The University of Texas at Arlington

EAGLE Tutorial
(SCH/PCB Design Software)

CSE 3323

Electronics for Computer Engineering

Topics Covered

1. **Installing EAGLE**
2. **EAGLE Control Panel**
3. **Importing Libraries**
   - Creating your own custom libraries
   - Creating your own components
4. **SCH – Schematic Design** *(.sch file)*
5. **PCB – Printed Circuit Board Design** *(.brd file)*
6. **Generating *Gerber Files*** (CAM Processor)
7. **Ordering Physical PCBs** ($$$)
   - Sending Gerber Files to a PCB Manufacturer (*JLCPCB*)

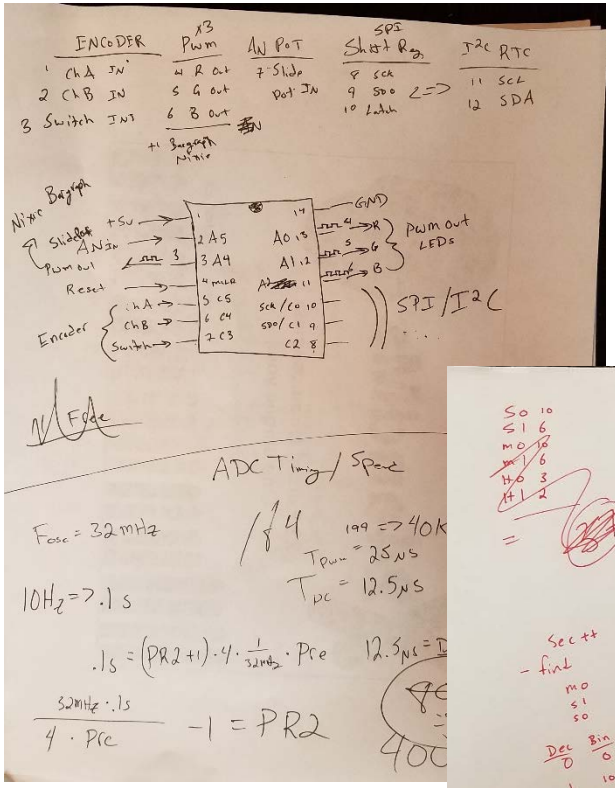
Circuit Idea Flow

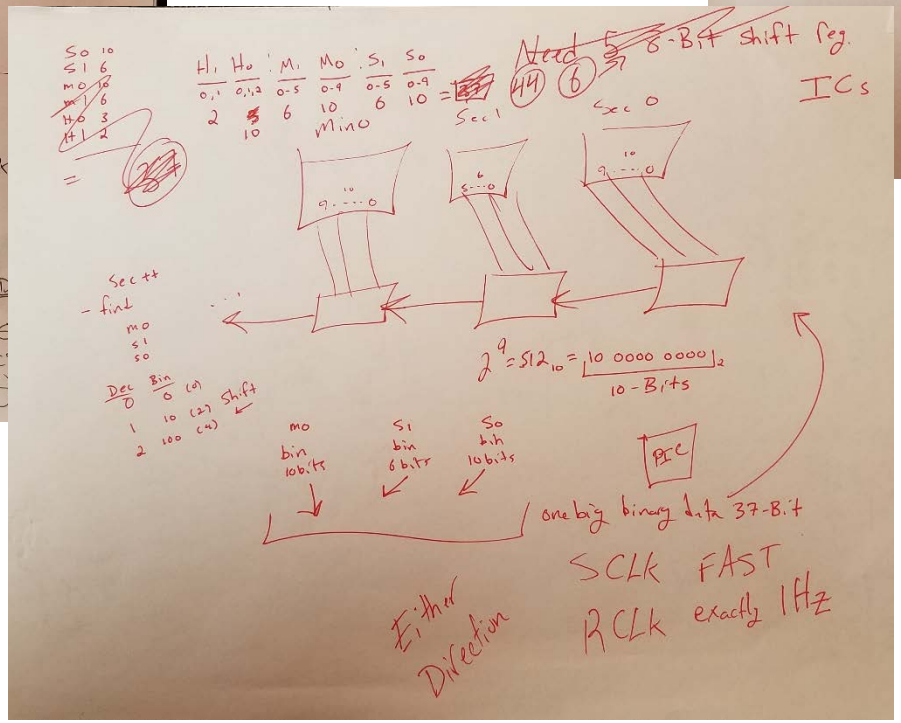
1. **Idea**
   - Research
2. **Sketch**
   - Simulate the Circuit (if possible)
   - Initial Breadboard Testing (partial)
3. **Schematic**
   - Full Breadboard Testing and Debugging (whole)
4. **PCB**
   - Solder your own prototype (optional)
5. **Gerber Files**
6. **Order Physical PCB**
7. **Solder/Connect Everything**
   - Test, Debug, Test Again…

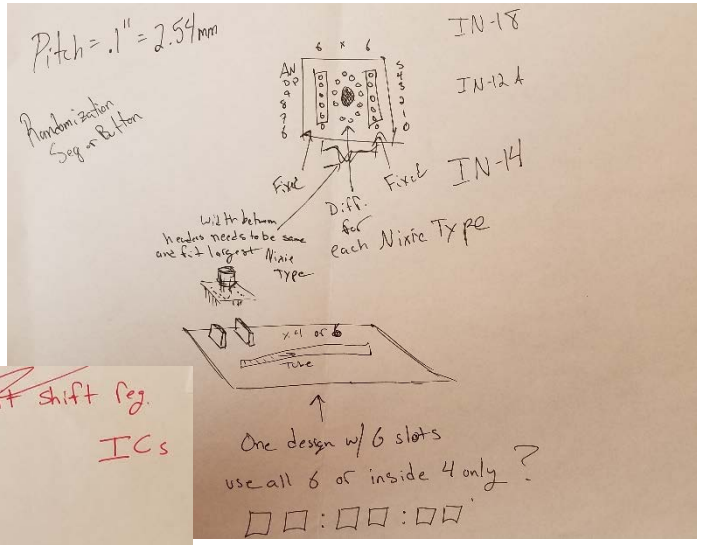
Idea & Research

- “I want to create my own Nixie Tube clock”

