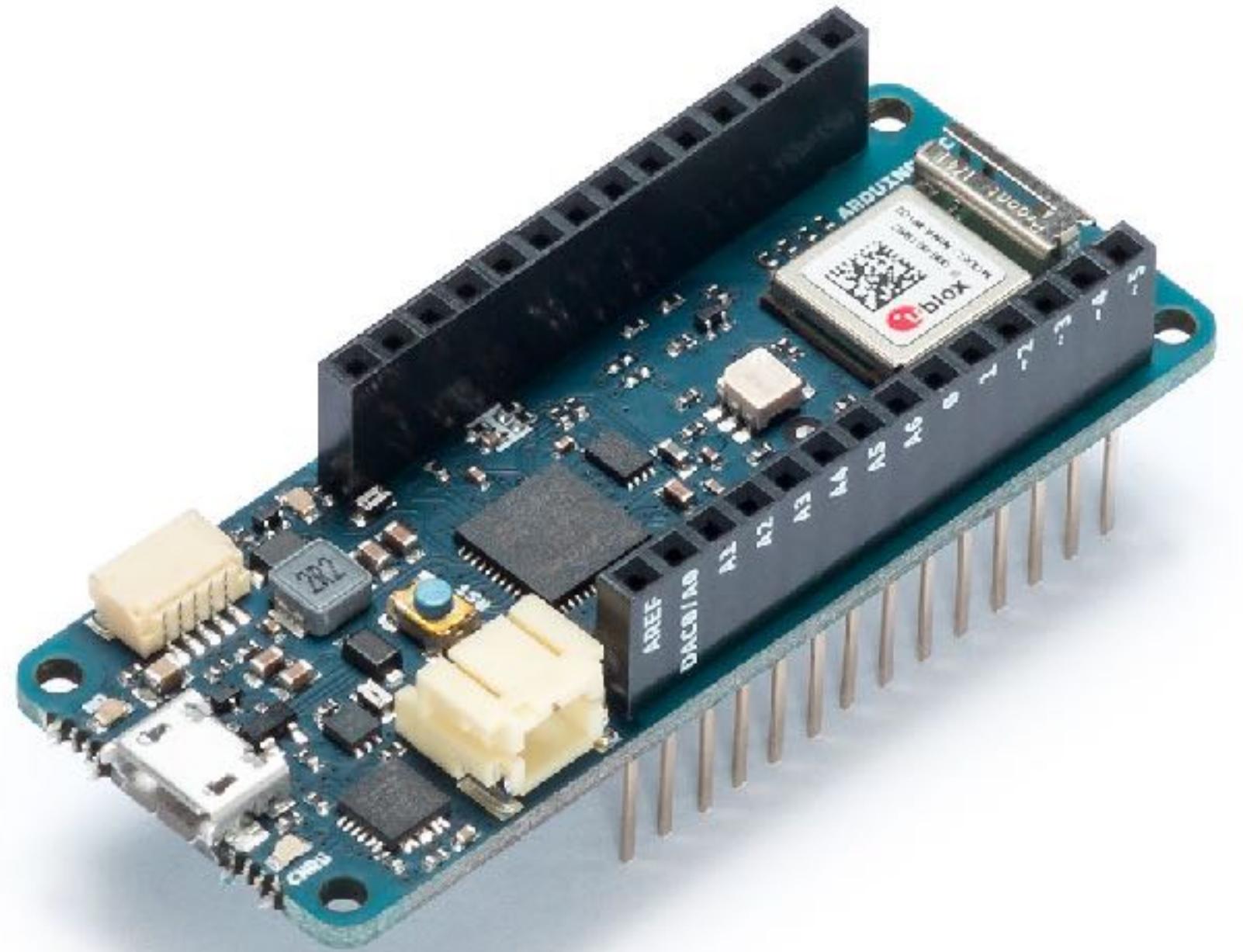


IoT Workshop

Philly Tech Week - May 10, 2019



Don Coleman

CHARIOT
SOLUTIONS

www.arduino.cc/en/Main/Software

Download the Arduino IDE



ARDUINO 1.8.9

The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. It runs on Windows, Mac OS X, and Linux. The environment is written in Java and based on Processing and other open-source software. This software can be used with any Arduino board.

Refer to the [Getting Started](#) page for Installation instructions.

Windows Installer, for Windows XP and up
Windows ZIP file for non admin install

Windows app Requires Win 8.1 or 10
[Get](#)

Mac OS X 10.8 Mountain Lion or newer

Linux 32 bits
Linux 64 bits
Linux ARM 32 bits
Linux ARM 64 bits

[Release Notes](#)
[Source Code](#)
[Checksums \(sha512\)](#)

HOURLY BUILDS

BETA BUILDS

github.com/don/chariot-iot-workshop

File Edit Sketch Tools Help

- Auto Format Ctrl+T
- Archive Sketch
- Fix Encoding & Reload
- Manage Libraries... Ctrl+Shift+I
- Serial Monitor Ctrl+Shift+M
- Serial Plotter Ctrl+Shift+L
-
- WiFi101 Firmware Updater
-
- Board: "Arduino/Genuino Uno" >
- Port >
- Get Board Info
-
- Programmer: "AVRISP mkII" >
- Burn Bootloader

- Boards Manager...
- △
- Arduino AVR Boards
- Arduino Yún
- Arduino/Genuino Uno
- Arduino Duemilanove or Diecimila
- Arduino Nano
- Arduino/Genuino Mega or Mega 2560
- Arduino Mega ADK
- Arduino Leonardo
- Arduino Leonardo ETH
- Arduino/Genuino Micro
- Arduino Esplora

Type

All

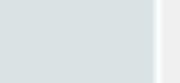


1010

Arduino SAMD Boards (32-bits ARM Cortex-M0+) by Arduino

Boards included in this package:

Arduino MKR WiFi 1010, Arduino/Genuino Zero, Arduino/Genuino MKR1000, Arduino MKRZERO, Arduino MKR FOX 1200, Arduino MKR WAN 1300, Arduino MKR GSM 1400, Arduino M0 Pro, Arduino M0, Arduino Tian, Adafruit Circuit Playground Express.

[Online help](#)[More info](#)[Install](#)[Close](#)

File Edit Sketch Tools Help



sketch

void se
// pu

}

void lo

// put your main code here, to run repeate

}

- Verify/Compile Ctrl+R
- Upload Ctrl+U
- Upload Using Programmer Ctrl+Shift+U
- Export compiled Binary Ctrl+Alt+S
- Show Sketch Folder Ctrl+K
- Include Library
- Add File...

Manage Libraries... Ctrl+Shift+I

Add .ZIP Library...

Arduino libraries

Bridge

EEPROM

Esplora

Ethernet

Firmata

GSM

HID

Keyboard

LiquidCrystal

Type

All



Topic

All



NINA

WiFiNINA by Arduino**Enables network connection (local and Internet) with the Arduino MKR WiFi 1010, Arduino MKR VIDOR 4000 and Arduino UNO****WiFi Rev.2.** With this library you can instantiate Servers, Clients and send/receive UDP packets through WiFi. The board can connect either to open or encrypted networks (WEP, WPA). The IP address can be assigned statically or through a DHCP. The library can also manage DNS.[More info](#)

Version 1.2.0

[Install](#)[Close](#)

Type

All



Topic

All



ArduinoMqttClient

ArduinoMqttClient by Arduino**[BETA]** Allows you to send and receive MQTT messages using Arduino.[More info](#)

Version 0.1.1

[Install](#)[Close](#)

Type

All



Topic

All



ECCX

ArduinoBearSSL by Arduino**Port of BearSSL to Arduino.** This library depends on ArduinoECCX08.[More info](#)

Version 1.2.0

[Install](#)**ArduinoECCX08 by Arduino****Arduino Library for the Atmel/Microchip ECC508 and ECC608 crypto chips**[More info](#)[Close](#)

Type

All

Topic

All

DHT

DHT sensor library by Adafruit**Arduino library for DHT11, DHT22, etc Temp & Humidity Sensors** Arduino library for DHT11, DHT22, etc Temp & Humidity Sensors[More info](#)

Version 1.3.0

Install

DHT sensor library for ESPx by beegee_tokyo**Arduino ESP library for DHT11, DHT22, etc Temp & Humidity Sensors** Optimized libray to match ESP32 requirements. Last changes: Use correct field separator in keywords.txt.[More info](#)**Grove Temperature And Humidity Sensor by Seeed Studio****Arduino library to control Grove Temperature And Humidity Sensor, it contains chip DHT11 AM2302.** This temperature & humidity sensor provides a pre-calibrated digital output. A unique capacitive sensor element measures relative humidity and the temperature is measured by a negative temperature coefficient (NTC) thermistor. It has excellent reliability and long term stability.[More info](#)**SimpleDHT by Winlin****Arduino Temp & Humidity Sensors for DHT11 and DHT22.** Simple C++ code with lots of comments, strictly follow the standard DHT

Close

Type All



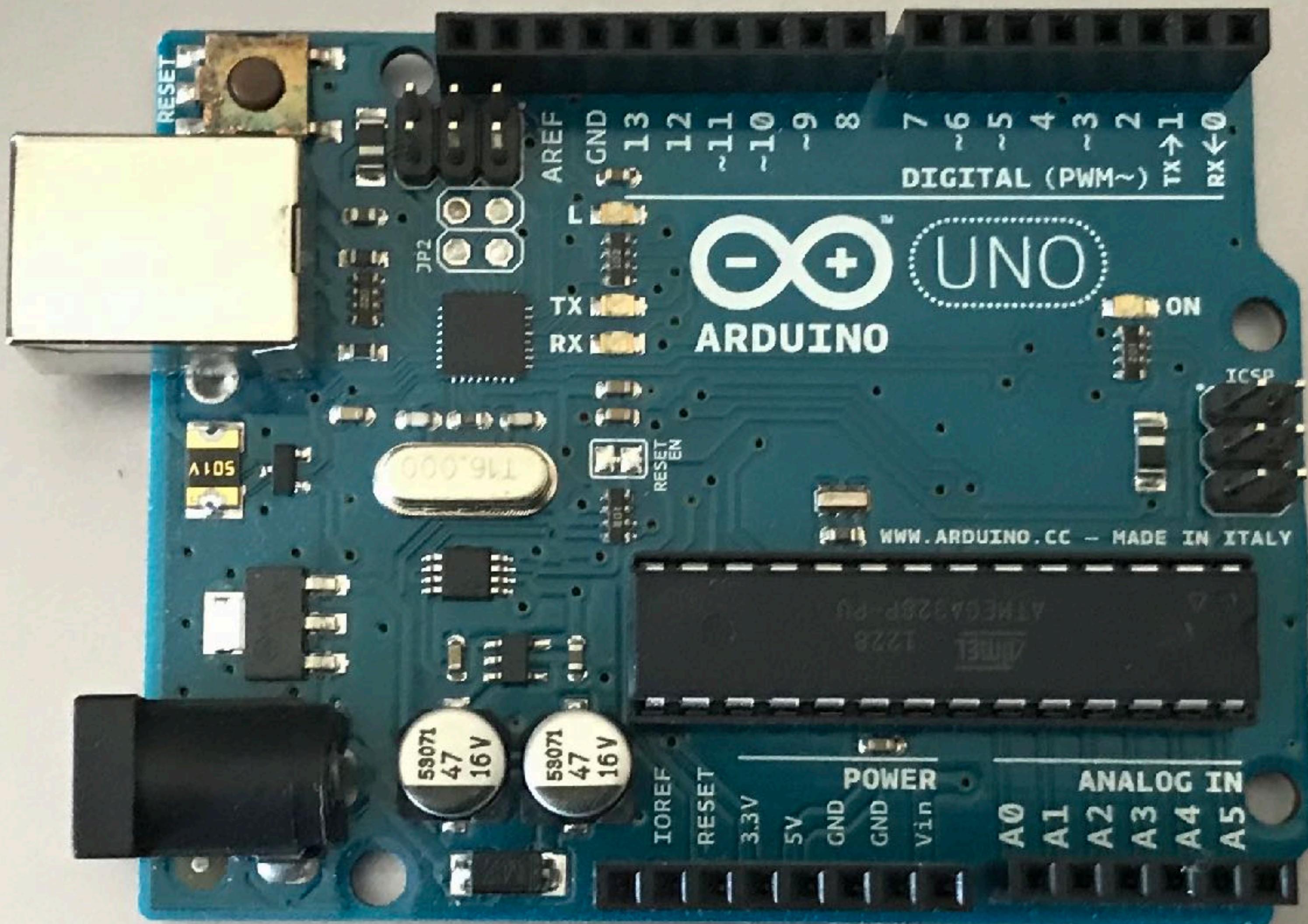
Topic All

Adafruit abstraction

Adafruit Unified Sensor by Adafruit**Required for all Adafruit Unified Sensor based libraries.** A unified sensor abstraction layer used by many Adafruit sensor libraries.[More info](#)

