

NFC/HF RFID reader IC software expansion for STM32Cube

Application	Application
Middleware	NDEF Lib RFAL
Hardware Abstraction	STM32Cube Hardware Abstraction Layer (HAL)
Hardware	STM32 Nucleo expansion boards X-NUCLEO-NFC12A1
	STM32 Nucleo development board



Features

- Complete middleware to build applications using the [ST25R300](#) high-performance NFC universal device supporting NFC initiator, NFC target, NFC reader, and NFC card emulation modes
- Sample application to detect NFC tags of different types
- Sample application:
 - Polling tag detection
- Sample implementations available for the [X-NUCLEO-NFC12A1](#) expansion board plugged onto the [NUCLEO-L476RG](#), [NUCLEO-C071RB](#), or [NUCLEO-G0B1RE](#) development board
- Easy portability across different MCU families, thanks to [STM32Cube](#)
- Complete RF/NFC abstraction (RFAL) for all major technologies, including complete ISO-DEP and NFC-DEP layers
- Free user-friendly license terms

Description

Product summary	
High performance HF reader/NFC initiator IC software expansion for STM32Cube	X-CUBE-NFC12
NFC card reader expansion board, based on ST25R500 for STM32 and STM8 Nucleos	X-NUCLEO-NFC12A1
High performance NFC universal device and EMVCo reader	ST25R300-AQET
STM32 Nucleo-64 development board with STM32L476RG MCU	NUCLEO-L476RG
STM32 Nucleo-64 development board with STM32C071RB MCU, supports Arduino and ST morpho connectivity	NUCLEO-C071RB
STM32 Nucleo-64 development board with STM32G0B1RE MCU, supports Arduino and ST morpho connectivity	NUCLEO-G0B1RE

The [X-CUBE-NFC12](#) software expansion for [STM32Cube](#) provides complete middleware for STM32 to control applications using the [ST25R300](#). The [ST25R300](#) is a high-performance NFC universal device supporting NFC initiator, NFC target, NFC reader, and NFC card emulation modes.

The device includes an advanced analog front end (AFE) and a highly integrated data framing system for reader NFC-A/B (ISO14443A/B), including higher bit rates, NFC-F (FeliCa™), NFC-V (ISO15693) up to 212 kbps, and NFC-A/NFC-F card emulation.

The expansion is built on top of [STM32Cube](#) software technology to ease portability across different STM32 microcontrollers.

The software comes with sample implementations of the drivers running on the [X-NUCLEO-NFC12A1](#) expansion board, plugged on top of a [NUCLEO-L476RG](#), [NUCLEO-C071RB](#), or [NUCLEO-G0B1RE](#) board.

1 Detailed description

1.1 What is STM32Cube?

STM32Cube is a combination of a full set of PC software tools and embedded software blocks running on STM32 microcontrollers and microprocessors, such as:

- **STM32CubeMX**: configuration tool for any STM32 device. It generates initialization C code for Cortex-M cores and the Linux device tree source for Cortex-A cores.
- **STM32CubeIDE**: integrated development environment based on open-source solutions, such as Eclipse or the GNU C/C++ toolchain, including compilation reporting features and advanced debug features.
- **STM32CubeProgrammer**: programming tool that provides an easy-to-use and efficient environment for reading, writing and verifying devices and external memories via a wide variety of available communication media (JTAG, SWD, UART, USB DFU, I²C, SPI, CAN, etc.).
- **STM32CubeMonitor**: family of tools (**STM32CubeMonRF**, **STM32CubeMonUCPD**, and **STM32CubeMonPwr**) that helps developers customize their applications in real-time.
- **STM32Cube MCU and MPU Packages** specific to each STM32 series with drivers (HAL, low-layer, etc.), middleware, and lots of example code used in a wide variety of real-world use cases.
- **STM32Cube Expansion Packages** for application-oriented solutions.

1.1.1 How does this software complement STM32Cube?

The proposed software is based on STM32CubeHAL, the hardware abstraction layer for the STM32 microcontroller. The package extends **STM32Cube** by providing a board support package (BSP) for the **X-NUCLEO-NFC12A1** expansion board for **STM32Nucleo**, and some middleware components for HF reader and NFC application drivers (RFAL).

The drivers abstract low-level details of the hardware and allow the middleware components and applications to access NFC and HF tags or P2P devices in a hardware independent fashion.

The package includes one sample application that developers can use to start experimenting with the code.

The sample application has been developed to detect NFC tags of different types.

Revision history

Table 1. Document revision history

Date	Revision	Changes
03-Jun-2025	1	Initial release.

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