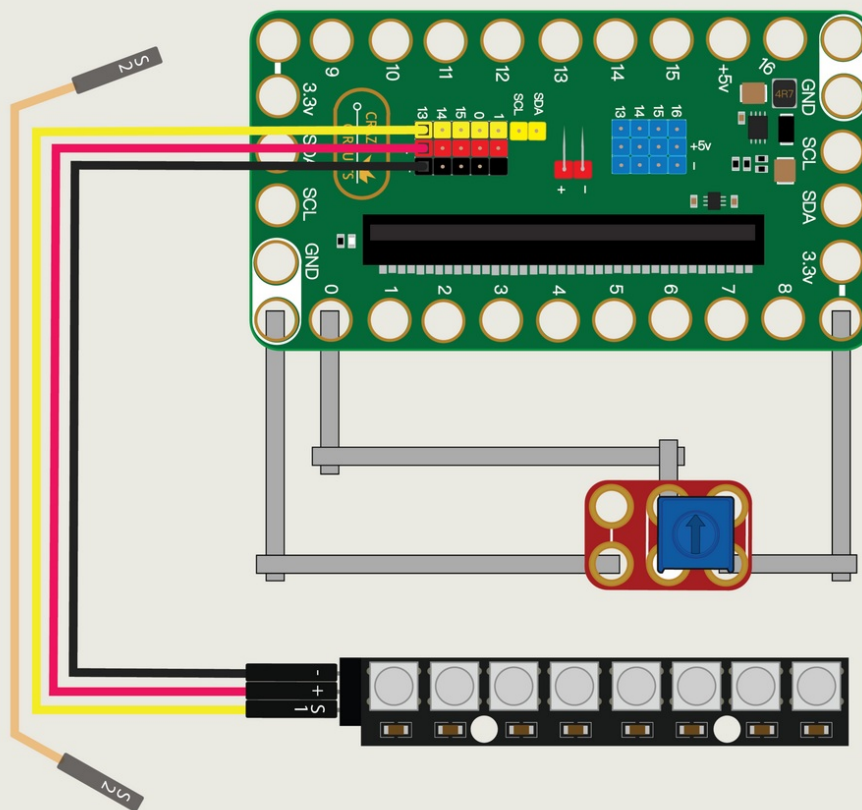




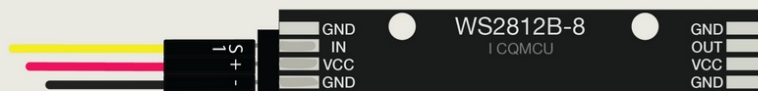
CH23-D - NeoPixel Rainbow Steps

Connect a NeoPixel Stick and a Potentiometer to a Bit Board and control them with code.

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Back of NeoPixel Strip



INTRODUCTION

Connect a NeoPixel Stick and a Potentiometer to a Bit Board and control them with code.

We'll explore how to control an Addressable RGB LED Strip (also called "NeoPixels").



TOOLS:

