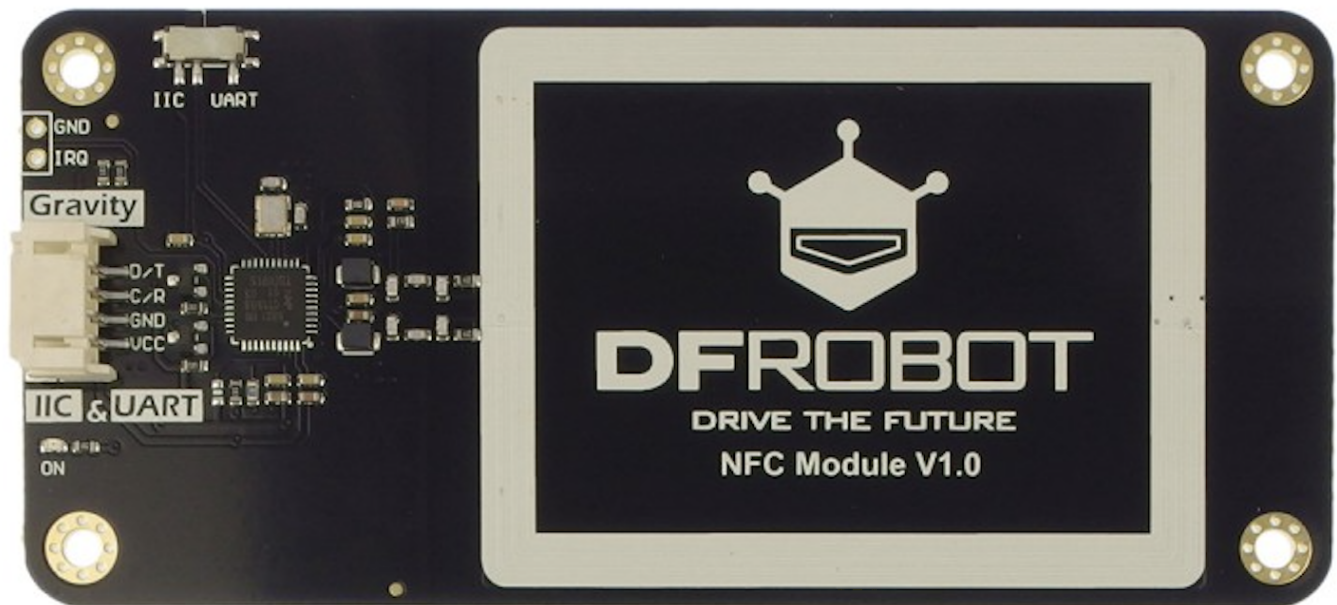


# Using an PN532 RFID reader

## What is the difference between an PN532 RFID reader and an MFRC522 RFID reader

The PN532 and MFRC522 are two popular RFID reader modules, each with its own features and use cases.



Feature	PN532	MFRC522	Which Better
Communication	SPI, I2C, UART	SPI only	✓ PN522
Supported Protocols	NFC, RFID (13.56 MHz)	RFID (13.56 MHz)	✓ PN522
Standards	ISO14443A/B, FeliCa	ISO14443A (MIFARE)	✓ PN522
Range	~10 cm	~5 cm	✓ PN522
Cost	Higher (~\$10-\$30)	Lower (~\$2-\$10)	✓ MFRC522
Power	Higher	Lower	✓ MFRC522
Applications	Advanced, NFC, IoT	Basic RFID projects	✓ PN522

In this tutorial, we will be using a PN532 module from DFRobot, if you are using an MFRC522 module, please refer to this [tutorial](#). This tutorial is adapted from [here](#).

## RFID Tag

Aside from the regular card, there are more options than before, including stickers, button tags etc.

