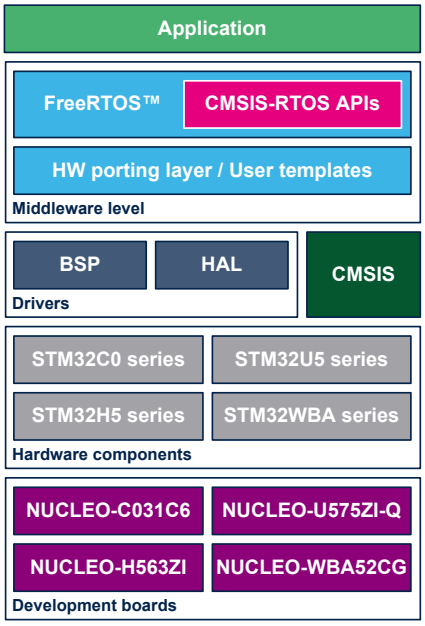
X-CUBE-FREERTOS

Data brief

FreeRTOS™ software expansion for STM32Cube



Product status link
X-CUBE-FREERTOS

Features

- Based on FreeRTOS™ kernel release 10.5.1
- Integrated and full-featured operating system: FreeRTOS™ kernel
- CMSIS RTOS V2 adaptation layer
- Many applicative examples available for the STMicroelectronics boards NUCLEO-C031C6, NUCLEO-H563ZI, NUCLEO-U575ZI-Q, and NUCLEO-WBA52CG
- Free user-friendly license terms
- Enhanced for the STMicroelectronics toolset: graphical configuration of the FreeRTOS™ kernel and generation of the initialization code with STM32CubeMX and STM32CubeIDE
- Update mechanism, which can be enabled by the user to be notified of new releases

Description

X-CUBE-FREERTOS (FreeRTOS™ software expansion for STM32Cube) provides a full integration of the FreeRTOS™ kernel in the STM32Cube environment for the STM32C0 series, STM32H5 series, STM32U5 series, and STM32WBA series of microcontrollers. Ready-to-run applicative examples provided for the evaluation boards NUCLEO-C031C6, NUCLEO-H563ZI, NUCLEO-U575ZI-Q, and NUCLEO-WBA52CG, along with a full compatibility with STM32CubeMX and STM32CubeIDE, ensure that X-CUBE-FREERTOS drastically reduces the learning curve and provides a smooth application development experience with FreeRTOS™ kernel and the STM32C0, STM32H5, STM32U5, and STM32WBA microcontrollers.

The CMSIS RTOS V2 adaptation layer is included and demonstrated, making it easy and quick to migrate from another RTOS.

X-CUBE-FREERTOS is only an STM32Cube integration of the FreeRTOS™ kernel. Other FreeRTOS™ libraries are not part of X-CUBE-FREERTOS, which therefore does not support native connectivity to the AWS Cloud.

1 General information

The X-CUBE-FREERTOS STM32Cube Expansion Package runs on the STM32C0, STM32H5, STM32U5, and STM32WBA microcontrollers based on the Arm® Cortex® processor.

Note: Arm is a registered trademark of Arm Limited (or its subsidiaries) in the US and/or elsewhere.
FreeRTOS is a trademark of Amazon in the United States and/or other countries.

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1.1 Ordering information

X-CUBE-FREERTOS is available for free download from the *www.st.com* website and through the STM32CubeMX and STM32CubeIDE software tools.

1.2 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 STM32CubeU5 for the STM32U5 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, USB-PD, touch library, network library, mbed-crypto, TFM, 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

1.3 How does X-CUBE-FREERTOS complement STM32Cube?

1.3.1 Complementing STM32Cube

X-CUBE-FREERTOS extends STM32Cube by providing a full porting of the FreeRTOS™ kernel, based on the STM32Cube HAL hardware abstraction layer for the STM32 microcontroller for maximized consistency and level of integration.

1.3.2 Enhanced for the STMicroelectronics toolset

The X-CUBE-FREERTOS STM32Cube Expansion Package includes different applicative examples and is compatible with STM32CubeMX (enhanced for the STMicroelectronics toolset). It can be downloaded from and installed directly into STM32CubeMX, as detailed in the user manual UM1718 (freely available on *www.st.com*), or from the product page on STMicroelectronics website.

2 License

X-CUBE-FREERTOS is delivered under the SLA0048 software license agreement and its Additional License Terms.

Revision history

Table 1. **Document revision history**

Date	Revision	Changes
27-Feb-2023	1	Initial release.
29-Aug-2023	2	Applicability extended to the STM32C0 and STM32WBA series: • Updated the cover picture • Updated Features and Description

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