

## Activity: Make your own motion detector alarm

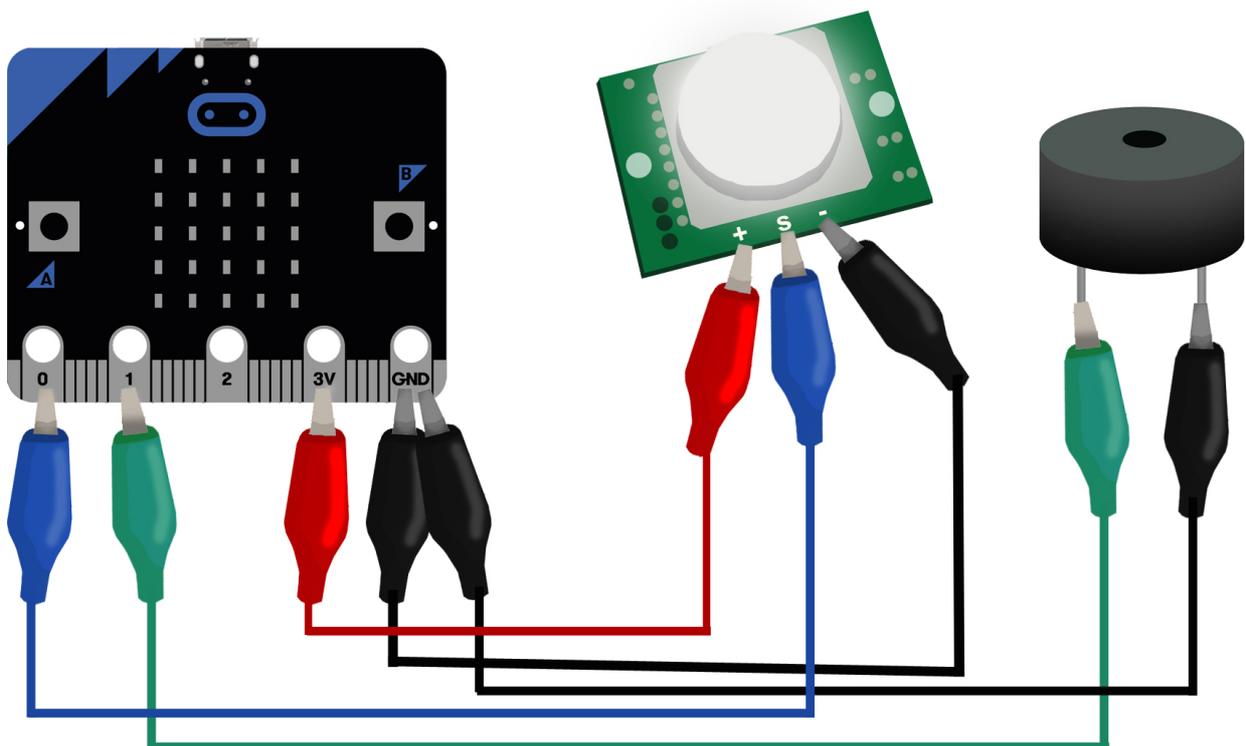
In our micro:bit: Mission to Mars Live Lesson, we'll be exploring different ways you can use the BBC micro:bit to test and understand your environment.

In this follow-up activity, you can learn how to create your very own motion detector alarm, which you can use to monitor if anyone is entering or walking past a room.

### Components needed:

- BBC micro:bit
- Micro USB cable for programming the BBC micro:bit
- 2AAA battery pack for the BBC micro:bit
- 2 x AAA batteries
- 1 x PIR motion sensor
- 1 x piezo buzzer
- Three wires with crocodile clips

### Step 1: Creating your circuit



You'll find three pins coming off the PIR sensor. Using the crocodile clips and wires, connect the positive (+) pin of the sensor to the 3V pin on the BBC micro:bit, the negative (-) pin of the sensor to GND and the signal pin of the sensor to Pin 0.

Your piezo buzzer should have a positive and a negative leg or wire. Connect the positive (+) leg or wire of the piezo buzzer to Pin 1 on the BBC micro:bit, and the negative (-) leg or wire to GND.

## Step 2: Import the code

Click on the hex file link on the Live Lessons website to view the code on the BBC micro:bit website.

The script for your temperature sensor should now appear in your code window.

Hit 'run' to see it in action on the simulator, or plug in your BBC micro:bit, hit 'compile' and drag the hex file onto your BBC micro:bit. Wave your hand in front of the sensor, and see what happens!

## Step 3: Understanding the code

```
forever
  if digital read pin (0,1) P0 = 1
  do
    show leds
      0 1 2 3 4
      0 ✓ □ □ □ ✓
      1 □ ✓ □ ✓ □
      2 □ □ □ □ □
      3 □ ✓ ✓ ✓ □
      4 ✓ □ □ □ ✓
    digital write (0,1) 1 to pin P1
    pause (ms) 1000
  else
    show leds
      0 1 2 3 4
      0 □ □ □ □ □
      1 □ ✓ □ ✓ □
      2 □ □ □ □ □
      3 ✓ □ □ □ ✓
      4 □ ✓ ✓ ✓ □
```

### A simple detection program

Here we've introduced a **loop** that goes on **forever**, which means that whatever is in this loop keeps happening unless something else in the program interrupts it.

We've introduced a conditional statement that says:

- IF Pin 0 registers a value of 1 (someone moves past the sensor), then an angry face is displayed on the LEDs. The program also then writes 1 to Pin 1 (the buzzer buzzes) for 1000 milliseconds.
- ELSE (if no one moves past the sensor), then a smiley face is displayed on the LEDs.

## Step 4: Test and play

Now that you understand the code, you can adapt it to suit your purposes.

A simple thing to experiment with is changing the image that your BBC micro:bit displays. Simply click on the **show leds** block and change it to whatever you like.

You can also adjust how long the buzzer buzzes for in response to the movement.