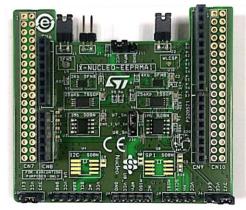


Quick Start Guide

Standard I²C and SPI EEPROM memory expansion board based on M24xx and M95xx series for STM32 Nucleo (X-NUCLEO-EEPRMA1)



Version 1.0.0 (5 Oct, 2018)



Quick Start Guide Contents

X-NUCLEO-EEPRMA1: Standard I²C and SPI EEPROM memory expansion board

Hardware and Software overview

Setup & Demo Examples Documents & Related Resources

STM32 Open Development Environment: Overview



Standard I²C and SPI EEPROM memory expansion board

Arduino UNO R3 connector

X-NUCLEO-EEPRMA1 Hardware Description

- The X-NUCLEO-EEPRMA1 expansion board is based on M24xx I²C and M95xx SPI EEPROM for data reading and writing.
- The expansion board acts as an external storage device that can be used to store data such as manufacturing traceability, calibration, user setting, error flags, data log and monitoring data to make applications more flexible and accurate.
- The X-NUCLEO-EEPRMA1 expansion board is compatible with the Arduino UNO R3 connector pin assignment and can be easily plugged to any STM32 Nucleo development board. You can mount the ST morpho connectors if required.

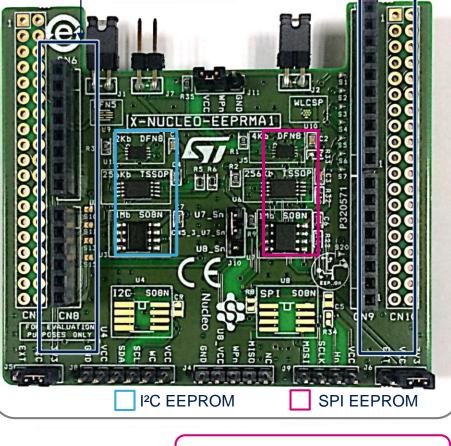
Features

- Easy portability across different MCU families
- Equipped with Arduino[™] UNO R3 connector
- Compatible with STM32 Nucleo boards
- Free comprehensive development firmware library and sample implementation available when the X-NUCLEO-EEPRMA1 expansion board is plugged on top of a NUCLEO-F401RE or NUCLEO-L053R8 development board
- Developer can choose and solder an EEPROM to be tested using the evaluation Software provided
- RoHS and WEEE compliant

Key Products on board

M24XX ST I²C EEPROM

M95XX ST SPI EEPROM



Hardware Overview

Latest info available at www.st.com X-NUCLEO-EEPRMA1



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Standard I²C and SPI EEPROM memory expansion board Software Overview

X-CUBE-EEPRMA1 Software Description

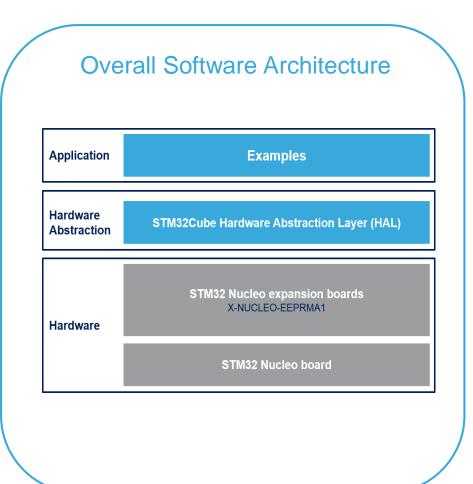
The X-CUBE-EEPRMA1 software expansion for STM32Cube provides an evaluating M24XX I²C and M95XX SPI EEPROM for data reading and writing.

The expansion is built on STM32Cube software technology to ease portability across different STM32 microcontrollers.

The software comes with sample implementations of the drivers running on the X-NUCLEO-EEPRMA1 expansion board connected to the featured development boards.

Key features

- Complete software to build applications using M24XX or M95XX based EEPROM
- Easy portability across different MCU families thanks to STM32Cube
- Free user-friendly license terms
- Examples implementation available on board X-NUCLEO-EEPRMA1 plugged on top of one NUCLEO-F401RE or NUCLEO-L053R8
- Developer can solder the EEPROM of his choice and test it using the Evaluation software provided.





