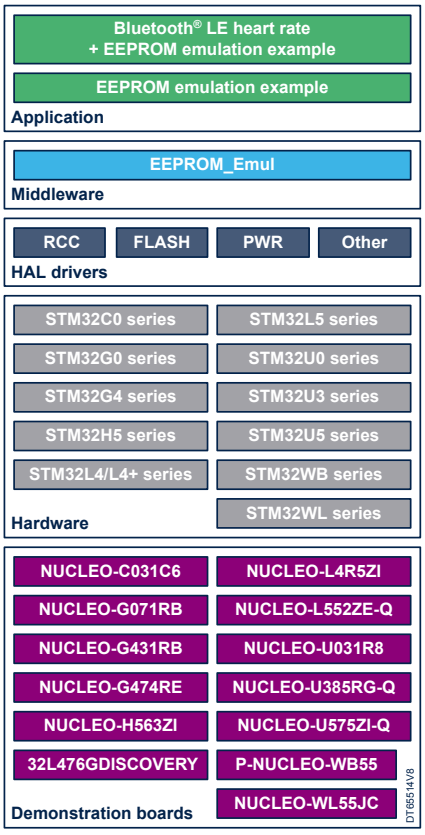
X-CUBE-EEPROM

Data brief

EEPROM emulation software expansion for STM32Cube



Product status
X-CUBE-EEPROM

Features

- Lightweight implementation and reduced footprint
- Simple API that consists of a few functions to format, initialize, read and write data, and clean up flash memory pages
  - User-configured EEPROM size
  - Supports 8-bit, 16-bit, and 32-bit variables; supports 96-bit variables for the STM32U5 series
  - Supports high-cycle data area for the STM32H5 series
  - Clean-up simplified for the user (background page erase)
  - Interrupt servicing is possible during program and erase operations
- At least two flash memory pages to be used for internal data management
- Wear leveling algorithm to increase emulated EEPROM cycling capability
- Increased EEPROM memory endurance versus flash memory endurance
- Robust against asynchronous resets and power failures
- Optional protection for flash memory sharing between the two cores of the STM32WB series microcontrollers
- Maintenance of cache coherency

Description

The microcontrollers in the STM32C0 series, STM32G0 series, STM32G4 series, STM32H5 series, STM32L4 series, STM32L4+ series, STM32L5 series, STM32U0 series, STM32U3 series, STM32U5 series, STM32WB series, and STM32WL series feature an internal low-power flash memory that is able to store code and data.

The applications in the X-CUBE-EEPROM Expansion Package demonstrate how to emulate an EEPROM using the internal flash memory, thus saving the cost of external components.

For the host board in P-NUCLEO-WB55, a specific example maintaining a Bluetooth® LE connection and communication while processing EEPROM operations is provided. For this example, a mechanism to share the flash memory efficiently between the two STM32WB microcontroller cores is implemented.

For the NUCLEO-H563ZI, an example using the high-cycle data area to perform the EEPROM operations is provided.

For more details, refer to the *How to use EEPROM emulation on STM32 MCUs* application note (AN4894), available on *www.st.com*.

1 General information

The X-CUBE-EEPROM Expansion Package runs on STM32 microcontrollers based on Arm® cores.

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

1.1 Ordering information

X-CUBE-EEPROM is available for free download from the *www.st.com* website.

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 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

2 License

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

Revision history

Table 1. Document revision history

Date	Revision	Changes
07-Jul-2017	1	Initial release.
28-May-2020	2	Extended the document scope to the STM32G0 series, STM32G4 series, STM32L4+ series, STM32L5 series, and STM32WB series. Updated the entire document: • Updated *Features* and *Description* • Added *Ordering information*, *License*, and *What is STM32Cube?*
02-Nov-2020	3	Extended the document scope to the STM32WL series. Added the cache coherency maintenance feature. Added the NUCLEO-WL55JC and NUCLEO-G474RE demonstration boards. Updated *Features*, *Description*, and *License*.
09-Dec-2021	4	Extended the document scope to the STM32U5 series. Added the NUCLEO-U575ZI-Q demonstration board: • Updated the cover picture • Updated *Features* • Updated *Description* Updated *License* with the Additional License Terms.
12-Jan-2023	5	Extended the document scope to the STM32C0 series. Added the NUCLEO-C031C6 demonstration board: • Updated the cover picture • Updated *Description*
17-Jul-2023	6	Extended the document scope to the STM32H5 series. Added the NUCLEO-H563ZI demonstration board: • Updated the cover picture • Updated *Features* • Updated *Description*
20-Mar-2024	7	Extended the document scope to the STM32U0 series. Added the NUCLEO-U031R8 demonstration board: • Updated the cover picture • Updated *Description*
12-Mar-2025	8	Extended the document scope to the STM32U3 series. Added the NUCLEO-U385RG-Q demonstration board: • Updated the cover picture • Updated Description

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