1001-act8 Introduction to Electronics

Activity	Use a Variable Resistor to Control the Brightness of an LED
Student Guide	Use a Variable Resistor to Control the Brightness of an LED: Student Guide tmt3Nngf
Teacher Guide	Use a Variable Resistor to Control the Brightness of an LED: Teacher Guide tmt3Nnge
Summary	For this activity we will add one of the variable resistors to the circuit from activity 6 so the brightness of the LED is controlled using a variable resistor. This introduces the idea of a resistor whose value changes in response to a physical action, in this case turning a shaft.
Principals Covered	- Current flows through wires like water in a hose - Resistance controls the current in a circuit - Varying the resistance changes the current and hence the power - This changes the amount of voltage the LED gets and hence its brightness
Learning Outcomes	- Know that a variable resistor is a resistor whose value is changed by turning a knob - Changing the resistance controls the brightness of the LED - Turning the resistor clockwise increases the resistance and decreases the brightness of the LED. Turning it anticlockwise has the opposite effect - Learn how changes in resistance affect current
Achievement Standards	
Equipment	Each student will need: 1 x JackBord 1 x JackBord TOP 10 x 10cm jumper wires
Preparation	Check the JackBords are charged
Instructions	***Building the Circuit:*** **1. Draw the Circuit Diagram as shown below:** Draw a simple LED circuit with a 3V power supply, 1K resistor and an LED. We will refer to this later.
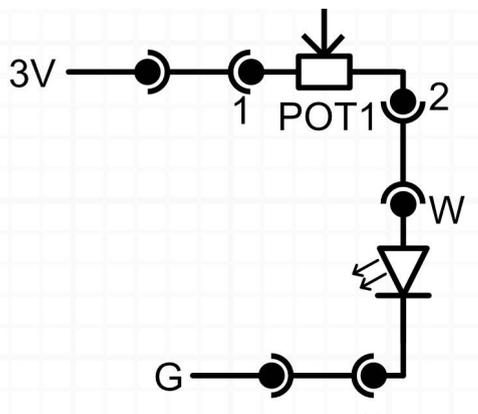
2. Issue JackBords & TOPs:
Issue the following to each student:

- 1 x JackBord
- 1 x JackBord TOP
- 10 x 10cm jumper wires

3. Attach the TOPs to the JackBords
Follow the instructions from activity 1001-act5 and connect the TOP to the JackBord so it can get power from the JackBord.

4. Connect the 3V Power Jumper to Pin 1 of POT1
Take a yellow jumper, any other color will also work but yellow is a good choice as it is the 3V power supply for your circuit. Connect one end to the 3V power supply pins on the TOP and the other end to pin 1 of the POT1 variable resistor as shown in the picture below.
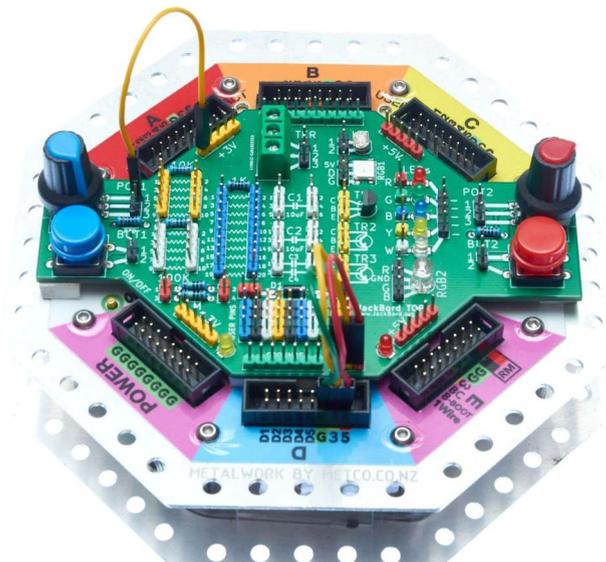

5. Connect a Jumper from the Pin 2 of PORT 1 to an LED
Next connect a jumper from pin 2 of POT1 to an LED, choose your favorite color, in our case we chose the white LED.
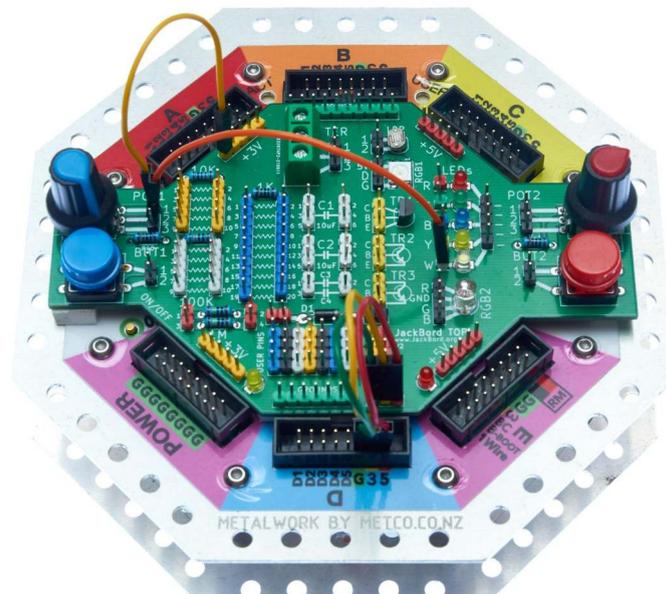
6. Connect a jumper from the LEDs negative pin to Ground

