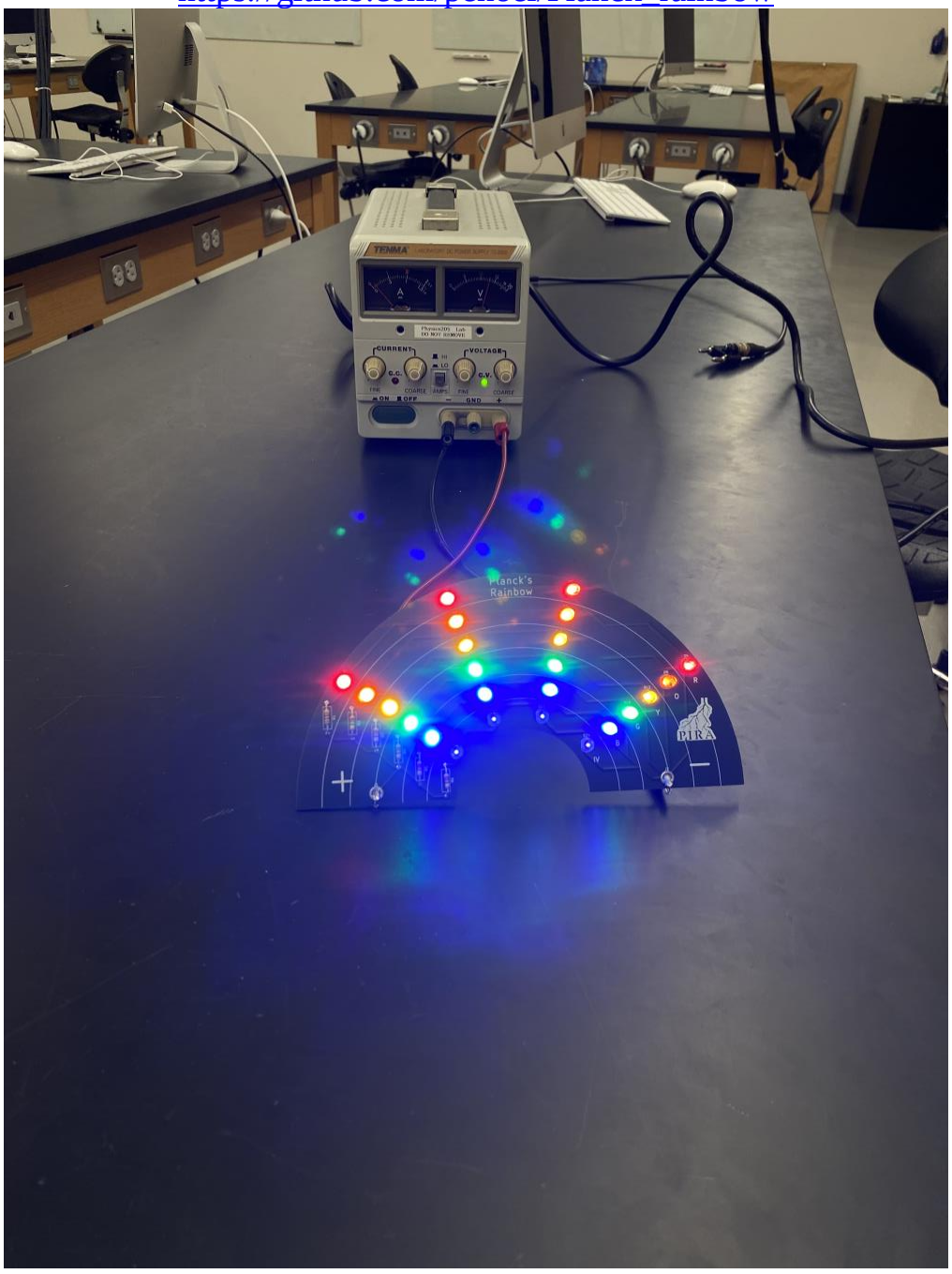
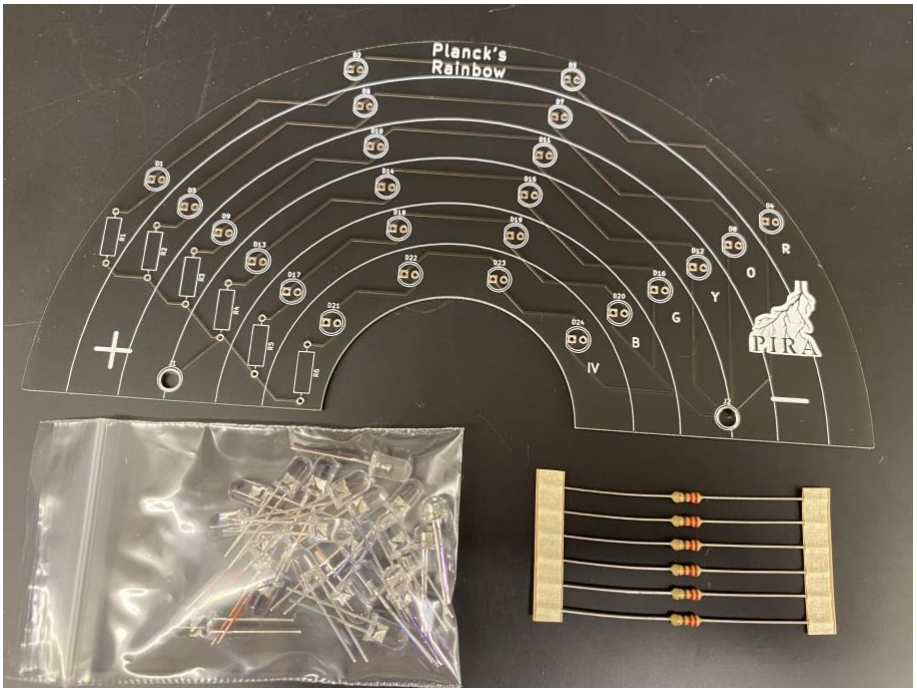
Planck’s Rainbow