Version 1.0.2

[Install](#)[Close](#)



THE ARDUINO MKR FAMILY



MKR 1000



MKR FOX1200



MKR WAN 1300



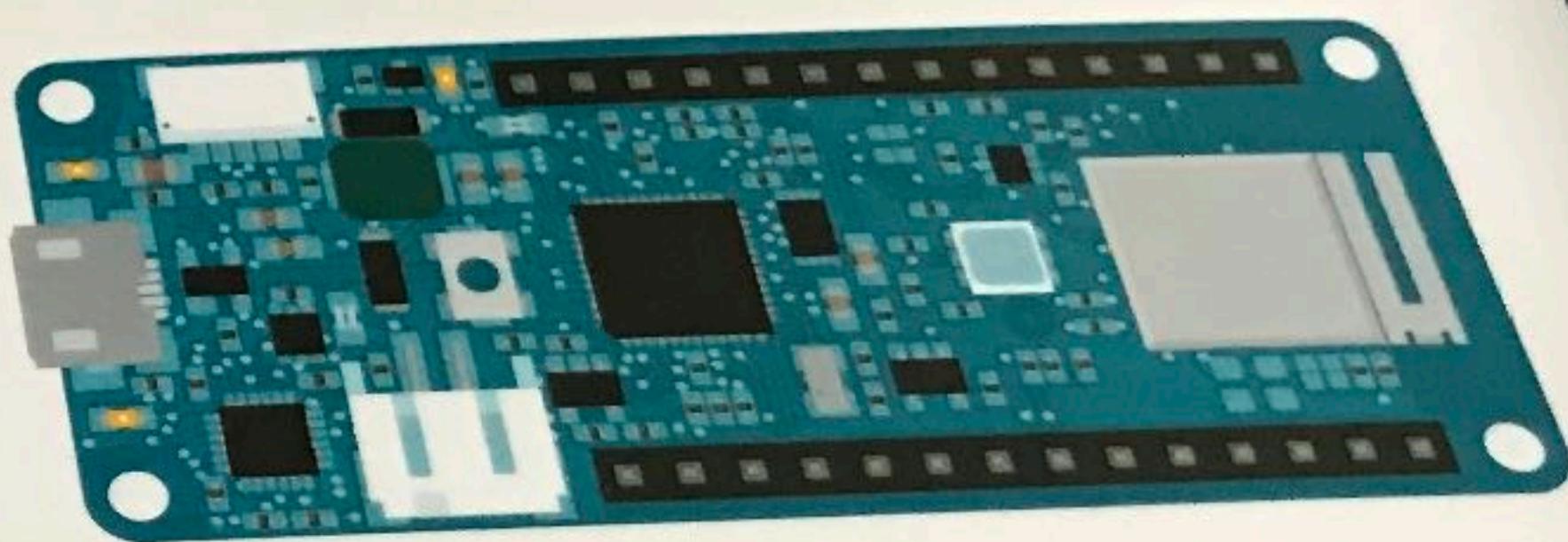
MKR GSM 1400

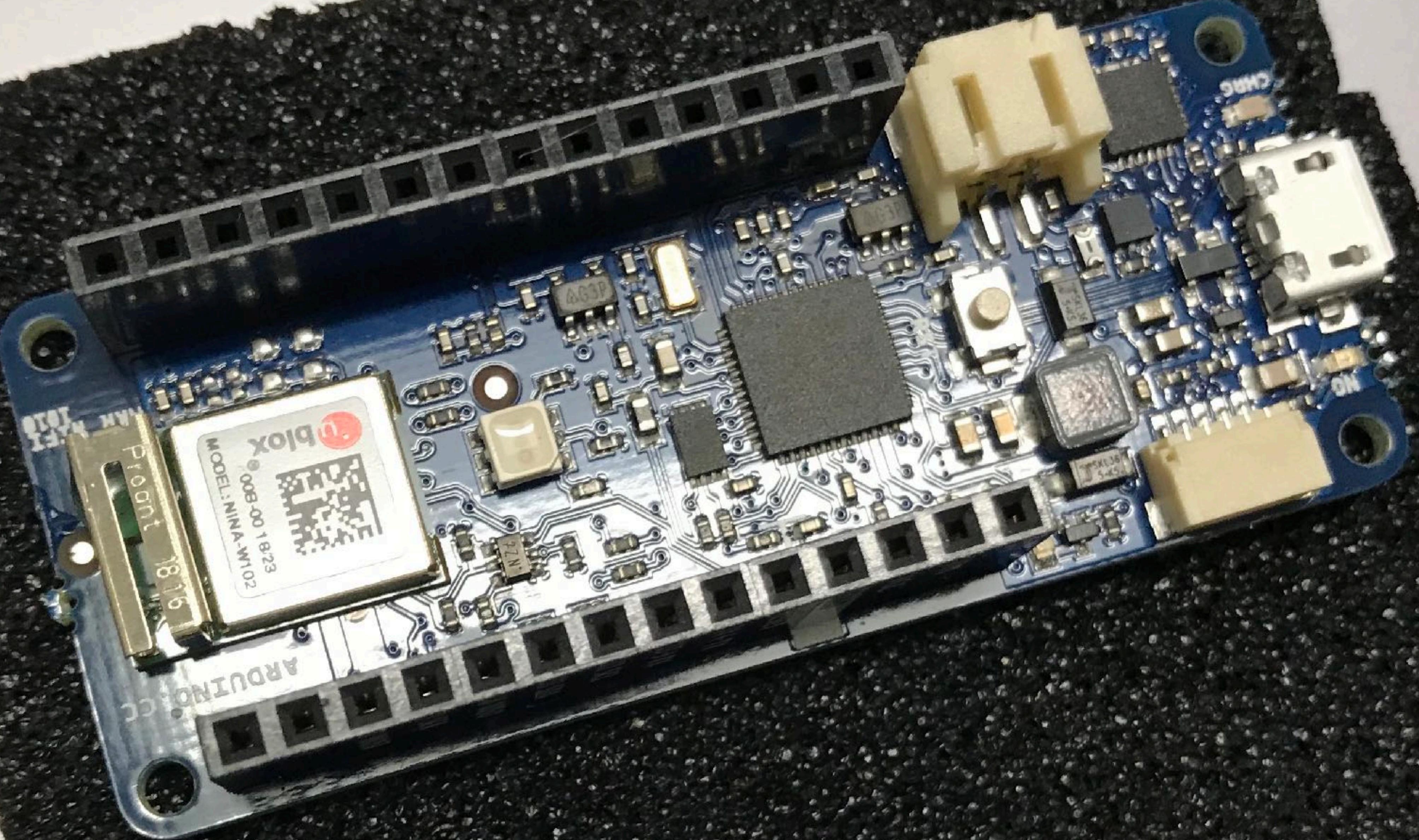


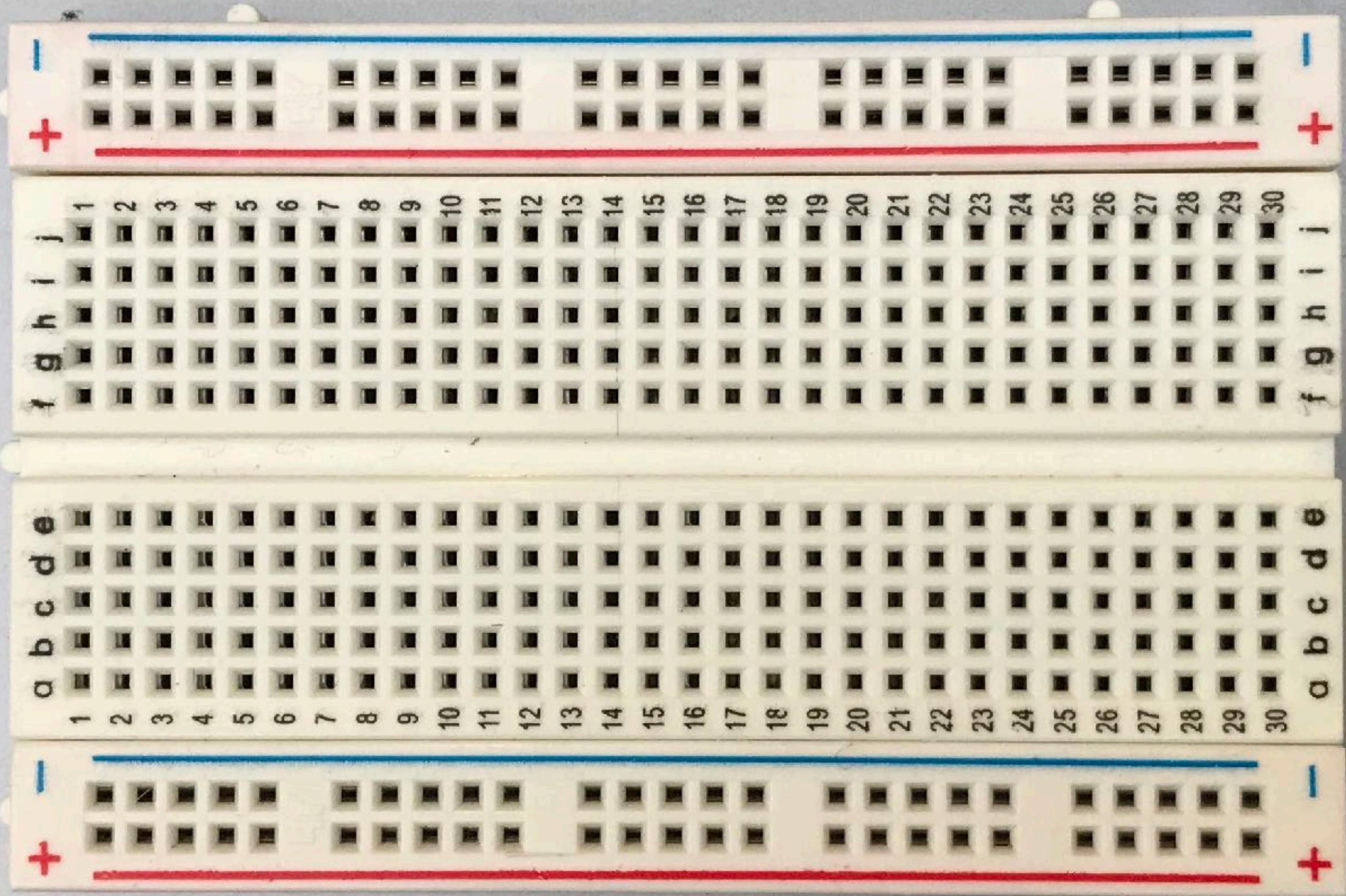
MKR NB 1500
(NB-IoT & CAT-M1)

