Project VI:

Implementation of RFID-RC522 on the Elevator Project

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EECE73125 – Engineering Project VI

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May 30, 2025

1. Overview

The purpose of this document is to provide the implementation details for the integration of the RFID-RC522 development board to the Elevator Project.

2. Operating Conditions

Table 1: Operating Conditions

Condition	Range	Unit
Operating Voltage	2.5 - 3.3	V
Operating Current	13 - 26	mA
Standby Current	10 - 13	mA
Operating Frequency	13.56	MHz
Wireless Transfer Speed	≤ 848	kb/s
SPI Bus Speed	≤ 10	Mb/s
I2C Bus Speed	Fast: ≤ 400 High-speed: ≤ 3400	kb/s
RS232 Serial Bus Speed	≤ 1228.8	kb/s
Operating Distance (wireless)	≤ 50	mm

3. Board Pinouts

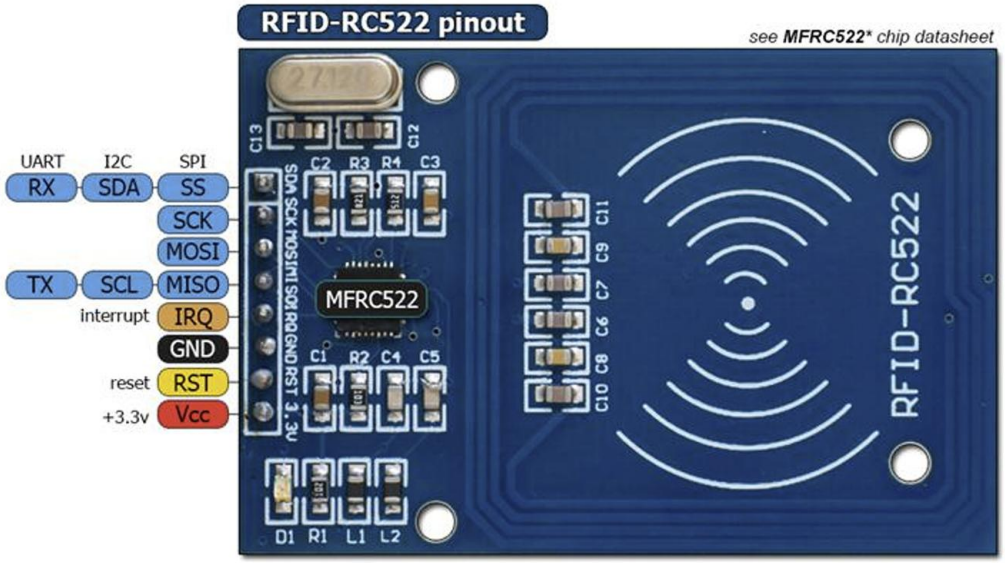
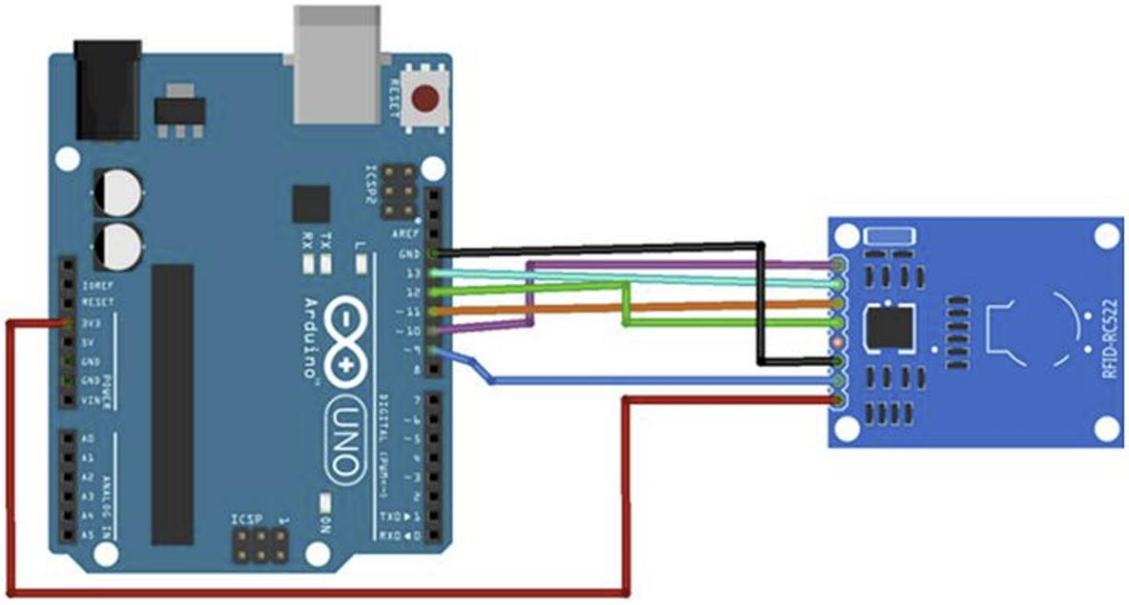


Figure 1: RFID-RC522 Pinout Diagram [1]

