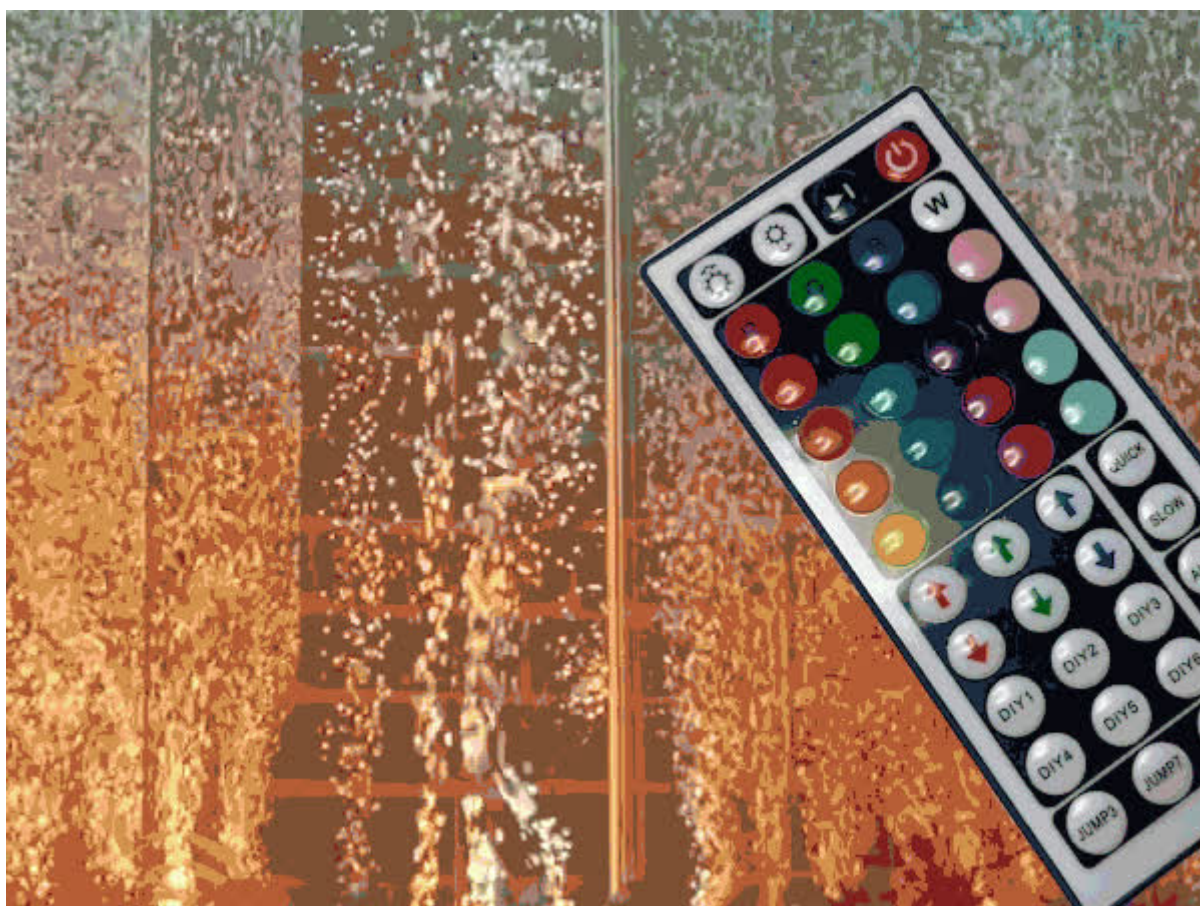




NeoPixel Remote: IR Control with WLED

Created by Erin St Blaine



<https://learn.adafruit.com/neopixel-remote-ir-control-with-wled>

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Overview

RGB LED lighting strips are everywhere. Many of these strips come with a handy infrared (IR) remote control that will allow you to select different colors, change brightness, and fade from one color to the next. They're very easy to install and use, but can be rather a disappointment for the discerning LED connoisseur.

