CH39-B - Distance Piezo Alarm Icon

Connect a Distance Sensor to a Bit Board and use it to control the output of a Piezo Speaker.

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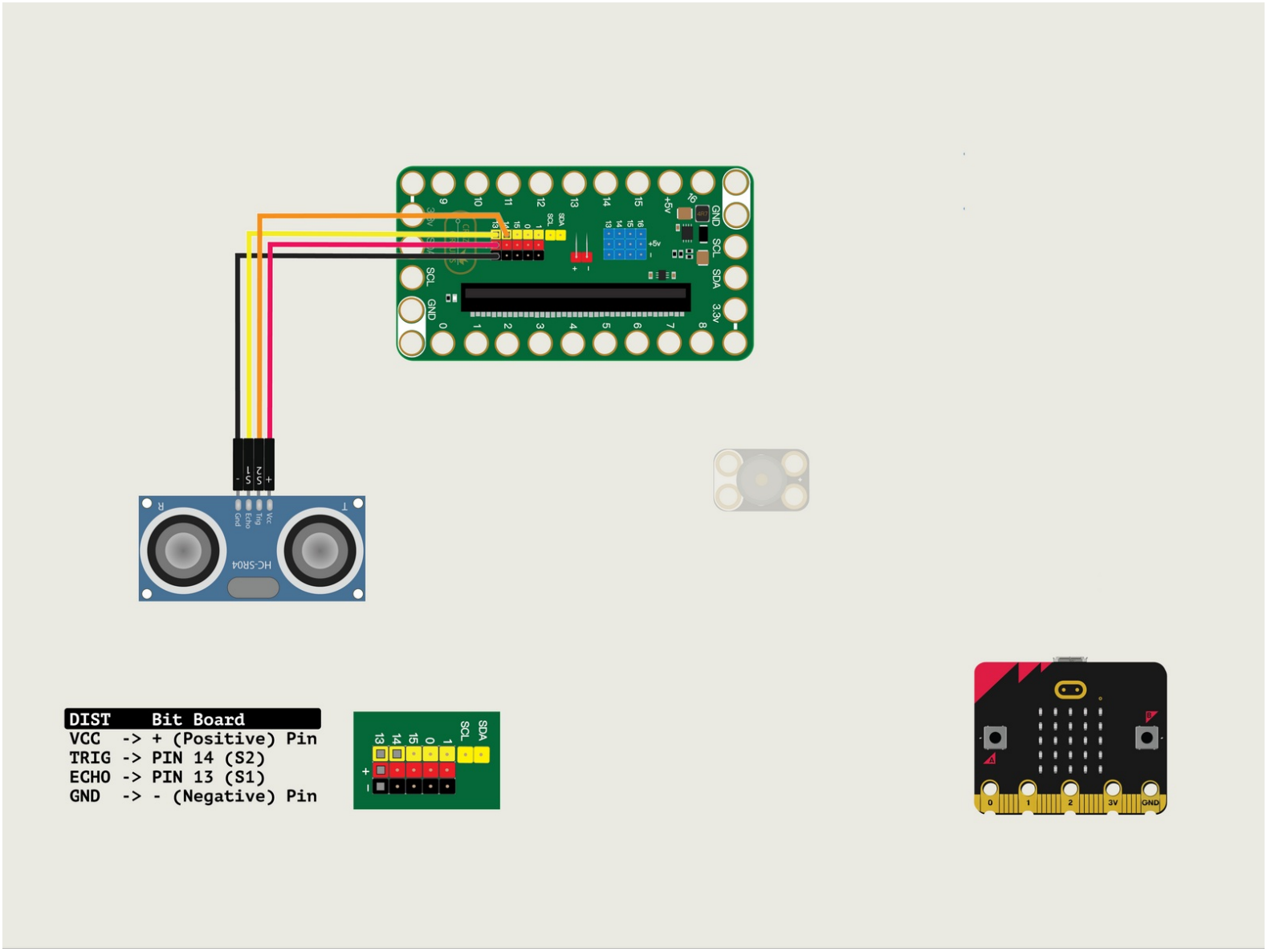


INTRODUCTION

Connect a Distance Sensor to a Bit Board and use it to control the output of a Piezo Speaker.

