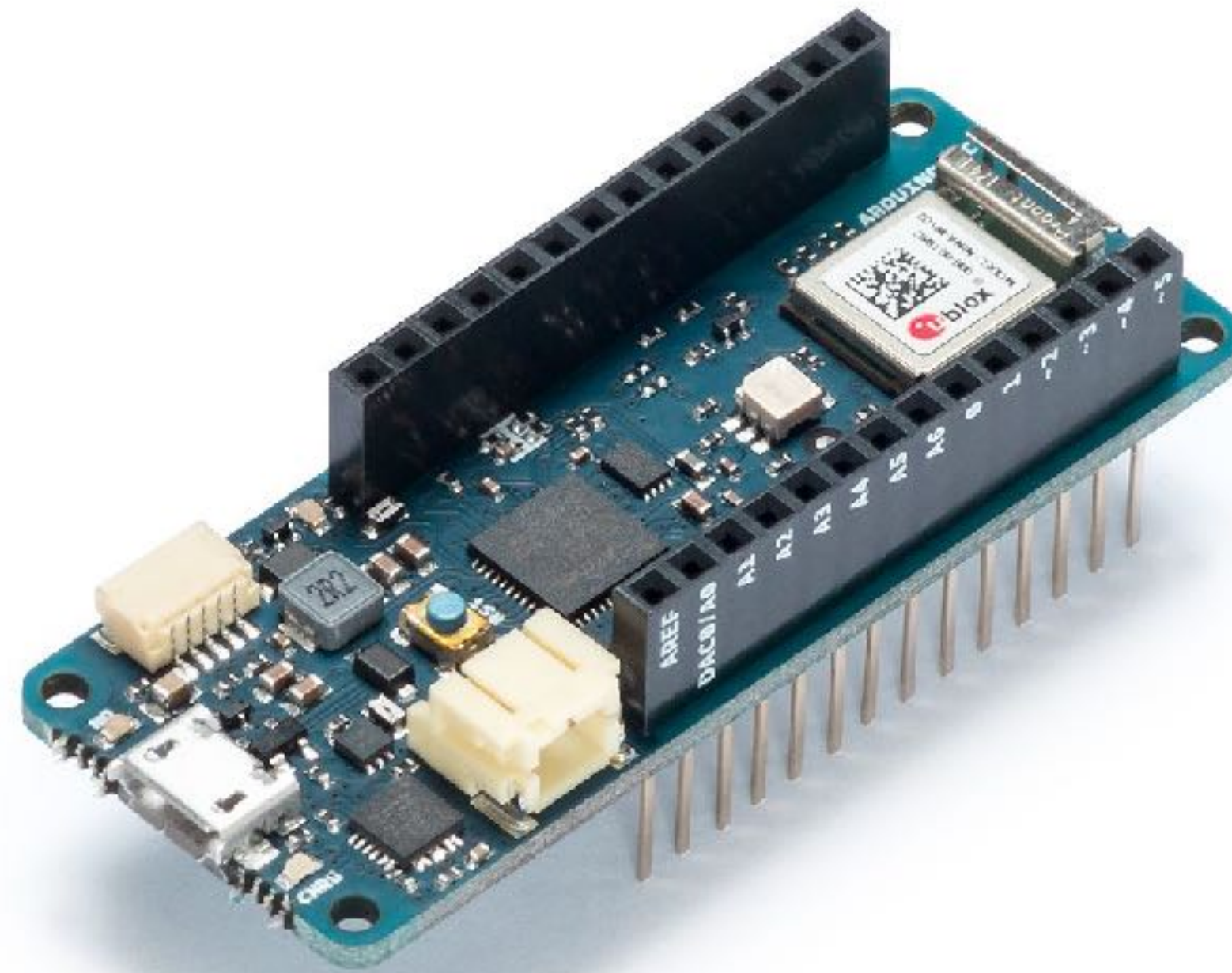


IoT Workshop

Philly Tech Week - May 10, 2019



Don Coleman





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



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



sketch_oct30a

```
void setup()  
  // put your  
}
```

```
void loop() {  
  // put your  
}
```

- 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 **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](#)

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...	

```
sketch
void se
// pu
}
void lo
// put your main code here, to run repeate
}
```

Manage Libraries... Ctrl+Shift+I

Add .ZIP Library...

Arduino libraries

Bridge

EEPROM

Esplora

Ethernet

Firmata

GSM

HID

Keyboard

LiquidCrystal

Type Topic **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

Type Topic

ArduinoMqttClient by **Arduino**
[BETA] Allows you to send and receive MQTT messages using Arduino.

[More info](#)

Version 0.1.1

Install

Close

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

Version 1.2.0 ▾

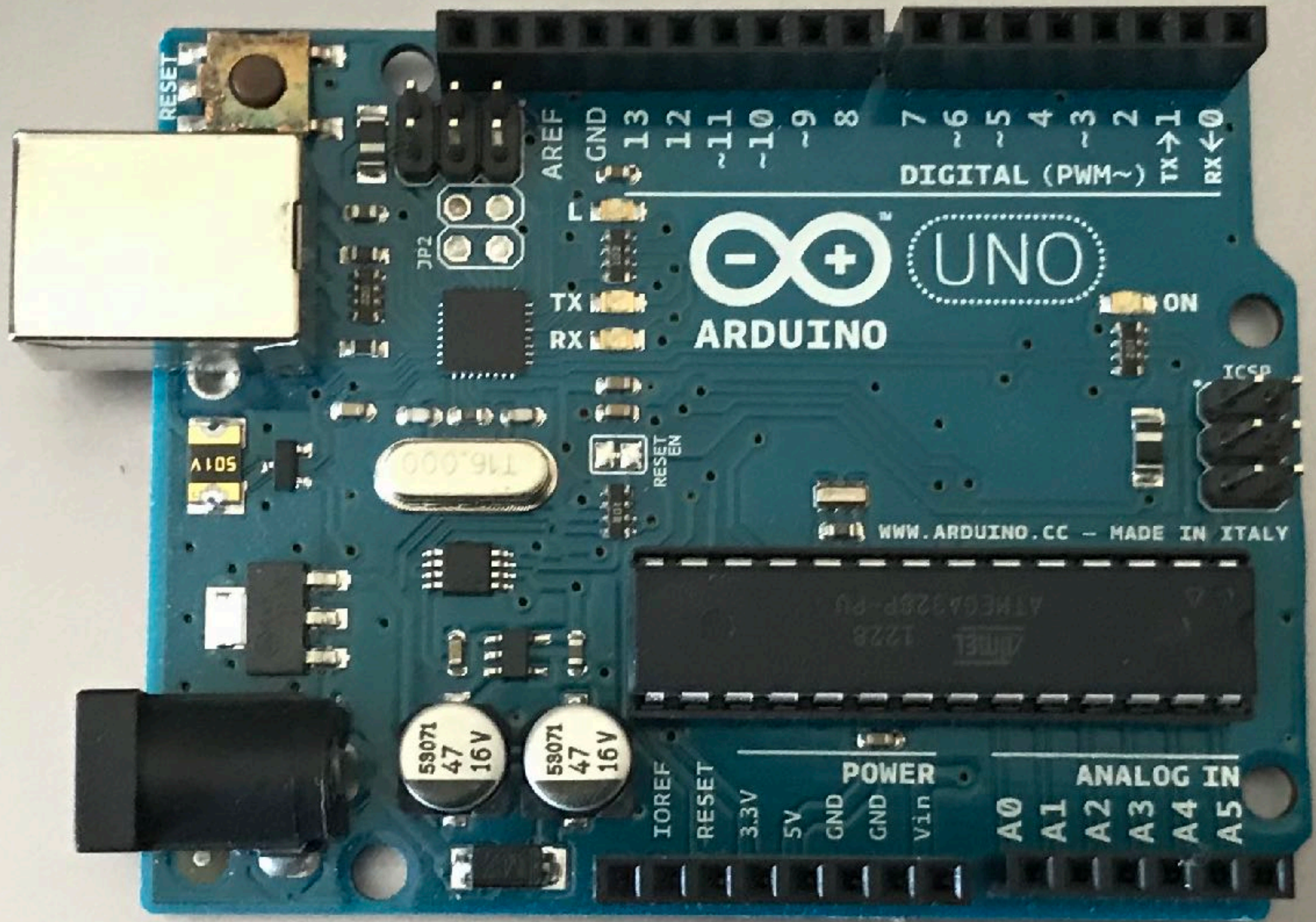
Install

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

Close

Type Topic **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 **DHT sensor library for ESPx** by **beegee_tokyo****Arduino ESP library for DHT11, DHT22, etc Temp & Humidity Sensors** Optimized library 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