4. Arduino Connection



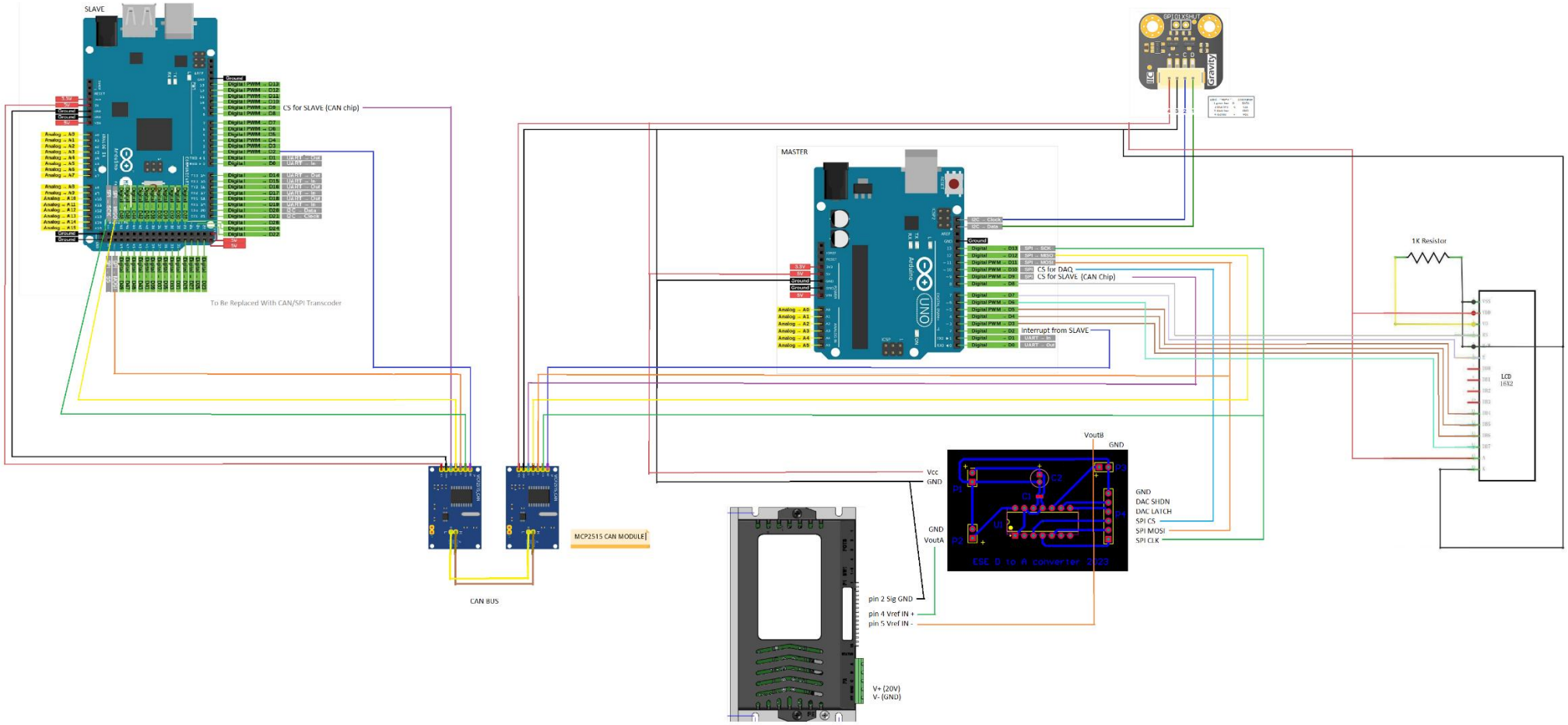
RC522 Pin	Wiring to Arduino Un
SDA	Digital 10
SCK	Digital 13
MOSI	Digital 11
MISO	Digital 12
IRQ	unconnected
GND	GND
RST	Digital 9
3.3V Supply	3.3V

Pin Wiring

Figure 2: Pin Wiring Diagram for Arduino [1]

5. Implementation

The RFID-RC522 user manual and datasheet has the libraries available for the Arduino connection using the SPI interface. Because of lower pin availability, the pin layout we are using for the card reader is shown below:



Because the card reader is being used for a lockout/tagout functionality, we will be using the Arduino so there is as little delay as possible for stopping the elevator. We are implementing a successful card-read similarly to a hardware interrupt. The plan is to have the card reader on constantly, and when a card is read on the system, it stops the elevator after it reaches the next floor. If the elevator is moving, the Arduino will wait for the elevator to stop before it locks out / stops the elevator controls.

6. References

[1] "Handson Technology Data Specs RC522 RFID Development Kit," Handson Technology. Accessed: May 30, 2025. [Online]. Available: https://www.handsontec.com/dataspecs/RC522.pdf

[2] "MFRC522 Standard performance MIFARE and NTAG frontend," NXP Semiconductors, Apr. 2016. Accessed: May 30, 2025. [Online]. Available: https://www.nxp.com/docs/en/data-sheet/MFRC522.pdf