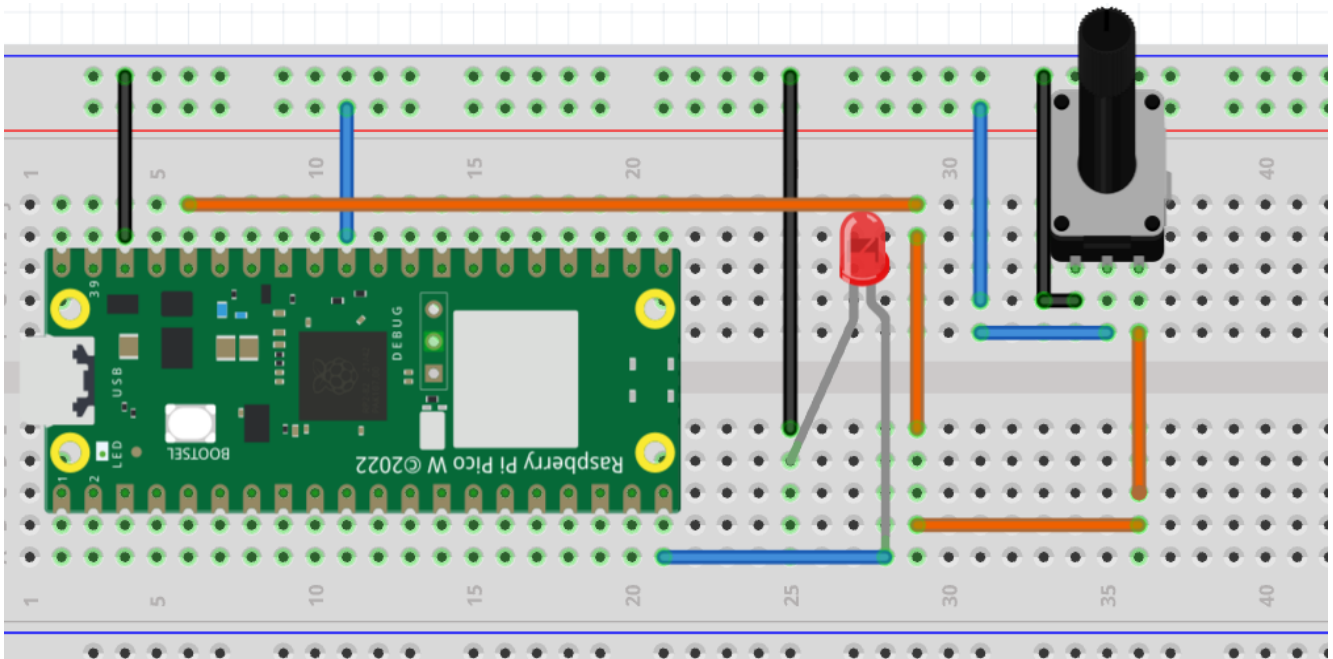


LESSON 6

Control LED Brightness with a Potentiometer

Raspberry Pi Pico W - Student Guide



Lesson Objective

Learn how to use a potentiometer to control the brightness of an external LED connected to the Raspberry Pi Pico W.

How the system works

Turn the potentiometer



Pico W reads the value from GP26



LED on GP15 becomes dimmer or brighter

Pin Numbers and Connections

Use the following pins when building the circuit.

Component	Pico GPIO	Physical Pin	Purpose
LED	GP15	Pin 20	Output pin that controls the LED brightness
Potentiometer	GP26	Pin 31	Analogue input signal from the potentiometer
3.3V Power	3V3(OUT)	Pin 36	Supplies power to the potentiometer
Ground	GND	Pin 18, 23, 28, 33, or 38	Completes the circuit

Connection Steps

1. Connect the LED signal leg to GP15 (Pin 20).
2. Connect the LED ground leg to a GND pin.
3. Connect the potentiometer centre pin (output/wiper) to GP26 (Pin 31).
4. Connect one outer potentiometer pin to 3V3(OUT) (Pin 36).
5. Connect the other outer potentiometer pin to a GND pin.

