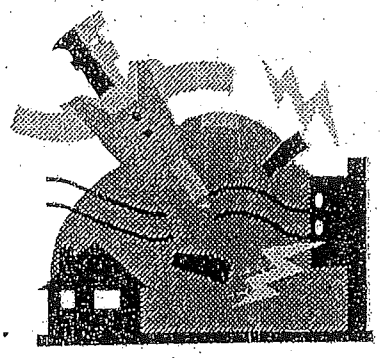
STROBE LIGHT SAFETY

A "*strobe light*" is a device that emits incredibly bright flashes of light, at a timed rate.



WARNING: Strobe circuits can be dangerous!!!

- Strobe circuits are based on high voltages.
- Strobe light circuits store up a large amount of energy in a capacitor and can release it all at once.
- All strobe units must have their electronics fully enclosed in an insulating case.
- The xenon strobe lamp must have a cover, in case it shatters during operation.
- If you have to work on a strobe light that has been used, make sure that the capacitors are discharged before you poking around in there. Put a *bleeder* resistor across the energy storage capacitor, even if the design does not call for one.

WARNING: Medical risk of strobes!!!

- People with a particular type of epilepsy (photosensitive epileptics) can have seizures triggered by strobe lights.
- Looking straight into a strobe for long periods of time might injure your eyes.
- The light is very bright --- dazzling. When combined with motion or other visual effects, it can be disorienting. The resulting mental confusion might prove dangerous in some places such as stairways.

NOTES related to our adjustable strobe light:

- This circuit is NOT isolated from ground. Use caution when operating without a case. A case is required for normal operation. Do not touch any part of the circuit with the case open or not installed.
- Do not operate this circuit at high flash rates for more than about 30 seconds or else C1 and C2 will overheat and explode.

VARIABLE ZENON STROBE

Name_____

Block____Date_____

Circuit Operation

The flash tube is a sealed glass tube filled with an inert gas called zenon. two electrodes are at each end, one the anode (+), the other the cathode (-). In the center is a third electrode called the trigger. The tube provides a white light, of high intensity for a very short period of time. It will be ideal for high speed photographic work, vehicle warning lights, ignition timers and stroboscopes.

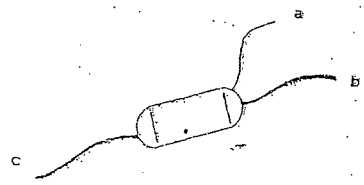
To operate the flash tube two voltages are required:
-Approximately 320 plus volts between the cathode and the anode.
-Approximately 4000 volts on the trigger electrode.

In any strobe light there will be two circuits. The 320 volts is produced by the Voltage Doubler Circuit. And the 4000 volts is produced by the Trigger Circuit

The Voltage Doubler Circuit consists of C-1 and D-1, D-2 and C-2. The purpose of the doubler is to convert the standard 120VAC to 320VDC. Resistor R-1 limits the current. The 320 plus VDC are stored in C-2 and eventually applied across the anode and cathode of the flash tube.

In the Trigger Circuit the 320 VDC charge stored on C-2 is applied to C-3 through the path of the potentiometer R-2 and resistor R-3. As soon as the voltage applied to the neon lamp L-1 is high enough to cause the lamp to ionize (65 to 70 volts), the charge on capacitor C-3 is applied to the trigger transformer through the "switching on" of SCR-1. The trigger transformer converts the high voltage to a 4000 volt pulse needed to ionize the zenon gas in the strobe tube. When this gas is triggered into ionization, a bright flash is emitted and almost the entire charge on capacitor C-2 is converted to light energy. the cycle now repeats itself and the frequency of the flashes is determined by the setting of the potentiometer (since R-3 and C-3 are constant). The lower the resistance the faster the flash rate