Now we need to connect the negative pin of the LED, which is on the right hand side and has a - sign next to it, to ground on the TOP. In the example below we chose the white LED so we need to use the bottom of the negative LED pins.
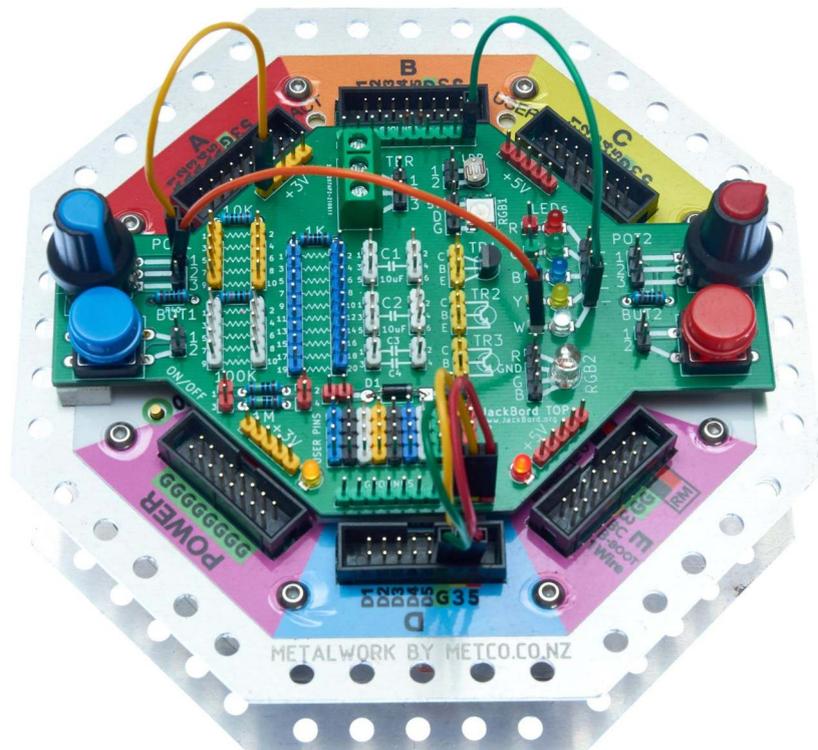
Connect the ground line as shown below.
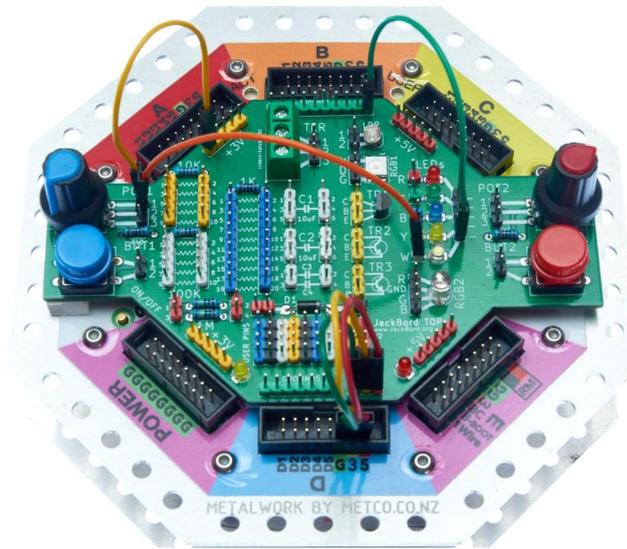
7. Check your Connections

Check your connections against the picture in step 6.

8. Turn on the JackBord

Now we are ready to test the circuit. We need to supply it with power and we will do so by turning on the JackBord. To turn on the JackBord press the power button on the left. If all is well your chosen LED should light up, as the white one does below. Turning the variable resistors knob will change the brightness of the LED.

	9. Have the Students Draw the Circuit Have the students draw the circuit diagram, from step 1, into their notebooks.
Notes	
Extension	● Add a second LED to the circuit and control its brightness using the second variable resistor ● See if you can add a push button switch to your circuit so you can turn it on and off which changing its brightness