

# IT 254 Final Project

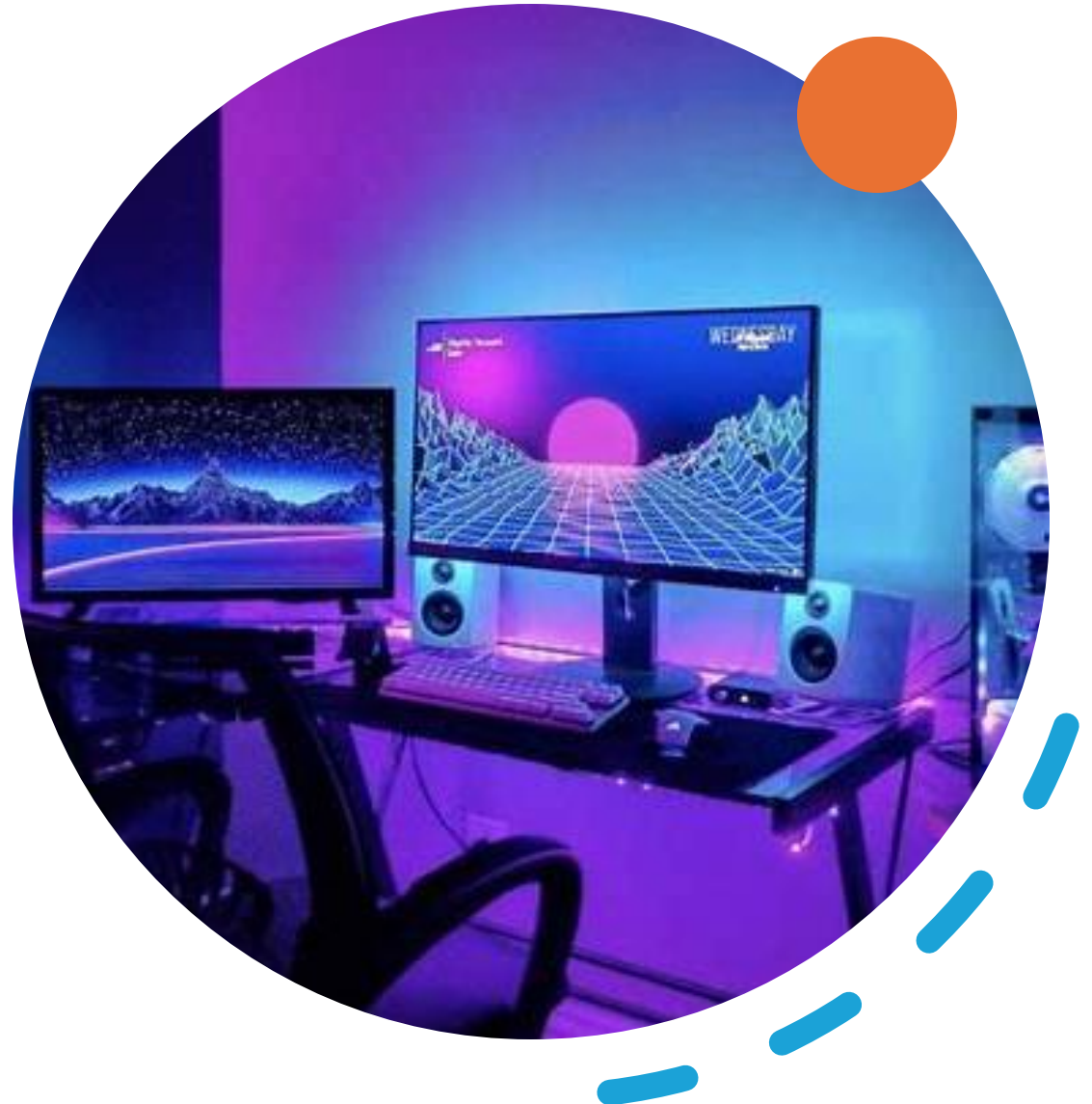
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(Group 2)



# About our Project

- We created an interactive LED solution that can go behind TVs, monitors, or any kind of big screen to give off a kind of colored light show. It takes the color from the screen and displays that same color on the LEDs that are directly behind the screen.
- Whether it be a sun rising that gives off a long-sustained light that builds up brightness or dims, to something like short flashing lights that may change colors every couple seconds.
- It is a great addition to any gaming or movie setup to enhance experience; just making an area by a screen more interactive.



