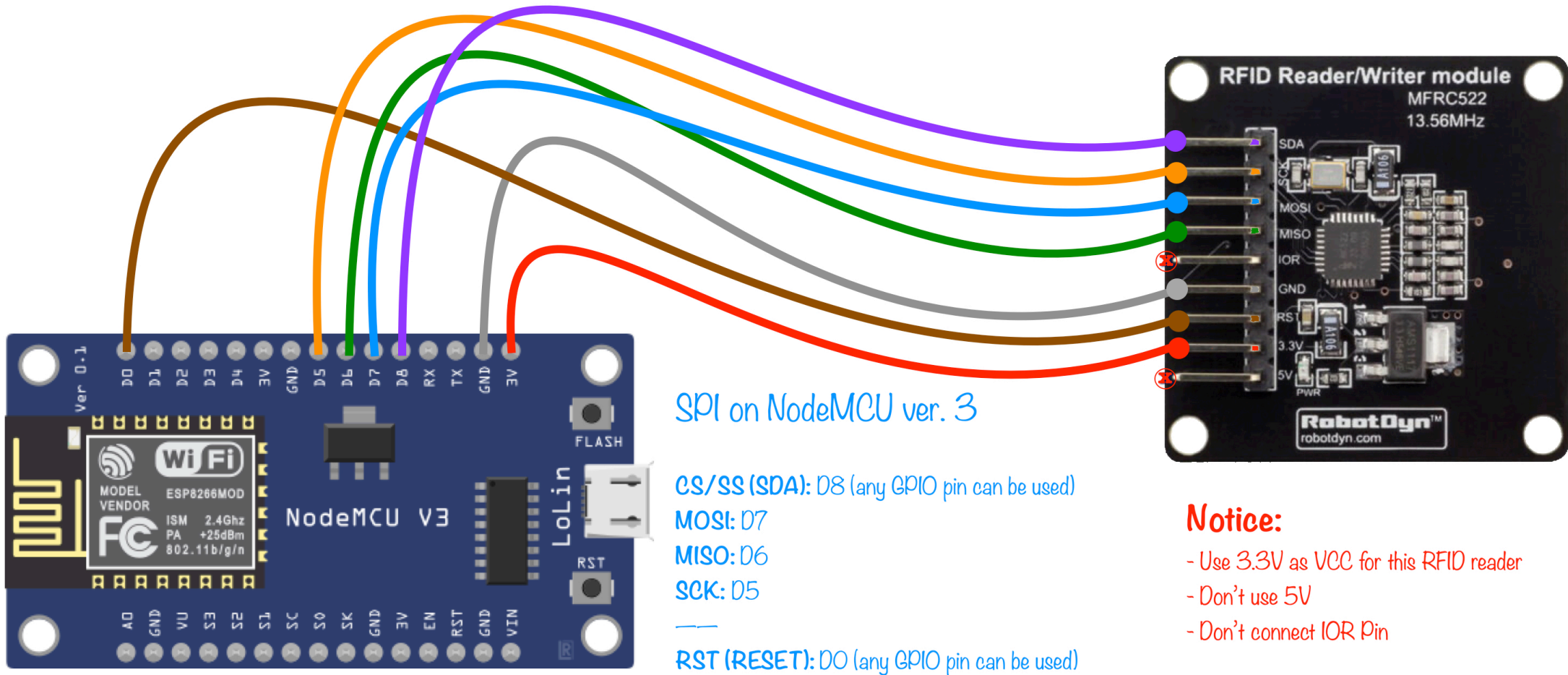


I. Hardware

Wiring Diagram



II. Environment Setup

Step 1: Install CP2102 on your PC and then reboot your PC

Silicon Labs CP2102 USB-to-Serial driver allows your computer to recognize and communicate with CP2102-based USB-to-UART (Universal Asynchronous Receiver-Transmitter) bridge devices. By installing the driver, your computer can detect and properly assign a COM port to the CP2102 USB-to-UART adapter, allowing serial communication.

Why Reboot the PC After Installation? After installing the driver, rebooting ensures the driver is properly loaded and initialized by the operating system.

Step 2: Integrate Arduino IDE with ESP8266 devices (NodeMCU v3 is a part of ESP8266 family)

- a) Let's open the Arduino IDE.
- b) Go to File > Preferences in the Arduino IDE
- c) Copy the URL https://arduino.esp8266.com/stable/package_esp8266com_index.json and then paste it in the field "Additional Boards Manager URLs".
- d) Click OK to close the preferences window.
- e) Go to Tools > Board > Boards Manager
- f) Navigate to esp8266 by ESP8266 Community and install it.

Step 3: Select your board

Go to Tools > Board > esp8266 > Generic ESP8266

Step 4: Select the port

Connect the NodeMCU to your PC.

On the Arduino IDE, go to: Tools > Port

You'll see a list of available serial ports. Disconnect the NodeMCU from your PC.

Go again to: Tools > Port

Note the ports that are currently listed.(Fewer?). Reconnect the NodeMCU to your PC.

Go again to: Tools > Port

A new port will appear. This is the one assigned to your device. Select that port.

Step 5: Libraries

The MFRC522 library for Arduino allows communication with the MFRC522 RFID module over SPI. It provides functions for reading card UID, authenticating, and reading/writing data to MIFARE cards.

- 📌 Install via Arduino Library Manager: Search for “MFRC522 by Miguel Balboa”.
- 📌 GitHub Repository: MFRC522 Library

Code for NodeMCU v3

Link to the code:

<https://github.com/benax-rw/RFID-Technology-Made-Easy/blob/main/loT-for-RFID/transact-and-transfer/transact-and-transfer.ino>

Highlights in the code:

Line 24: `connectToWiFi("Benax-POP8A", "ben@kushi");`

Benax-POP8A is the SSID name. Please change to your SSID you want to use.

ben@kushi is the WiFi key for Benax-POP8A SSID: Please change to your key according to the SSID you choose.

Line 216: `transferData(mData, "/projects/4e8d42b606f70fa9d39741a93ed0356c/y2-2025/upload.php");`

Of course you have a different address: If you don't remember how to check the address to your upload.php file, please watch the video <https://www.youtube.com/watch?v=pLzxo7PBQDQ>

Upload the code, open the Serial Monitor, make sure the baud rate is set to 115200, place the PICC with enough balance near the RFID card reader (in 2 cm or less) and then check what's being printed on the Serial Monitor.

Open your project link from <https://foreach.benax.rw/?go=exhibition> and check if data is uploaded. Otherwise, DEBUG, DEBUG and DEBUG until you make it.