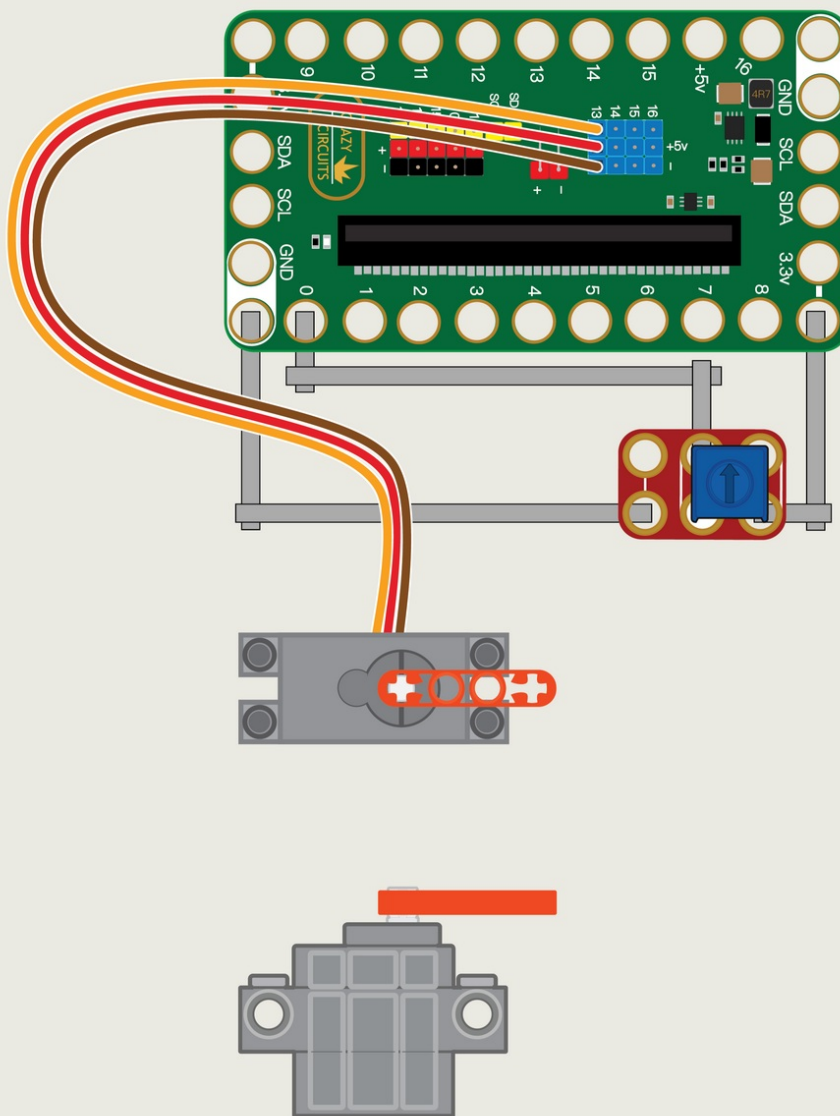




CH26-D - Servo Potentiometer Step

Connect a 270° Servo to a Bit Board and control it with a Potentiometer and code.

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INTRODUCTION

Connect a 270° Servo to a Bit Board and control it with a Potentiometer and code.

We'll explore using a potentiometer (and some code) to control the movement of a servo motor.



TOOLS:

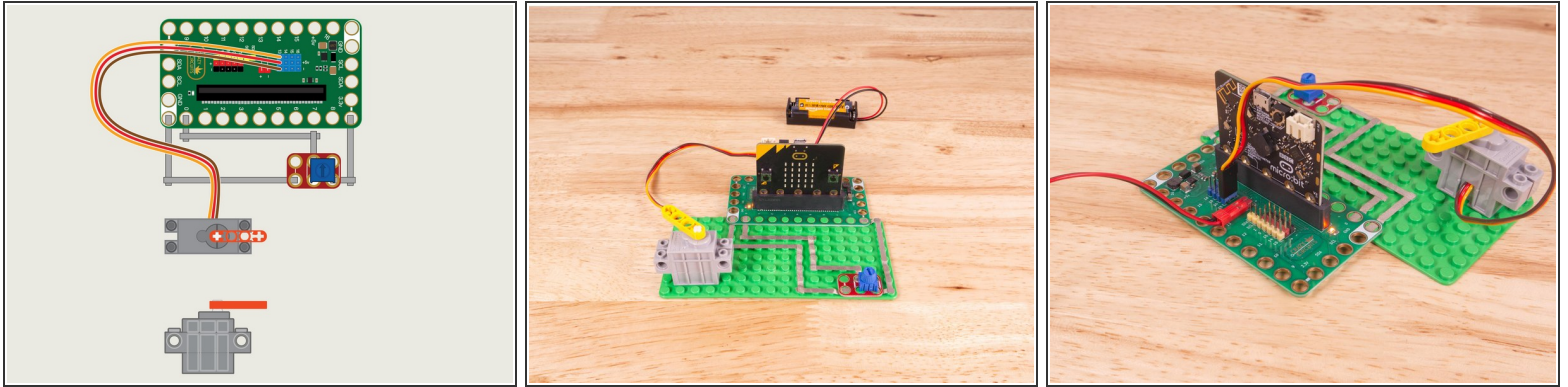
- [Computer](#) (1)
- [Scissors](#) (1)



PARTS:

- [Crazy Circuits Bit Board](#) (1)
 - [micro:bit](#) (1)
 - [Brick Compatible 270 Degree Servo](#) (1)
 - [Crazy Circuits Potentiometer Chip](#) (1)
 - [Maker Tape](#) (1)
- 1/8" Wide

Step 1 — Connect the 270° Servo and Potentiometer



- The **270 Degree Servo Motor** has a 3-wire connector on the end that can plug directly into the pins on the back of the Bit Board.
- Make sure the **Orange Wire** is closest to the number **13** for the **Pin 13** column.
- Then the **Brown Wire** should be closest to the micro:bit (in the - row) and the **Red Wire** will be in the middle (the **+5v** row).
- We'll need to connect one side of the Potentiometer to **Ground** (GND) and the other side to **3.3v**
- We will then connect the center of the Potentiometer to **Pin 0**. (Note that **Pin 0** is an **analog** pin, which we'll need for the Potentiometer.)
 - The other analog pins are **1, 2, 3, 4, and 10**. See this chart for a pinout diagram: <https://makecode.microbit.org/device/pin...>
- ☑ You'll notice the **Ground** on the Bit Board is color coded **White**.
- ☑ The **3.3v** hole on the Bit Board is labeled and is actually two holes right next to each other on the Bit Board. (There is a small line showing the connection between them.)

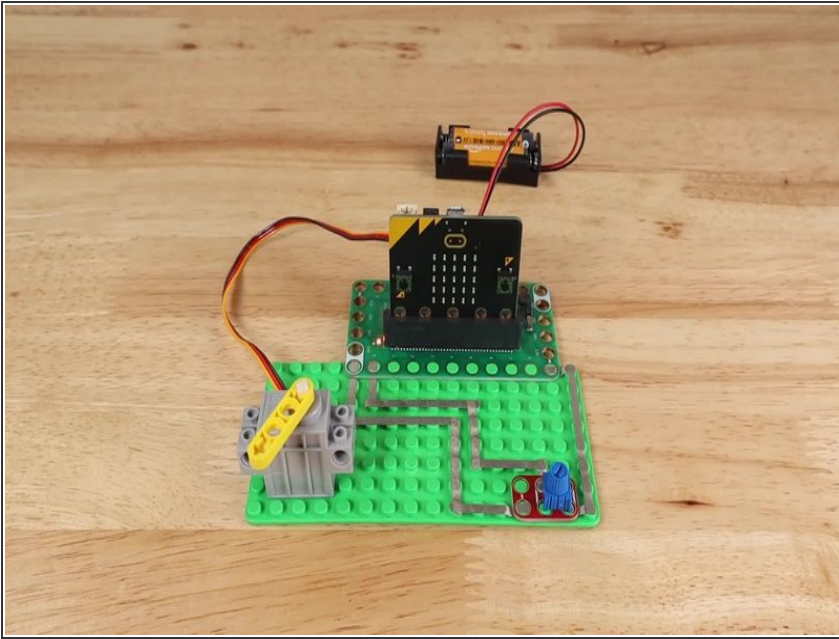
Step 2 — Load the Code

```

forever
  set potVal to analog read pin (analog pin P0)
  if potVal >= 0 and potVal <= 255 then
    servo write pin P13 to 180
  else if potVal >= 256 and potVal <= 512 then
    servo write pin P13 to 120
  else if potVal >= 513 and potVal <= 768 then
    servo write pin P13 to 60
  else if potVal >= 769 then
    servo write pin P13 to 0
  
