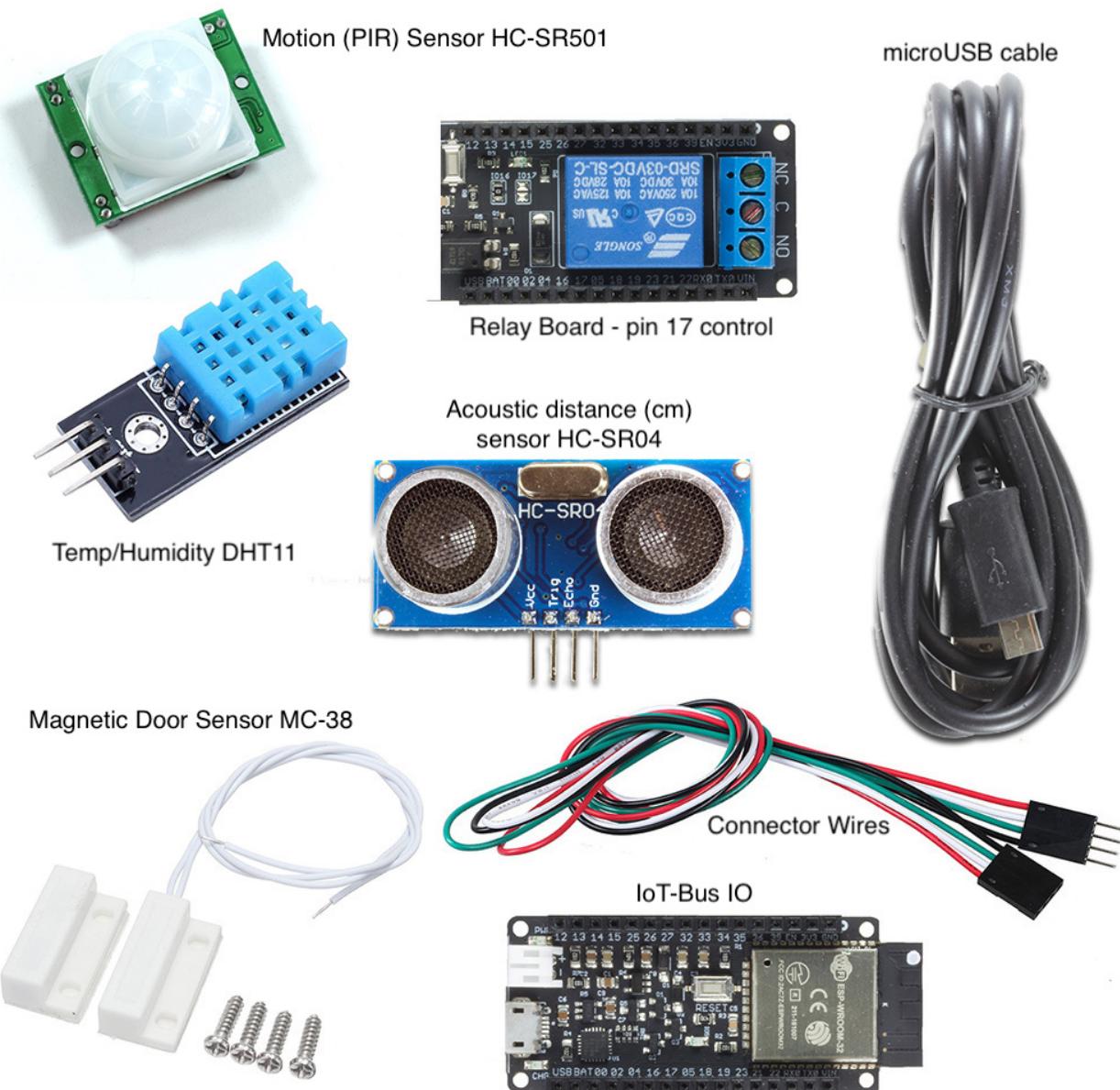


IoT-Bus Thing Kit for Mozilla's Things Gateway

This kit contains:

- IoT-Bus IO - female headers
- IoT-Bus Relay - female headers
- DHT11 Temperature/Humidity Module
- MC-38 Door sensor
- HC-SR501 PIR Motion Sensor
- HC-SR04 Ultrasonic Distance Sensor
- Micro USB Cable
- M-M Jumper wires
- M-F Jumper wires

DRAFT



Getting Started with MicroBlocks

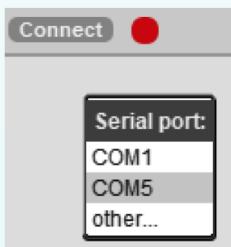
Download MicroBlocks and install it on your PC
<http://microblocks.fun/download.html#download>

Read through the board setup section
<http://microblocks.fun/download.html#setup>

The IoT-Bus IO board in your kit has the MicroBlocks Virtual Machine (VM) already installed. New VMs are available periodically, and this board currently has a separate VM update process. Details on special ESP32 setup (until available within the IDE):
<http://microblocks.fun/esp32Setup.html>

The MicroBlocks web site has more detail, but here is a quick summary for connecting the board and making sure it works. Note that the “user LED” is blue, and located on the IO board which may be inside the sandwich if the Relay board is stacked on top.

To connect to your board, click the Connect button and select the serial port.



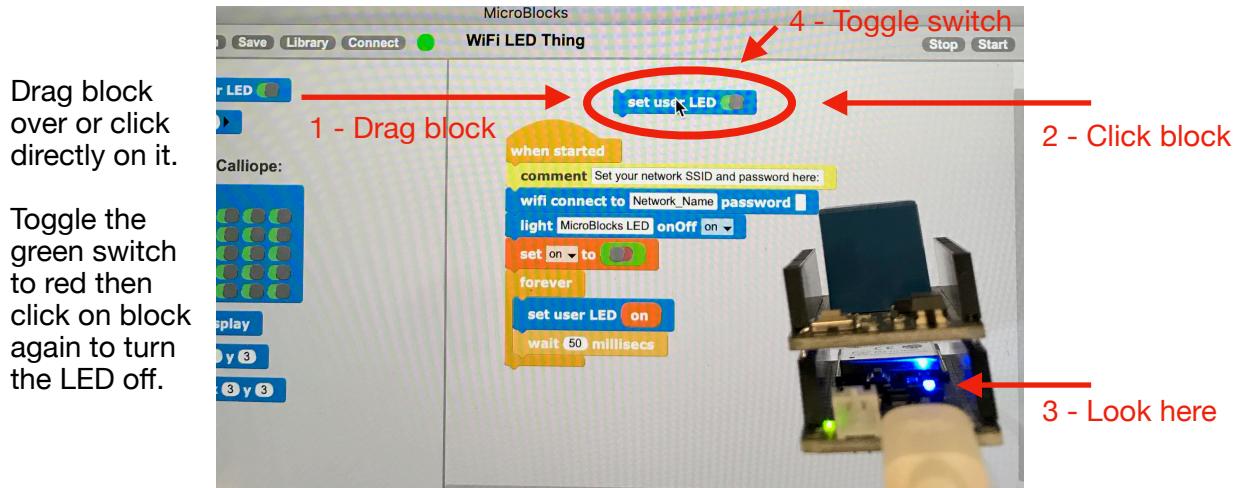
When the board is connected the connection indicator will turn green:



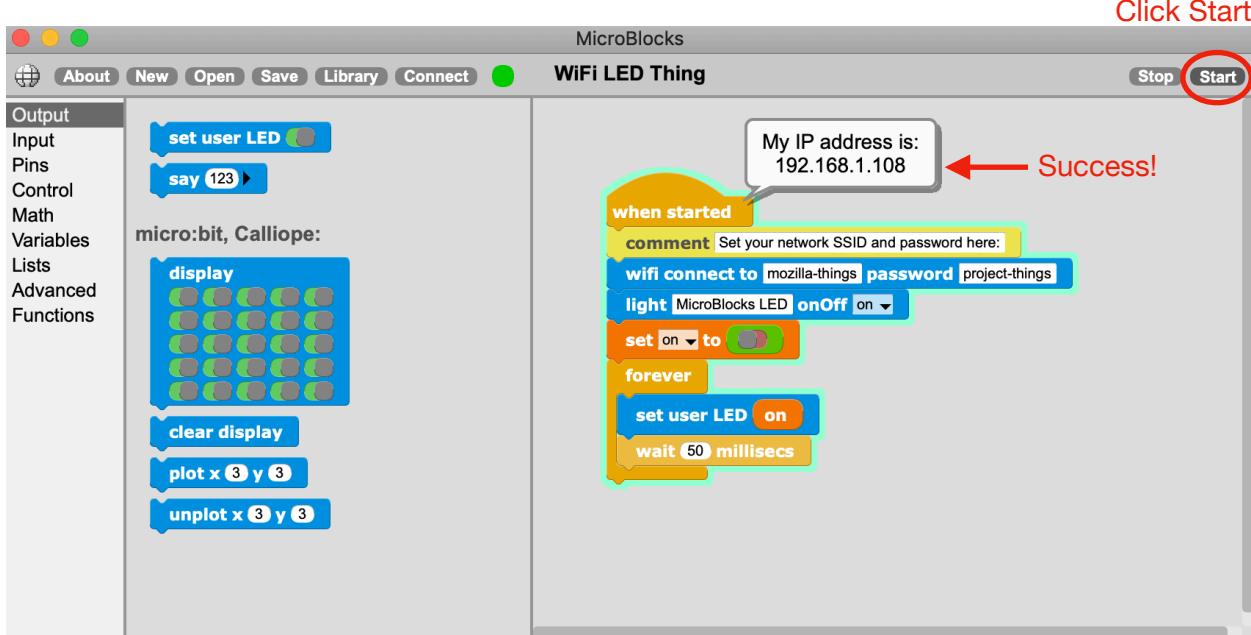
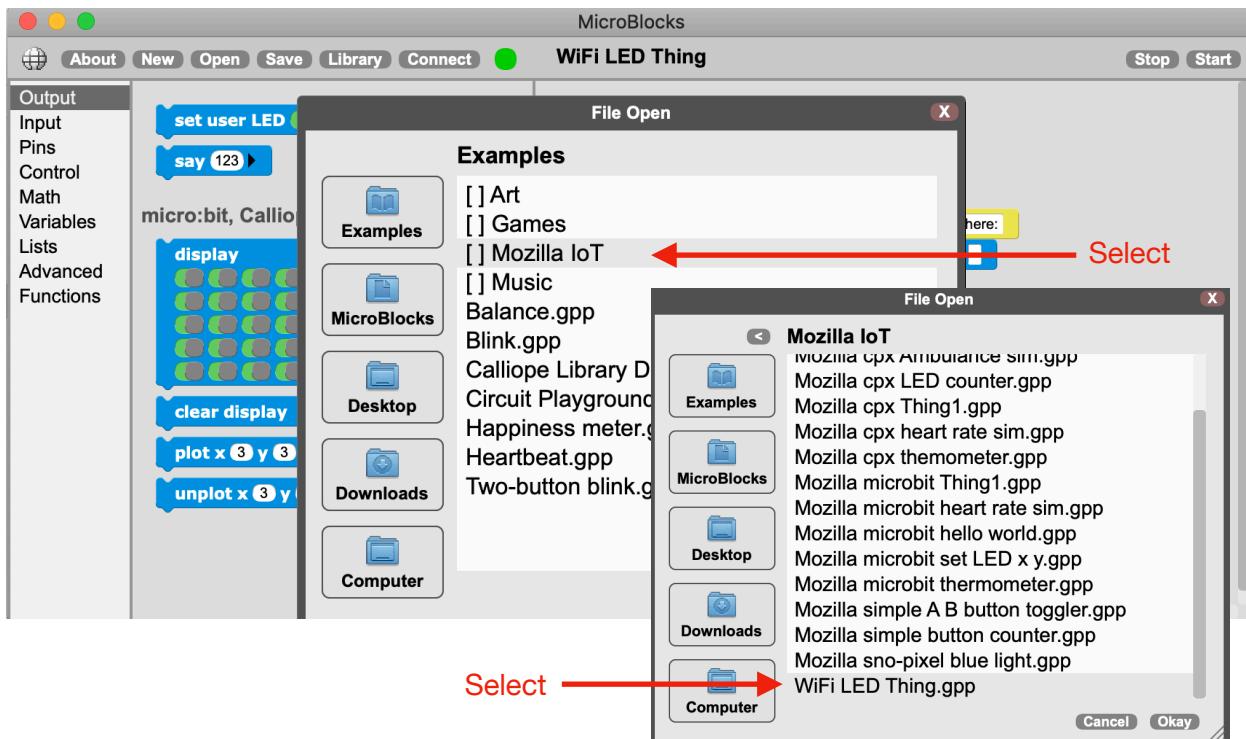
As a quick test, click on the block:



The user LED on your board should light up, showing that the board is connected. You're ready to code!



To check the Wi-Fi connectivity to your router, click (Open), select folder “[] Mozilla IoT”, scroll to the bottom and select “WiFi LED Thing.gpp”. Set your “Network_Name” (SSID) and password in the first blue block. Then click (Start). Goal is to get an IP address.

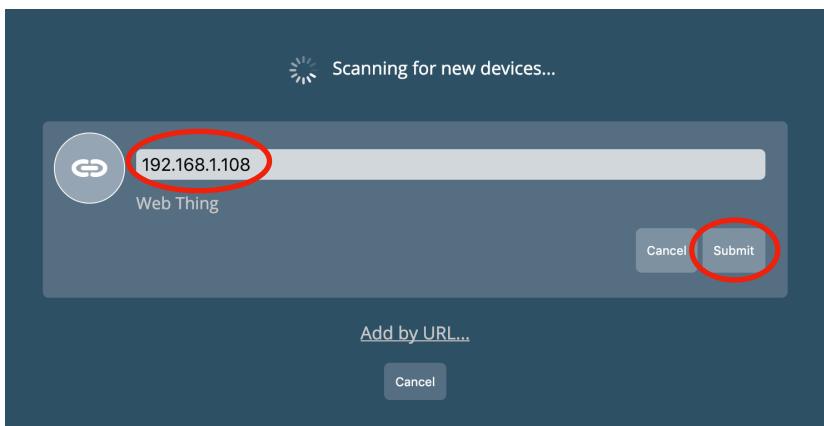


Examples for the remainder of this guide can be downloaded from [github](#) to your computer. You then “open” them by navigating to wherever you stored them.
<https://github.com/kgiori/iot-bus-microblocks> => store .gpp examples to your computer.

