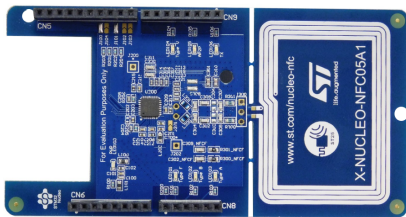# NFC card reader expansion board based on ST25R3911B for STM32 and STM8 Nucleos

Features

- On-board NFC card reader IC: ST25R3911B
- 47 mm x 34 mm, four turns, 13.56 MHz inductive antenna etched on PCB and associated tuning circuit
- Six general purpose LEDs
- ISO 18092 (NFCIP-1) active P2P
- ISO 14443A and ISO14443B
- ISO 15693
- FeliCa™
- VHBR
    - 6.8 Mbit/s AFE and PCD to PICC framing
    - 3.4 Mbit/s PICC to PCD framing
- Up to 1.4 W output power with differential antenna
- Possibility of driving two antennas in single ended configuration
- Inductive and capacitive wake-up
- Automatic antenna tuning system
- Transparent and Stream modes to implement MIFARE™ Classic compliant or other custom protocols
- Equipped with Arduino™ UNO R3 connector
- Free comprehensive development firmware library compatible with STM32Cube and samples for ST25R3911B
- Scalable solution for multiple board cascade
- FCC certified
- RoHS compliant

Product summary

Product summary	
NFC card reader expansion board based on ST25R3911B for STM32 Nucleo	X-NUCLEO-NFC05A1
NFC / HF RFID Reader IC	ST25R3911B
High performance HF reader/NFC initiator IC software expansion for STM32Cube	X-CUBE-NFC05

Description

The X-NUCLEO-NFC05A1 is an NFC card reader expansion board based on the ST25R3911B.

The expansion board is configured to support ISO14443A/B, ISO15693, FeliCa™ and AP2P communication.

By default, a VHBR compatible matching is populated to achieve bit rates up to 3.4 Mbps.

The ST25R3911B manages frame coding and decoding in reader mode for standard applications, such as NFC, proximity and vicinity HF RFID standards.
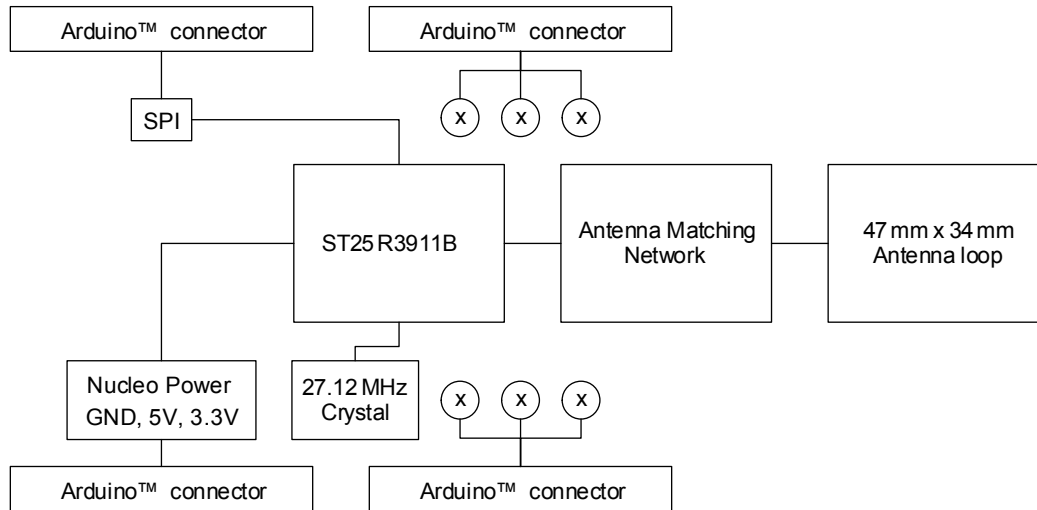
The ST25R3911B supports ISO/IEC 14443 Type A and B, ISO/IEC 15693 (single Subcarrier only) and ISO/IEC 18092 communication protocols. It also supports the detection, reading and writing of NFC Forum Type 1, 2, 3, 4 and 5 tags. It contains a low power capacitive sensor that can be used for ultra-low power wake-up without switching the reader field on.

Traditional inductive wake-up to select amplitude or phase measurement can be used as well.

Furthermore, the automatic antenna tuning (AAT) technology enables operations close to metallic parts and/or in changing environments.