Important

Use a resistor in series with the LED to protect it from excessive current.

Python Code

File name: lesson6.py

```
from picozero import LED, Pot

led = LED(15)
pot = Pot(26)

while True:
    led.value = pot.value
```

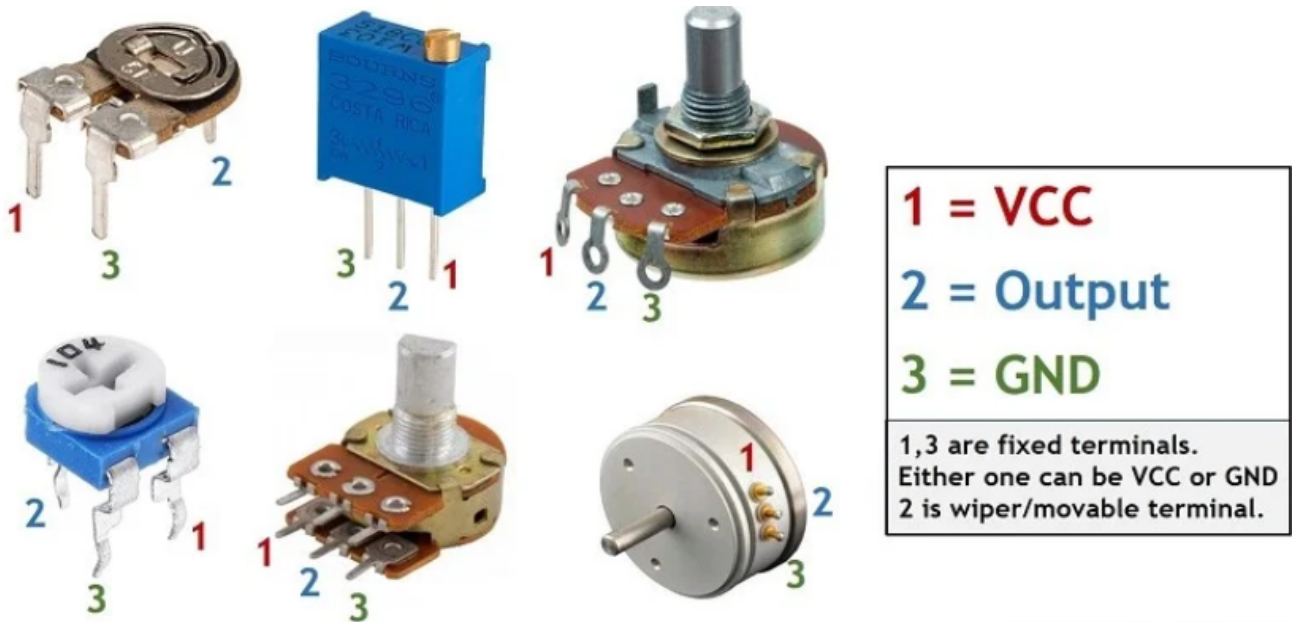
Understanding the Code

Code	Meaning
<code>from picozero import LED, Pot</code>	Imports the LED and potentiometer tools from PicoZero.
<code>led = LED(15)</code>	Creates the LED on GP15.
<code>pot = Pot(26)</code>	Creates the potentiometer input on GP26.
<code>while True:</code>	Repeats the instruction continuously.
<code>led.value = pot.value</code>	Copies the potentiometer value to the LED brightness.

Brightness values

0 = off or very dim
0.5 = medium brightness
1 = full brightness

About the Potentiometer



What is a potentiometer?

A potentiometer is a variable resistor with a turning knob or adjustment screw. Turning it changes the output value sent to the Raspberry Pi Pico W.

The three terminals

Terminal	Name	Connection
1	VCC	Connect to 3V3(OUT), Pin 36
2	Output / Wiper	Connect to GP26, Pin 31
3	GND	Connect to a GND pin

The two outer terminals are fixed terminals. The centre terminal is the movable wiper. The outer terminals may be swapped; this only reverses the direction used to make the LED brighter or dimmer.