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14 mm x 14 mm antenna reference board
for the M24SR64-Y dual interface EEPROM

Introduction

The ANT7-T-M24SR64 is a ready-to-use demonstration board intended to evaluate the M24SR64-Y dual interface Electrically Erasable Programmable Memory (EEPROM), a device featuring an I2C interface that can be operated from an external power supply. The M24SR64-Y is a contactless memory, powered by the received carrier electromagnetic field.

The board (see *Figure 1*) features:

- M24SR64-Y dual interface EEPROM

- 14 mm x 14 mm, 13.56 MHz dual layer etched antenna

- I2C test points

- Configurable General Purpose Output (GPO) to indicate an ongoing RF or I2C operation available on test point

- RF disable test point (DIS) for activation/deactivation of RF commands

Figure 1. ANT7-T-M24SR64 board

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1 Hardware description

The ANT7-T-M24SR64 (see *Figure 2*) contains the M24SR64-Y EEPROM device and a 14 mm x 14 mm, 13.56 MHz dual layer etched antenna.

Figure 2. Functional block diagram
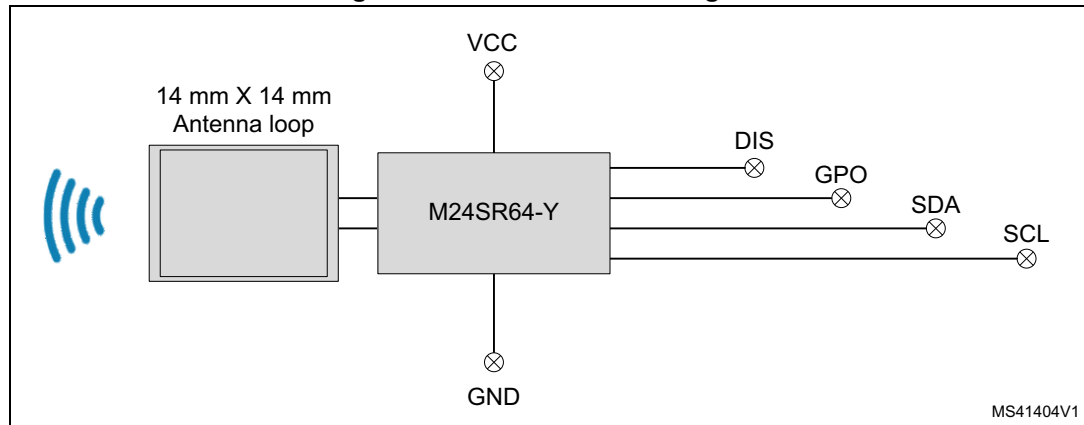
The M24SR64-Y is a dynamic NFC Forum Type 4 Tag – ISO/IEC 14443 with 25 pF internal tuning capacitance. Memory size is 64 Kbits with NDEF support, that can be accessed either by I2C interface or by 13.56 MHz air interface.

The tag features a user configurable digital output pin toggling during either RF or I2C operation.

The M24SR64-Y also provides an input used to disable the RF communication.

As shown in *Figure 1*, all M24SR64-Y pins (except AC0 and AC1, related to antenna connection) are made available to the user, with 1.2 mm diameter through-hole test points.

1.1 Startup

The ANT7-T-M24SR64 is already programmed with an URI that will automatically redirect to the associated ST web-page.

User has to:

- Enable NFC on the phone (Settings → Wireless and Networks → NFC) and make sure it is also connected to the Internet
- Bring the phone close to the ANT7-T-M24SR64 antenna to be redirected to the ST25 web-page.

Various usages of the ANT7-T-M24SR64 with a smartphone are allowed with ST25 NFC Demo application for Android.

To download the application and for more use cases details user should visit the dedicated pages on https://play.google.com and on *www.st.com*.

It is also possible to access the M24SR64-Y memory with CR95HF demonstration board and associated PC software available on *www.st.com*.

1.2 Using RF disable (DIS) pin

This active high signal is used to disable the RF communication.