```

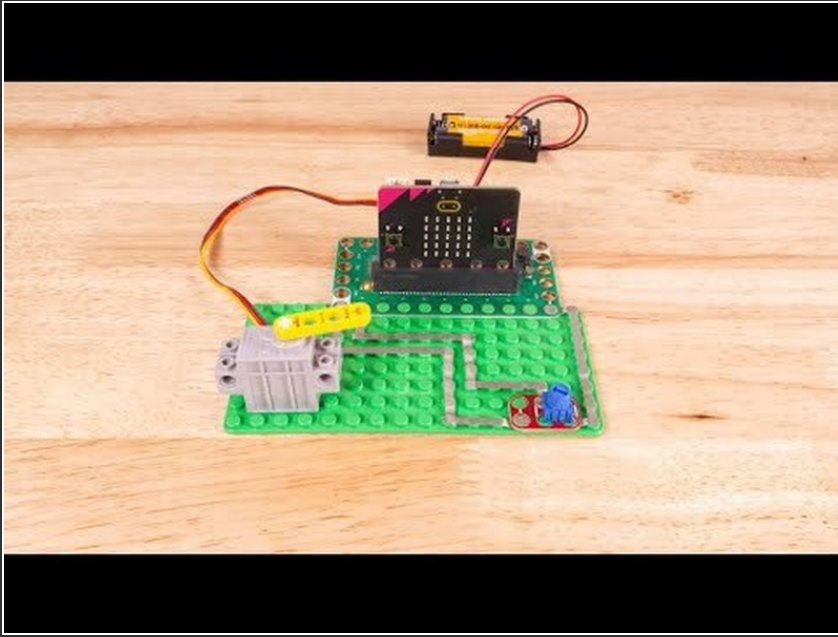
- If you've never used a micro:bit before you'll want to check out this guide: [Bit Board V2 Setup and Use](#)
 - We're going to load the following code for our **Servo Potentiometer Step** program: https://makecode.microbit.org/_CgYJieX9Y...
 - Our Potentiometer will function like a **four-position rotary switch**.
 - The code will check the value of the Potentiometer and determine what angle to set the Servo based on the `potVal` variable.
- ① Where does the 60 come from? If we divide 180 by 4 we get 45... but we need to **divide 180 by 3** because we also need the 0 (zero) position, so **180 / 3 = 60**.
- ① We do (almost) the same thing with the Potentiometer value, though the math gets tricky because 0 to 1023 is 1024 values, so when we count the first 256 values we use 0 to 255. *(Math gets weird when you include zero)*

Step 3 — Test it Out!



- Once the code is loaded it should start running immediately.
- ① You can power the micro:bit via the USB cable you used to load the code, but now that we are using servos we recommend using a battery pack plugged into the Bit Board.
- ★ The [Blue Pins](#) on the Bit Board provide extra power (5 volts instead of 3 volts) by **boosting the voltage** coming from the battery pack. This helps improve servo performance, especially with multiple servos.
- Turn the Potentiometer dial to move the Servo to one of four different positions/angles.

Step 4 — 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://youtube.com/live/7ulebPcKk2A>