Type Topic **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



ARDUINO UNO

WWW.ARDUINO.CC - MADE IN ITALY

AREF GND 13 12 ~11 ~10 ~9 8 7 6 5 4 3 2 1 0
DIGITAL (PWM ~) TX → RX ←

IOREF RESET 3.3V 5V GND GND V_{IN}
POWER ANALOG IN
A0 A1 A2 A3 A4 A5

116.000

59071 47 16V
59071 47 16V

50V

RESET

ICSP

ON

RESET EN

TX RX

JP2

THE ARDUINO MKR FAMILY



MKR 1000



MKR FOX1200



MKR WAN 1300



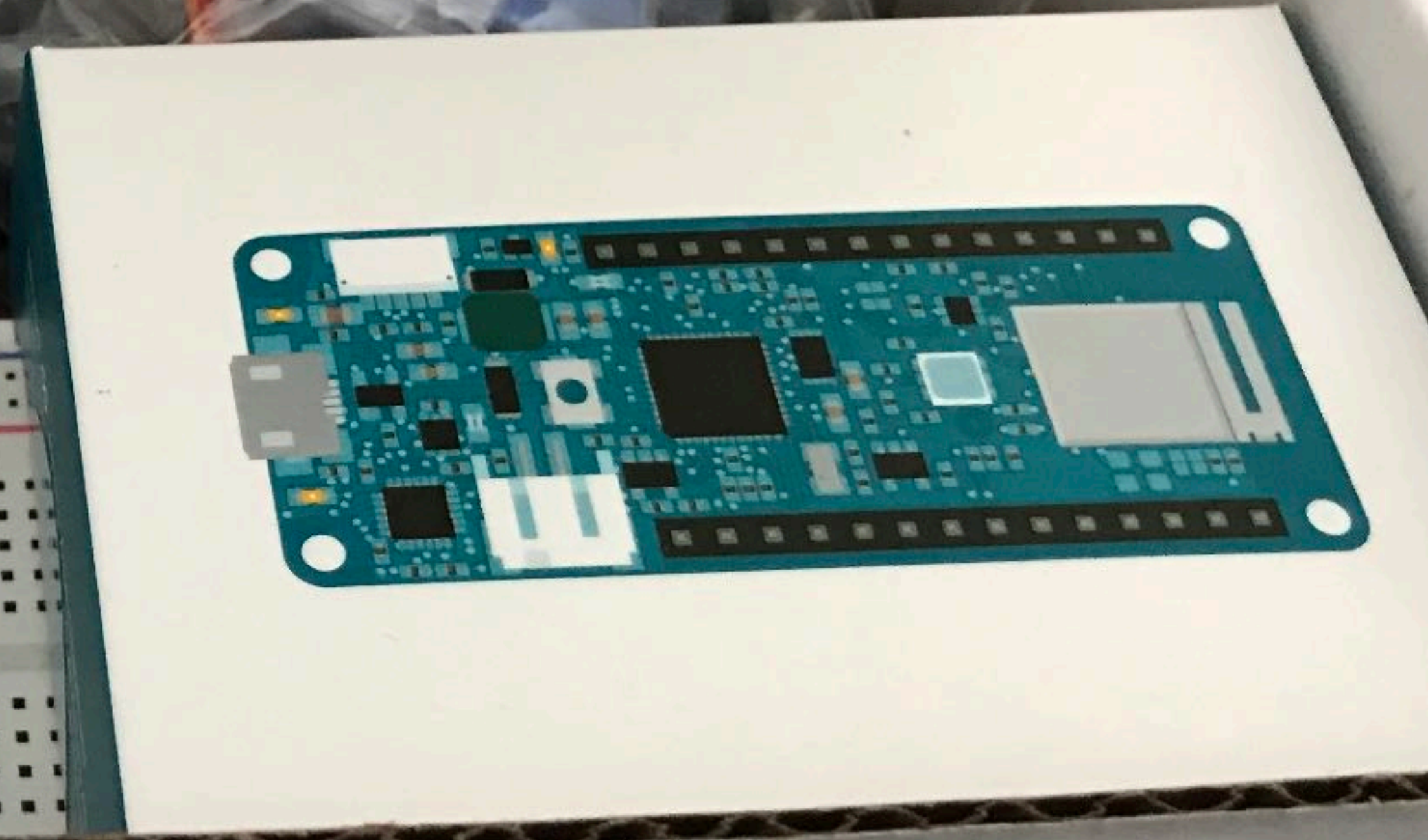
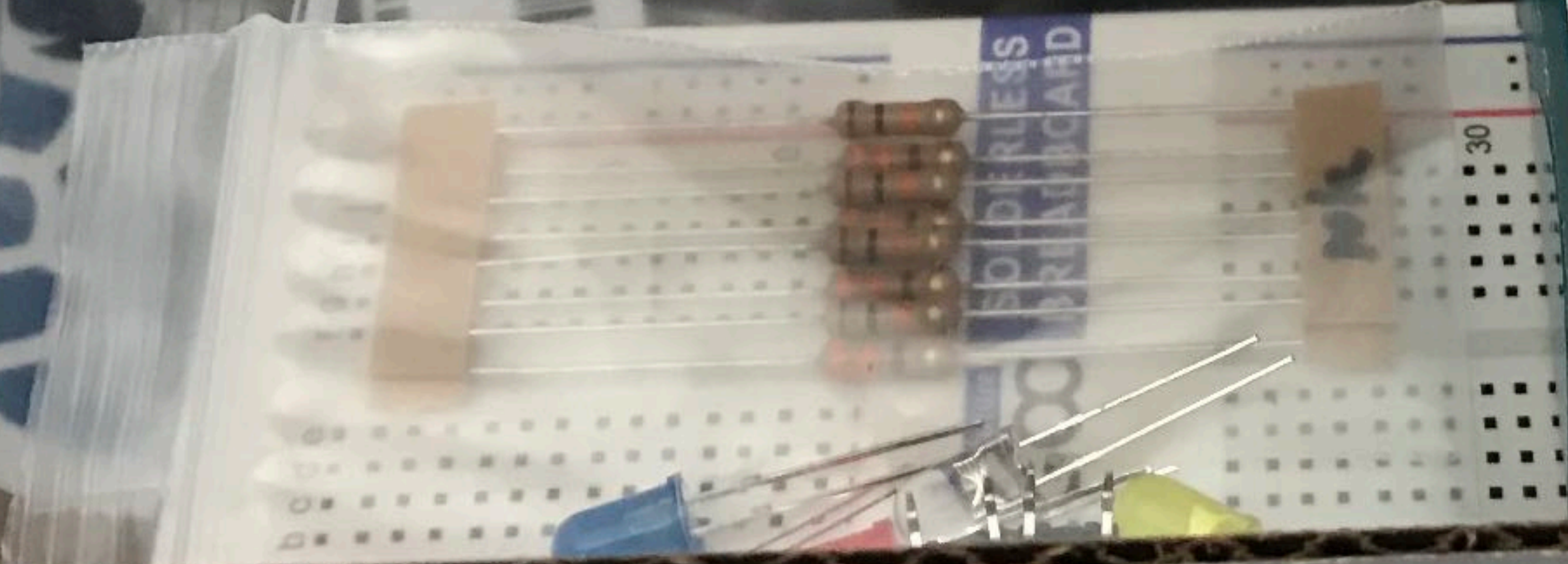
MKR GSM 1400

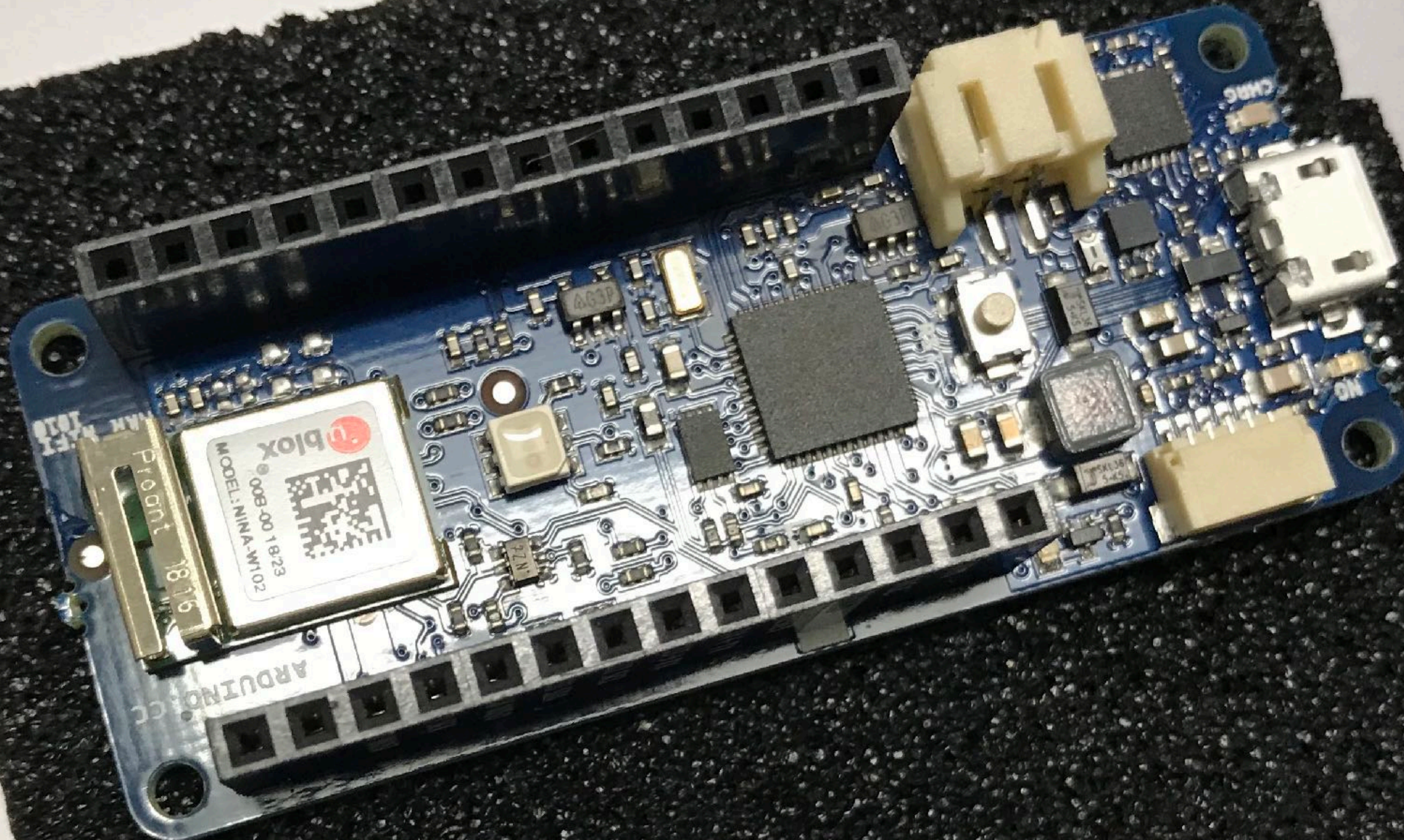


MKR NB 1500
(NB-IoT & CAT-M1)



