

## Auto Night Lamp Using High Power Led

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### ABSTRACT :

Auto Night Lamp Using High Power LEDs is a circuit which turns ON the LED lights interfaced to it at night time and it turns OFF the lights automatically when it is day. Usage of LEDs is growing day by day due to the advantages they provide compared to the conventional filament bulbs or fluorescent lamps. They provide good quality of white light with a better intensity compared to others. They also consume less power compared to their alternatives. These are the advantages which the LEDs encourage us to use them compared to their alternatives. The working of turning on or off of high power LED's with light intensity. The element which is used for sensing light in the circuit is the light dependent resistor. The resistance of the light dependent resistor depends on the light incident on it. If the intensity of light incident on it is more, then the resistance of the circuit decreases. If the intensity of light incident on it decreases, then the resistance of the device increases. We are making use of this property of the light dependent resistor to detect the light and thereby operate the LED'S.

### INTRODUCTION:

This circuit automatically turns on a night lamp when bedroom light is switched off. The lamp remains 'on' until the light sensor senses daylight in the morning. A yellow LED is used as the night lamp. It gives bright and cool light in the room. When the sensor detects the daylight in the morning, a melodious morning alarm sounds. The circuit utilizes light-dependent resistors (LDRs) for sensing darkness and light in the room. The circuit is designed around the popular timer IC NE555, which is configured as a monostable. NE555 is activated by a low pulse applied to its trigger pin 2. Once triggered, output pin 3 of NE555 goes high and remains in that position until timer is triggered again at its pin 2. The musical tone of the alarm is generated by UM66 IC. generated by UM66 IC.

### BASIC COMPONENTS

- IC NE555N
- LIGHT DEPENDENT RESISTOR.
- MUSIC GENERATOR UM66. 8Ω,
- 4.5W SPEAKER
- RESISTORS 220Ω, 560Ω, 580Ω, 1k, 120k, 150 k.
- LIGHT EMITTING DIODE.
- ZENER DIODE.
- TRANSISTOR BC
- CAPACITOR 0.01μF

## THEORY

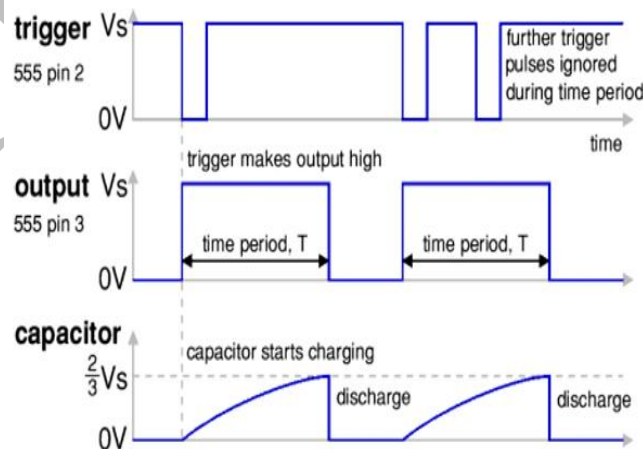
- This circuit automatically turns on a night lamp when bedroom light is switched off. The lamp remains 'on' until the light sensor senses daylight in the morning. A super-bright white LED is used as the night lamp. It gives bright and cool light in the room. When the sensor detects the daylight in the morning, a melodious morning alarm sounds.
- The circuit is powered from a 6V DC supply.
- The circuit utilizes light-dependent resistors (LDRs) for sensing darkness and light in the room. The resistance of LDR is very high in darkness, which reduces to minimum when LDR is fully illuminated. LDR1 detects darkness, while LDR2 detects light in the morning.
- The circuit is designed around the popular timer IC NE555 (IC2), which is configured as a monostable. IC2 is activated by a low pulse applied to its trigger pin 2. Once triggered, output pin 3 of IC2 goes high and remains in that position until IC2 is triggered again at its pin 2.
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## MONOSTABLE MODE

The output pulse ends when the voltage on the capacitor equals  $2/3$  of the supply voltage. The output pulse width can be lengthened or shortened to the need of the specific application by adjusting the values of R and C. The output pulse width of time  $t$ , which is the time it takes to charge C to  $2/3$  of the supply voltage, is given by

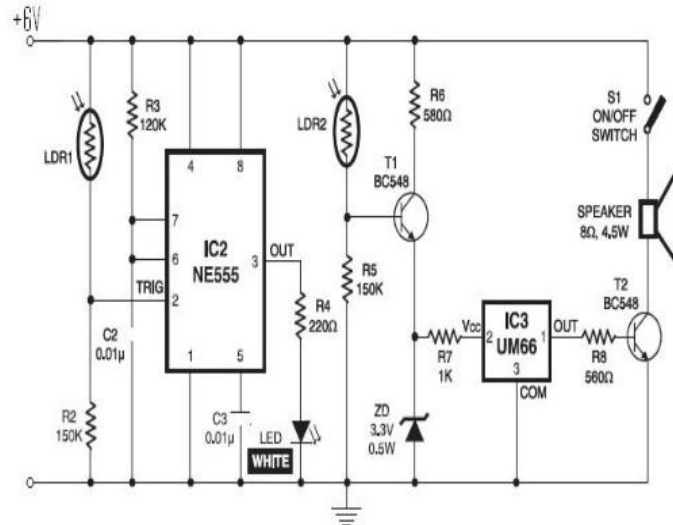
$$t = RC \ln(3) \approx 1.1RC$$

Where  $t$  is in seconds, R is in ohms (resistance)