https://github.com/penoel/Planck_rainbow

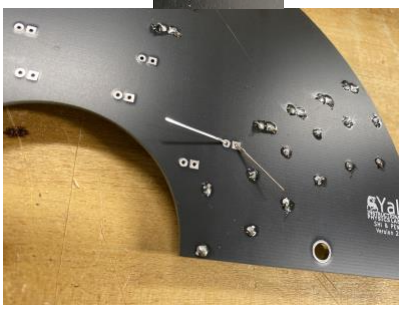


The Planck’s Rainbow apparatus is used to demonstrate the energy wavelength relationship. It comprises 6 branches with each branch in parallel. Each branch has a resistor in series with 4 leds of the same color. Each led has a distinct turn on voltage. For the branch to light the voltage must increase above the turn on voltage for all four leds added. If the voltage increases more the voltage drop across the leds stay the same and the voltage drop across the resistor increases. If the voltage increases high enough the next branch will light.

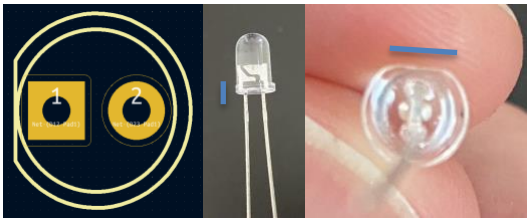


The Rainbow kit contains the following components:

- 1 – PCB
- 4 – Red led
- 4 – Yellow led
- 4 – Blue led
- 6 – 220 Ω resistors
- 4 – Orange led
- 4 – Green led
- 4 – UV/purple led