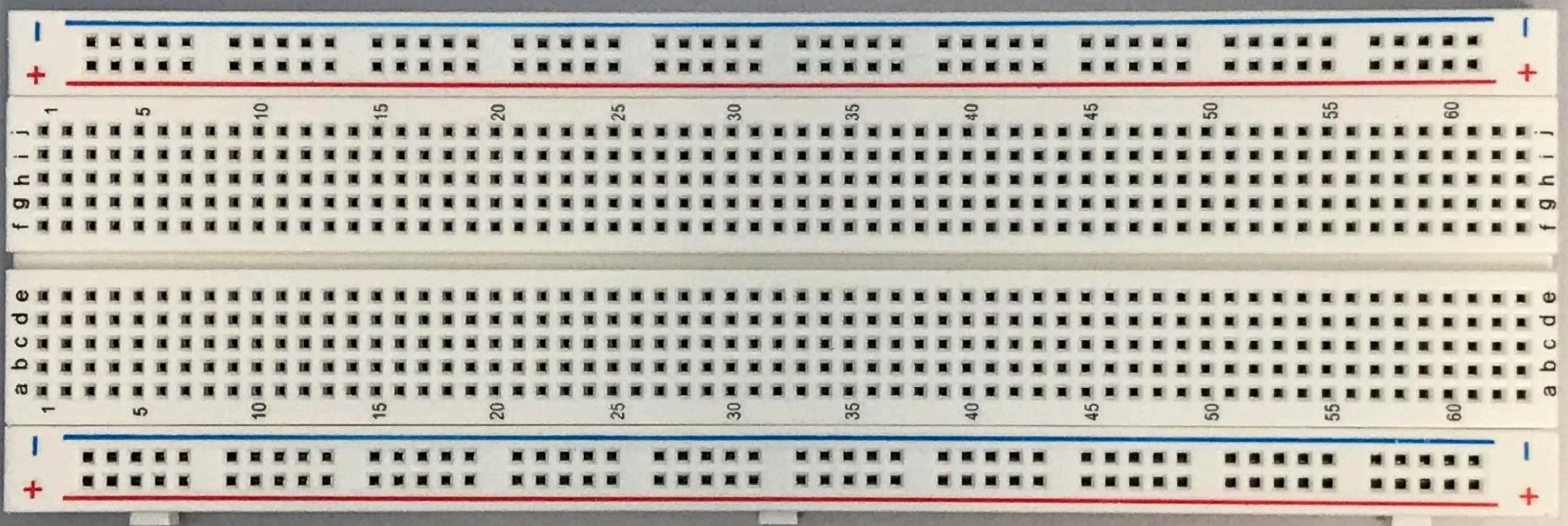


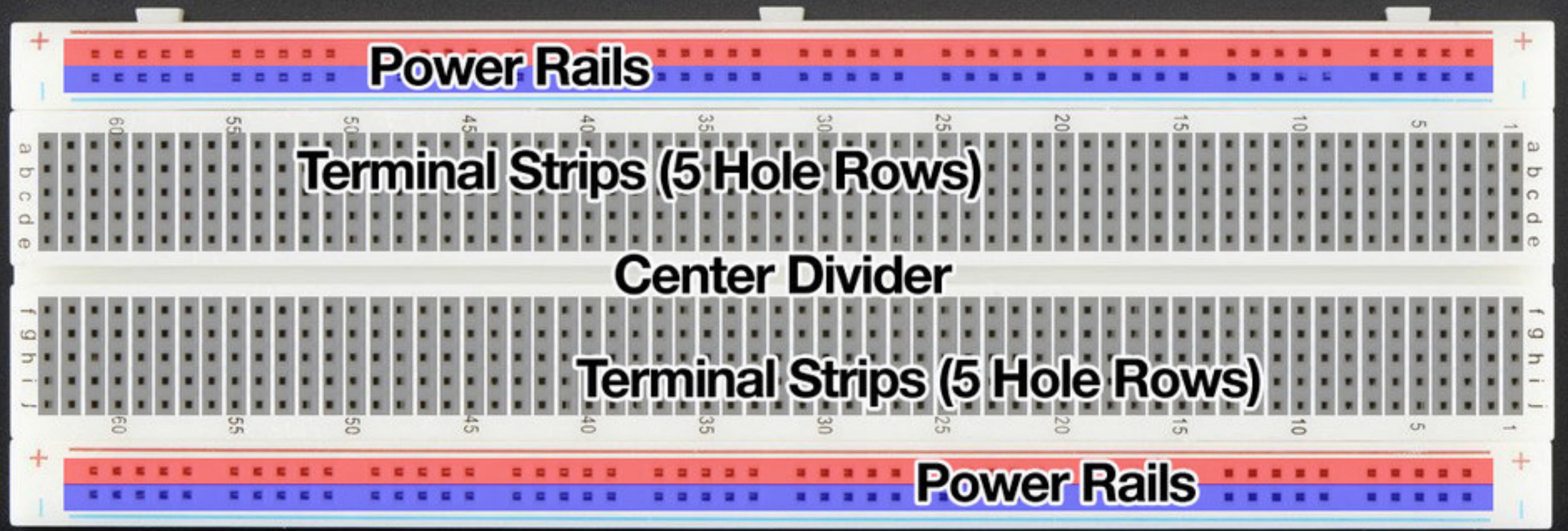
MKR WIFI 1010



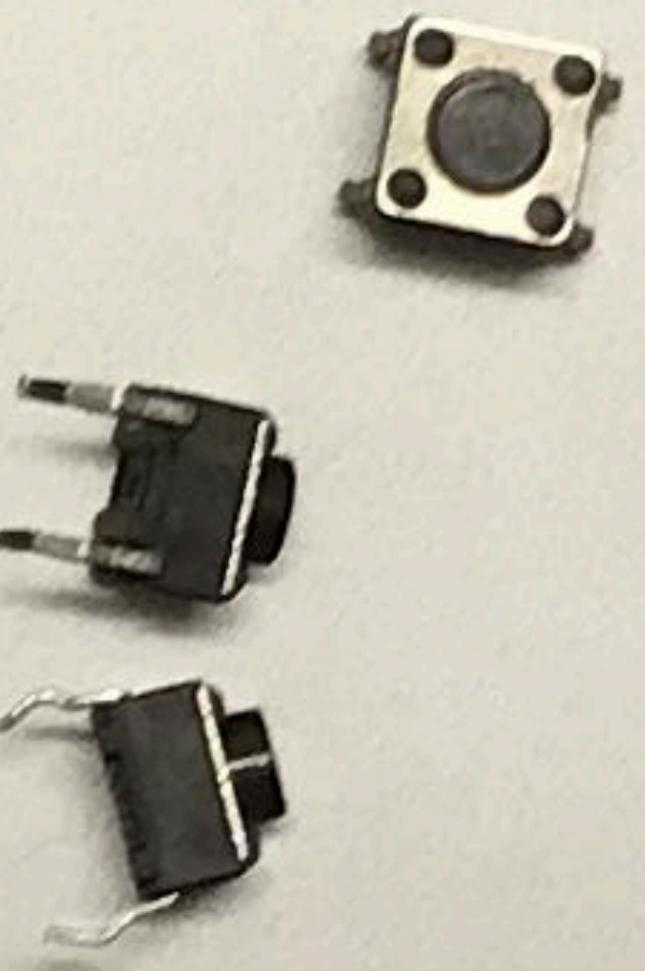
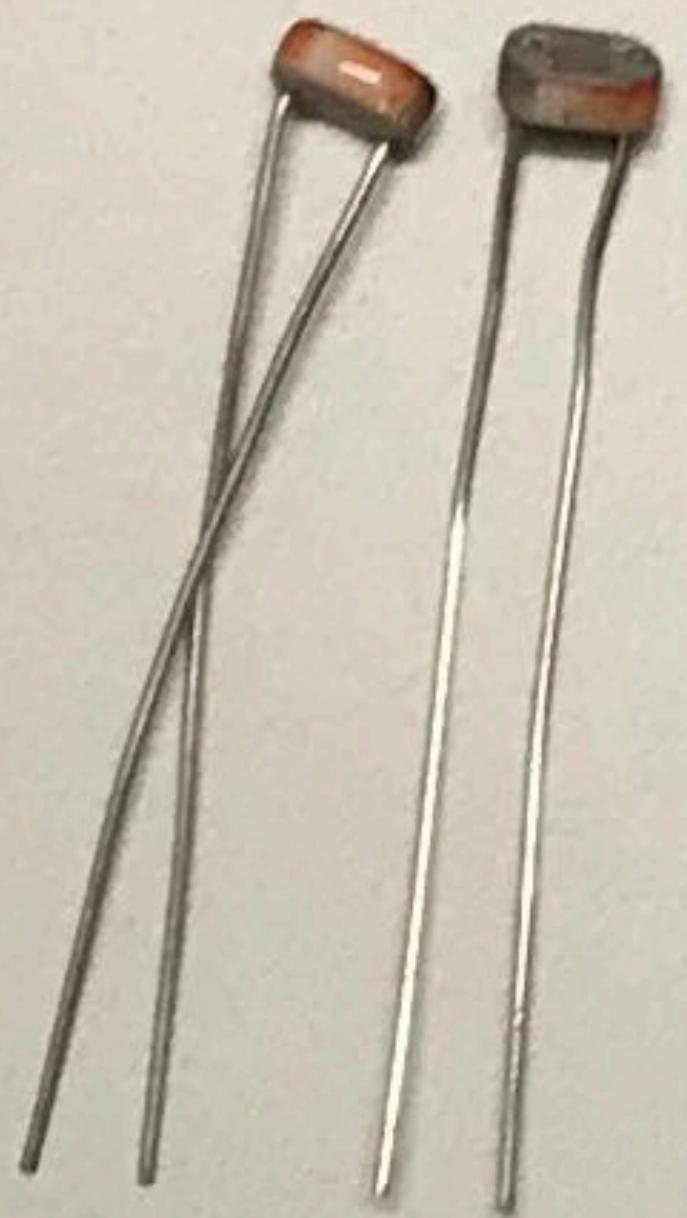