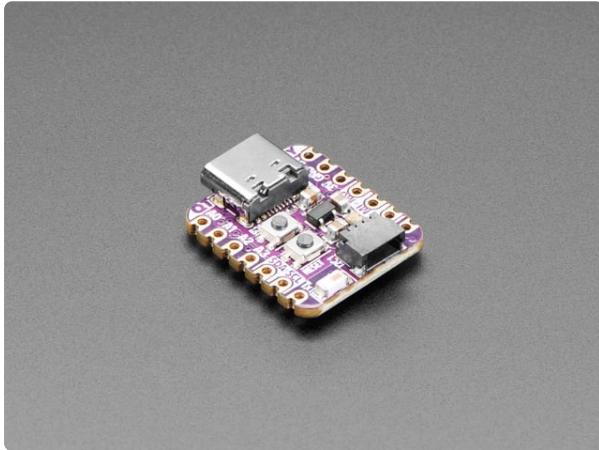
The pre-programmed animations and available colors on these cheap RGB strips are very basic. You can get ordinary solid colors or annoying blink modes, but buttery smooth subtle color shifts, gradients, and beautiful mesmerizing animations are far beyond the reach of these "dumb" RGB strips. For subtlety and beauty, you need NeoPixels - "smart" individually addressable LED lights that can be controlled with code.

This guide will show you how to get beautiful, subtle NeoPixel animations up and running and controllable with a simple IR remote in minutes, with no coding required.

The free, open-source WLED app allows you to create your own NeoPixel animations, choosing from hundreds of effects and color palettes. Automatically map your custom animations to the buttons on your IR remote, so you can choose solid colors or run your beautiful custom animations from the same controller.



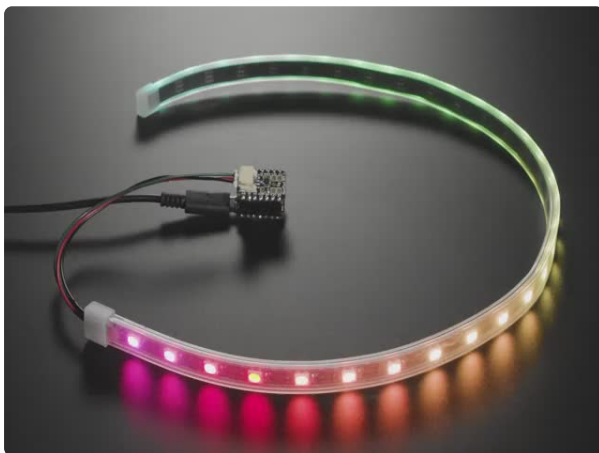
Parts



[Adafruit QT Py ESP32 Pico - WiFi Dev Board with STEMMA QT](https://www.adafruit.com/product/5395)

This dev board is like when you're watching a super-hero movie and the protagonist shows up in a totally amazing costume in the third act and you're like 'OMG! That's...

<https://www.adafruit.com/product/5395>



[Adafruit NeoPixel Driver BFF Add-On for QT Py and Xiao](https://www.adafruit.com/product/5645)

Our QT Py boards are a great way to make very small microcontroller projects that pack a ton of power - and now we have a way for you to quickly add a

<https://www.adafruit.com/product/5645>

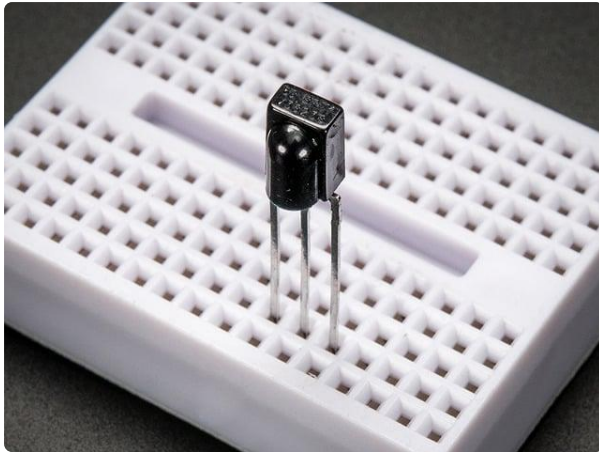


[Adafruit NeoPixel LED Strip with 3-pin JST PH 2mm Connector](https://www.adafruit.com/product/3919)

Plug in and glow, this Adafruit NeoPixel LED Strip with JST PH Connector has 30 total LEDs in a "60 LED per meter" spacing,...