TOOLS:

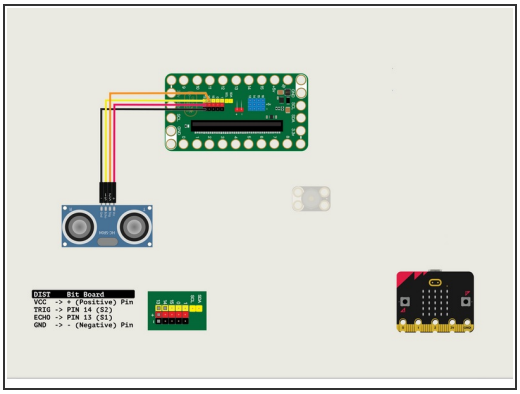
- Computer (1)

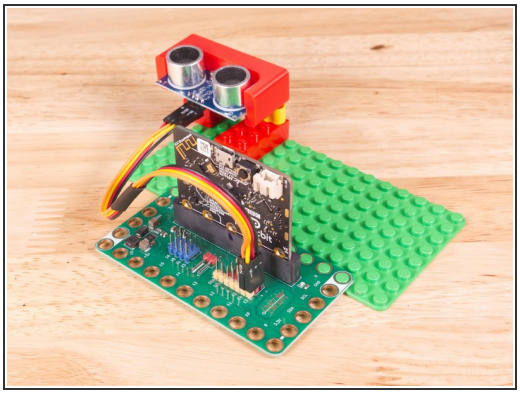
PARTS:

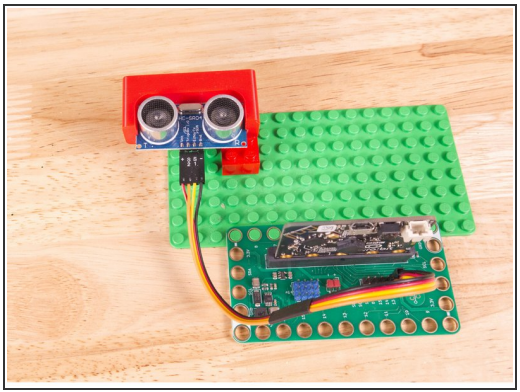
- Crazy Circuits Bit Board (1)
- micro:bit (1)
- Crazy Circuits Ribbon Cable (1)
- Distance Sensor (1)
- Crazy Circuits Piezo Speaker Chip (1)

(Optional)

Step 1 — Connect the Distance Sensor

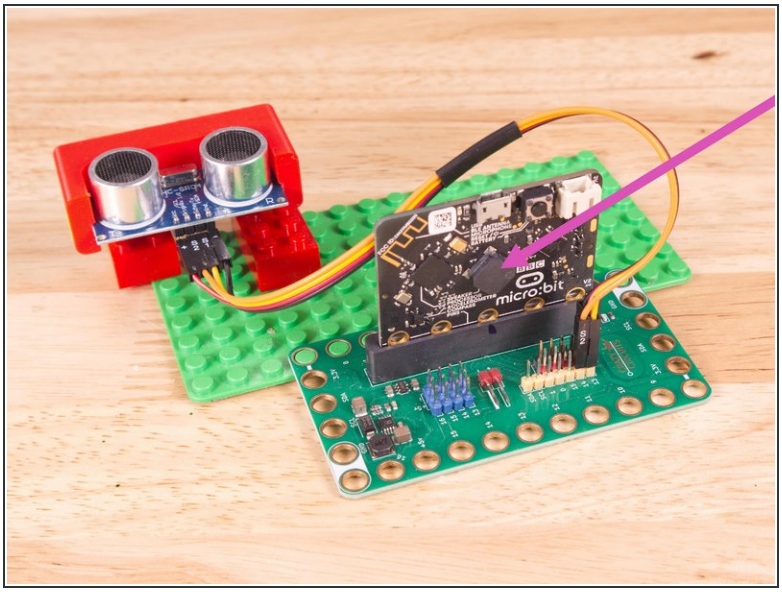


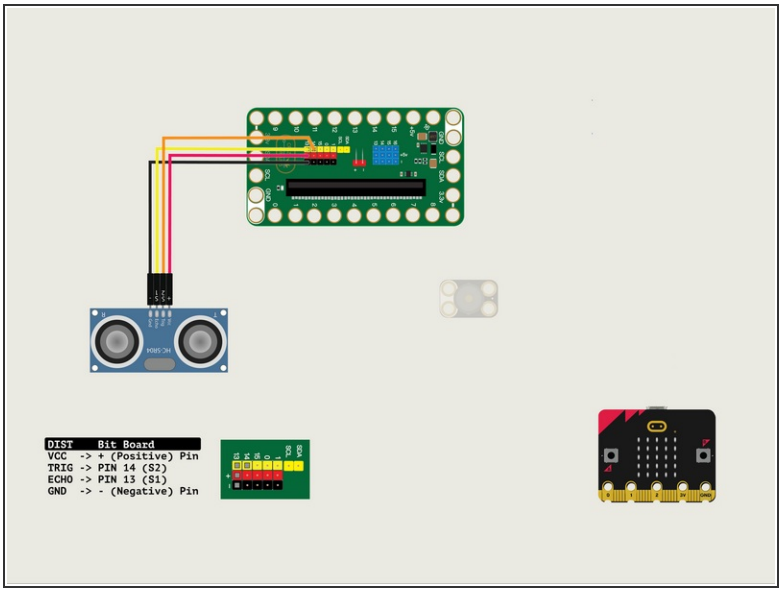




- We'll connect the **Distance Sensor** with a **Crazy Circuits Ribbon Cable** using all four wires.
- Plug the three-wire connector of the **Crazy Circuits Ribbon Cable** into the row with **Pin 13** on the Bit Board. The wire colors should match the pin header colors, with **S1** (yellow) going to 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 Piezo (Optional)

