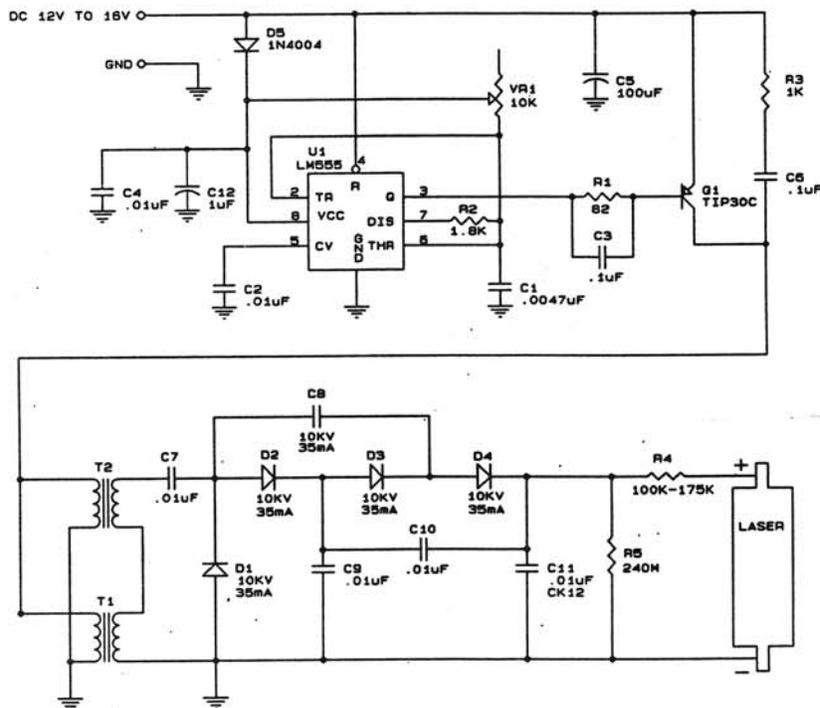


# Class II Laser Kit

# LK-1

## SCHEMATIC DIAGRAM



## PARTS LIST

R1	Resistor 82Ω 1/2W	D5	Diode 1N4003
R2	Resistor 1.8KΩ 1/4W	Q1	Transistor TIP30
R3	Resistor 1KΩ 1/4W	IC1	IC 555
R4	Resistor 130KΩ 2W	T1, 2	Transformer
R5	Resistor 240MΩ 4W	1	IC Socket 8 pin
VR1	Trim Pot 10K	1	Heat Sink
C1	Capacitor Mylar .0047µF (472)	1	Screw 4-40x1/4"
C2, C4	Capacitor Mylar .01µF (103)	1	Nut 4-40
C3, C6	Capacitor Mylar .1µF (104)	2	8" High Voltage Wire
C5	Capacitor Lytic 100µF	1	Roll Solder
C7, 8, 9, 10	Capacitor Discap .01µF (103)	9"	Black 20 Ga. Wire
C11	Capacitor Discap .001µF (102)	9"	Red 20 Ga. Wire
C12	Capacitor Lytic 1µF	1	Laser Tube
D1, 2, 3, 4	Diode 10KV 35MA	2	Solder Lugs



# Elenco Educational Kits



### STEP 1



Identify the following resistors. Bend their leads at right angles and mount them to the PC board in the positions shown in the top legend. Bend the leads slightly to hold the parts in place, solder and cut off excess leads.

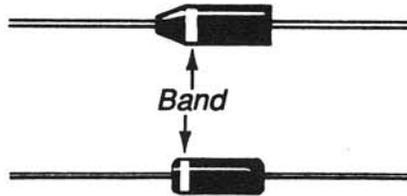
- R1 - 82Ω 1/2W (gray-red-black-gold)
- R2 - 1.8KΩ 1/4W (brown-gray-red-gold)
- R3 - 1KΩ 1/4W (brown-black-red-gold)
- R5 - 240MΩ 4W



### STEP 2

Identify the following diodes. Mount them to the PC board in the positions shown in figure A. **IMPORTANT**; diodes have polarity mount them with the band on the diode in the same direction shown in figure A. Solder diodes in place.

