

# THE DESIGN AND CONSTRUCTION OF A POTABLE RECHARGEABLE LAMP WITH AUTOMATIC MECHANICAL MANUAL TIMER CONTROL SWITCH.

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**ABSTRACT:** A rechargeable lamp is a portable lighting device or mounted light fixture used to illuminate broad areas. Lamps may also be used for signaling, as torches, or as general light sources outdoors. Low light level varieties are used for decoration. The term "lamp" is also used more generically to mean a light source, or the enclosure for a light source. The design and construction of a potable rechargeable lamp was constructed to add more values to existent ones. The introduction of the automatic mechanical manual timer control switch which was introduced was serve as off and on switch , to make the rechargeable lamp valuable, durable, increase the efficiency and life span of the battery.

**Keywords:** automatic mechanical manual timer, rechargeable battery, LEDs.

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## INTRODUCTION

A lamp is a portable lighting device or mounted light fixture used to illuminate broad areas. Lamps may also be used for signaling, as torches, or as general light sources outdoors. Low light level varieties are used for decoration. The term "lamp" is also used more generically to mean a light source, or the enclosure for a light source. Examples are glass pane enclosed streetlights, or the housing for the top lamp and lens section of a lighthouse (Douglas, 2014). The introductions of the manual timer control switch which is introduced to serve as off and on, to make the rechargeable valuable, durable, increase the efficiency and life span of the battery. Lamps were used by the ancients in augury. The only known representation of an ancient Egyptian lamps probably is not much different from those spoken of by John the Evangelist in John 18:3 from the New Testament, where the party of men who went out of Jerusalem to apprehend Jesus in the garden of Gethsemane is described as being provided "with lamps and torches (Farago,1996). Lamps in ancient China were made of silk, paper, or animal skin with frames made of bamboo or wood. One of the earliest descriptions of lamp is found in records from Khorana, which describes a "mounting lamp" made of white paper (James et al., 1982). The simplest technology used is the candle lantern. Candles give only a faint light, and must be protected from wind to prevent flickering or complete extinguishment. A typical candle lamp is a metal box or cylinder with glass or mica side panels and an opening or ventilated cover on the top. A primitive form of candle lantern, made from white horn and wood and called a lanthorn, was first made in the time of the English king Alfred the Great (849–899) (James et al.,1982).

Decorative lamps exist in a wide range of designs. Some hang from buildings, while others are placed on or just above the ground. Paper lamps occur in societies around the world. Modern varieties often place an electric light in a decorative glass case. The ancient Chinese sometimes captured fireflies in transparent or semi-transparent containers and used them as (short-term) lamps. *Raise the red lamp*, a Chinese film, prominently features lamps as a motif. Lamps are used in many Chinese festivals. During the Ghost Festival, lotus shaped lamps are set afloat in rivers and seas to symbolic guide the lost souls of forgotten ancestors to the afterlife. During the Lamp Festival, the displaying of many lamps is still a common sight on the 15th day of the first lunar month throughout China. In Chinese festivities, the kongming lanterns can be seen floating high into the sky during festivities (Vishay,2008).

## METHODOLOGY

All the materials are locally purchase in Owo, Ondo State Nigeria and mounted on a circuit board according circuit diagram shows below

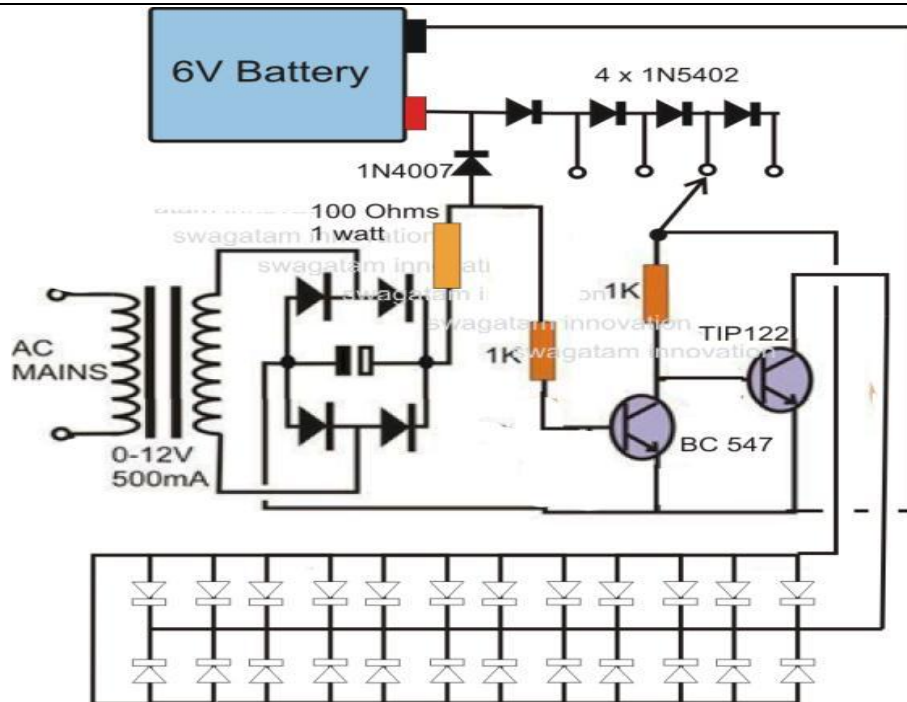


Figure 1: circuit diagram of rechargeable lamp. ([www.homemade-circuits.com/2011/12/how-to-make-efficient-led-emergency](http://www.homemade-circuits.com/2011/12/how-to-make-efficient-led-emergency))