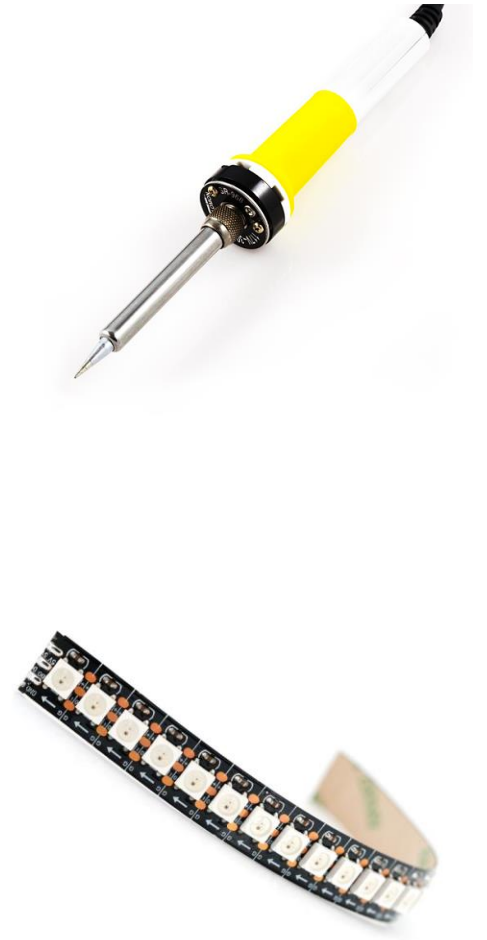
# Inspiration

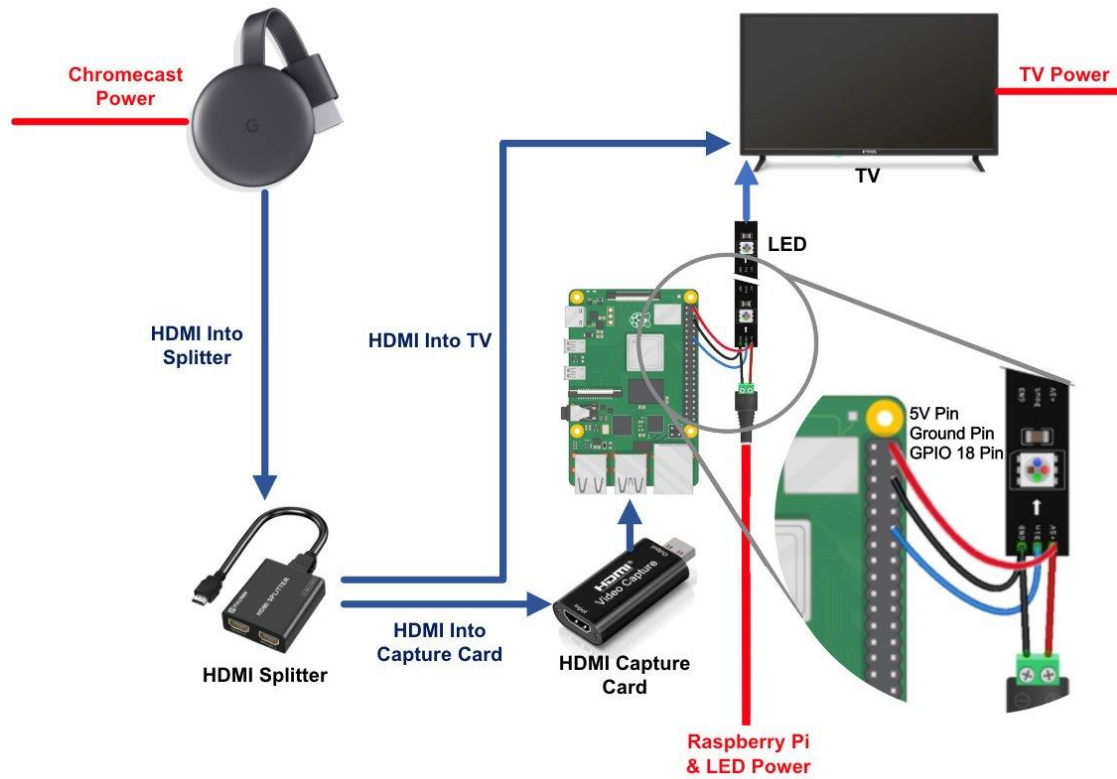
- The inspiration behind our project was based on the Phillips Hue light system
- Phillips Hue lights are smart LED bulbs that can be controlled wirelessly using a smartphone, tablet, or smart home device
- They recently came out the Sync Box, which does exactly what our project achieves, but at \$300
- We wanted to create a cheaper alternative/accessory since the Phillips Hue light is a bit pricey



# Resources Needed

- Raspberry Pi 4
- HDMI Splitter (1-to-2)
- HDMI Video Capture Card
- HDMI Cords (3)
- Google Chromecast / Media Device
- 5V 15Amp Power Supply
- Soldering Kit
- WS2812B Individually addressable LEDs (255)
- TV / Monitor



