

Lesson 16 RFID

Introduction

In this Raspberry Pi RFID RC522 tutorial, I will be walking you through the steps on how to set up and wire the RFID RC522 chip with your Raspberry Pi. The RFID RC522 is a very low-cost RFID (Radio-frequency identification) reader and writer that is based on the MFRC522 microcontroller. This microcontroller provides its data through the SPI protocol and works by creating a 13.56MHz electromagnetic field that it uses to communicate with the RFID tags.

Make sure that the tags you purchase for your RFID RC522 operate on the 13.56MHz frequency otherwise we will fail to read them

Hardware Required

- Raspberry Pi
- Power Supply
- RC522 RFID Reader
- Breadboard
- Breadboard Wire

Wiring the RFID RC522

On your RFID RC522 you will notice that there are 8 possible connections on it, these being **SDA** (Serial Data Signal), **SCK** (Serial Clock), **MOSI** (Master Out Slave In), **MISO** (Master in Slave Out), **IRQ** (Interrupt Request), **GND** (Ground Power), **RST** (Reset-Circuit) and **3.3v** (3.3v Power In). We will need to wire all of these but the **IRQ** to our Raspberry Pi's GPIO pins.

You can either wire these directly to the GPIO Pins or like we did in this tutorial, plug the RFID RC522 into our Breadboard then wire from there to our Raspberry Pi's GPIO Pins.

Wiring your RFID RC522 to your Raspberry Pi is fairly simple, with it requiring you to connect just 7 of the GPIO Pins directly to the RFID reader. Follow the table below, and check out our GPIO guide to see the positions of the GPIO pins that you need to connect your RC522 to.

SDA connects to **Pin 24**.

SCK connects to **Pin 23**.

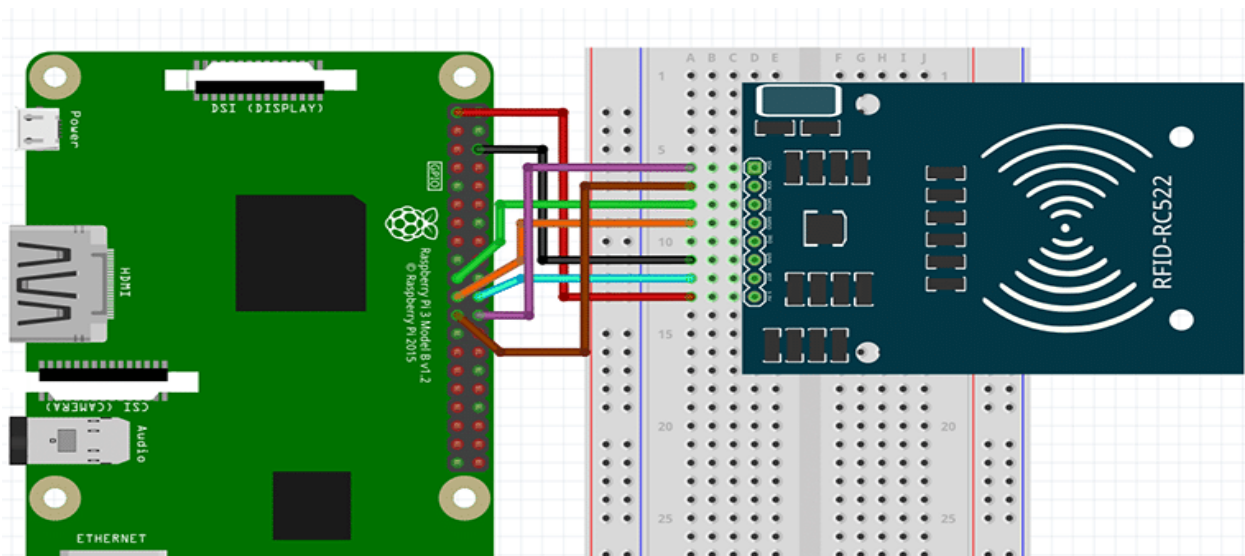
MOSI connects to **Pin 19**.

MISO connects to **Pin 21**.

GND connects to **Pin 6**.

RST connects to **Pin 22**.

3.3v connects to **Pin 1**.



Python Coding

For our first Python script, we will be showing you how to write data from the RC522 to your RFID tags. Thanks to the SimpleMFRC522 script this will be relatively simple, but we will still go into how each part of the code works.

Writing the RFID RC522

begin writing our Write.py Python script.

```
#!/usr/bin/env python

import RPi.GPIO as GPIO

import SimpleMFRC522

reader = SimpleMFRC522.SimpleMFRC522()

try:

    text = raw_input('New data:')

    print("Now place your tag to write")

    reader.write(text)

    print("Written")

finally:
```

```
GPIO.cleanup()
```

You can look at our example output below to see what a successful run looks like.

```
pi@raspberrypi:~/MFRC522-python $ sudo python Write.py
New data:pimylifeup
Now place your tag to write
Written
```

You have now successfully written your **Write.py** script, and we can now proceed to show you how to read data from the RFID RC522 in the next segment of this tutorial.

Reading with the RFID RC522

Now that we have written our script to write to RFID tags using our RC522 we can now write a script that will read this data back off the tag.

```
#!/usr/bin/env python
import RPi.GPIO as GPIO
import SimpleMFRC522
reader = SimpleMFRC522.SimpleMFRC522()
try:
    id, text = reader.read()
    print(id)
    print(text)
finally:
    GPIO.cleanup()
```

With the script now running, all you need to do is place your RFID Tag on top of your RFID RC522 circuit. As soon as the Python script detects the RFID tag being placed on top, it will immediately read the data and print it back out to you.

An example of what a successful output would look like is displayed below.

```
pi@raspberrypi:~/MFRC522-python $ sudo python Read.py  
827843705425
```

Output

If you successfully receive data back from your Read.py script with the text that you pushed to the card using your Write.py script then you have successfully set up your Raspberry Pi to connect with your RFID RC522 Circuit.

Application

- Home Security System
- Smart Billing System
- Smart Locker