



## 3D Printed IoT On Air Sign for Twitch

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Last updated on 2018-08-22 03:53:26 PM UTC

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## Overview

### IoT On-Air Sign

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In this tutorial, you'll learn how to build an internet connected On Air Sign. It will light up whenever your favorite Twitch channel start streaming. You can use this as visual notification or if you're a broadcaster, this will let the people around know to be courteous!

It's uses an Adafruit HUZZAH with ESP8266 or you can optionally use an Adafruit Feather MO with WiFi. You'll also need a strip of NeoPixel LEDs.



### Parts List

- [Adafruit Feather MO with WiFi \(https://adafru.it/n6f\)](https://adafru.it/n6f) or [Adafruit HUZZAH ESP8266 \(https://adafru.it/n6A\)](https://adafru.it/n6A)
- [NeoPixel LED Strip \(https://adafru.it/n6B\)](https://adafru.it/n6B)

### Tools & Supports

- Soldering Iron with Solder
- 26AWG silicone coated stranded wire
- Wire Strippers
- 3D Printer with Filament
- Double-sided tape
- 8x #4-40 flat Phillips machine screws

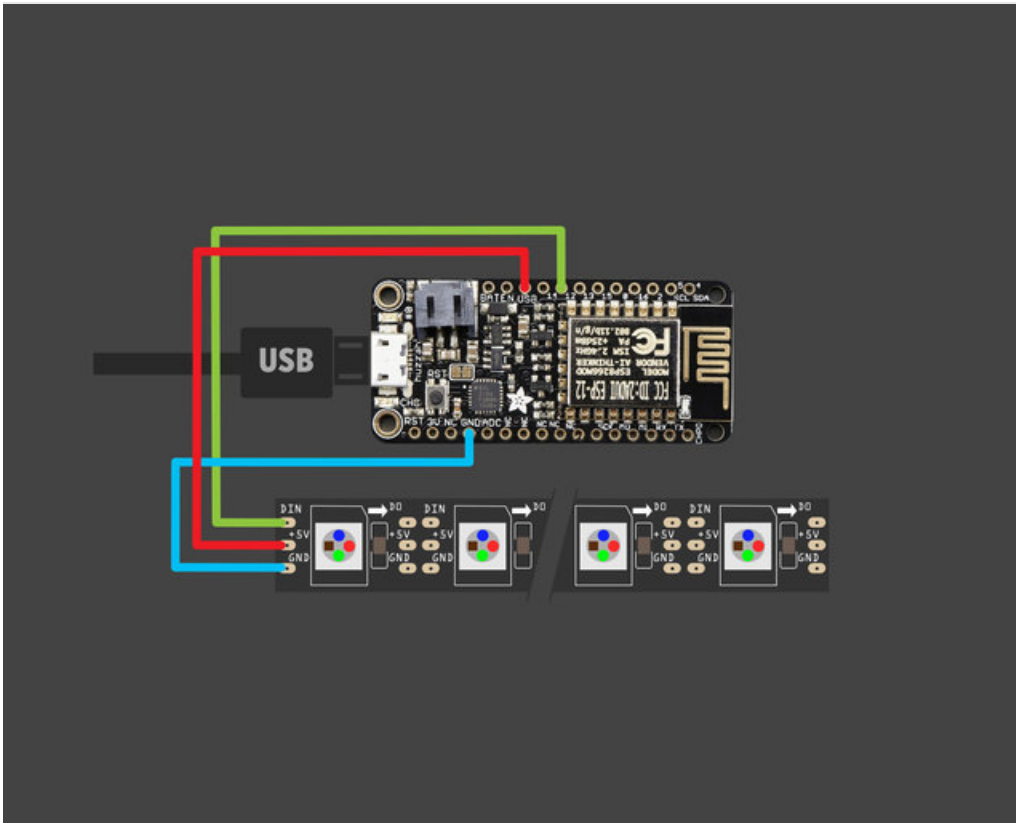
### Prerequisite Guides

Walk through the following guides to get familiar with the hardware used in this project.