<https://www.adafruit.com/product/3919>

This works with a traditional inexpensive IR sensor:

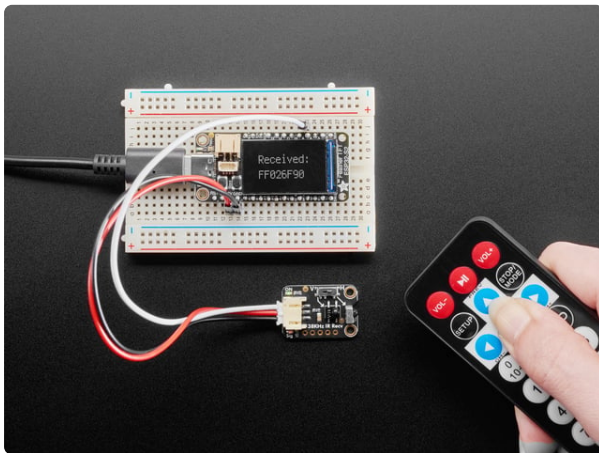


IR (Infrared) Receiver Sensor

IR sensor tuned to 38KHz, perfect for receiving commands from a TV remote control. Runs at 3V to 5V so it's great for any microcontroller. To use, connect pin 3 (all the...

<https://www.adafruit.com/product/157>

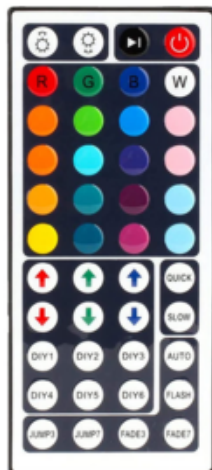
Or you can use Adafruit's IR Remote Receiver, which has IR sensors that face in two directions. This is a plug-and-play solution with a Stemma connector so you don't need to worry about soldering fiddly sensor legs.



Adafruit Infrared IR Remote Receiver - STEMMA JST PH 2mm

A year ago we designed a high-current-output Infrared Transmitter STEMMA which makes it easy to create high-powered...

<https://www.adafruit.com/product/5939>



WLED software will work with a [wide variety of different remotes](https://adafru.it/18iB) (<https://adafru.it/18iB>). For this tutorial I'm using this [44-key remote from Amazon](https://adafru.it/18iC) (<https://adafru.it/18iC>).

1 x Stemma Connector

Stemma Connector with Female Sockets

<https://www.adafruit.com/product/4397>

1 x Standard Heat Shrink

Heat Shrink Tubing in various sizes

<https://www.adafruit.com/product/344>

USB C to USB A Cable

1 x [USB C cable](#)

<https://www.adafruit.com/product/4474>

USB C to USB A Cable

1 x [Female Headers](#)