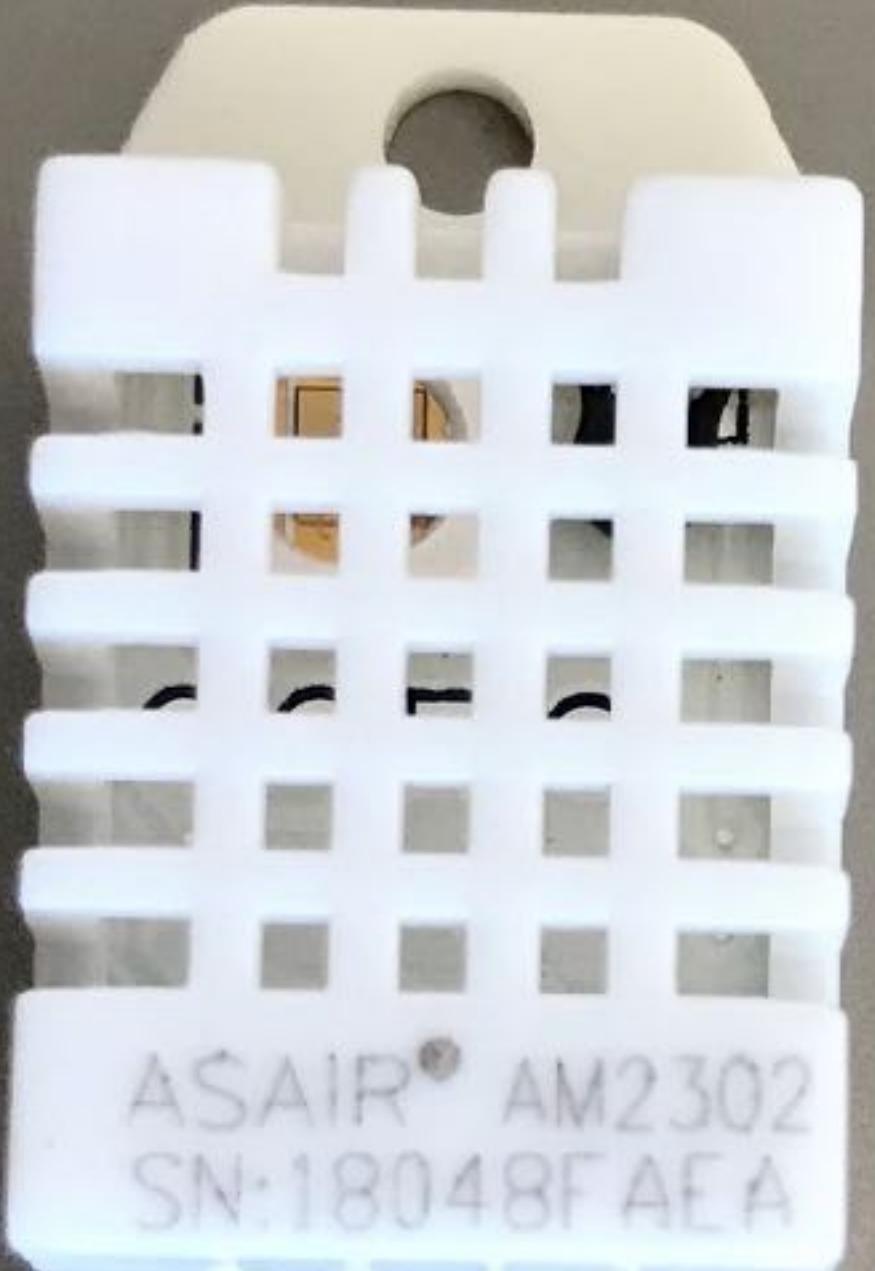




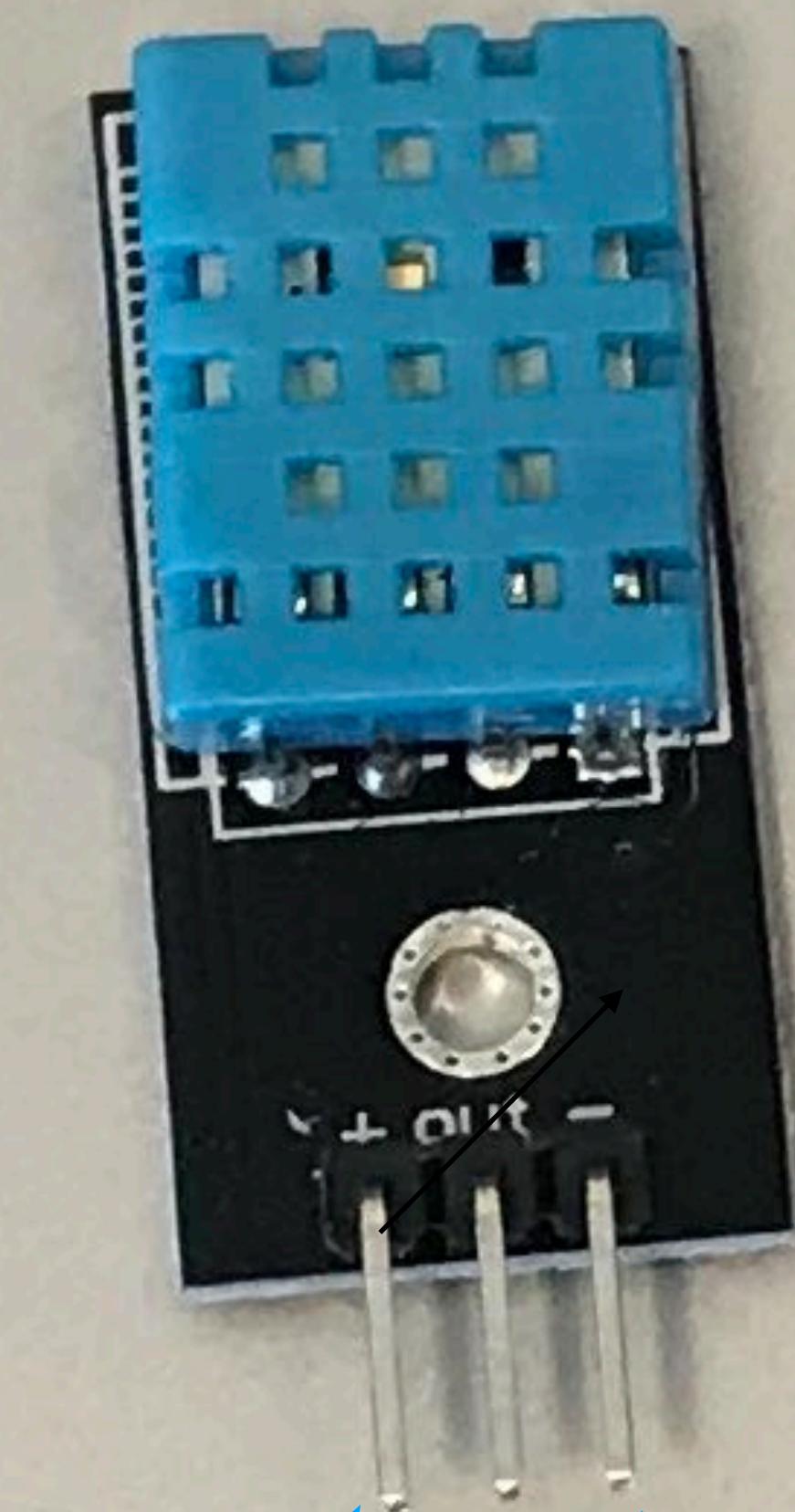


flat edge





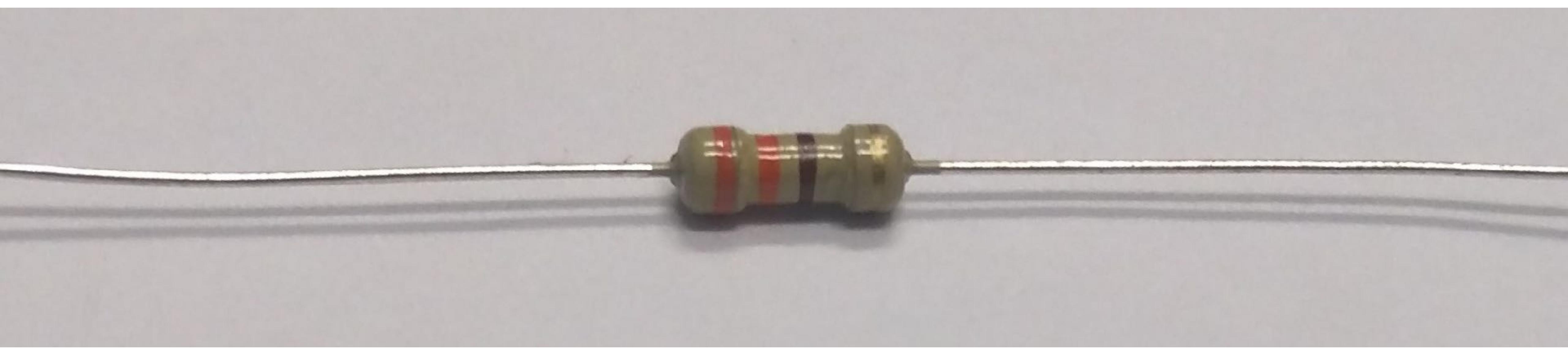
VCC Data Out Ground



Vcc

Data

Ground



**330 Ω Orange Orange Brown Gold
10,000 Ω Brown Black Orange Gold**

4 Band Resistor Color Code Calculator

This tool is used to decode information for color banded axial lead resistors. Select the number of bands, then their colors to determine the value and tolerance of the resistors or [view all resistors](#) Digi-Key has to offer. Learn more about [resistors and resistor color codes](#).

Number of Bands:

4 Band **5 Band** **6 Band**

Select the color of each band on the resistor:

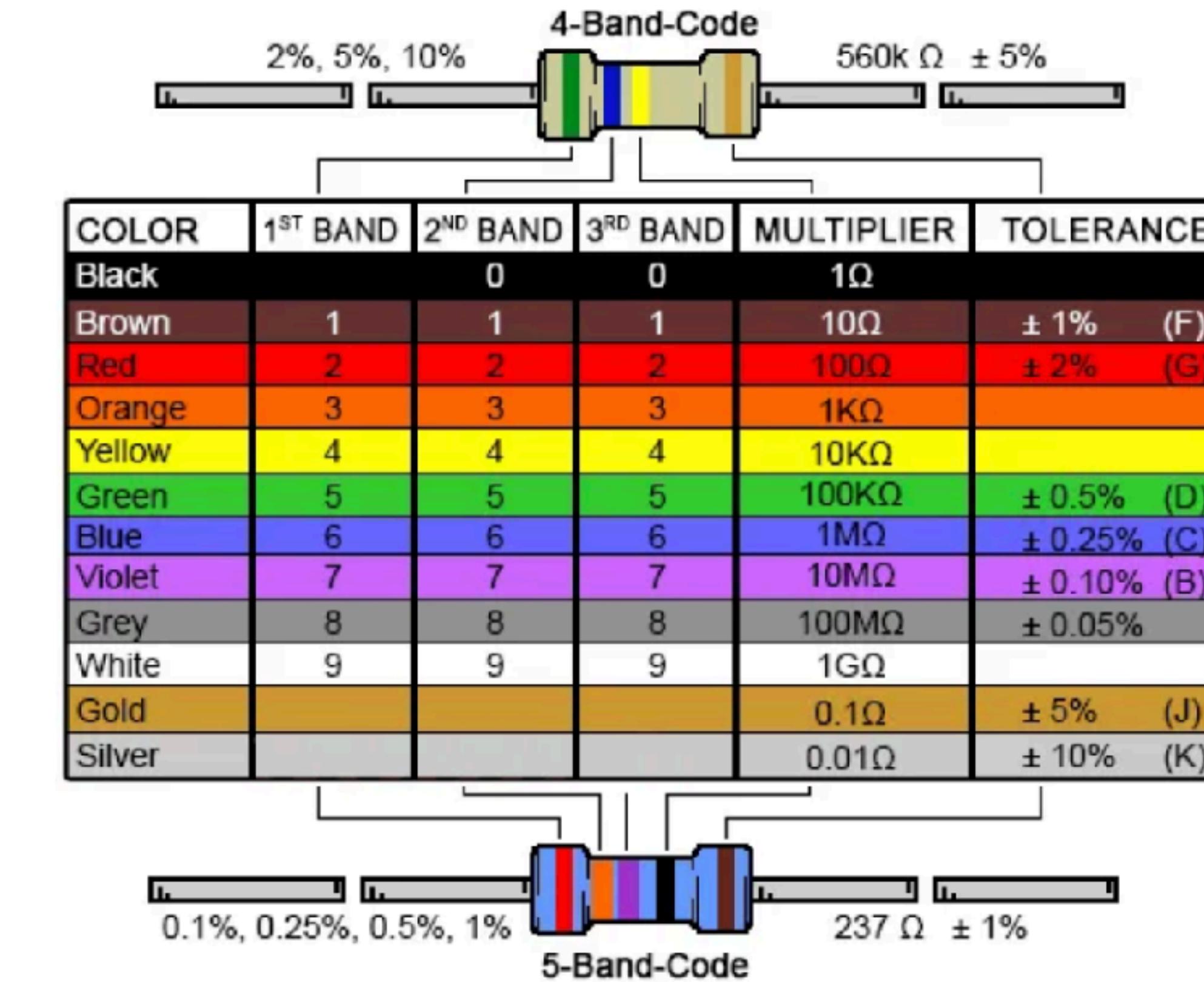
1st Band:  **Red** **2**

2nd Band:  **Red** **2**

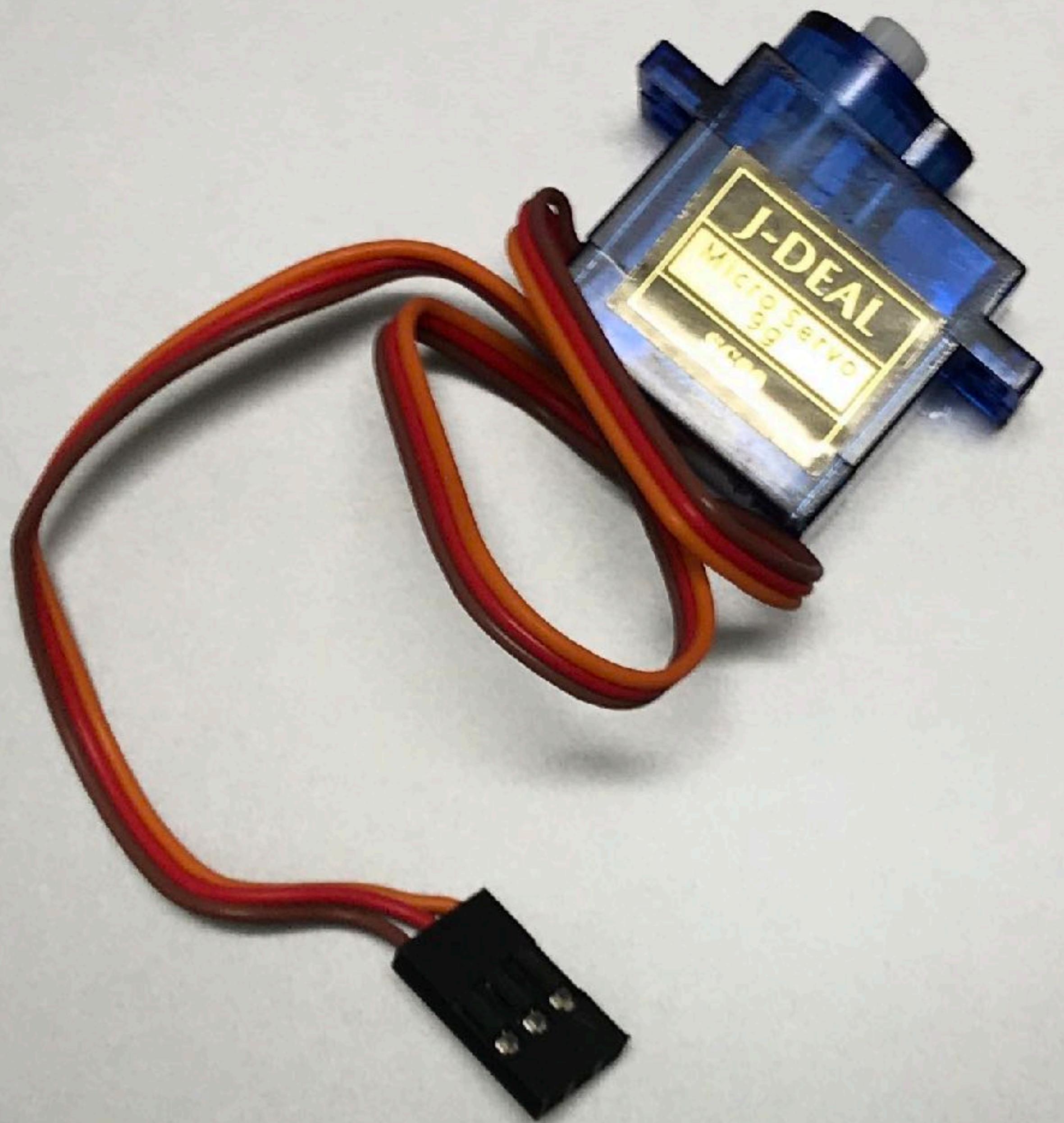
Multiplier:  **Brown** **$\times 10 \Omega$**

