Introduction

The ST25DV-DISCOVERY is a demonstration kit that evaluates features and capabilities of the ST25DV04K Dynamic NFC / RFID Tag.

The kit is composed of two boards:

- **MB1283 (ST25DX_Discovery_Mboard):** a microprocessor mother board, which includes a complement of hardware and software tools allowing the use the full STM32 Nucleo ecosystem. The board is powered through one USB connector.

- **MB1285 (ST25DV_Discovery_ANT_C5):** a daughter board, which embeds the ST25DV04K Dynamic NFC / RFID tag device. This daughter board provides a buffering data transfer capability and has a Class 5 antenna.

The communication link between boards is the I2C serial and the power is provided by the processor card or via energy harvesting. Specific data lines complete the pin connector assignment shared between cards.

A variety of demonstrations can be performed with this kit. The kit allows the users to develop and to test their own applications.

The MB1283 and the MB1285 boards schematics, BOM, gerber files, drivers and firmware are available at the STMicroelectronics website at [www.st.com](http://www.st.com).
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1 Description

The ST25DV series Dynamic NFC tags discovery kit (ST25DV-DISCOVERY) allows the user to evaluate the features and capabilities of the ST25DV04K products.

The ST25DV-DISCOVERY kits comes with application notes, software applications, drivers, BOM (bill of materials), board schematics, gerber files and firmware schematics. All these documents help the user to reduce the design efforts and they can be downloaded at www.st.com.

The MB1283 in standard edition is designed to help the user explore the features of the ST25DV04K products with the support of the STM32 Nucleo ecosystem. This mother board uses a 32-bit ARM® Cortex™-M4 CPU with FPU high-performance microcontroller to develop the applications.

The MB1283 standard edition board is powered through the USB bus. It is based on an STM32F405 line microcontroller and includes:

- An ST-LINK embedded debug tool interface
- A 2.4" TFT LCD with touch screen capability
- LEDs
- Push buttons (reset and user)
- A mini USB debug connector
- A user-dedicated micro USB connector.

The MB1283 demonstration edition board includes all of the features of the standard edition plus a HE20 JTAG connector, a WIFI® module and a low-energy Bluetooth® module. These additional features demonstrate various use cases.

The MB1285 is a dynamic NFC/RFID tag providing a buffering data transfer capability expansion board usable with the MB1283 mother board. This daughter board interfaces with the STM32 MCU via the I2C.

Figure 2. ST25DV-DISCOVERY overview
2 Features

2.1 MB1283 board features

The MB1283 (ST25DX_Discovery_Mboard) is a ready-to-use printed circuit board (PBC) which includes:

- On standard edition:
  - An STM32F405VGT6 LQFP100 32-bit microcontroller with 1 Mbyte of Flash memory and 192 + 4 Kbyte of SRAM.
  - LCD color screen (320 x 200 pixels)
  - Touch screen driver
  - Different color LEDs (power, user, WiFi® status)
  - User push button
  - Reset button
  - Joystick for menu selection
  - On board ST link for microcontroller firmware upgrade and debug
  - ST-LINK mini USB
  - User micro USB
  - USB micro or mini connector for board powering
  - Demonstration use cases flashed in memory
- On demonstration edition:
  - All features available on the standard edition
  - A JTAG connector
  - Bluetooth® low-energy module
  - WiFi® module

2.2 MB1285 board features

The MB1285 (ST25DV_Discovery_ANT_C5) is a ready-to-use PCB which includes:

- A ST25DV04K Dynamic NFC/RFID tag IC with 4 Kbits EEPROM which provides a buffering data-transfer capability
- Class 5 single-layer inductive antenna etched on the PCB (ANT C5)
3 Hardware layout

3.1 MB1283 board layout

This section presents the layout of the MB1283 board from a top view (see Figure 3) and a bottom view (see Figure 4).

Figure 3. MB1283 board top view

Figure 4. MB1283 board bottom view

1. * Available only on demonstration edition.
3.2 MB1285 board layout

This section presents the layout of the MB1285 board from a top view (see Figure 5) and a bottom view (see Figure 6).

Figure 5. MB1285 board top view

![MB1285 board top view diagram]

Figure 6. MB1285 board bottom view

![MB1285 board bottom view diagram]
4 ST25DV-DISCOVERY kit powering and startup

The mother board and the daughter board must be connected together.

The ST25DV-DISCOVERY kit is powered by an USB bus via a cable connected to the power source (like a PC).

When powered up, the microcontroller starts the firmware, which is already downloaded in the Flash memory. This is a demonstration of the different capabilities of the ST25DV04K (like RF on/off, change vCard message for example). There are no modifications nor configuration to be done on the board to run the demo. Refer to the firmware's user manual available on STMicroelectronics website to get more details.
In order to Flash or debug an STM32 microcontroller application on the ST25DV-DISCOVERY kit, simply connect the mini USB cable.

The on-board ST-LINK in-circuit debugger and programmer allows to start the dedicated tools.

Then, launch the ST-LINK utility PC software (available for download at STMicroelectronics website).

For more information or documentation on the ST-LINK in-circuit debugger and programmer, visit www.st.com.
6 Hardware implementation

The pages hereafter show the ST25DV-DISCOVERY schematics for:
- ST25DX_Discovery_MBoard (board reference MB1283)
- ST25DV_Discovery_ANT_C5 (board reference MB1285).

6.1 MB1283 board schematics

This section presents the schematics for the MB1283 board.
Figure 7. MB1283 schematics - top level
Figure 8. MB1283 schematics - power supply

D D
C C
B B
A A

VUSB_MCU

BAT60JFILM

JP1
HE14

5V

VinIN

GND GND

V out OUT

U1 KF33BDT

C1 100nF

C2 2.2uF/16V

C3 100nF

L2 744232090

L1 742792042

L3 742792042

R1 0R

R3 0R

R4 NC

GND 5V

R2 510R

GND_USB

C4 810uF/25V

3V3

PEG1 SJ5306

PEG2 SJ5306

PEG3 SJ5306

PEG4 SJ5306

R11 8 NC

R119 0R NC

R12 0R NC

R121 0R NC

PEG5 SJ5306
Figure 11. MB1283 schematics - ST-LINK JTAG
Figure 12. MB1283 schematics - LCD
Figure 13. MB1283 schematics - WiFi® BLE
Figure 14. MB1283 schematics - ST25DX connectors
Figure 15. MB1283 schematics - USB
6.2 MB1285 board schematics

This section presents the schematics for the MB1285 board.

Figure 16. MB1285 board schematics
7 Revision history

Table 1. Document revision history

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<td>Initial release.</td>
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<td>12-Sep-2017</td>
<td>2</td>
<td>Updated:</td>
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<td>– Section 6.2: MB1285 board schematics</td>
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<td>– Figure 1: ST25DV-DISCOVERY mother board and daughter board</td>
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