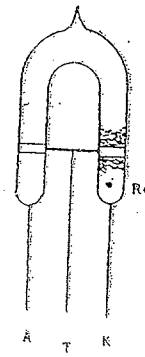
T-1 Trigger Transformer, step-up



a, b -(Primary Coil)

c -Secondary

FT Zenon Flash Tube



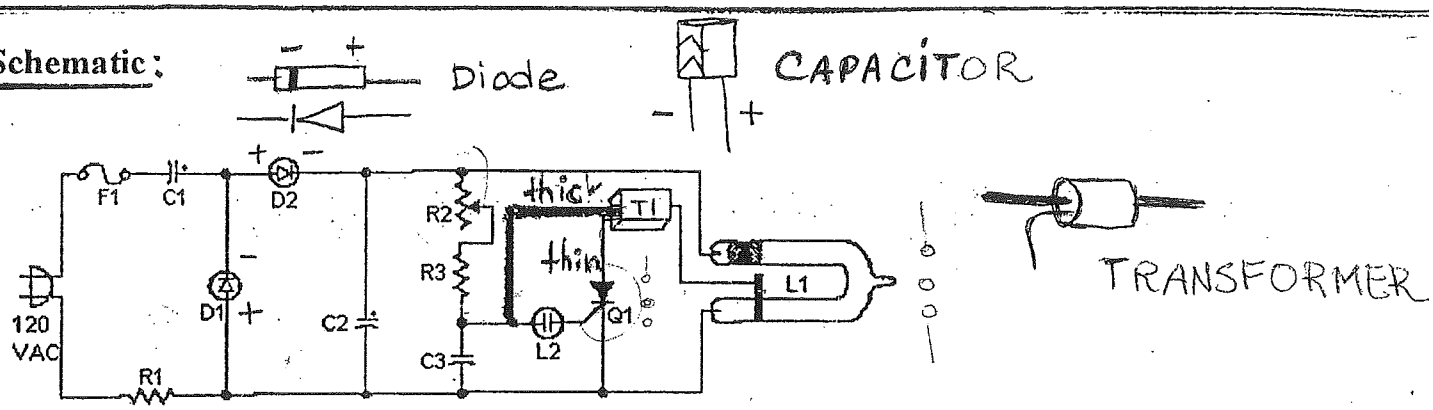
K - Cathode

A - Anode

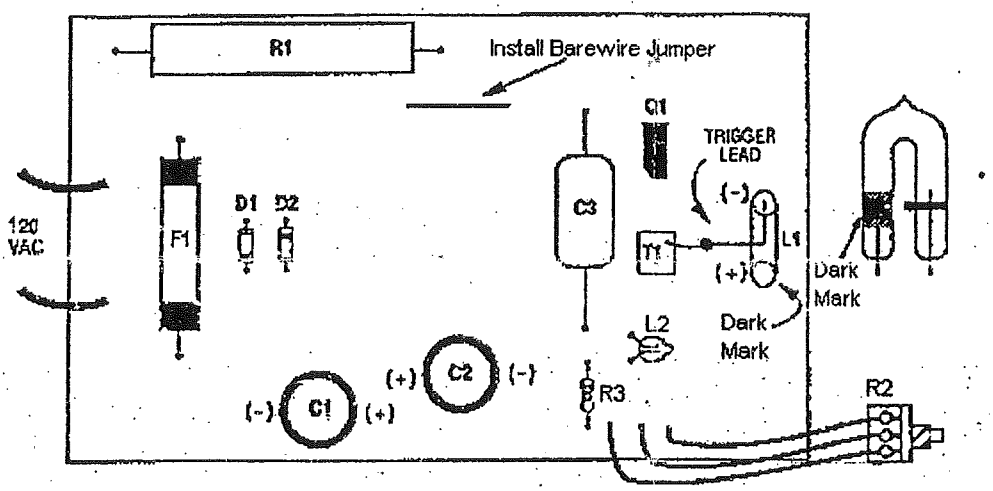
T - Trigger

Adjustable Strobe Light

1. Schematic:



2. Parts Placement:

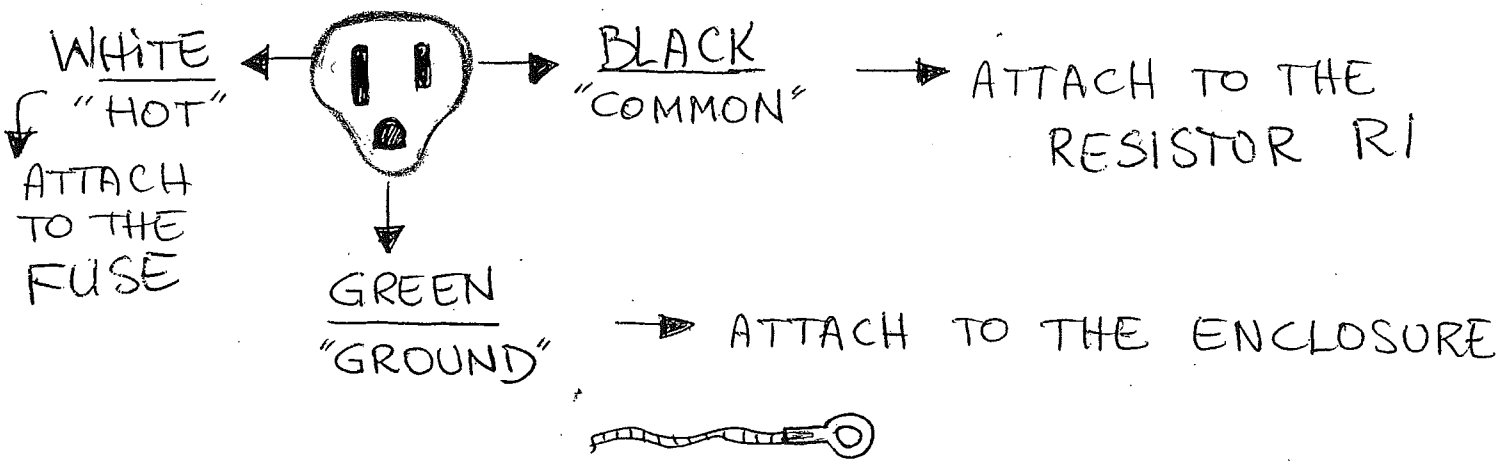


3. Parts:

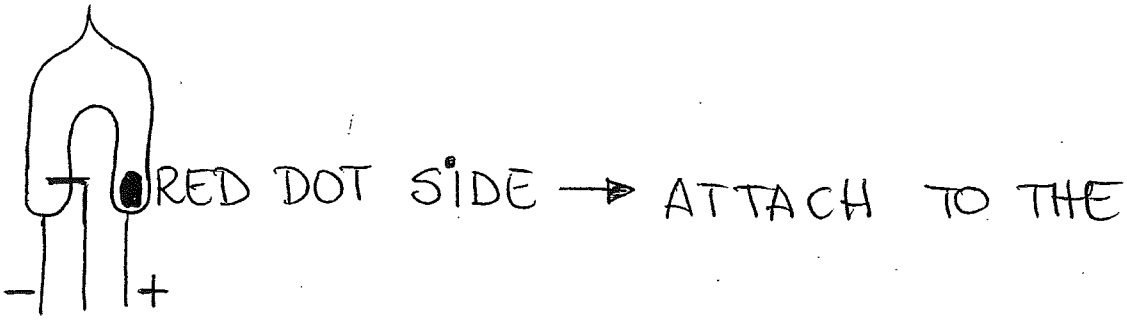
Part	Total Qty	Description	Substitutions / Notes
R1	1	250 Ohm 10 Watt Resistor	
R2	1	500K Pot	
R3	1	680K 1/4 Watt Resistor	
D1, D2	2	1N4004 Silicon Diode	
C1, C2	2	22 uF 350V Capacitor	
C3	1	0.47uF 400 Volt Mylar Capacitor	
T1	1	4KV Trigger Transformer (see "Notes")	
L1	1	Flash Tube (see "Notes")	
L2	1	Neon Bulb	
Q1	1	106 SCR D	
F1	1	115V 1A Fuse	
MISC	1	Case, Wire, Line Cord, Knob For R2	