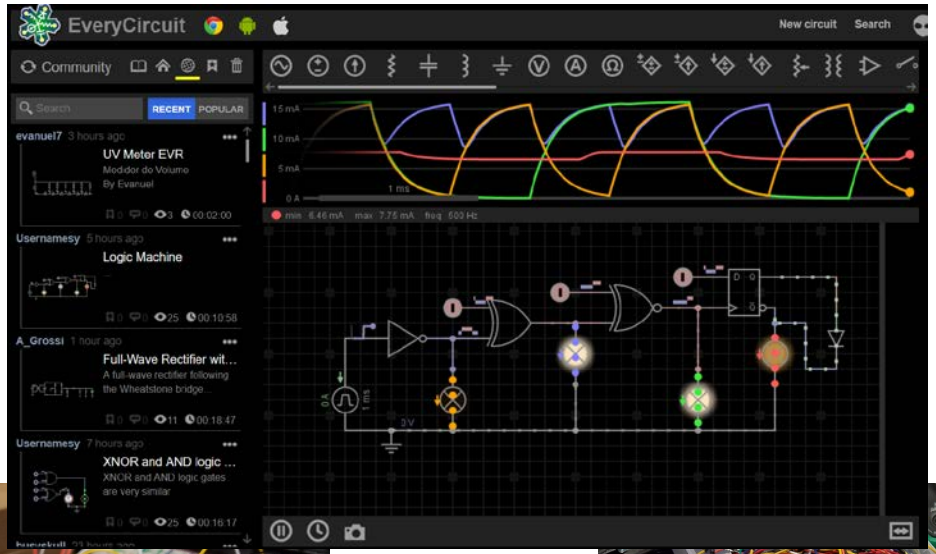
Sketch

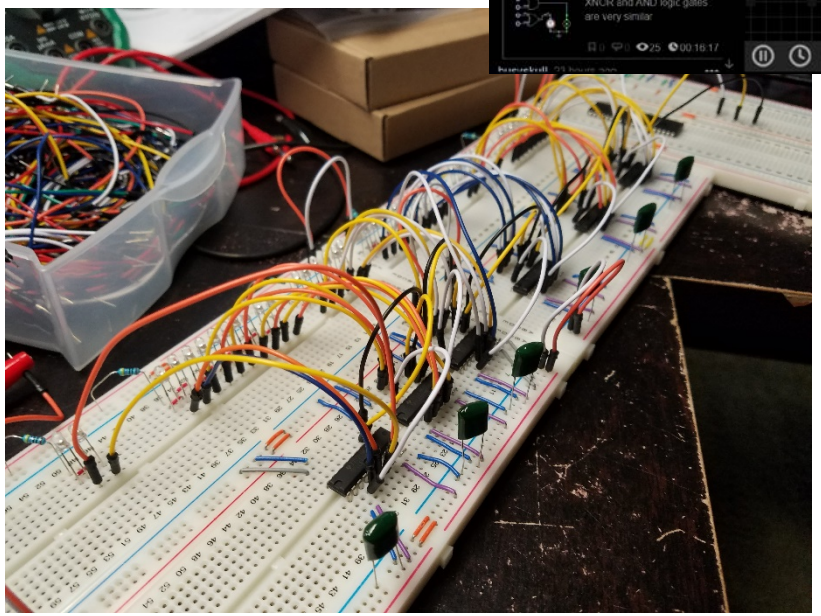

ENCODER
Pwm
AN POT
Shift Reg
I2C RTC
ADC Timing / Speed
Fosc = 32mHz
10Hz => .1 s
Tpwm = 25 µs
Tpc = 12.5 µs
SPI / I2C
PWM out LEDs
Encoder
Reset
Pwm out

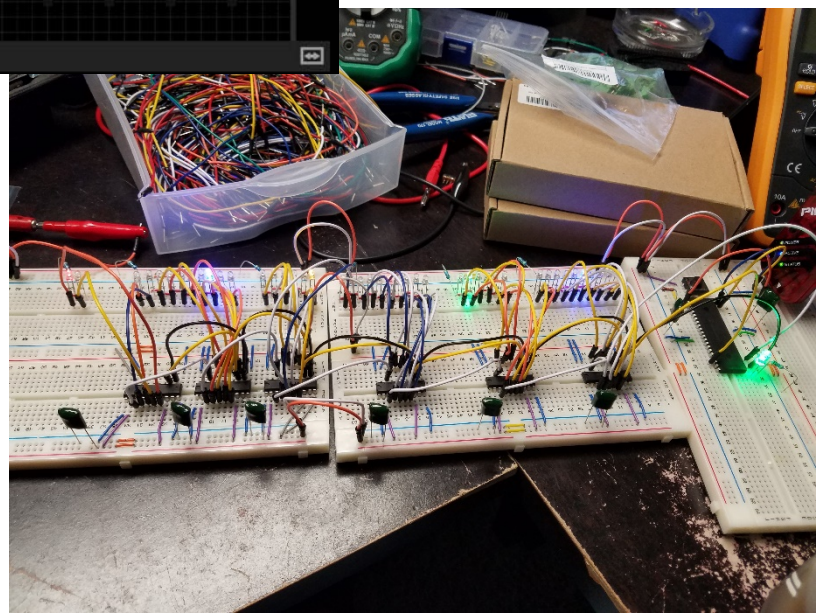

Need 5 8-Bit shift reg.
ICs
Mino
Sec 1
Sec 0
10-Bits
PIC
one big binary data 37-Bit
SCLK FAST
RCLK exactly 1Hz
Either Direction


Pitch = .1" = 2.54mm
IN-18
IN-12 A
IN-14
Randomization Seq or Button
Fixed
Fixed
Diff. for each Nixie Type
Width between headers needs to be same and fit largest Nixie Type
One design w/ 6 slots
use all 6 or inside 4 only ?

Simulation & Initial Breadboarding







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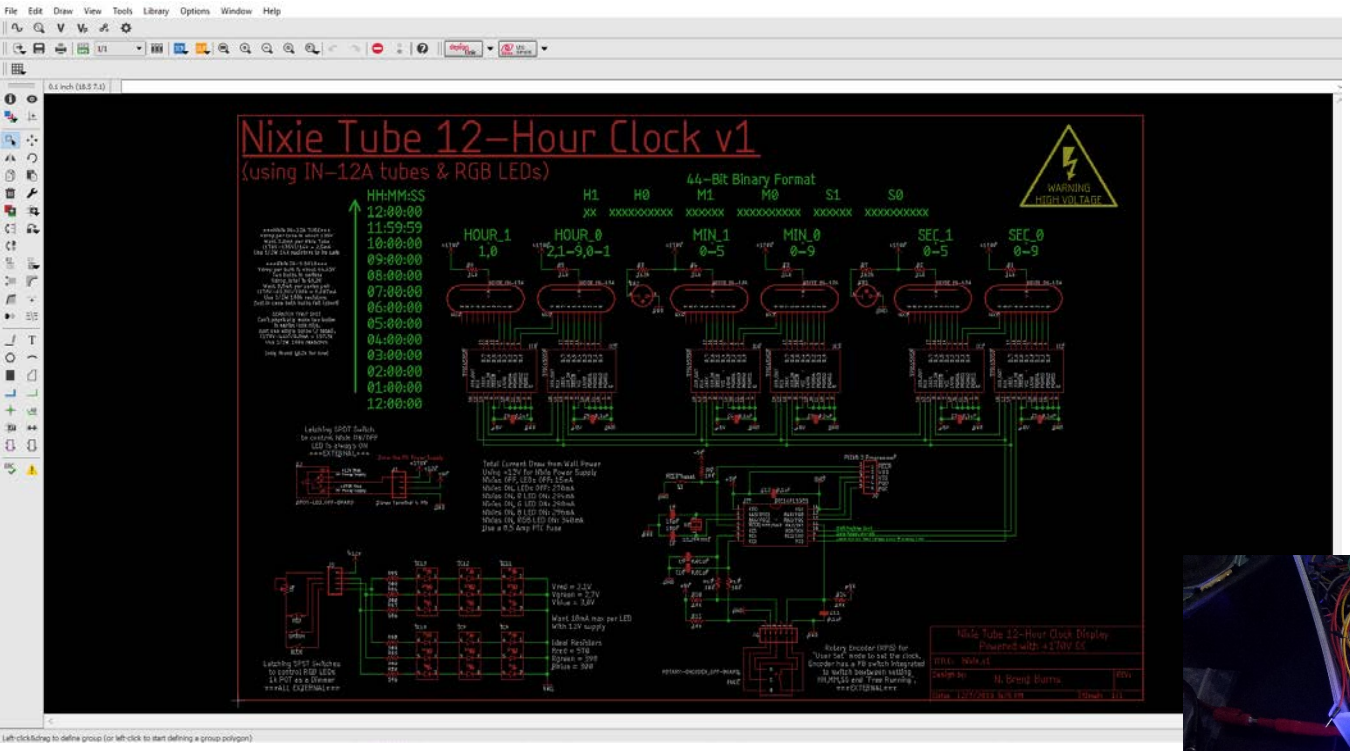
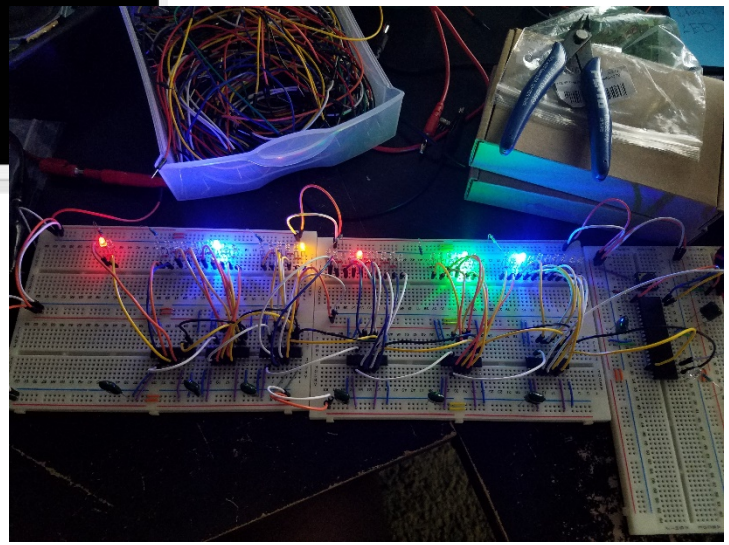
Schematic & Final Breadboarding





