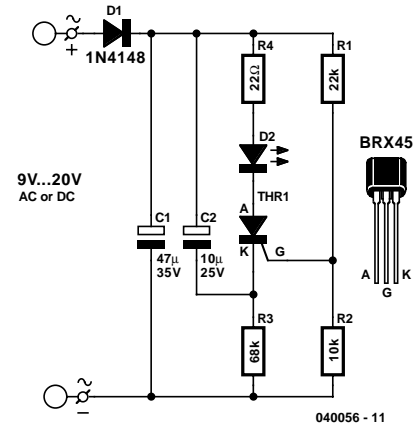


# Unusual LED Blinker



## Robert Edlinger

This LED blinker manages with only a few components and is dimensioned to operate from an ac supply in the range of 4–16 V (6–24 V dc). As its current consumption is less than 1 mA, it's also suitable for long-term battery-powered operation. It thus offers several advantages in various applications, compared with using the well-known 555 timer IC as an astable multivibrator. Depending on the values of the timing components, the blinking rate ranges from 1 to 1.5 Hz. Although the duration of each blink is only a few milliseconds, a high brightness level is achieved by using a relatively high LED current. There are numerous potential applications for this circuit in model railway systems, in both stationary

and moving equipment.

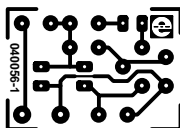
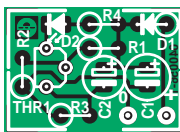
An small, inexpensive thyristor serves as an oscillator. Voltage divider R1/R2 holds the voltage on the gate lead (G) to approximately 20 % of the supply voltage. Capacitor C2 charges via R3. This causes the voltage on the cathode (K) to drop until it is around 0.5 V to 1 V below the gate voltage (depending on the thyristor type), at which point the gate current is sufficient to trigger the thyristor. Capacitor C2 then discharges via the cathode-anode junction, R4 and the LED. The only purpose of R4 is to limit the LED current to a permissible value. After C2 has discharged, the cathode-anode junction is again cut off, since the resistance of R3 is so high that the sustaining current level (which is less than 5 mA for the BRX45–57 family) is not achieved. The

next blink cannot occur until C2 has again charged.

The blinking rate can be adjusted over a wide range by varying the values of R3 and/or C2. The listed thyristor is recommended for use in this circuit due to its high gate current sensitivity (<0.2 mA). Practically any model railway transformer or bell transformer can be used as a power source. A half-wave rectifier and small filter capacitor are adequate for rectifying the supply voltage.

The components can be fitted to a small printed circuit board or a small piece of perforated board. The blinker can also be powered from a dc source (5–24 V). In that case, D1 provides reverse-polarity protection.

(040056-1)



## COMPONENTS LIST

### Resistors:

R1 = 22k $\Omega$   
R2 = 10k $\Omega$   
R3 = 68k $\Omega$   
R4 = 22 $\Omega$

### Capacitors:

C1 = 47 $\mu$ F 35V  
C2 = 10 $\mu$ F 25V

### Semiconductors:

D1 = 1N4148  
D2 = low-current LED  
THR1 = BRX45

### Miscellaneous:

PCB, order code 040056-1 from The PCBShop