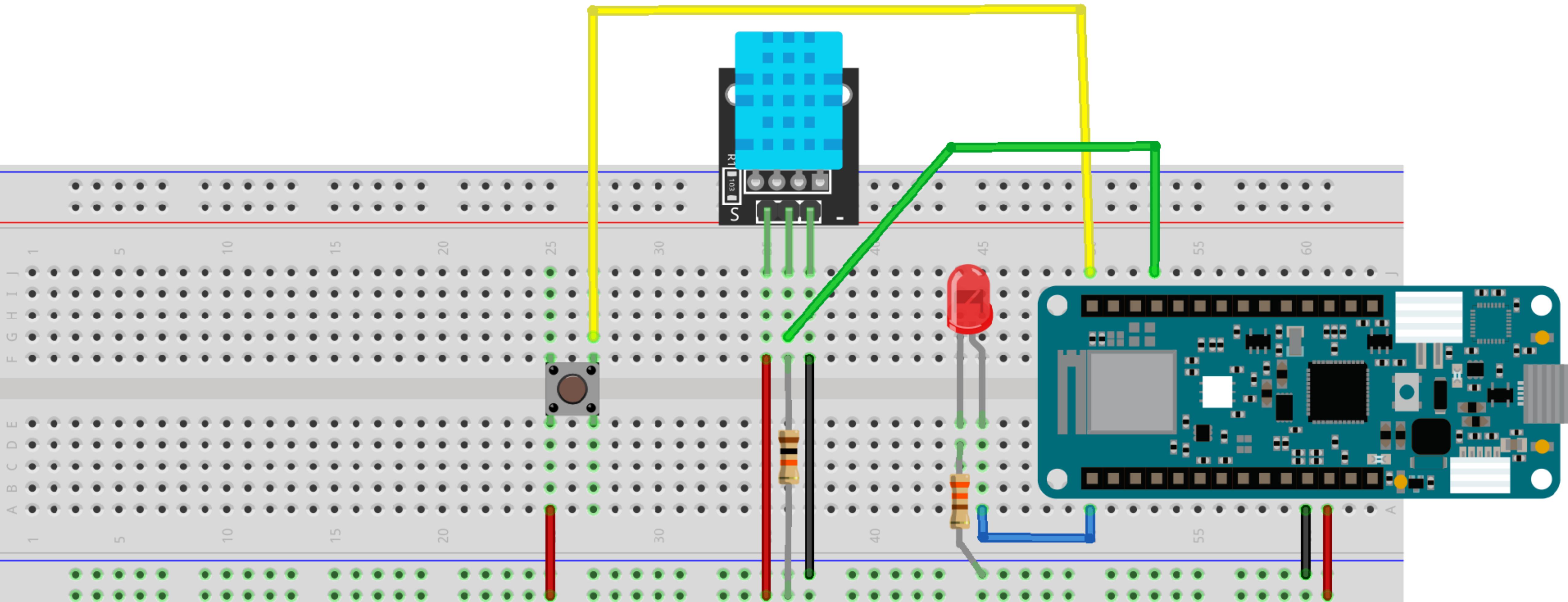
Tolerance:  **Gold** **$\pm 5\%$**

Resistor Value: **220 Ohms 5%** 

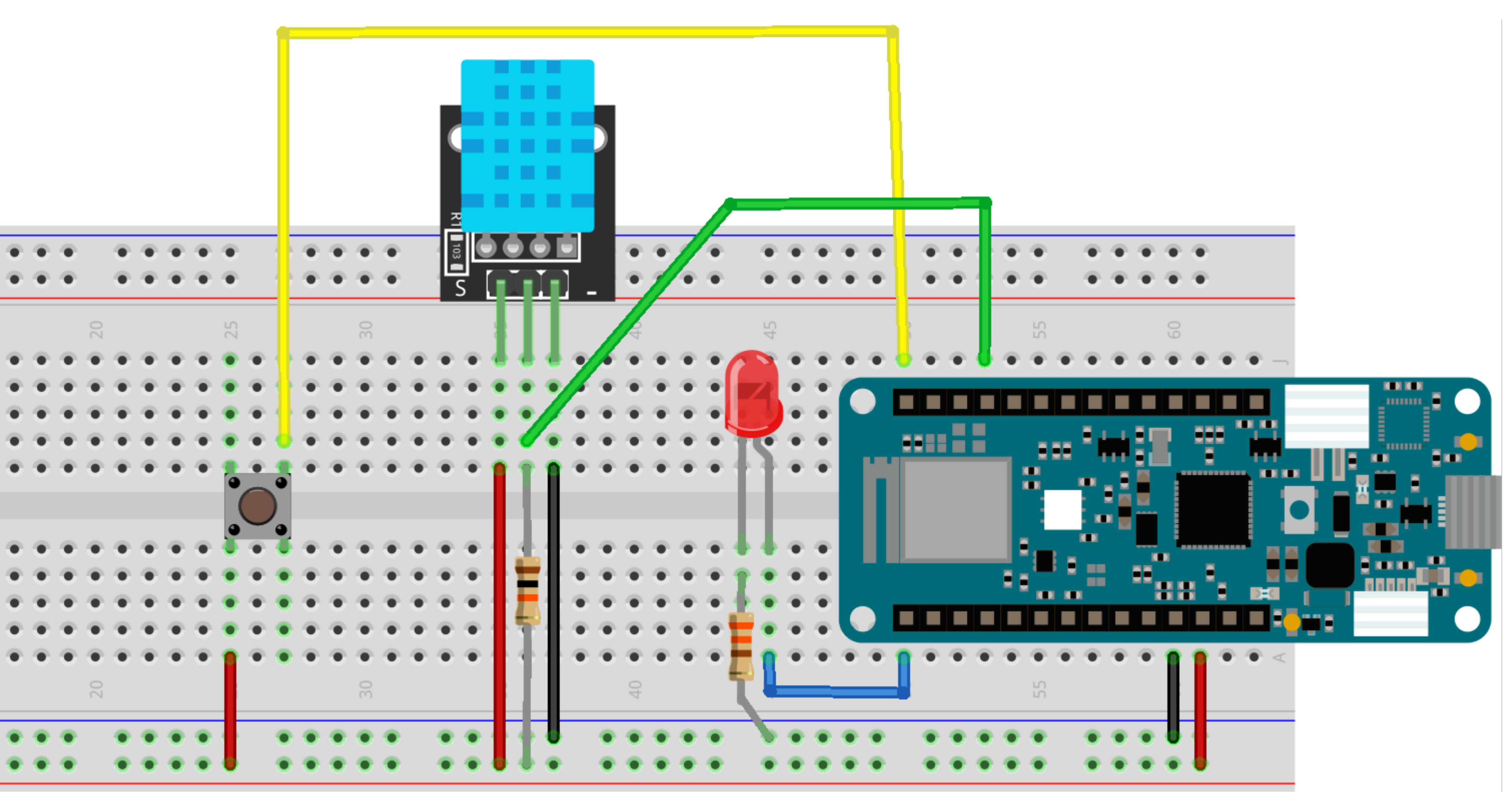


Learn more about [resistors and resistor color codes](#).

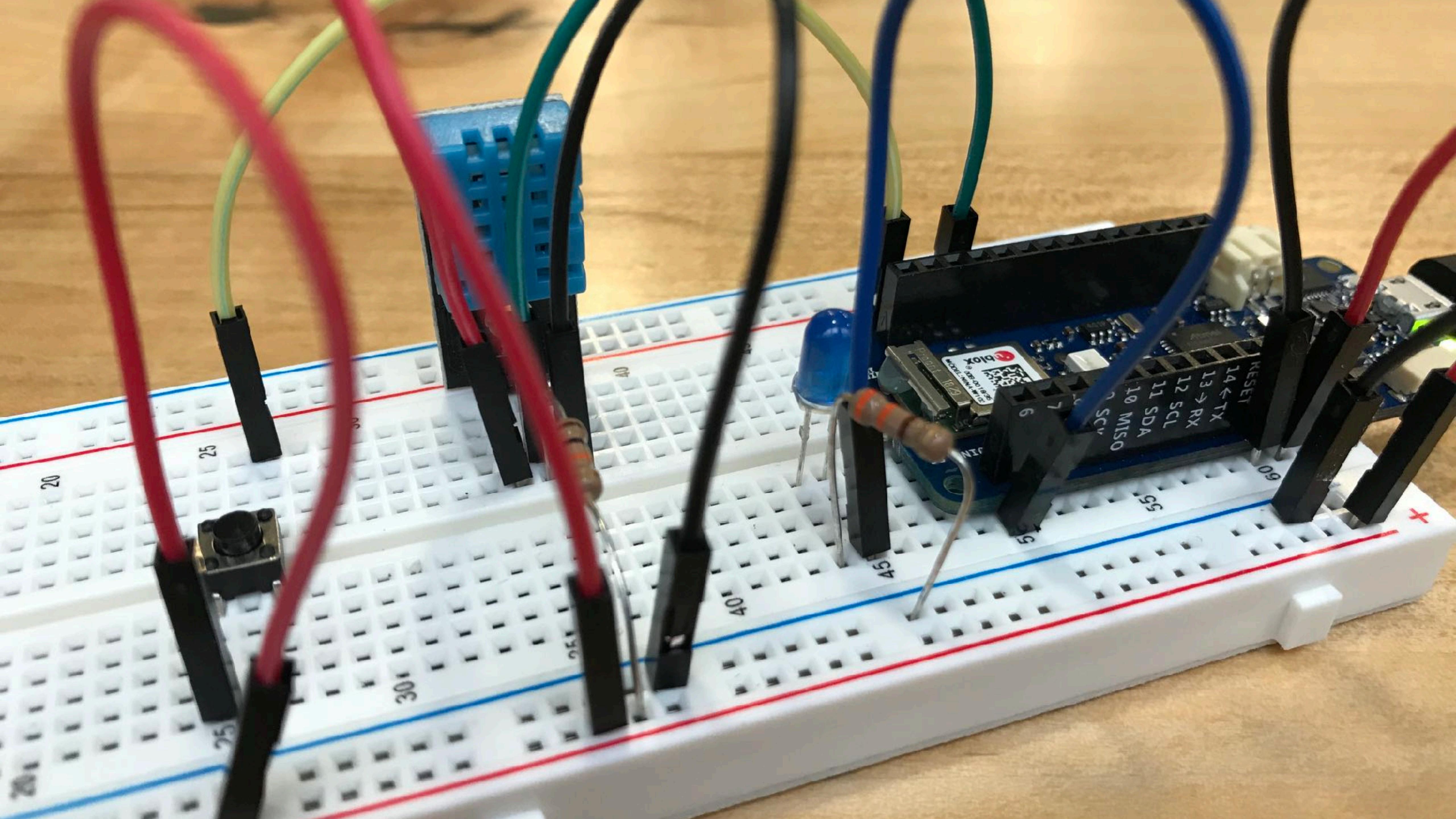




fritzing



fritzing



HardwareTest.ino

File Edit Sketch Tools Help

Auto Format Ctrl+T

Archive Sketch

Fix Encoding & Reload

Manage Libraries...

Ctrl+Shift+I

Serial Monitor

Ctrl+Shift+M

Serial Plotter

Ctrl+Shift+L

WiFi101 Firmware Updater

Board: "Arduino MKR WiFi 1010"

Port

Get Board Info

Programmer: "AVRISP mkII"

Burn Bootloader

Boards Manager...

