HI-POWER

eti project

Build this high-power strobe for parties, light shows and discotheques.

This high-power strobe light is ideal for use at parties, light shows and discotheques.

It provides a short intense pulse of light adjustable in frequency between one flash per second and twenty flashes per second.

The circuit is unusual in that several strobe lights may be driven from the one basic triggering unit.

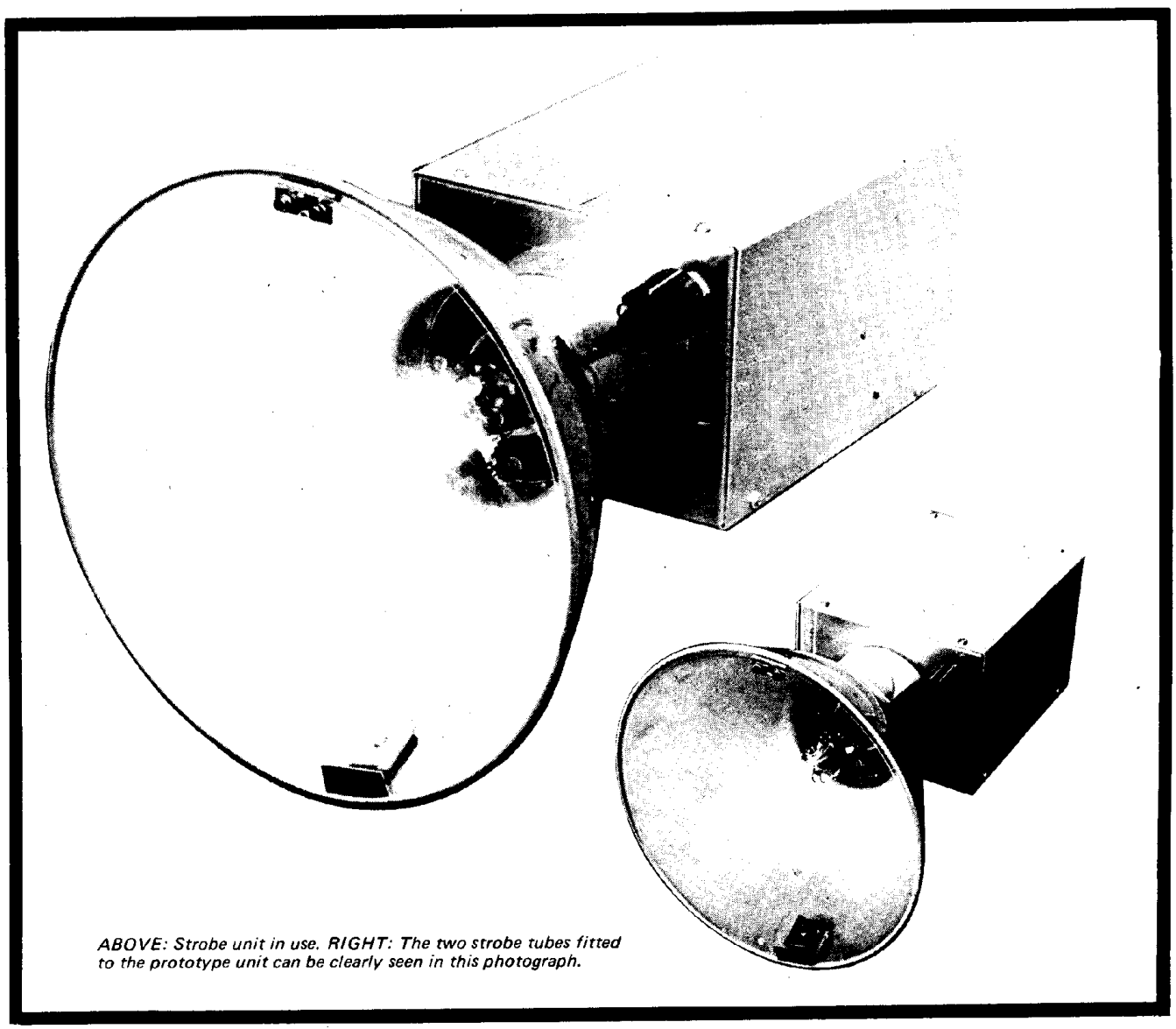
CIRCUIT DESCRIPTION

The circuit of the complete strobe unit is shown in Fig.1.