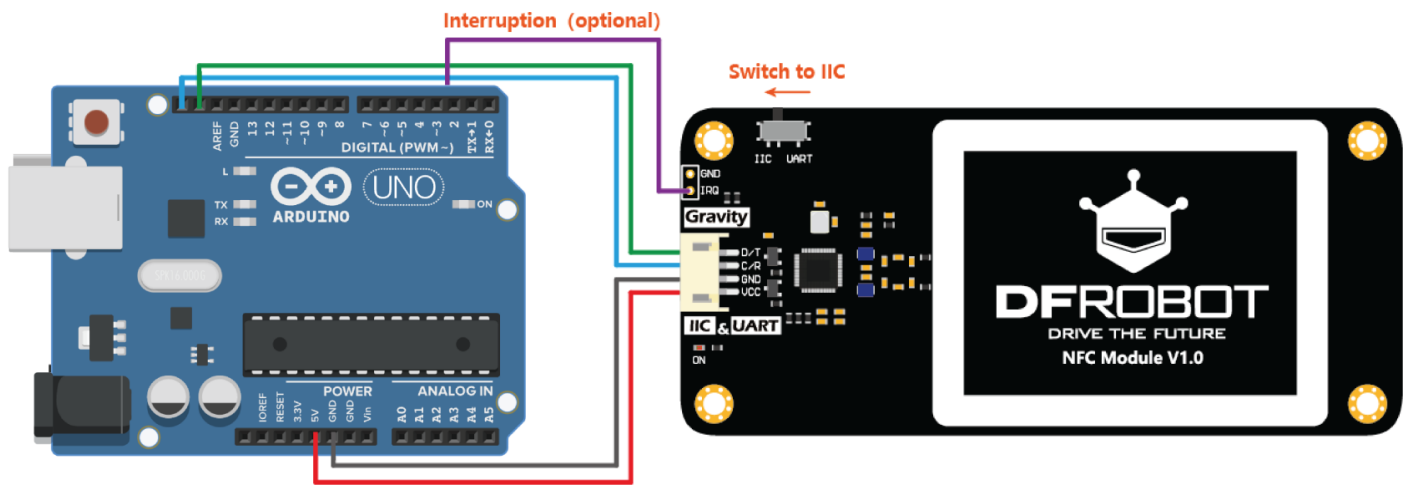


## Wiring

### Switch

This tutorial will be using the i2c communication protocol, make sure you switch to IIC on the module.

1. D/T - SDA (Pin 14)
2. C/R - SCL (Pin 15)
3. GND - GND (Ground)
4. VCC to 5V (Power)



## Library

We will be using the `DFRobot_PN532` library. Please see this [tutorial](#) to learn how to install libraries.

## Getting started

The number of blocks of data depends on the type of RFID tag or card you're using. Most commonly, the MIFARE Classic card is used, which is compatible with both the PN532 and MFRC522. A standard MIFARE Classic 1K card will have **64** blocks of data and the smaller NTAG213 tag will have **36** blocks of data.

Some blocks are read-only, so you cannot write data to those blocks. For example, **Block 0** usually contains the UID (Unique Identifier) and other manufacturer data, and is read-only.

The below codes are only for writing to and reading the data from **Block 3**.

## Write Data

```
#include <DFRobot_PN532.h>

#define BLOCK_SIZE    16
#define PN532_IRQ      2
#define INTERRUPT      1
#define POLLING        0
// The block to be written
#define WRITE_BLOCK_NO  3

DFRobot_PN532_IIC nfc(PN532_IRQ, POLLING);

uint8_t dataWrite[BLOCK_SIZE] = {"your message"}; //change to your data
```

```

void setup() {
  Serial.begin(115200);
  Serial.print("Initializing");
  while (!nfc.begin()) {
    Serial.print(".");
    delay (1000);
  }
  Serial.println();
  Serial.println("Waiting for a card.....");
}

void loop() {
  // For S50 card/tag, block 1-2, 4-6, 8-10, 12-14... 56-58, 60-62 are for user data
  // You can read/write these blocks freely.
  // Use "MifareClassic_ReadAllMemory.ino" to check all the blocks
  if (nfc.scan()) {
    if (nfc.writeData(WRITE_BLOCK_NO, dataWrite) != 1) {
      Serial.print("Block ");
      Serial.print(WRITE_BLOCK_NO);
      Serial.println(" write failure!");
    }
    else {
      Serial.print("Block ");
      Serial.print(WRITE_BLOCK_NO);
      Serial.println(" write success!");
      Serial.print("Data written(string):");
      Serial.println((char *)dataWrite);
      Serial.print("Data written(HEX):");
      for (int i = 0; i < BLOCK_SIZE; i++) {
        Serial.print(dataWrite[i], HEX);
        Serial.print(" ");
      }
    }
  }
  delay(500);
}