STROBE LIGHT NOTES:

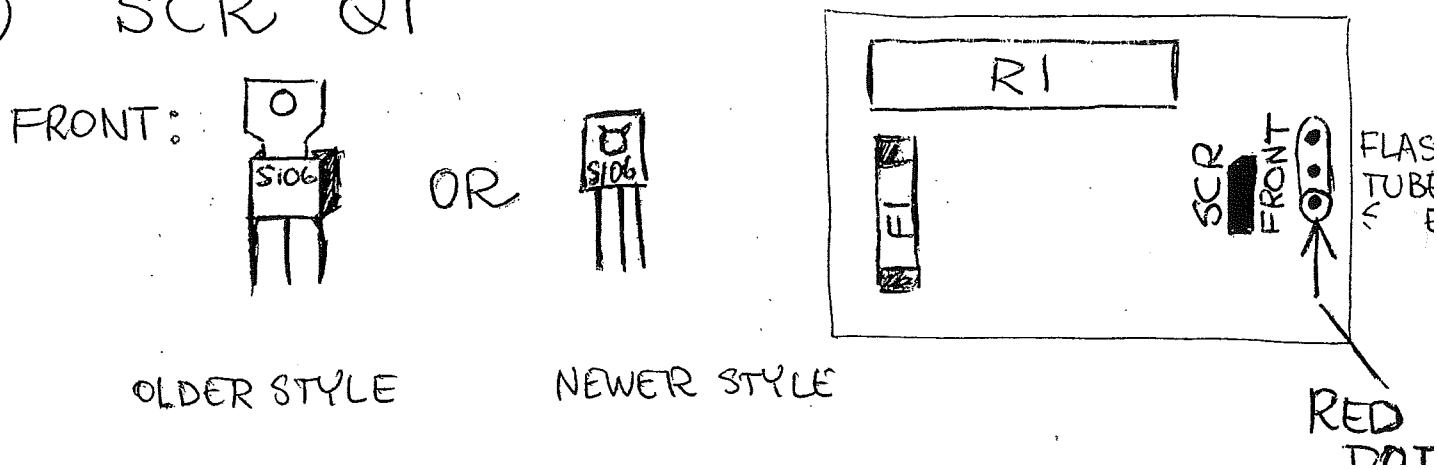
① 120 V CORD



② STROBE LIGHT (FLASH TUBE L1)