<https://www.adafruit.com/product/2940>

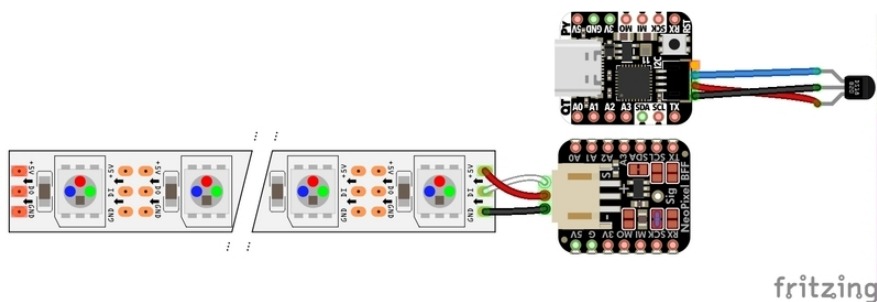
Short Female Headers

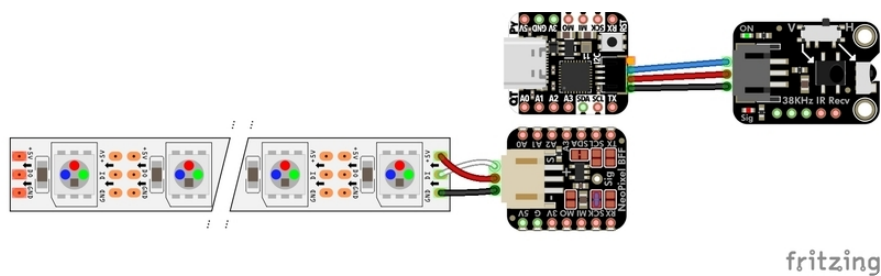
Tools & Accessories

- Heat Gun
- Hot Glue Gun
- Soldering iron & accessories



Wiring Diagram





We'll be powering the pixels directly through the board since we only have a few pixels. This arrangement works for small projects of 30-60 pixels. For larger projects with more LEDs, you'll want to power the pixels directly from a 5V power supply. If you are powering more than 20 LEDs or so, see the guides below:

- [Sipping Power With NeoPixels \(https://adafru.it/wbm\)](https://adafru.it/wbm)
- [Adafruit NeoPixel Überguide \(Powering NeoPixels\) \(https://adafru.it/DCq\)](https://adafru.it/DCq)

The QT Py attaches back-to-back with the BFF using soldered-on headers.

The NeoPixel strip plugs into the 3-pin connector on the BFF, and the IR sensor will plug into the Stemma port on the QT Py using a a Stemma cable.

WLED Software

Board Choices

WLED runs on several different boards in Adafruit's collection. There are different benefits to each, but the installation process is largely the same. This page contains instructions for multiple boards -- be sure to use the pinouts and installation instructions for the one you're using,

QT Py Pico ESP32

The [QT Py Pico \(http://adafru.it/5395\)](http://adafru.it/5395) is small and affordable, so usually my go-to for costumes or wearables. It also has a range of BFF add-on boards that add functionality. Here's a guide with more QT Py info.

Note: WLED works on the QT Py Pico but NOT on the S2 or S3 versions, at the time of writing.

Feather Huzzah ESP32

The [Feather Huzzah ESP32 \(http://adafru.it/3405\)](http://adafru.it/3405) the top of the line. It's a great choice for projects where you want to add sensors, interaction, or drive a whole lot of LEDs. It's the most reliable as well -- I've run these for two months straight with no power cycling and they just keep on truckin. Adafruit has a very wide selection of

Feather Wing boards that connect to the Feather microcontroller line. The sky is the limit with these boards.

It also comes in a version with a high-powered WiFi range extender! If you're trying to sync multiple instances across distance, check this one out. [Feather Huzzah ESP32 V2 w.FL Antenna \(http://adafru.it/5438\)](http://adafru.it/5438)

Feather Huzzah ESP8266

The [Feather Huzzah ESP8266 \(http://adafru.it/2821\)](http://adafru.it/2821) will run WLED as well, but won't drive as many pixels: the ESP32 limit on WLED is around 1000 pixels, but the ESP8266 tops out at around 500. It's about \$5 cheaper though, so for smaller projects it's a great way to save a little money and still have access to all the Featherwing options in the Adafruit store.

QT Py Driver Update

Some versions of the QT Py have a new serial chip which needs a driver installed before we can install WLED. Head over to our [How to Install Drivers for WCH USB to Serial Chips \(https://adafru.it/-f8\)](https://adafru.it/-f8) tutorial, and download and install the new driver.

If you have an older QT Py with CP2102 USB-to-Serial bridge, [use SiLabs' driver instead \(https://adafru.it/11em\)](https://adafru.it/11em).