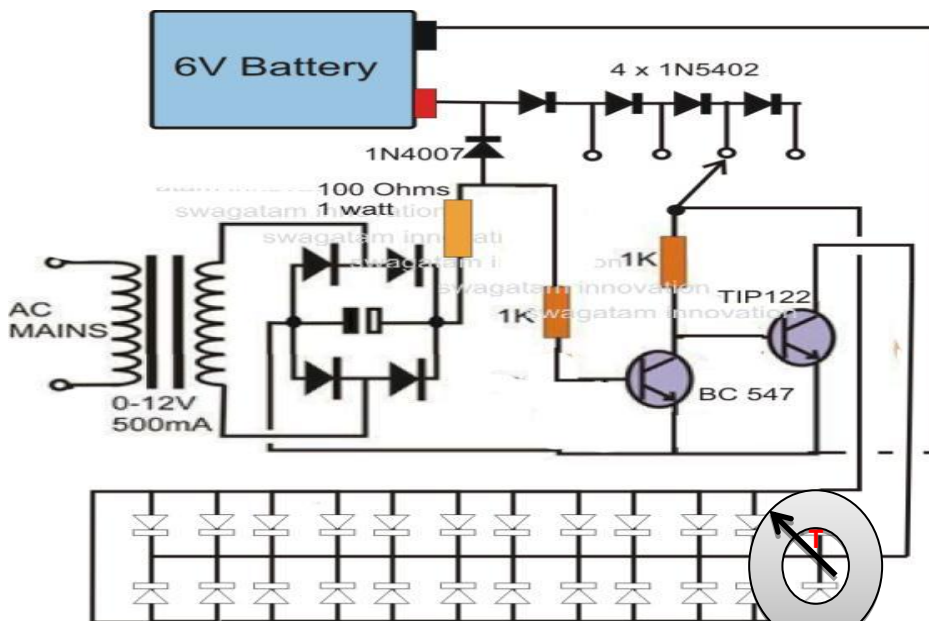


Figure 2: The modified rechargeable lamp circuit with automatic mechanical control switch.

### POWER SUPPLY UNIT

The power supply unit consists of a step down transformer of a value 240-9volt were connected to the four diodes which were connected back to back and front to front to the capacitor(100nf/50volt) and the capacitor convert the alternative current of 9voltage which is the output from the transformer to direct current. The positive were connected to the emitter of the transistor the negative was connected to 1k ohm resistor both positive and negative leg were connected battery terminal to charge the rechargeable battery.

The rectified output passes through an electrolytic capacitor to filter out the ripples. The resistor in this power supply unit was used as a current limiter (i.e. current limiting resistor) also an indicator which is a light emitting diode (LED) was used to indicate the presence of alternative current in the circuit.

### **CHARGING UNIT**

The charging unit of this circuit includes capacitor and also the battery when the battery is in the discharge state. It provides output voltage of 9volt, this output voltage drives the transistor and LEDs

### **AUTOMATIC MECHANICAL CONTROL TIMER**

The automatic mechanical control timer is connected in between collector terminal of TIP 122 transistor and the LED terminal.

### **LIGHT EMITTING DIODE CIRCUIT**

The circuit consist of 24 light emitting diode which were connected in parallel form to each other on a veroboard while all the positive terminal where connected to positive terminal of the timer and all negative terminals were connected to 1kohms resistor.

### **RESULTS AND DISCUSSION**

This rechargeable lamp works efficiently and the introductions of the automatic mechanical manual timer make this rechargeable more durable and expand the lifespan of the battery compare when compare with rechargeable lamp show in figure 1

### **CONCLUSION**

With introduction of automatic mechanical manual timer introduce shows that it prolong and extended the life span of both the rechargeable battery and LEDs.

### **REFERENCES**

- [1]. Douglas, W.H. (2013) Department of Electrical and Computer Engineering, University of Waterloo. Retrieved 2014-09-11
- [2]. Farrago, P.S. (2006) An Introduction to Linear Network Analysis, The English University Press Ltd pp 18-21
- [3]. James, H .H. Paul, N.L. (1982) Essentials of Electrical Circuit, Reston publishing Company pp 96-97
- [4]. Vishay, B.S.(2008) Basic of Linear Fixed Resistor Application page 34-37
- [5]. [www.homemade-circuits.com/2011/12/how-to-make-efficient-led-emergency](http://www.homemade-circuits.com/2011/12/how-to-make-efficient-led-emergency)