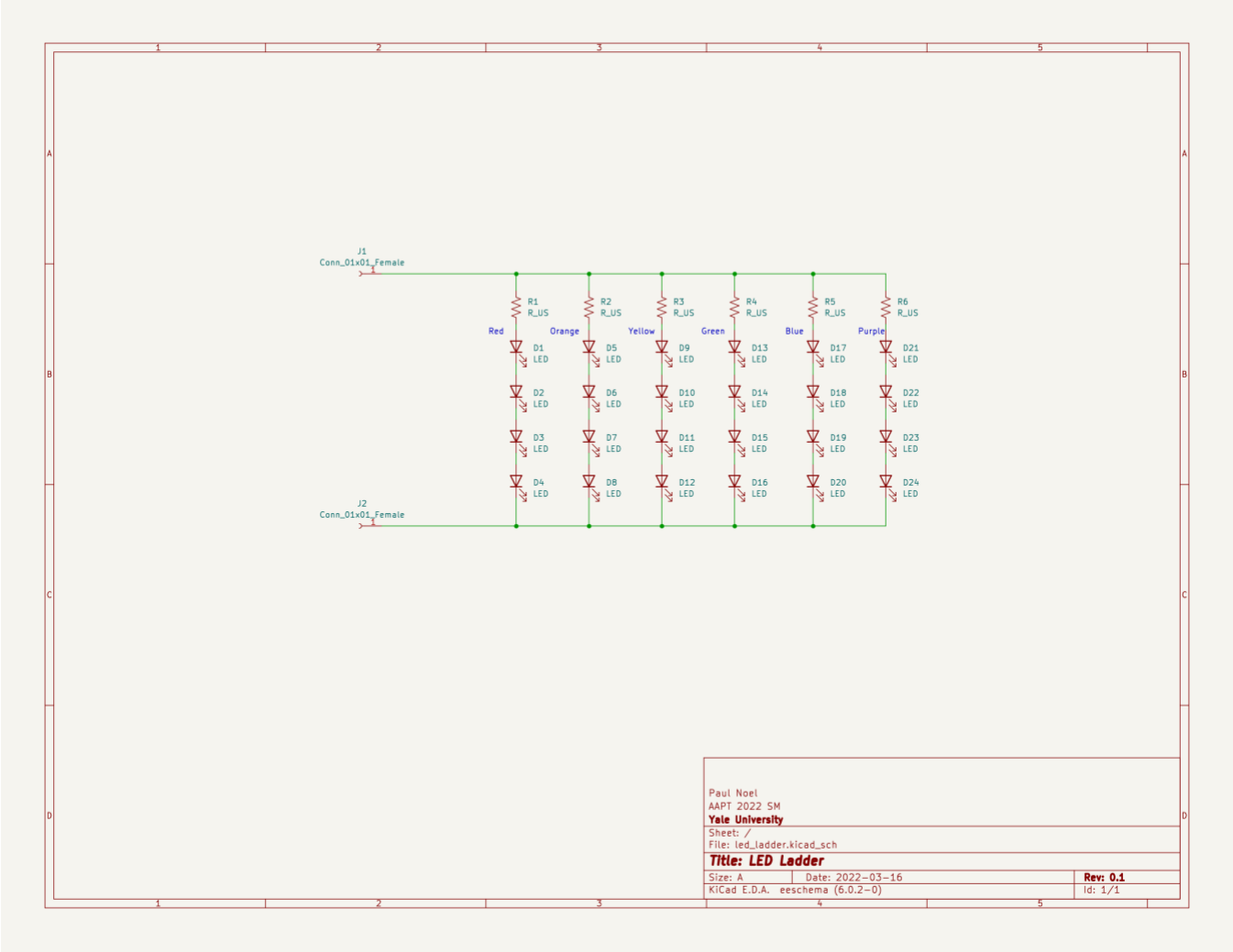


- Take the pcb and 6 resistors out of the bag.
- Bend the legs of the resistor, place them in the pcb, and bend the legs so they won't fall out.
- Solder the resistors and trim the legs.
- Take the red marked leds and place them in the top row of the pcb (make sure that the flat part of the led is matched with the pcb screen print shape.) Bend legs so they don't fall out.
- Solder the leds and trim the legs.
- Repeat for the orange (next most outside row), then do the same for yellow (unmarked), green, blue, uv/purple.



Rainbow operation

You can hook up a genecon and spin it at different speeds to light up more and more led branches. You can also hook it up to a variable dc power supply (at least 15V) and turn it up watching more branches light.


J1
Conn_01x01_Female
J2
Conn_01x01_Female
R1 R_US
R2 R_US
R3 R_US
R4 R_US
R5 R_US
R6 R_US
Red
Orange
Yellow
Green
Blue
Purple
D1 LED
D2 LED
D3 LED
D4 LED
D5 LED
D6 LED
D7 LED
D8 LED
D9 LED
D10 LED
D11 LED
D12 LED
D13 LED
D14 LED
D15 LED
D16 LED
D17 LED
D18 LED
D19 LED
D20 LED
D21 LED
D22 LED
D23 LED
D24 LED
Paul Noel
AAPT 2022 SM
Yale University
Sheet: /
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Title: LED Ladder
Size: A
Date: 2022-03-16
Rev: 0.1
KiCad E.D.A. eeschema (6.0.2-0)
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