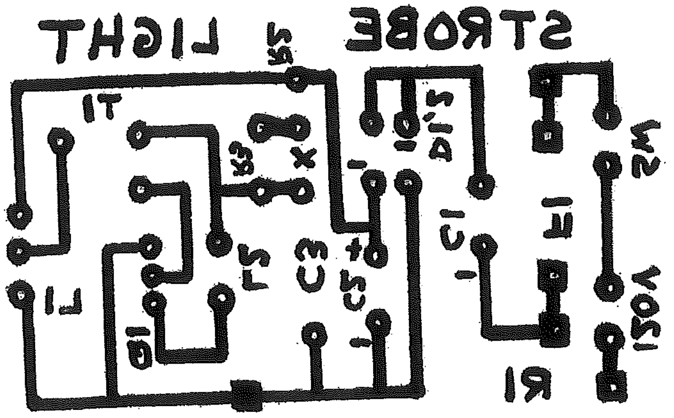


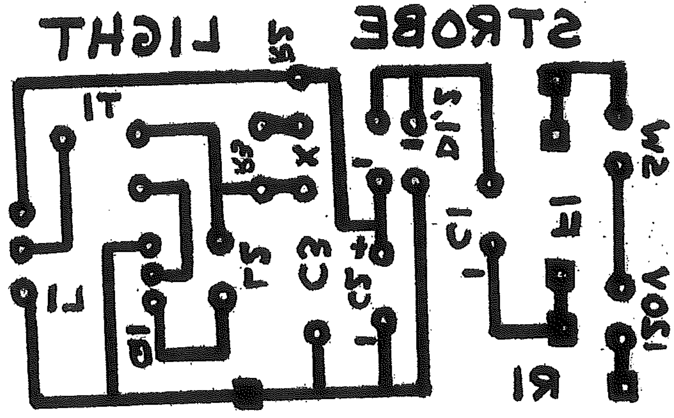
③ SCR Q1



Making a case /Strobe light assembly

1. Decide on a shape of your case.
2. Draw your layout on a piece of paper (full size). Add sides and tabs.
3. Figure out where to drill or punch the holes for the potentiometer, power cord, PCB mounting bolts and box assembly connections.
4. Show your layout to the teacher for approval.
5. Tape your layout to the metal.
6. Cut out the shape.
7. File the sharp corners.
8. Center punch all holes.
9. Drill or punch all holes needed for your project.
10. Clean the holes using an oversized drill bit (manually).
11. Bend the sides of your case using pan brake.
12. Rivet the case sides.
13. Measure and cut a piece of plastic for the top of your case using the band saw.
14. Drill the holes in plastic. Put a transparent tape on both sides of the plastic to prevent it from chipping.
15. Design and make a reflector.
16. Install the PCB in a case.
    - You would have to unsolder a power cord, insert a grommet in a case, put the cord through the back of your case, make a knot and solder the cord back in place.
    - Install PCB using bolts with 2 nuts and plastic spacers.
    - Install a potentiometer/ switch on a side of the case.
17. Add the plastic knob to the pot.
18. Install the reflector and the plastic cover.
19. Plug in your strobe light and test to see if it is still works. If it works, you are DONE!!!