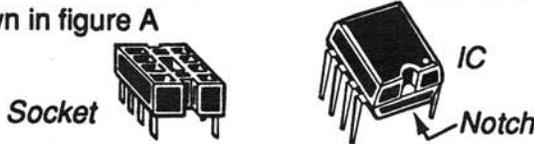
- D1 - 10KV 35MA
- D2 - 10KV 35MA
- D3 - 10KV 35MA
- D4 - 10KV 35MA
- D5 - 1N4004



### STEP 3

Identify the 8 pin IC socket. Push the socket carefully in place shown in figure A (IC1). Be sure all the pins are through the holes in the PC board. Solder the pins in place, avoiding solder bridges between pins. Carefully insert the 555 IC into the socket with the notch in the IC in the direction shown in figure A

- 8 pin IC Socket
- IC1 - 555 IC



### STEP 4

Identify the trim pot. Mount it in the position shown in figure A, then solder in place.

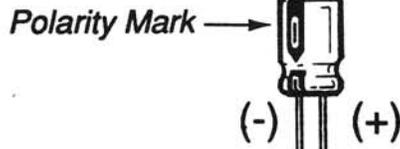
- VR1 - 10K Trim Pot



### STEP 5

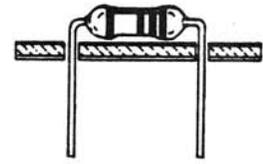
Identify the following electrolytic capacitors. **IMPORTANT**; these capacitors have a polarity marking on them indicating the negative (-) lead, the opposite lead is positive (+). Mount the lytics with the (+) lead in the hole, as shown in figure A. Solder lytics in place.

- C5 - 100μF
- C12 - 1μF

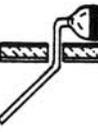


### READ THIS BEFORE

✓ Check off each box when completed side of the PC board without foil traces. down close to the PC board, unless ins



Mount Part



Bend to h

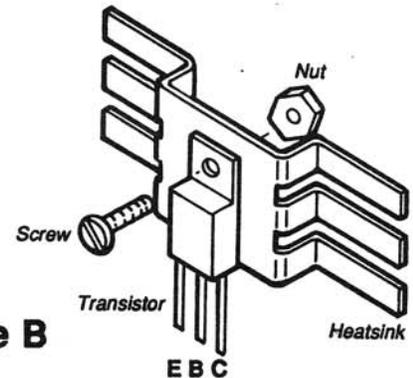
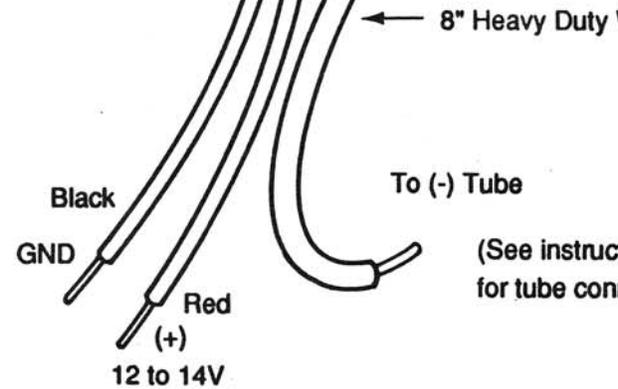
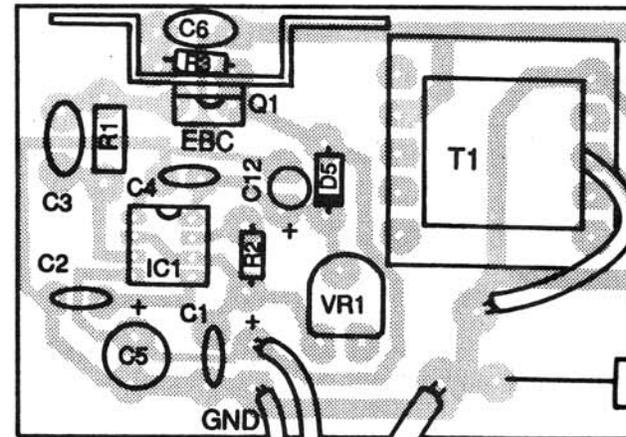


Figure B

## ASSEMBLING YOUR KIT!

All components are to be mounted on the PCB. When mounted the components should be soldered differently.



