

# WiFi OLED Display Badge Created by Becky Stern



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## Overview

Create an internet connected display brooch and wear your data on your sleeve (or jacket, or backpack...)! This simple Adafruit IO project pulls forecast data from IFTTT and displays it on a FeatherWing OLED display, made wearable with a magnetic pin back. It also toggles to display a favorite quote, or serve as a nametag!

For this project you will need:

- Adafruit Feather HUZZAH ESP8266 WiFi board (http://adafru.it/2821)
- FeatherWing OLED display (http://adafru.it/2900)
- Magnetic pin back (http://adafru.it/1170)
- Lipoly battery (350mAh (http://adafru.it/2750) or 500mAh (http://adafru.it/1578) recommended)
- Soldering tools and supplies (https://adafru.it/drl)
- Accounts on Adafruit IO (https://adafru.it/fsU) and IFTTT (https://adafru.it/iOe)

Before you begin, please review and understand the following prerequisite guides:

- Adafruit Feather HUZZAH ESP8266 (https://adafru.it/kD3)
- Monochrome OLED breakouts (https://adafru.it/dAZ)
- Adafruit IO (https://adafru.it/kSb)
- MQTT, Adafruit.IO & you! (https://adafru.it/Cgj)
- Adafruit guide to excellent soldering (https://adafru.it/drl)





### Assemble Circuit



First up, solder headers onto the FeatherWing OLED. The easiest way to get the headers installed with proper alignment is to do this in a solderless breadboard. Trim one of the sections to fit the shorter row of holes on the FeatherWing and press into the breadboard. Slide the FeatherWing OLED onto the headers and solder in place.



If you have an extra feather to spare, setting one up on a breadboard withstacking headers (http://adafru.it/2830) is a great way to prototype with FeatherWings. Though not strictly necessary, this lets you try out different FeatherWings and assess any faulty solder connections without committing to permanently connecting the two.







Next, solder your FeatherWing OLED to your Feather main board-- but don't let it be crooked! It's easiest to solder the pin closest to the JST battery connector first, then level the board as that solder cools. Then the rest of the pins will be oriented nicely for soldering up a perfectly parallel board sandwich.



## Adafruit IO and IFTTT Setup

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First, create a feed to store your data on Adafruit IO called "hightemp"-- this will catch the value from IFTTT (https://adafru.it/iOe) and your Feather will check this feed for new values.



Next, create a recipe on IFTTT using the weather channel, and set it to trigger at the time of your choice. Select the Adafruit channel as the output and configure it to send today's forecasted high temperature value to the "hightemp" feed you already created.

#### You can also adopt the pre-made recipe we published on IFTTT! (https://adafru.it/kSd)

Now each day the recipe will update the feed with today's projected high temperature! Substitute this recipe with any value, weather related or not, to customize the project.

You can manually add a value to the feed to test the project, since the IFTTT recipe will only update the feed once per day.



## Code

This guide assumes you've completed the setup required to get your ESP8266 up and running with Arduino IDE and Adafruit IO.

• If you haven't yet set up your ESP8266 for use with Adafruit IO and the Arduino IDE, follow along with this guide (https://adafru.it/DCI). The setup only needs to be performed once.

The following Arduino libraries are required (install manually or through the library manager under Sketch-> Include Library-> Manage Libraries...):

- Adafruit SSD1306 (https://adafru.it/aHq)
- Adafruit GFX (https://adafru.it/aJa)
- Adafruit BusIO (https://adafru.it/GxD)