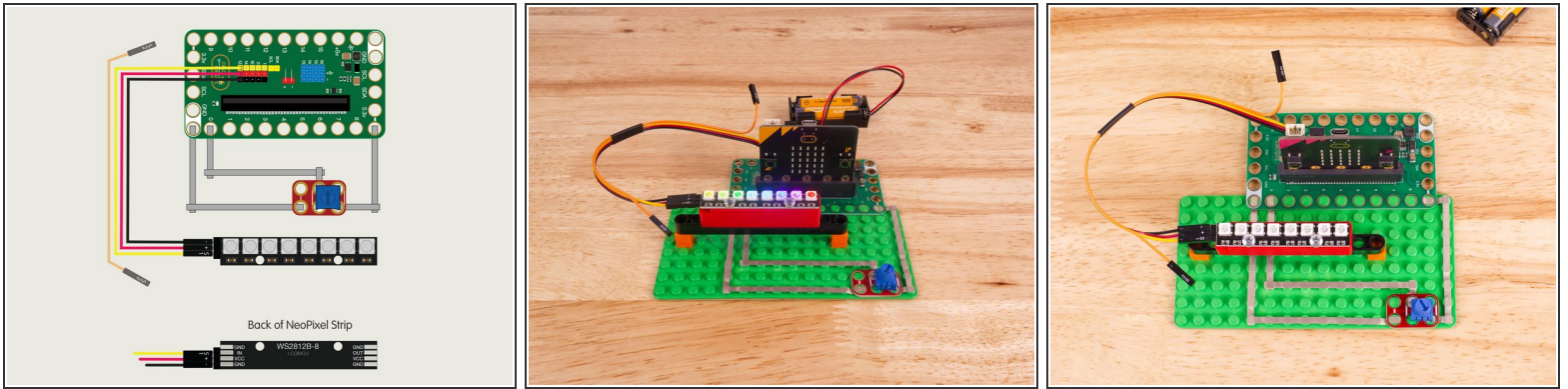
- [Computer](#) (1)
- [Scissors](#) (1)



PARTS:

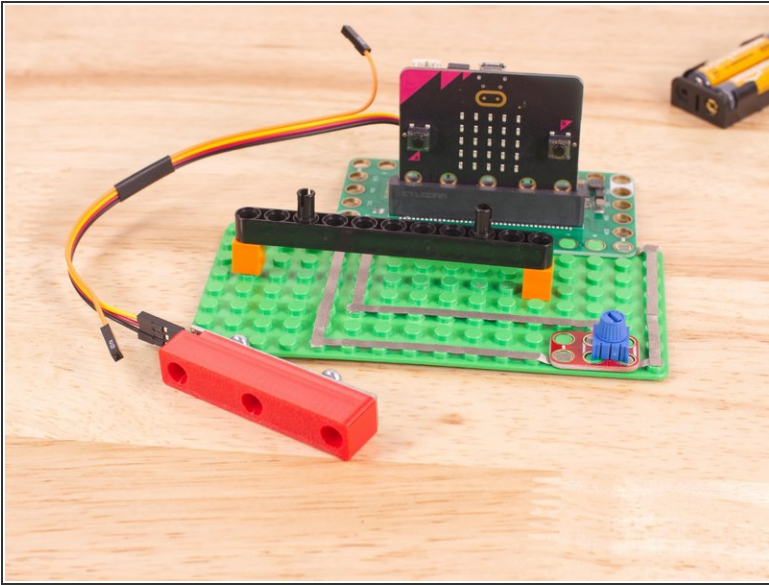
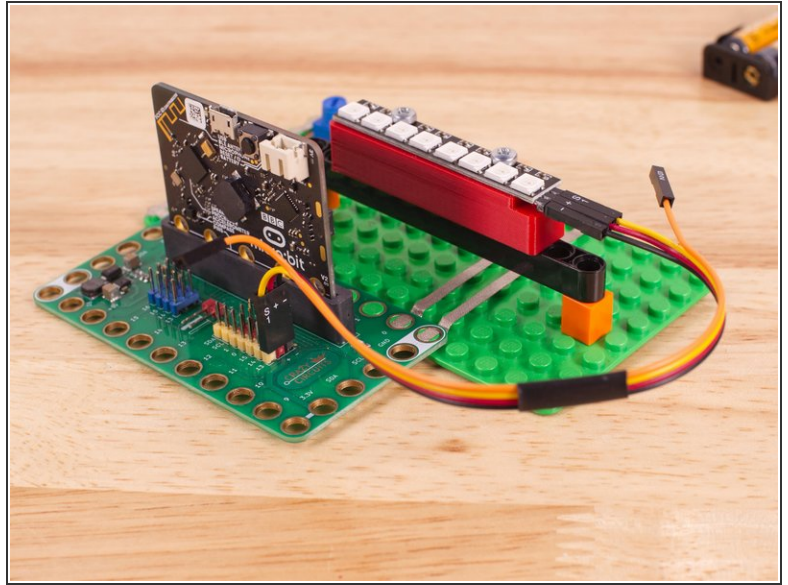
- [Crazy Circuits Bit Board](#) (1)
 - [micro:bit](#) (1)
 - [Addressable RGB LED Strip](#) (1)
 - [Crazy Circuits Potentiometer Chip](#) (1)
 - [Crazy Circuits Ribbon Cable](#) (1)
 - [Maker Tape](#) (1)
- 1/8" Wide