Install WLED

These next steps require a **Web Serial-compatible browser**. As of this writing, that means **Google Chrome, Microsoft Edge or Opera** “desktop” browsers. Other browsers (Safari, Firefox, Explorer and anything mobile) won't work.



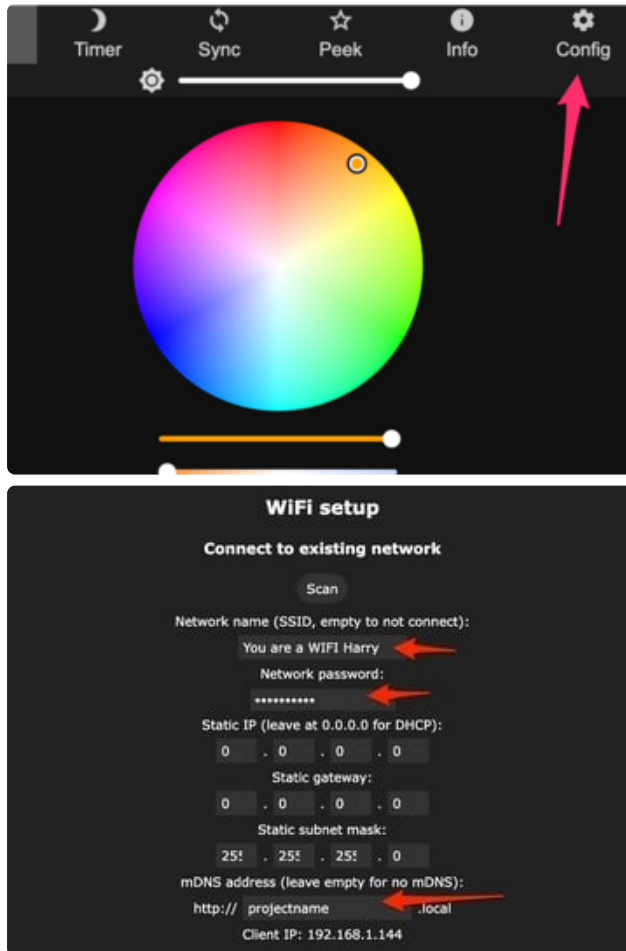
Visit <https://install.wled.me/> (<https://adafru.it/11dL>)

Plug your microcontroller into your computer with a known good USB cable. Click "Install" and select the port for your board.

Depending on the USB-to-serial bridge chip on the board, you might see one or two serial ports. On Mac, for instance, there might be both “/dev/cu.usbmodem[number]” and “/dev/cu.wchusbserial[number]”. Use the “wchusbserial” one.

After successful installation, enter your WiFi network name and password when prompted. This must be a **2.4 GHz** WiFi network; ESP32 does not support 5 GHz networks. If it can't connect, then as a fallback WLED will create its own 2.4 GHz WiFi access point.

Setup & Preferences



WiFi Setup

Head to the **WiFi Setup** screen under Config and create a good URL so you can control your project from any web-enabled device. Call it something you'll remember, that's easy to type into any web browser on your WiFi network in order to connect to your project.



LED Preferences

Next, head to the **LED Preferences** tab under the Config menu.

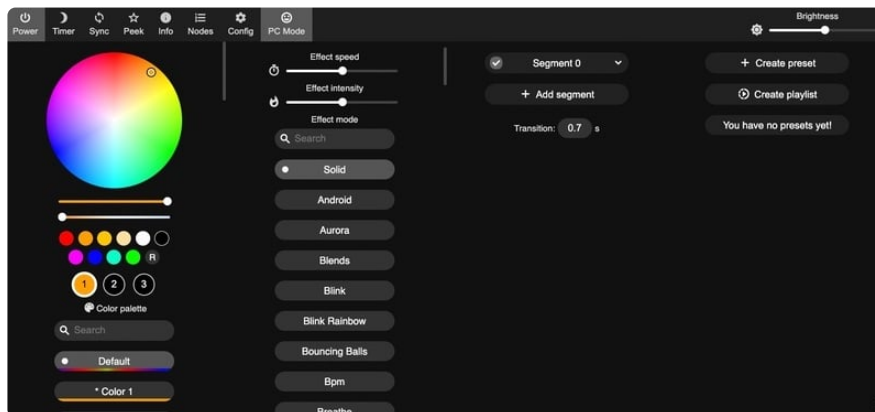
Scroll down to **Hardware Setup**. Put your total number of LEDs into the "Length" field, and change GPIO to the pin number associated with the pin you soldered to. Check the pinout diagram for the board you're using (it's the number in yellow).