Diodes D1 to D4 produce positive voltages, at the points marked 'A' and 'B', on alternate half-cycles.

The voltage appearing at point 'A' charges the capacitors C2 and C3, these two capacitors supply the energy for the strobe tube.

Strobe operating frequency is determined by the timing circuit of SCR1, RV1, R2, C1 and LP1/2. Timing capacitor C1 is charged via RV1 and R2 by the positive voltage appearing at point 'B' on alternate half-cycles. When the charge on C1



ABOVE: Strobe unit in use. RIGHT: The two strobe tubes fitted to the prototype unit can be clearly seen in this photograph.

STROBE

exceeds the break-over voltage of the neons LP1 and LP2, these conduct triggering SCR1.

When SCR1 conducts, the timing capacitor C1 discharges through the primary winding of the pulse transformer (T1) and SCR1.

This causes a high voltage spike to be generated in the secondary winding of the pulse transformer, and it is this spike that triggers the strobe tube into conduction.

Capacitors C2 and C3 discharge practically instantaneously through the strobe tube resulting in a brilliant flash of light. Peak current may exceed 60 amps during this short period.

Since both the timing circuit and the storage capacitors are charged by an unsmoothed half-wave supply, neither can conduct for longer than one half-cycle of supply voltage.

The amount of light produced by the strobe tube during each flash is a function of the capacity of C2 and C3. Increasing the size of these capacitors will increase the amount of light but only at the expense of tube operating life. The capacitors specified will provide several hundred hours operation at a light level adequate for most purposes.

A far more satisfactory way to increasing light output is to fire two or more strobe tubes from the main triggering circuit. This is done by connecting the second and further tubes, additional 220 ohms resistors, and 6.5uf storage capacitors, as indicated by the dotted lines in Fig.1.

No modifications are required to the main timing circuit.

If desired the additional strobe tubes may be mounted within the existing single reflector.