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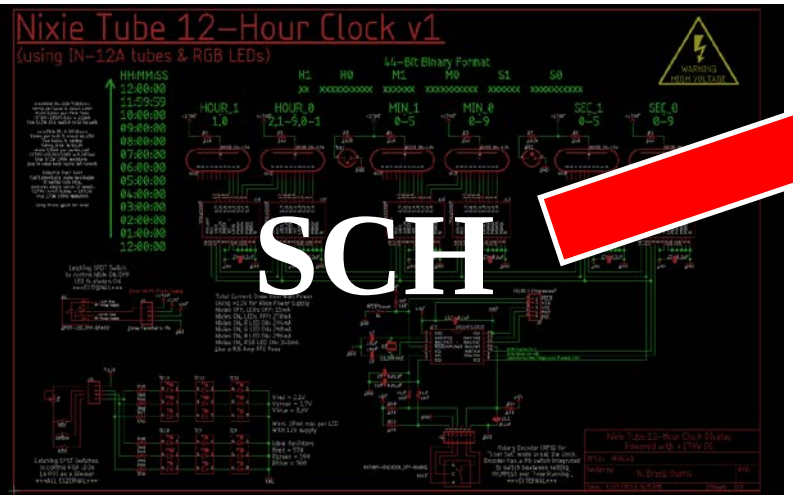
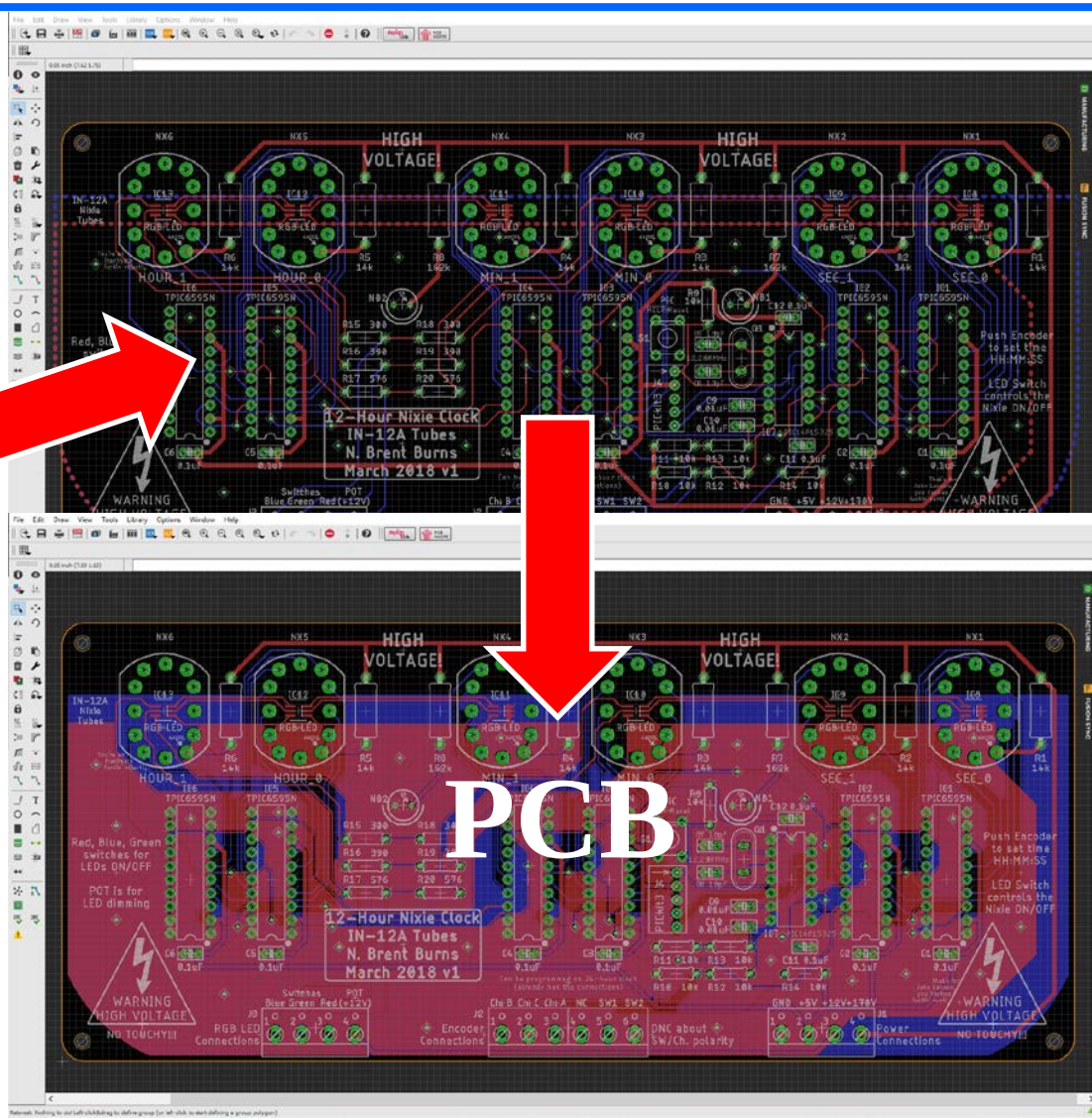
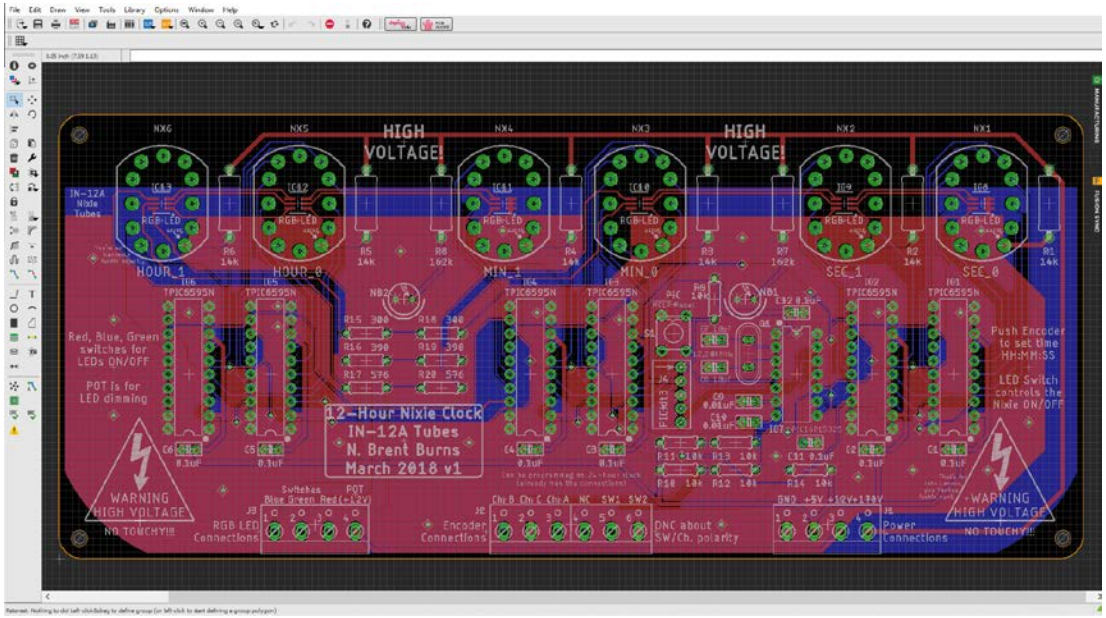
PCB


