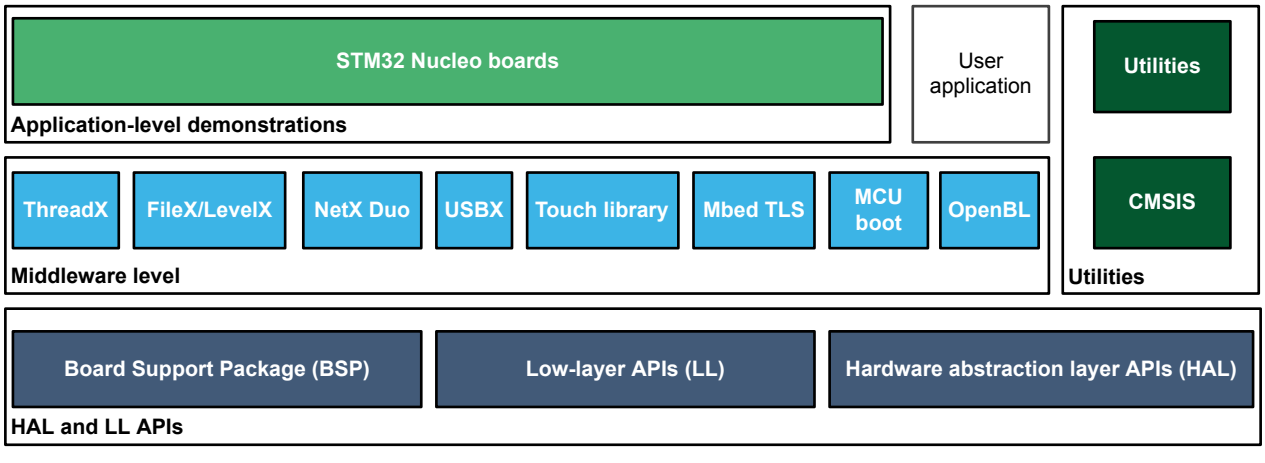
STM32CubeU3

Data brief

STM32Cube embedded software for STM32U3 MCUs including LL/HAL drivers, USBX, touch library, and RTOS



Product status link
STM32CubeU3

Features

- Consistent and complete embedded software that provides hardware abstraction to easily develop end-user firmware
- Maximized portability between all STM32 series supported by STM32Cube, with more than 280 examples and applications for easy understanding, all compatible with STM32CubeMX to facilitate the configuration through a graphical tool
- Production–ready HAL and LL APIs, developed in compliance with MISRA C®:2012 guidelines, and elimination of possible runtime errors with Synopsys® Coverity® static analysis tool
- Comprehensive STM32U3-dedicated middleware offer including USBX, Azure® RTOS, OpenBL, and Mbed TLS.
- STM32 touch sensing library (TSL), used to support the touch sensing controller peripheral (TSC)
- CMSIS CORE, DSP, and RTOS software components
- Free-of-charge, user-friendly license terms
- Update mechanism with new-release notification capability

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 STM32CubeU3 MCU Package, composed of the STM32Cube hardware abstraction layer (HAL) and the low-layer (LL) APIs, a consistent set of middleware components, including ThreadX, FileX, LevelX, NetX Duo, USBX, touch library, Mbed TLS, and OpenBL. 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, elimination of possible runtime errors with the Synopsys® Coverity® static analysis tool, and code coverage by running tests on STM32 hardware with the LDRA dynamic analysis tool (on new drivers or after significant updates). Reports are available on demand.

STM32CubeU3 gathers in one single package all generic embedded software components required to develop an application on STM32U3 series. Following the STM32Cube initiative, this set of components is highly portable, not only within the STM32U3 series, but also to other STM32 series. In addition, the low-layer APIs provide an alternative, high-performance, low-footprint solution to the STM32CubeU3 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 STM32CubeU3 MCU Package runs on STM32 32-bit microcontrollers based on the Arm® Cortex®-M33 processor.

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2.1 Ordering information

STM32CubeU3 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 STM32CubeU3 for the STM32U3 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, USBX, touch library, Mbed TLS, and OpenBL
  - 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

STM32CubeU3 is delivered under the SLA0048 software license agreement and its Additional License Terms.

Revision history

Table 1. **Document revision history**

Date	Version	Changes
21-Feb-2025	1	Initial release