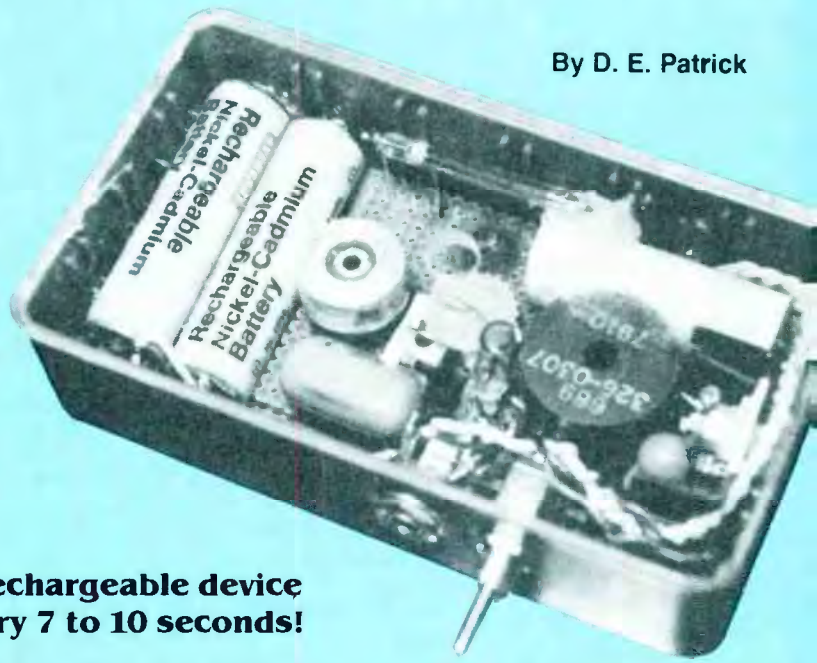


# POCKET SAFETY FLARE

By D. E. Patrick



**Powered by two AA cells, this rechargeable device fires off a xenon flash tube every 7 to 10 seconds!**

IMAGINE YOURSELF DRIVING DOWN A BUSY HIGHWAY IN the middle of a dark, dreary, rainy night. Suddenly your car gives up the ghost! A tire blows, water hose splits, fan belt breaks, or the motor just sputters to a quiet death—just about any fault will end you on the shoulder; or worse, on the highway! Now, turn on the flashers or blinkers (if your battery will let you), and step out into no man's land with other cars whizzing by.

*How safe do you feel?*

Well, maybe you're better prepared than most. You get out the old strike-type flares and reflective triangles, placing them so another vehicle won't slam into either you or your car. But if you're not that well prepared, a slow creeping fear grips your guts, when the flash of a too close truck's headlights blind you for a second, disappearing into the night.

*Now how do you feel?*

Then again, maybe the horrifying thought of one of those high-speed, gas or diesel projectiles scattering what's left of you and your car all over the concrete slab you're standing on

hasn't hit home. Who's to say? Some idiots have run right up the rear end of a parked police car, *whirling cherries* and all, at full tilt! Will it be your turn next?

So, you start around the car, lift the hood and stare into even more darkness, as the cars going by seem to be getting closer and closer with each pass.

Where's that flashlight? You fumble with it, fight with it, and finally slap it around till it lights up. If it lights at all, maybe you'll start to feel a little better. If it doesn't light, you feel instantly worse. But no matter what, the thought of a high-flyer slamming into your car's rear never leaves your mind.

