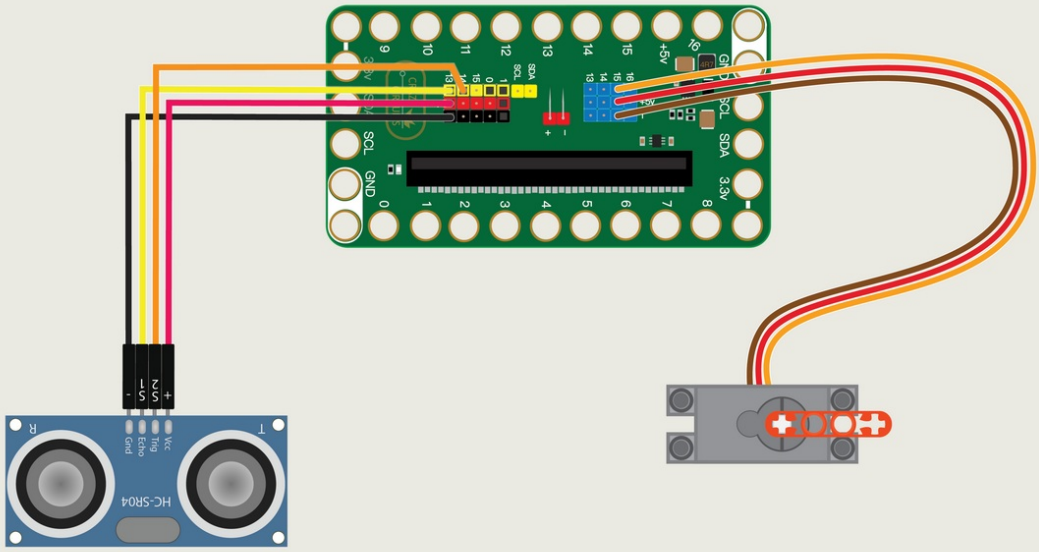
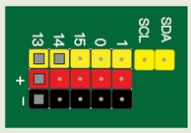
CH38-D - Distance Sensor 270 Servo Angles

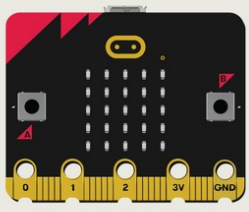
Connect a Distance Sensor to a Bit Board and use it to control a 270 Degree Servo.

Written By: Pete Prodoehl



DIST	Bit Board
VCC	-> + (Positive) Pin
TRIG	-> PIN 14 (S2)
ECHO	-> PIN 13 (S1)
GND	-> - (Negative) Pin





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INTRODUCTION

Connect a Distance Sensor to a Bit Board and use it to control a 270 Degree Servo.

TOOLS:

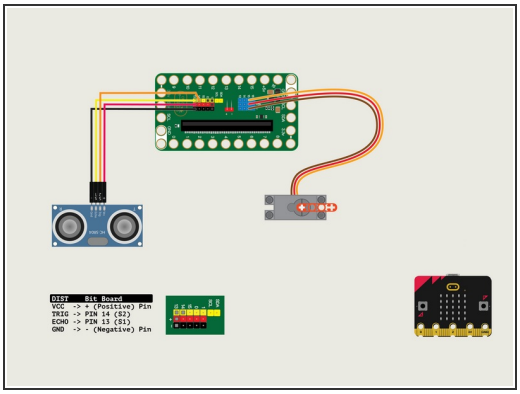
- Computer (1)

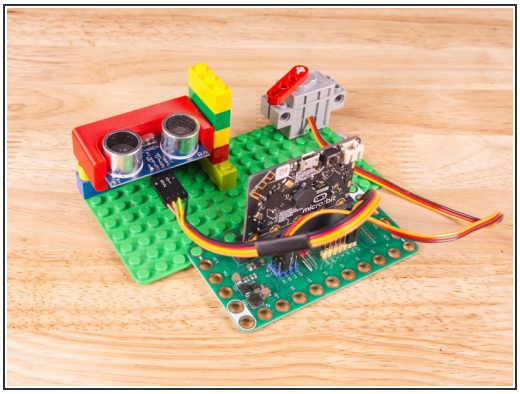
PARTS:

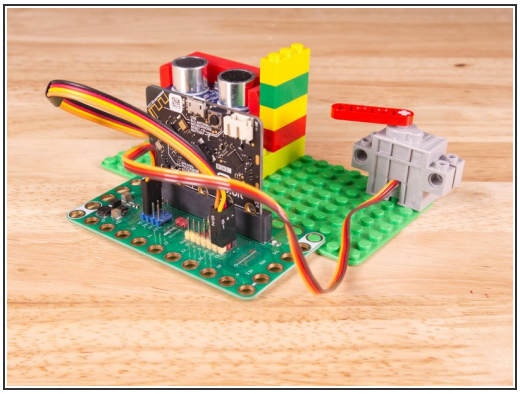
- Crazy Circuits Bit Board (1)
- micro:bit (1)
- Crazy Circuits Ribbon Cable (1)
- Distance Sensor (1)
- Brick Compatible 270 Degree Servo (1)