MKR WIFI 1010





MANUFACTURED IN CHINA

Product 1816

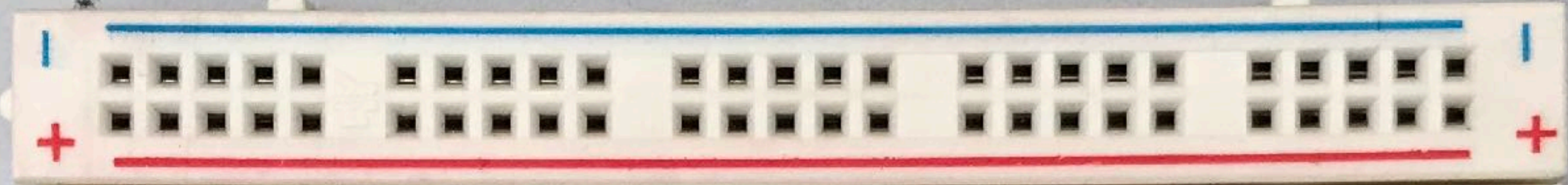
blox
MODEL: NINA-W102
009-00 1823

ARDUINO CC

CHRG

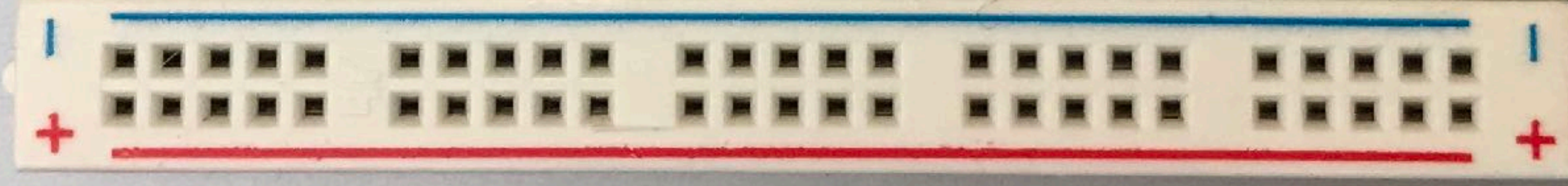
NO

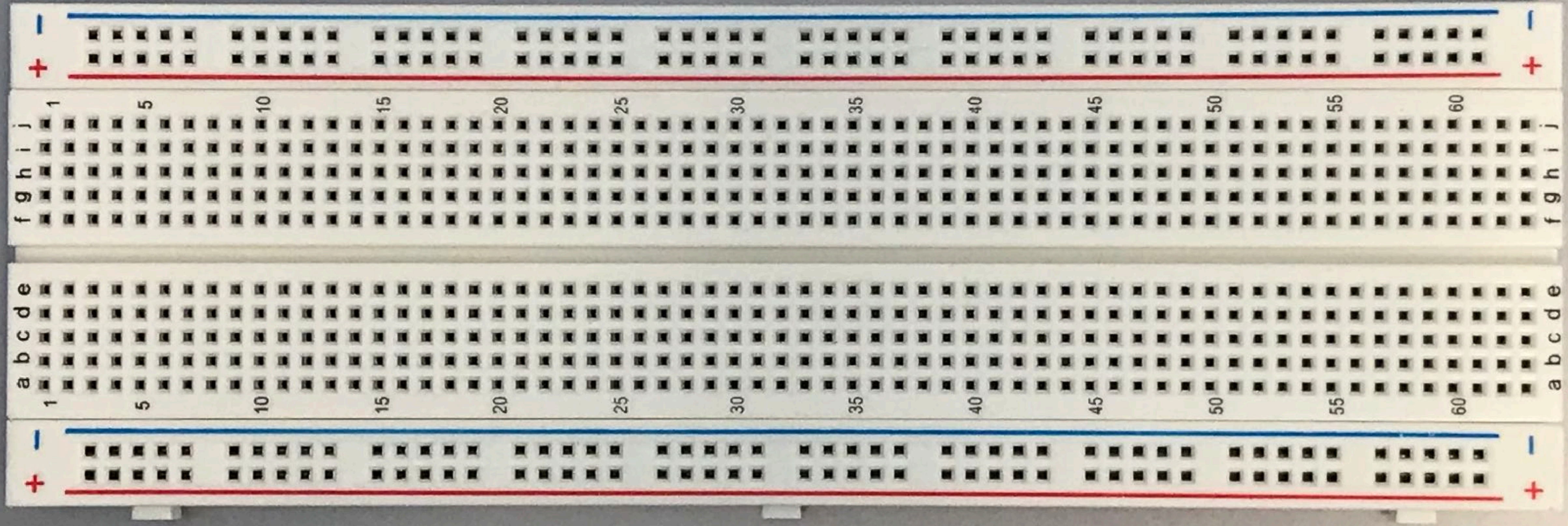
ON

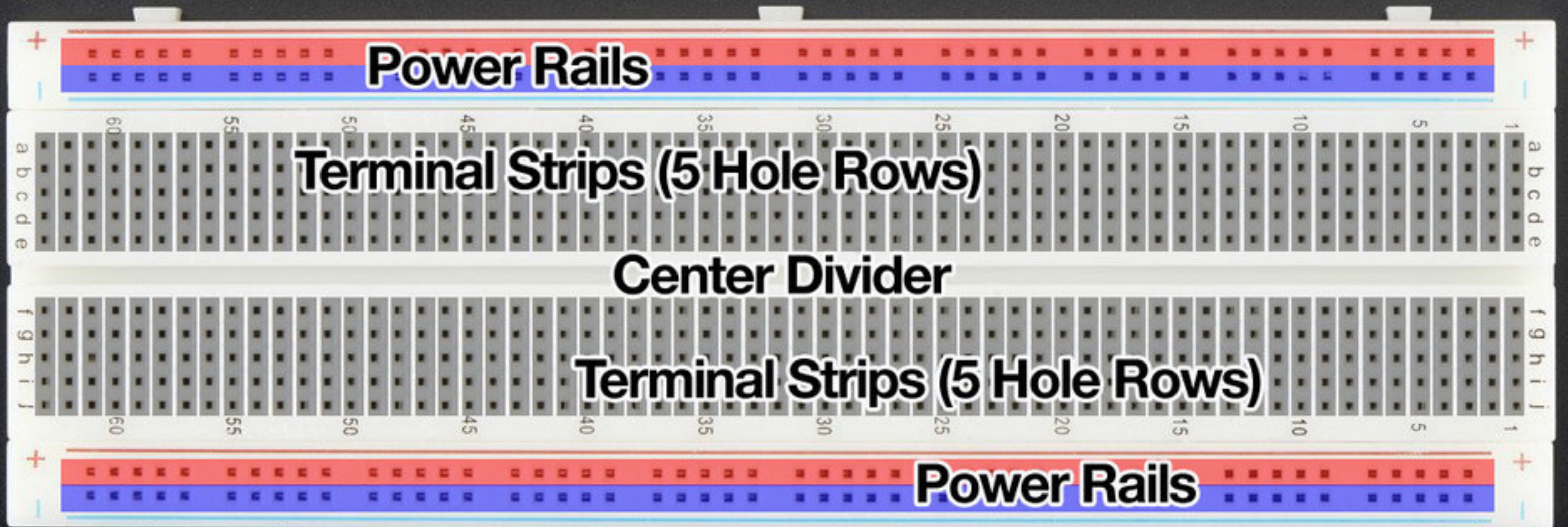


f	g	h	i	j	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	f
---	---	---	---	---	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---

