Electronic Street Light Switch

Oyndrila Roy [a], Aranyak Roy [b], Dr.Debasis Roy [b, c*]

a University of Engenering and Management, Kolkata, India.

b La MartiniereForBoys, Kolkata, India.

c Depart of Physics, Jadavpur University, Kolkata, India

.*Corresponding Author: debasis35@yahoo.co.in

Abstract— This project is all about to control the power consumptions at the streets and eliminating manpower. This includes controlling a circuit of street lights with specific Sensors and LDR during day and night. The street lights of our country sometimes remain on throughout the day even if there is sunlight and they remain off when there is no sunlight, because these lights are operated by certain people. Especially on highways, it is often seen that the lights are on throughout the day time even when there is sunlight and off in the night time when they are supposed to be on. This wastes a lot of valuable electrical energy in the day time, which could have been used for other purposes and it is also inconvenient for the vehicles and pedestrians on the road. Now the energy requirement is increasing day by day and its supply is declining. Hence it is wise to save electricity wherever possible. Our project is to save electricity by using a switch which automatically turns if off at sunrise and turns on at sunset. The automatic function saves electricity besides manpower.

Key words — Zener diode, capacitor, transistor, resistor, LDR, PCB, IC1 555.

1. Introduction

This project aims at saving maximum electrical energy and giving comfort to the people by switching 'on' the street lights only when there is no light , either due to sunset or due to the adverse weather condition or switching 'off' the street in the daytime. Thus the project saves lot of the energy every day. Street lights are the major requirement in today's life of transportation for safety purposes and avoiding accidents during night. Despite that in today's busy life no one bothers to switch it off/on when not required. The project introduced here gives solution to this by eliminating manpower and reducing power consumption.

2.1 Experimental

During daytime there is no requirement of street lights so the LDR keeps the street light off until the light level is low or the frequency of light is low the resistance of the LDR is high. This prevents current from flowing to the base of the transistors. Thus the street lights do not glow. As soon as the light level goes high or if light falling on the device is of high enough frequency, photons absorbed by the semiconductor give bound electrons enough energy to jump into the conduction band. The resulting free electron (and its hole partner) conduct electricity, thereby lowering resistance. Now the circuitry goes in on condition and the block diagram represented here starts working.

Broadly, the circuit can be divided into power supply and switching circuit. The switching circuit is built around light dependent resistor LDR1, transistor T1 through T3 and timer IC1. The resistance of LDR1 remains low in the day time and high at the night time. Timer IC1 is designed to work as an inverter. During daytime , light falls on LDR1 and transistor T1 and T2 remains cut off and hence IC1 remains low and the street bulbs does not glow.

At night, no light falls on LDR1 and transistor T1 and T2 conduct

and hence IC1 remains high and the street bulbs turned ‘on” and

glows.

2.2 Circuit diagram

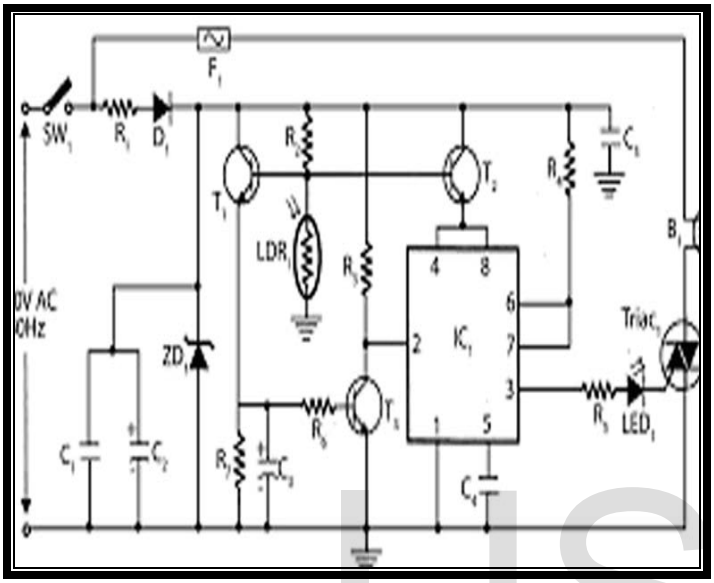

Figure 1: Circuit diagram of the Electronic street light switch.

Figure 2: Front view of the working model .

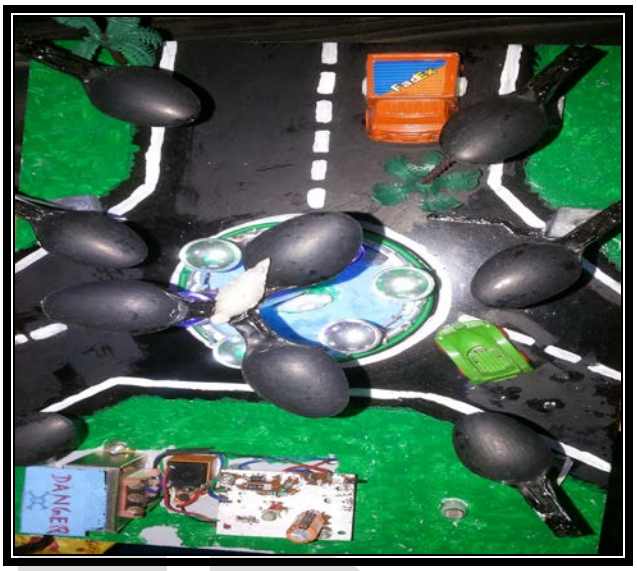

Figure 3: Top view of the working model.

3. Applications

1 Street lights,

2. Parking lights,

3. Garden lights.

3.1 Future Aspect

If the system has traffic speed sensors then this system can be used for traffic speed. If the average traffic speed is too fast during evening and night hours, this could be used to trigger a slight dimming of the streetlights. The level of dimming would be im-

perceptible to motorists but they would slow down, regardless, in response to the slightly diminished lighting. A five percent light reduction slows traffic but is not noticeable to motorists.

4. Conclusion

This project of ELECTRONIC STREET LIGHT SWITCH is a cost effective, practical, eco-friendly and the safest way to save energy. It clearly tackles the two problems that world is facing today, saving of energy and also disposal of incandescent lamps, very efficiently. According to statistical data we can save more than 40 % of electrical energy that is now consumed by the highways. Initial cost and maintenance can be the draw backs of this project. With the advances in technology and good resource planning the cost of the project can be cut down and also with the use of good equipment the maintenance can also be reduced in terms of periodic checks. The LEDs have long life, emit cool light, donor have any toxic material and can be used for fast switching. For these reasons our project presents far more advantages which can over shadow the present limitations. Keeping in view the long term benefits and the initial cost would never be a problem as the investment return time is very less. The project has scope in various other applications like for providing lighting in industries, campuses and parking lots of huge shopping malls. This can also be used for surveillance in corporate campuses and industries.

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