```

## Read Data

```
#include <DFRobot_PN532.h>
```

```

#define BLOCK_SIZE    16
#define PN532_IRQ     2
#define INTERRUPT     1
#define POLLING       0

// The block to be read
#define READ_BLOCK_NO  3

DFRobot_PN532_IIC nfc(PN532_IRQ, POLLING);
uint8_t dataRead[16] = {0};

void setup() {
  pinMode(13,OUTPUT);
  Serial.begin(115200);
  Serial.print("Initializing");
  while (!nfc.begin()) {
    Serial.print(".");
    delay (1000);
  }
  Serial.println();
  Serial.println("Waiting for a card.....");
}

void loop() {
  // For S50 card/tag, block 1-2, 4-6, 8-10, 12-14... 56-58, 60-62 are for user data
  // You can read/write these blocks freely.
  // Use "MifareClassic_ReadAllMemory.ino" to check all the blocks
  if (nfc.scan()) {
    if (nfc.readData(dataRead, READ_BLOCK_NO) != 1) {
      Serial.print("Block ");
      Serial.print(READ_BLOCK_NO);
      Serial.println(" read failure!");
    }
    else {
      Serial.print("Block ");
      Serial.print(READ_BLOCK_NO);
      Serial.println(" read success!");

      Serial.print("Data read(string):");
      String data = (char *)dataRead;
      Serial.println(data);
    }
  }
}

```

```

/*
  //interaction
  if(data == "your message" ){
    digitalWrite(13, HIGH);

  }else{
    digitalWrite(13, LOW);
  }
*/
/*
  //in hex
  Serial.print("Data read(HEX):");
  for (int i = 0; i < BLOCK_SIZE; i++) {
    Serial.print(dataRead[i], HEX);
    Serial.print(" ");
    dataRead[i] = 0;
  }
  Serial.println();
*/
}

delay(500);
}
}

```

## NTAG203

If you are using a NTAG203 sticker, you will need to use the `Adafruit_PN532` library instead.

## Write Data

```

#include <Wire.h>
#include <Adafruit_PN532.h>

#define SDA_PIN SDA
#define SCL_PIN SCL
#define WRITE_PAGE_NO 4 // Change this to the correct writable page

```

```

Adafruit_PN532 nfc(SDA_PIN, SCL_PIN);

uint8_t dataWrite[4] = {'T', 'E', 'S', 'T'}; // Must be 4 bytes for NTAG203

void setup() {
  Serial.begin(115200);

  nfc.begin();

  uint32_t versiondata = nfc.getFirmwareVersion();
  if (!versiondata) {
    Serial.println("PN532 not found!");
    while (1);
  }

  nfc.SAMConfig();
  Serial.println("Waiting for an NFC card...");
}

void loop() {
  uint8_t uid[] = {0, 0, 0, 0, 0, 0, 0}; // Store UID
  uint8_t uidLength;

  if (nfc.readPassiveTargetID(PN532_MIFARE_ISO14443A, uid, &uidLength)) {
    Serial.println("NFC tag detected!");

    if (nfc.ntag2xx_WritePage(WRITE_PAGE_NO, dataWrite)) {
      Serial.println("Write successful!");
    } else {
      Serial.println("Write failed!");
    }

    delay(2000); // Avoid continuous writes
  }
}

```

## Read Data

```

#include <Wire.h>
#include <Adafruit_PN532.h>

```

```
#define SDA_PIN SDA
#define SCL_PIN SCL
#define READ_PAGE_NO 4 // Change this to the page you want to read

Adafruit_PN532 nfc(SDA_PIN, SCL_PIN);

void setup() {
  Serial.begin(115200);

  nfc.begin();

  uint32_t versiondata = nfc.getFirmwareVersion();
  if (!versiondata) {
    Serial.println("PN532 not found!");
    while (1);
  }

  nfc.SAMConfig();
  Serial.println("Waiting for an NFC tag...");
}

void loop() {
  uint8_t uid[] = {0, 0, 0, 0, 0, 0, 0}; // To store the tag UID
  uint8_t uidLength;

  if (nfc.readPassiveTargetID(PN532_MIFARE_ISO14443A, uid, &uidLength)) {
    Serial.println("NFC tag detected!");

    uint8_t dataRead[4]; // NTAG203 pages are 4 bytes each
    if (nfc.ntag2xx_ReadPage(READ_PAGE_NO, dataRead)) {
      Serial.print("Data at Page ");
      Serial.print(READ_PAGE_NO);
      Serial.print(": ");

      // Print as ASCII characters
      for (int i = 0; i < 4; i++) {
        Serial.print((char)dataRead[i]);
      }

      Serial.print(" (HEX: ");
      for (int i = 0; i < 4; i++) {
```



```
    Serial.print(dataRead[i], HEX);  
    Serial.print(" ");  
  }  
  Serial.println("");  
} else {  
  Serial.println("Read failed!");  
}  
  
delay(2000); // Avoid continuous reads  
}  
}
```

---

Revision #5

Created 26 November 2024 16:31:42 by Joanne Leung

Updated 14 March 2025 15:50:17 by Joanne Leung