- [Adafruit HUZZAH ESP8266 Guide \(https://adafru.it/n6C\)](https://adafru.it/n6C)



## Circuit Diagram



## Reference Connections

Use the circuit diagram to reference for connecting the components together. The diagram does not depict exact wire lengths or size of components.

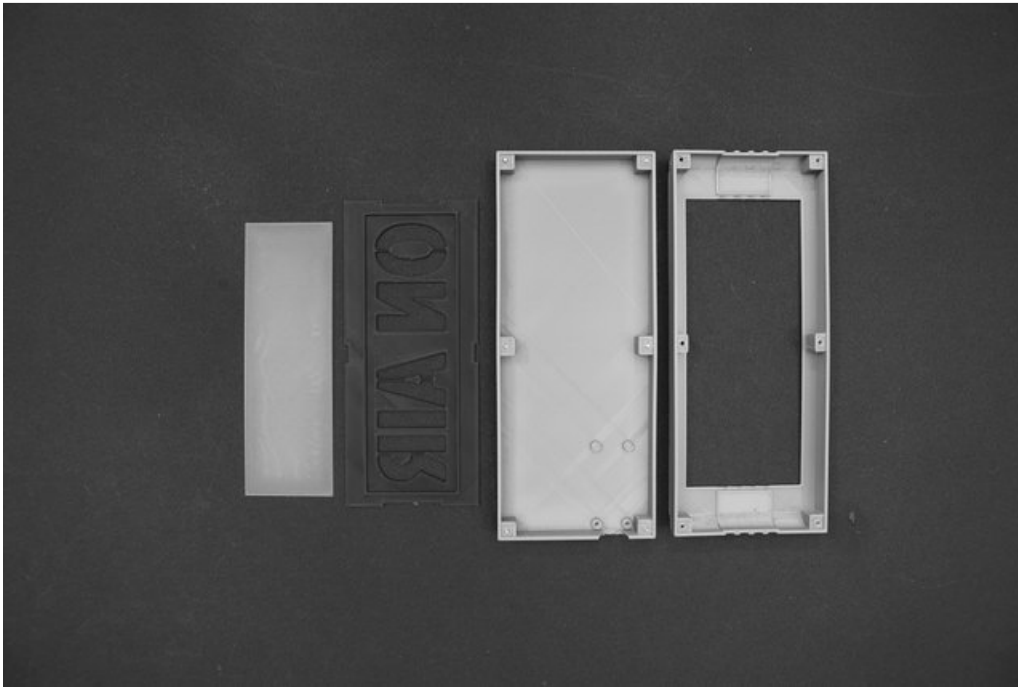
Please take note of the connections on the NeoPixel Strip. The order of the connections vary from strip to strip.

- Pin # 12 from HUZAZH to Data In on NeoPixel Strip
- GND from HUZAZH to GND or "-" on NeoPixel Strip
- USB from HUZAZH to +5V or PWR on NeoPixel Strip

## Power

Use a 5V USB power supply and a microUSB cable to power the circuit

## 3D Printing



### Materials

We suggest using PLA material but your free to use ABS, PET or exotic composites like wood, metals and others. The parts are listed in the tablet below.

bot-case.stl	Bottom case half. HUZDAH and LED strip are mounted to this.	
top-case.stl	Top half of case.	x
face.stl	Panel with "On-Air" text stencil cutout.	x
diffuser.stl	Blank diffuser piece should be printed in transparent/white material.	x

### Slice Settings

Depending on your 3D printers hardware, you'll need to use your preferred slice settings. The parts are oriented to print "as-is" and doesn't require any support materials (very minimal overhangs).

These are the slice settings we used on our Printrbot Play, sliced using Simplify3D

- 220C Extruder (on a non-heated bed)
- 20% Infill
- 2 shells/parameters
- 4 top and bottom layers
- 1.0 Extrusion multiplier
- 0.48 Extrusion width

### Customize Design

The enclosure parts are available to modify and download. Click below to download the source. Size it to fit the bed of your 3D printer.