Check Connectivity to Mozilla Things Gateway

Since the IoT-Bus IO board supports Wi-Fi, you can connect it to the [Mozilla Things Gateway](#), and then monitor or control it using the gateway user interface (UI). Follow these quick steps to try it now, if you have a Things Gateway online and if you are on the same Wi-Fi network.

1. Click (+) on Things page to scan for new devices, then click the “[Add by URL...](#)” link located directly above the “Cancel” button

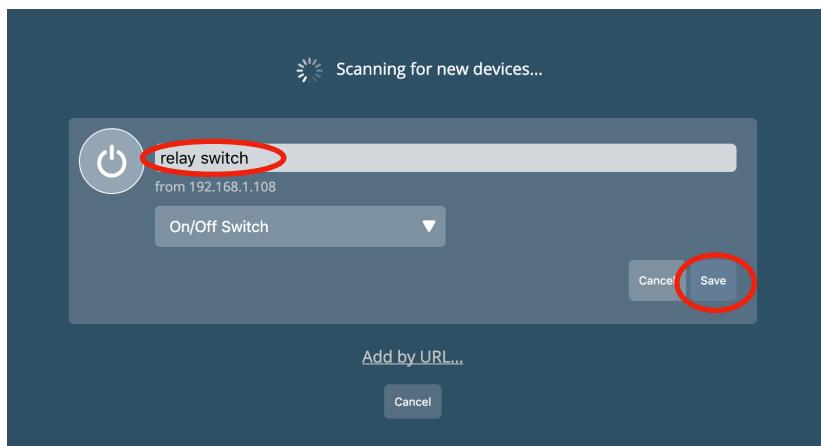


[Add by URL...](#)

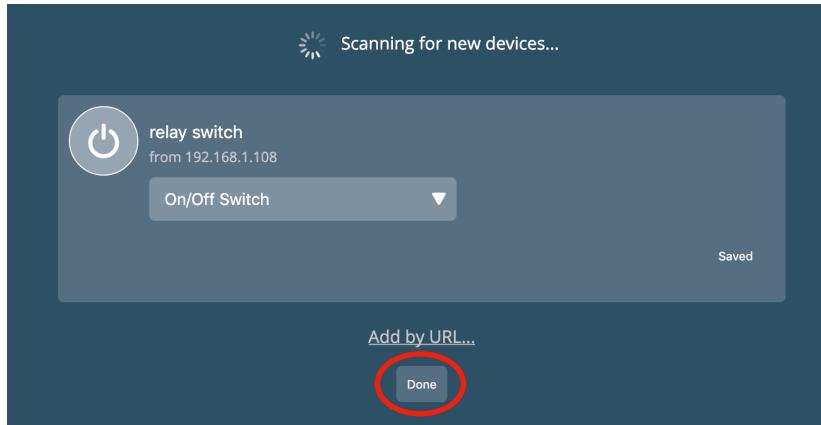
Cancel

A new block will open where you can enter the IP address noted when you ran the “WiFi LED Thing” example

2. Enter the IoT-Bus IP address then click [Submit]



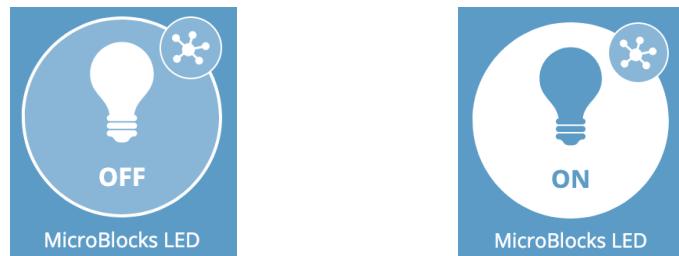
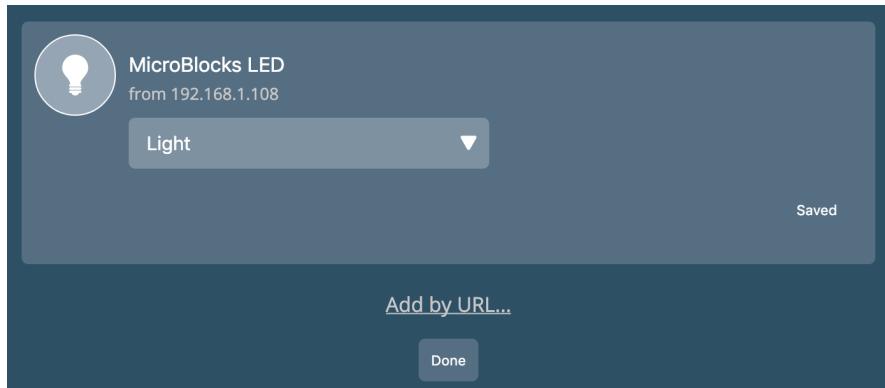
3. Update the name if desired, then click [Save]



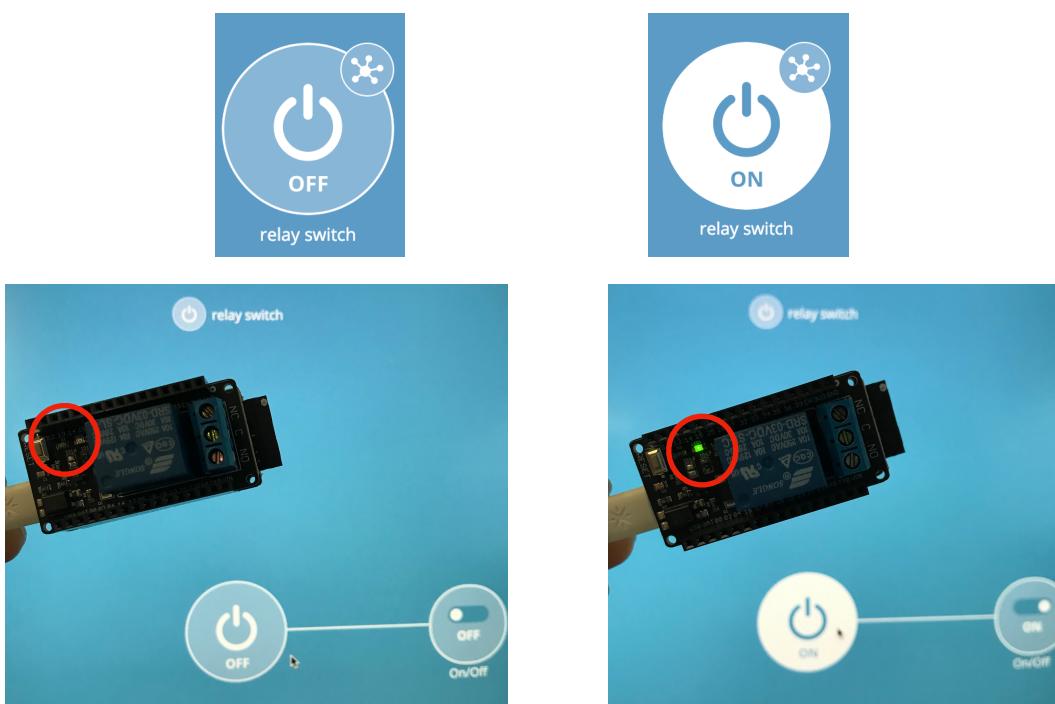
4. Then click [Done] and return to the Things page

If you ran the **WiFi LED Thing** example, the board will be recognized as a light, as shown in the screen below.

From the Things page, you can now toggle the icon to turn the blue user LED (sandwiched under the Relay board) on and off.