Nixie Tube 12–Hour Clock v1
(using IN-12A tubes & RGB LEDs)
SCH

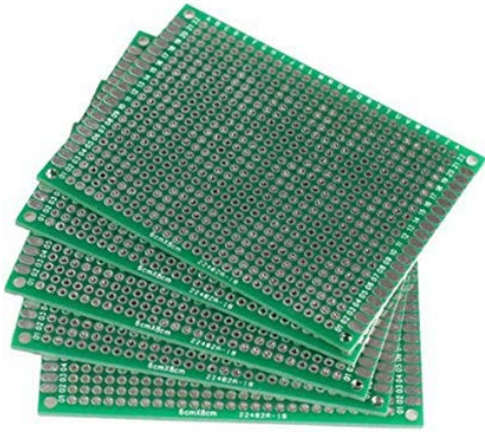

HIGH VOLTAGE
12–Hour Nixie Clock
IN-12A Tubes
N. Brent Burns
March 2018 v1
PCB

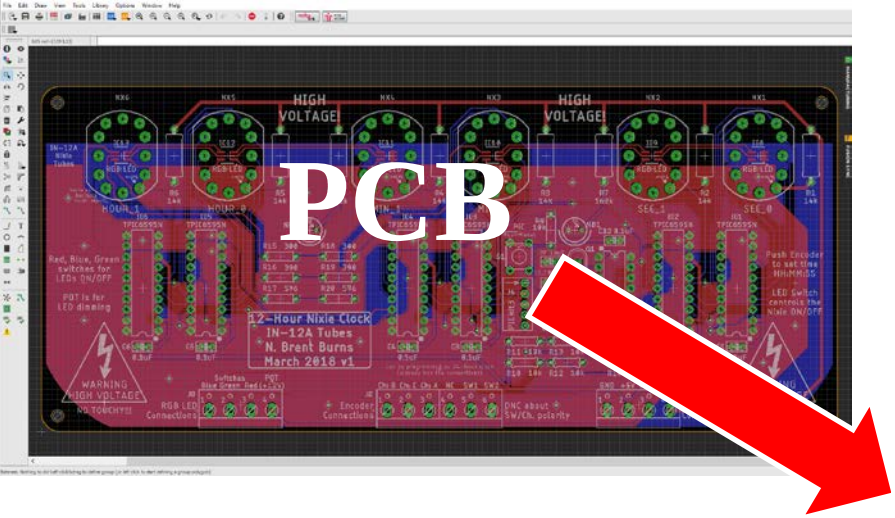
PCB Sanity Check (Print PCB on Paper)

- NOTE! Before ordering PCBs and spending money, print your PCB layout on paper with a 1:1 scale and **ENSURE** that your components line up perfectly with the drill holes, SMD pads, and packaging layouts of your components.

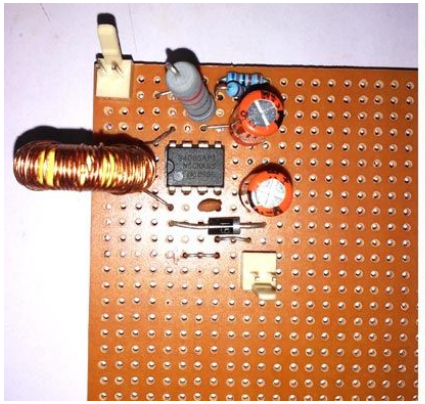


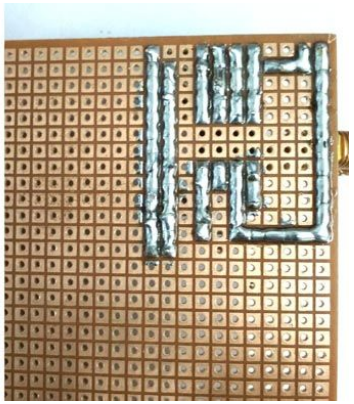
Solder Prototype (Optional)

