

EXP.NO.10: INTERFACING SERVO MOTOR WITH ESP8266 TO CONTROL ITS POSITION USING BLYNK

OBJECTIVES:

1. To interface a servo motor with the ESP8266 NodeMCU board.
2. To control the position of the servo motor using the Blynk IoT app.

MATERIALS REQUIRED:

- ☐ ESP8266 NodeMCU board
- ☐ Servo motor
- ☐ Breadboard
- ☐ Jumper wires
- ☐ USB cable
- ☐ Computer with Arduino IDE installed
- ☐ Blynk app installed on a smartphone or tablet

THEORY:

A servo motor is an electromechanical device that can rotate an output shaft to a specific angular position. It consists of a motor, a potentiometer, and a control circuit. By sending a Pulse Width Modulation (PWM) signal to the control wire, we can command the motor to rotate to a desired position.

The ESP8266 NodeMCU board is a low-cost Wi-Fi microchip with full TCP/IP stack and microcontroller capability, designed to provide access to Wi-Fi networks or to act as an access point.

Blynk is a platform with iOS and Android apps to control Arduino, Raspberry Pi, and similar devices over the Internet. It provides a digital dashboard where you can build a graphic interface for your project by simply dragging and dropping widgets.

CIRCUIT DIAGRAM:

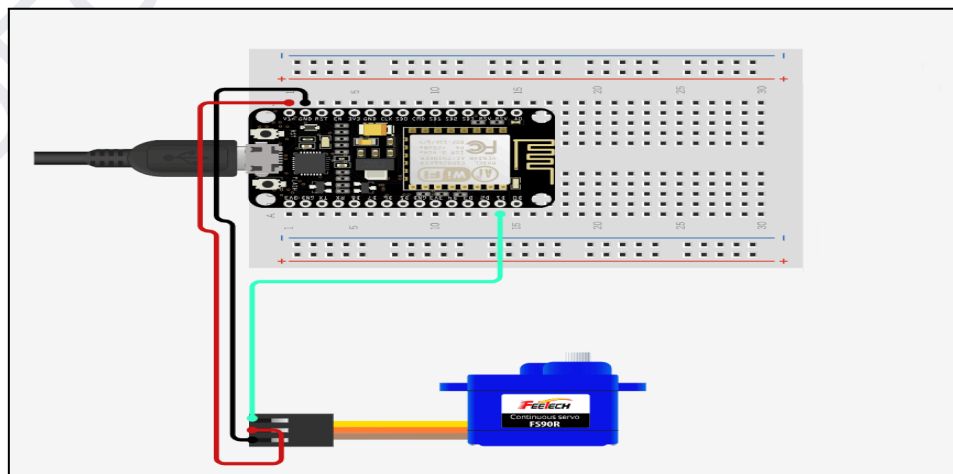


Fig.10.1 Connections between the ESP8266 NodeMCU and the servo motor

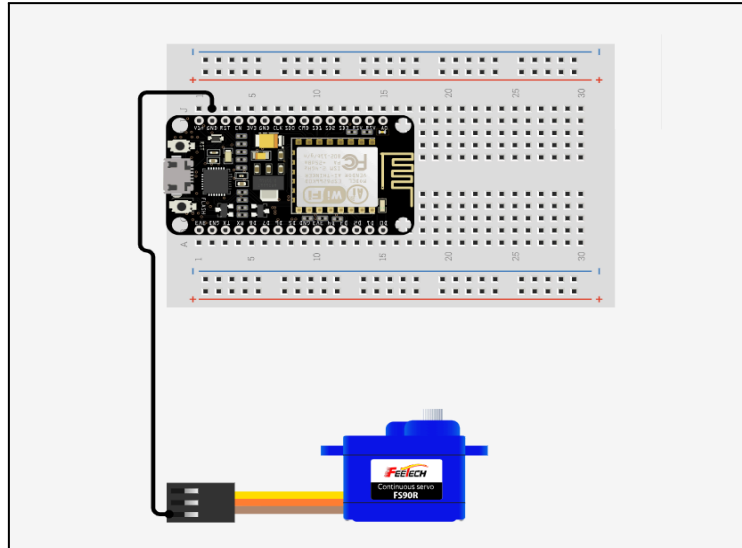
Servo Motor Pin Configuration:

- ☐ V_{CC} : 3.3V
- ☐ GND: GND
- ☐ Control: GPIO D4 on ESP8266

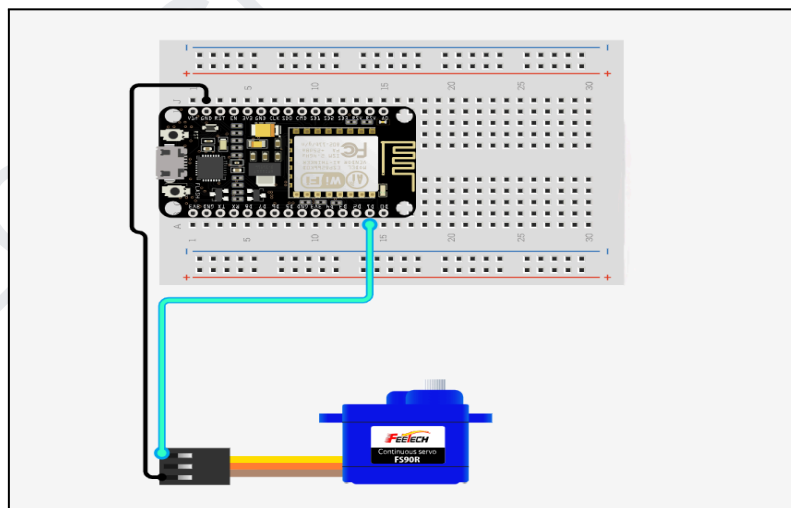
Procedure:

1. Hardware Setup:

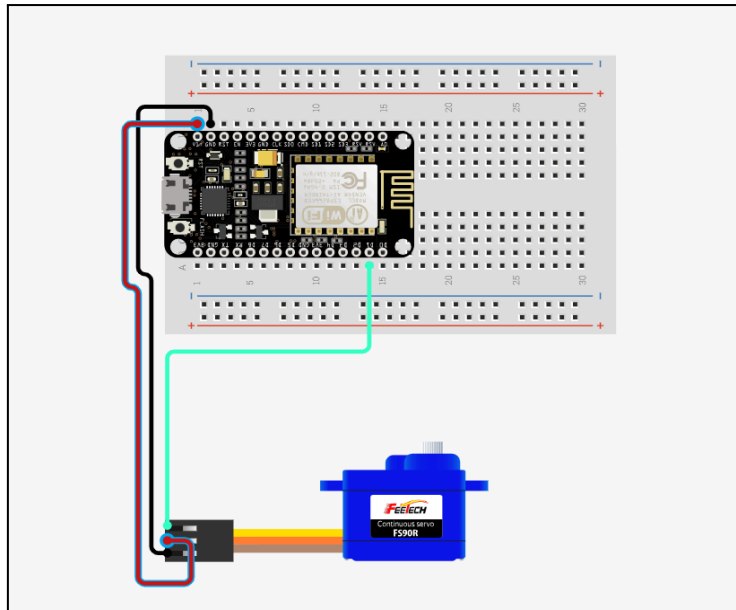
- ☐ Connect the GND pin of the servo motor to a GND pin on the ESP8266.



- ☐ Connect the Control pin of the servo motor to the D2 pin on the ESP8266 using jumper wires.



- ☐ Connect the V_{CC} pin of the servo motor to the 3.3V pin on the ESP8266.



2. Software Setup:

- ☐ Open the Arduino IDE on your computer.
- ☐ Install the necessary libraries: Servo library and any required dependencies.
- ☐ Install the Blynk library by navigating to Sketch -> Include Library -> Manage Libraries and searching for “Blynk”.

3. Blynk App Setup:

- ☐ Open the Blynk app on your smartphone/tablet.
- ☐ Create a new project and note the Auth Token.
- ☐ Add a Slider widget and set it to Virtual Pin V0.

4. Programming:

- ☐ Connect the ESP8266 to your computer using a USB cable.
- ☐ In the Arduino IDE, write the following code:

```
#define BLYNK_TEMPLATE_ID "TMPL3VNzDV1x7"
#define BLYNK_TEMPLATE_NAME "sov"
#define BLYNK_AUTH_TOKEN "jbBGzXAs1CNJZH8zq1L5ljf7EBzqNmYz"
#define BLYNK_PRINT Serial
```

```
#include <ESP8266WiFi.h>
#include <BlynkSimpleEsp8266.h>
#include <Servo.h>
```

```
char ssid[] = "WIFI_NAME";
```

```
char pass[] = "Password";
```

```
Servo myservo;
```

```
int servoPin = D2;
```

```
void setup()
```

```
{  
  Serial.begin(115200);  
  Blynk.begin(BLYNK_AUTH_TOKEN, ssid, pass);  
  myservo.attach(servoPin);  
}
```

```
BLYNK_WRITE(V0)
```

```
{  
  int sliderValue = param.asInt();  
  int servoAngle = map(sliderValue, 0, 100, 0, 180);  
  myservo.write(servoAngle);  
}
```

```
void loop()
```

```
{  
  Blynk.run();  
}
```

- ☐ Replace "YourAuthToken", "YourNetworkName", and "YourPassword" with the actual values.
- ☐ Upload the code to the ESP8266.