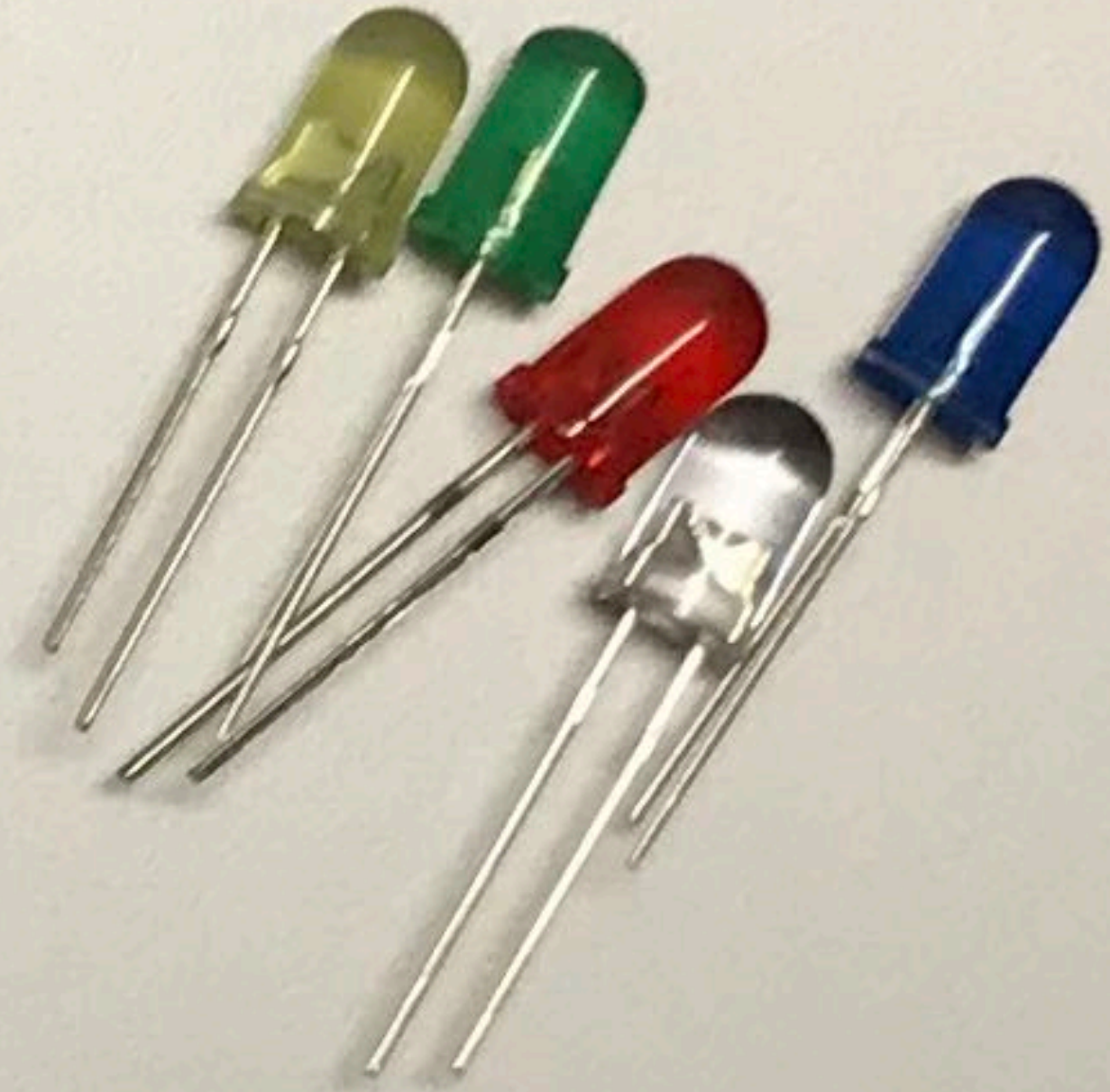
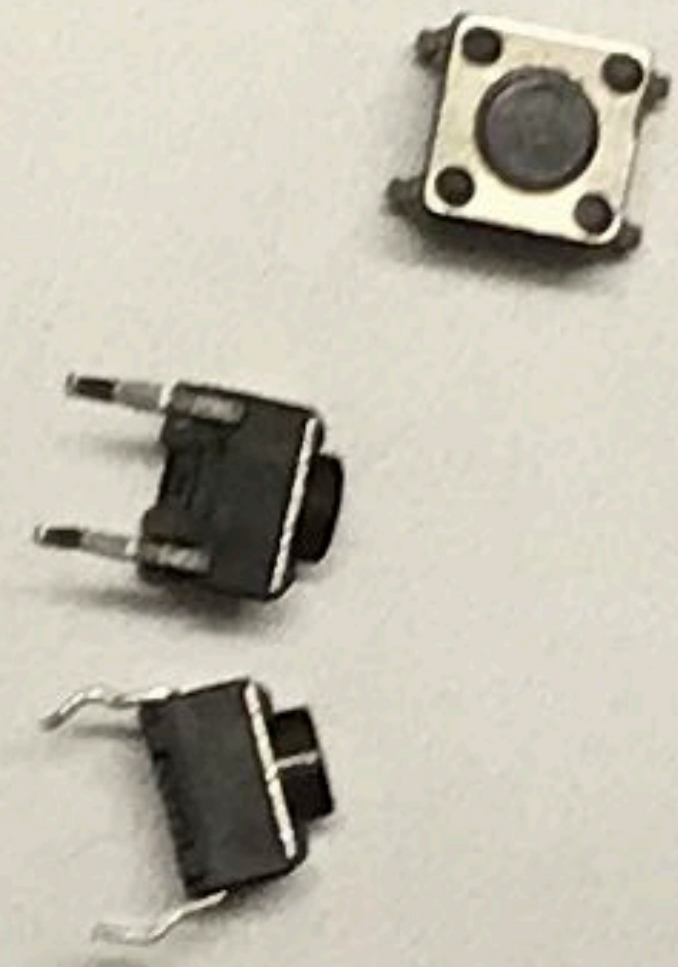
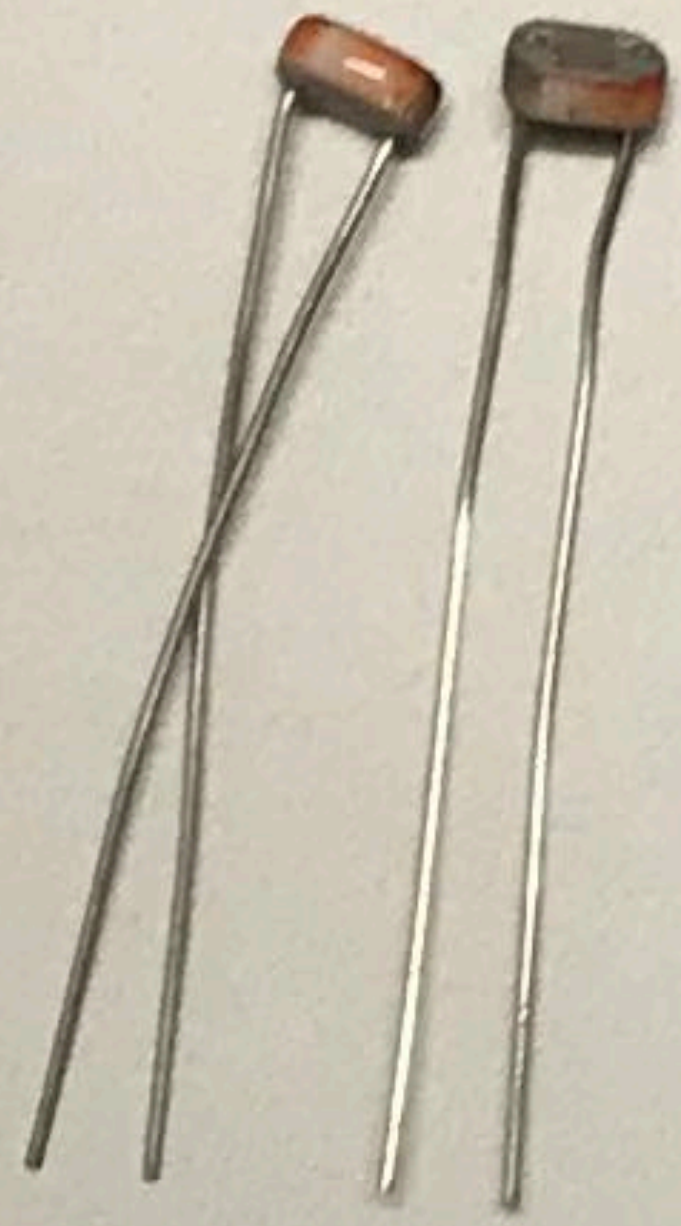
a	b	c	d	e	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	a
---	---	---	---	---	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---











flat edge

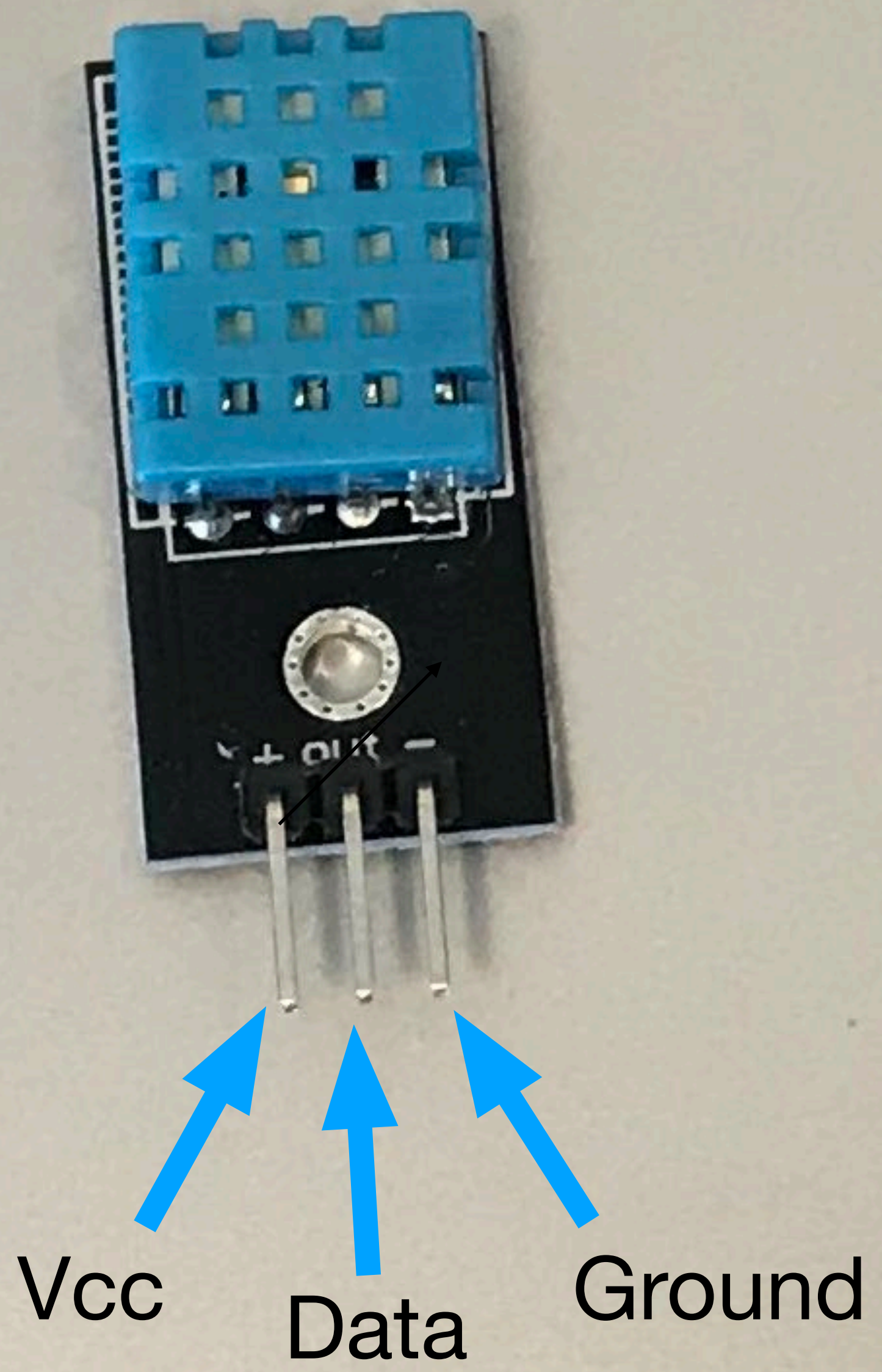


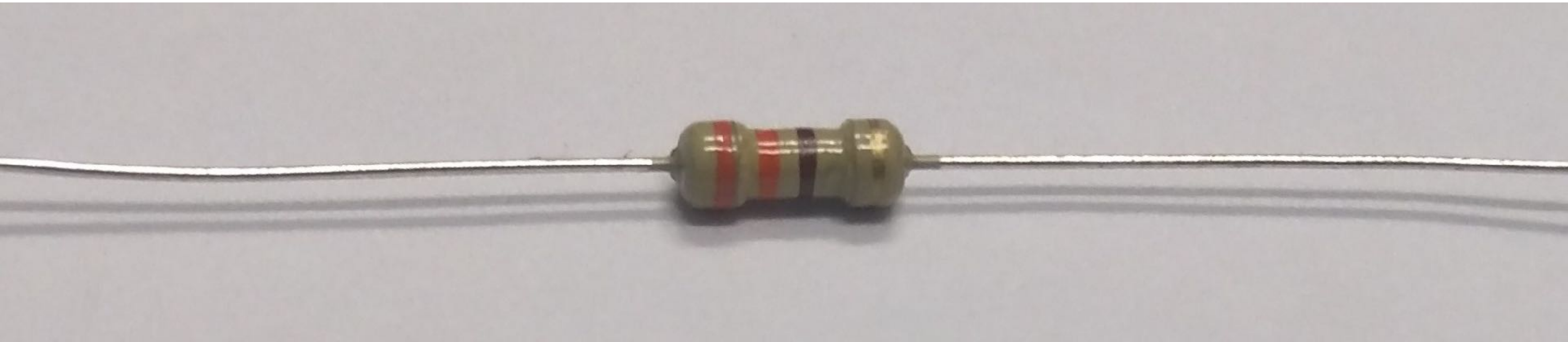


ASAIR® AM2302
SN:18048FAEA



VCC **Data Out** **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:

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%

4-Band-Code

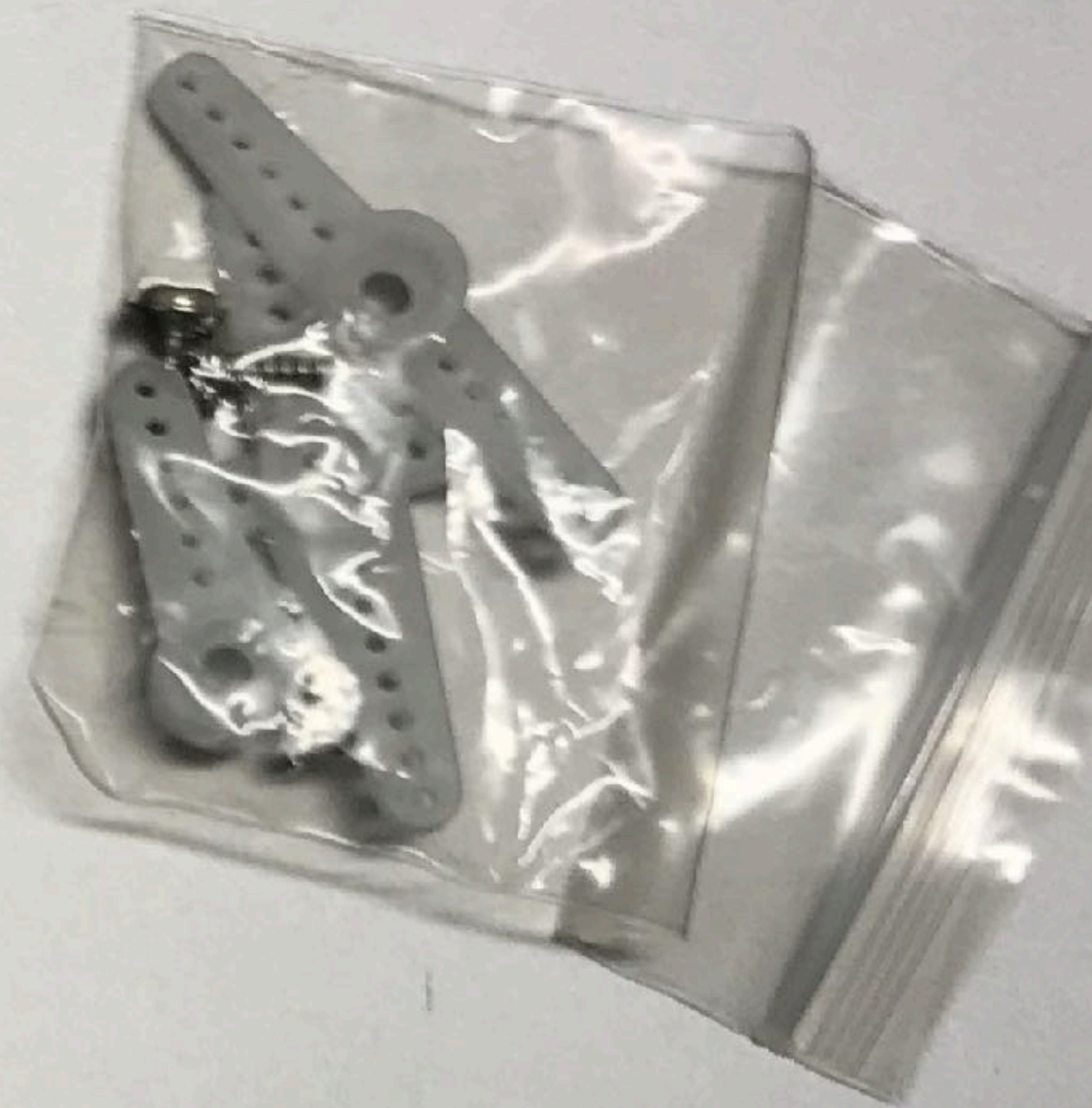
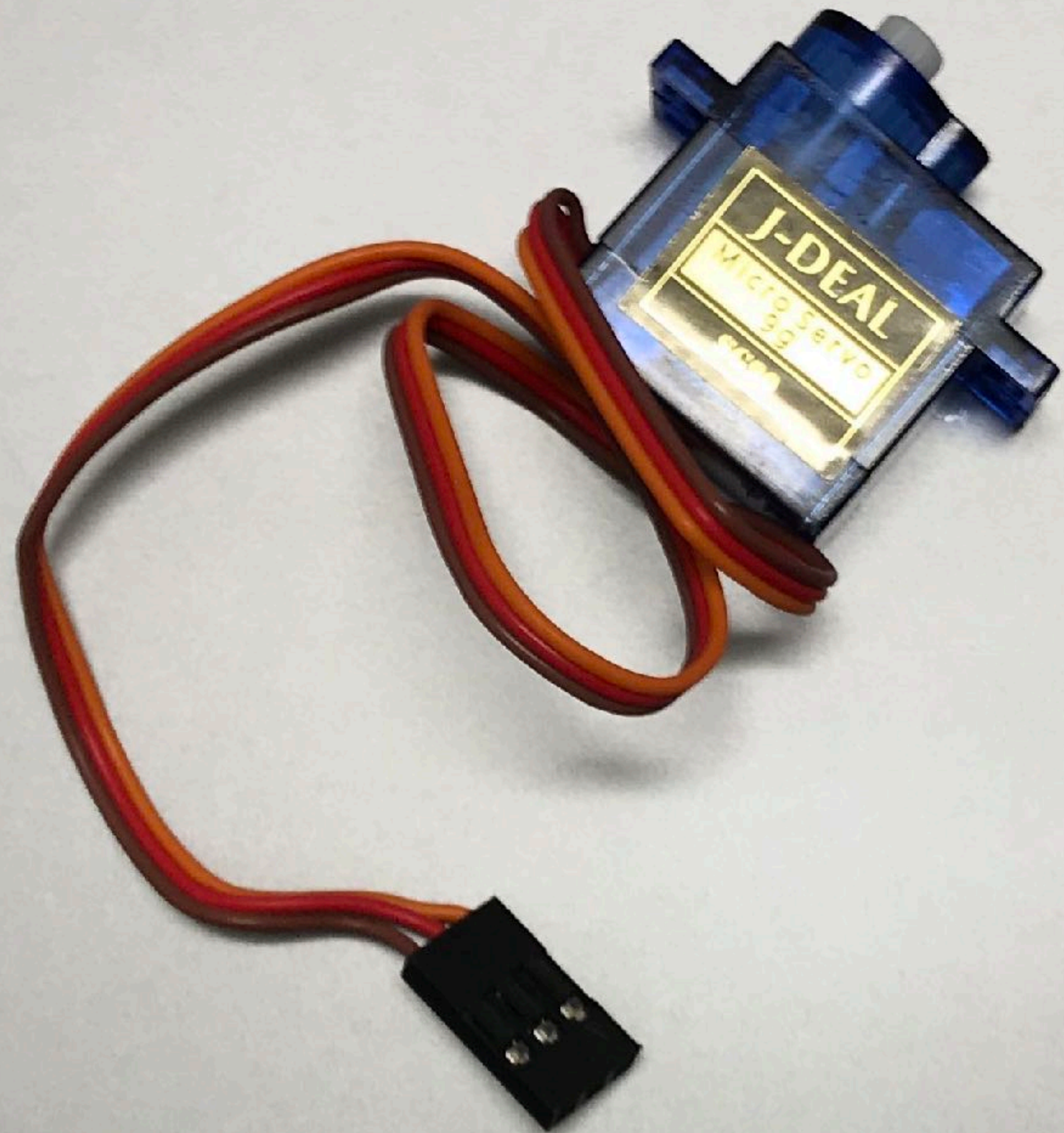
2%, 5%, 10% 560k Ω $\pm 5\%$