<https://adafru.it/n6D>

<https://adafru.it/n6D>

## Download STLs

3D print the files "as-is" if they can fit on the bed of your 3D printer (case is 220mm x 90mm)

<https://adafru.it/n6E>

<https://adafru.it/n6E>

## Software

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### Adafruit HUZZAH 8266 Arduino Libraries

Be sure to follow the guide below to install the board and libraries.

<https://adafru.it/IRC>

<https://adafru.it/IRC>

### Arduino Sketch

The arduino sketch will connect to the Twitch API and determine if the Twitch channel is currently streaming - if so, the Feather will turn on some NeoPixels to light up the sign. In the sketch, you'll need to add your WiFi credentials, change the number of pixels you're using and your desired twitch channel.

Download the sketch from the github repo linked below.

<https://adafru.it/n6F>

<https://adafru.it/n6F>

```
1  /*
2  * Simple HTTP get webclient test
3  */
4
5  #include <ESP8266WiFi.h>
6  #include <Adafruit_NeoPixel.h>
7
8  const char* ssid    = "ssid";
9  const char* password = "password";
10
11 #define HOST "api.twitch.tv"
12 #define PATH "/kraken/streams/adafruit"
13 #define REFRESH 20 // seconds between refresh
14 #define LED 13
15 #define PIN 12
16 Adafruit_NeoPixel strip = Adafruit_NeoPixel(30, PIN, NEO_GRBW + NEO_KHZ800);
17
18 // Fill the dots one after the other with a color
19 void colorWipe(uint32_t c, uint8_t wait) {
20   for(uint16_t i=0; i<strip.numPixels(); i++) {
21     strip.setPixelColor(i, c);
22     strip.show();
23     delay(wait);
24   }
25 }
```

### Twitch API

If you're interested in reading how the twitch API works, click on the link below.