STROBE LIGHT
T1
R2
R3
X
D1,2
C1
C2+
C3
L1
Q1
R1
120V
SW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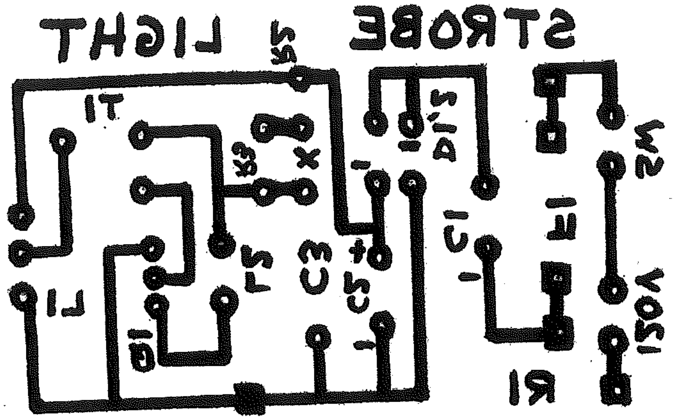
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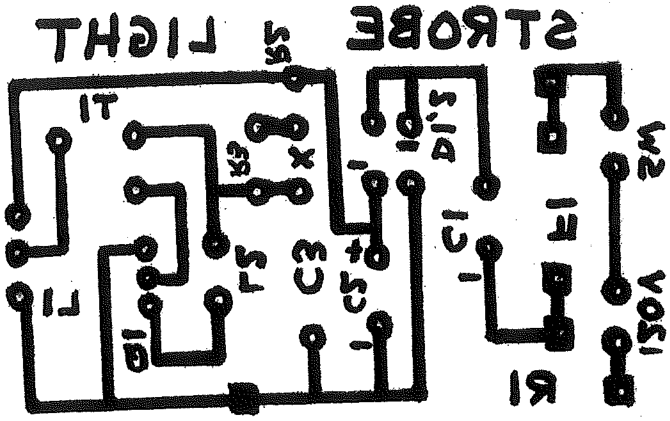
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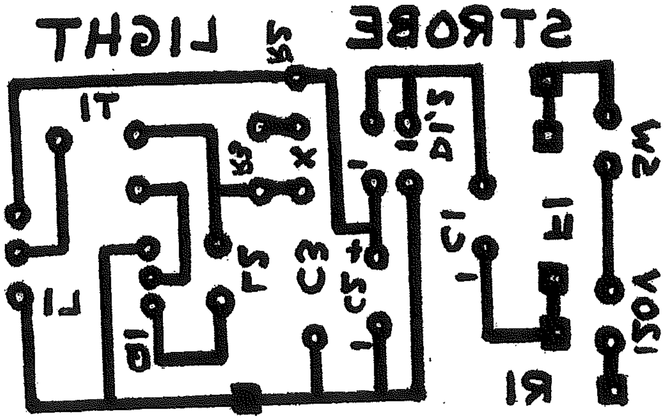
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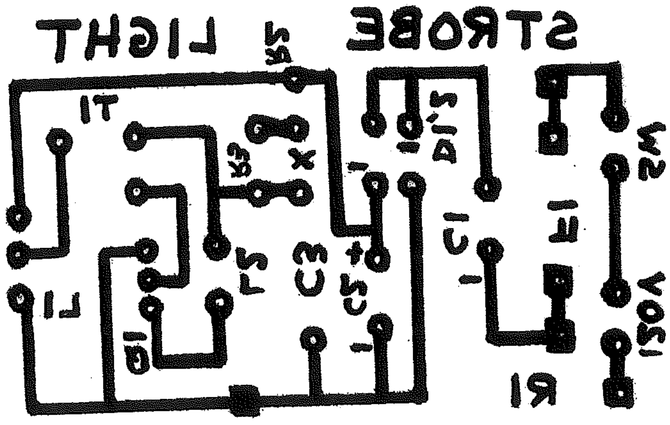
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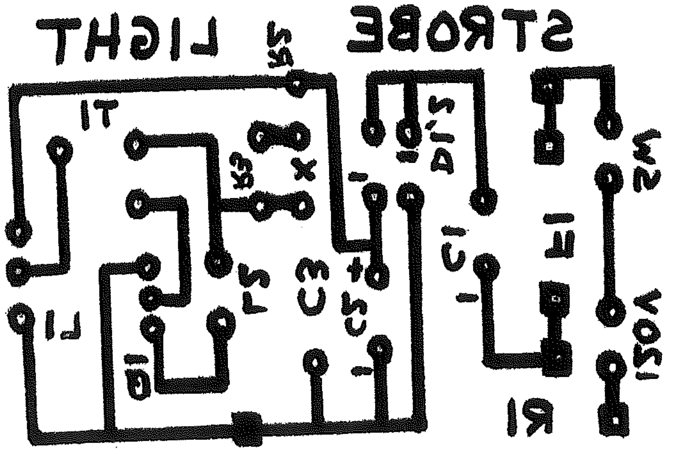
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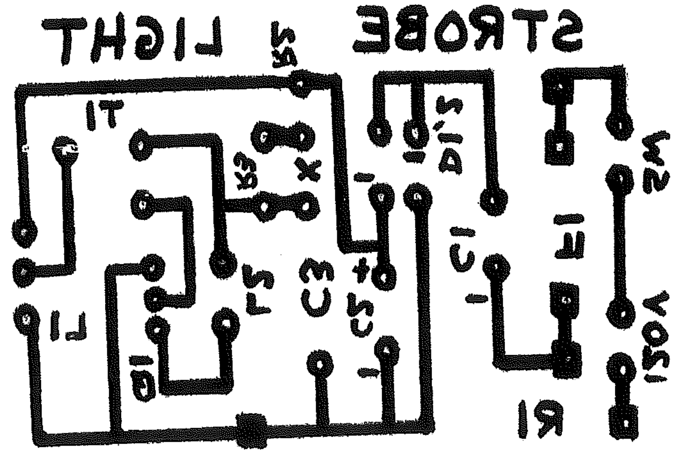
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