Now snap out of it—it doesn't *have* to be that way. Consider building the battery-powered Pocket Safety Flare, which you can place on top of your car when you get out. It provides a bright flash that can be seen at great distances, while not so bright it destroys another driver's night vision. The bright flashes emitted will illuminate both you and your car and all of a sudden you won't be in the dark any more. You'll have a

## PARTS LIST FOR POCKET SAFETY FLARE

### SEMICONDUCTORS

- D1—1N4002 rectifying diode
- D2—1N4005 rectifying diode
- LED1—20-mA light-emitting diode with maximum current of 50 mA
- Q1—TCG-152 NPN silicon transistor (SK-3041 or equivalent)
- SCR1—Silicon controlled rectifier (GE C106D1 or GE C107D1)

### RESISTORS

- R1—100-ohm, 1/2-watt
- R2—330-ohm, 1/2-watt
- R3—1.2-Megohm, 1/4-watt
- R4—5-Megohm, linear-taper, trimmer potentiometer

### CAPACITORS

- C1—100- $\mu$ F, 10-WVDC tantalum
- C2—4- $\mu$ F, 250- to 400-WVDC, electrolytic or film
- C3—.022- $\mu$ F, 500- to 600-WVDC, mylar, disc, or ceramic

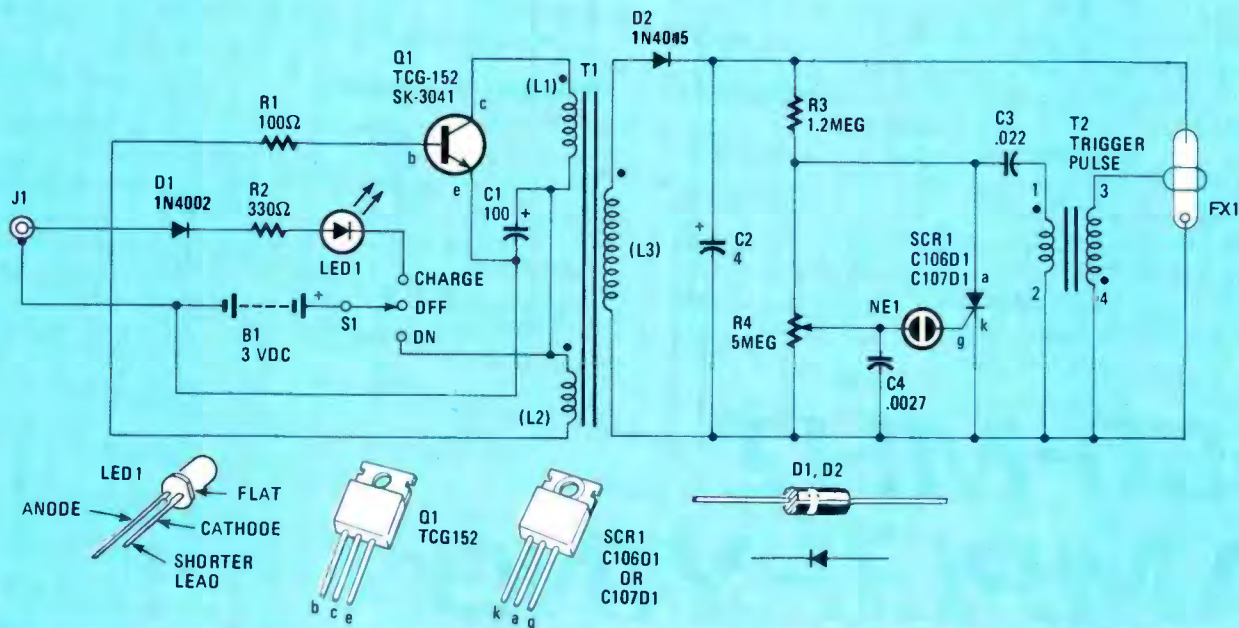
- C4—.0027- $\mu$ F, 200-WVDC, disc, mylar, or film

### ADDITIONAL PARTS AND MATERIALS

- B1—AA Ni-Cd cells—2 required
- FX1—Xenon flash tube (ETC 11510 or any 5-watt flash tube)
- J1—Phono jack
- NE1—Neon lamp (NE2 or equivalent)
- S1—SPDT toggle switch with center-off position
- T1—Potted ferrite transformer (ETC 11516)
- T2—Trigger-pulse transformer (ETC 11501 or Radio Shack 272-1146)
- Plastic case, clear plastic cover, perfboard or printed-circuit materials, RV cement, wire, solder, hardware, etc.

