

BUILD THE PPFL

A UNIQUE LIGHT FLASHER IS THE

Pulsating Psychedelic Fluorescent Lamp

BY L. EDWARDS

FLASHING LIGHTS have many uses—some serious and some just for fun. The PPFL (Pulsating Psychedelic Fluorescent Lamp) falls in both categories and its flashing rate can be varied from about one flash per second to many times per second. Thus it can be used for window displays and Christmas lighting, as a warning light, or as a rhythm-conscious lamp that flashes in synchronization with an audio signal.

Since it uses a fluorescent lamp, the PPFL runs cool and interesting patterns can be obtained by using either straight or circular lamps. As an added bonus, an ultra-violet fluorescent lamp can be used in conjunction with fluorescent paints or

decals to get some effects that are really a blast.

Construction. The basic fluorescent flasher, whose circuit is shown in Fig. 1, can be built in, or on, almost any type of chassis. In the author's version, an 8" circular lamp was mounted on a 10" × 10"

CAUTION

Persons subject to epileptic seizures should not watch this—or any other—pulsating light display. Nobody should stare at this—or any other light display—for long periods of time.

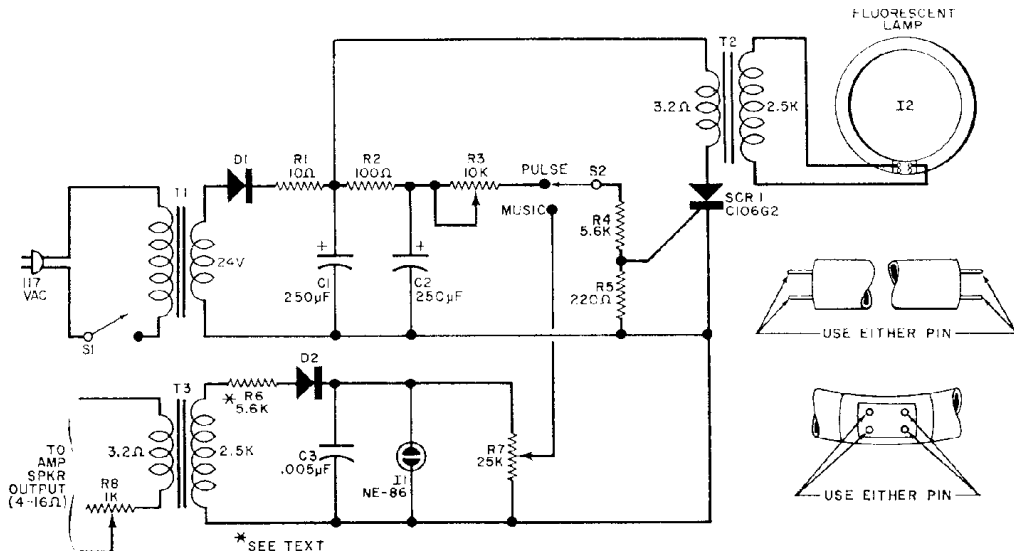


Fig. 1. To protect the amplifier, the value of R6 can be increased when driving the PPFL from a very high signal level. Be cautious of the lamp driving leads when the system is operating, as you can get quite a jolt when the SCR fires. The entire music portion can be eliminated for plain blinking.

PARTS LIST

- C1, C2—250- μ F, 50-volt minimum, electrolytic capacitor
 C3—0.005- μ F capacitor
 D1, D2—1-ampere, high-voltage silicon diode rectifier
 J1—NE-86 neon lamp (don't use NE-2)
 J2—Fluorescent lamp
 R1—10-ohm, 1-watt resistor
 R2—100-ohm, 2-watt resistor
 R3—10,000-ohm potentiometer
 R4—5600-ohm, $\frac{1}{2}$ -watt resistor
 R5—220-ohm, $\frac{1}{2}$ -watt resistor
 R6—5600-ohm, 1-watt resistor (see caption)
 R7—25,000-ohm potentiometer (see text)
 R8—1000-ohm potentiometer
 S1—S.p.d.t. switch

- S2—S.p.d.t. switch
 SCR1—C106G2 silicon controlled rectifier (G-E)
 T1—117-volt to 24-volt step-down transformer (Knight 54F4710 or similar)
 T2, T3—3.2-ohm to 2500-ohm output transformer (Knight 54F2063 or similar)
 Misc.—Chassis for electronics, mounting for lamp, lamp pin connectors (2), line cord, insulated hookup wire, mounting hardware, etc.
 Note—A complete kit of parts containing everything but the fluorescent lamp and including a steel wall-mounting box is available for \$34.90 or having a drilled and punched aluminum front panel for use with your own wooden case for \$30.90. Order from Lyman E. Greenlee, P.O. Box 1036, Anderson, Ind. 46015. Postage paid in continental U.S. No overseas orders, please.

piece of aluminum having four wooden supports fixed to the aluminum sheet. Since there are only two connections to the lamp, the circuit may be mounted in a conventional metal box with the lamp as a separate fixture.

Once the method of construction has been determined, wire the circuit point-to-point using multi-lug terminal strips to support the various components. To avoid thermal damage, use a heat sink on the leads when soldering the semiconductors. A long-nose plier is good for this purpose.

The connections to the fluorescent lamp pins can be simplified by attaching metal connector sleeves to the ends of the wires leading to the lamp and sliding the sleeves over one set of lamp terminals.