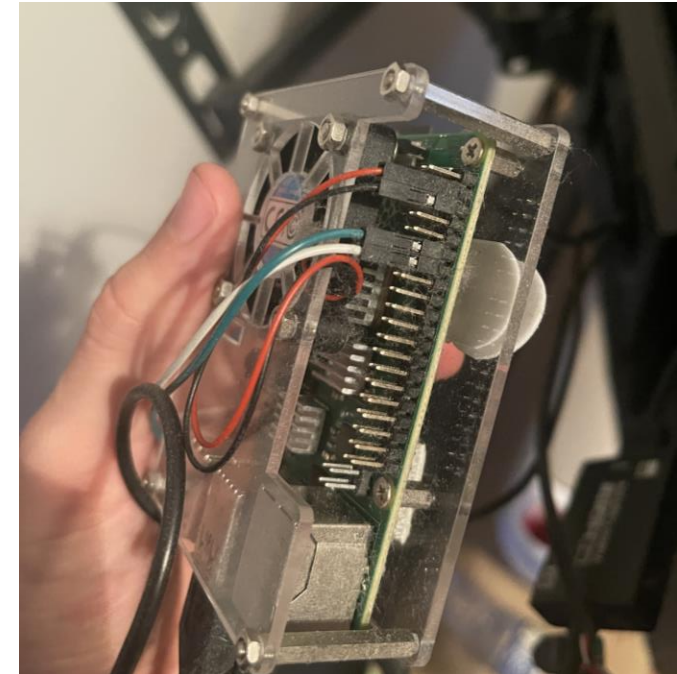
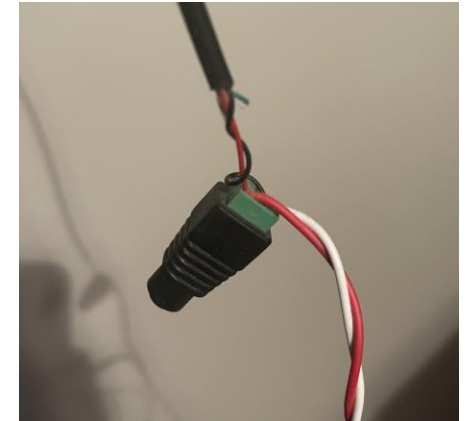


# Schematics

# Tasks/Timeline

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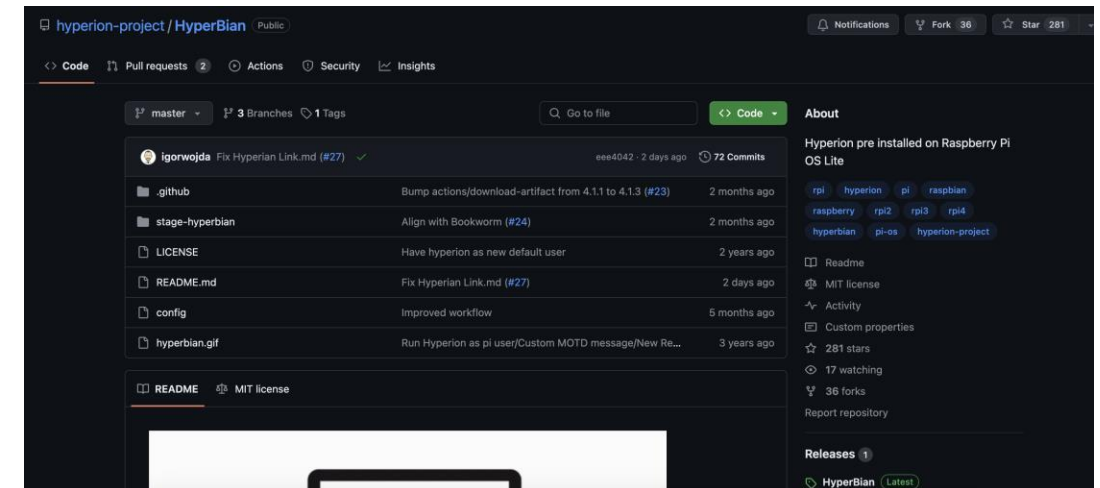
- Began initial project proposal and brainstorming – 1 day
- Schematics and acquiring project resources – 3 days
- Strip wires and connect power supply. Measure and install LEDs onto back of TV, begin to solder corner connections – 1 day
- Connect capture card, HDMI cables, Google Chromecast, and Raspberry Pi. Begin to code and configure program to calibrate lights and accessories – 4 days





# Code Implementation

- We burned a free and open-source image of Hyperion/Hyperbain onto the Raspberry Pi.
- Accessed SSH, and installed libraries
- Created a server, where you can configure and setup various settings of the project. Can be done by visiting IP of Raspberry Pi.