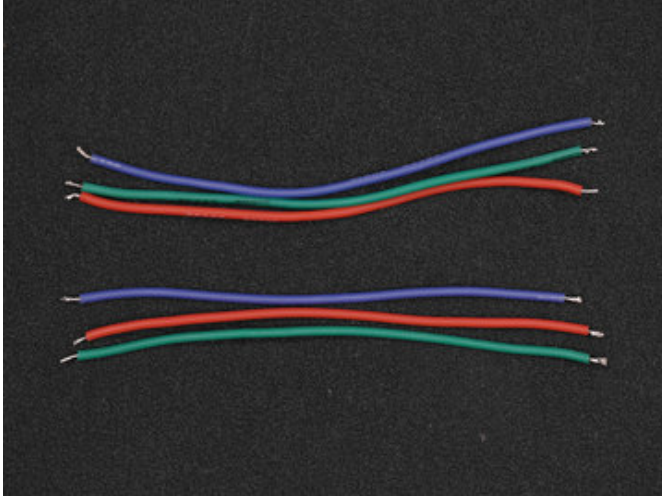
<https://adafru.it/n7a>

<https://adafru.it/n7a>





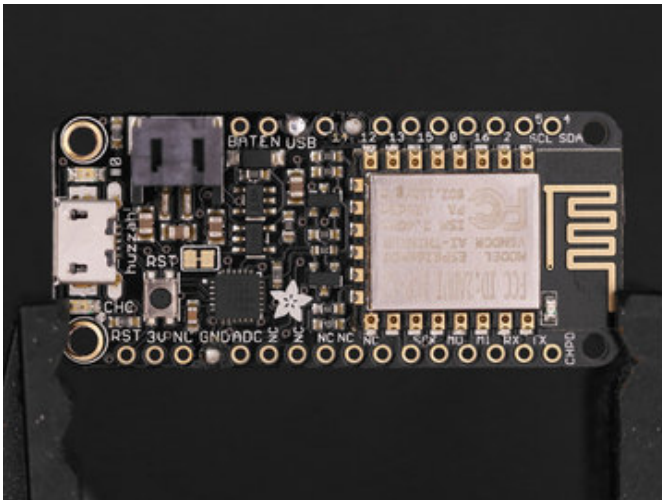
## Wiring Components



### Prep Wires

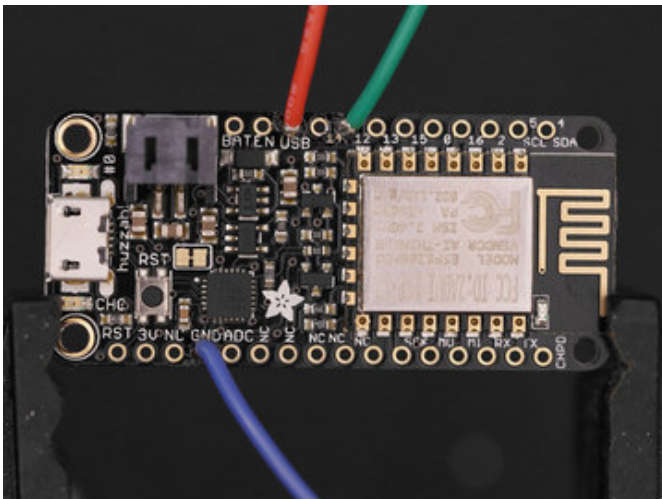
Let's start by preparing the wires for this project. You'll need six pieces of wire. I suggest 26AWG silicone coated stranded wires. Measure each wire to about 9cm in length.

Use wire strippers to remove about 3mm of insulation of the tips of each wire. Tin the exposed tips of each wire by heating it up with the soldering iron and applying a bit of solder.



### Adafruit Huzzah ESP8266

Secure the Huzzah ESP8266 to a Panavise Jr. or helping third hands. Tin the USB, #12 and GND pins. Solder wires to these pins. They don't have to be color coded but it does help tell them apart.

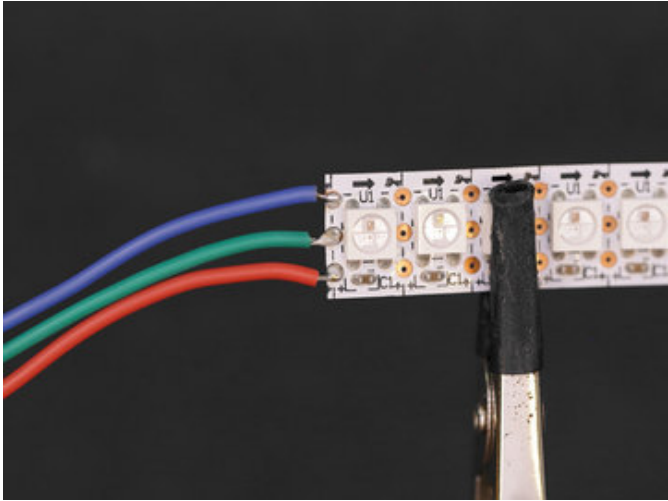




### Cut NeoPixel LED Strips

Next, you'll need to cut the NeoPixel LED strips into two pieces. Use the length of the enclosure to determine the right size (it should be a little longer than the diffuser).

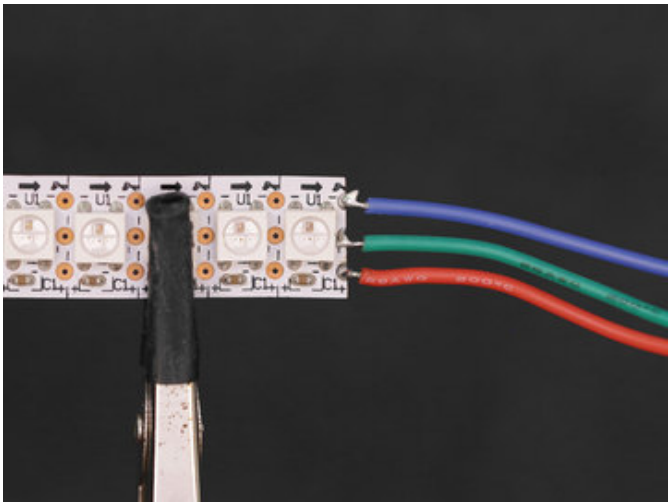
If your using a high density NeoPixel strip (like the 144 LEDs per 1m), you may need to remove a "sacrificial" pixel. This is where you need to cut a pixel off so that you have more exposed pads to work with. Otherwise, you may find it difficult to apply solder to a pad thats cut in half.

