

APPLICATION NOTE - NE555 TIMER CIRCUIT

The NE555 timer IC is widely used in tower light controllers as the oscillator for flashing the beacon lights. The output frequency and duty cycle are controlled by two resistors and a capacitor and are independent of the supply voltage. The output can source or sink up to 200mA so it can be directly connected to most solid-state relays.

The formulas for determining the output characteristics are:

$$T1 = 0.000693(R1+R2)C \quad \text{<output high - beacon on>}$$

$$T2 = 0.000693(R2)C \quad \text{<output low - beacon off>}$$

R1 and R2 are in K Ω , C is in μ F, and T1 and T2 are in seconds

For the flash characteristics to be centered in the FAA tolerances, the periods should be T1 = 1.16 and T2 = 0.83 seconds. This gives a flash rate of 30 flashes per minute and a flash ratio of 0.6 (the beacon on time to total on and off time). Selecting a 10 μ F capacitor for C then:

$$1.16 = 0.000693(R1+R2)10$$

$$T1+T2 = 2 \text{ seconds} = 30 \text{ fpm}$$

$$0.83 = 0.000693(R2)10$$

$$T1/(T1+T2) = 0.6 = \text{flash ratio}$$

Solving for R2 yields 120 K Ω , and then solving for R1 yields 47 K Ω .

Figure 1 shows the NE555 schematic using these values. Depending on the type of solid-state relay used (normally open or normally closed) will determine if it is connected between the output and +V supply or ground. Normally closed relays are sometimes used to keep the beacon on if drive to the relay is lost.

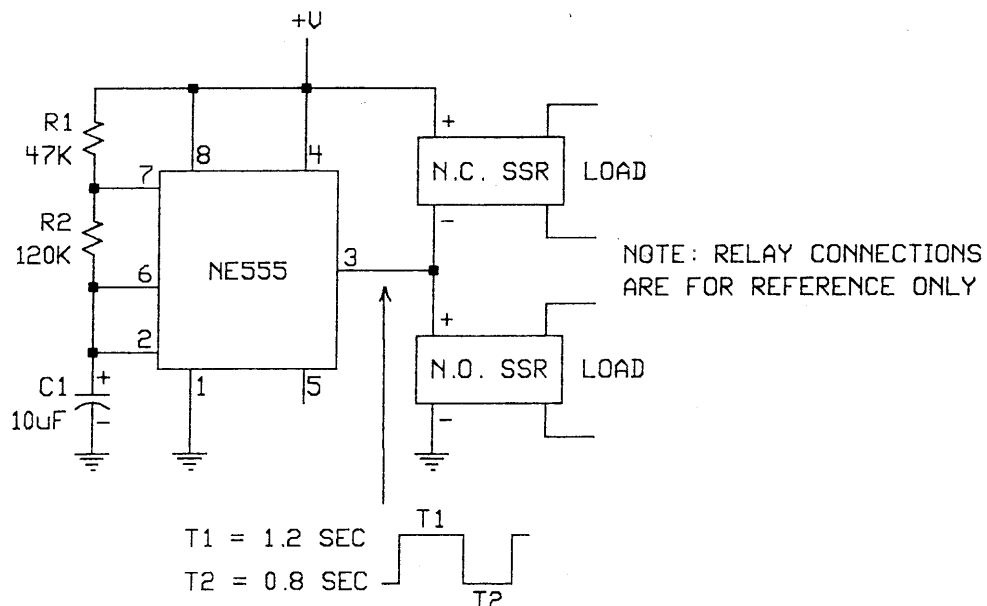


FIG. 1 - TIMER SCHEMATIC FOR 30 FPM AND FLASH RATIO OF 0.6