[QT Py Pico Pinout \(https://adafru.it/11dK\)](https://adafru.it/11dK)

[Feather Huzzah ESP8266 Pinout \(https://adafru.it/1a53\)](https://adafru.it/1a53)

[Feather Huzzah ESP32 Pinout \(https://adafru.it/1aaj\)](https://adafru.it/1aaj)

Use It



Now you can use any computer or handheld device to control your LEDs.

Make sure your device is on the same WiFi network as your board. Navigate to your custom URL (projectname.local/) in a web browser. You'll see a color picker above a whole bunch of color palette choices.

Choose a color, choose an effect, and watch your lights animate and glow!

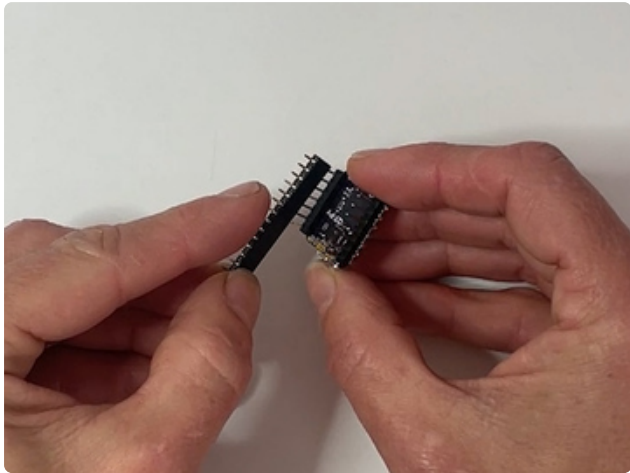
Save your favorite combinations as presets, create playlists, control the speed and intensity of the animations, and lots more. This web app is incredibly intuitive and easy to use.

Head over to the WLED wiki at <https://kno.wled.ge/> (<https://adafru.it/11dN>) to delve into all the particulars.

Electronics Assembly

Assembly is fairly simple for this project. [Watch the video tutorial \(https://adafru.it/18iE\)](https://adafru.it/18iE) for a complete step-by-step.

QT Py & BFF Headers

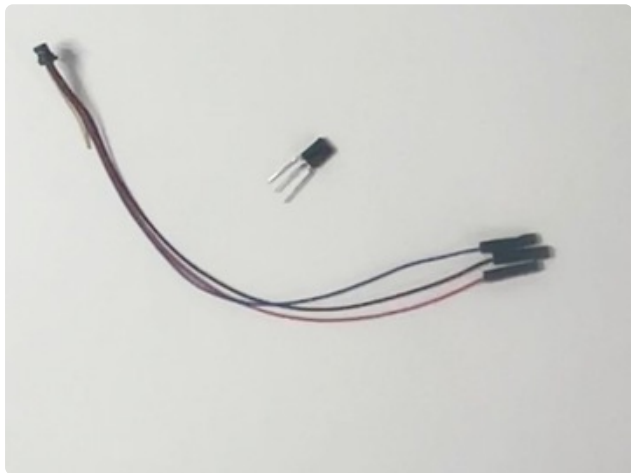


Solder headers onto the QT Py and BFF to stick them together. If you're new to soldering headers, check out this [How to Solder Headers guide \(https://adafru.it/RdJ\)](https://adafru.it/RdJ).



