

Part 2

lesson

12

**Analog Joystick
Module**

Overview

Analog joysticks are a great way to add some control in your projects.

In this tutorial we will learn how to use the analog joystick module.

Component Required:

- (1) x Elegoo ESP32
- (1) x Joystick module
- (5) x F-M wires (Female to Male DuPont wires)

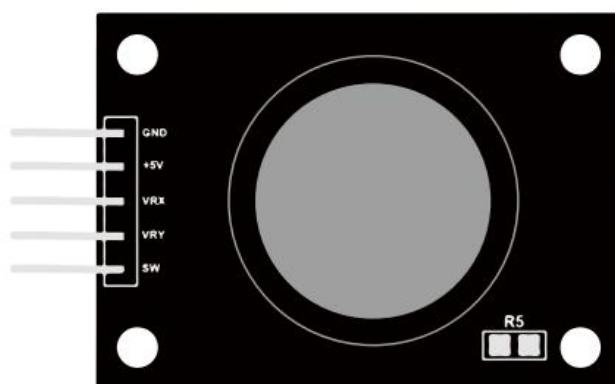


Component Introduction

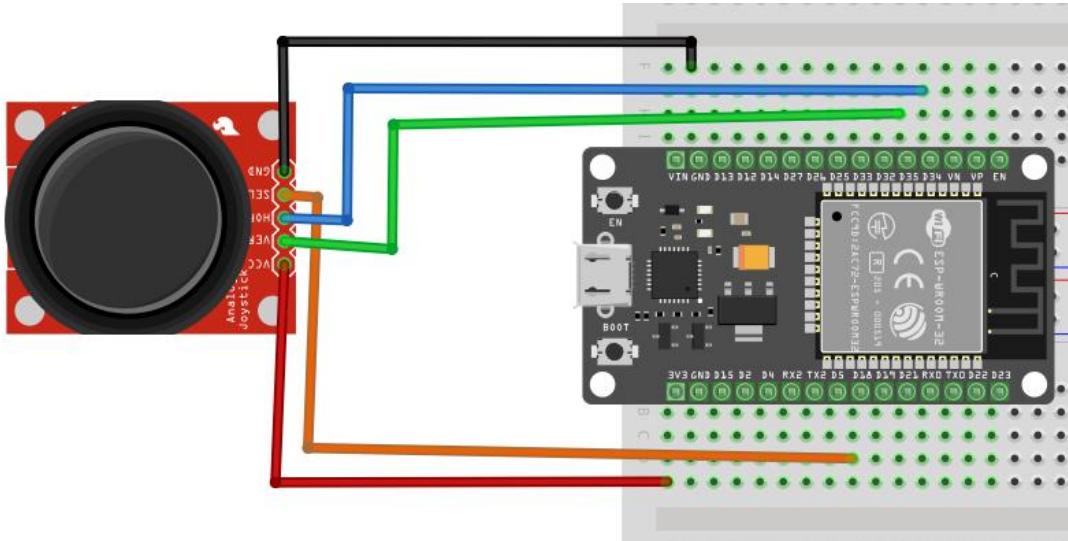
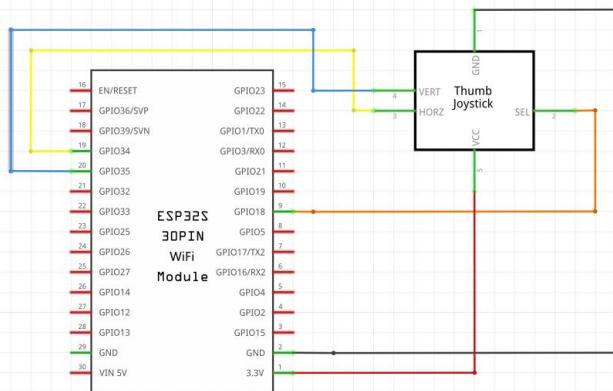
Joystick

The module has 5 pins: VCC, Ground, X, Y, Key. Note that the labels on yours may be slightly different, depending on where you got the module from. The thumb stick is analog and should provide more accurate readings than simple 'directional' joysticks that use some forms of buttons, or mechanical switches. Additionally, you can press the joystick down (rather hard on mine) to activate a 'press to select' push- button.

We have to use analog Arduino pins to read the data from the X/Y pins, and a digital pin to read the button. The Key pin is connected to ground, when the joystick is pressed down, and is floating otherwise. To get stable readings from the Key /Select pin, it needs to be connected to VCC via a pull-up resistor. The built in resistors on the Arduino digital pins can be used. For a tutorial on how to activate the pull-up resistors for Arduino pins, configured as inputs. For example: **pinMode(SW_pin, INPUT);**



Connection Schematic



We need 5 connections to the joystick.

The connections are: Key, Y, X, Voltage and Ground. "Y and X" are Analog and "Key" is Digital. If you don't need the switch then you can use only 4 pins.

Connection Schematic

Code

After wiring, please open the program in the code folder- **Analog_Joystick** and click UPLOAD to upload the program. See Lesson 5 in part 1 for details about program uploading if there are any errors.

Analog joysticks are basically potentiometers so they return analog values.

When the joystick is in the resting position or middle, it should return a value of about 2048.

The range of values goes from 0 to 4095.

Pin Definition: Defines the ESP32 pins connected to the joystick, Pay close attention to the correct pin-to-pin mapping; otherwise, unexpected behavior or confusion may occur.

`digitalRead(SW_pin)`: Reads the digital state of SW_pin (returns HIGH (1) if the joystick button is not pressed, LOW (0) if pressed).

`analogRead(X_pin)`: Reads the analog voltage of X_pin (ESP32 converts the 0-3.3V input to a 12-bit value: 0-4095). This value corresponds to the joystick's horizontal position (e.g., 0 = leftmost, 4095 = rightmost, 2048 = center).

```
const int SW_pin = 18;  
const int X_pin = 34; /  
const int Y_pin = 35; /
```

```
Serial.print(digitalRead(SW_pin));
```

```
Serial.print(analogRead(X_pin));
```

Open the monitor then you can see the data as blow:

Click the Serial Monitor button to turn on the serial monitor. The basics about the serial monitor are introduced in details in part 2 Lesson 4