DB3333 - Rev 3 - February 2019
For further information contact your local STMicroelectronics sales office.

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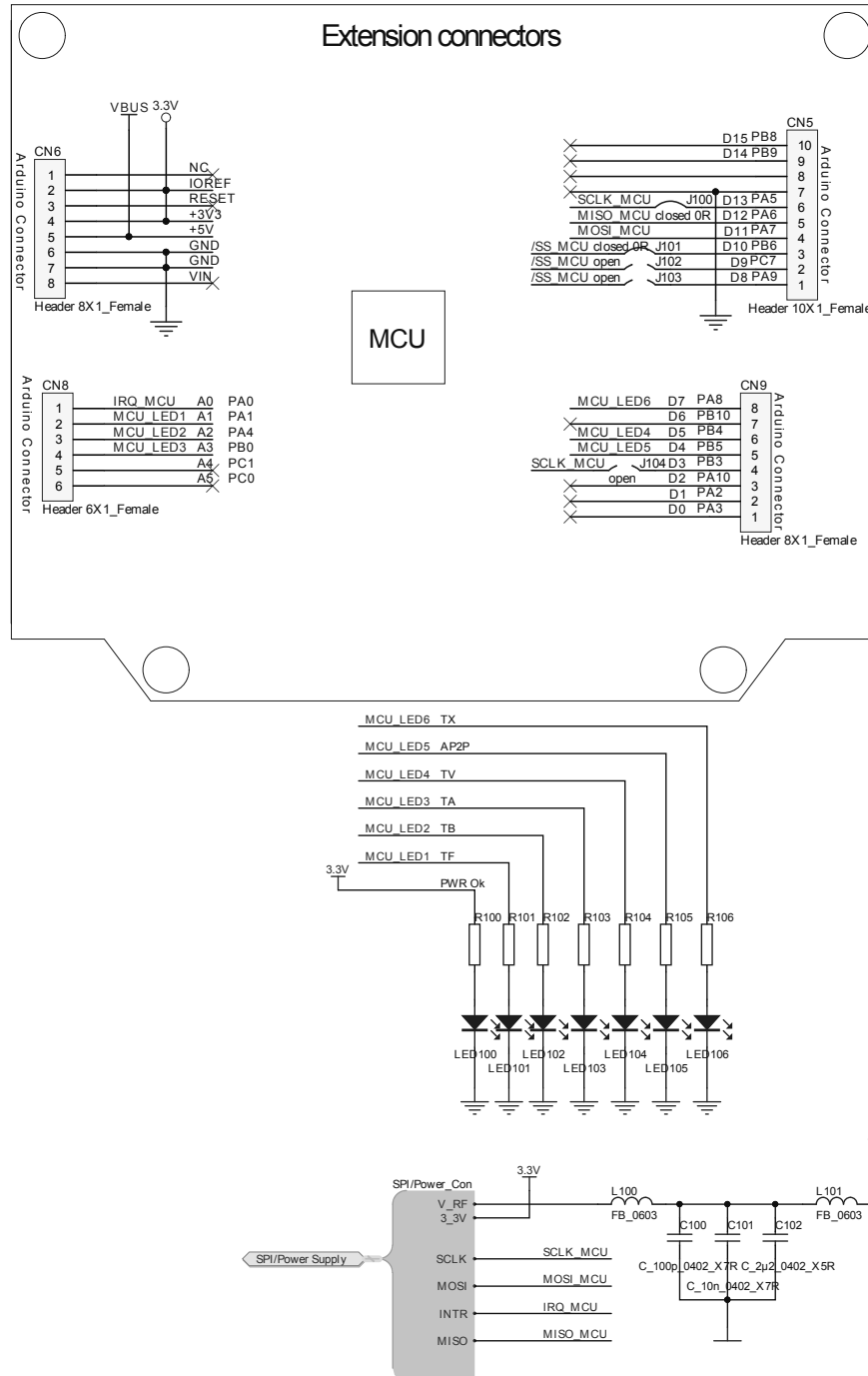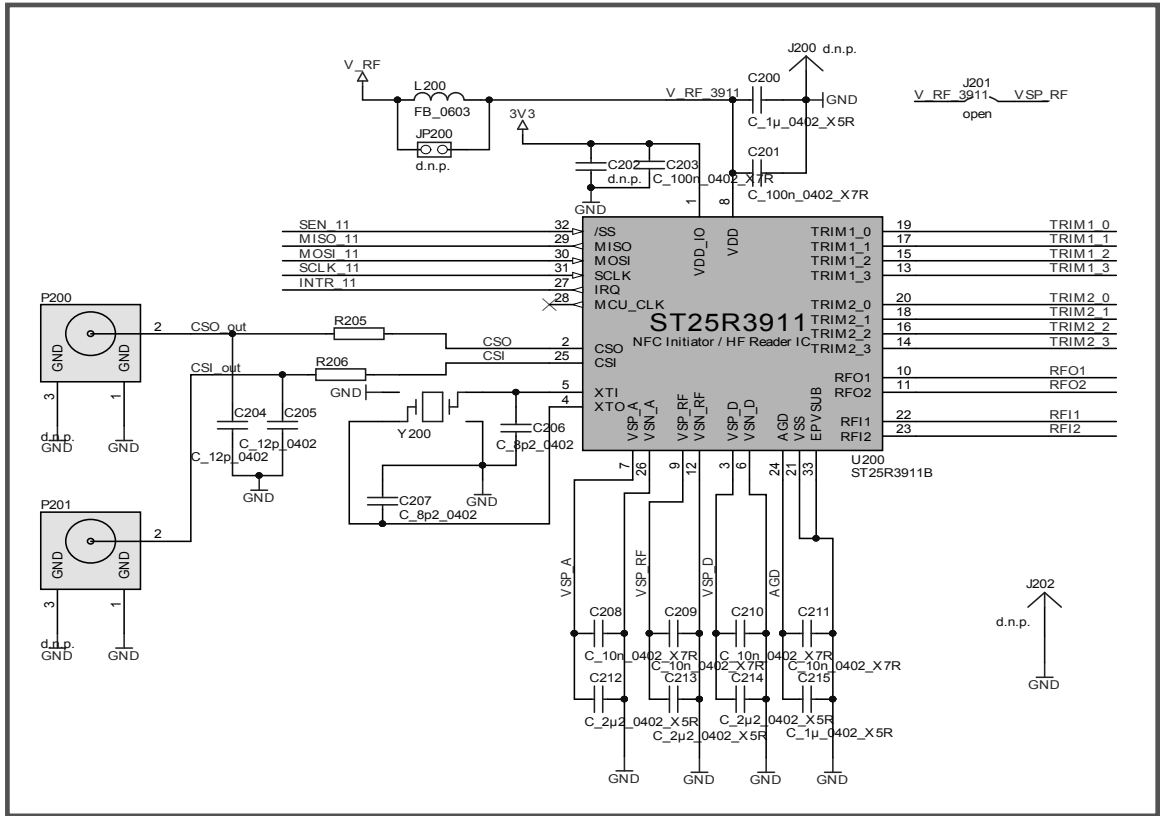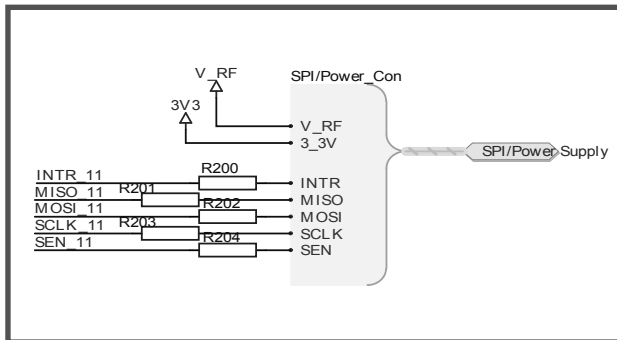# 1   Schematic diagrams