Modify the variables near the top of the sketch to match your WiFi network's SSID, password, Adafruit IO username, and Adafruit IO key before programming your Feather with the sketch.

```
/*
* WiFi OLED Display Badge
* guide: https://learn.adafruit.com/digital-display-badge/
 * based on Home Automation sketch by M. Schwartz
 * with contributions from Becky Stern and Tony Dicola
 */
#include <ESP8266WiFi.h>
#include "Adafruit MQTT.h"
#include "Adafruit_MQTT_Client.h"
const char* ssid = "SSID";
const char* password = "password";
// Adafruit IO
#define AIO SERVER "io.adafruit.com"
#define AIO SERVERPORT 1883
#define AIO USERNAME "your IO username"
#define AIO KEY
                     "your IO key"
// Functions
void connect();
// Create an ESP8266 WiFiClient class to connect to the MQTT server.
WiFiClient client;
// Store the MQTT server, client ID, username, and password in flash memory.
// This is required for using the Adafruit MQTT library.
const char MQTT SERVER[] PROGMEM
                                   = AIO SERVER:
// Set a unique MQTT client ID using the AIO key + the date and time the sketch
// was compiled (so this should be unique across multiple devices for a user,
// alternatively you can manually set this to a GUID or other random value).
const char MQTT CLIENTID[] PROGMEM = AIO KEY DATE TIME ;
const char MQTT USERNAME[] PROGMEM = AIO USERNAME;
const char MQTT PASSWORD[] PROGMEM = AIO KEY;
// Setup the MQTT client class by passing in the WiFi client and
// MOTT conver and login details
```

```
// העוד סבועבו מהת נטקדה תבנמדנס.
Adafruit_MQTT_Client mqtt(&client, MQTT_SERVER, AI0_SERVERPORT,
 MQTT CLIENTID, MQTT USERNAME, MQTT PASSWORD);
// Setup a feed called 'hightemp' for subscribing to changes.
// Notice MQTT paths for AIO follow the form: <username>/feeds/<feedname>
const char hightemp FEED[] PROGMEM = AIO USERNAME "/feeds/hightemp";
Adafruit MQTT Subscribe hightemp = Adafruit MQTT Subscribe(&mqtt, hightemp FEED);
#include <SPI.h>
#include <Wire.h>
#include <Adafruit GFX.h>
#include <Adafruit SSD1306.h>
#define OLED RESET 3
Adafruit_SSD1306 display(128, 32, &Wire, OLED_RESET);
// this constant won't change:
const int buttonPin = 2; // the pin that the pushbutton is attached to
// Variables will change:
int buttonPushCounter = 0; // counter for the number of button presses
int buttonState = 0; // current state of the button
int lastButtonState = 0; // previous state of the button
void setup() {
 Serial.begin(115200);
 delay(100);
 // initialize the button pin as a input:
 pinMode(buttonPin, INPUT_PULLUP);
 // SSD1306 SWITCHCAPVCC = generate display voltage from 3.3V internally
 display.begin(SSD1306 SWITCHCAPVCC, 0x3C); // Address 0x3C for 128x32
  // Show initial display buffer contents on the screen --
  // the library initializes this with an Adafruit splash screen.
 display.display();
 delay(2000); // Pause for 2 seconds
 // Clear the buffer.
 display.clearDisplay();
 // We start by connecting to a WiFi network
 Serial.println();
 Serial.println();
 Serial.print("Connecting to ");
 Serial.println(ssid);
 WiFi.begin(ssid, password);
 while (WiFi.status() != WL CONNECTED) {
   delay(500);
   Serial.print(".");
  }
  Serial.println("");
  Serial.println("WiFi connected");
```

```
Serial.println("IP address: ");
  Serial.println(WiFi.localIP());
  display.setTextSize(1);
  display.setTextColor(WHITE);
  display.setCursor(0,0);
  display.print("Connected to ");
  display.println(ssid);
 display.setCursor(0,16);
 display.print("IP address: ");
 display.println(WiFi.localIP());
 display.display();
  delay(2000);
 // listen for events on the weather feed
 mqtt.subscribe(&hightemp);
 // connect to adafruit io
 connect();
}
int temp = 151;
int whichbutton = 0;
void loop() {
 Adafruit MQTT Subscribe *subscription;
 // ping adafruit io a few times to make sure we remain connected
 if(! mqtt.ping(3)) {
    // reconnect to adafruit io
   if(! mqtt.connected())
      connect();
  }
  // read the pushbutton input pin:
  buttonState = digitalRead(buttonPin);
  // compare the buttonState to its previous state
 if (buttonState != lastButtonState) {
   // if the state has changed, increment the counter
   if (buttonState == LOW) {
     // if the current state is LOW then the button was pressed
     buttonPushCounter++;
     Serial.print("number of button pushes: ");
     Serial.println(buttonPushCounter);
   }
 }
 // this is our 'wait for incoming subscription packets' busy subloop
 if (subscription = mqtt.readSubscription(1000)) {
    // we only care about the weather events
    if (subscription == &hightemp) {
     temp = atoi((char*)hightemp.lastread);
      Serial.print(F("Received: "));
      Serial.println(temp);
    }
  }
  //A button position - display today's high temperature
  if (huttonPushCounter % 3 == 0)
```

```
1 (DUCCOIL USICOULICE 0 5 -- 0) [
    if(temp == 151) {
      display.clearDisplay();
      display.setCursor(0,16);
      display.println("Waiting for temp data");
      display.display();
      Serial.println(F("Printed: Waiting for temp data"));
    } else {
      display.clearDisplay();
      display.setCursor(0,16);
      display.print("Today's high: ");
      display.print(temp);
      display.println(" F");
      display.display();
      Serial.print(F("Printed: "));
      Serial.println(temp);
   }
 }
  //B button position - David Bowie quote
 if (buttonPushCounter % 3 == 1) {
    display.clearDisplay();
    display.setCursor(0,0);
    display.println("I'm an instant star. Just add water and ");
    display.println("stir.");
                        David Bowie");
    display.println("
    display.display();
 }
 //C button position - nametag
 if (buttonPushCounter % 3 == 2) {
    display.clearDisplay();
    display.setCursor(0,0);
    display.println("Your Name");
    display.println();
    display.println("Your Title");
    display.display();
 }
 // save the current state as the last state.
 //for next time through the loop
 lastButtonState = buttonState;
}
// connect to adafruit io via MQTT
void connect() {
  Serial.print(F("Connecting to Adafruit I0... "));
 int8 t ret;
 while ((ret = mqtt.connect()) != 0) {
    switch (ret) {
     case 1: Serial.println(F("Wrong protocol")); break;
     case 2: Serial.println(F("ID rejected")); break;
     case 3: Serial.println(F("Server unavail")); break;
     case 4: Serial.println(F("Bad user/pass")); break;
      case 5: Serial.println(F("Not authed")); break;
      case 6: Serial.println(F("Failed to subscribe")); break;
```

```
default: Serial.println(F("Connection failed")); break;
}
if(ret >= 0)
mqtt.disconnect();
Serial.println(F("Retrying connection..."));
delay(5000);
}
Serial.println(F("Adafruit IO Connected!"));
}
```



## Wear it!



When your circuit is working properly, attach the magnetic pin back by peeling the paper from the adhesive backing on the metal plate. Stick it to the back of the Feather, and use the magnetic plate to attach it to your jacket, backpack, and more!

The C button on the FeatherWing OLED serves to toggle between display modes. If you wish, you may tuck your battery inside a 3D printed pocket (https://adafru.it/kSa)!





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