Insert leads  
into hole part



Solder and  
cut off leads

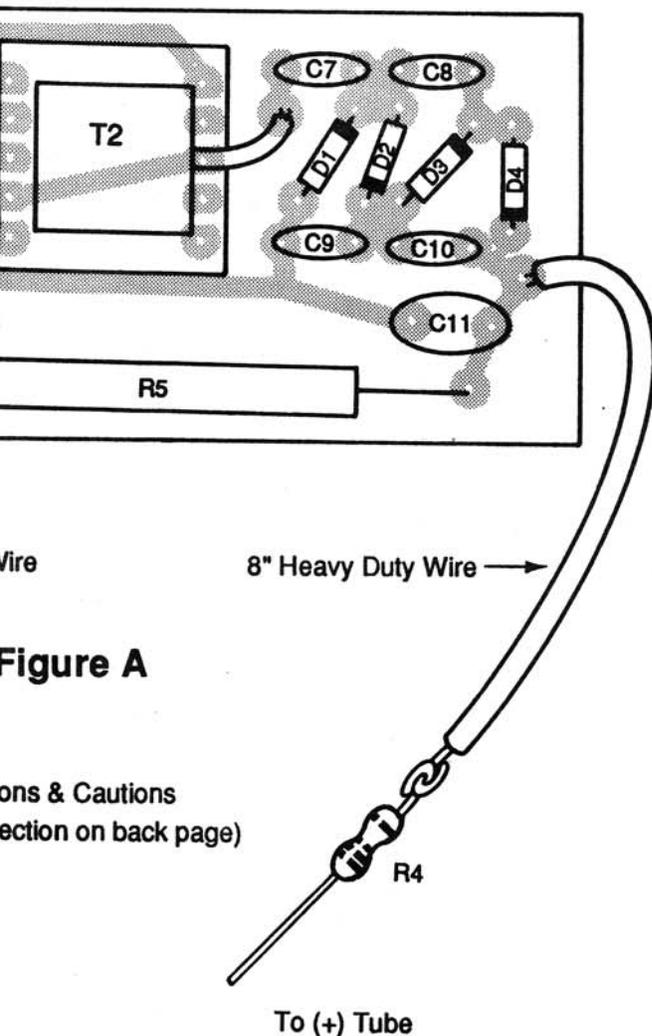


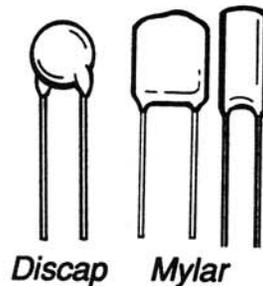
Figure A

See Wires & Cautions  
section on back page)

## STEP 6

Identify the following capacitors. Mount them in positions shown in figure A. Solder in place.

- C1 - .0047 $\mu$ F Mylar (may be marked 472)
- C2 - .01 $\mu$ F Mylar (may be marked 103)
- C3 - .1 $\mu$ F Mylar (may be marked 104)
- C4 - .01 $\mu$ F Mylar (may be marked 103)
- C6 - .1 $\mu$ F Mylar (may be marked 104)
- C7 - .01 $\mu$ F Discap (may be marked 103)
- C8 - .01 $\mu$ F Discap (may be marked 103)
- C9 - .01 $\mu$ F Discap (may be marked 103)
- C10 - .01 $\mu$ F Discap (may be marked 103)
- C11 - .001 $\mu$ F Discap (may be marked 102)



## STEP 7

Identify the transformers. Mount them and the single wire from each transformer as shown in figure A. Solder all pins and wires in place.

- T1 - Transformer
- T2 - Transformer

## STEP 8

Identify the transistor. Mount the transistor to the heat sink with the screw and nut, see figure B. Mount the transistor with the (B) base, (C) collector and (E) emitter leads in the correct holes as shown in figure A. Leave 1/4" space between the transistor and the PC board. Solder transistor in place.

- Q1 - TIP 30

## STEP 9

Strip the insulation off both ends of the 9" black & 9" red wires to expose 1/4" bare wire. Insert and solder one end of the black wire to the hole marked "GND" as shown in figure A. Solder one end of the red wire to the hole marked "+".