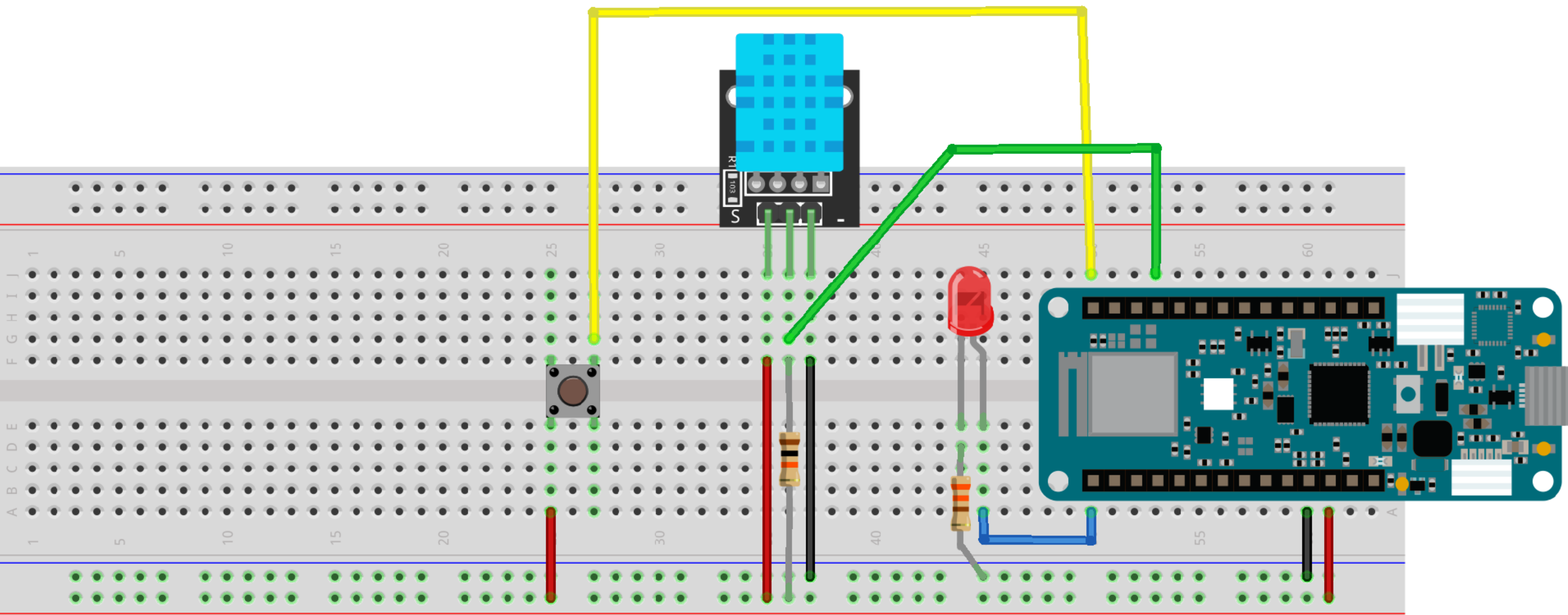
COLOR	1 ST BAND	2 ND BAND	3 RD BAND	MULTIPLIER	TOLERANCE
Black		0	0	1 Ω	
Brown	1	1	1	10 Ω	$\pm 1\%$ (F)
Red	2	2	2	100 Ω	$\pm 2\%$ (G)
Orange	3	3	3	1K Ω	
Yellow	4	4	4	10K Ω	
Green	5	5	5	100K Ω	$\pm 0.5\%$ (D)
Blue	6	6	6	1M Ω	$\pm 0.25\%$ (C)
Violet	7	7	7	10M Ω	$\pm 0.10\%$ (B)
Grey	8	8	8	100M Ω	$\pm 0.05\%$
White	9	9	9	1G Ω	
Gold				0.1 Ω	$\pm 5\%$ (J)
Silver				0.01 Ω	$\pm 10\%$ (K)

0.1%, 0.25%, 0.5%, 1% 237 Ω $\pm 1\%$

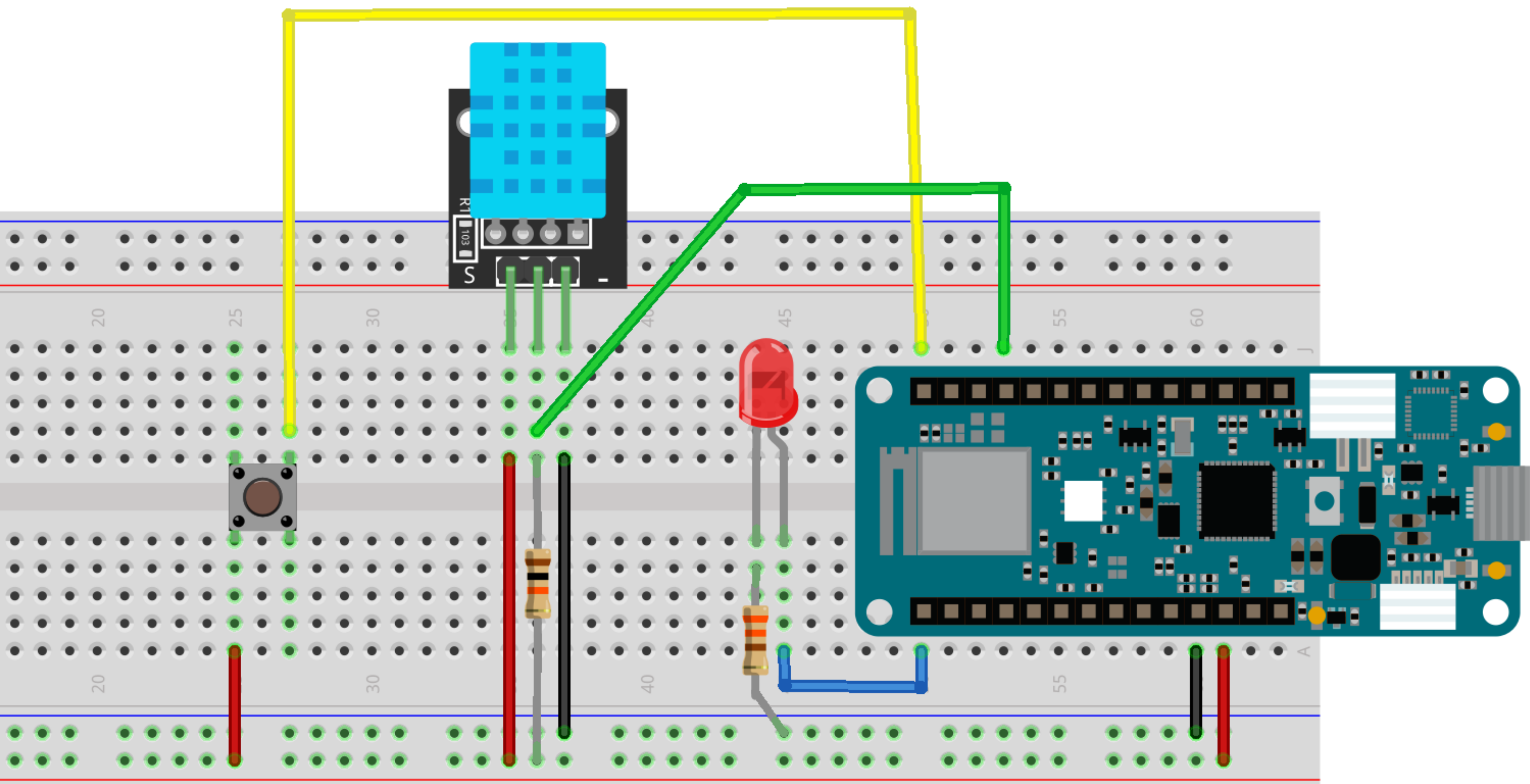
5-Band-Code

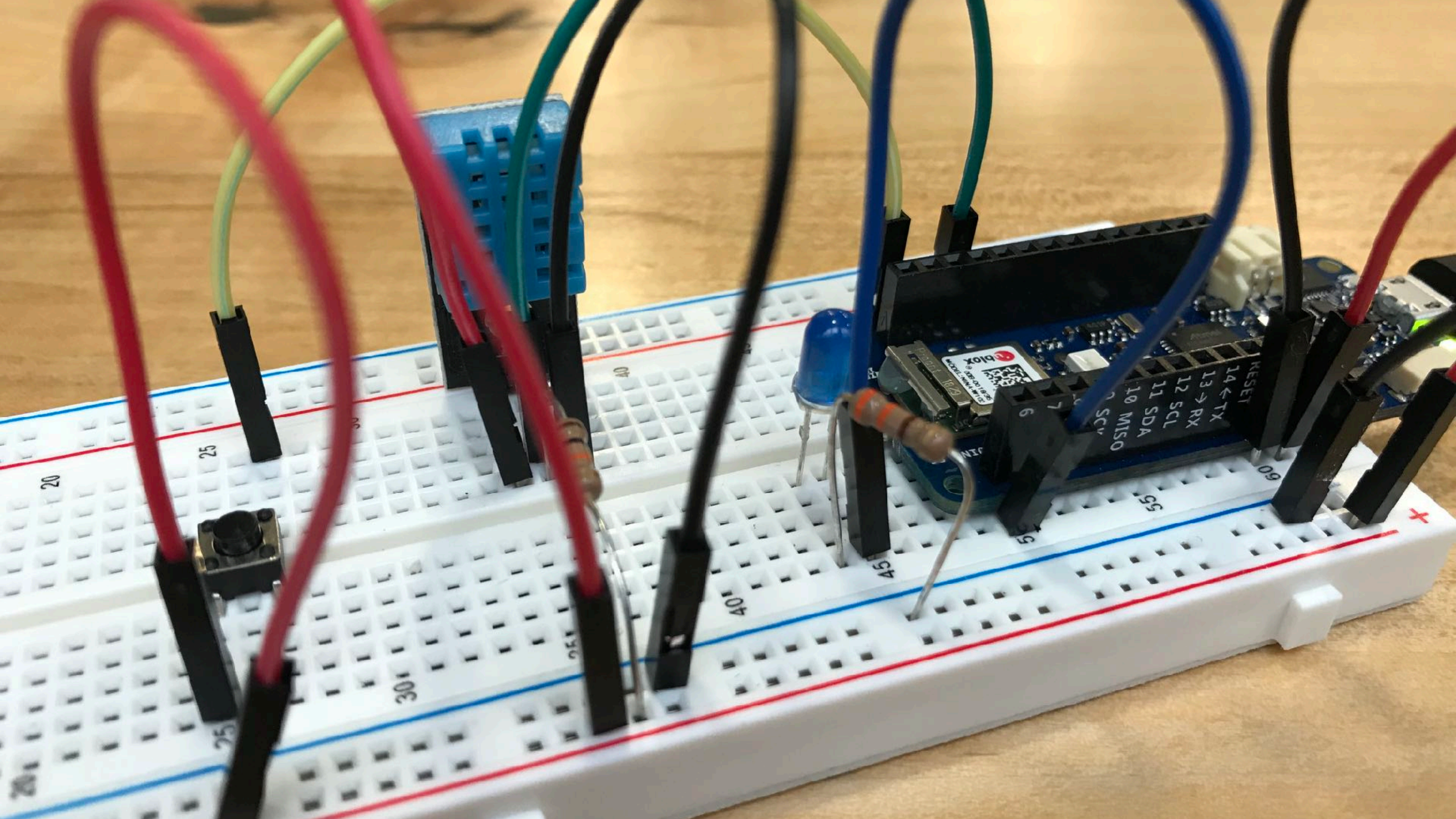
Learn more about [resistors and resistor color codes](#).





fritzing





HardwareTest.ino

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	

```

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

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

void setup()
  // initiali
  Serial.begin(2000);

// initialize temperature sensor
dht.begin();

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

```

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 Tera



HardwareTest

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

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

```
void setup()  
  // initiali  
  Serial.begin(9600);
```

```
  // initialize temperature sensor  
  dht.begin();
```

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

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	

Serial ports

COM3 (Arduino MKR WiFi 1010)

correctly. This blinks the LED and prints

Send

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.