Latest info available at www.st.com X-CUBE-EEPRMA1

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Setup & Demo Examples HW prerequisites

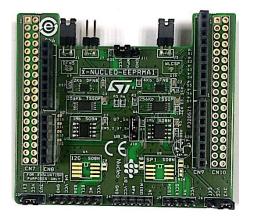
- 1x Standard I²C and SPI EEPROM memory expansion board (X-NUCLEO-EEPRMA1)
- 1x STM32 Nucleo development board (NUCLEO-F401RE or NUCLEO-L053R8)
- 1x Windows 7 Laptop/PC
- 1x USB type A to Mini-B USB cable



NUCLEO-F401RE NUCLEO-L053R8







X-NUCLEO-EEPRMA1



Setup & Demo Examples SW prerequisites

- STSW-LINK008: ST-LINK/V2-1 USB driver ٠
- STSW-LINK007: ST-LINK/V2-1 firmware upgrade ٠
- X-NUCLEO-EEPRMA1 Software expansion for STM32Cube
 - Copy the .zip file content into a folder on your PC. The package will contain source code example (Keil, IAR, System Workbench) based only on NUCLEO-F401RE or NUCLEO-L053R8
- Windows PC based Console Application



X-CUBE-EEPRMA1 Start coding in just a few minutes with X-CUBE-EEPRMA1 www.st.com/x-nucleo Package structure htmresc life.augmented Docs Documentation www.st.com BSP, HAL and drivers 3 Drivers mmm 2 Middlewares **Download & unpack** Select Example Projects X-CUBE-EEPRMA1 X-NUCLEO-EEPRMA1 Release_Notes.html Download & install STM32 Nucleo ST-LINK/V2-1 USB 6 driver

project

88 SPI FEPROM INITIALIZED



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X-CUBE-EEPRMA1 Using serial line monitor – e.g. Tera Term

Pressing the **RESET** button on STM32 Nucleo triggers the initialization phase 🛄 COM42 - Tera Term VT File Edit Setup Control Window Help I2C EEPROM && SPI EEPROM INITIALIZED ---SPI EEPROM READ STATUS-target: M95256 [rx: 0c target: M95256 [rx: 0c arget: M95040|rx: f0 arget: M95040|rx: f2 arget: M95M01|rx: 00 M95M01 |rx: 02 --SPI EEPROM BLOCK PROTECT--TestDataitarget: M95256 laddress: 0:IX: abcdefghE-EEPROM- Expansion Firmware library EEPROM driver e X-Nucleo-eXpansion firmware library. This block of data is specially written to test the data writ are library EEPROM driver example : This firmware provides a basic example of how to use the X-Nucl itten to test the data write function of E! RX: abcdefghE-EEPROM-Expansion Firmware library E how to use the X-Nucleo-eXpansion firmware library. This block of data is specially written to test to to test the data write for the scample of how to to to the scample of how to specially written to test the data write function of Eldata size: 495;result: passed BlockProtectitarget: M95256iaddress: 0iTX: ByeBye STMByeBye STM: RX: abcdefghE-EEPR0M- Expa ides a basic example of how to use the X-Mucleo-eXpansion firmware library. This block of data is s 2C) abcdefghE-EEPR0M-Expansion Firmware library EEPR0M driver example: This firmware provides a ry. This block of data is specially written to test the data write function of Eldata size: 495 ---I2C EEPROM WRITE PROTECT---estDataltarget: H24256iaddress: 0:ITX: abcdefyhE-EEPROM-Expansion Firmware library EEPROM driver ex -Mucloe-eXpansion firmware library. This block of data is specially written to test the data write on Firmware library EEPROM driver example : This firmware provides a basic example of how to use t ially written to test the data write function of EEPROM (SPI/2C) idata size: 255/result: passed --I2C EEPROM SINGLE BYTE--estByte¦target: M24C02¦address: 200¦result: passed --SPI EEPROM SINGLE BYTE--estByte!target: M95040!address: 456!TX: k!RX: k!result: passed I2C EEPROM DATA -— I20 EEFRON DAIM estDatitarget: M24002 laddress: Øldata size: 255 result: passed estDatitarget: M24256 laddress: Øldata size: 255 result: passed estDatitarget: M24400 laddress: Øldata size: 128 iresult: passed -- Write Data into SPI EEPROM memory from begin to end and then [estData!taryet: M95040!address: 0!data size: 51!!result: passed [estData!taryet: M95M0!address: 0!data size: 128!result: passed and then read ----I2C EEPROM PAGE--[estPage|target: M24C02|address: 0|data size: 16|result: passed --SPI EEPROM PAGE--TestPage|target: M95M01|address: 0|data size: 255|result: passed

