

Dimmable LED

Picobricks

Beginner

15 Mins

1 Overview

In this tutorial we're going to use the RGB LED and the potentiometer on the PicoBricks board to make a dimmable lighting system.



What you'll learn

- How to control the RGB LED using the potentiometer.

2 What you'll need



What you'll need

- PicoBricks
- Raspberry Pi Pico
- USB to MicroUSB cable

3 What you'll need

Key words

Potentiometer

A potentiometer is a knob or dial that controls how much electricity flows through a circuit. Think of it like a tap for water: turn it one way and more comes out, turn it the other way and less comes out.

A volume dial on a speaker is a potentiometer, turn it up for louder sound and down for quieter.

RGB LED

An RGB LED is a tiny light that can glow in any colour you like. It mixes red, green and blue light in different amounts, a bit like mixing paints, to make all sorts of colours.

Like the colour-changing lights some people put behind their TV, an RGB LED can shift from red to green to blue and everything in between.

Variable

A variable is something that can change. Think of it like a labelled box: you pop something inside, and the label tells you what it is. You can swap what's inside whenever you like.

A variable called score might start at 0, then change to 1, 2 and 3 as you collect points in a game.

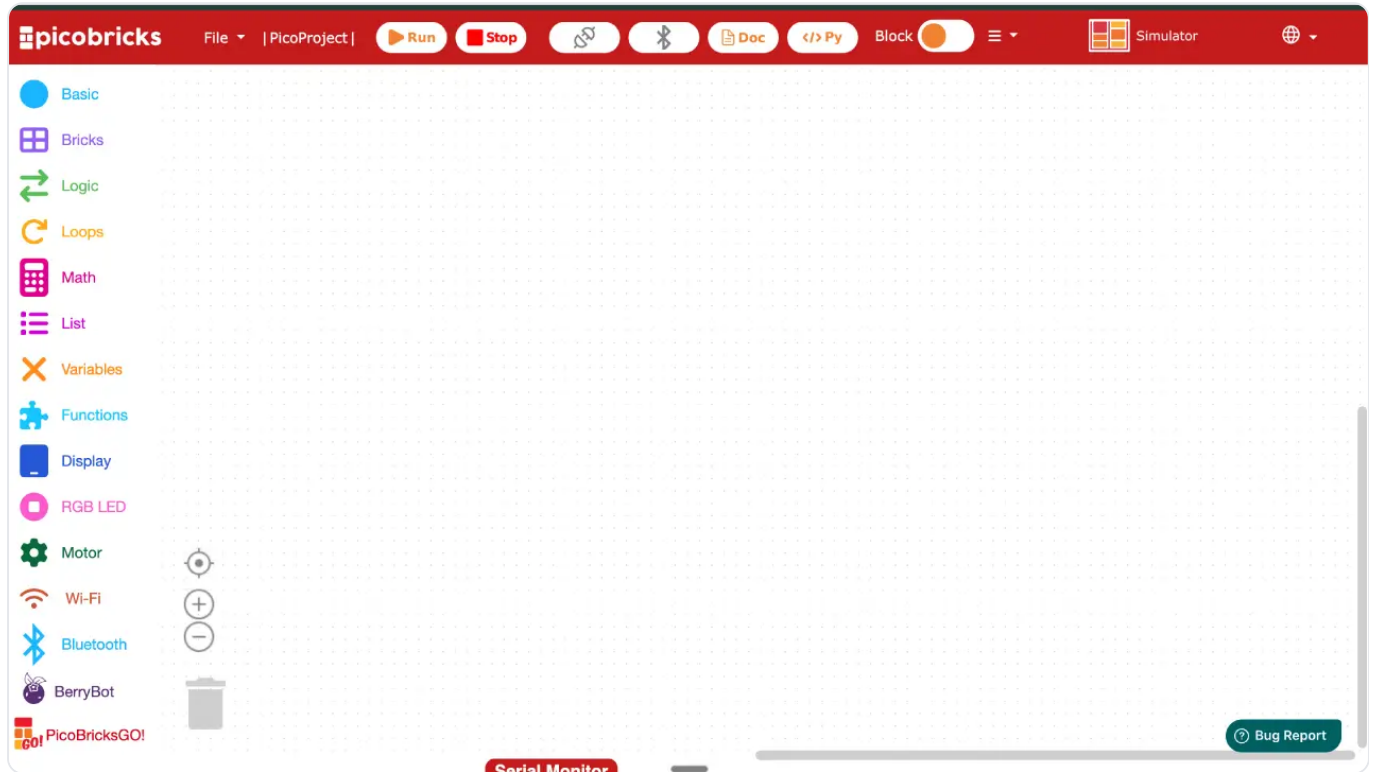
Forever loop

A forever loop repeats its instructions again and again without ever stopping (until you switch off or reset). It's perfect for anything you want to keep happening over and over.

Like a clock's second hand that keeps ticking round and round, a forever loop keeps running the same steps over and over.