Arduino SAMD (32-bits ARM Cortex-M0+) Boards

Arduino/Genuino Zero (Programming Port)

Arduino/Genuino Zero (Native USB Port)

Arduino/Genuino MKR1000

Arduino MKRZERO

Arduino MKR FOX 1200

Arduino MKR GSM 1400

Arduino MKR WAN 1300

● Arduino MKR WiFi 1010

Adafruit Circuit Playground Express

Arduino M0 Pro (Programming Port)

Arduino M0 Pro (Native USB Port)

Arduino M0

Arduino T

```
// Hackaday S
// Hardware T
//
// Run this s
// the temper

#include <DHT
#define DHTTY
#define DHTPI
DHT dht(DHTPI

void setup()
// initiali
Serial.begin(500000

// initialize temperature sensor
dht.begin();

// initialize digital pin LED_BUILTIN as an output.
pinMode(LED_BUILTIN, OUTPUT);
```

File Edit Sketch Tools Help

Auto Format Ctrl+T
Archive Sketch
Fix Encoding & Reload
Manage Libraries... Ctrl+Shift+I
Serial Monitor Ctrl+Shift+M
Serial Plotter Ctrl+Shift+L

WiFi101 Firmware Updater

Board: "Arduino MKR WiFi 1010"

Port

Serial ports

COM3 (Arduino MKR WiFi 1010)

Get Board Info

Programmer: "AVRISP mkII"

Burn Bootloader

```
// Hackaday S
// Hardware T
//
// Run this s
// the temper

#include <DHT
#define DHTTY
#define DHTPI
DHT dht(DHTPI

void setup()
// initiali
Serial.begin(www,
             

// initialize temperature sensor
dht.begin(); 

// initialize digital pin LED_BUILTIN as an output.
pinMode(LED_BUILTIN, OUTPUT);
```

The screenshot shows a terminal window with the following details:

- Terminal title: /dev/cu.usbmodem14601
- Text input field: An empty text input field with a "Send" button.
- Output content:
 - IoT Workshop MKR 1010 Hardware Test
 - 74.12°F 48.00% RH
 - Button is released.

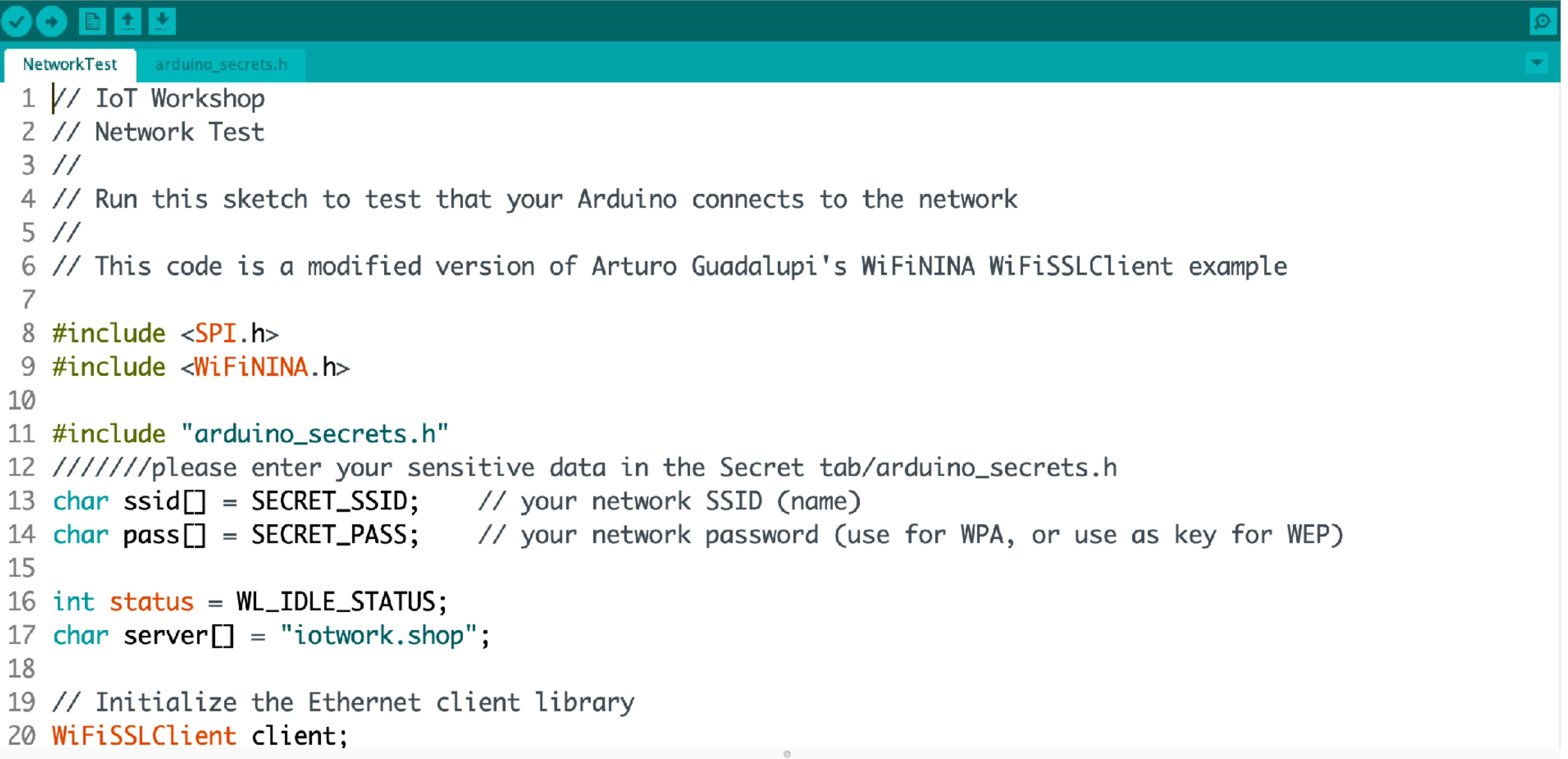
 - 73.94°F 47.00% RH
 - Button is released.

 - 74.12°F 50.00% RH
 - Button is released.

 - 73.94°F 50.00% RH
 - Button is pressed.

 - 74.12°F 50.00% RH
 - Button is released.
- Bottom controls:
 - Autoscroll: checked
 - Show timestamp: unchecked
 - Text encoding dropdown: Both NL & CR
 - Baud rate dropdown: 9600 baud
 - Clear output button

NetworkTest.ino



The image shows the Arduino IDE interface with the following details:

- Sketch Name:** NetworkTest
- File:** arduino_secrets.h
- Code Content:** The code is a modified WiFiNINA WiFiSSLClient example. It includes headers for SPI and WiFiNINA, and defines constants for SSID and password. It initializes the Ethernet client library and creates a WiFiSSLClient object.
- Line Numbers:** 1 through 20 are visible on the left side of the code editor.

```
1 // IoT Workshop
2 // Network Test
3 //
4 // Run this sketch to test that your Arduino connects to the network
5 //
6 // This code is a modified version of Arturo Guadalupi's WiFiNINA WiFiSSLClient example
7
8 #include <SPI.h>
9 #include <WiFiNINA.h>
10
11 #include "arduino_secrets.h"
12 ///////////////please enter your sensitive data in the Secret tab/arduino_secrets.h
13 char ssid[] = SECRET_SSID;      // your network SSID (name)
14 char pass[] = SECRET_PASS;     // your network password (use for WPA, or use as key for WEP)
15
16 int status = WL_IDLE_STATUS;
17 char server[] = "iotwork.shop";
18
19 // Initialize the Ethernet client library
20 WiFiSSLClient client;
```

COM3 (Arduino MKR WiFi 1010)

— □ ×

Send

Starting connection to server...

connected to server

HTTP/1.1 200 OK

Server: nginx/1.14.0 (Ubuntu)

Date: Wed, 31 Oct 2018 02:13:42 GMT

Content-Type: text/html

Content-Length: 10

Last-Modified: Tue, 30 Oct 2018 14:36:04 GMT

Connection: close

ETag: "5bd86c54-a"

Accept-Ranges: bytes

IT WORKS!

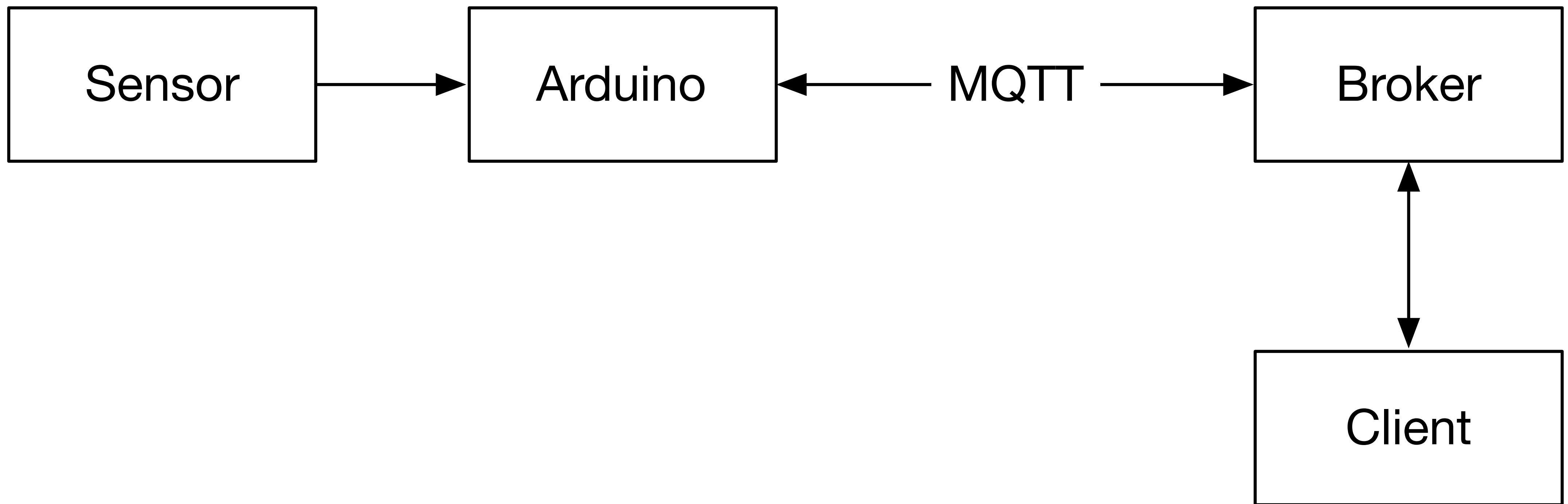
disconnecting from server.

Autoscroll Show timestamp

Newline

9600 baud

Clear output



location/device/sensor

workshop/device01/temperature

workshop/device01/humidity

Write to a topic

Subscribe to a topic

Security

The screenshot shows the Arduino IDE interface with a teal header bar. The title bar reads "sample | Arduino 1.8.7". Below the header is a toolbar with icons for file operations (checkmark, arrow, file, upload, refresh). The main workspace contains a code editor with a teal background. A tab labeled "sample" is selected. The code in the editor is:

```
1 void setup() {  
2     // put your setup code here, to run once:  
3  
4 }  
5  
6 void loop() {  
7     // put your main code here, to run repeatedly:  
8  
9 }
```

At the bottom of the code editor, a message "Done Saving." is displayed. The bottom status bar is black with white text, showing the number "1" on the left and "Arduino MKR WiFi 1010 on /dev/cu.usbmodem1461" on the right.