Autoscroll Show timestamp

Both NL & CR 

9600 baud 

Clear output

NetworkTest.ino



NetworkTest arduino_secrets.h

```
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!

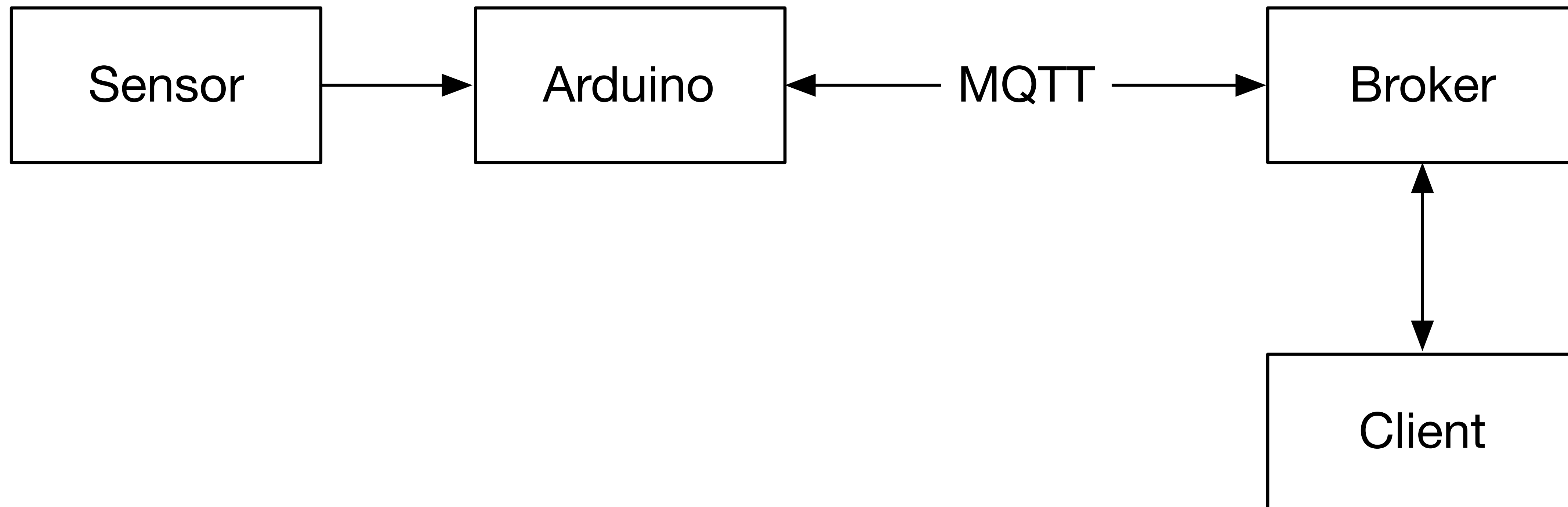
disconnecting from server.
```

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



sample

```
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 }
```

Done Saving.

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) {  
    // publish MQTT message  
    mqtt.publish(topic, message);  
    lastMillis = millis();  
  }  
}
```

```
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) {  
    // publish MQTT message  
    mqtt.publish(topic, message);  
    lastMillis = millis();  
  }  
}
```

```
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
[root@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
```



Search packages

Search

log in or sign up

mqtt

2.18.8 • Public • Published 2 months ago

Readme

14 Dependencies

926 Dependents

132 Versions



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

build passing codecov 94%

npm mqtt downloads (12 months)

Download stats from npm are currently unavailable

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;
```

```
    <button id=disconnectButton onclick="disconnect(); return
```

```
  </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.innerHTML += '\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  
});
```

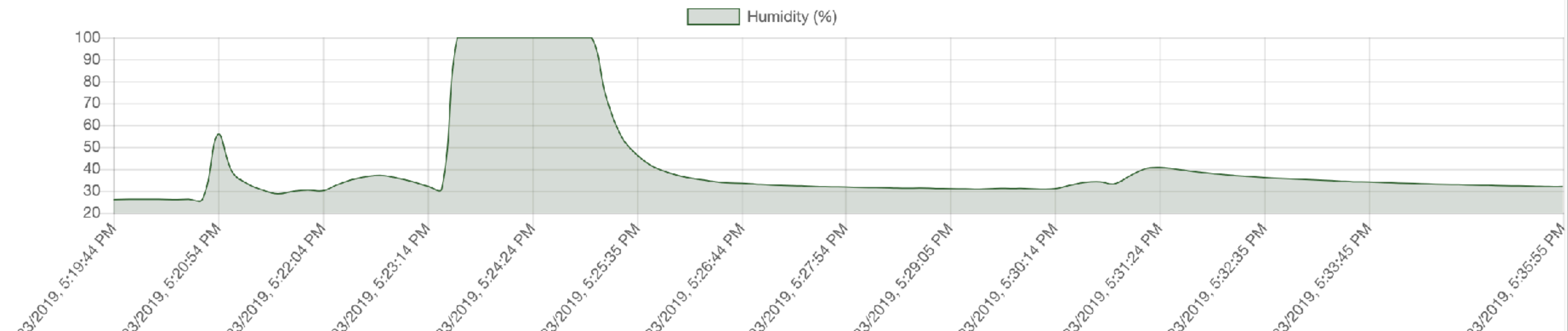
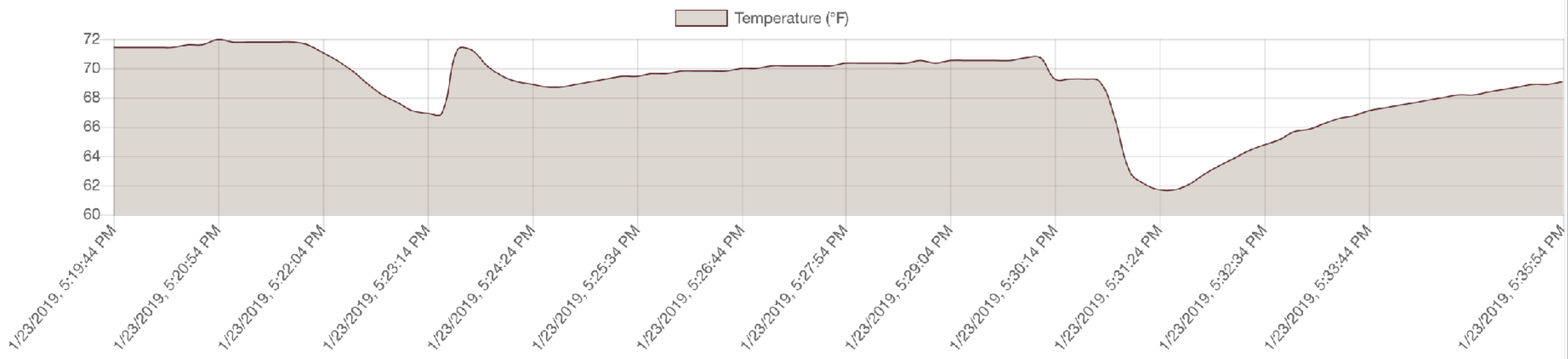
```
client.on('connect', function () {  
  console.log('connected');  
  client.subscribe(`workshop/${deviceId.value}/temperature`);  
  client.subscribe(`workshop/${deviceId.value}/humidity`);  
});
```

```
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:
Password:
Device Id:



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>

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-----

```
MIHNMHUCAQAwEzERMA8GA1UEAxMIZGV2aWNlNDIwWTATBgqhkj0PQIBBggqhkj0PQMwNCAAR6
M/7tbk0UGYWJwf+318azPvjPdT4qK2dcPCRN5h/i3lMTbYT0HKsb9bs+NChrbpUAXs0/lryuh/cl
i030J3xAoAAwCgYIKoZIzj0EAwIDSAAwRQIhAIx6syDeKiCKxafktzLpkLzbXQHxWYBOSwmaFMoL
qH0MAiB6q+1A24Y4Y2hJTy0XCnZcG6XCAB987duPMJnwUAMU7Q==
```

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

<https://iot.glitch.me>



Dashboard

[Register Thing](#)



Button Presses 1

Made with [Glitch!](#)

Register thing

Certificate Signing Request

```
-----BEGIN CERTIFICATE REQUEST-----  
MIHOMHUCAQAWEzERMA8GA1UEAxMIZGV2aWNIMTcwWTATBgqhkjOPQIBBggqhkjOPQM  
BBwNCAASX  
iZiYMWTPg8CK5rUkkk+UEbko5vDpJp49IPCfRTSXiXn/Jzpmnly2pldF1K8xshYaa6Jlp7wIA+z  
CLzqa/4/oAAwCgYIKoZlzi0EAWIDSQAwrGlhAJsRLjZAjMh99z9vuuoetSn+/9/1m9C5EG8Et+A8  
sUJiAiEaxOG7afp8VZepEc00ZFwyGAvTa7IG4HHIDMiOvM3GqLU=  
-----END CERTIFICATE REQUEST-----
```

Register

Thing registered

Broker

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

Device ID

device17

Certificate