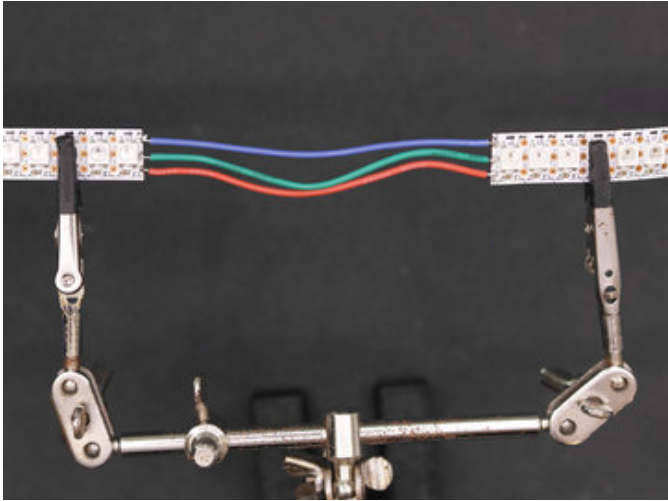


## Wire NeoPixel LED Strips

Now we need to solder the three wires from the Adafruit HUZDAH to one of the NeoPixel LED Strips.

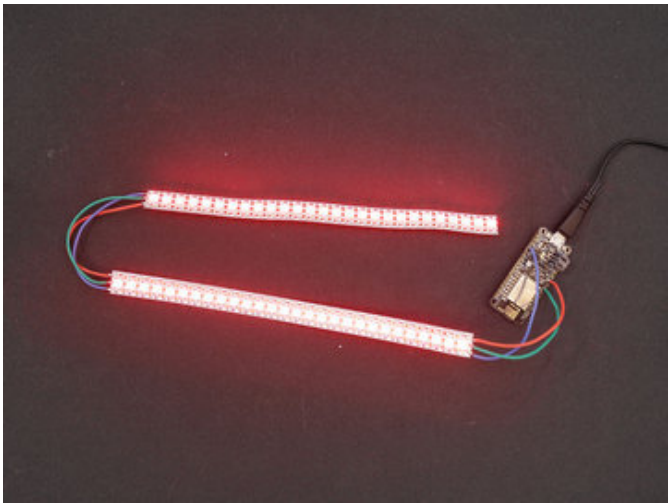
But first, apply solder to each pin on both ends of the NeoPixel LED strips. While heating up the tinned pin with the tip of the soldering iron, quickly place a wire to solder it in place. Gnd to -negative, USB to +positive, and #12 to data in. Then, connect the remaining three wires to the end of the first NeoPixel strip.





### Connect NeoPixel LED Strips

Now we need to connect the two NeoPixel strips together. Solder up the three wires from the first NeoPixel LED strip to the second. Make sure the marked arrows are flowing and not pointing towards each other. A pair of helping third hands will make it easier to solder.



### Test Circuit

Now is a good time to test your wiring before mounting it to the case.

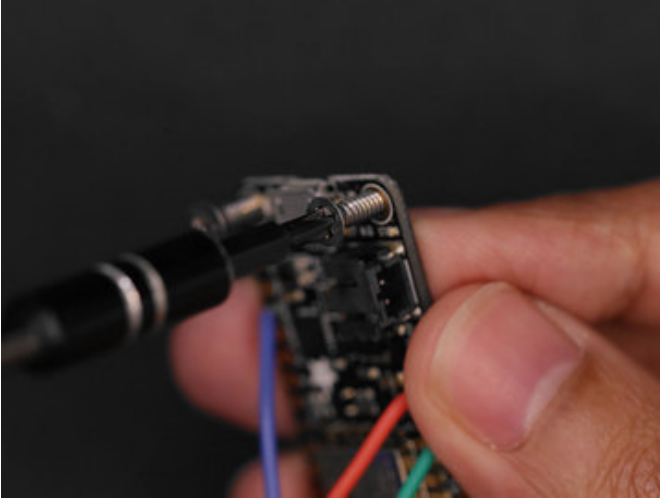
Plug in a micro USB cable into the Adafruit Huzzah and into your computer. You can upload the Arduino sketch or an example NeoPixel demo (like the simple sketch) to test the NeoPixel LED strips - just make sure to update the sketch with the correct number of pixels and pin 12.

