

A Sensor Based Usb Driven Lamp Using Computer Hardware Technology

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Abstract

The Universal Serial Bus (USB) is the chief source of data interaction between computer peripherals. The USB is used extensively to drive various devices like mouse, flash memory etc. Apart from that the USB have a direct current supply of 5 volts. By this knowledge the aim of this paper is to develop a circuit which can be supporting 5 volts which can drive the devices like a lamp in which white bright light emitting diodes can be placed.

Keywords: USB, LDR, sensor, transistor, lamp

1 INTRODUCTION

The ports of USB are used for communication. This port enables 5 volts direct current supply, due to which we can build various gadgets which works with this voltage power. We can build fans, torches, USB mug etc.

In our dissertation we realized a USB lamp. The purpose of our lamp is to provide uninterrupted viewing to the laptop keyboards and to the work at night or whenever the light in the room is poor.

2 COMPONENTS OF OUR LAMP

We have used various electronic components to build our lamp.

2.1 RESISTOR

A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element.

The current through a resistor is in direct proportion to the voltage across the resistor's terminals. This relationship is represented by Ohm's law:

$V=RI$, where I is the current through the conductor in units of amperes, V is the potential difference measured across the conductor in units of volts, and R is the resistance of the conductor in units of ohms. We are using a 220 ohms resistor.

2.2 LDR RESISTOR

Light Dependent Resistor (LDR) is a resistor whose resistance decreases with increasing incident light intensity; in other words, it exhibits photoconductivity. This LDR acts as a sensor in our lamp.

A photo resistor is made of a high resistance semiconductor. 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. We are using LDR resistor.

2.3 TRANSISTOR

A transistor is a semiconductor device used to amplify and switch electronic signals and electrical power. It is composed of semiconductor material with at least three terminals for connection to an external circuit. A voltage or current applied to one pair of the transistor's terminals changes the current through another pair of terminals. Because the controlled (output) power can be higher than the controlling (input) power, a transistor can amplify a signal. Today, some transistors are packaged individually, but many more are found embedded in integrated circuits. We are using a BC547 transistor.

2.4 USB CABLE

A USB cable will be used to provide power to our lamp. We can use any USB cable such that first end will be connected to the laptop and the second end we will be cutting to expose the four wires. We have to use only two wires namely red for positive current and the black for negative current.

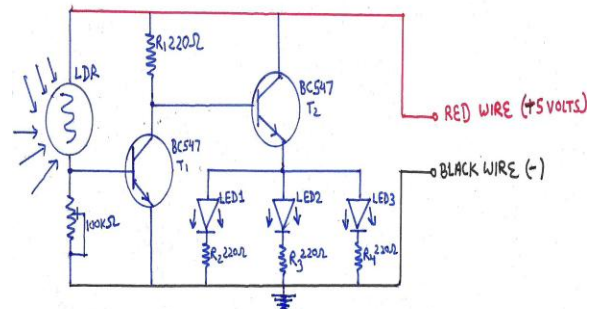
2.5 CIRCUIT BOARD

We use a circuit board for implementing our design. We place all the electronic components in the board and we solder these components by a soldering iron.

3 CIRCUIT DIAGRAM

Our circuit diagram consist of one Light Dependent Resistor, three Light Emitting Diodes(LED), two transistors BC 547, a variable resistor of 100 K ohm, four 220 ohm resistors,

red wire of USB cable for positive supply of 5 volts direct current, black wire of USB cable for negative terminal.



USB Lamp Circuit Diagram

4 CONCLUSION

The lamp which we build is different from what we are getting in the market because we have used an LDR (Light Dependent Resistor) which acts as a sensor. The sensor activates when there is less light available in the room where this lamp is placed.

5 FUTURE WORK

Our future work will be to enhance its functionality so that this lamp can be made operational by using battery system, so that the lamp does not get dependent on the USB power supply. We moreover want the lamp to be operating more than 5 volts supply.

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