Tyler:

Thanks for the interest in building a cubcar registration station. Hopefully this document is helpful in getting you up and running. This is not the registration program (as it needs the database) but here is all the working components.

For a registration station you need a few parts.

1. Raspberry Pi – just about any Pi will do, Pi zero, Pi3b, Pi4 etc. Does not work on a Pico.
   1. Keyboard, Mouse, Monitor
   2. Micro SD Card 16GB or Greater – You may want to start with a new one as you need to install a bunch of libraries and you will likely want to burn a clean image once you are done.
   3. RC522 RFID Tag Reader – Connector needs to be soldered on.

A picture containing text

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* 1. I2C 20x4 LCD Display Module with serial interface adapter – Serial interface adaptor needs to get soldered onto the back of the display. 4 Pins to the outside edge of the display.

Graphical user interface, text

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* 1. Dupont jumper wires to connect all the pieces together
  2. To make things simpler a Cub Car HAT can be used which makes wiring easier. (From Jeff)

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1. Configuring Raspberry Pi card

Go to Raspberry.org and download imager for windows

Install a new copy of Raspbian 32 bit (Legacy) drivers do not work with Bullseye which is the latest image on the SD-Card

Put the SD-Card into the Pi, add keyboard / mouse and video and power up the Pi, which will then run the startup wizard. Make sure you connect pi to wifi or none of the other steps will work.

After the startup wizard completes then reboot pi and open up a terminal window.

*sudo raspi-config*

Enable SPI

Enable I2C

Enable SSH

Enable VNC

Exit raspi-config and reboot

Open a terminal window and run the following:

*sudo apt-get update*

*sudo apt-get upgrade*

*sudo apt-get install python3-pip*

*sudo apt-get install ntp*

*sudo apt-get install python3-dev python3-pip*

*pip3 install spidev*

*pip3 install --upgrade pip setuptools*

Install software for database connector

*sudo pip3 install mysql-connector-python*

*sudo apt install mariadb-client mariadb-server*

Install Pandas

*sudo apt-get install python3-pandas*

1. RC522 Wiring:

|  |  |  |  |
| --- | --- | --- | --- |
| **RS522 Header** | **Diagram Colour** | **PI Header** | **Notes** |
| 3.3 V | Red | 17 | 3.3V |
| RST | Brown | 22 | GPIO25 |
| GND | Black | 20 | Ground |
| IRQ |  |  | Not Connected |
| MISO | White | 21 | GPIO9 |
| MOSI | Green | 19 | GPIO10 |
| SCK | Maroon | 23 | GPIO11 |
| SDA | Blue | 24 | GPI08 |

How to install drivers:

*sudo apt-get update*

*sudo apt-get upgrade*

*sudo apt-get install python3-dev python3-pip*

*sudo pip3 install spidev*

*sudo pip3 install mfrc522*

*sudo python3 -m pip install mfrc522 --upgrade*

sample code to read and RFID tag: Read.py

#!/usr/bin/env python

import RPi.GPIO as GPIO

from mfrc522 import SimpleMFRC522

reader = SimpleMFRC522()

try:

id, text = reader.read()

print(id)

print(text)

finally:

GPIO.cleanup()

1. I2C Display Wiring

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|  |  |  |
| --- | --- | --- |
| I2C Display | **Diagram Colour** | **PI Header** |
| 5 V | Red | 2 |
| GND | Blue | 6 |
| SCL | Green | 5 |
| SDA | Yellow | 3 |

How to install drivers:

*sudo apt-get install i2c-tools*

*pip3 install smbus2*

You can find additional notes and sample code here:

<https://www.circuitbasics.com/raspberry-pi-i2c-lcd-set-up-and-programming/>

sample code LCD\_Test.py

import I2C\_LCD\_driver

from time import \*

mylcd = I2C\_LCD\_driver.lcd()

mylcd.lcd\_display\_string("Works", 1)