Figure 1. Functional block diagram

Figure 2. X-NUCLEO-NFC05A1 evaluation board circuit schematic (1 of 3)

Figure 3. X-NUCLEO-NFC05A1 evaluation board circuit schematic (2 of 3)

ST25R3911 NFC Initiator/HF Reader

Controller interface

Antenna connection
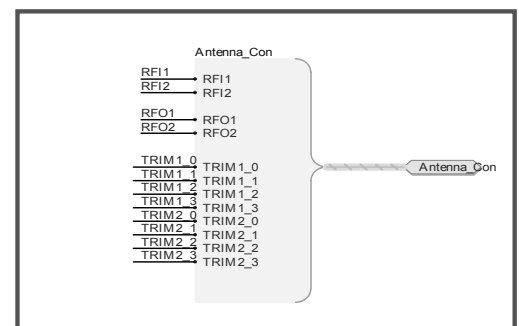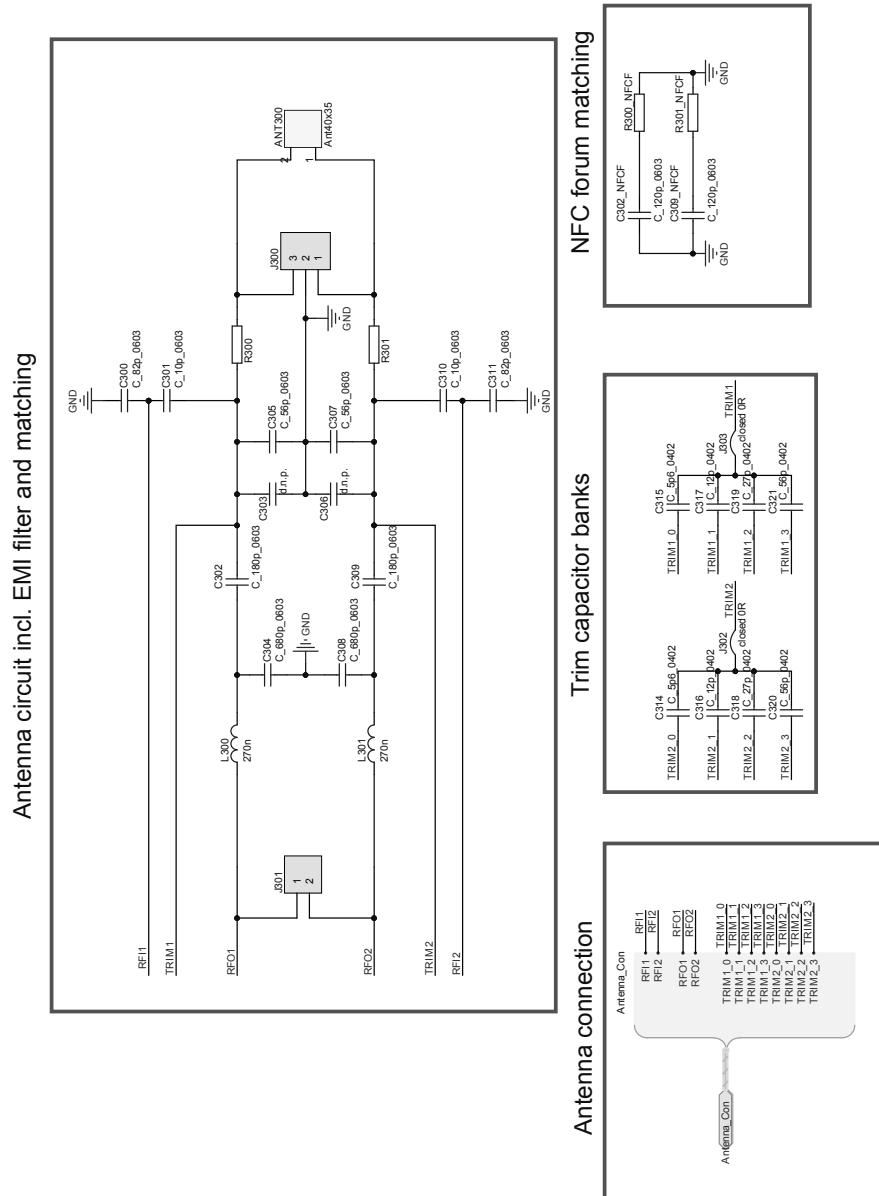
Figure 4. X-NUCLEO-NFC05A1 evaluation board circuit schematic (3 of 3)

Antenna circuit incl. EMI filter and matching

NFC forum matching

Trim capacitor banks

Antenna connection

2 Federal Communications Commission (FCC) and Industry Canada (IC) compliance statements

2.1 FCC Compliance Statement

2.1.1 Part 15.19

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

2.1.2 Part 15.21

Any changes or modifications to this equipment not expressly approved by STMicroelectronics may cause harmful interference and void the user's authority to operate this equipment.

2.1.3 FCC ID

FCC ID: YCPNFC05A1

2.2 Formal notices required by the Industry Canada ("IC")

2.2.1 Compliance statement

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation.

2.2.2 Declaration de conformité

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

2.2.3 IC ID

IC ID: 8976A-NFC05A1

Revision history

Table 1. Document revision history

Date	Version	Changes
14-Jul-2017	1	Initial release.
04-Dec-2018	2	Updated short description
26-Feb-2019	3	Fixed link in product summary table

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IMPORTANT NOTICE – PLEASE READ CAREFULLY