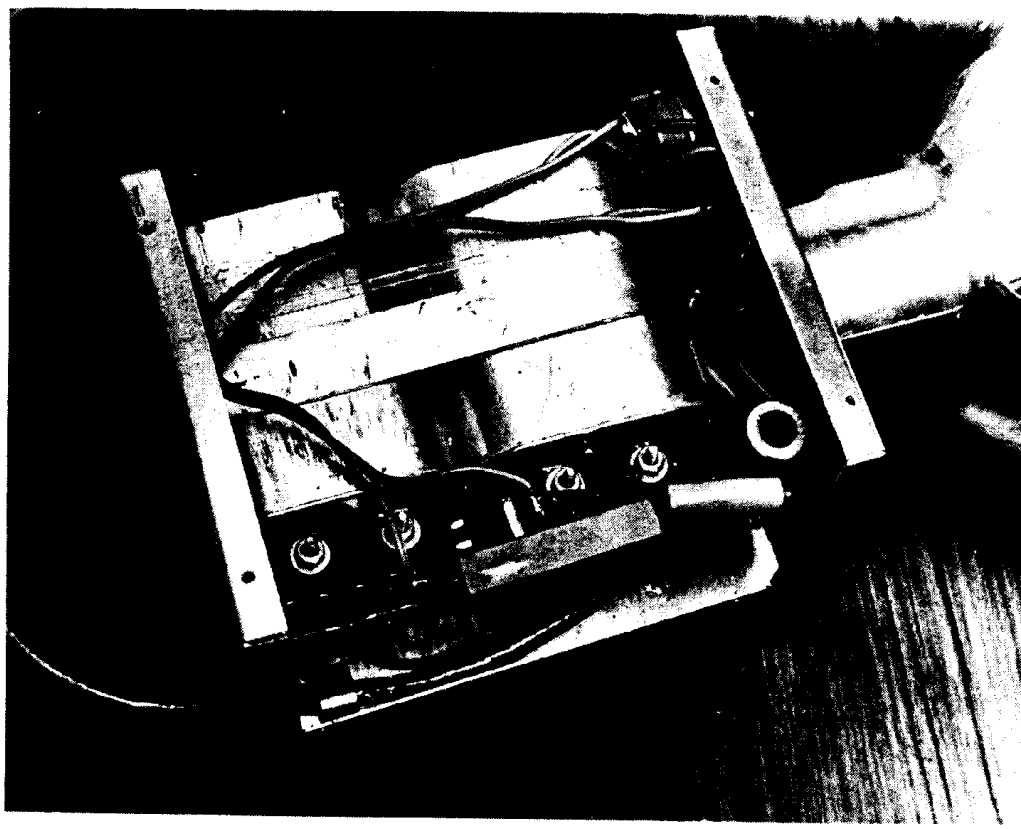


Fig. 5. Construction of the unit -- this particular unit has been constructed to drive two flash-tubes. The additional capacitors and 220 ohm, 10 watt resistor referred to in the text can be clearly seen. The pulse transformer is on the extreme light of the matrix board which in turn is bolted securely to the energy storage capacitors.

CONSTRUCTION

Our prototype unit was constructed from an aluminium case 5¾" x 4½" x 3½" onto which was mounted a 7" diameter photographic type reflector.

The reflector should be fitted with a perspex cover to protect the tube. A suggested method of locating this cover is shown in Fig.2.

The strobe tube or tubes should be soldered into an octal plug. A corresponding octal socket is housed in the base of the reflector (as shown in Fig.2.) This enables the tube/s to be easily removed for replacement.

Since this unit is connected directly to the 240 volt mains, great care must be taken to earth all external metal parts. Unless you are thoroughly conversant with electrical wiring, have the finished unit checked by an electrician.

Component layout is simple and non-critical. Apart from the capacitors and strobe tubes, all components may be mounted on a matrix board or on tag strips.

The storage capacitors are 6.5uf, 250 volt working, paper insulated units of the type used for power factor correction with fluorescent lights. These have been selected for this purpose because they have high discharge current ratings and are readily obtainable from electrical wholesalers. This type of capacitor is larger than the electrolytic variety.

If space is critical, electrolytics of the same capacity, but having a 450 volt dc voltage rating, may be used in their place. They will however require replacement at frequent intervals.

If the recommended type of capacitor is used, the matrix board carrying the remaining components can be bolted to these capacitors' terminals, and the capacitors securely located within the metal case.

LOCATE COMPONENTS SECURELY

All components must be fixed rigidly in position so that there is no possibility of their contacting the metal case. If there is the slightest doubt, insulate the component with tape, and line the interior of the metal case with an insulating board.

