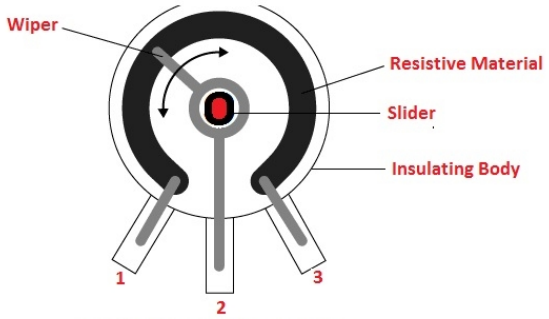
HOW TO CONNECT THE ESP32 UP AS A VOLTMETER

EXCERPT FROM THE MICROPYTHON ONLINE MANUAL

```
from machine import ADC
adc = ADC(pin)        # create an ADC object acting on a pin
val = adc.read_u16()  # read a raw analog value in the range 0-65535
val = adc.read_uv()   # read an analog value in microvolts
```

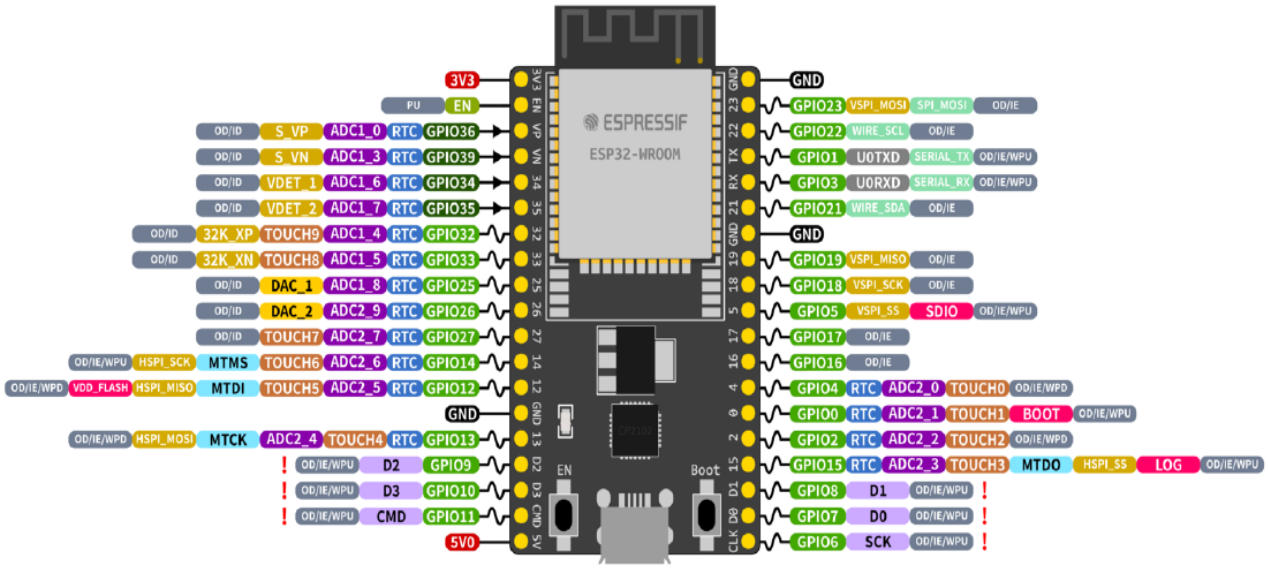
CIRCUIT SETUP USED HERE :

Use pin25
3.3V across pot : Terminal 1 to 3.3V
Terminal 3 to GND
Terminal 2 = Wiper to Pin 25



Terminals in a Variable Resistor
www.CircuitsToday.com

ESP32-DevKitC



ESP32 Specs

MICROPYTHON CODE :

```
import machine
import sys
import utime

# Pin definitions
adc_pin = machine.Pin(25)

# Create an ADC object out of our pin object
adc = machine.ADC(adc_pin)

# 11 dB attenuation means full 0 - 3.3V range
adc.atten(adc.ATTN_11DB)

i = 0
val1 = 3.3

while True:
    # Read ADC and convert to voltage
    val2 = adc.read()
    val2 = val2 * (3.3 / 4095)
    change = 1000 * (val1 - val2)
    percent = (100*change)/(1000 * val2)
    print(i, "  ", round(val2, 6), " V  change = ", round(change, 2), "mV   change = ",
round(percent, 2), " %")
    val1 = val2
    i = i + 1
    # Wait 2 secs before taking another reading
    utime.sleep_ms(2000)
```

Note : If you have trouble halting the program (because you want to make changes to better suit your purposes) then the best tactic is to momentarily press the EN button on the ESP32 (bottom left on diagram) on the ESP32 Dev Kit

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Test Results :

```
1   0.535897  V  change =  0.0 mV    change =  0.0  %
2    0.53348   V  change =  2.42 mV   change =  0.45 %
3   0.534286  V  change = -0.81 mV   change =  -0.15%
4   0.534286  V  change =  0.0 mV    change =  0.0  %
5   0.536703  V  change = -2.42 mV   change =  -0.45%
```

6 0.534286 V change = 2.42 mV change = 0.45 %
7 0.535897 V change = -1.61 mV change = -0.3 %
8 0.535897 V change = 0.0 mV change = 0.0 %
9 0.534286 V change = 1.61 mV change = 0.3 %
10 0.53348 V change = 0.81 mV change = 0.15 %
11 0.534286 V change = -0.81 mV change = -0.15%
12 0.534286 V change = 0.0 mV change = 0.0 %
13 0.53348 V change = 0.81 mV change = 0.15 %
14 0.53348 V change = 0.0 mV change = 0.0 %
15 0.535897 V change = -2.42 mV change = -0.45%
16 0.535897 V change = 0.0 mV change = 0.0 %
17 0.536703 V change = -0.81 mV change = -0.15%
18 0.535092 V change = 1.61 mV change = 0.3 %
19 0.534286 V change = 0.81 mV change = 0.15 %
20 0.536703 V change = -2.42 mV change = -0.45%
21 0.536703 V change = 0.0 mV change = 0.0 %
22 0.53348 V change = 3.22 mV change = 0.6 %
23 0.534286 V change = -0.81 mV change = -0.15%
24 0.537509 V change = -3.22 mV change = -0.6 %
25 0.53348 V change = 4.03 mV change = 0.76 %
26 0.535897 V change = -2.42 mV change = -0.45%

Mean Voltage = 0.534
SD of the measured voltages = 1.3 mV
CV% of the measured voltages = 0.24%

Sources of the variability were not ascertained but are probably a combination of noise within the ADC plus the pickup of mains 'hum' by the unshielded wiring of the circuit.

Tom Hartley : April 2023