5. Running the Experiment:

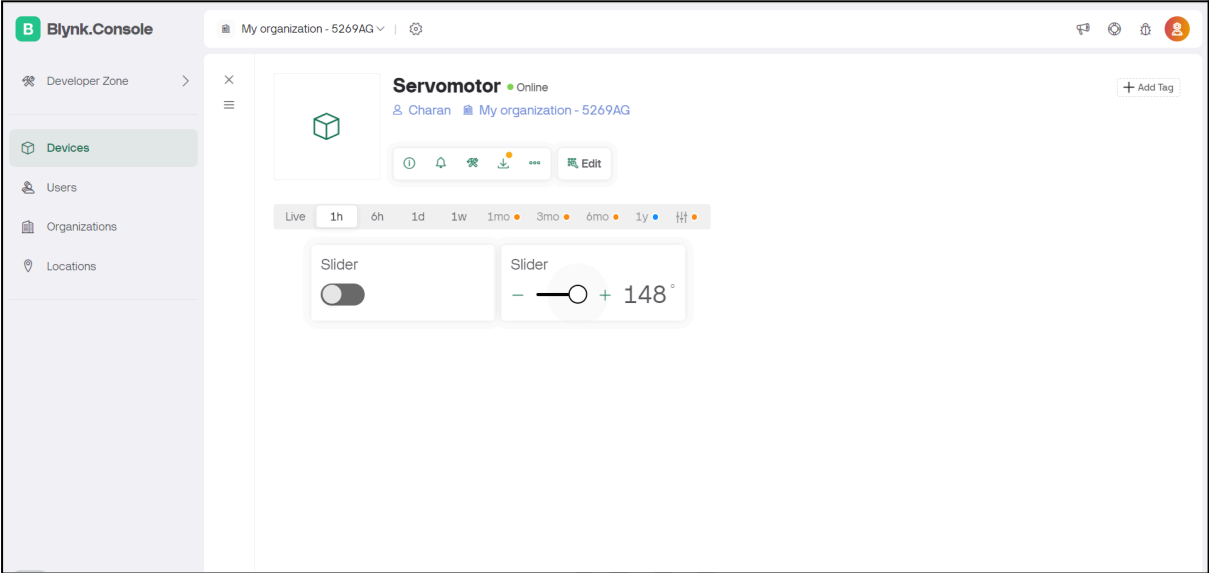
- ☐ Open the Serial Monitor in the Arduino IDE to observe the servo motor movements.
- ☐ Open the Blynk app and use the Slider widget to control the position of the servo motor.

Observations:

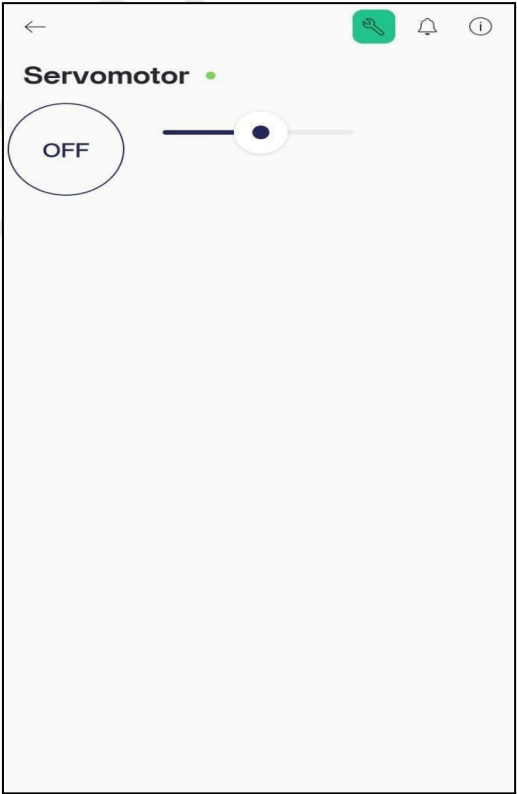
Record the servo motor positions displayed on the Blynk app at different intervals.

S.No.	ANGLE(degree)

Observation in Blynk website:



Observation in Blynk IoT mobile app:



Result:

The position of the servo motor was successfully controlled using the Blynk app.

Conclusion:

This experiment demonstrates how to interface a servo motor with the ESP8266 board and use the Blynk IoT platform to remotely control its position. The successful implementation confirms the practicality of using ESP8266 and Blynk for IoT applications.

Appendix:**A. Symbols, Units, and Abbreviations:**

- ☐ V: Voltage
- ☐ V_{CC} : Voltage Common Collector
- ☐ GND: Ground
- ☐ GPIO: General Purpose Input/Output
- ☐ PWM: Pulse Width Modulation

B. Tools Required:

- ☐ ESP8266 NodeMCU board
- ☐ Servo motor
- ☐ Breadboard
- ☐ Jumper wires
- ☐ USB cable
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- ☐ Blynk app installed on a smartphone or tablet

C. Additional Resources:

- ☐ ESP8266 Documentation
- ☐ Arduino IDE Installation Guide
- ☐ Blynk Documentation
- ☐ Servo Motor Guide

D. Reference link with QR code

https://www.youtube.com/watch?v=A_s2TP5VI00



This format provides a clear and comprehensive guide for conducting the experiment, ensuring students can follow along and achieve the desired outcomes.