### KIT OF PARTS

A complete set of parts is available from Electronic Technical Consultants, PO Box 29278, Denver, CO 90229 for \$35.00 postpaid.



safety flasher that illuminates, attracts attention, and wards off bad spirits, especially those drivers with lots of bad spirits sloshing around inside.

Instead of red blinkers, flashers, or whirling gumballs which seem to have the nasty habit of attracting drunks like flies to sour mash. Light-sensitive night drivers will avoid flashing strobes as a vampire would avoid sunlight. Thus, while not a 100% sure thing, the Pocket Safety Flare beats standing around in the dark, wishing for the best and fearing the worst. Further, the Pocket Safety Flare can be used by bikers, pedestrians, et al. Use of the the Pocket Safety Flare is better than cursing the darkness.

### How the Circuit Works

In Fig. 1, two Ni-Cd AA cells provides about 3-volts DC to the circuitry when S1 is in the ON position and the optional trickle charger LED1, R2, and D1 are not in circuit. The AA cells will provide over two hours of continuous operation, albeit that time may be increased by using C or D cells.

In any case, when S1 is on, power is applied to an oscillator composed of Q1, R1, C1, L1, and L2. Coil L1 is the primary winding of T1, and L2 is the feedback winding. When Q1 turns on, its collector current saturates T1's ferrite core. That, in turn, removes the base drive to Q1 through L2. Transistor Q1 then turns off. As the field around L1 and L2 decays, Q1 will eventually turn on again, and the cycle repeats over, and over.

Transformer T1 is a step-up, ferrite-core, potted-type unit (see the Parts List), whose secondary-winding (L3) output is rectified by D2 and filtered by C2. That capacitor charges up to around 250 to 300 volts, which is applied to the resistor divider composed of R3 and R4, along with the flash tube FX1. Capacitors C3 and C4 will charge up to around 200 and 100 volts, respectively, through R3 and R4, respectively. Flash rate is adjustable via R4.

When the charge on C4 gets to around 100 volts, neon lamp NE1 fires discharging C4 into the gate circuit of silicon control rectifier SCR1. Then SCR1 turns on discharging C3 into the primary winding of trigger-pulse transformer T2. Transformer T2 is another step-up, pulse-type unit (see the Parts List) providing an output of around 4 kW across trans-

former T2's secondary winding. The xenon gas inside FX1 is ionized and a bright flash is emitted. Finally, C3 quickly discharges through L4, and the cycle repeats over, and over.

The trickle charger can be plugged into the car's cigarette lighter, or wall outlet at home, via a 12-volt DC battery eliminator. Twelve volts is applied through D1 to prevent polarity reversal to R2, a current limiter, and LED1. The function of LED1 is to indicate when the Pocket Safety Flare is charging. That circuit should have a maximum charging current of around 50 mA. It will also act as a fast-acting fuse if large currents are pulled thru it. Thus, if R2 shorted in the charger circuit, LED1 would open. In any case, R2 will determine the current applied, which in this case is around 20 to 30 mA.

Another possible configuration is to run the Pocket Safety Flare directly off the car's battery. But that defeats the stand-alone portability inherent in the unit's design. It may, however, be added as another optional feature with suitable dropping resistors and another switch position, if desired.

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**CONSTRUCTION** of the Pocket Safety Flare is in a flat plastic chassis case with a clear plastic cover. Hole in plastic cover permits adjustment of flash-rate potentiometer R4.

# ELECTRONIC LIGHT FLASHER

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in mind that you will be working with AC line-voltage here, so extra care should be taken (use insulated wire of appropriate gauge, etc.). We also strongly recommend that the circuit board and AC receptacle be placed in an chassis box.

The DC voltage required by the circuit can be obtained from batteries or from an AC-to-DC adapter wired into the 117-volt AC side of the circuit.

OK, you are all set to connect the Electronic Light Flasher to a resistive load. Try not to exceed the current rating of the Triac you use. Also, inductive loads play havoc with circuits of this type, so avoid their use. The inductive kick during "switch-off" produces current spikes way in excess of the device's current and voltage safe ranges. ■