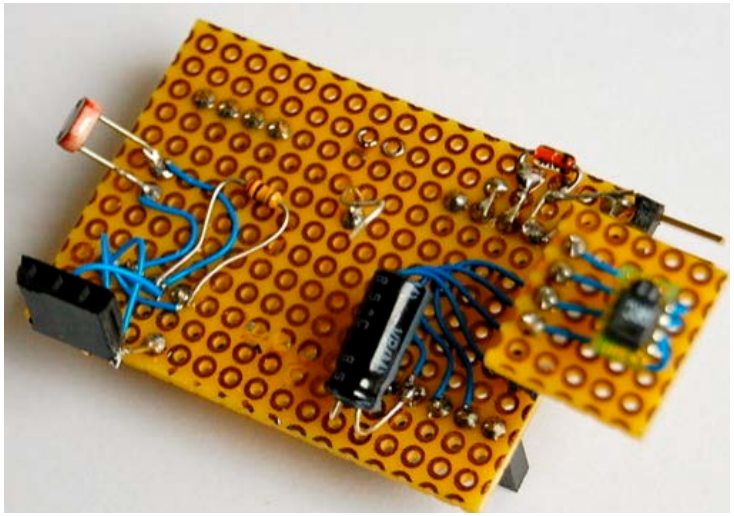


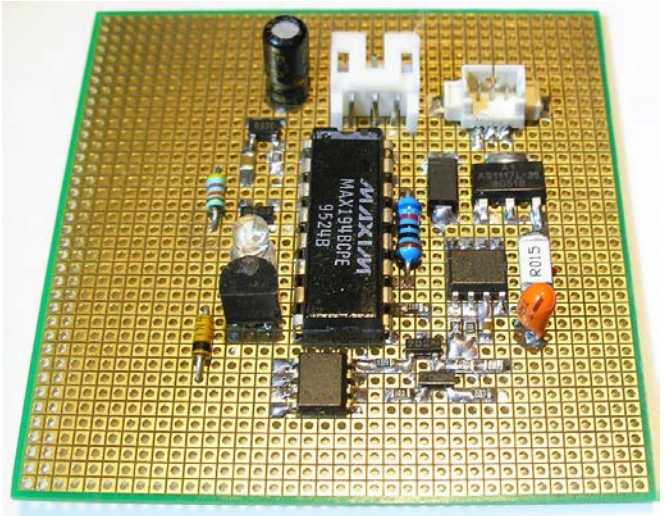


PCB









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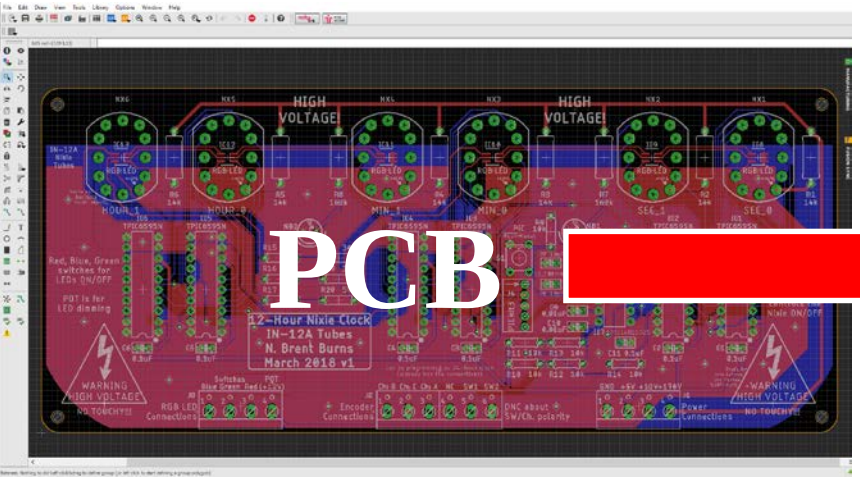
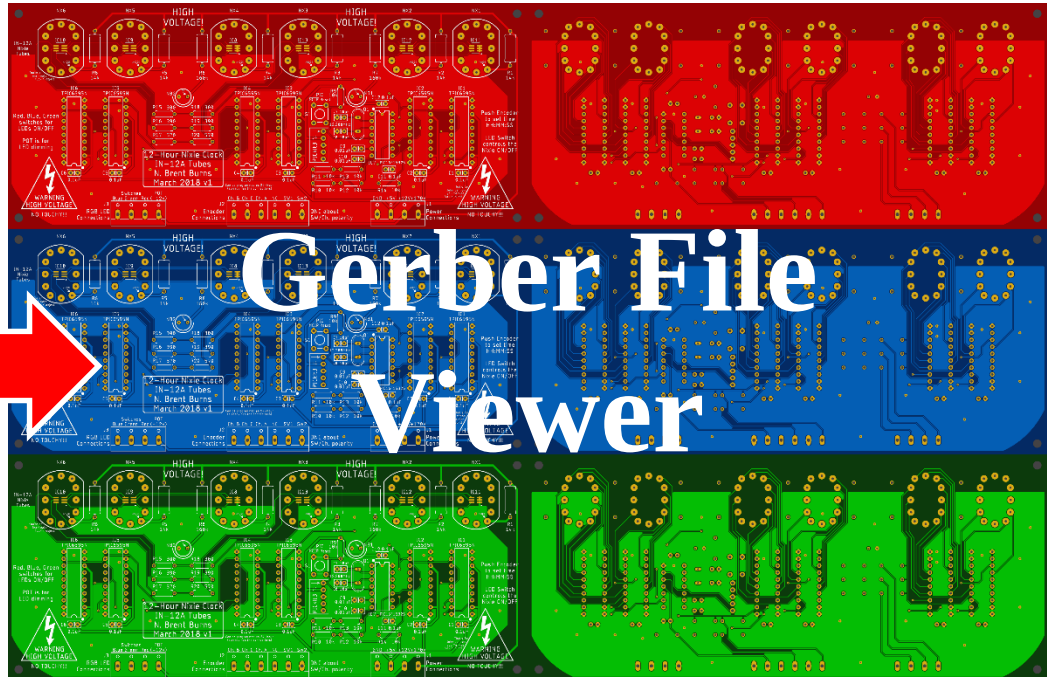
Gerber Files

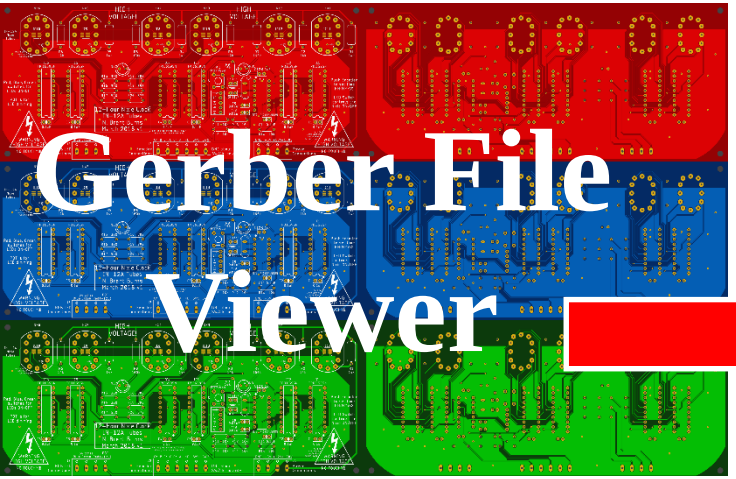


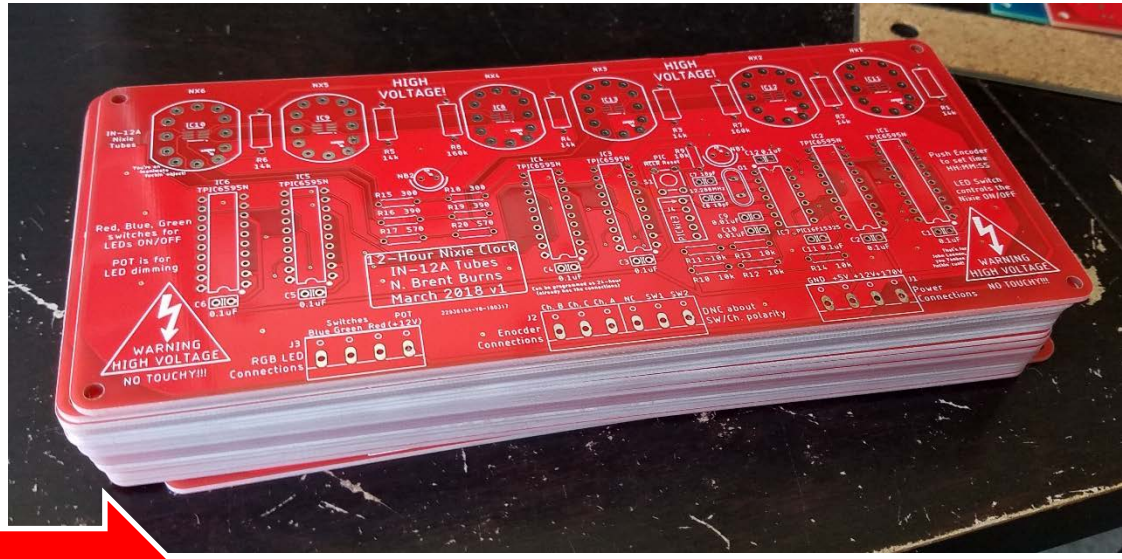
PCB

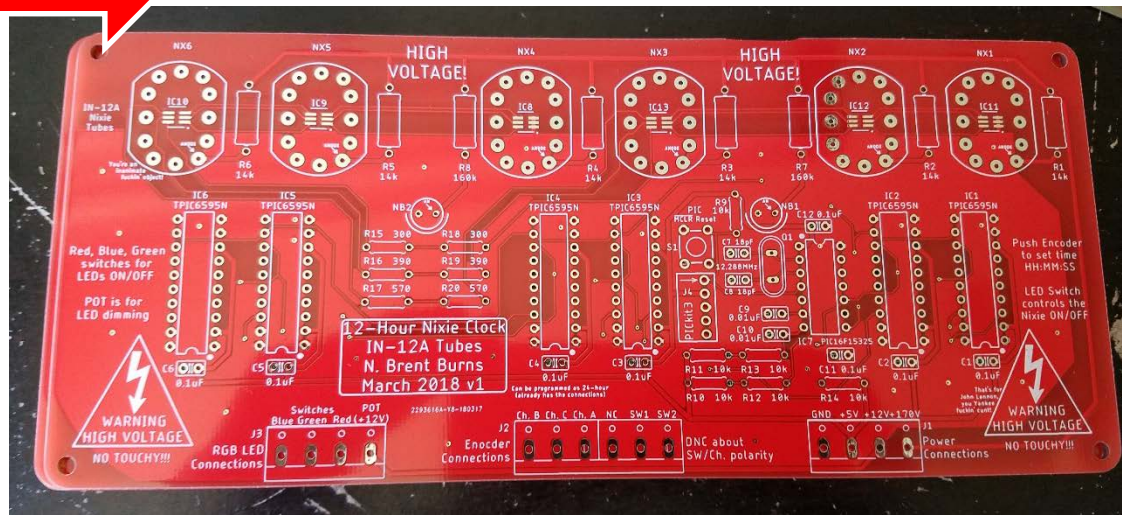


Gerber File Viewer

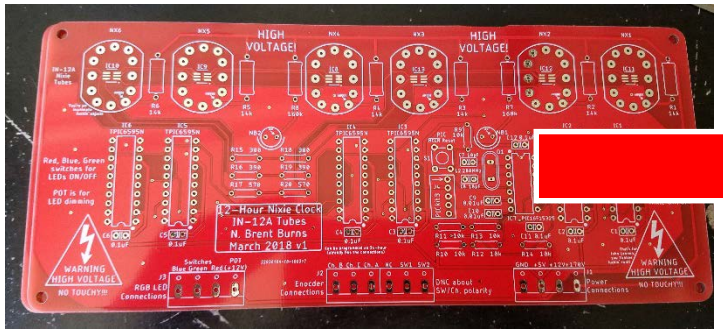
Order Physical PCBs (via Gerber Files)