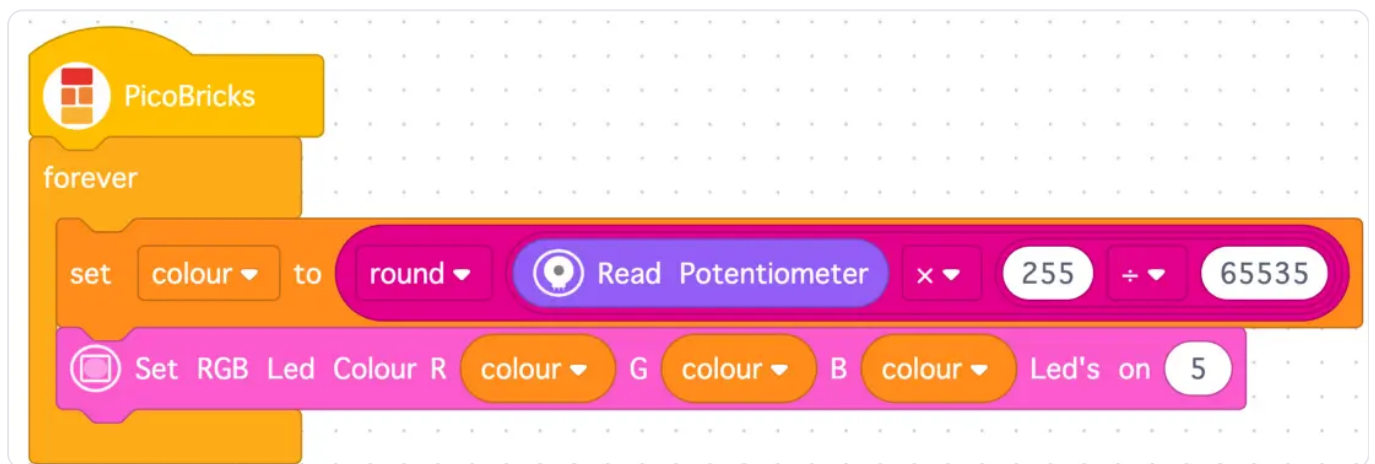
4 Set up your PicoBricks

1. Connect the PicoBricks board to your computer using the USB cable.
2. Open your favourite web browser (we recommend Google Chrome or Microsoft Edge), go to ide.picobricks.com and select **PicoBlockly**.
3. Connect the board to the coding environment by selecting the **connect** button at the top of the code area.



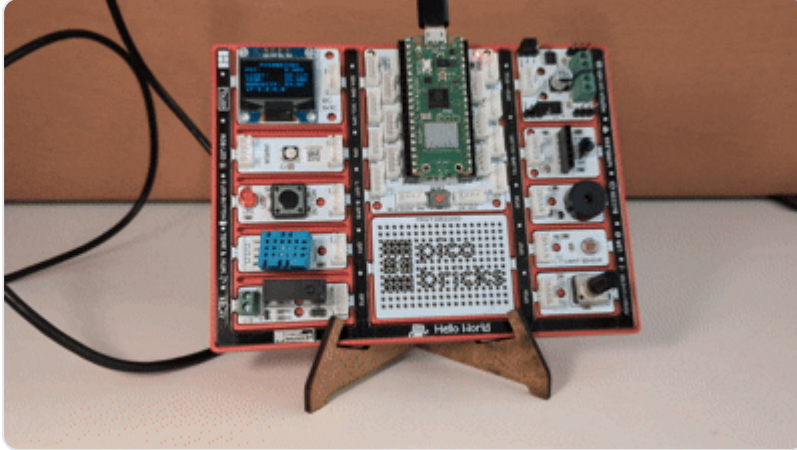
5 Build the code

1. Select **Basic**. Drag a **PicoBricks** block into the code area.
2. Select **Loops**. Snap a **forever** block onto the **PicoBricks** block.
3. Select **Variables**. Select **Create variable** and type **Colour**. Snap a **set Colour to** block inside the forever block.
4. Select **Math**. Snap a **round** block onto the **set Colour to** block.
5. Select **Math**. Snap a **1 + 1** block onto the **round** block, then change the **+** to a **x**.
6. Select **Bricks**. Snap a **Read Potentiometer** block onto the **round** block, before the **x** sign.
7. Select **Math**. Snap another **1 + 1** block onto the **round** block, after the **x**. Change the first **1** to **255**, the **+** to **÷** and the remaining **1** to **65535**.
8. Select **RGB LED**. Snap a **Set RGB Led Colour R 255 G 255 B 255** block under the **set Colour to** block.
9. Select **Variables**. Snap a **Colour** block into the **R** value of the **Set RGB Led Colour** block.
10. Do the same as **step 9** for the **G** and **B** values.



6 Run it and Watch

Now the code's finished, let's test it. Select the **Run** button at the top of the code area. Turn the potentiometer to see the LED get brighter or dimmer, right down until it goes out, depending on which way you turn it.



7 Try it yourself

Try it yourself

Challenge: Can you make your dial control just one colour? Try setting the **G** and **B** values to `0` and leave only the **R** value linked to the potentiometer, so your knob fades a red glow from bright to off. Then have a go at swapping it to just green, or just blue. What happens if you mix two colours together?

8 Stuck? Quick fixes

Problem	Try this
The LED doesn't light up at all	Check PicoBricks is connected using the connect button at the top of the code area, then press Run again.
The brightness doesn't change when you turn the dial	Check your `Read Potentiometer` block is inside the `round` block, just before the x , and that the maths reads ` $x \ 255 \div 65535$ `.
The colour looks wrong or flickers	Make sure the same `Colour` variable is dropped into all three slots (R , G and B).
PicoBricks won't connect	Try a different USB cable or port, check you picked PicoBlockly , and press the connect button again.