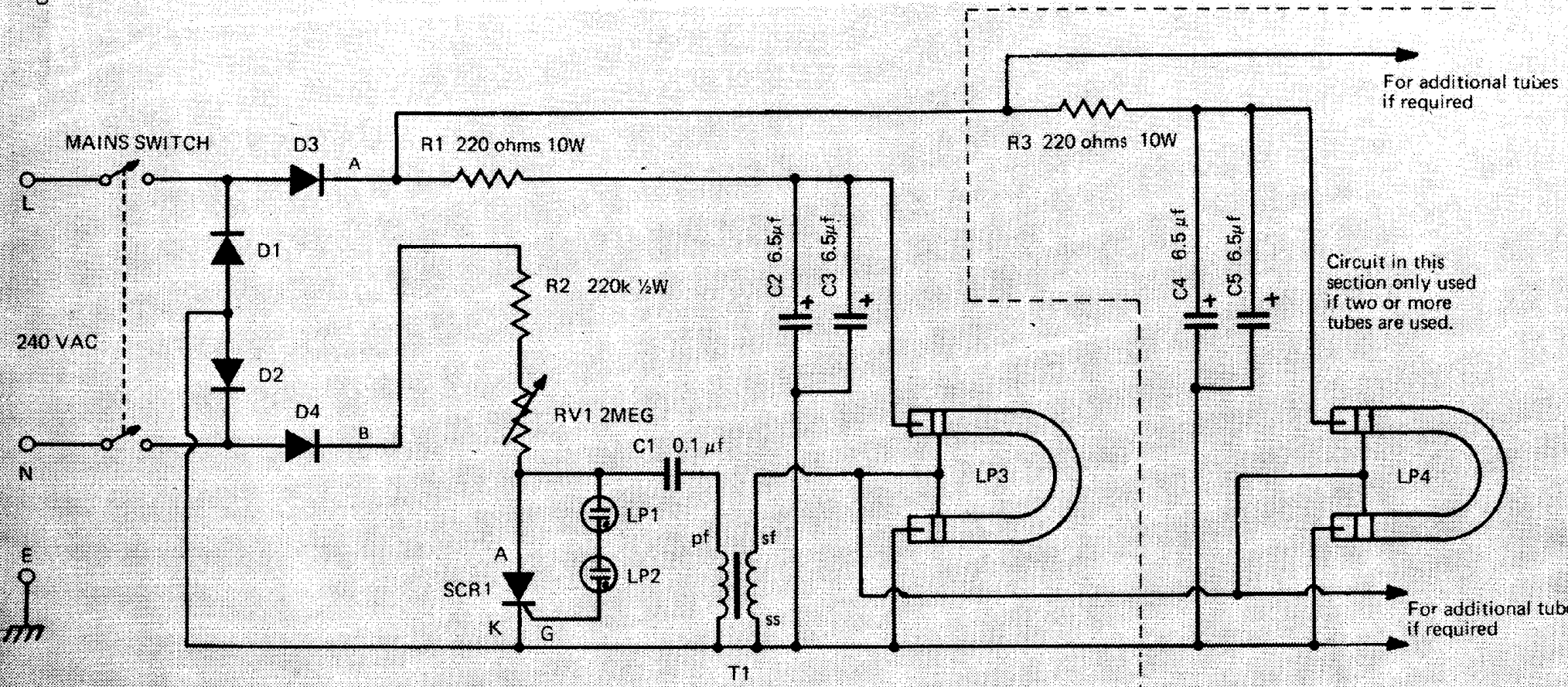
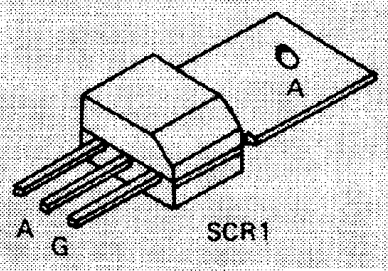
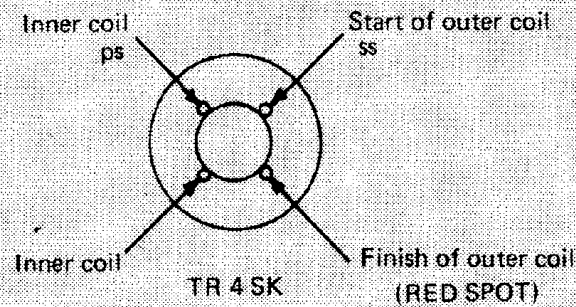