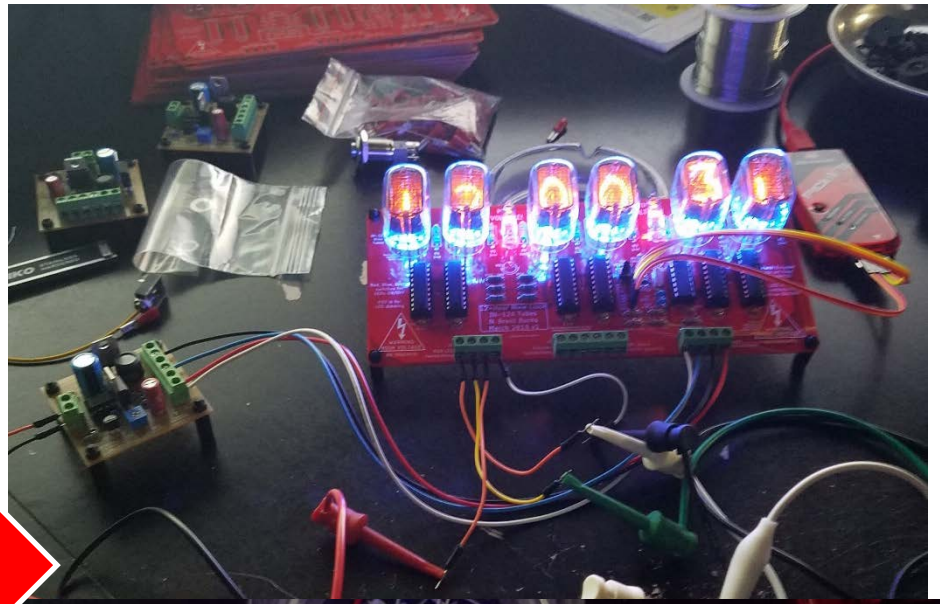


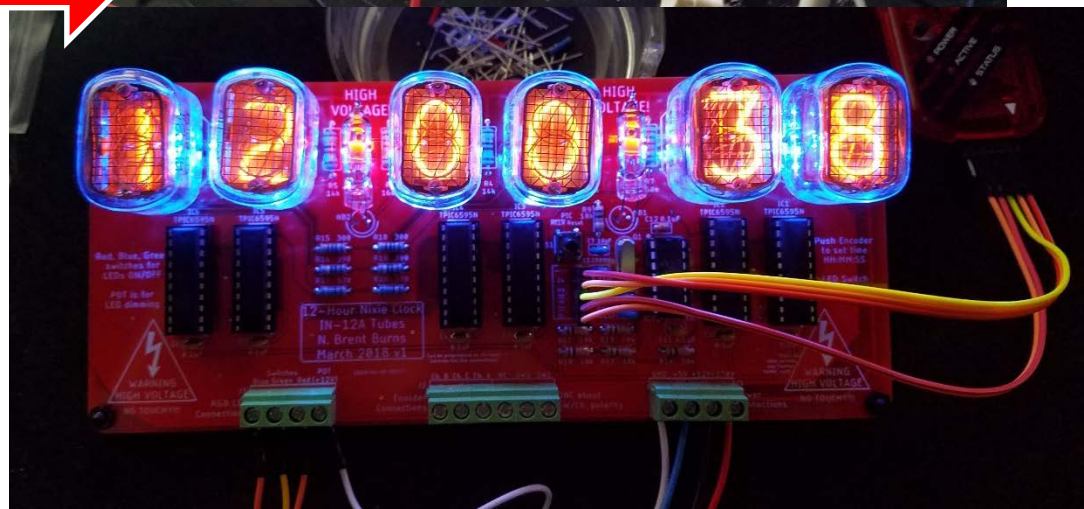




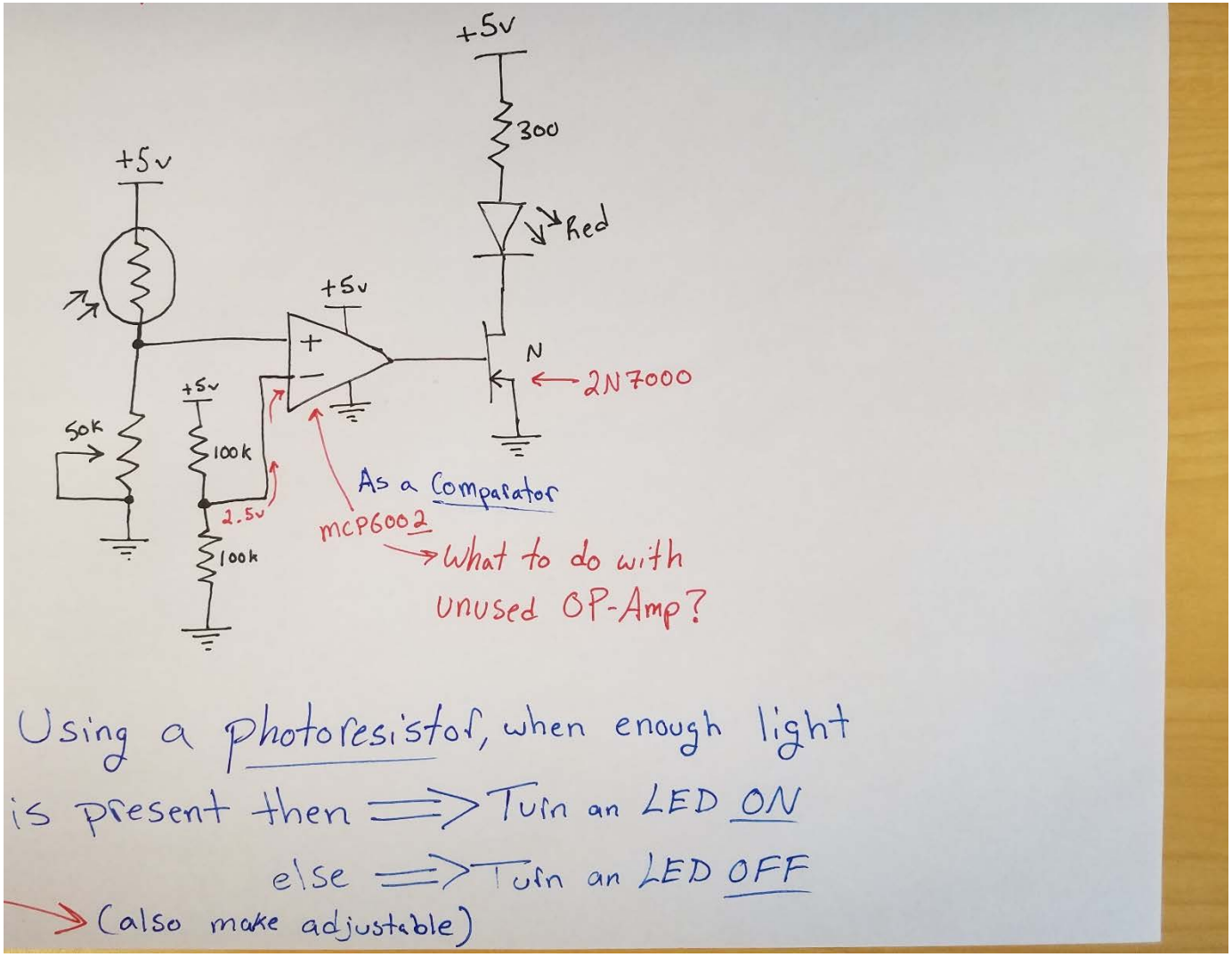
Solder Components, Test Connections, Power Up, and Test