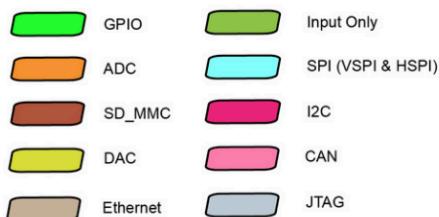


When implementing the “Relay Switch” example described in a later section, you can see the relay board LED toggled on and off, as shown in the photos. You will also hear it ‘click’.

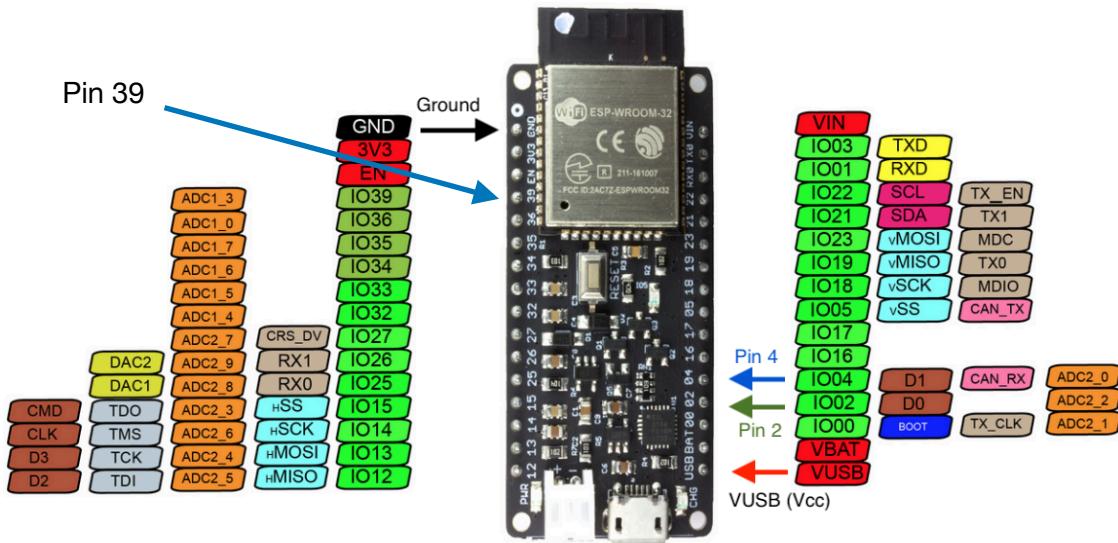


IoT-Bus IO Board Pinout

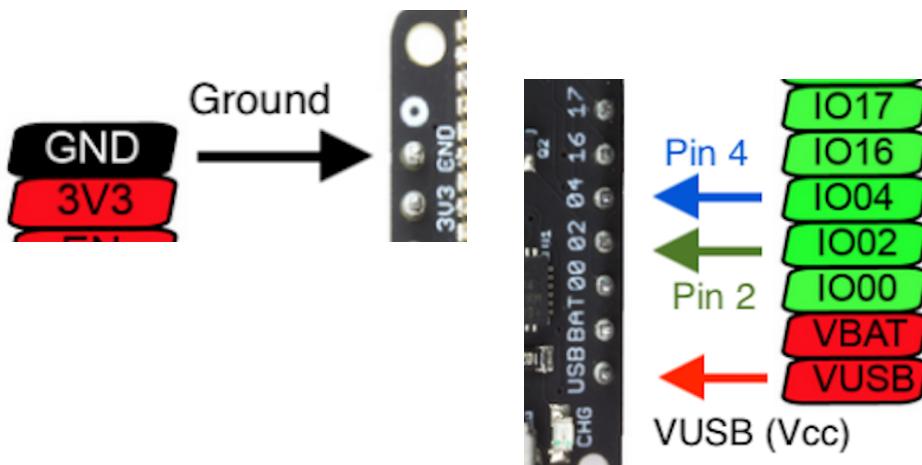
The IoT-Bus IO board is the “brains” of all the following examples. The pinout of the board is shown below, along with arrows highlighting the pins most commonly used in the examples.



Arrows show commonly used pins (IO #)

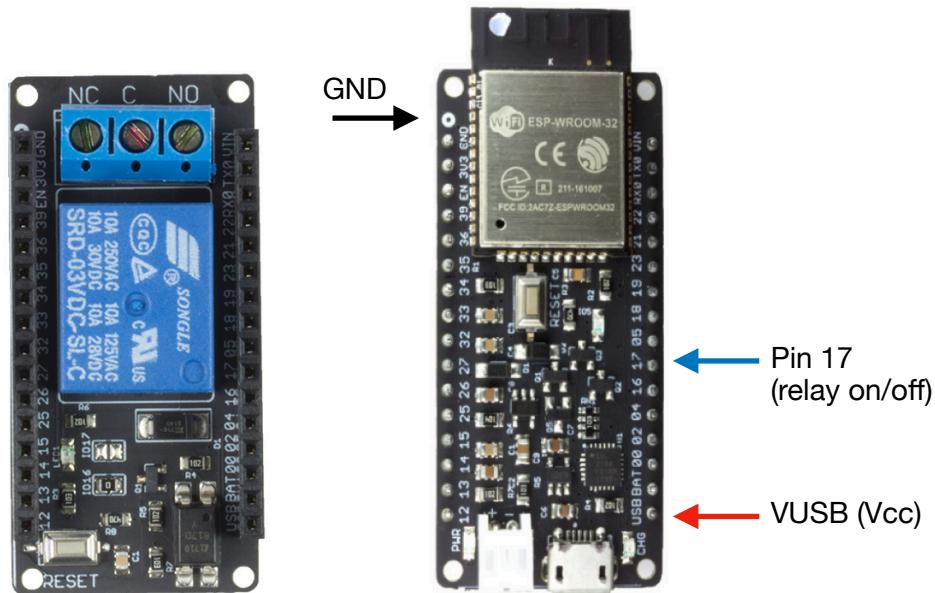


Expanded View



Relay Switch

IoT-Bus Relay Thing



Stackable as shown
Relay activated when pin 17 high
(no wiring needed if stacked)

The following script is in the kit-tests.gpp example. Try toggling the relay.

