

LAB 6: Smart RFID System with Cloud & SD Logging

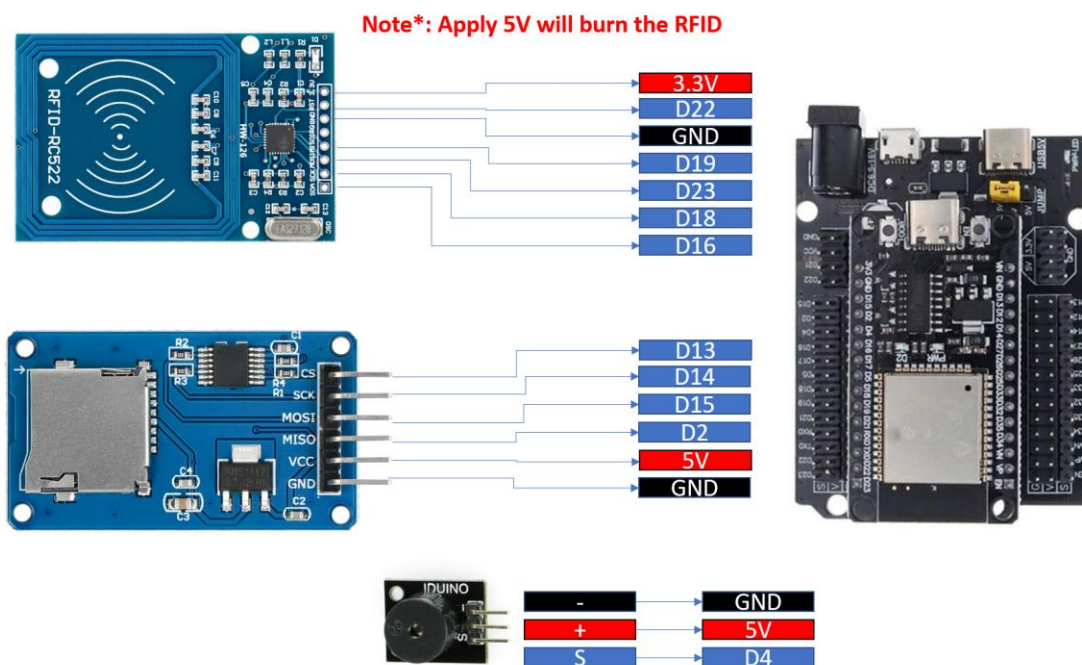
1. Overview

In this lab, students will design and implement a smart RFID-based attendance system using ESP32 and MicroPython (Thonny). The system integrates RFID-RC522, SD card, Firestore, and a buzzer. The system identifies users, logs attendance locally and remotely, and provides real-time feedback.

2. Learning Outcomes (CLO Alignment)

- Integrate SPI-based RFID sensor (RC522) with ESP32
- Implement UID-based identification system
- Design structured data storage (CSV format)
- Store data locally (SD card) and remotely (Firestore)
- Implement real-time feedback using buzzer
- Apply system integration across multiple modules

3. Connection



4. Task

1. Read UID from RFID card
 - Detect card and retrieve its unique ID (UID)
2. Match UID with student database
 - Compare UID with predefined data
 - If found -> valid student
 - If not -> unknown card
3. Generate current datetime
 - Format:
YYYY-MM-DD HH:MM:SS
4. If UID is valid:
 - Activate buzzer for 0.3 seconds
 - Save data to SD card (CSV format):
UID, Name, StudentID, Major, DateTime
 - Send data to Firestore
5. If UID is invalid:
 - Activate buzzer for 3 seconds
 - Display: "Unknown Card"
 - Do not save or send data

5. Submission & Academic Integrity

- main.py
- Flowchart
- CSV file
- Firestore screenshot
- Demo video (60–90 sec)
- README.md

All work must be original. No code sharing.