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Step 1 — Connect the Distance Sensor

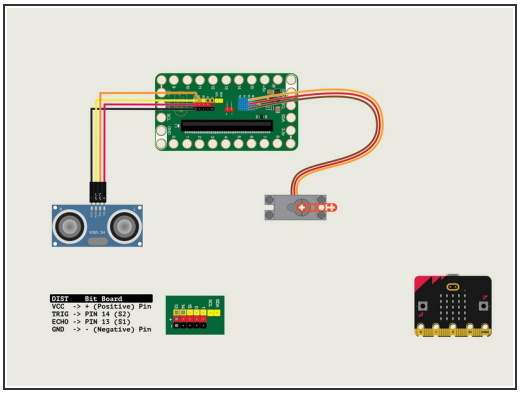


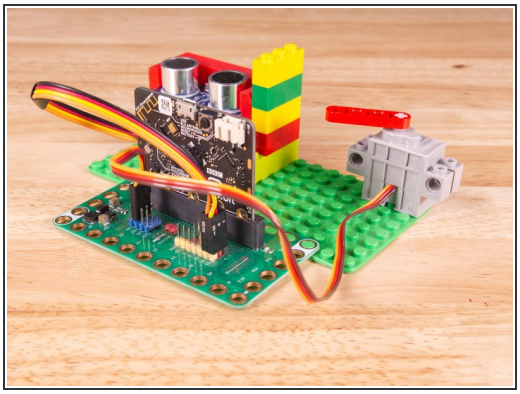


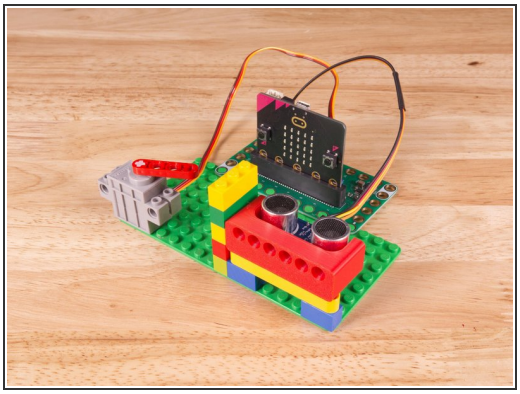


- We'll connect the **Distance Sensor** with a **Crazy Circuits Ribbon Cable** using all four wires.
- Plug the three-wire connector of the **Crazy Circuits Ribbon Cable** into the row with **Pin 13** on the Bit Board. The wire colors should match the pin header colors, with **S1** (yellow) going to the yellow pin.
- Next, plug **S2** (orange) into **Pin 14**. *(S2 is separated from the three-wire connector to allow you to plug it into another row.)*
- To the Distance Sensor plug **+** (red) into **VCC**; **S2** (orange) into **TRIG**; **S1** (yellow) into **ECHO**; and **-** (black) into **GND**.