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a Term: Serial port setup	
Port:	СОМ35 - ОК
Baud rate:	115200 -
Data:	8 bit 🔹 Cancel
Parity:	none 🔻
Stop:	1 bit 🔹 Help
Flow control:	none 🔻
Transmit delay O msec/char O msec/line	

Configure the serial line monitor (speed, LF)



Documents & Related Resources

All documents are available in the DESIGN tab of the related products webpage

X-NUCLEO-EEPRMA1:

- Gerber files, BOM, Schematic
- DB3728: X-NUCLEO-EEPRMA1: Standard I²C and SPI EEPROM memory expansion board Data brief
- UM2480: Getting started with the X-NUCLEO-EEPRMA1, standard I²C and SPI EEPROM memory expansion board based on M24xx and M95xx series for STM32 Nucleo – User manual

X-CUBE-EEPRMA1:

- DB3729: Standard I²C and SPI EEPROM software expansion for STM32Cube Data brief
- UM2481: Getting started with the X-CUBE-EEPRMA1 software expansion for STM32Cube- User manual



Consult www.st.com for the complete list

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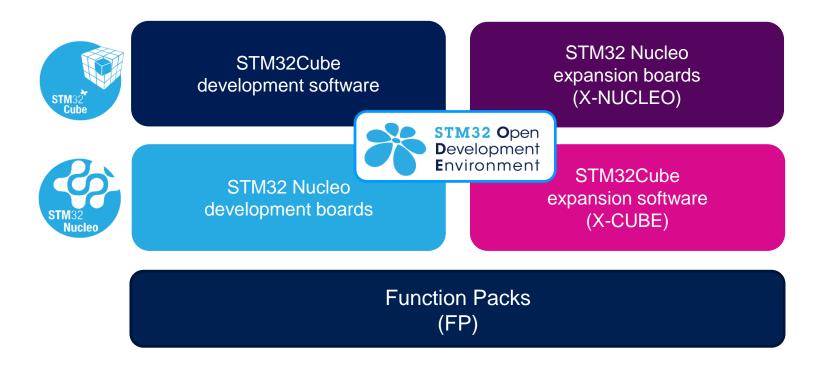
Setup & Demo Examples Documents & Related Resources

STM32 Open Development Environment: Overview



STM32 Open Development Environment Fast, affordable Prototyping and Development

• The STM32 Open Development Environment (ODE) consists of a set of stackable boards and a modular open SW environment designed around the STM32 microcontroller family.

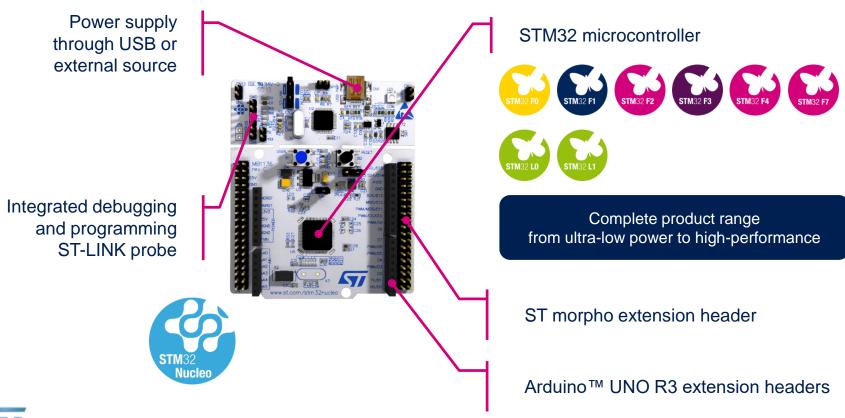




www.st.com/stm32ode

STM32 Nucleo Development Boards (NUCLEO)

 A comprehensive range of affordable development boards for all the STM32 microcontroller series, with unlimited unified expansion capabilities and integrated debugger/programmer functionality.