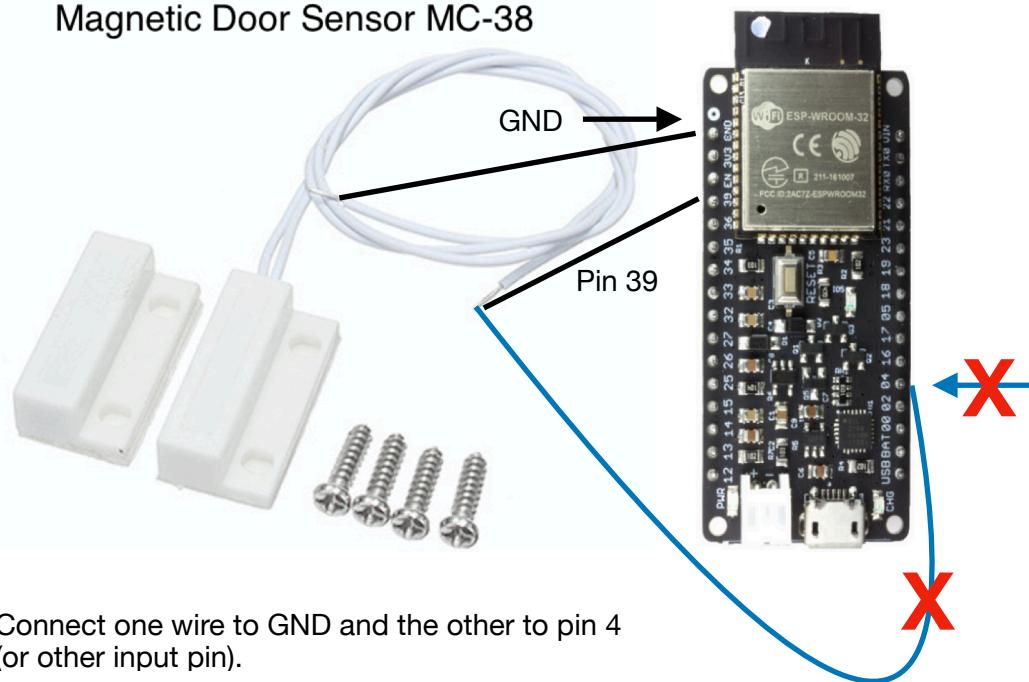
```
comment Click here first to initialize relay state to off
set on ▾ to off

comment Relay - click these blocks to toggle state
set on ▾ to not on
if on
  set digital pin 17 to on
  say Relay on!
else if off
  set digital pin 17 to off
  say off!
end
wait 20 millisecs
```

Door / Window Sensor

IoT-Bus Window and Door Sensor Thing

Magnetic Door Sensor MC-38



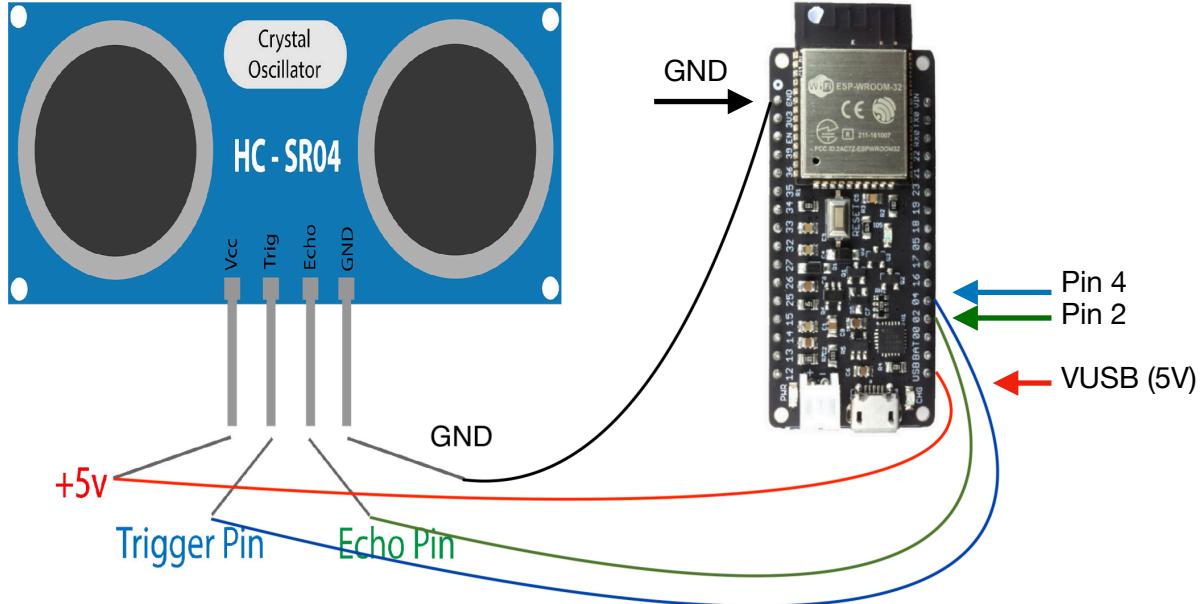
Connect one wire to GND and the other to pin 4 (or other input pin).

The following script is in the kit-tests.gpp example. Try opening and closing the magnets.