### Assemble Case

If everything works as expected, it's safe to start mounting the circuit to the 3D printed enclosure!

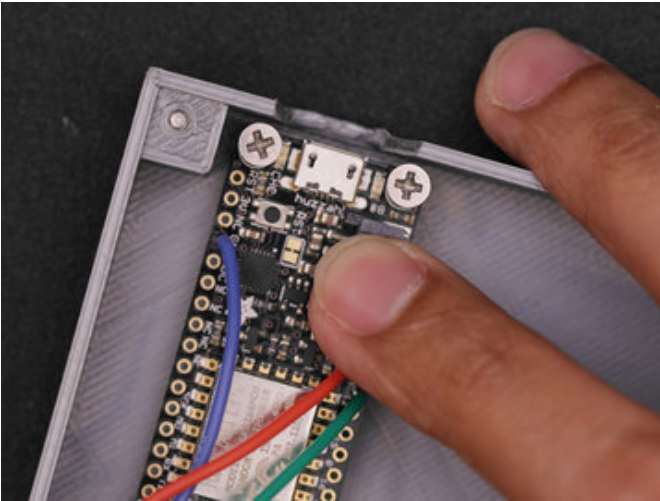
## Case Assembly

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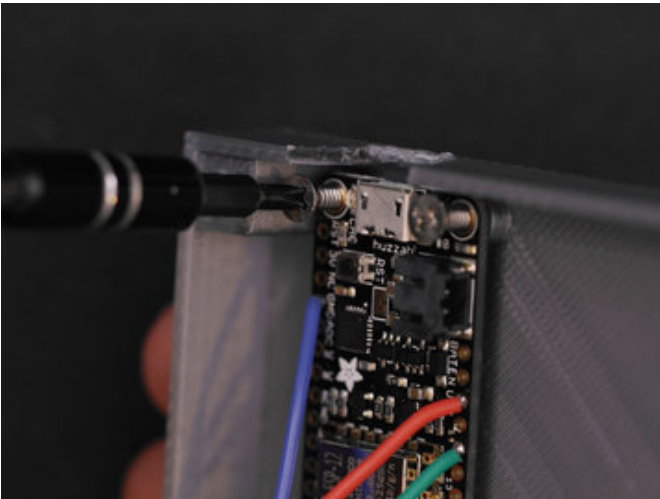
### Tap Mounting Holes

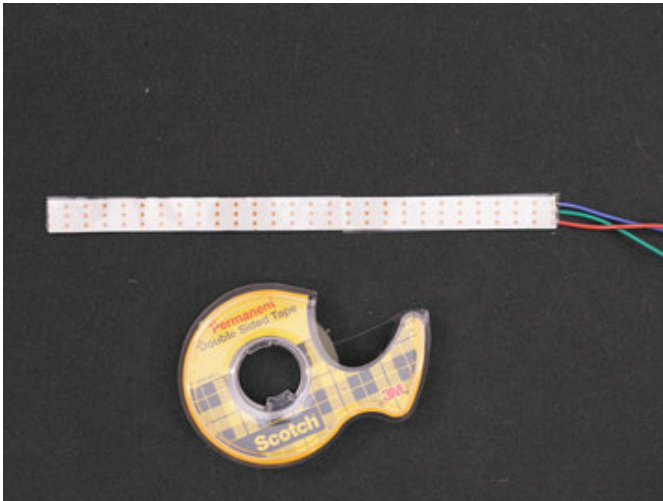
Before securing the HUZAZH board to the case, it's a good idea to tap the holes. Use a #4-40 machine screw to do this. Start by placing the screw over the mounting hole and slowly fasten it in - try your best to keep the screw straight so it doesn't go in at an angle. This will create threads. Do this for each hole.



