

## Christmas Flasher

Fig. 1 shows a versatile LED flasher circuit which may be used to make a variety of nice Christmas decorations. This configuration can give a long delay with smaller capacitors than other flashers but the 2N4403 will not "saturate" so a few volts will remain across the circuit during the flash. Although LEDs with built-in flashers are available, their duty cycle is fairly high and the battery life will be shorter than with this circuit.

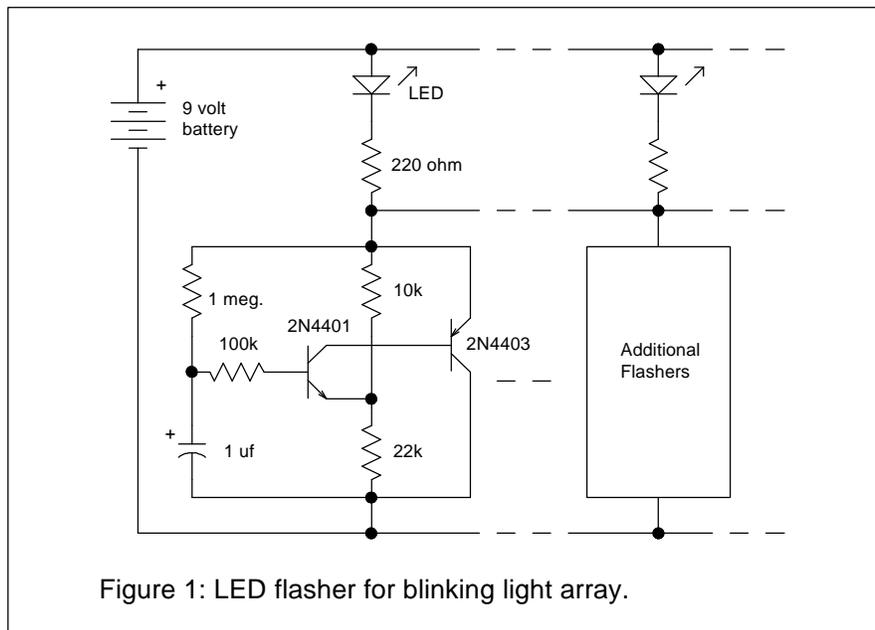
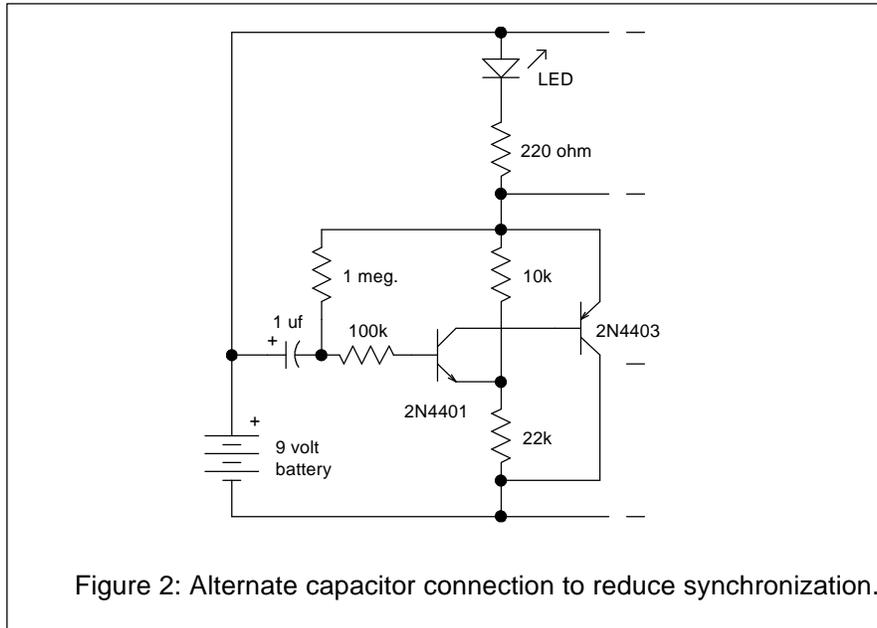


Figure 1: LED flasher for blinking light array.

The circuit is shown as a "two-wire" flasher which is simply connected in series with the load but a slight modification might prove more satisfactory when several lamps will be operated from the same battery. When the battery begins to lose its charge and its series resistance increases, the lights may tend to synchronize. By connecting the capacitor to the positive terminal of the battery instead of the negative as shown in fig.2 the sudden voltage drop caused by other flashers will not tend to trigger the circuit.



A nice Christmas surprise can be constructed by building about five blinkers into a small, red felt stocking. Decorate the stocking with a glitter Christmas tree and poke the LEDs through holes in the stocking to light the tree. The battery can be dropped to the bottom of the stocking and held in place with a wad of paper. Glue a heavy piece of paper over the circuitry on the inside of the stocking to protect the wiring. The circuit will run for many days so it can be sent to Grandma and Grandpa with the battery installed and the lights twinkling.



This flasher circuit is an excellent addition to the experimenter's bag of tricks because it offers a surprising level of performance for its simplicity. For example, increase the 1 megohm charging resistor up to 100 megohms (5, 22 megohms in series), increase the discharge resistor from 100k up to 1 megohm, and reduce the capacitor down to 0.01 uf and the circuit will flash an LED at about one flash per second. That's pretty slow for only 0.01uf. Increase the capacitor to 1uf (non-electrolytic) and the delay will reach 100 seconds. High gain transistors are best for this circuit and an MPSD-54 or similar PNP darlington is a great choice for the output transistor when driving higher current loads. Electrolytic capacitors may be used in this circuit but they often exhibit a little leakage so charging resistor values below 1 megohm are recommended.