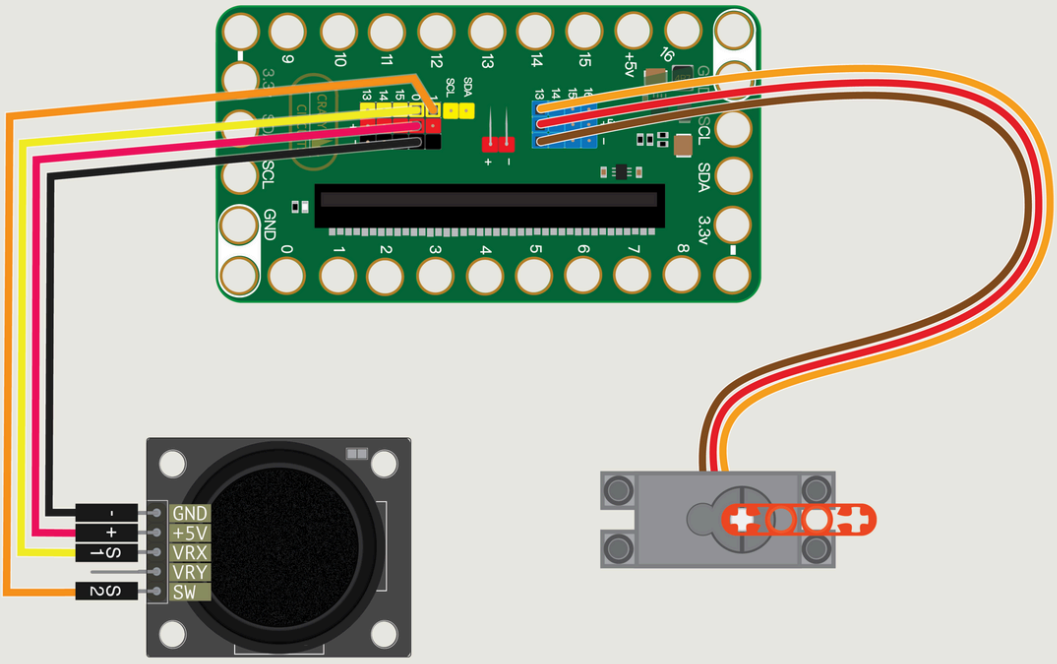
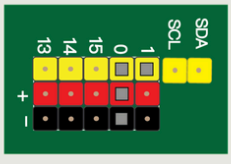
CH44-B - Thumbstick 270 Servo Sweep Half

Connect a Thumbstick to a Bit Board and use it to control a 270˚ Servo.

Written By: Pete Prodoehl



TSTK	Bit Board
GND	-> - (Negative) Pin
+5V	-> + (Positive) Pin
VRX	-> PIN 0 (S1)
VRY	-> (not used)
SW	-> PIN 1 (S2)



INTRODUCTION

Connect a Thumbstick to a Bit Board and use it to control a 270˚ Servo.

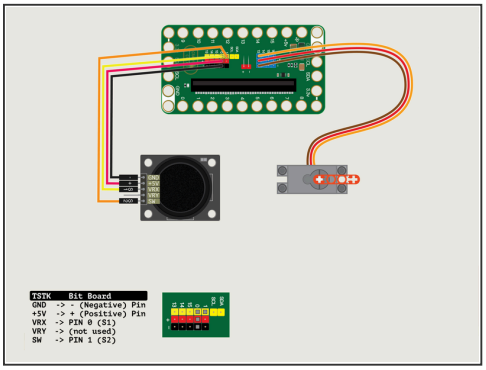
TOOLS:

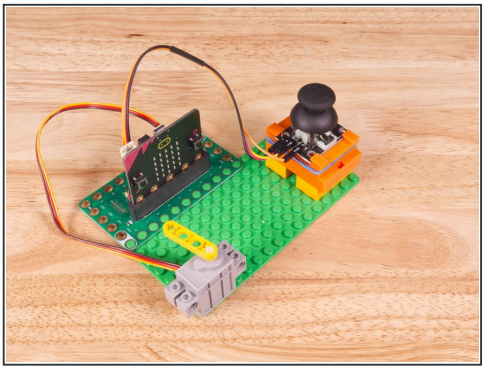
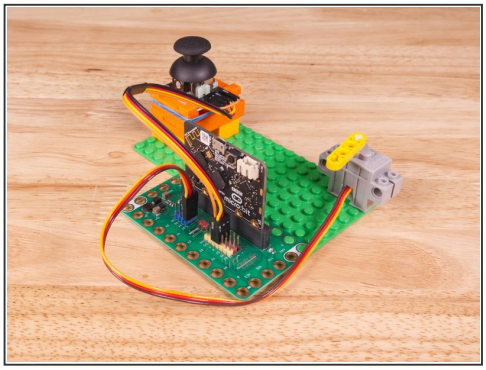
- Computer (1)

PARTS:

- Crazy Circuits Bit Board (1)
- micro:bit (1)
- Crazy Circuits Ribbon Cable (2)
- Thumbstick (1)
- Brick Compatible 270 Degree Servo (1)

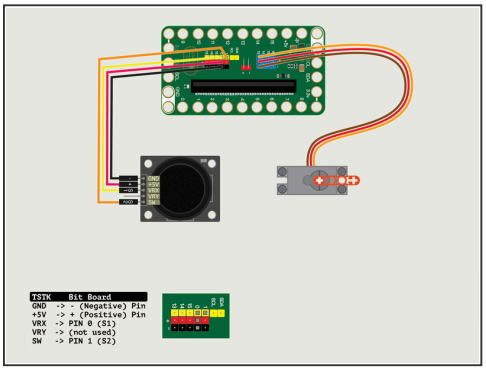
Step 1 — Connect the Thumbstick

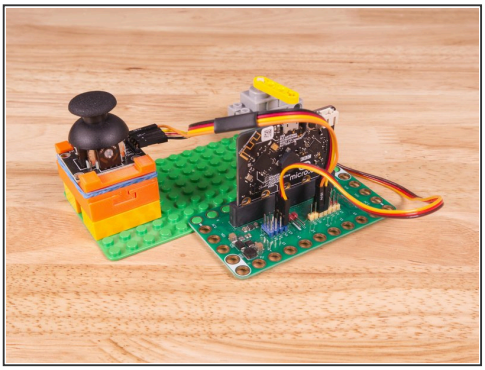
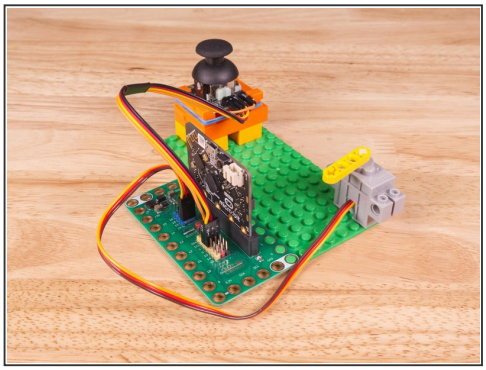


- We'll connect the **Thumbstick** with a **Crazy Circuits Ribbon Cable** using all four wires.
- Plug the three-wire connector of the **Crazy Circuits Ribbon Cable** into the row with **Pin 0** on the Bit Board. The wire colors should match the pin header colors, with **S1** (yellow) going to the yellow pin.
- Next, plug **S2** (orange) into **Pin 1**. *(S2 is separated from the three-wire connector to allow you to plug it into another row.)*
- To the Thumbstick plug **-** (black) into **GND**, **+** (red) into **+5V**; **S1** (yellow) into **VRx**; **S2** (orange) into **SW**.
- We won't plug anything into **VRy** pin for this example.