If the lamp is to be used anywhere but in a private home, it must be mounted in a metal case to avoid fire hazards and protect against accidental shocks. Some means of protecting the relatively fragile fluorescent lamp against accidental breakage must also be used. This can be accomplished by putting a metal screen around the lamp, by installing it in a protected commercial fixture, or by putting it in a ceiling-type fixture.

Operation. Almost any type of lamp can be used in the PPFL, even some that might not work in a conventional fixture. There will be some blackening of the ends of the tube with use, but this is normal when pulse operation is used. Some types of fluorescents work better than others.

HOW IT WORKS

In the pulse mode of operation, transformer *T1* steps the commercial 117-volt line power down to 24 volts. This is rectified by *D1* and filtered by *R1*, *C1*, *R2*, and *C2* to produce about 45 volts into an open circuit.

When *SCR1* is not conducting, it blocks power to the primary of *T2*, a step-up transformer. As *C2* charges, the voltage on the SCR gate circuit (*R3*, *R4*, *R5*) builds up. When this voltage reaches the required level, the SCR fires and *C1* is discharged across the primary of *T2*. The high-current pulse in the primary of *T2* produces a high-voltage pulse in the secondary which is sufficient to flash the fluorescent lamp. Capacitor *C2* is also discharged during this interval, but it discharges at a slow rate through *R2*. This increases the pulse width and allows *T2* to saturate and provide a stronger voltage pulse to the lamp.

Since the voltage across *C1* drops almost to zero when it fires, *SCR1* returns to its non-conductive state after the pulse and the cycle is repeated. The flashing rate is determined by the setting of potentiometer *R3*.

When the system is in the MUSIC mode of operation, the trigger voltage for *SCR1* is derived from a step-up transformer *T3*. A rectifier-filter network is composed of *R6*, *D2*, and *C3* while neon lamp *I1* acts as a voltage regulator. The NE-86 neon used here incorporates a radioactive (non-dangerous) tracer so that it will strike at a lower voltage than a conventional NE-2. Potentiometer *R7* is used to adjust the firing level, while *R8* adjusts the input level to prevent a high-power amplifier from damaging transformer *T3*.

Check the circuit for possible wiring errors before applying the a.c. power. Place *S2* in the PULSE position and allow a few moments for the two electrolytic capacitors to charge up. The lamp should

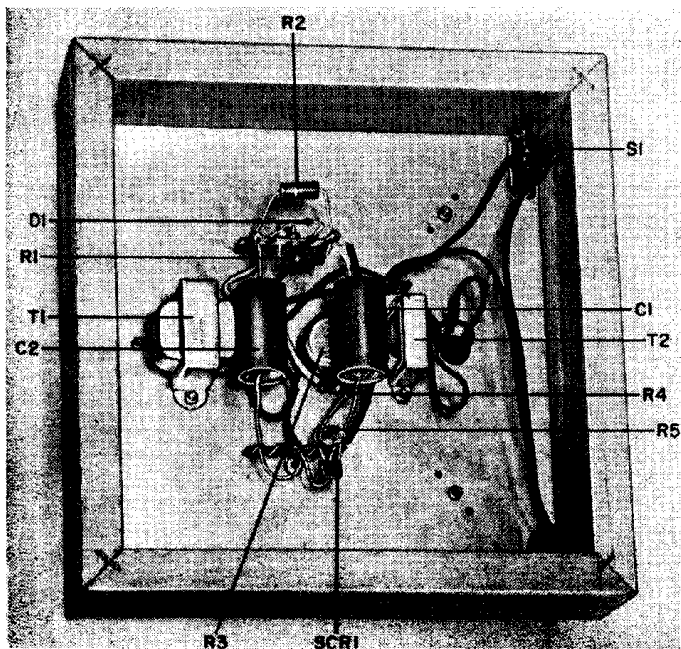
then start pulsing at a rate determined by the setting of potentiometer *R3*.

Place *S2* in the MUSIC position, and connect the audio input line to the output terminals of the audio amplifier or radio being used as the audio source. Set potentiometer *R8* to its maximum resistance, and set *R7* at its halfway mark. With the audio source set to the desired output level, slowly adjust *R8* and *R7* to get a flashing indication of the lamp. Use the maximum value of *R8* with the amplifier operating at normal level and adjust *R7* for the best trigger. If you want to simplify things a little, substitute a pair of 10,000-ohm resistors in series for *R7* and take the trigger voltage from the center connection.

If you want to flash a 4' fluorescent, change *T2* to a transformer with an impedance ratio of 3.2 to 10,000 ohms. For an 8' fluorescent or a string of fluorescent lamps in series, use an automobile ignition coil for *T2*. (Do not use the ballast resistor that is associated with the ignition coil in the car.)

Do not handle the lamp leads while the circuit is operating as you can get quite a jolt when the lamp fires. This means the PPFL should be protected or safely out of the way where children are concerned.

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The author's PPFL before installing the music portion. The added components can be fitted into one of the empty corners. It is not necessary to mount the fluorescent lamp on this chassis, and almost any type of lamp holder will suffice. Just make sure that the lamp cannot be accidentally broken.

“Build the PPFL” (August 1969). The silicon controlled rectifier called for in the Parts List is a General Electric Type C106G2. General Electric has discontinued this model. In this project, and in most others where the C106G2 is called for, General Electric’s Type C106A2 can be substituted. It is readily available from Allied Radio—and many other suppliers—at a price slightly above \$1.00.