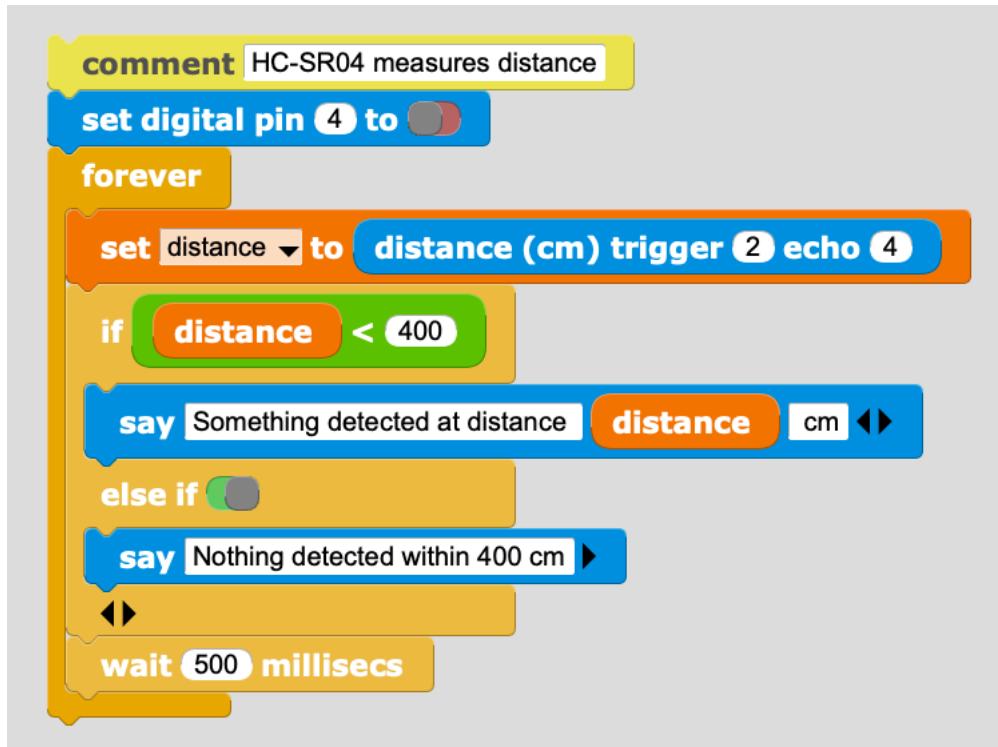


Distance Sensor

IoT-Bus HC-SR04 Thing

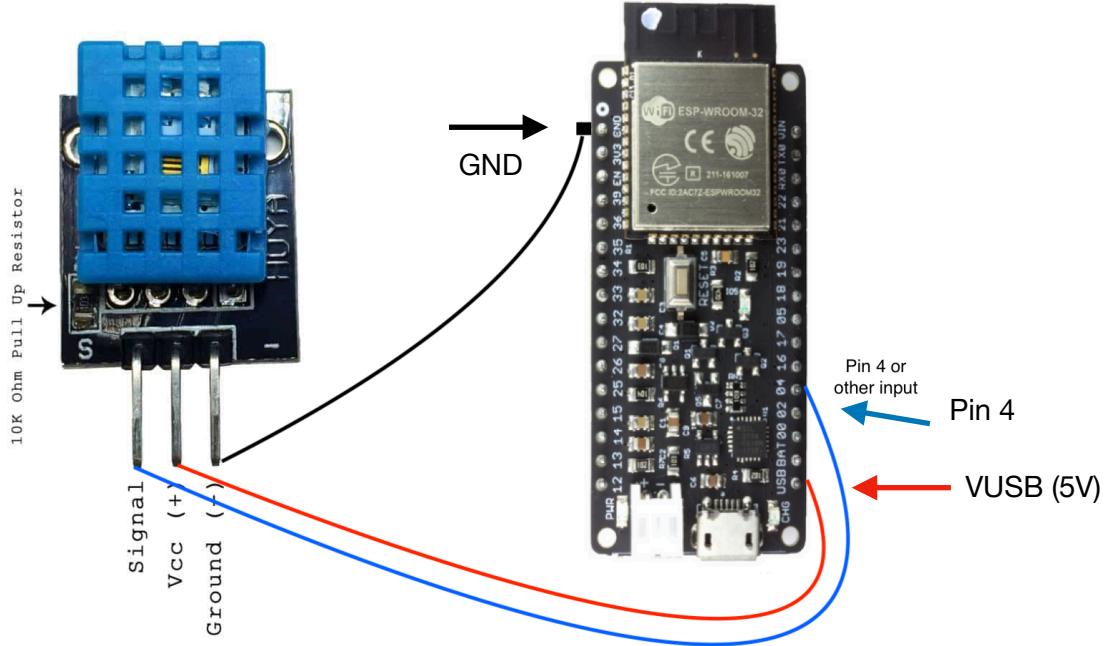


The following script is in the kit-tests.gpp example. Try measuring distance.



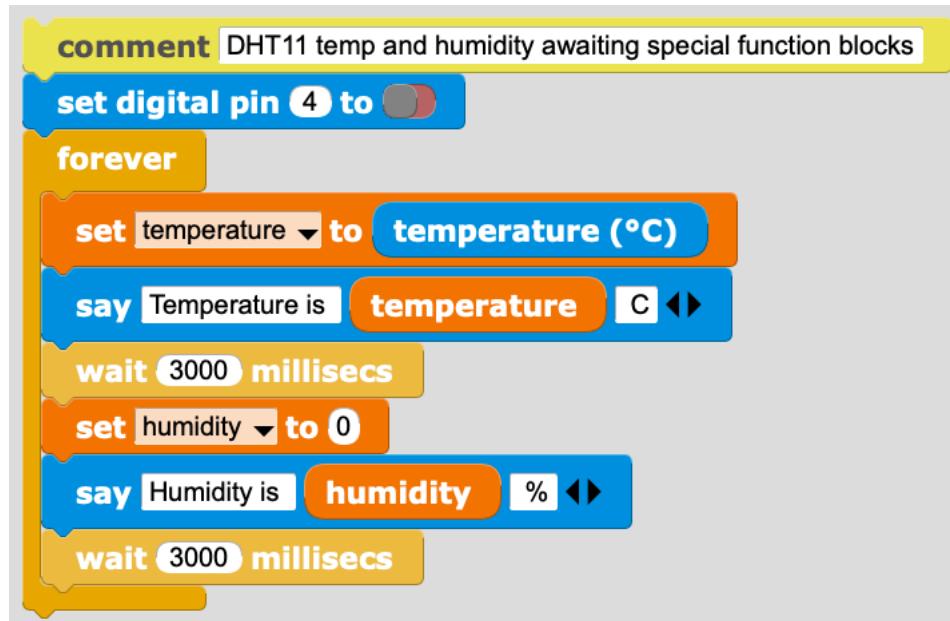
Temperature / Humidity

IoT-Bus DHT11 Thing



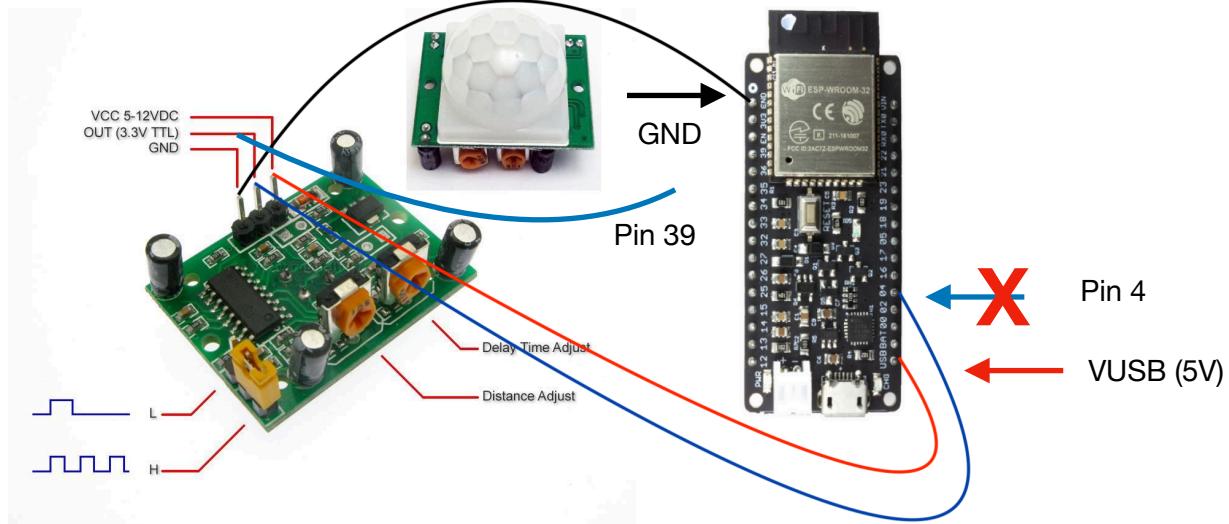
The following script is in the kit-tests.gpp example. Try measuring temperature and humidity.

(DHT11 MicroBlocks support pending, so check GitHub examples for update. Should be something like the following.)