Step 1 — Connect the NeoPixel Stick and Potentiometer



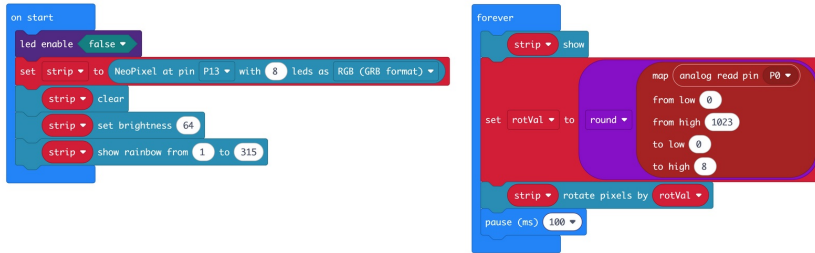
- The magical thing about these “Individually Addressable” LEDs is that you don’t have to connect each LED to an individual pin on your micro:bit, you just need **one signal wire** along with power (**Positive** and **Negative**) to light things up.
- So let's get connected! If you turn the **NeoPixel Strip** over you'll see labels for the three pins. You should see **IN**, **VCC**, and **GND**.
- Use the [Crazy Circuits Ribbon Cable](#) to connect the **NeoPixel Strip** to the **Bit Board**.
- The end with **S1**, **+**, and **-** can plug directly into the **Pin 13** row (make sure S1 goes into 13) and the other end should plug into the **NeoPixel Strip** as shown.
- ☑ We only need three wires for the **NeoPixel Strip** so you can leave **S2** (the Orange wire) unconnected.
- We'll also connect a potentiometer using Maker Tape. Connect it to **GND**, **Pin 0**, and **3V**. (The center hole connects to **Pin 0**.)

Step 2 — Mount the NeoPixel Stick



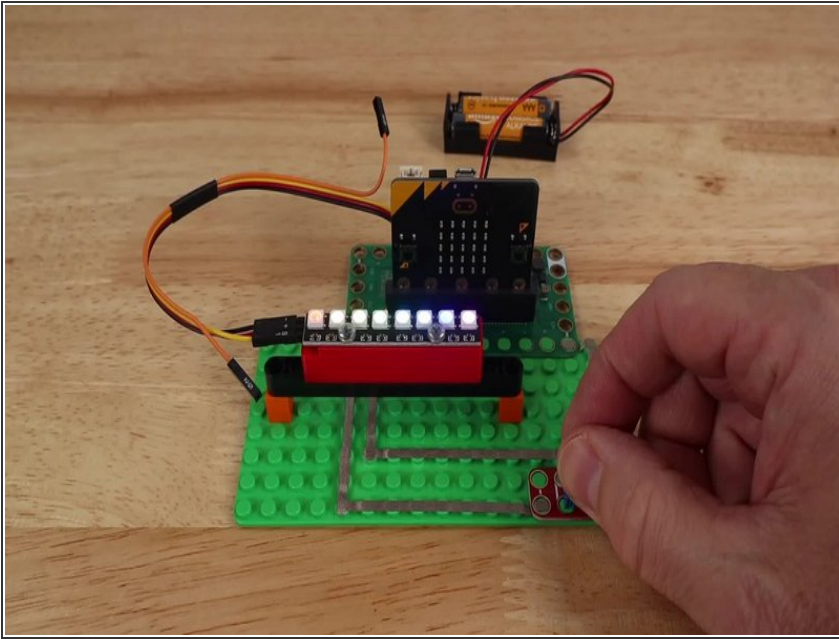
- To mount the NeoPixel Stick in place we used our [NeoPixel Beam Holder](#) with a long Technic Beam and two 1x1 LEGO bricks.
- You can always use rubber bands, tape, or some other method.
- The important thing is to make sure the connector is on the left hand side so the number index for the NeoPixel strip makes sense.