When the voltage on the VCC pin is below the POR level or not connected, an internal pull-down resistor is connected on this pad. Thus, the RF disable pad is maintained to the low level and the RF analog front end is activated. When the voltage on the VCC pin is higher than the POR level, the I2C host shall set this pin to disable the RF communication.

In Dual interface mode, the DIS pin must not be left floating.

1.3 Using General Purpose Output (GPO) pin

This configurable output signal is used either to indicate that the M24SR64-Y is executing an I2C or RF session in the mode chosen by the user. It is an open drain output and a pull-up resistor (20 kΩ) must be connected between GPO and VCC pins. This digital output pin is easily accessible to the user on the GPO test point.

1.4 Using I2C pins

The memory is accessible through I2C when it is powered by the VCC pin. I2C clock and data signals are respectively available on SCL and SDA test points. Since I2C is an open drain interface, pull up resistors have to be connected from both lines to VCC pin.

2 Component description

2.1 M24SR64-Y

The M24SR64-Y device is a Dynamic NFC/RFID tag IC with a dual interface, electrically erasable programmable memory (EEPROM). It features an I2C interface and can be operated from a V_{CC} power supply. It is also a contactless memory powered by the received carrier electromagnetic field.

Table 1. M24SR64-Y

Feature	Description
Sales type	M24SR64-YMN6
Package	SO8N
Operating voltage	2.7 to 5.5 Volts

3 Schematics

Figure 3. ANT7-T-M24SR64 hardware schematics
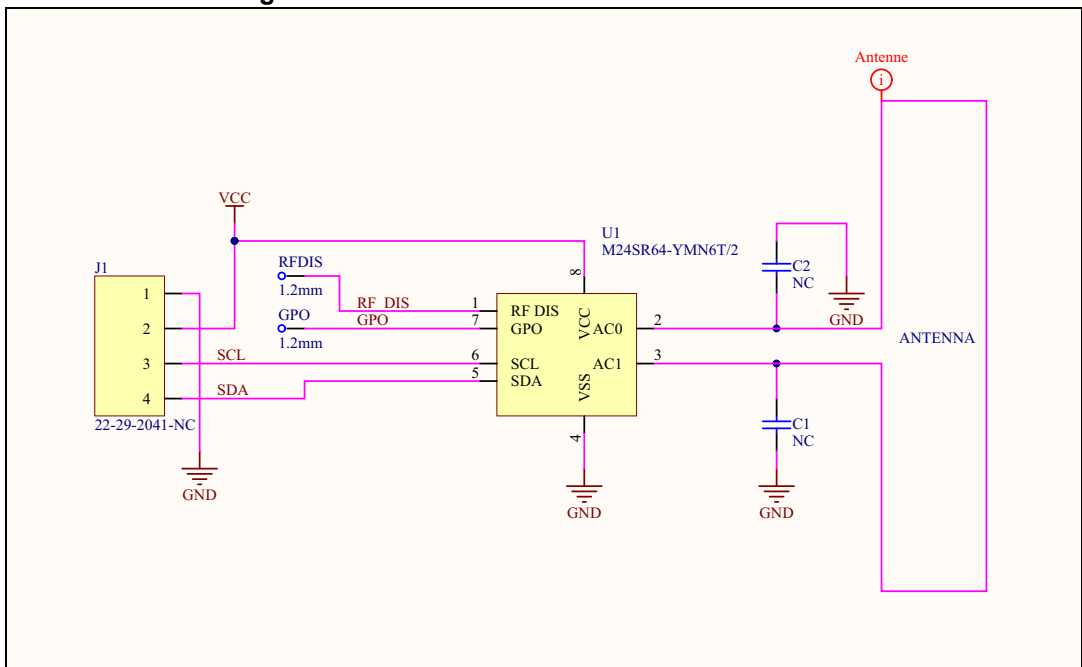
4 Federal Communications Commission (FCC) and Industry Canada (IC) compliance statements

4.1 FCC Compliance Statement

4.1.1 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.

4.1.2 Part 15.105

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

4.1.3 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

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

4.2.1 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.

4.2.2 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.

5 Revision history

Table 2. Document revision history

Date	Revision	Changes
21-Apr-2016	1	Initial release.

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