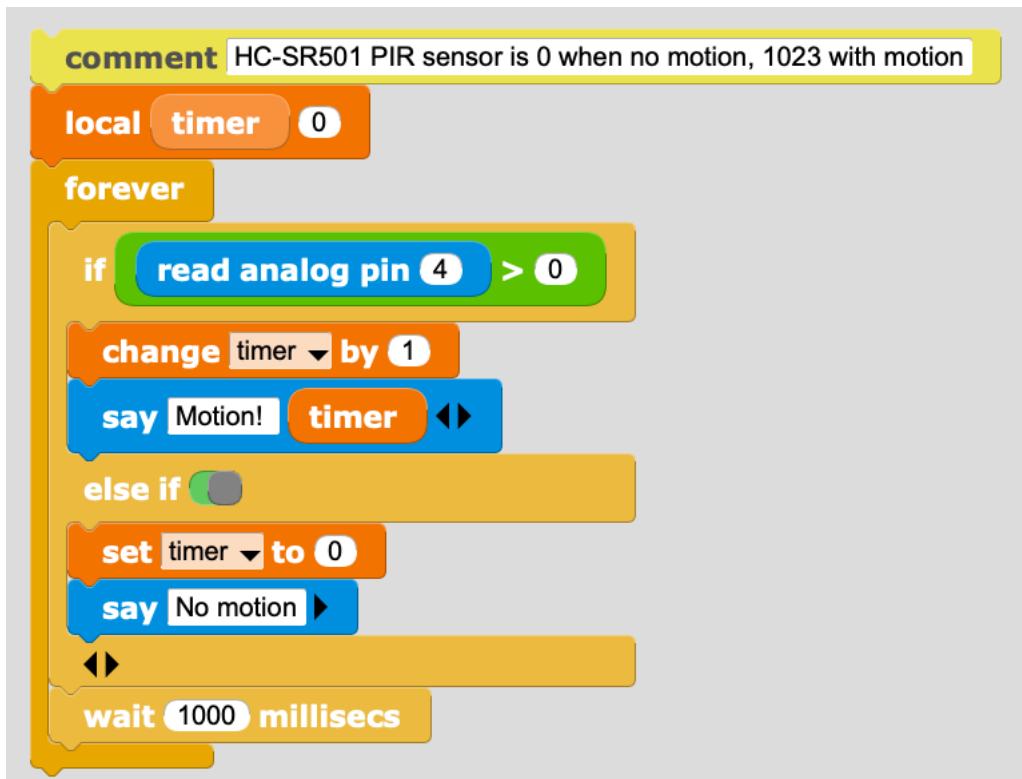


Motion (PIR) Sensor

IoT-Bus HC-SR501 PIR Thing



The following script is in the kit-tests.gpp example. Try measuring motion, and adjusting the “Delay Time Adjust” potentiometer to raise or lower the timeout that occurs after no motion is sensed, before the input is released from being pulled low. (After triggering motion, you can quickly put the sensor in a box to make sure it doesn’t detect you, then watch the seconds counted out by the script to estimate the delay.)

