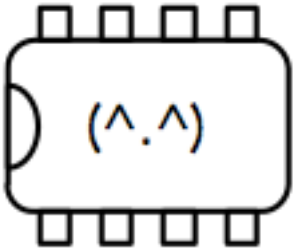
Color Sensor Experiment ch1



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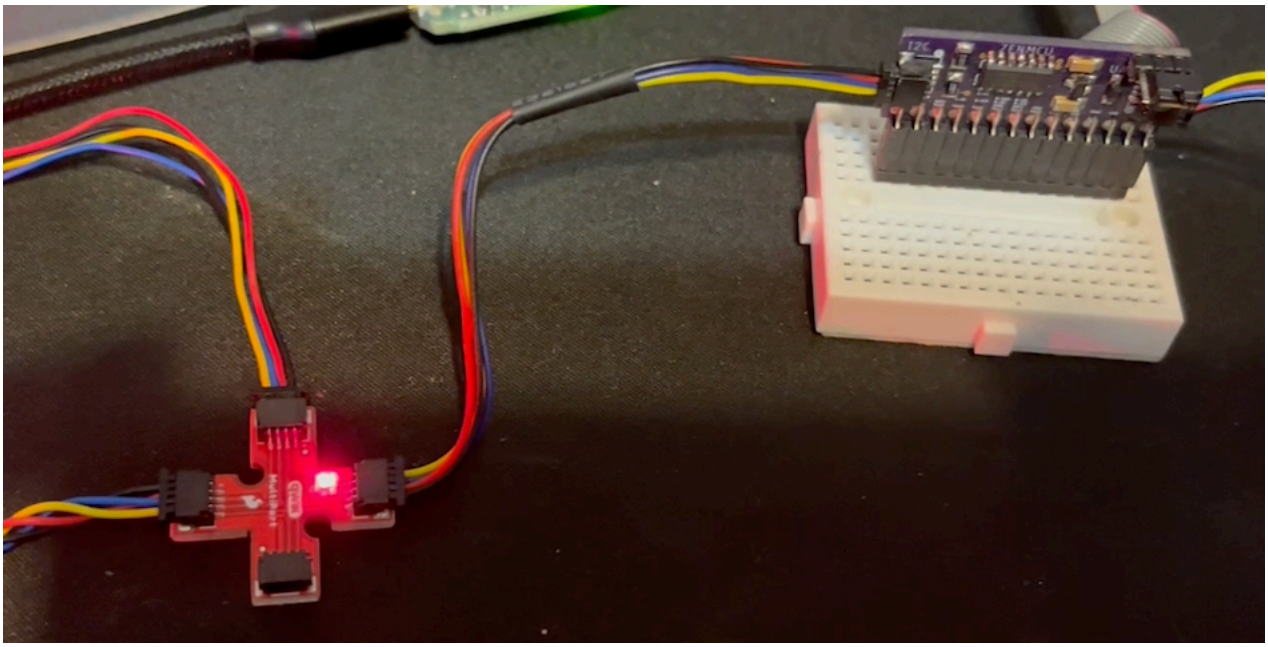
Color Sensor Experiment #1

This document is a supplement to com.zenmcu.0031-0_(zenai-community-of-robots).pdf.

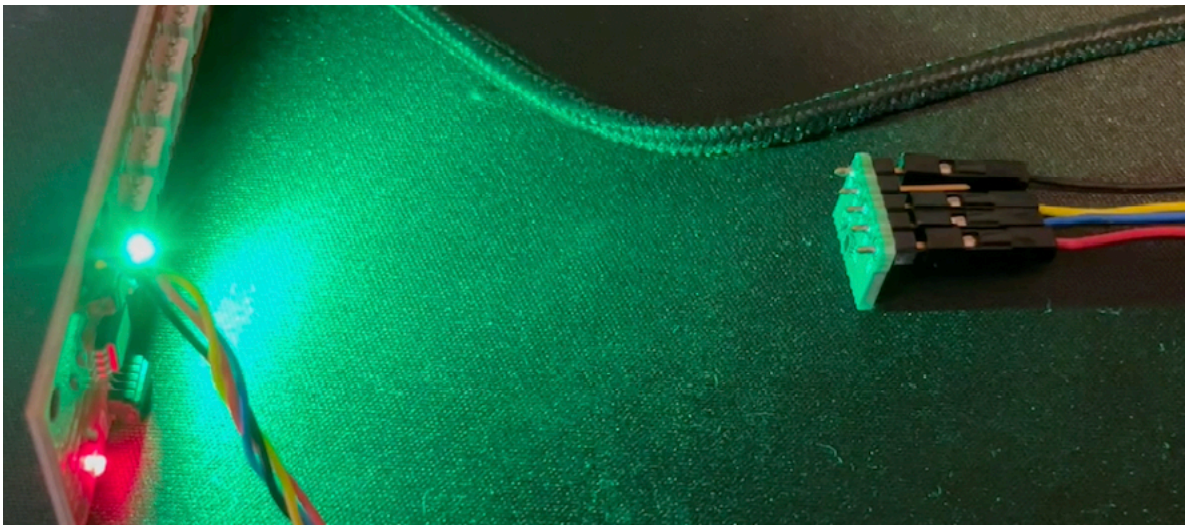
Because my various experiments with LEDs as color sensors have been only just almost tolerable so far I decided to explore using color sensing ICs.