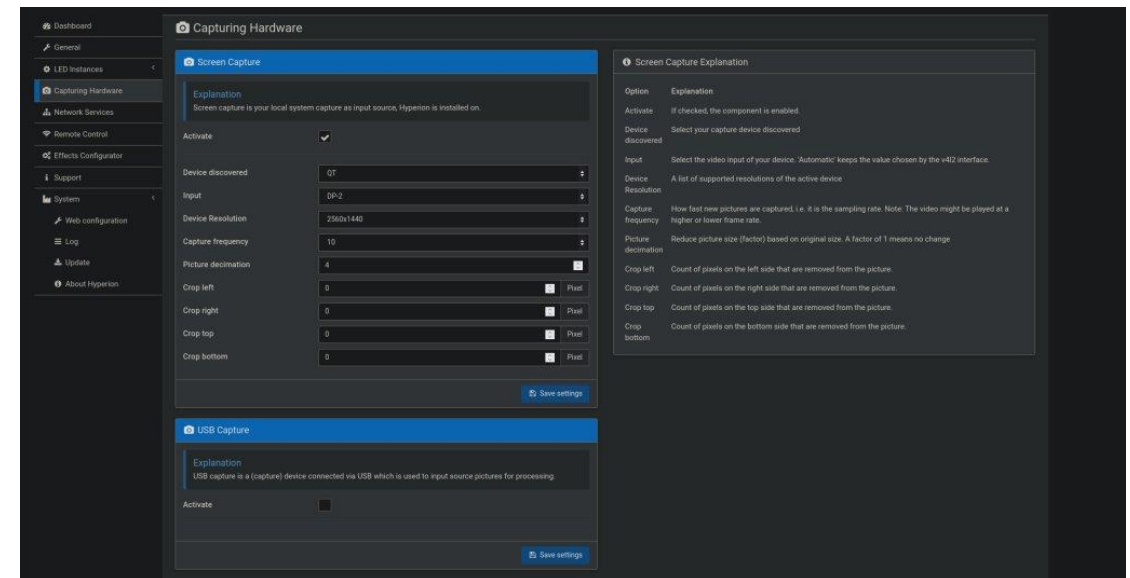
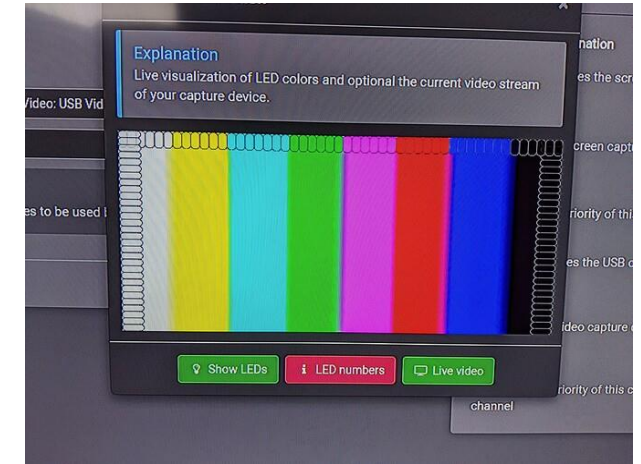


# Implementation/Testing

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- When we first began testing, we started to run into a few errors.
  - Amperage
  - Configuration
  - Ground
- This caused the Raspberry Pi to not function properly
- We got a new power supply at 15 amps and allowed us to get configure the LEDS
- The testing took us about 2 days since we had issues
- The ground wire wasn't in the correct pin in the Raspberry Pi
- So, then we went to every troubleshooting activity





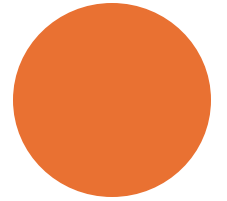
# Results

- We were perfectly able to demonstrate the code to display the led lighting effects
- We noticed they're were smooth transitions between the lighting and different colors being displayed
- There was also no latency between the moment we ran the code to the lighting and led colors being shown
- There was no other challenges that we faced after we troubleshooted our power and ground and displayed the led colors



# Real World

- As gaming and streaming has become more popular and mainstream nowadays, the more popular streamers are getting better setups and are looking for the best ways to enhance their setup.
- By putting the lights behind their TVs or monitors it gives gamers more of an interactive experience while on stream or generally gaming.
- Also, different theaters around the world can invest in this technology to make the movie viewing experience more interactive and bring it more into the realm of 3D and IMAX. It can give movie goers more of a reason to go to movies at theaters for an enhanced experience.



# Conclusion

- Overall, this was a fun... but a challenging project. It incorporated different aspects of hardware and software elements.
- Costed us approximately \$18 each. (surpassing our goal)
- Even though this took quite a bit of time, we would still recommend this project to anyone that is interested in coding, building, soldering, etc.