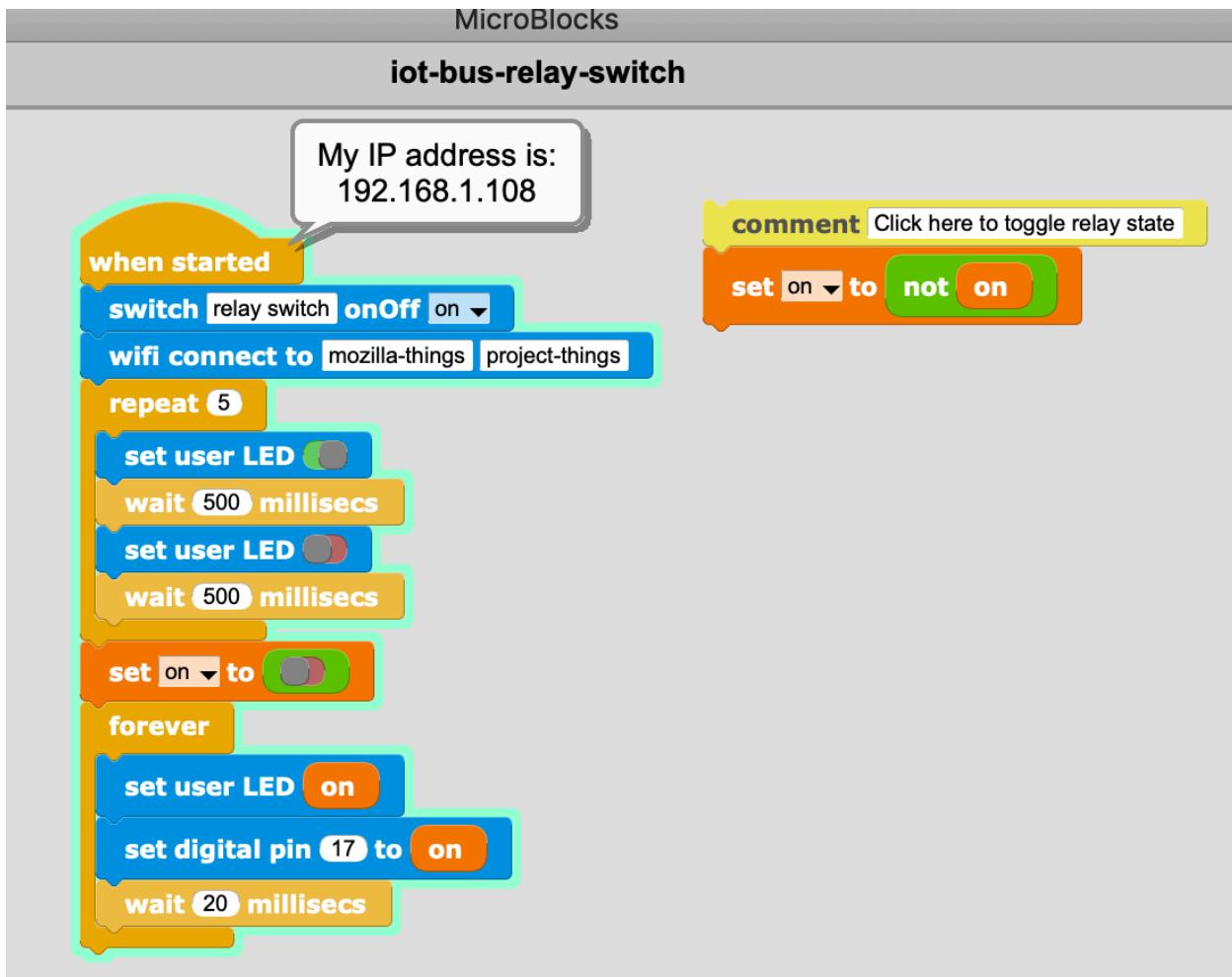


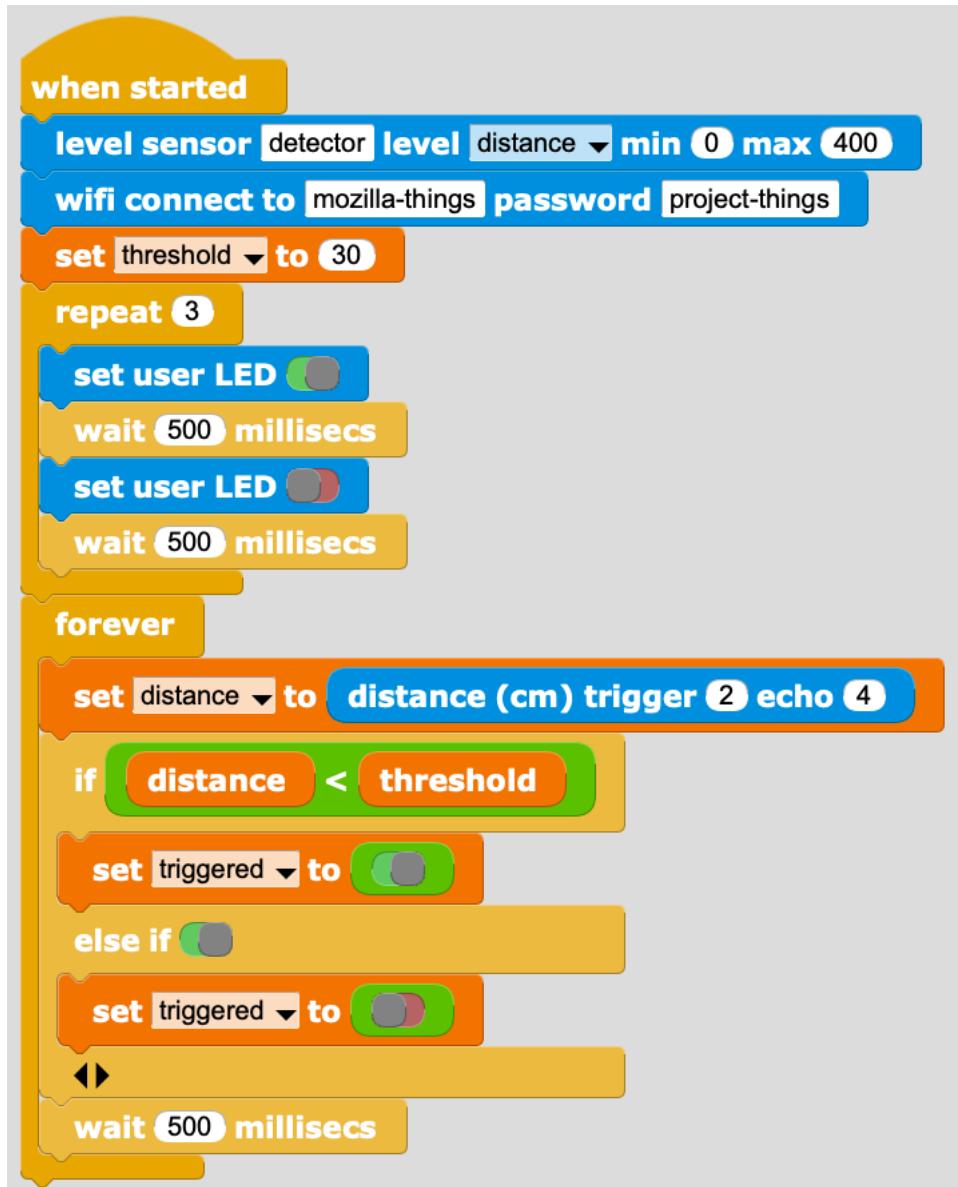
Examples Connecting to Things Gateway

Setup and operation of the Things Gateway by Mozilla is described in a [separate document](#).

The project web site at iot.mozilla.org/gateway also has more information.

To test connecting your IoT-Bus things to the Mozilla gateway, you can download Wi-Fi ready examples from [GitHub](#) to your computer, then open them using the MicroBlocks IDE. Here are some screen shot examples for quick reference.



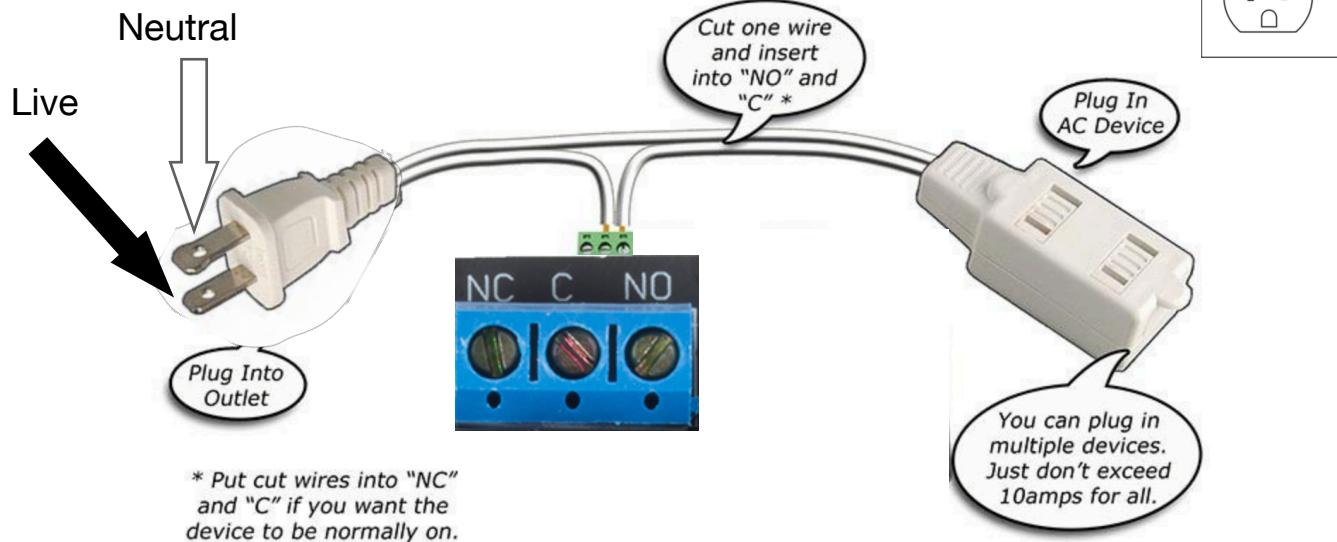


USING AN AC DEVICE WITH A 2-PRONG PLUG

You can cut the device's cable or use an extension cord and then plug the device into that. **Make sure the total of all AC devices plugged into one relay do not exceed 10amps!**

Important safety information!!

Always splice the LIVE wire, not neutral.
See below for more detail.

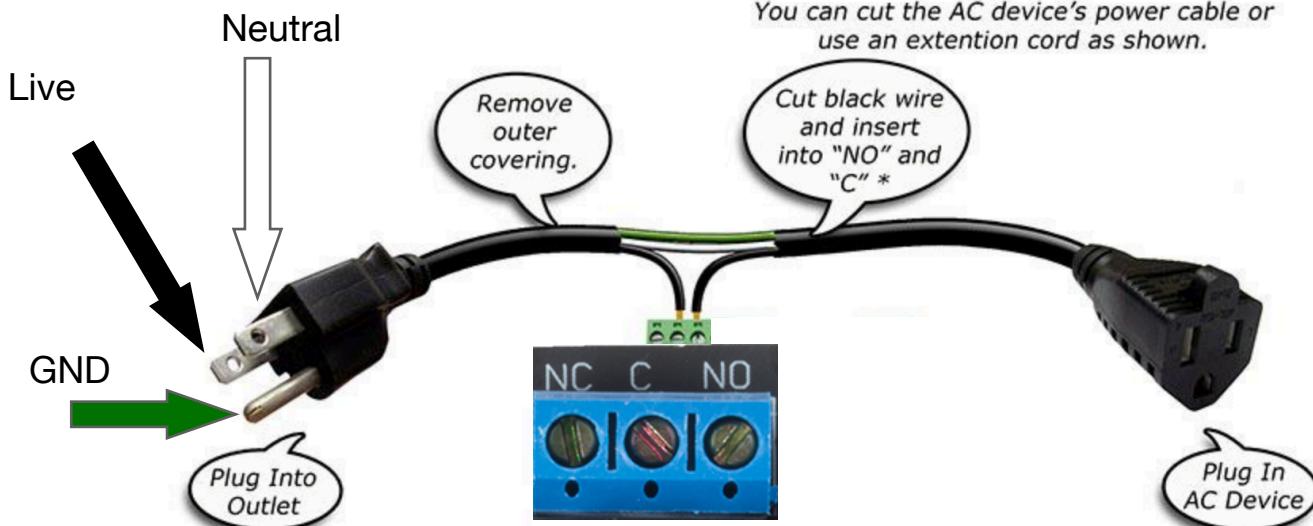


USING AN AC DEVICE WITH A 3-PRONG PLUG

You can cut the device's cable or use an extension cord and then plug the device into that.

Using AC Devices with Relays

You can cut the AC device's power cable or use an extention cord as shown.



Important safety information!!

Always splice the LIVE wire, not neutral. Do not plug into wall socket until completely enclosed so you can't touch any exposed wiring. You can be electrocuted if not careful. Use a multimeter to check your wiring before applying power.