Step 2 — Connect the 270˚ Servo

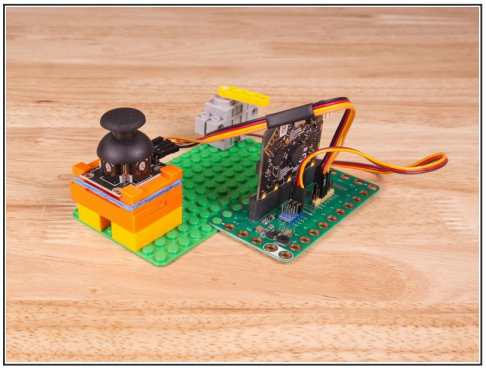
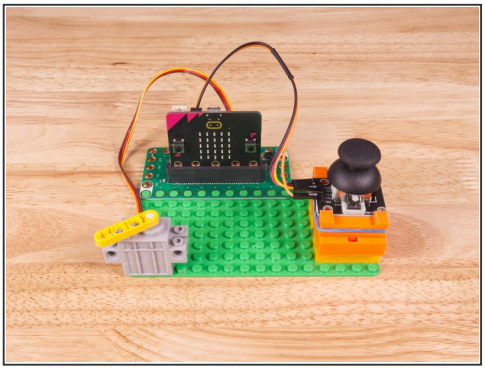
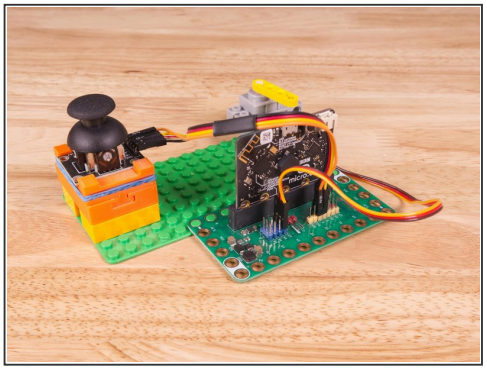


- The **270 Degree Servo Motor** has a 3-wire connector on the end that can plug directly into the pins on the back of the Bit Board.
- Make sure the **Orange Wire** from the servo is closest to the number **13** for the **Pin 13** column.
- Then the **Brown Wire** should be closest to the micro:bit (in the **-** row) and the **Red Wire** will be in the middle (the **+5v** row).

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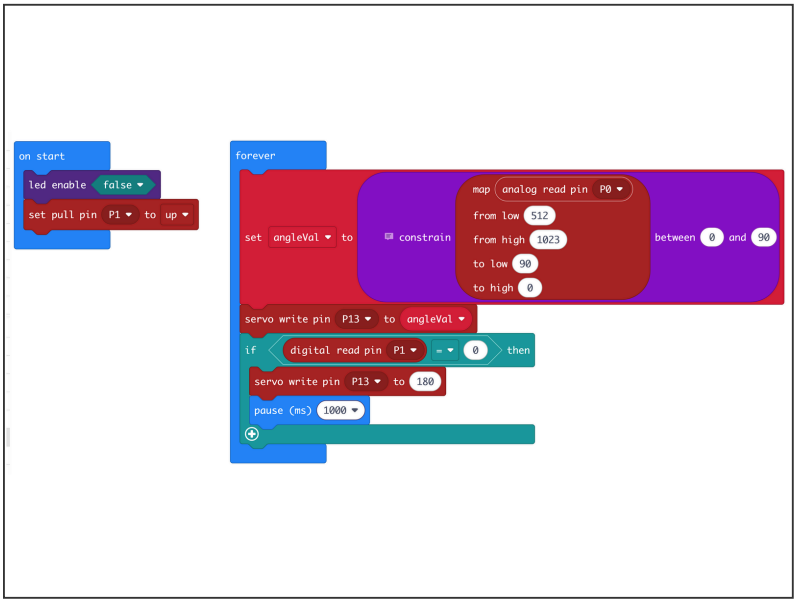
Step 3 — Mounting the Thumbstick

- We used a 3D printed part we designed to hold the Thumbstick in place on a LEGO baseplate.
- We attached two 2x4 LEGO Bricks to the bottom of the 3D printed holder to allow it to snap onto the LEGO Baseplate a bit easier.
- Alternately you can try to use some LEGO bricks and some rubber bands to hold the sensor in place, or just hold it in your hand.
- 3D print your own Thumbstick Sensor Holder.

