32WBA series, but also to other STM32 series. In addition, the low-layer APIs provide an alternative, high-performance, low-footprint solution to the STM32CubeWBA 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

STM32CubeWBA runs on STM32 microcontrollers based on the Arm® Cortex®-M processor

Note: *Arm is a registered trademark of Arm Limited (or its subsidiaries) in the US and/or elsewhere.*

Acknowledgements

- Zigbee and Matter are protocols of the Connectivity Standards Alliance.
- Thread is a protocol of the Thread Group Alliance.
- The Bluetooth® word mark and logos are registered trademarks owned by Bluetooth SIG, Inc.

2.1   Ordering information

STM32CubeWBA 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 all-in-one development tool with peripheral configuration, code generation, code compilation, and debug features
    - STM32CubeCLT, an all-in-one command-line development toolset with code compilation, board programming, and debug features
    - 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
- STM32Cube MCU and MPU Packages, comprehensive embedded-software platforms specific to each microcontroller and microprocessor series (such as STM32CubeWBA for the STM32WBA 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 ThreadX, FileX, LevelX, NetX Duo, FreeRTOS™, USBX, touch library, mbed-crypto, TFM, MCUboot, OpenBL, and STM32_WPAN (including Bluetooth® LE profiles and services, Mesh, Zigbee®, OpenThread, Matter, 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

STM32CubeWBA is delivered under the SLA0048 software license agreement and its Additional License Terms.

Revision history

Table 1. Document revision history

Date	Version	Changes
02-Mar-2023	1	Initial release.
21-Mar-2024	2	Updated: • Document title • Cover image • Section Features • Section 1: Description • Section 2: General information
28-Feb-2025	3	Updated Features and Section 1: Description

IMPORTANT NOTICE – READ CAREFULLY