Example Circuit



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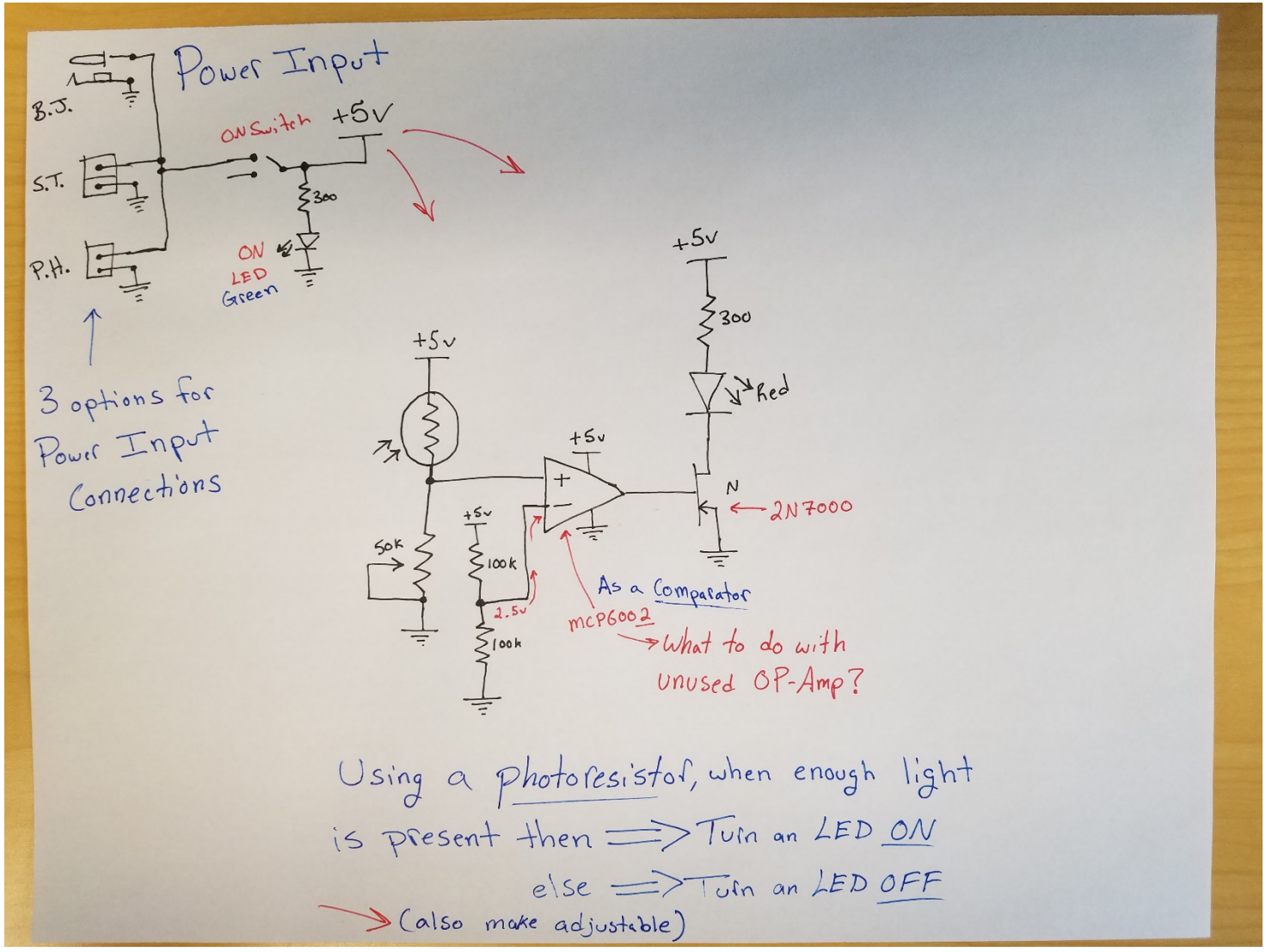
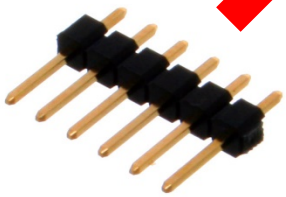


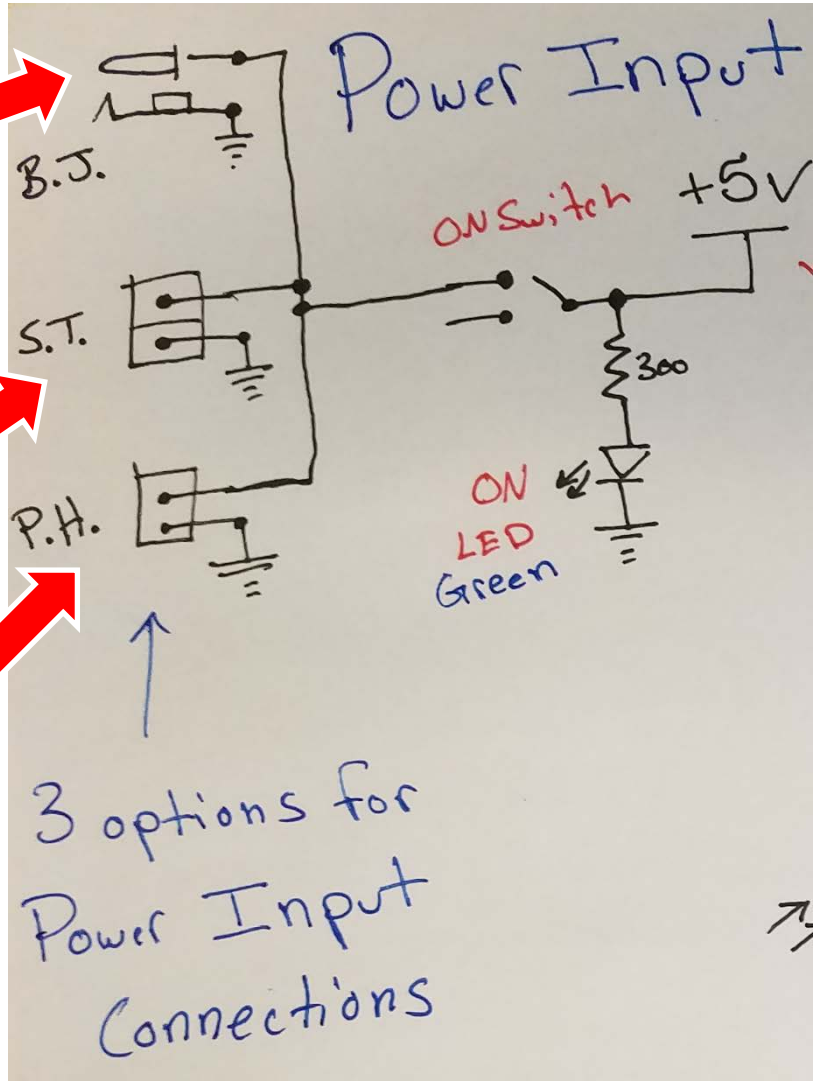
Example Circuit

Barrel Jack
(DC Jack)
(Power Connector)