Step 3 — Load the Code



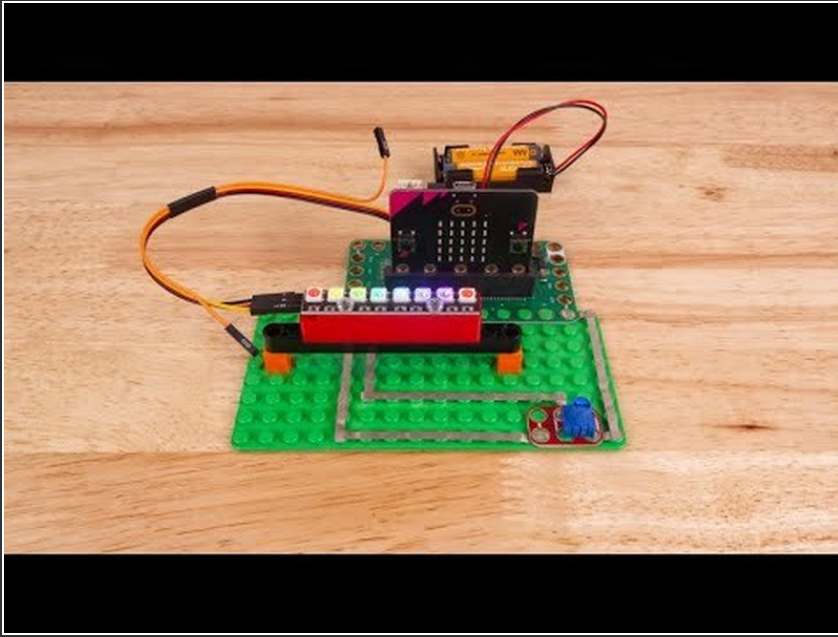
- If you've never used a micro:bit before you'll want to check out this guide: [Bit Board V2 Setup and Use](#)
- We're going to load the following code for our **NeoPixel Rainbow Steps** program:
https://makecode.microbit.org/_PXP3pzcscd...
- We'll once again map the input from the potentiometer to a smaller scale. While the input will be from **0 to 1023** our output will be from **0 to 8**. This effectively turns the potentiometer into a multi-position switch.
- We will rotate the lit up pixels (using the show rainbow function) anywhere from 0 to 8 steps.

Step 4 — Test it Out!



- Once the code is loaded it should start running immediately.
- ❗ You can power the micro:bit via the USB cable you used to load the code or you can use a battery pack plugged into the Bit Board.
- With the potentiometer turned all the way anti-clockwise you'll see that the pixels do not move.
- If you rotate the potentiometer all the way clockwise it will also appear that the pixels are not moving... But! They are moving, just 8 steps at a time, which means they appear to *not* be moving.
- With the potentiometer all the way anti-clockwise start to turn the potentiometer slowly in the clockwise direction and you'll see the pixels move. First one step, then two, then three, etc...
- When you get past the halfway point on the potentiometer the pixels may *appear* to start moving backwards, but they are not!
- ★ If the pixels appear to be moving backwards what we are seeing is sometimes call the [Wagon-wheel effect](#) which is usually related to film frames and rotating objects.

Step 5 — Follow Along



- Follow along with our recorded Live Stream!
- ① You can watch the full video of us walking through this project, along with explaining and exploring the code:
<https://www.youtube.com/live/-2ECPBjKX1Q>