Quick Start Guide

Dynamic NFC/RFID tag IC expansion board based on ST25DV04K for STM32 Nucleo
(X-NUCLEO-NFC04A1)
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X-NUCLEO-NFC04A1: Dynamic NFC/RFID tag IC expansion board
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X-NUCLEO-NFC04A1 Hardware Description

- The X-NUCLEO-NFC04A1 dynamic NFC/RFID tag IC expansion board is based on the ST25DV04K NFC Type V/RFID tag IC with a dual interface 4 Kbits EEPROM that also features an I²C interface. It can be powered by the pin of Arduino connector or directly by the received carrier electromagnetic field.

- The X-NUCLEO-NFC04A1 expansion board is compatible with the Arduino™ UNO R3 connector pin assignment and can easily be plugged onto any STM32 Nucleo board. Various expansion boards can also be stacked to evaluate different devices operating together with the dynamic NFC tag. The board also features an antenna with a 54 mm ISO 24.2 diameter, single layer, copper etched on PCB.

Key products on board

**ST25DV04KV**
Dynamic NFC/RFID tag IC with 4-Kbit, 16-Kbit or 64-Kbit EEPROM, and Fast Transfer Mode capability
Dynamic NFC/RFID tag IC expansion board

Software overview

X-CUBE-NFC4 software description

- The X-CUBE-NFC4 software expansion for STM32Cube provides a complete middleware for STM32 to build applications using dynamic NFC/RFID tag IC (ST25DV device).
- The software is based on STM32Cube technology and expands STM32Cube based packages. It 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-NFC04A1 expansion board plugged on top of NUCLEO-F401RE or NUCLEO-L053R8.

Key features

- Complete middleware to build applications using dynamic NFC/RFID tag IC (ST25DV04K)
- Easy portability across different MCU families, thanks to STM32Cube
- Sample application to communicate with PC software
- Samples to use the ST25DVbasic features
- Free user-friendly license terms
- Sample implementation available on the X-NUCLEO-NFC04A1 expansion board plugged on top of a NUCLEO-F401RE or a NUCLEO-L053R8 board

Overall system architecture

Latest software available at www.st.com
X-CUBE-NFC4
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Setup & demo examples

HW prerequisites

• 1x Dynamic NFC/RFID tag IC expansion board (X-NUCLEO-NFC04A1)

• 1x STM32 Nucleo development board (NUCLEO-L053R8 or NUCLEO-F401RE)

• 1x NFC-enabled Android™ smartphone and ST25 NFC App

• 1x USB type A to Mini-B USB cable

Smartphone requirement

Application for Demo

Setup & demo examples
SW prerequisites

- **STSW-LINK009**: ST-LINK/V2-1 USB driver
- **X-CUBE-NFC4**: expansion software for STM32Cube
  - Copy the .zip file content into: “c:\Program Files (x86)\STMicroelectronics\” folder on your PC
  - The package contains source code example projects (Keil, IAR, AC6) based on **NUCLEO-L053R8** or **NUCLEO-F401RE** and ST25DV drivers.
Dynamic NFC/RFID tag IC expansion board
Start coding in just a few minutes with X-CUBE-NFC4 (1/2)

1. Go to www.st.com/x-nucleo
2. Select X-NUCLEO-NFC04A1
3. Download & unpack X-CUBE-NFC4
4. Download & install STM32 Nucleo ST-LINK/V2-1 USB driver STSW-LINK009
5. Open project example
6. Modify, build application
7 Program STM32 on Nucleo with STM32xxxx.hex binary file

8 Enable NFC on your phone and make sure it is also connected to the internet

9 Bring the phone close to the X-NUCLEO-NFC04A1 Antenna. You are directly redirected to www.st.com
Documents & Related Resources

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

X-NUCLEO-NFC04A1:

- Gerber files, BOM, Schematic
- **DB3301**: Dynamic NFC/RFID tag IC expansion board based on ST25DV04K for STM32 Nucleo – Data Brief
- **UM2235**: Getting started with X-NUCLEO-NFC04A1 dynamic NFC/RFID tag IC expansion board based on ST25DV04K for STM32 Nucleo – User manual

X-CUBE-NFC4:

- **DB3316**: Dynamic NFC/RFID tag IC software expansion for STM32Cube – Data Brief
- **UM2239**: Getting started with the X-CUBE-NFC4 dynamic NFC/RFID tag IC software expansion for STM32Cube – User manual
- Software setup file

Consult www.st.com for the complete list
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STM32 Open Development Environment: Overview
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.
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.

Power supply through USB or external source

STM32 microcontroller

Complete product range from ultra-low power to high-performance

Integrated debugging and programming ST-LINK probe

ST morpho extension header

Arduino™ UNO R3 extension headers
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)

- Sense
- Connect
- Power
- Move/Actuate
- Interact

DIL24 support for new devices

Motion MEMS sensors

Environmental sensors

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.

**Tools & IDEs**
- IAR EWARM, Keil MDK-ARM, GCC-based IDEs (e.g. Ac6 System Workbench for STM32)

**Applications**
- Sample applications
- Application examples (e.g. based on ST OpenSoftwareX)

**Middleware**
- STM32Cube middleware
- STM32Cube expansion middleware

**Hardware Abstraction**
- STM32Cube Hardware Abstraction Layer (HAL)

**Hardware**
- STM32 Nucleo expansion boards (X-NUCLEO)
- STM32 Nucleo developer boards

**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
STM32 Open Development Environment
Building block approach

The building blocks

- Sense
  - Accelerometer, gyroscope
  - Inertial modules, magnetometer
  - Pressure, temperature, humidity
  - Proximity, microphone

- Connect
  - Bluetooth LE, Sub-GHz radio
  - NFC, Wi-Fi, GNSS

- Translate
  - Audio amplifier
  - Touch controller
  - Operation Amplifier

- Move / Actuate
  - Stepper motor driver
  - DC & BLDC motor driver
  - Industrial input / output

- Power
  - Energy management & battery

- Process
  - General-purpose microcontrollers
  - Secure microcontrollers

- Software

Your need

Our answer

COLLECT
TRANSMIT
ACCESS
CREATE
POWER
PROCESS

www.st.com/stm32ode