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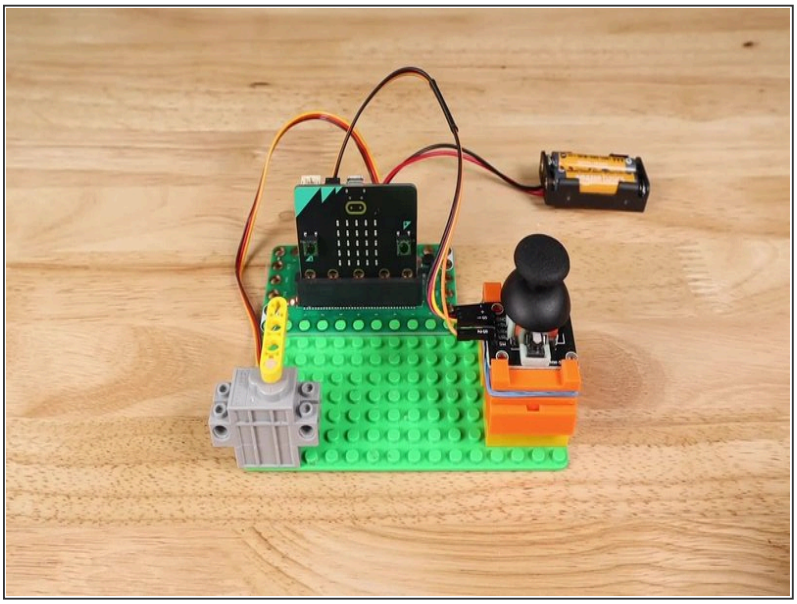
Step 4 — Load the Code



- 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 **Thumbstick 270 Servo Sweep Half** program: https://makecode.microbit.org/_dWu0JX568...
- In the on start block we'll disable the LED matrix and set **Pin 1** to **pull up**, as we'll attach this to the button on the Thumbstick.
- In the forever loop we'll read analog **Pin 0** and map the value from **512** to **1023** to a scale going from **90** to **0**.
- Note that we will also constrain the value we get between **0** and **90**. Without this constraint any input **lower than 512** would cause our low value to go **higher than 90.**
  - Yes, this is weird! The map does not *restrict* the values so when we go outside of our **from low** or **from high** settings those values will be used... potentially in unexpected ways. So constrain prevents that.
- We will assign the value to the variable named **angleVal** and then move the servo (attached to **Pin 13**) to the appropriate value/angle.

- After that we will check if the button is pressed, and if pressed move the servo to **180 degrees** for **one second**.

Step 5 — Test it Out!



- Once the code is loaded it should start running immediately.

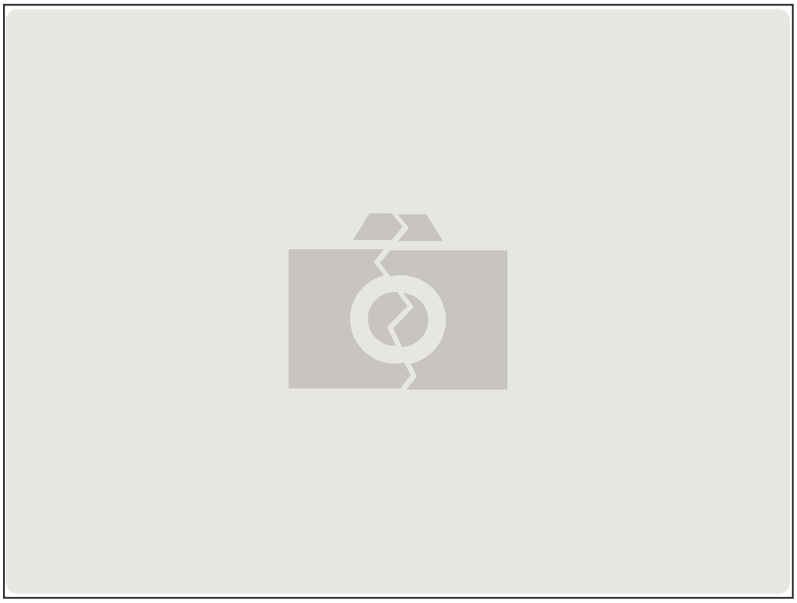
- You can power the micro:bit via the USB cable you used to load the code or you can use a battery pack plugged into the Bit Board.

- Move the Thumbstick left and the servo should not move. Move the Thumstick to the right and you should see the beam attached to the servo shaft move right.

- Press the Thumbstick (button) down and the servo will go to the 180 degree position for one second.

- Chapter 24 has a few notes on using 270 Servos with the Bit Board and some MakeCode limitations: CH24-A - Servo Sweep

Step 6 — Follow Along



- Follow along with our recorded Live Stream!

(We'll add the video to this step after we do the stream!)