FIG. 1
CIRCUIT DIAGRAM





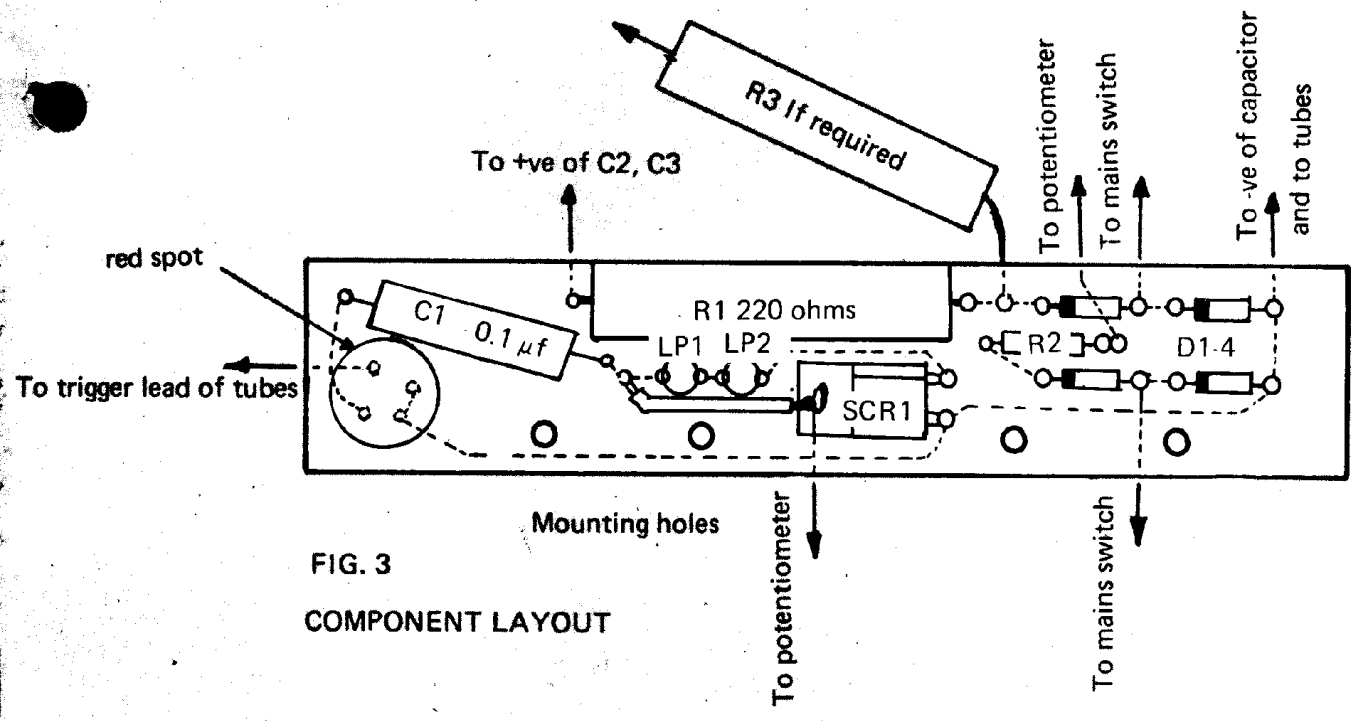


FIG. 3

COMPONENT LAYOUT

Connect components using 23/0076 240 volt insulated wire. A two-pole mains switch must be used, this may consist of a separately mounted unit, or it can be combined with the main speed-setting potentiometer (a combined switch-potentiometer is specified in the parts list).

The mains cable must be protected by a grommet at the point where it enters the case, it must also be securely attached to the case by a suitable clamp.

Many types of strobe tubes have been found to operate satisfactorily with this project. The tube used in our prototype is the Philips type 126048.

A length of tinned copper wire must be wrapped around some types of tube to act as a triggering lead (Fig. 4).

This lead is inbuilt in the Philips strobe-tube, but we have found that an additional winding may be required (in this application) to eliminate erratic triggering.

WARNING

Repetitive pulses of light – especially those occurring at frequencies around nine flashes a second – may cause epileptics to have convulsive seizures.

Those prone to grand mal, petit mal, or psychomotor attacks should avoid areas where strobe lights are used.

In the event of such an attack whilst a strobe is being used, the strobe light must be turned off immediately.

Fig. 4. Two strobe tubes are mounted in one octal holder. A triggering lead has been wrapped around one tube to show technique.

PARTS LIST

D1,D2,D3,D4.	–	silicon diode 1N400.4 (or equivalent)
R1	–	resistor 220 ohm,.10 Watt, 10%
R2	–	resistor 220k, ½ Watt, 10%
R3 *	–	resistor 220 Ohm, 10 Watt, 10%
RV1	–	potentiometer, 2 Megohm, linear scale, with double pole switch.
C1	–	capacitor, 0.1uf, 400V.
C2, C3 **	–	capacitor 6.5uf, 250 volt ac.
C4, C5 *	–	as above
LP1, LP2	–	neon indicator tube
LP3	–	strobe tube.
LP4 *	–	strobe tube – as above
T1	–	pulse transformer –
SCR1	–	silicon controlled rectifier, C106D, BT100A 500R or equivalent.
Octal plug	–	McMurdo type L8USP1
Octal socket	–	McMurdo type RT8
Sundries	–	reflector, metal box, spacers, perspex cover, hinge, magnetic catch, hook-up wire, three-core flex, nuts, bolts, washers, etc.

** Components marked with one asterisk – only required if two or more strobe tubes are to be used.*

*** If unobtainable from your kit parts supplier, these capacitors can usually be obtained from main electrical dealers handling fluorescent lighting equipment.*