Step 2 — Connect the 270˚ Servo

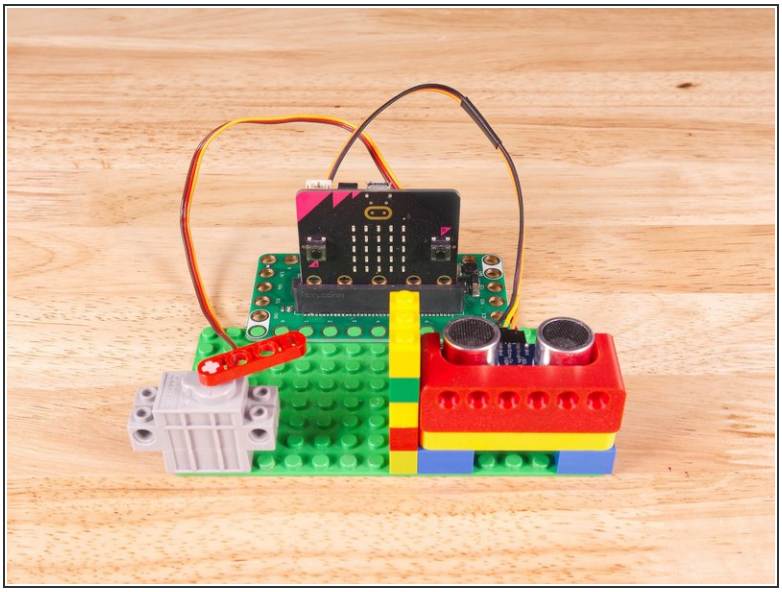


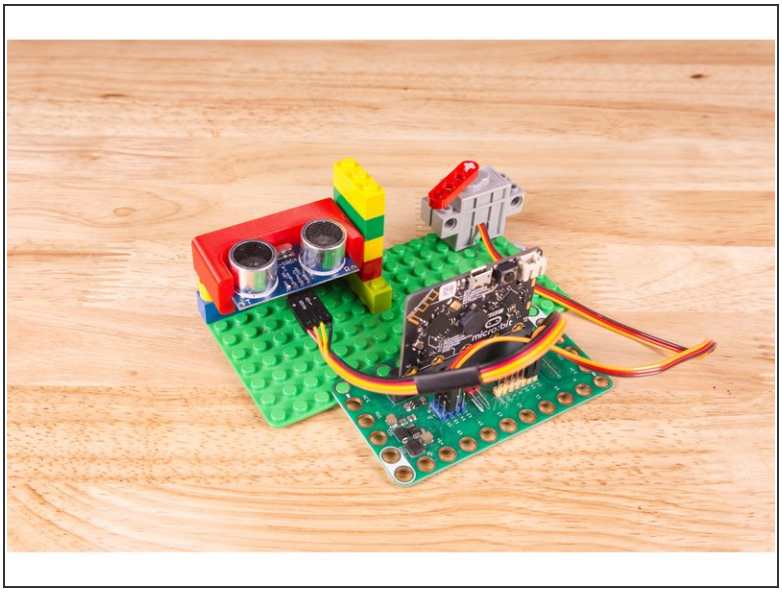




- The **270 Degree Servo Motor** has a 3-wire connector on the end that can plug directly into the pins on the back of the Bit Board.
- Make sure the **Orange Wire** from the servo is closest to the number **15** for the **Pin 15** column.
- Then the **Brown Wire** should be closest to the micro:bit (in the **-** row) and the **Red Wire** will be in the middle (the **+5v** row).

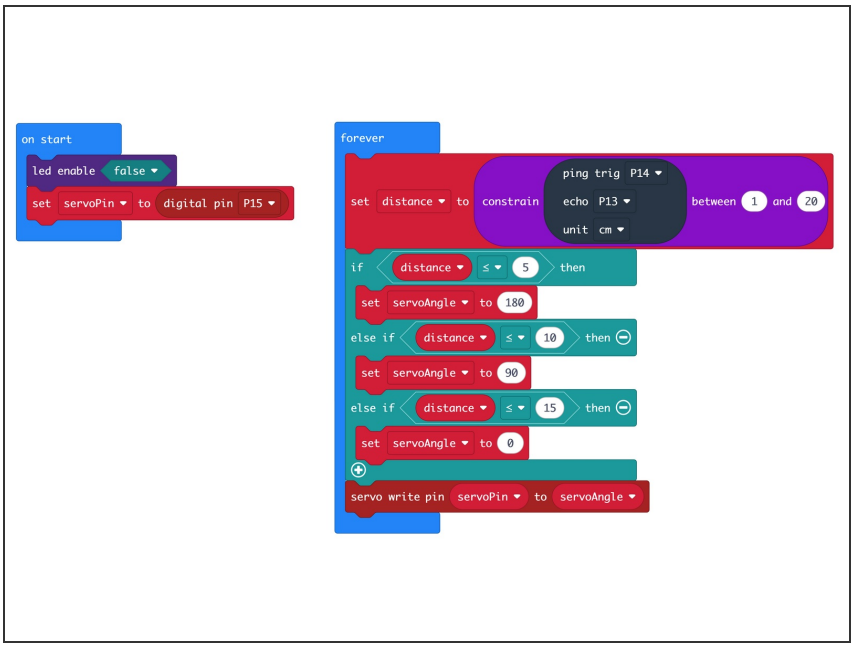
Step 3 — Mounting the Sensor and Servo





- We used a 3D printed part we designed to hold the Distance Sensor in place on the LEGO baseplate.
- A few Technic pins, a Technic beam, and some LEGO bricks are all that is needed.
- Alternately you can use some LEGO bricks and a rubber band or tape to hold the sensor in place. *(But don't use anything conductive!)*
- The bottom of the servo is "Brick Compatible" and can snap right onto a LEGO baseplate.
- 3D print your own Distance Sensor Holder with Holes.