The boards align back-to-back, so I soldered regular headers onto the QT Py and female socket headers onto the back of the BFF.

IR Sensor



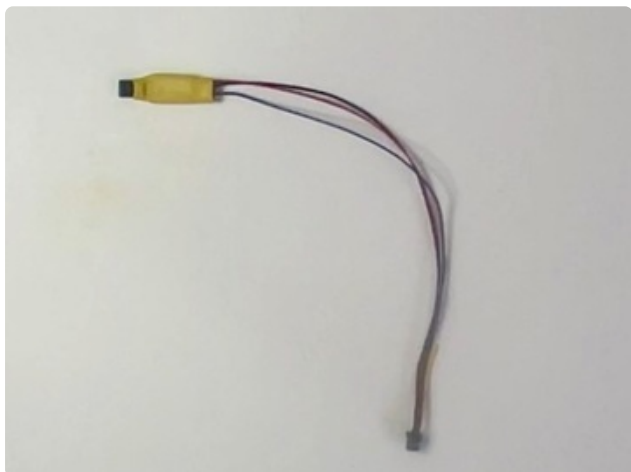
Trim the sensor legs about halfway down. Cut the yellow wire off your stemma connector - we only need 3 wires for the sensor.



With the sensor bump facing you and the legs pointing down, slip the red wire onto the leg on the right, the black wire to the middle leg, and the blue wire to the leg on the left.

Cover the connections with heat shrink, and squirt a little hot glue inside before you shrink it down to hold the connections firmly together.

Solder to the stemma connector as follows:

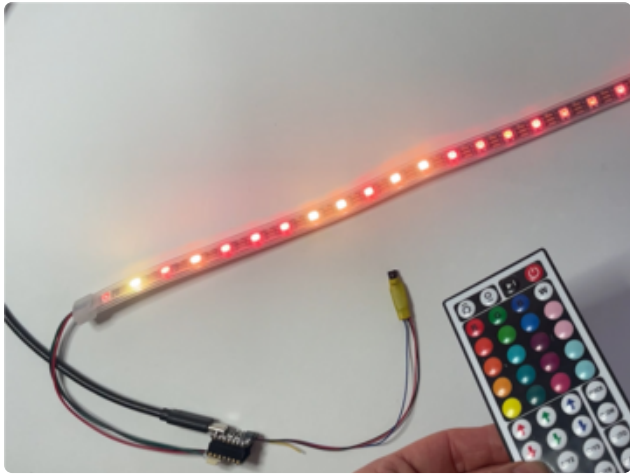


IR sensor red --> stemma red
IR sensor black --> stemma black
IR sensor white --> stemma blue

The yellow wire on the stemma connector is unused.

IR Breakout

Plug your smaller stemma wire into the QT Py's stemma port, and your larger stemma wire into the IR sensor. Connect the two together by soldering or just plugging in the male and female ends.



Plug the sensor into the Stemma port on the QT Py and the NeoPixel strip into the BFF's NeoPixel port. Plug the QT Py into power with the USB cable. And you're in business!

Troubleshooting

If the lights don't come on, or the remote doesn't seem to do anything, here are a couple things to try:

1. Open the WLED software and go to the LED Settings page. Make sure you have the correct pin (GPIO) entered here. The BFF's port is attached to A3, which corresponds to digital pin 15 (A3 is the analog pin number. Find this out in the [pinout diagram in the QT PY guide \(https://adafru.it/11dK\)](https://adafru.it/11dK)).
2. Also be sure you've chosen IR GPIO pin 22 in the WLED software on the same page, and that you've selected your remote from the dropdown.
3. Wiggle the connections on the IR sensor to be sure they haven't pulled loose.
4. If it's still not working, head over to the [NeoPixel Uberguide \(https://adafru.it/dhw\)](https://adafru.it/dhw) and try uploading some basic code, just to see whether the problem is with your wiring or with the software. If you can get the lights to come on using Arduino or CircuitPython, the trouble is with the software -- try reinstalling.