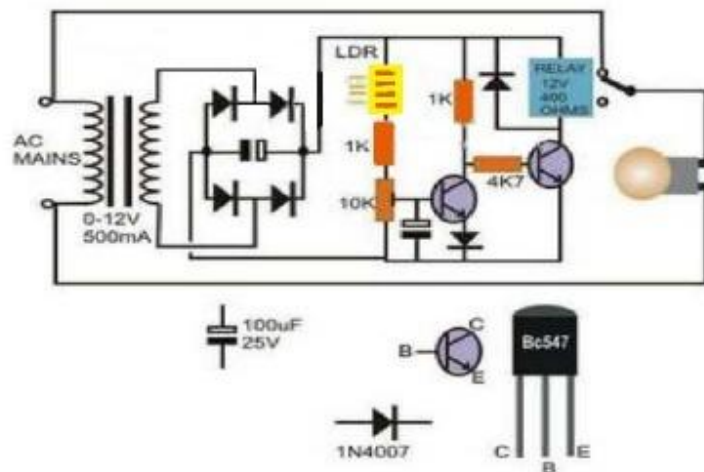


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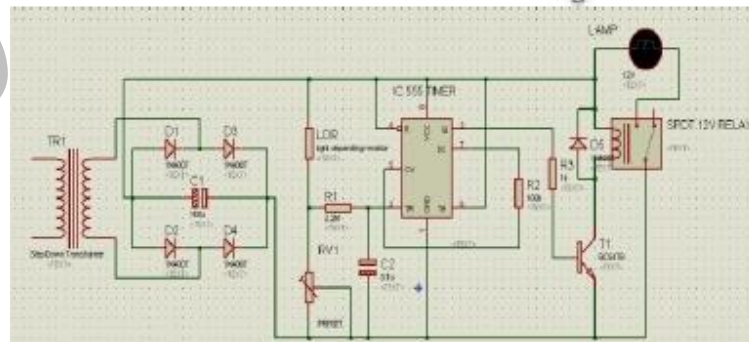
- Low-value capacitor C2 maintains the monostable for continuous operation, eliminating the timer effect. By increasing the value of C2, the 'on' time of the white LED can be adjusted to a predetermined time. LDR2 and associated components generate the morning alarm at dawn. LDR2 detects the ambient light in the room at sunrise and its resistance gradually falls and transistor T1 starts conducting. When T1 conducts, melody-generator IC UM66 (IC3) gets supply voltage from the emitter of T1 and it starts producing the melody. The musical tone generated by IC3 is amplified by single-transistor amplifier T2.
- Resistor R7 limits the current to IC3 and zener diode ZD limits the voltage to a safer level of 3.3 volts. The circuit can be easily assembled on a general-purpose PCB.



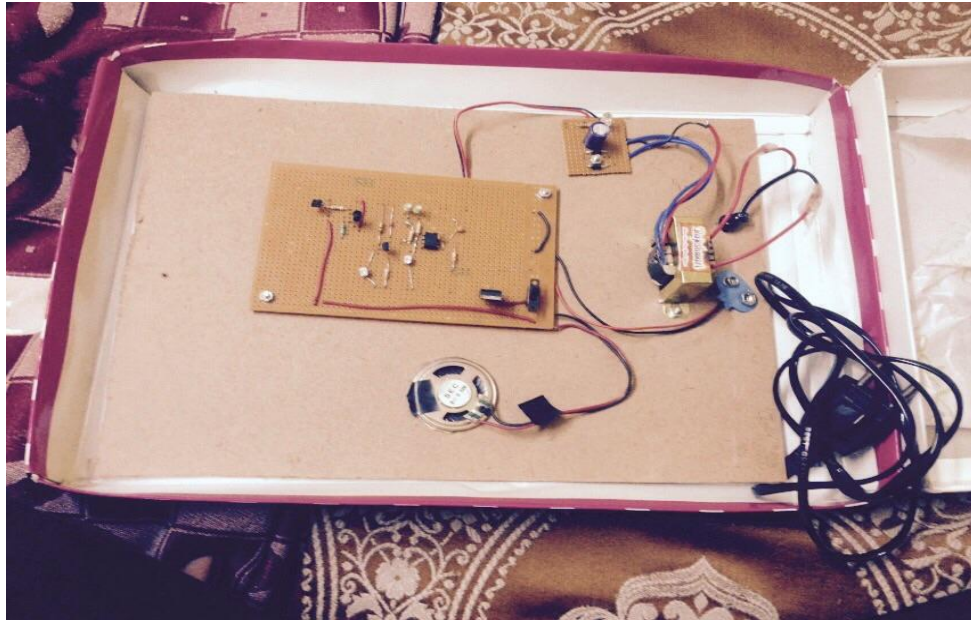
DC CIRCUIT



AC CIRCUIT



## HARDWARE



## CONCLUSION

- The project Automatic LED Night Lamp makes use of a super bright LED as the night lamp. It is powered by a standard 0-9 V transformer. In case of power failure, battery backup is also provided which keeps the circuit in active mode. Light-dependant resistors or LDR's are used for sensing the darkness in the room.
- Once the bedroom light is switched off, the LDR's resistance becomes minimum and the LED glows. This LED provides a bright yet cool light. In the morning, the sensor detects the sunlight and switches off along with an alarm that goes ON. The circuit in the project can be easily assembled on a PCB

## ADVANTAGES AND APPLICTIONS

- The project described here has got high sensitivity and depend on light intensity for its working.
- Its other advantages are its low cost and reliability.
- No manual operation is required
- Loads up to 7 A can be handled.
- However it also has manual mode of operation too.

This project can be applied at a variety of places like bedrooms, hostels hotels. Also to save electricity it can be applied to street lamps and gardens

## REFERENCE

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