### Secure Adafruit HUZAZH

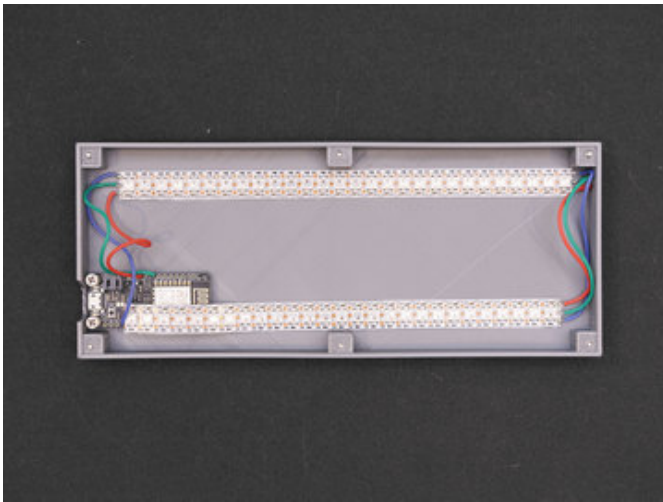
Place the HUZAZH board over the standoffs on the bottom case and fasten the screws. **DO NOT** fasten them all the way through - otherwise the screw will poke through the case. You only need to fasten it a few turns, until the board is secured to the case.

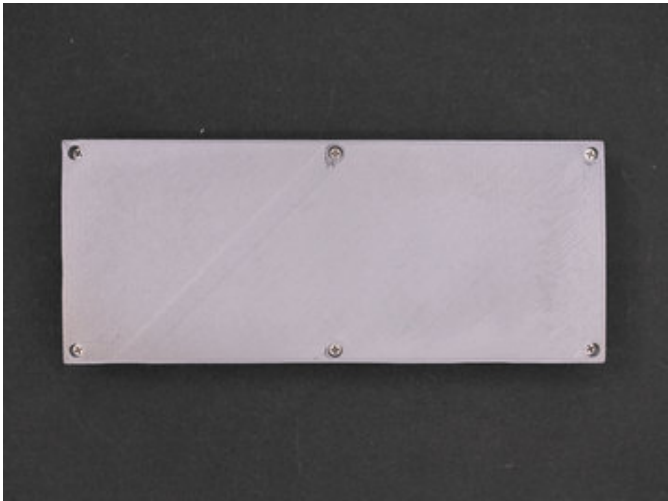




### Stick NeoPixel LED strips

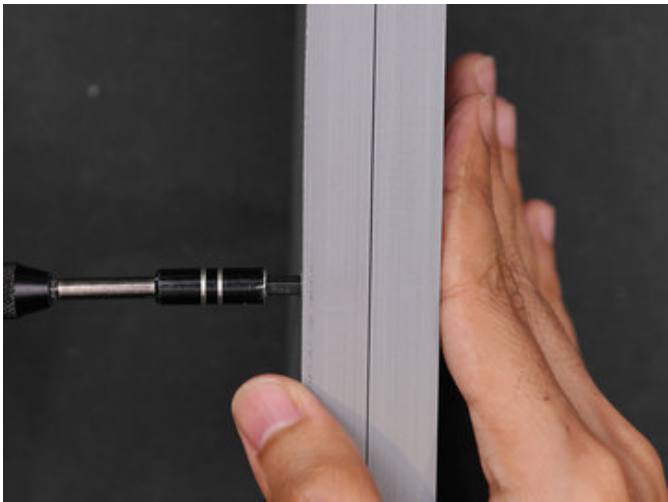
Add pieces of double-sided tape to the back of each NeoPixel LED strips and stick it to the inside of the case. Reference the photo for best position.





### Secure Case Halves

Insert 6 #4-40 3/8 flat Phillips machine screws into the back of the case and fasten them in until they poke through the top. Place the top half over the bottom half and hole them together while fastening the screws all the way in.







## Final Assembly

Plug in a micro USB cable into the Adafruit HUZZAH ESP8266 and power it by either your computer or a 5V power supply.