

Electrical Candle Lamp

Shreya Suresh Dhamake

Student

Department of Information Technology

Shared Institute of Technology Polytechnic Yadrav (Ichalkaranji), India

Corresponding Author's E-mail: shreyadhamake0@gmail.com

Abstract

An electric light is a device that produces visible light from electric power. It is the most common form of artificial lighting and is essential to modern society, providing interior lighting for buildings and exterior light for evening and night time activities. In technical usage, a replaceable component that produces light from electricity is called a lamp. Lamps are commonly called light bulbs; for example, the incandescent light bulb. Lamps usually have a base made of ceramic, metal, glass, or plastic, which secures the lamp in the socket of a light fixture. The electrical connection to the socket may be made with a screw-thread base, two metal pins, two metal caps or a bayonet cap.

The three main categories of electric lights are incandescent lamps, which produce light by a filament heated white-hot by electric current, gas-discharge lamps, which produce light by means of an electric arc through a gas, such as fluorescent lamps, and LED lamps, which produce light by a flow of electrons across a band gap in a semiconductor.

Keywords: LED Lamps, Lighting for Buildings, Flow of Electrons

INTRODUCTION

Flickering effect: Basically, its impression on steadiness of visual sensation induced by a light source whose luminance or spectral distribution fluctuates with

time. It applies to cyclic variation of light intensity resulting from fluctuation of the supply voltage, which, in turn, can be caused by disturbances introduced during power generation, transmission or

distribution. However, flicker is typically caused by the use of large loads having rapidly fluctuating active & reactive power demand. The phenomenon of flickering in light sources has been an issue since the beginning of power distribution systems. We have done this project due to the very good performance of the circuit related to the low power consumption of light. Also, it is having variable pots for varying the intensity of the bulb. By adjusting the pot, we can use the bulb for several purposes.

WORKING PRINCIPLE

Here is a simple circuit that can produce the effect of candle light in a normal electric bulb. A candle light, as well known, resembles randomly flickering light. So, the objective of this project activity is to produce randomly flickering light effect in an electric bulb.

To achieve this, the entire circuit can be divided into 3 parts. The first part comprises

IC1(555), IC2(74LS164), IC3(74LS86), IC4(74LS00) and the associated components. These generate randomly changing train of pulses.

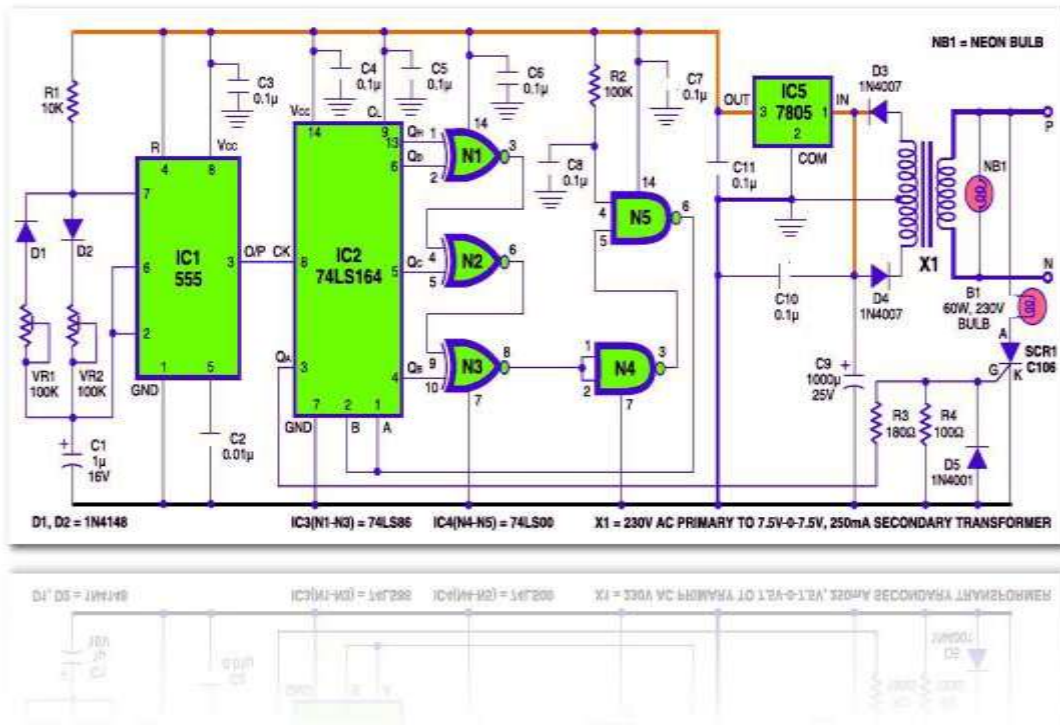
The second part of the circuit consists of SCR1 (C106), an electric bulb connected

between anode of SCR1 and mains live wire, and. The third part is the power supply cut to generate regulated 5V DC from 230V AC for random signal generator. It comprises a step down transformer (X1), full wave rectifier (diode D3, D4), filter capacitor (C9), followed by a regulator (IC 5).

The random signal generator of the circuit is built around an 8-bit serial in/parallel out shift register (IC 2). Different o/p of the shift register IC pass through a set of logic gates (N1 through N5). And final o/p appearing at pin 6 of gate N5 is fed back to I/p of pin 1&2 of IC 2. The clock signal appears at pin 8 of IC2, which is clocked by an astable multivibrator configured around timer (IC 1). The clock frequency can be set using preset VR1 & VR2. It can be set around 100 HZ to provide better flickering effect in the bulb. The random signal triggers the gate of SCR1.