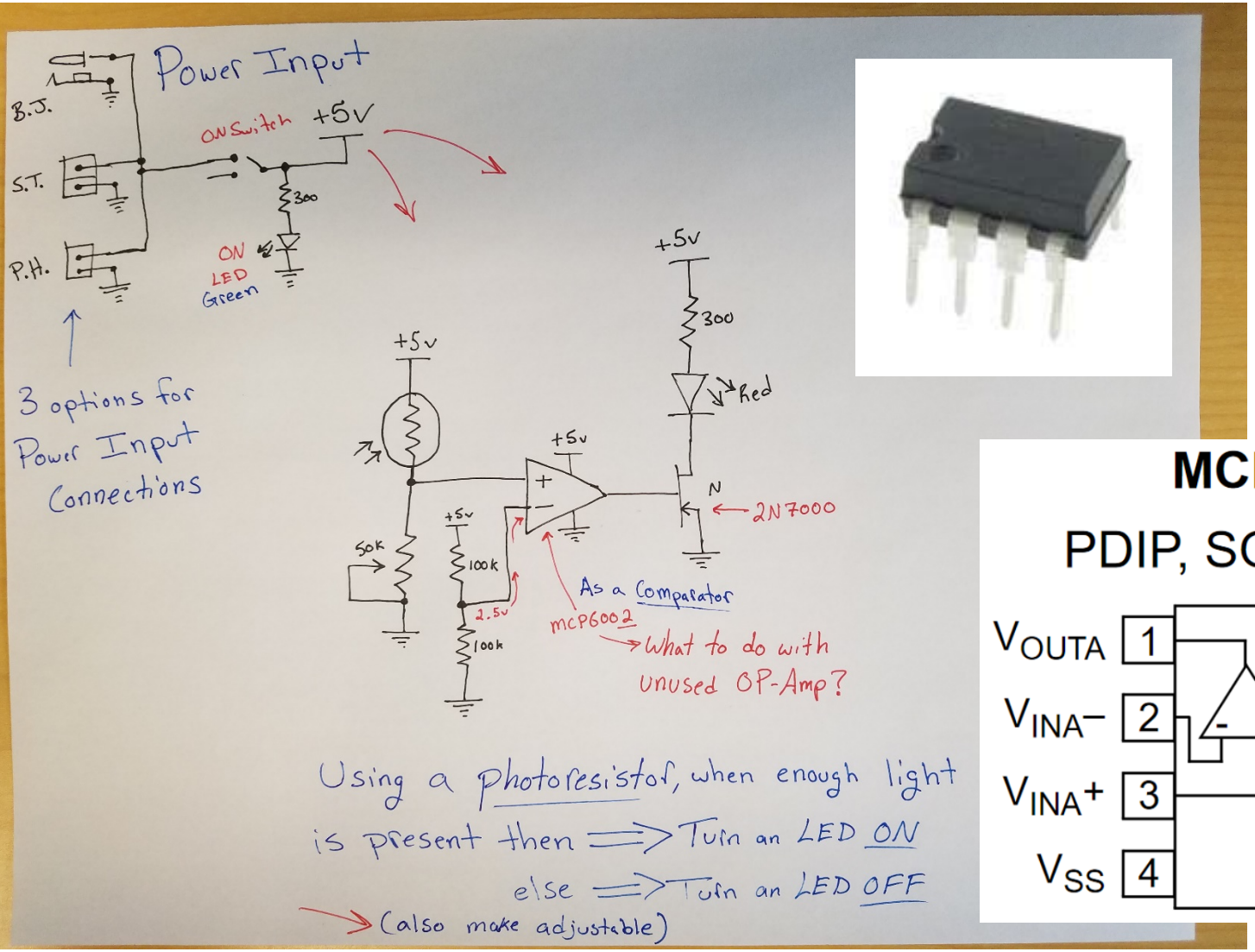
Screw Terminal

Pin Headers



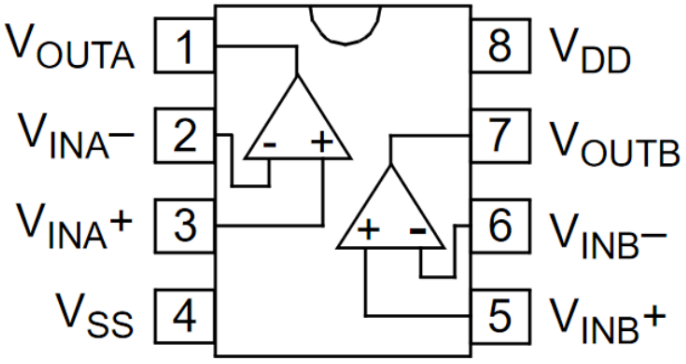
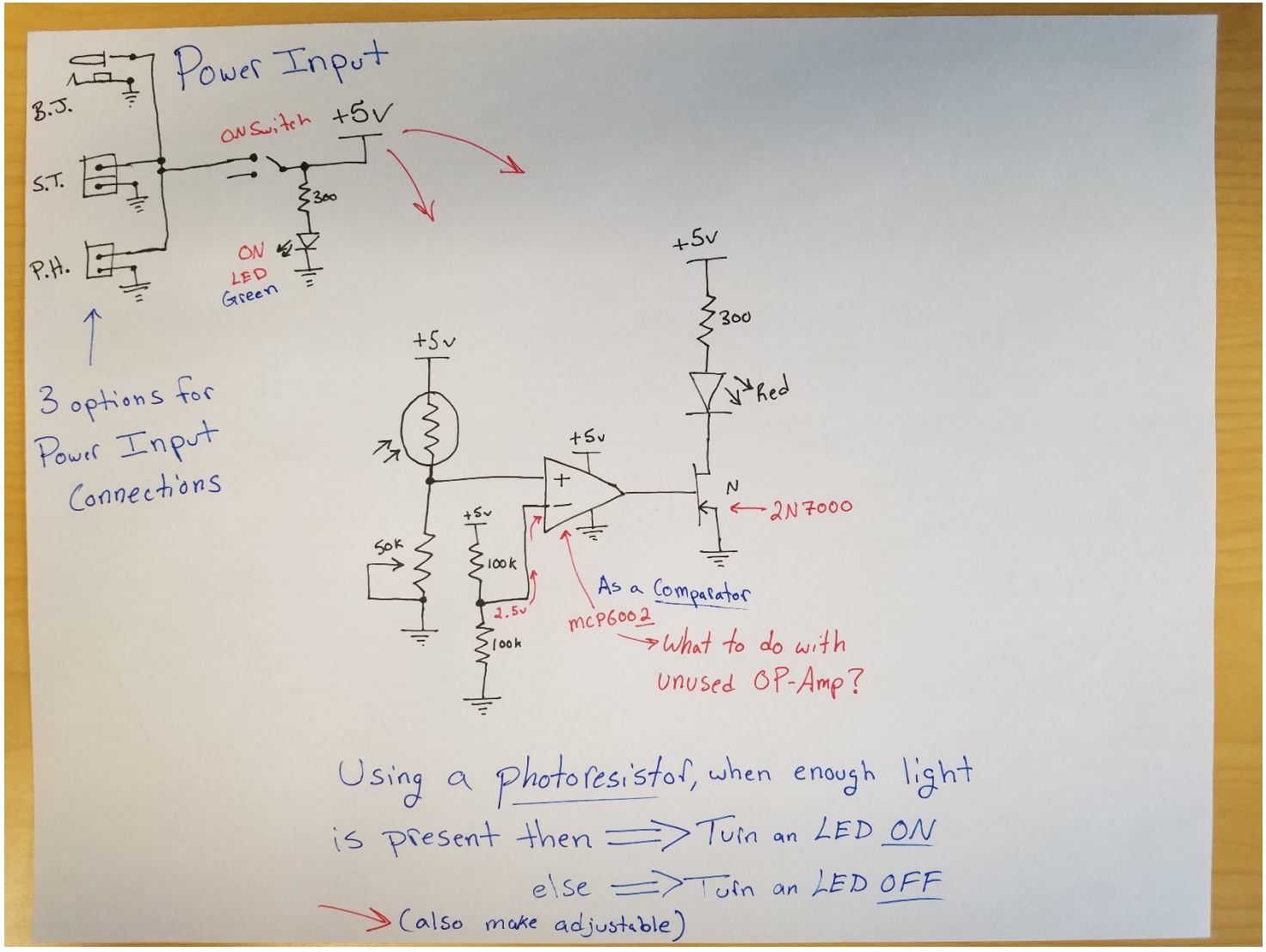


Example Circuit



MCP6002

PDIP, SOIC, MSOP



Example Circuit