

Arduino RFID Smart Lock Lab Manual

Printable pinout, wiring, code, build steps, expected results, and troubleshooting for every Arduino tutorial on the WolfieWeb Arduino page.

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Goal: Build a simple access-control system using card ID logic, LED feedback, a buzzer, and servo motion.

Pin Codes and Wiring Map

Part / Lead	Arduino Pin / Connection	Purpose
MFRC522 VCC	3.3V	Do not use 5V unless your board is 5V tolerant
MFRC522 GND	GND	Ground
MFRC522 RST	D9	Reset
MFRC522 SDA/SS	D10	SPI select
MFRC522 MOSI	D11	SPI data
MFRC522 MISO	D12	SPI data
MFRC522 SCK	D13	SPI clock
Servo signal	D6	Lock control
Green LED	D4 via 220 ohm	Approved

Red LED	D5 via 220 ohm	Denied
Buzzer +	D3	Audio feedback

Step-by-Step Build Instructions

Step 1: Wire only the RFID module first and run a UID reader test.

Step 2: Scan the approved card and copy the UID exactly from Serial Monitor.

Step 3: Add the servo and test locked/unlocked positions before adding access logic.

Step 4: Add green LED, red LED, and buzzer feedback.

Step 5: Load the full lock sketch. Approved UID should unlock; unknown cards should be denied.

Step 6: Mount the servo beside a small latch. Keep the first mechanical version simple and reliable.

Expected Result

Approved card lights green, chirps the buzzer, rotates the servo open, waits, then relocks. Wrong card lights red and stays locked.

Troubleshooting

Problem	What to check
No card detected	Check 3.3V, SDA pin 10, and SPI pins 11/12/13.
Correct card denied	UID string does not match exactly. Copy spacing and capitalization.
RFID fails when servo moves	Servo noise or current draw is disturbing power. Use separate servo power with shared ground.

Arduino Code

```
#include <SPI.h>
#include <MFRC522.h>
#include <Servo.h>
#define SS_PIN 10
#define RST_PIN 9
MFRC522 rfid(SS_PIN, RST_PIN);
Servo lockServo;
String approvedUID = "DE AD BE EF";

void setup() {
  Serial.begin(9600); SPI.begin(); rfid.PCD_Init();
  lockServo.attach(6); lockServo.write(0);
  pinMode(3, OUTPUT); pinMode(4, OUTPUT); pinMode(5, OUTPUT);
}

void loop() {
  if (!rfid.PICC_IsNewCardPresent()) return;
  if (!rfid.PICC_ReadCardSerial()) return;
  String cardUID = "";
  for (byte i=0; i<rfid.uid.size; i++) {
    if (rfid.uid.uidByte[i] < 0x10) cardUID += "0";
    cardUID += String(rfid.uid.uidByte[i], HEX);
    if (i < rfid.uid.size-1) cardUID += " ";
  }
  cardUID.toUpperCase();
  if (cardUID == approvedUID) { digitalWrite(4,HIGH); tone(3,1200,150); lockServo.write(90); delay(3000);
  lockServo.write(0); digitalWrite(4,LOW); }
  else { digitalWrite(5,HIGH); tone(3,300,400); delay(700); digitalWrite(5,LOW); }
  rfid.PICC_HaltA(); rfid.PCD_StopCrypto1();
}
```

Scan the QR code on the package README or visit www.wolfieweb.com/works01.html for the live tutorial page.