I used an APA102C I2C RGB LED board from Sparkfun to emit the color to be sensed, and a TCS34725 I2C RGB sensor. I started with the TCS34725 because I had some on hand and it was simple to wire them up. Unfortunately, this sensor is obsolete and no longer in production. But it lets me establish a baseline.

I connected a brd0034f's HIF (Host InterFace) to a USB2UART using picocom, and its COM I2CM to a Sparkfun QUIIC 4 port hub. I connected the APA102C and the TCS34725 to the hub to simplify the wiring.

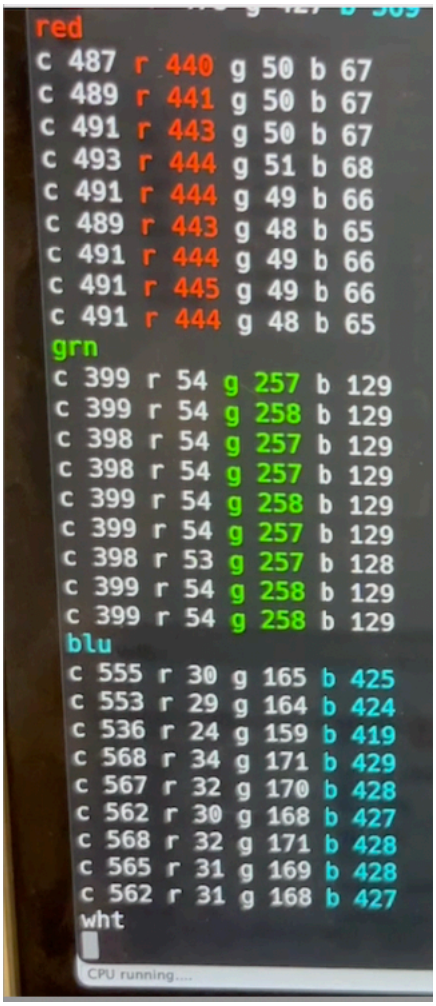


The brd0035f and the Sparkfun hub.



The APA102C emitting green light and the TCS34725 sensing it.

The test just configures the LED, and the sensor, and then periodically changes the LED color, reads the sensor, and prints the results to the terminal via the HIF.



The test prints the color the RGB LED is emitting (like "red") then prints the samples read from the sensor, with the dominant color (colorized to make it easier to see while watching it scroll by).

Observations;

I looked at some example driver code for this sensor on github. Some do not follow the datasheet and read the color data in byte mode instead of block mode. Some worry about the various interrupts and timing etc. So I had to write my own driver. I only implemented chip id, configuration, and read color data. I didn't use any interrupts etc, and I didn't worry much about power management or other features since this is an obsolete part.

During testing I kept having intermittent I2C failures wherein command writes would fail and the code would hang waiting for MB in the driver. I realized that with two I2C devices hanging off a HUB I had a pretty long wire whose capacitance might be borderline. So I shortened the wiring and the stability improved.

I did notice that occasionally when I tried to read the color data the sensor would NAK the command. That caused my driver to error out. I decided to implement a couple of retries in that case, which seemed to work fine.

Overall I found this experiment very encouraging. It seems likely that I can use this sort of color sensor on the robots to sense other robots emitting RGB colors to identify themselves.

But since this specific sensor is obsolete I need to try the Vishay VEML6040. TO do that I need to create a board, solder them to it, write a driver, and test it all. And these are very tiny ICs so soldering them is likely to be tricky.

End