- 9" Black Wire
- 9" Red Wire

## STEP 10

Strip the insulation off both ends of the two 8" heavy duty wires to expose 1/4" bare wire. Insert and solder the two wires to the PC board in places shown in figure A. Form a tight connection between one lead of the 130K resistor (R4) and tube wire, then solder.

- 8" Heavy Duty Wire (-)
- 8" Heavy Duty Wire (+)
- R4 - 130K $\Omega$  (brown-orange-yellow-gold)

**IMPORTANT: READ THE INSTRUCTIONS BELOW BEFORE OPERATING THE POWER SUPPLY.**

**DO NOT OPERATE POWER SUPPLY WITHOUT TUBE CONNECTED.**

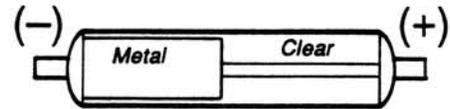
**CAUTION: HIGH VOLTAGE IS PRESENT AT TUBE AND POWER SUPPLY. DO NOT TOUCH TUBE OR POWER SUPPLY WHEN POWER IS ON, EXCEPT VR1 (10K trim pot). LASER TUBE CAN ALSO HOLD CHARGE WHEN POWER SUPPLY IS TURNED OFF.**

**CAUTION: DO NOT STARE INTO LASER BEAM.**

**CAUTION: Do not attempt to measure HV output because it will destroy most meters.**

**LASER TUBE CONNECTION**

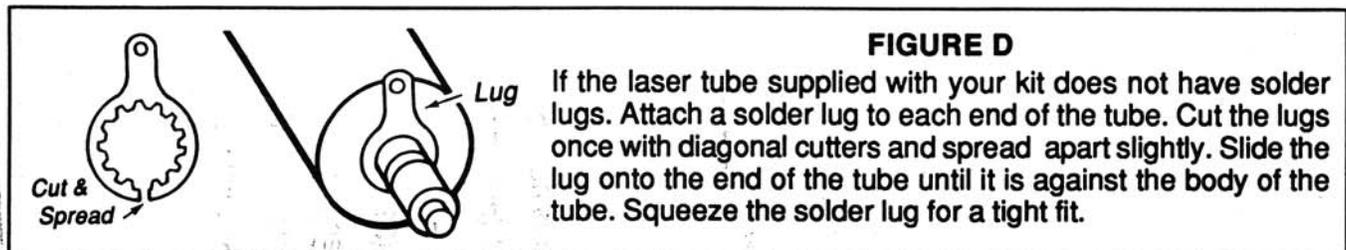
After construction of your power supply kit, make sure VR1 trim pot is turned fully clockwise. Make sure the tube is installed with the proper polarity, as shown in figure C. If the tube is installed with the wrong polarity, it can be damaged.



**FIGURE C**

Solder the negative (-) 8" heavy duty wire from the PC board, (see figure A for location of wire) to the solder lug on the negative end of the tube (if the tube has no solder lug see figure D).

Cut the lead on R4 so it is 1/2" in length. Attach R4 with the (+) 8" heavy duty wire to the solder lug on the positive (+) end of the laser tube. Make sure the body of R4 is no more than 1/4" away from the solder lug, solder in place (if tube has no solder lug see figure D).



**FIGURE D**

If the laser tube supplied with your kit does not have solder lugs. Attach a solder lug to each end of the tube. Cut the lugs once with diagonal cutters and spread apart slightly. Slide the lug onto the end of the tube until it is against the body of the tube. Squeeze the solder lug for a tight fit.

**TO START AND ADJUST SUPPLY**

1. Have you first read the cautions above.
2. Check that VR1 trim pot is set fully clockwise.
3. Attach red wire from PC board to (+) terminal of 12-14V Power supply or battery. Attach the black wire from the PC board to the GND or COMMON terminal of the 12-14V power supply.
4. At this time the tube may or may not flicker, that is OK.
5. Turn VR1 trim pot counter clockwise until tube comes on steady. (if you have an amp meter go to step 6) After this happens, turn VR1 trim pot just a small amount more.
6. If you have an amp meter, connect in series with the 12-14V supply. Adjust VR1 trim pot counter clockwise until tube lights, then set power supply between 750 MA, not to exceed 1.25 AMPS.