Temperature & Humidity

1. Connect to the WiFi
2. Connect to the MQTT Server
3. Read the temperature & humidity
4. Write the data to MQTT



TemperatureHumidity

config.h

```
1 const char WIFI_SSID[] = "wifi";
2 const char WIFI_PASSWORD[] = "password";
3
4 const char MQTT_BROKER[] = "mqtt.chariotday.com";
5 const int MQTT_PORT = 8883;
6 const char MQTT_USER[] = "device00";
7 const char MQTT_PASSWORD[] = "secret";
8
9 const String DEVICE_ID = "device00";
```

```
#include <SPI.h>
#include <WiFiNINA.h>
#include <ArduinoMqttClient.h>

WiFiSSLClient net;
MqttClient mqtt(net);

// Temperature and Humidity Sensor
#include <DHT.h>
#define DHTTYPE DHT22
#define DHTPIN 2
DHT dht(DHTPIN, DHTTYPE);
```

```
void setup() {  
    Serial.begin(9600);  
  
    // Uncomment next line to wait for a serial connection  
    // while (!Serial) { }  
  
    // initialize temperature sensor  
    dht.begin();  
  
    Serial.println("Connecting WiFi");  
    connectWiFi();  
}
```

```
void connectWiFi() {  
    while (status != WL_CONNECTED) {  
        status = WiFi.begin(wifi_ssid, wifi_password);  
        delay(3000); // wait 3 seconds  
    }  
    printWiFiStatus();  
}
```

```
void loop() {
    if (WiFi.status() != WL_CONNECTED) {
        connectWiFi();
    }

    if (!mqtt.connected()) {
        connectMQTT();
    }

    // poll for new MQTT messages and send keep alives
    mqtt.poll();

    if (millis() - lastMillis > publishInterval) {
```

```
void connectMQTT() {  
    Serial.print("Connecting MQTT...");  
    mqtt.setId(DEVICE_ID);  
    mqtt.setUsernamePassword(MQTT_USER, MQTT_PASSWORD);  
  
    while (!mqtt.connect(MQTT_BROKER, MQTT_PORT)) {  
        Serial.print(".");  
        delay(5000);  
    }  
  
    Serial.println("connected.");  
}
```

```
void loop() {
  if (WiFi.status() != WL_CONNECTED) {
    connectWiFi();
  }

  if (!mqtt.connected()) {
    connectMQTT();
  }

  // poll for new MQTT messages and send keep alives
  mqtt.poll();

  if (millis() - lastMillis > publishInterval) {
```

```
if (millis() - lastMillis > publishInterval) {  
    lastMillis = millis();  
  
    float temperature = dht.readTemperature(true);  
    float humidity = dht.readHumidity();  
  
    mqtt.beginMessage(temperatureTopic);  
    mqtt.print(temperature);  
    mqtt.endMessage();  
  
    mqtt.beginMessage(humidityTopic);  
    mqtt.print(humidity);  
    mqtt.endMessage();  
}
```

mosquitto_sub

```
don — root@iot-workshop: ~ — ssh root@iotwork.shop — 80x24
[don@iot-workshop:~# mosquitto_sub -u user1 -P superconf18! -v -t \
workshop/device1/temperature 70.88
workshop/device1/humidity 39.30
workshop/device25/temperature 74.84
workshop/device25/humidity 39.30
workshop/device1/temperature 70.70
workshop/device1/humidity 39.10
workshop/device25/temperature 74.84
workshop/device25/humidity 39.30
workshop/device1/temperature 70.88
workshop/device1/humidity 39.30
```

www.npmjs.com/package/mqtt

Nuclear Pumpkin Mayhem

npm Enterprise Features Pricing Docs Support

Search packages

Search log in or sign up

mqtt

2.18.8 • Public • Published 2 months ago

Readme

14 Dependencies

926 Dependents

132 Versions



build passing codecov 94%



install

```
> npm i mqtt
```

weekly downloads

75,107



version

2.18.8

license

MIT

open issues

124

pull requests

8

homepage

github.com

repository

github

last publish

Subscribe to a MQTT topic

```
<body>
  <form>
    <input type="text" name="username" id="username" />
    <input type="password" name="password" id="password" />
    <input type="text" name="topic" id="topic" />
    <button id="connectButton" onclick="connect(); return false;">Connect</button>
    <button id="disconnectButton" onclick="disconnect(); return false;">Disconnect</button>
  </form>
  <pre id="pre"></pre>
  <script src="https://unpkg.com/mqtt/dist/mqtt.min.js"></script>
  <script src="index.js"></script>
</body>
```

```
function connect() {
  client = mqtt.connect('wss://broker.shiftr.io',
    username: username.value,
    password: password.value
  );

  client.on('connect', function () {
    client.subscribe(topic.value);
  })

  client.on('message', function (topic, message) {
    console.log(topic, message.toString());
    pre.innerText += '\n' + topic + '\t' + message;
  })
}
```



MQTT

Username

Password

Topic

```
Wed Jan 23 2019 17:50:04 GMT-0500 (EST) workshop/device00/temperature 70.70
Wed Jan 23 2019 17:50:04 GMT-0500 (EST) workshop/device00/humidity 29.80
Wed Jan 23 2019 17:50:14 GMT-0500 (EST) workshop/device00/temperature 70.70
Wed Jan 23 2019 17:50:14 GMT-0500 (EST) workshop/device00/humidity 29.80
Wed Jan 23 2019 17:50:24 GMT-0500 (EST) workshop/device00/temperature 70.70
Wed Jan 23 2019 17:50:24 GMT-0500 (EST) workshop/device00/humidity 29.80
Wed Jan 23 2019 17:50:34 GMT-0500 (EST) workshop/device00/temperature 70.70
Wed Jan 23 2019 17:50:34 GMT-0500 (EST) workshop/device00/humidity 29.80
Wed Jan 23 2019 17:50:44 GMT-0500 (EST) workshop/device00/temperature 70.70
Wed Jan 23 2019 17:50:44 GMT-0500 (EST) workshop/device00/humidity 29.80
```

MQTT wildcards

workshop/device1/+

workshop/+/temperature

Graphing Data

```
<body>
    <canvas id="temperatureCanvas" height="75"></canvas>
    <canvas id="humidityCanvas" height="75"></canvas>
    <script src="chart.js"></script>
    <script src="mqtt.js"></script>
</body>
```

```
client = mqtt.connect('wss://broker.shiftr.io', {  
  username: username.value,  
  password: password.value  
});  
  
client.on('connect', function () {  
  console.log('connected');  
  client.subscribe(`workshop/${deviceId.value}/temperature`);  
  client.subscribe(`workshop/${deviceId.value}/humidity`);  
});
```

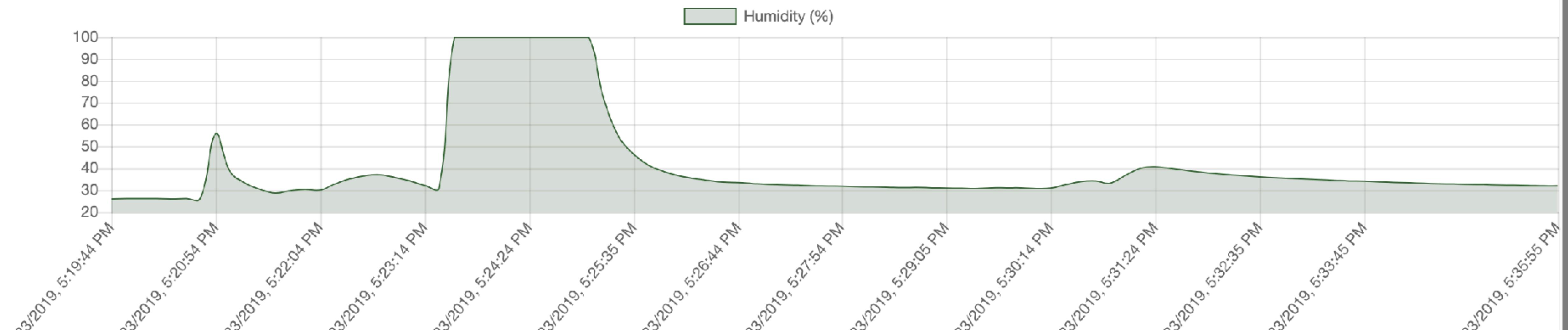
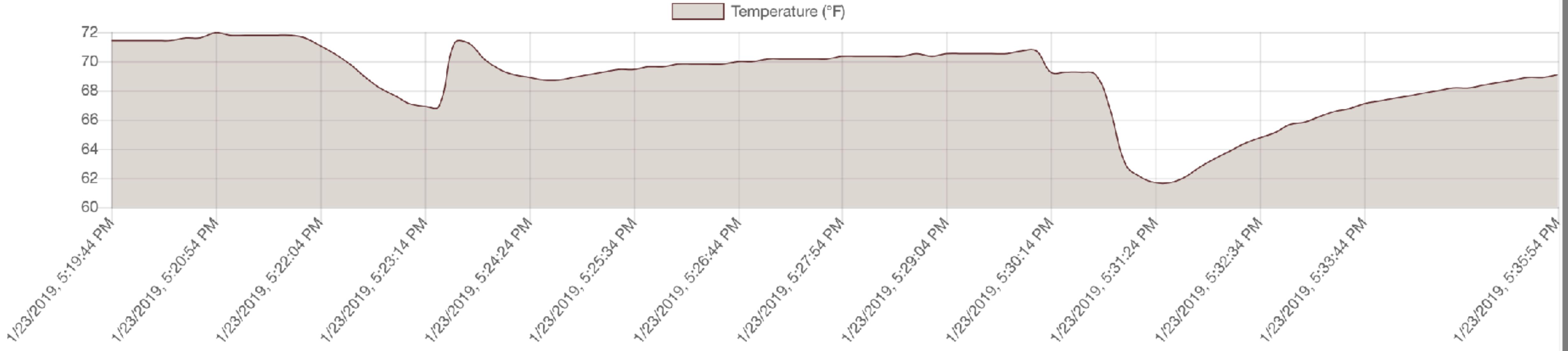
```
client.on('message', function (topic, message) {
  console.log(topic, message.toString());
  let dt = new Date().toLocaleString();

  if (topic.endsWith("temperature")) {
    temperatureData.labels.push(dt);
    temperatureData.datasets[0].data.push(parseFloat(message.toString()));
    temperatureChart.update();
  } else if (topic.endsWith("humidity")) {
    humidityData.labels.push(dt);
    humidityData.datasets[0].data.push(parseFloat(message.toString()));
    humidityChart.update();
  }
});
```

-MQTT-

Username	iotdevfest
Password
Device Id	device00

Disconnect



Sending Data to the Arduino

LED.ino

workshop/device/led

```
void connectMQTT() {  
    mqtt.setId(DEVICE_ID);  
    mqtt.setUsernamePassword(MQTT_USER, MQTT_PASSWORD);  
  
    while (!mqtt.connect(MQTT_BROKER, MQTT_PORT)) {  
        Serial.print(".");  
        delay(5000);  
    }  
  
    mqtt.subscribe(ledTopic);  
}
```

```
mqtt.onMessage(messageReceived);
```

```
void messageReceived(int messageSize) {  
    String payload = mqtt.readString();  
    if (payload == "ON") {  
        // turn the LED on  
        digitalWrite(LED_BUILTIN, HIGH);  
    } else if (payload == "OFF") {  
        // turn the LED off  
        digitalWrite(LED_BUILTIN, LOW);  
    }  
}
```



MQTT

Username

Password

Topic

LED

On

Off

```
function on() {
    client.publish(topic.value, 'ON');
    console.log('on');
}

function off() {
    client.publish(topic.value, 'OFF');
    console.log('off');
}
```

X.509

Securely Connecting an Arduino MKR WiFi 1010 to AWS IoT Core

<http://bit.ly/2CJVAH4>

Send

ECCX08 Serial Number = 01237F2B0D8A1817EE

The ECCX08 on your board is not locked, would you like to PERMANENTLY configure and lock it now? (y/N) [N]: Y
ECCX08 locked successfully

Hi there, in order to generate a new CSR for your board, we'll need the following information ...

Country Name (2 letter code) []:

State or Province Name (full name) []:

Locality Name (eg, city) []:

Organization Name (eg, company) []:

Organizational Unit Name (eg, section) []:

Common Name (e.g. server FQDN or YOUR name) [01237F2B0D8A1817EE]: device42

What slot would you like to use? (0 - 4) [0]: 0

Would you like to generate a new private key? (Y/n) [Y]: Y

Here's your CSR, enjoy!

