

EEPROM emulation software expansion for STM32Cube

Bluetooth® Low Energy heart rate + EEPROM emulation example	
EEPROM emulation example	
Application	
EEPROM_Emul	
Middleware	
RCC	FLASH
PWR	Other
HAL drivers	
STM32C0 series	STM32L5 series
STM32G0 series	STM32U0 series
STM32G4 series	STM32U5 series
STM32H5 series	STM32WB series
STM32L4/L4+ series	STM32WL series
Hardware	
NUCLEO-C031C6	NUCLEO-L4R5ZI
NUCLEO-G071RB	NUCLEO-L552ZE-Q
NUCLEO-G431RB	NUCLEO-U031R8
NUCLEO-G474RE	NUCLEO-U575ZI-Q
NUCLEO-H563ZI	P-NUCLEO-WB55
32L476GDISCOVERY	NUCLEO-WL55JC
Demonstration boards	

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](#), [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® Low Energy 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.

Product status link
X-CUBE-EEPROM



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 STM32CubeU0 for the STM32U0 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, USBX, touch library, mbed-crypto, MCUboot, 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: <ul style="list-style-type: none"> Updated <i>Features</i> and <i>Description</i> Added <i>Ordering information</i>, <i>License</i>, and <i>What is STM32Cube?</i>
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 <i>Features</i> , <i>Description</i> , and <i>License</i> .
09-Dec-2021	4	Extended the document scope to the STM32U5 series. Added the NUCLEO-U575ZI-Q demonstration board: <ul style="list-style-type: none"> Updated the cover picture Updated <i>Features</i> Updated <i>Description</i> Updated <i>License</i> with the Additional License Terms.
12-Jan-2023	5	Extended the document scope to the STM32C0 series. Added the NUCLEO-C031C6 demonstration board: <ul style="list-style-type: none"> Updated the cover picture Updated <i>Description</i>
17-Jul-2023	6	Extended the document scope to the STM32H5 series. Added the NUCLEO-H563ZI demonstration board: <ul style="list-style-type: none"> Updated the cover picture Updated <i>Features</i> Updated <i>Description</i>
20-Mar-2024	7	Extended the document scope to the STM32U0 series . Added the NUCLEO-U031R8 demonstration board: <ul style="list-style-type: none"> Updated the cover picture Updated Description

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