```
-----BEGIN CERTIFICATE-----  
MIICgzCCAUwugAwIBAgIUUP//YHA84TPtjk/9kXebJnNjtHGwwDQYJKoZIhvcNAQEL  
BQAwTTFLMEkGA1UECwxQW1hem9uIFdlYiBTZXJ2aWNlcyBPPUFTYXpvbi5jb20g  
SW5jLiBMPVNIYXR0bGUgU1Q9V2FzaGluZ3RvbiBDPVVTMB4XDTE5MDEyMzIxNTk0  
N1oXDTQ5MTIzMTIzNTk1OVowEzERMA8GA1UEAxMIZGV2aWNIMTcwWTATBgcqhkiO  
PQIBBgqhkiOPQMBBwNCAASXiZjYMWTPg8CK5rUkkk+UEbkpO5vDpJp49IPCfRTS  
XjXn/Jzpmnly2pldF1K8xshYaa6Jlp7wIA+zCLzqa/4/o2AwXjAfBgNVHSMEGDAW  
gBQwV2k0UaGqgDOJNZqKy0XiJouiYDAdBgNVHQ4EFgQUntbzfYtYC21Kj8ChcfD  
r1SJ1zAwDAYDVR0TAQH/BAIwADAObgNVHQ8BAf8EBAMCB4AwDQYJKoZIhvcNAQEL  
BQADggEBAMJcZxuYAGjhbK2kb5lOtOD0qzTjT8X1+O8rpH/SJ3ORA+wJ2LC2BvVj  
KcEJMf4T0jmqqxA36BILY1zpq0WWEfl2MyHG8HopI/Z6tWhGNT5YDfYGCScz25gk  
8Q/tIBOt5Zris8x4InaVg2vqvdeadVJr6RNGg9SROJi+DF8mxMHVXtiP2BJfCeGH  
HvqxHMEA9LzPNr0ee6M3avwXN1cca1LKjBn4tEWicjSZxcn08Psoa4S4X+aaHZz1  
fb7QooXTPV5d9M0xUxbx/HMU/s/3HhuYvswFBnlSsuIKNIROVUqxzCpsth73zTe  
SDDNRoDb9KRDnblUTUr8b4dLPIqURew=  
-----END CERTIFICATE-----
```

Dashboard



[Register Thing](#)

0123B377D31EAE87EE

Refresh

Button Presses 3

LED

Switch:

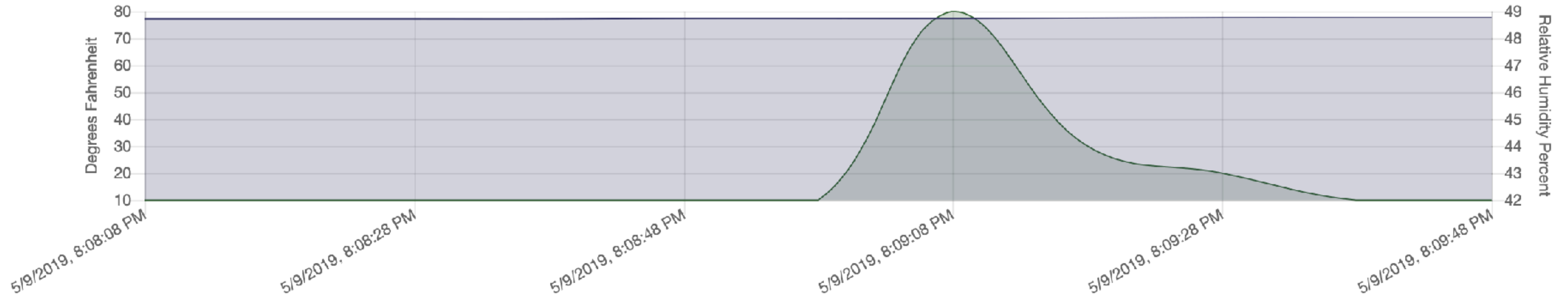


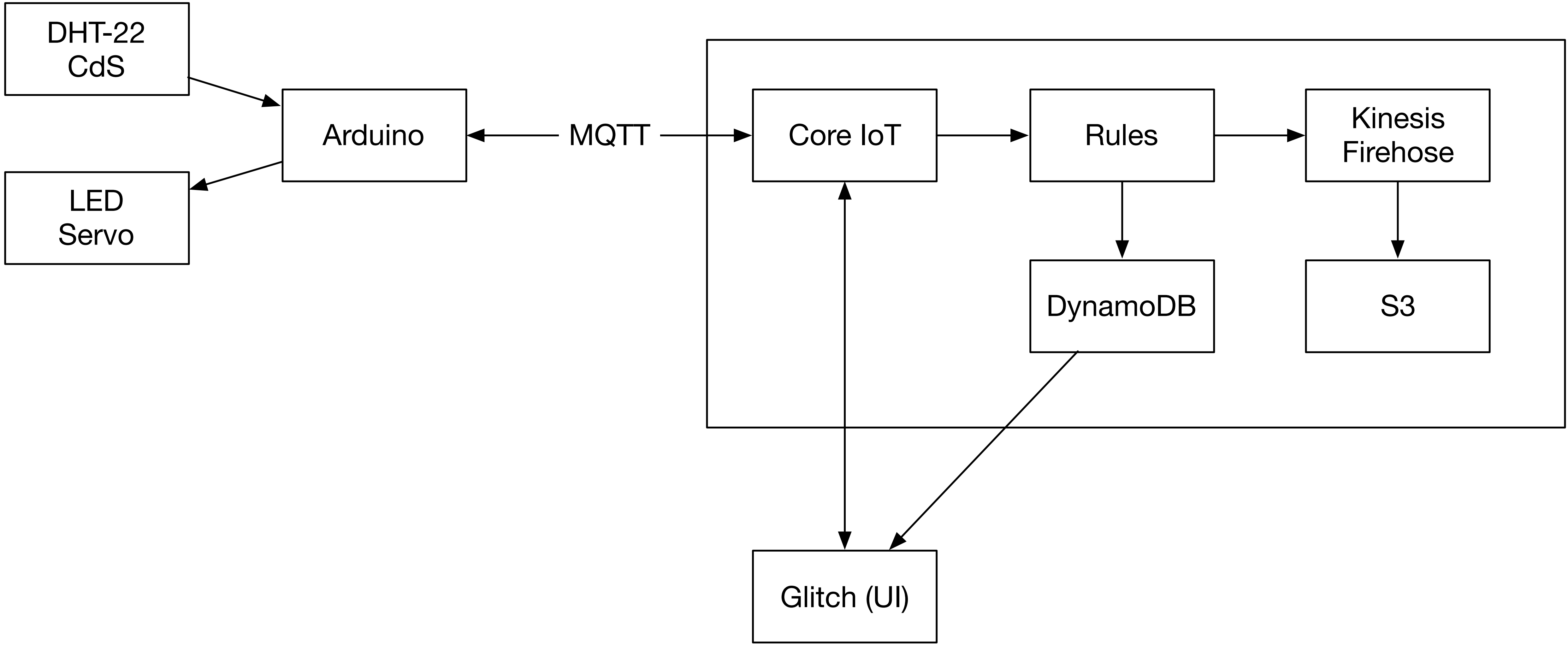
Brightness



MKR 1010 Temperature & Humidity

Temperature (°F) Humidity (%)







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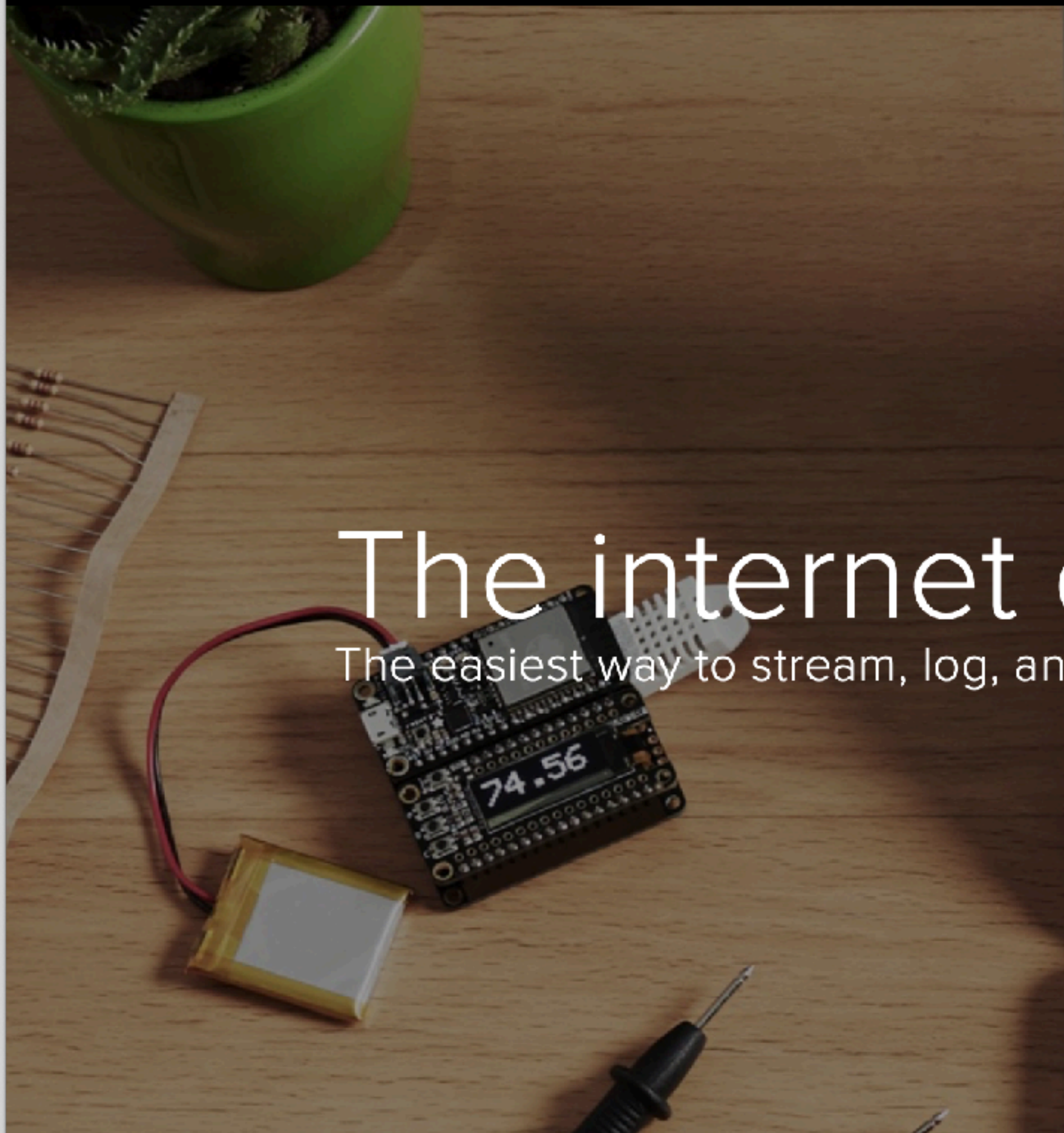
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