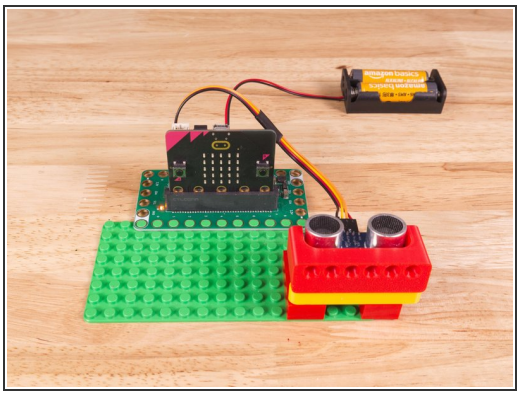
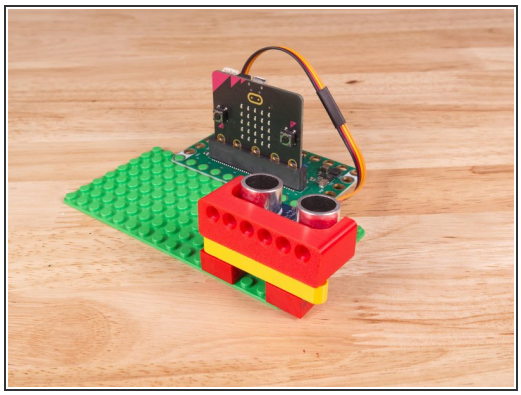
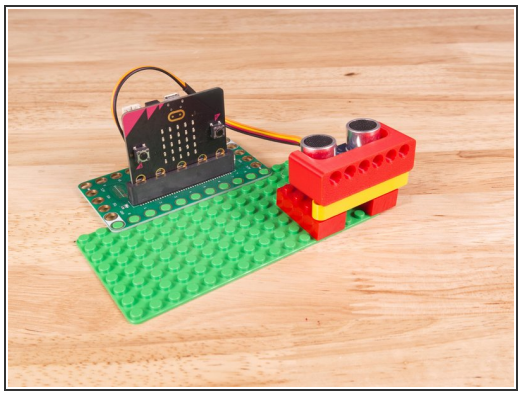




- For this guide we'll use the **built-in** piezo speaker found on the micro:bit V2.

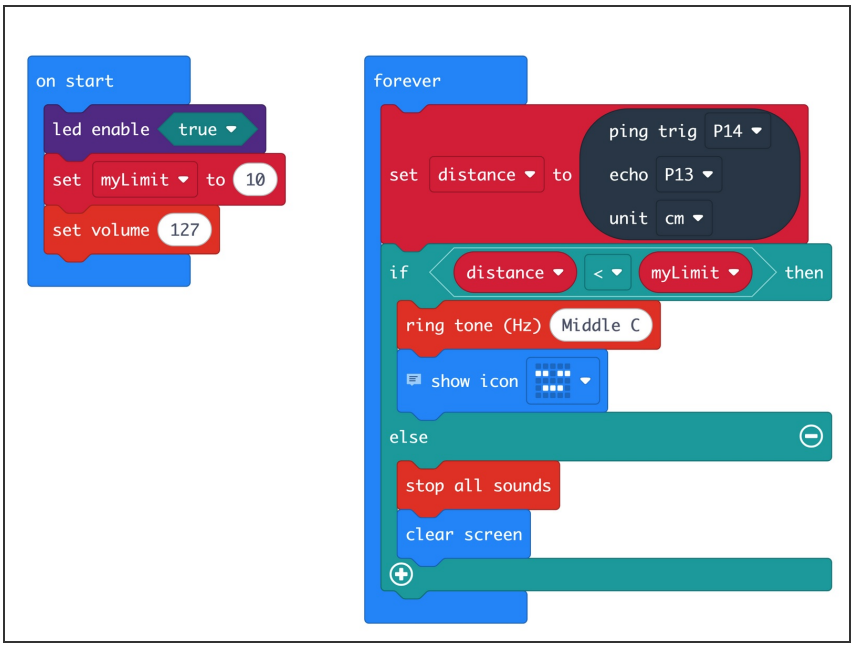
- If you prefer to connect a Crazy Circuits Piezo Speaker take a look at Chapter 13 for notes on connecting one and adding code to use it.

