Project: Scan & Buzz System

In this project, we will combine the **RFID RC522** and the **Buzzer**. We will create an "Access Control" system where the buzzer provides audible feedback: a short "beep" when a card is successfully scanned.

1. Connections

Connection will require a breadboard as well.

ESP32 Pin	Component Pin	Description
3.3V	**RC522 3.3V**	Power for RFID
3.3V/5V	**Buzzer Middle Pin**	Power for Buzzer
GND	**RC522 GND** **Buzzer (-)**	Common Ground
GPIO 5	**RC522 SDA (SS)**	SPI Slave Select
GPIO 18	**RC522 SCK**	SPI Clock
GPIO 23	**RC522 MOSI**	SPI Master Out
GPIO 19	**RC522 MISO**	SPI Master In
GPIO 22	**RC522 RST**	RFID Reset
GPIO 13	**Buzzer S (Signal)**	Buzzer Trigger

2. Libraries that are needed to be downloaded

You need to install this one library from the Arduino Library Manager.
Go to Tools > Manage Libraries and install:

1. **MFRC522** by GithubCommunity

3. Code

How it works

The ESP32 monitors the SPI bus for a card. When `*rfid.PICC_IsNewCardPresent()*` returns true, the code reads the **p** (Primary Key/UID). Immediately after identifying the card, it triggers `*digitalWrite(buzzerPin, HIGH)*` for 100ms to create a "success" beep.

Steps to connect

1. Connect the pins as shown in the table above.
2. Plug your ESP32 into your computer.
3. Copy-paste the code below in the IDE and click **Upload** (arrow sign at top left).
4. Open the **Serial Monitor** (Baud rate: 115200)

Code

```
#include <SPI.h>
#include <MFRC522.h>

#define SS_PIN  5
#define RST_PIN 22
#define BUZZER_PIN 13

// a = Aim: Sound buzzer when an RFID card is detected
MFRC522 rfid(SS_PIN, RST_PIN);

void setup() {
  Serial.begin(115200);
  SPI.begin();
  rfid.PCD_Init();

  pinMode(BUZZER_PIN, OUTPUT);
  digitalWrite(BUZZER_PIN, LOW); // Ensure silent at start

  Serial.println("System Ready. Scan a card...");
}

void loop() {
  // Look for new cards
  if (!rfid.PICC_IsNewCardPresent() || !rfid.PICC_ReadCardSerial()) {
    return;
  }

  // Card Detected! Beep for 100ms
  digitalWrite(BUZZER_PIN, HIGH);
  delay(100);
  digitalWrite(BUZZER_PIN, LOW);

  // Print UID to Serial
  Serial.print("Card Scanned (p): ");
  for (byte i = 0; i < rfid.uid.size; i++) {
```

```
    Serial.print(rfid.uid.uidByte[i] < 0x10 ? " 0" : " ");
    Serial.print(rfid.uid.uidByte[i], HEX);
  }
  Serial.println();

  // Halt PICC to stop multiple reads of the same card
  rfid.PICC_HaltA();
  rfid.PCD_StopCrypto1();
}
```

4. What to expect

- ✓ When you power on the ESP32, nothing will happen initially.
- ✓ As soon as you bring an RFID card or fob close to the RC522 reader, the buzzer will give a quick, sharp beep.
- ✓ The Serial Monitor will display the UID of the card scanned.
- ✓ This provides instant confirmation that the scan was successful without having to look at a screen.

Note: If you get weird results in the serial monitor, check if the baud rate is set to 115200 and none of the connections are loose.