The electric bulb gets AC power only for the period for which SCR1 is fired. SCR1 is fired only during the positive half cycles only. Conduction of SCR1 depends upon the gate triggering pin 3 of IC2, which is random. Thus, we see a flickering effect in the light o/p.

BLOCK DIAGRAM



Component List

a) IC'S

IC 555,
IC 74LS164,
IC74LS86,
IC74LS00,
IC 7805.

b) RESISTERS

R1=10K,
R2=100K,
R3=180 ohm,
R4=100 Ohm.

c) POT

VR1=100 K,
VR2=100 K.

d) DIODES

D1,D2,D3,D4=1N4007.

e) CAPACITORS

C1=1Uf, 15v,
C2=0.01Uf,
C3, C4,C5,C6,C7,C8,C10,C11=0.1UF,
C9=1000Uf, 25v.

STEP DOWN TRANSFORMERS (X1),
SCR1(C106)

IC'S SPECIFICATIONS

A. IC 555

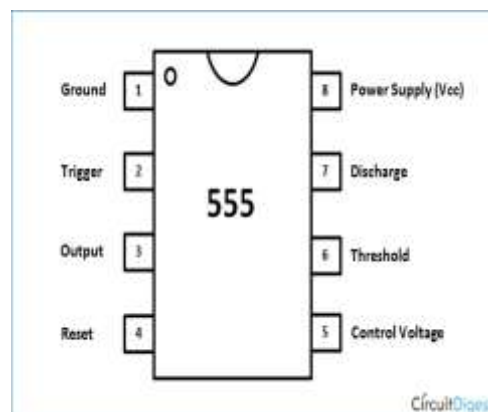
The IC 555 has three operating modes:

1. *Bistable mode or Schmitt trigger-* the 555 can operate as a flip-flop, if the

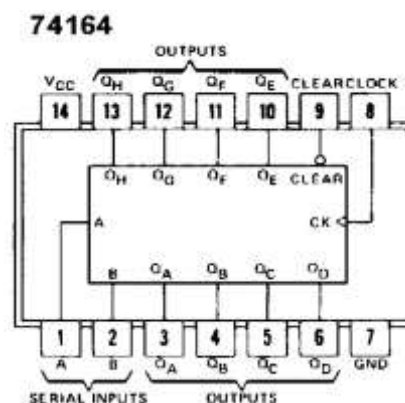
DIS pin is not connected and no capacitor is used. Uses include bounce-free latched switches.

2. *Monostable mode* - in this mode, the 555 functions as a "one-shot" pulse generator. Applications include timers, missing pulse detection, bounce-free switches, touch switches, frequency divider, capacitance measurement, pulse-width modulation (PWM) and so on.
3. *Astable (free-running) mode*- the 555 can operate as an electronic oscillator.

Uses include LED and lamp flashers, pulse generation, logic clocks, tone generation, security alarms, pulse position modulation and so on. The 555 can be used as a simple ADC, converting an analog value to a pulse length (e.g., selecting a thermistor as timing resistor allows the use of the 555 in a temperature sensor and the period of the output pulse is determined by the temperature). The use of a microprocessor-based circuit can then convert the pulse period to temperature, linearize it and even provide calibration means.



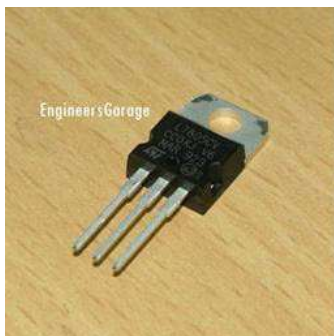
IC 74LS164



The SN54/ 74LS164 is a high speed 8-Bit Serial-In Parallel-Out Shift Register. Serial data is entered through a 2-Input AND gate synchronous with the LOW to HIGH transition of the clock. The device features an asynchronous Master Reset which clears the register setting all outputs LOW independent of the clock. It utilizes the Schottky diode clamped process to achieve high speeds and is fully compatible with all Motorola TTL products.

- Typical Shift Frequency of 35 MHz
- Asynchronous Master Reset
- Gated Serial Data Input
- Fully Synchronous Data Transfers
- Input Clamp Diodes Limit High Speed Termination Effects
- ESD > 3500 Volts

IC 7805



DESCRIPTION/ORDERING INFORMATION

This series of fixed-voltage integrated-circuit voltage regulators is designed for a wide range of applications.

These applications include on-card regulation for elimination of noise and distribution problems associated with single-point regulation. Each of these regulators can deliver up to 1.5 A of output current. The internal current-limiting and thermal-shutdown features of these regulators essentially make them immune to overload. In addition to use as fixed-voltage regulators, these devices can be used with external components to obtain adjustable output voltages and currents, and also can be used as the power-pass element in precision regulators.

ADVANTAGE

- Low power consumption.
- Easy to operate.
- Adjustable intensity.
- Higher illumination.

DISADVANTAGES

- More expensive.
- Circuit is complex.

APPLICATIONS

- Used in home applications.
- By varying the potentiometer (pot) we can use the lamp as zero bulb as well as a high intensity bulb.

CONCLUSION

From this project, we came to know the FLICKERING EFFECT, by using this effect. We can consume the power .By adjusting the pot; we can control the intensity of bulb. This circuitry is also known as ELECTRONIC CANDLE LAMP because this circuit gives. The effect of candle using flickering effect.

REFERENCE

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