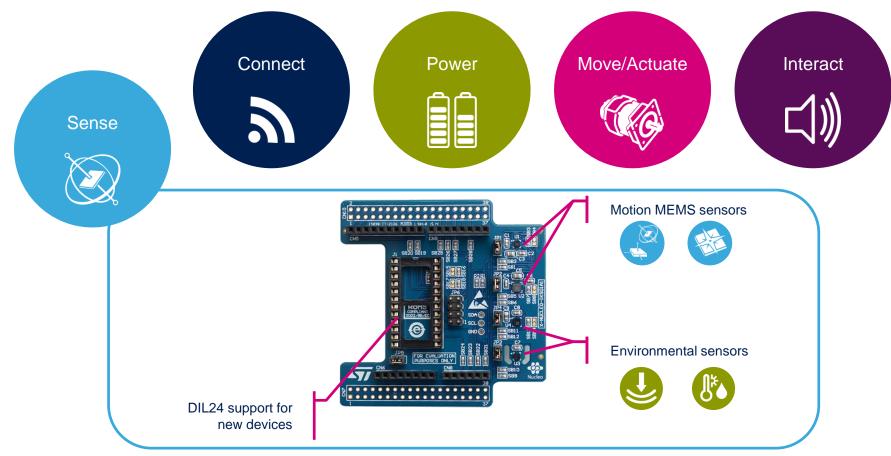




www.st.com/stm32nucleo

STM32 Nucleo Expansion Boards (X-NUCLEO)

• Boards with additional functionality that can be plugged directly on top of the STM32 Nucleo development board directly or stacked on another expansion board.



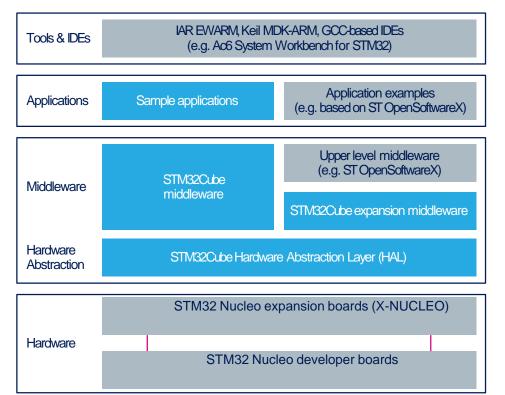


Example of STM32 expansion board (X-NUCLEO-IKS01A1)

www.st.com/x-nucleo

STM32 Open Development Environment Software components

- STM32Cube software (CUBE) A set of free tools and embedded software bricks to enable fast and easy development on the STM32, including a Hardware Abstraction Layer and middleware bricks.
- STM32Cube expansion software (X-CUBE) - Expansion software provided free for use with the STM32 Nucleo expansion board and fully compatible with the STM32Cube software framework. It provides abstracted access to expansion board functionality through high-level APIs and sample applications.



 Compatibility with multiple Development Environments - The STM32 Open Development Environment is compatible with a number of IDEs including IAR EWARM, Keil MDK, and GCC-based environments. Users can choose from three IDEs from leading vendors, which are free of charge and deployed in close cooperation with ST. These include Eclipse-based IDEs such as Ac6 System Workbench for STM32 and the MDK-ARM environment.



OPEN LICENSE MODELS: STM32Cube software and sample applications are covered by a mix of fully open source BSD license and ST licenses with very permissive terms.

www.st.com/stm32cube

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www.st.com/x-cube

STM32 Open Development Environment Building block approach

The building blocks Your need Our answer Accelerometer, gyroscope Inertial modules, magnetometer COLLECT Sense STM32 Open Pressure, temperature, humidity Proximity, microphone Development Environment TRANSMIT Bluetooth LE, Sub-GHz radio Connect NFC, Wi-Fi, GNSS Audio amplifier ACCESS **Touch controller** Translate **Operation Amplifier CREATE** Move / Stepper motor driver DC & BLDC motor driver Actuate Industrial input / output POWER Power **Energy management & battery General-purpose microcontrollers** PROCESS Process Secure microcontrollers www.st.com/stm32ode

Software

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