-----BEGIN CERTIFICATE REQUEST-----

MIHNMHUCAQAwEzERMA8GA1UEAxMIZGV2aWNlNDIwMTATBgchkjOPQIBBggqhkjOPQMBBwNCAAR6
M/7tbk0UGYWJwf+318azPvjPdT4qK2dcPCRN5h/i31MTbYT0HKsb9bs+NChrbpUAXs0/lryuh/cL
i030J3xAoAAwCgYIKoZIzj0EAwIDSAAwRQIhAIx6syDeKiCKxafktzLpkLzbXQHxWYBOSwmaFMoL
qH0MAiB6q+1A24Y4Y2hJTy0XCnZcG6XCAb987duPMJnwUAMU7Q==

-----END CERTIFICATE REQUEST-----

<https://iot.glitch.me>



Dashboard

[Register Thing](#)

All things

Refresh

Button Presses 1

Made with [Glitch!](#)

Register thing

Certificate Signing Request

-----BEGIN CERTIFICATE REQUEST-----

MIHOMHUCAQAwEzERMA8GA1UEAxMIZGV2aWNIMTcwWTATBgcqhkjOPQIBBggqhkJOPQMBBwNCAASX
iZjYMWTPg8CK5rUkkk+UEbkpO5vDpJp49IPCfRTSXIXn/Jzpmnly2pldF1K8xshYaa6Jlp7wlA+z
CLzqa/4/oAAwCgYIKoZIzj0EAwIDSQAwRglhAJsRLjZAiMh99z9vuuoeTSn+/9/1m9C5EG8Et+A8
sUJiAiEAxOG7afp8VZepEc00ZFwyGAvTa7IG4HHIDMiOvM3GqLU=

-----END CERTIFICATE REQUEST-----

Register

Thing registered

Broker

a3jmxo5vrdefm0.iot.us-west-2.amazonaws.com

Device ID

device17

Certificate

```
-----BEGIN CERTIFICATE-----  
MIICgzCCAWugAwIBAgIUP//YHA84TPtjk/9kXebJnNjtHGwwDQYJKoZIhvcNAQEL  
BQAwTTFLMEkGA1UECxwCQW1hem9uIFdIYiBTZXJ2aWNlcyBPPUfYXpvbi5jb20g  
SW5jLiBMPVNIYXR0bGUgU1Q9V2FzaGlz3RvbIBDPVVTMB4XDTE5MDEyMzIxNTk0  
N1oXDTQ5MTIzMThNTk1OVowEzERMA8GA1UEAxMIZGV2aWNIMTcwWTATBgcqhkjO  
PQIBBggqhkjOPQMBBwNCAASXiZjYMWTPg8CK5rUkkk+UEbkpO5vDpJp49IPCFRTS  
XjXn/Jzpmnly2pldF1K8xshYaa6JIp7wIA+zCLzqa/4/o2AwXjAfBgNVHSMEGDAW  
gBQwV2k0UaGqgDOJNZqKy0XiJouiYDAdBgNVHQ4EFgQUntbzfmYtYC21Kj8ChcfD  
r1SJ1zAwDAYDVR0TAQH/BAIwADAOBgNVHQ8BAf8EBAMCB4AwDQYJKoZIhvcNAQEL  
BQADggEBAMJcZxuYAGjhbk2kb5lOtOD0qzTjT8X1+O8rpH/SJ3ORA+wJ2LC2BvVj  
KcEJMf4T0jqgxA36BILY1zpq0WWEfI2MyHG8HopI/Z6tWhGNT5YDfYGCScz25gk  
8Q/tIBOt5Zris8x4lnaVg2vqvdeadVJr6RNGg9SROJi+DF8mxMHVXtiP2BJfCeGH  
HvqxHMEA9LzPNr0ee6M3avwXN1cca1LKjBn4tEWicjSZxcn08Psoa4S4X+aaHZz1  
fb7QooXTPV5d9M0xUxbx/HMU/s/3HhuYvswFBnISsuIKNlROVUqxzCpstfH73zTe  
SDDNRoDb9KRDnbIUTUr8b4dLPIqURew=  
-----END CERTIFICATE-----
```



Dashboard



[Register Thing](#)

0123B377D31EAE87EE

Refresh

Button Presses 3

LED

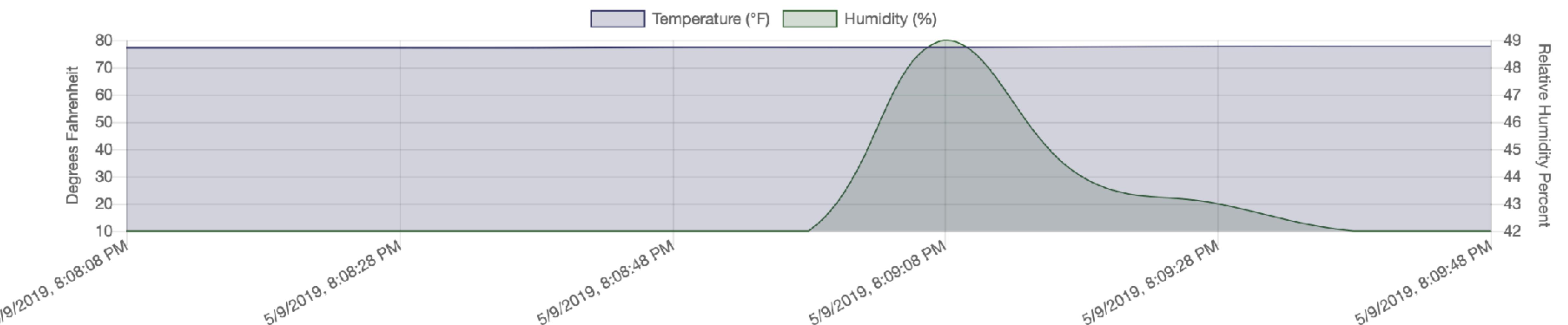
Switch:

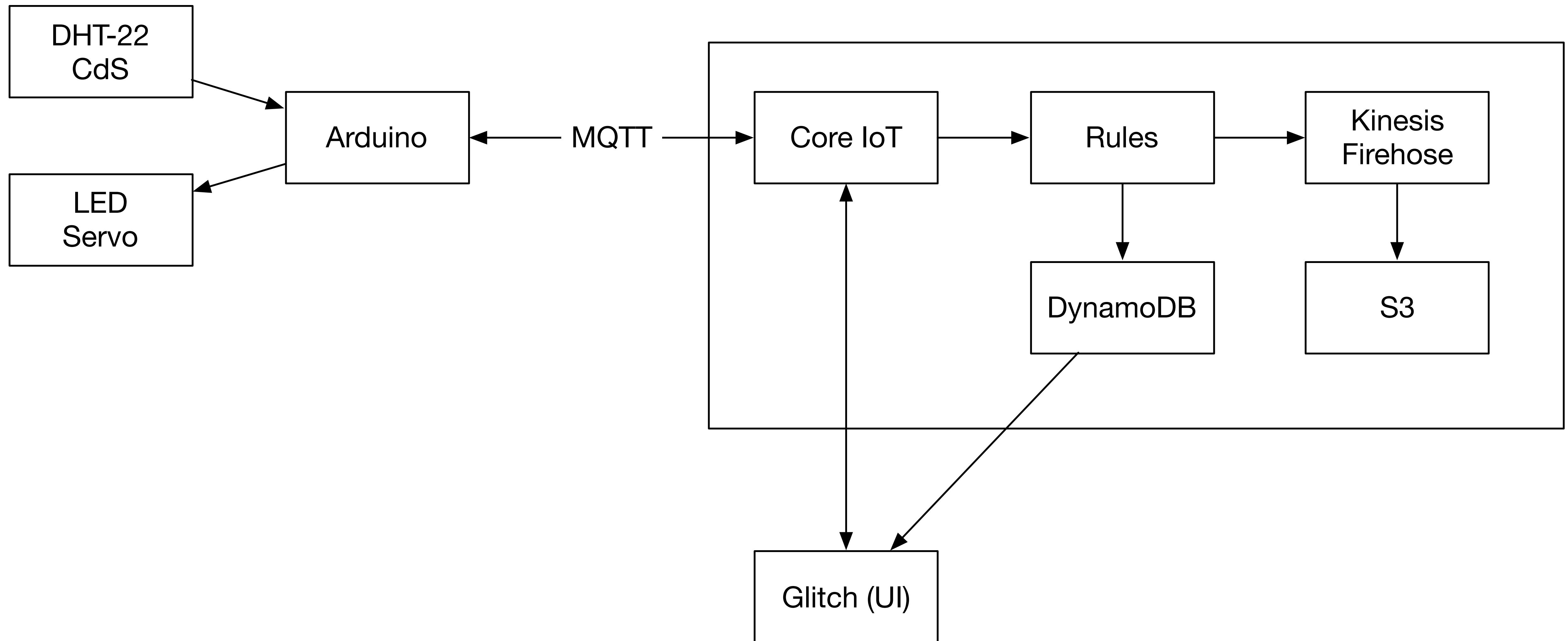


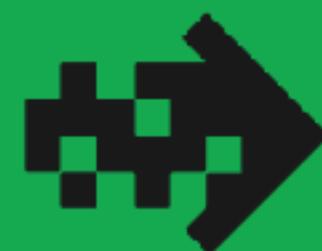
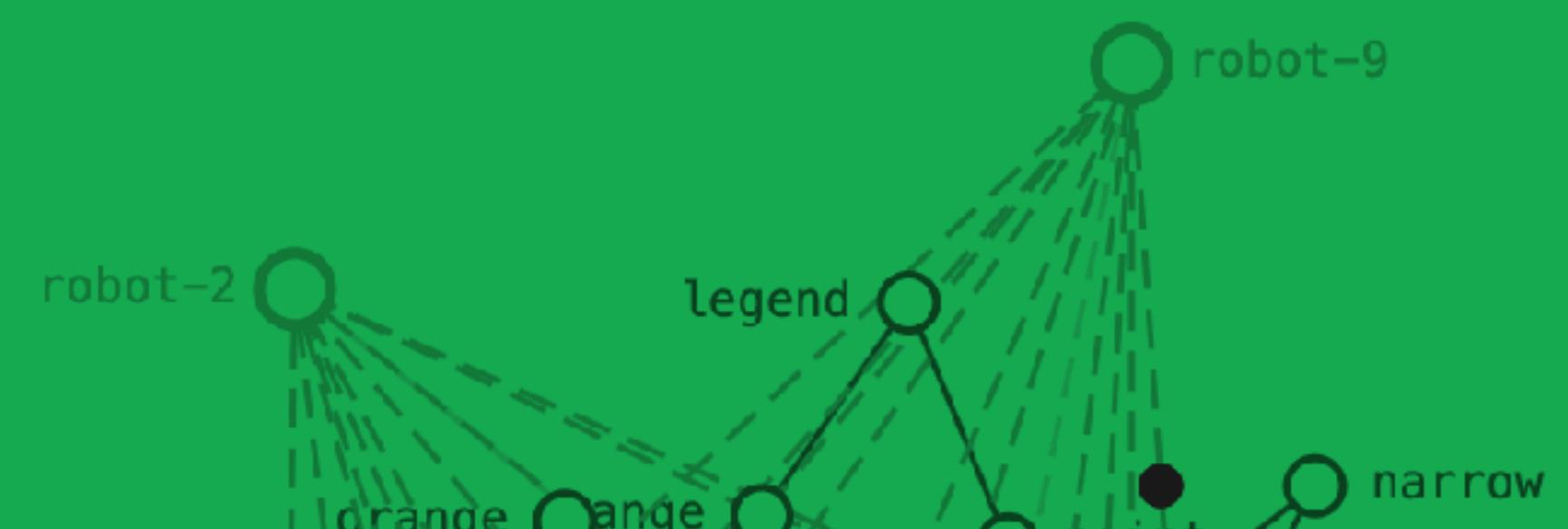
Brightness



MKR 1010 Temperature & Humidity

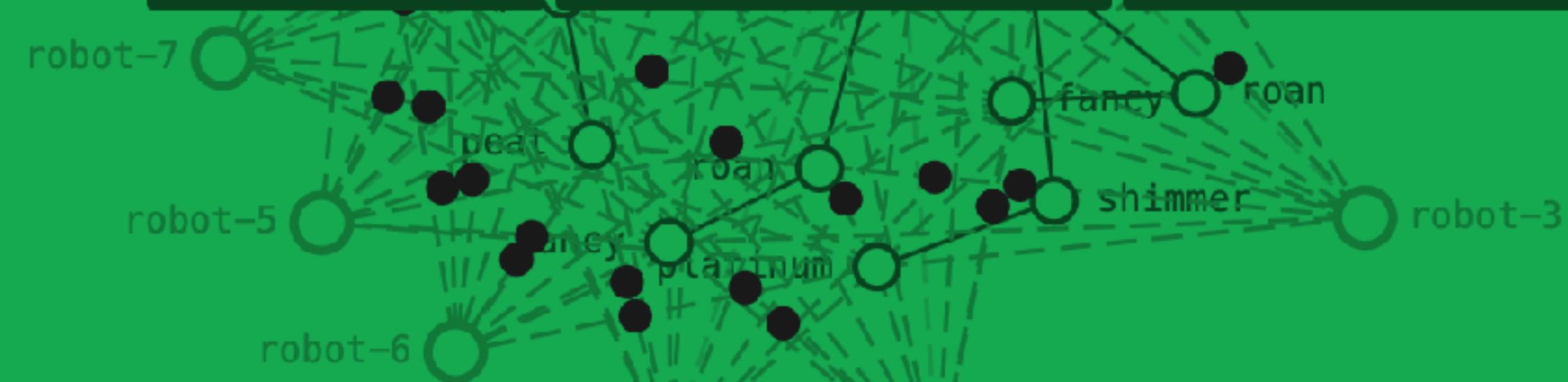




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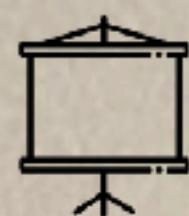
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