Step 3 — Mounting the Sensor

- 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!)*
- 3D print your own Distance Sensor Holder with Holes.

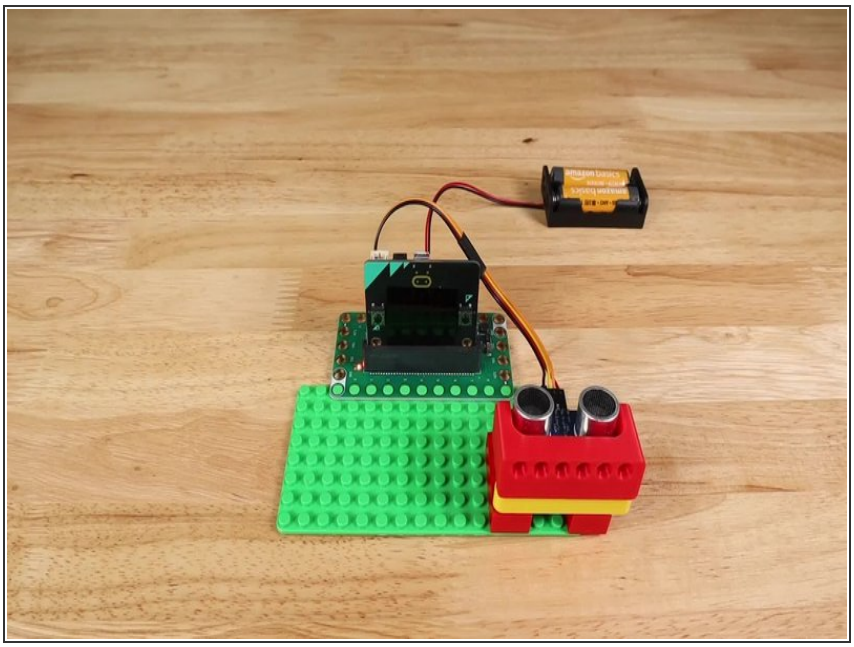
Step 4 — Load the Code



- 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 Piezo Alarm Icon** program: https://makecode.microbit.org/_2gCYoACYr...
- In the on start block we *enable* the LED matrix, set **myLimit** to 10, and set the **volume** to 127 (out of 255).
- In our forever loop we'll check if the distance is less than **myLimit**, and **if** it is, the micro:bit will play the sound...
- In this version we've also added the **show icon** command when the sound is played.
- You'll notice that this slows down the response time of our program. When you move the object away from the sensor it will continue to play the sound (and show the icon) for another 600 milliseconds.

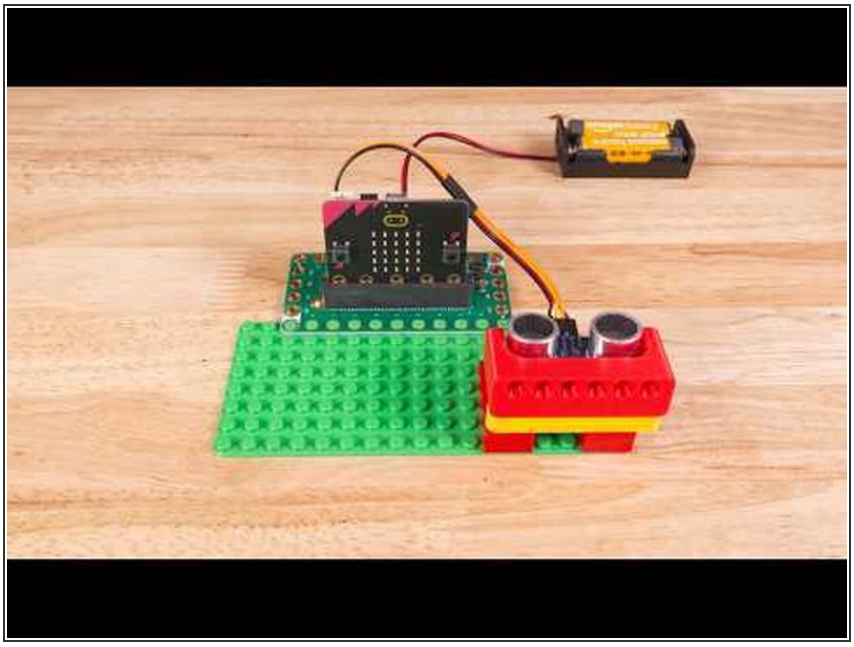
ⓘ The show icon command adds a **600ms delay** which can *only* be adjusted in the Python or JavaScript mode, not in the Block mode. (The show LEDs command adds 400ms.)

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) close to the sensor. If the object is less than 10cm away the piezo will play a sound and show an icon.
- When you move the object away from the sensor the sound will keep playing and the icon will keep displaying for an additional 600 milliseconds.

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/8rIhboQLKSo

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