

1. INTRODUCTION

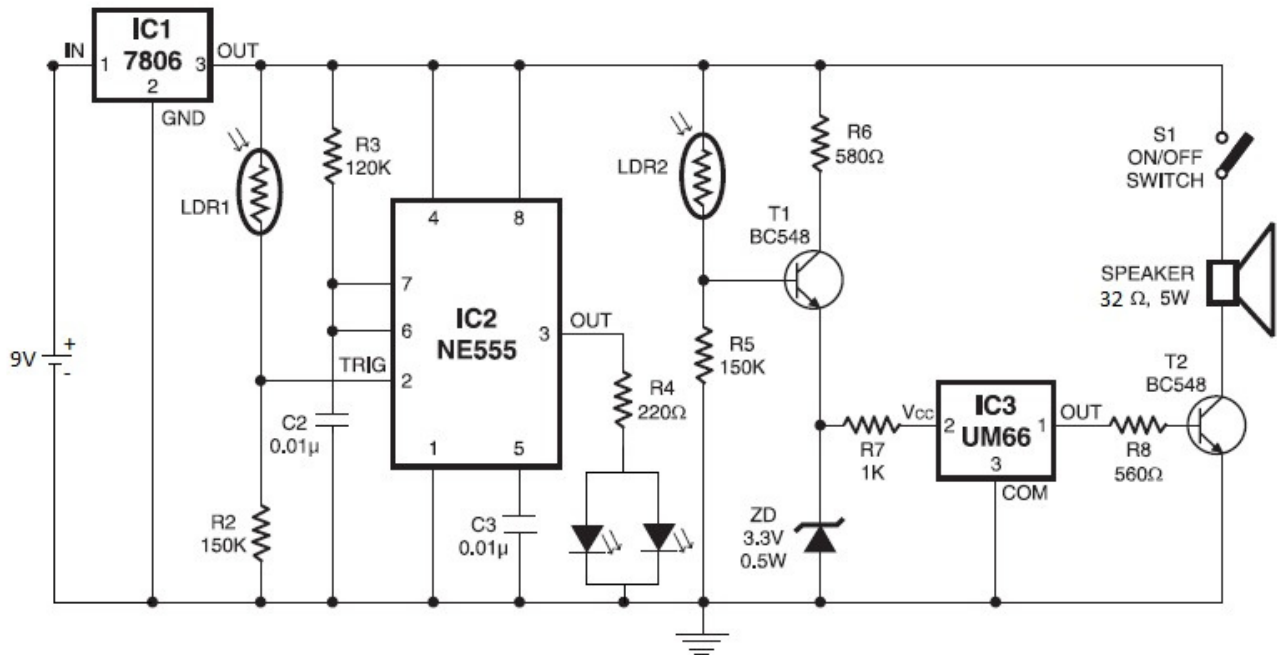
In this busy world, minimizing the human effort and time is the ultimate aim of technology. It may be frustrating when a tired person gets into bed and remembers he had forgotten to switch the bed light off. The project 'automatic night lamp with morning alarm' helps avoid this problem by switching on an LED itself when it detects darkness in the room. The LED serves as a bed lamp or a reading lamp provided a reflector. In the morning the LED switches itself off and sounds a melodious alarm to wake the user. The user can manually switch the alarm off.

The project makes use of an IC NE555 timer configured as a monostable multi-vibrator. An LDR is used to control the trigger of the multi-vibrator. During daytime, the trigger is high and the multi-vibrator is in OFF condition. During the night the trigger goes low and the device starts to operate i.e. the LED is ON.

UM66 IC is used to generate the melody for the alarm. An LDR is used to control the switching of the alarm. During night time, the LDR resistance is high and the alarm is in OFF state. When daylight is detected, the resistance goes low and alarm switches ON. It can also be switched off using a manual switch.

This project can be effectively used for automatic lighting of bedrooms, hostels, streetlights, garden lamps etc to save power and reduce human intervention. It is of low cost and requires only a trivial amount of DC power to operate.

2. CIRCUIT DIAGRAM



Description:

The project makes use of a NE555 timer IC configured as a monostable multi-vibrator. An LDR is used to control the trigger of the multi-vibrator. During daytime, the trigger is high and the multi-vibrator is in OFF condition. During the night the trigger goes low and the device starts to function i.e. the LED is ON.

UM66 IC is used to generate the melody for the alarm. An LDR is used to control the switching of the alarm. During night time, the LDR resistance is high and the alarm is in OFF state. When daylight is detected, the resistance goes low and alarm switches ON. It can also be switched off using a manual switch.

4. CIRCUIT OPERATION

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-dependant 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. When LDR1 is illuminated with ambient light in the room, its resistance remains low, which keeps trigger pin 2 of IC2 at a positive potential. As a result, output pin 3 of IC2 goes low and the white LED remains off. As the illumination of

LDR1's sensitive window reduces the resistance of the device increases. In total darkness, the specified LDR has a resistance in excess of 280 kilo ohms. When the resistance of LDR1 increases, a short pulse is applied to trigger pin 2 of IC2 via resistor R2 (150 kilo ohms). This activates the monostable and its output goes high, causing the white LED to glow. 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.

5. APPLICATIONS

- Can be applied for automatic light switching in bed rooms. Alarm is used to wake the user in the morning.
- Used to save power in Hostels and Hotels.
- Automation of Balcony / stair case / parking Lights.
- Automatic street light switching during dawn and dusk.

6. CONCLUSION

The project 'automatic night lamp with morning alarm' helps reduce human effort and time by switching ON an LED itself when it detects darkness in the room. The LED serves as a bed lamp or a reading lamp provided a reflector. In the morning the LED switches itself OFF and sounds a melodious alarm to wake the user. The user can manually switch the alarm off.

The project makes use of an IC NE555 timer configured as a monostable multi-vibrator to control the LED. An LDR is used to control the trigger of the multi-vibrator. UM66 IC is used to generate the melody for the alarm. An LDR is used to control the switching of the alarm.

This project can be effectively used for automatic lighting of bedrooms, hostels, streetlights, garden lamps etc to save power and reduce human intervention. It is of low cost and requires only a trivial amount of DC power.