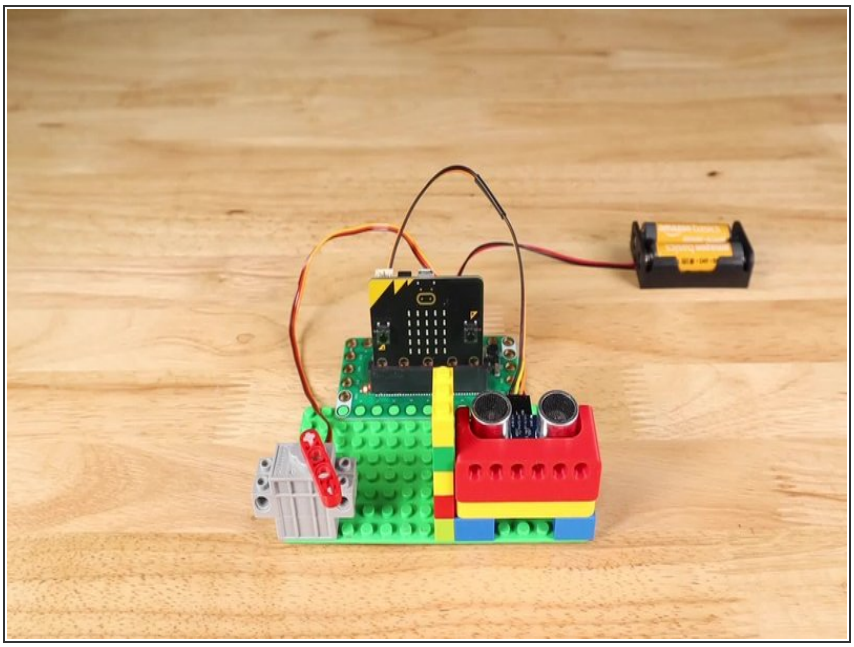
Step 4 — Load the Code



- 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 **Distance Servo Angles** program: https://makecode.microbit.org/_fJpf10AMP...
- In the on start block we disable the LED matrix. (In this case we don't need to, but we tend to disable it if we are not specifically using it.)
- We also assign **digital pin P15** to a variable named **servoPin**.
- In our forever loop we read the distance sensor and assign the value to the **distance** variable and then check *if* the distance is lower than **5**, and if it is not, check if it is lower than **10**, and if it is not, check if it is lower than **15**.
- For each of those **if/else if** checks we'll set the **servoAngle** to a specified angle if the comparison is *true*. At the end of the block we'll use servo write pin to move the servo.

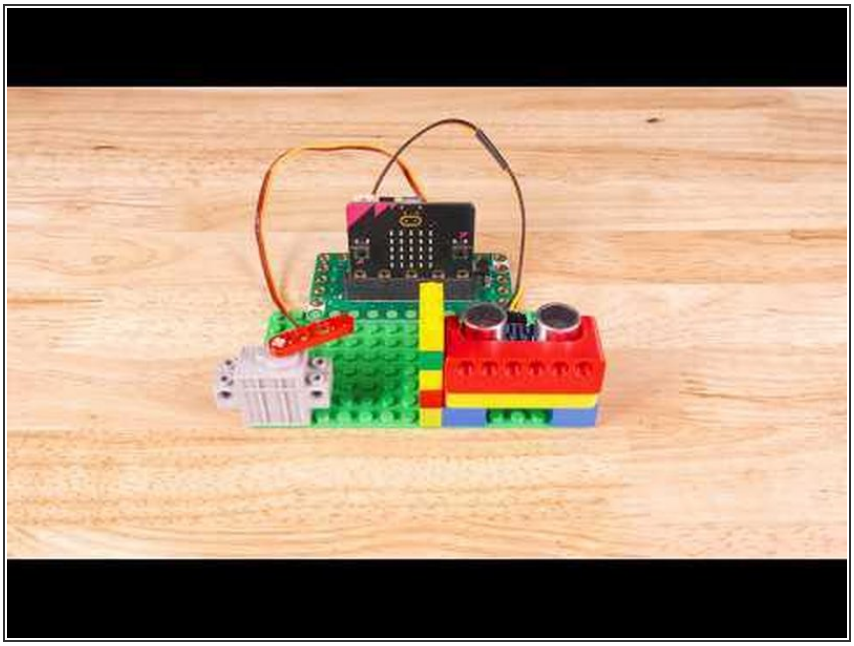
- You'll notice we used the constrain function when reading the distance sensor. This will ensure we never get a value **lower than 1** or **higher than 20**.

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 your hand (or a flat object) in front of the sensor. The servo will move to one of three positions depending on how close the object is to the sensor.

Step 6 — Follow Along



- Follow along with our recorded Live Stream!
- ⓘ You can watch the full video of us walking through this project, along with explaining and exploring the code: https://youtube.com/live/R6W2ZeUkq7U