

## Mini Project Report

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# Automatic Car Parking System using LDR & BUZZER

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*Mini Project Report Submitted in partial fulfilment of the requirements for the degree of  
Bachelor of Technology from Maulana Abul Kalam Azad University of Technology, West  
Bengal*

*(Formerly known as West Bengal University of Technology)*

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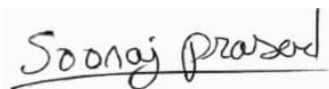
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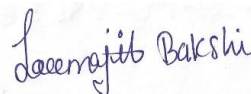
We would also like to thank all the faculty members, technical assistants and staffs of the Department of Electronics and Communication Engineering, Cooch Behar Government Engineering College, for their kind and friendly cooperation extended to us.

We have no appropriate words to express sincere thanks to our family members for their continuous support and encouragement.



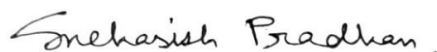
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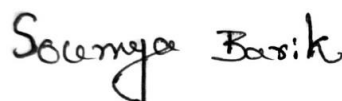
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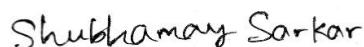
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# Abstract

Automatic Car Parking System using LDR & BUZZER is a simply yet powerful concept, which uses transistor as a switch. By using this system manual works are 100% removed. It automatically switches ON lights when the sunlight goes below the visible region of our eyes. This is done by a sensor called Light Dependant Resistor (LDR) which senses the light actually like our eyes.

It automatically switches OFF lights whenever the sunlight comes, visible to our eyes. By using this system energy consumption is also reduced because nowadays the manually operated street lights are not switched off even the sunlight comes and also switched on earlier before sunset. In this project, no need of manual operation like ON and OFF time setting.

This project clearly demonstrates the working of transistor in saturation region and cut-off region. The working of relay is also known.

Laser based Security System is one type of security and alarm system that uses laser light and a light sensor. It is more effective than the other systems.

## **List of Abbreviations**

- **LDR**-*Light Dependent Resistor*
- **BJT**-*Bipolar Junction Transistor*
- **LED**-*Light Emitting Diode*
- **IR Sensor**-*InfraRed Sensor*
- **ASLC**-*Automatic Street Light Control*
- **IC**- *Integrated Circuit*

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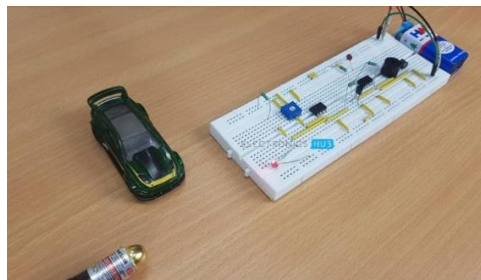
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## 1.1 Introduction:-

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We need to save or conserve energy because most of the energy sources we depend on, like coal and natural gas can't be replaced. Once we use them up, they are gone forever. Saving power is very important, instead of using the power in unnecessary times it should be switched off. In any city "STREET LIGHT" is one of the major power consuming factors. Most of the time we see street lights are controller has an LDR which is used to detect the ambient light. If the ambient light is below a specific value the lights are turned ON.



Laser based Security System is a type of security and alarm system that uses laser light and a light sensor. A security system protects our homes, offices, banks, lockers etc. from intrusion and unauthorised access. There are different types of security systems available and laser based security system is an important and efficient type. A Laser security system can acts as a standalone system, which makes some sound or noise when it detects any irregular activity, or can be part of a much bigger security and home automation system, which can send messages, call the owner etc. In this project, we have designed a simple DIY lased based security system, which acts as a tripwire like security system and triggers an alarm when the laser in interrupted.

## 1.2 Basic Principle

Automatic Car Parking System using LDR & BUZZER system operates on 12 v DC supply. The automatic streetlight controller has a photoconductive device whose resistance changes proportional to the extent of illumination, which switches ON or OFF the LED with the use of transistor as a switch. Light dependent resistor, a photoconductive device has been used as the transducer to convert light energy into electrical energy. The central dogma of the circuit is that the change in voltage drop across the light dependent resistor on illumination or darkness switches the transistor between cut-off region or saturation region and switches OFF or ON the LEDAs we know property of LDR that during the time of day resistance is low therefore voltage at the inverting input(IE pin2) is higher than the voltage at the non-inverting input(pin3) hence the output at the pin6 is low so the transistor goes into the cut off state which means LED or bulb will no glow.

## 2.1 Components Required:-

- BC-547 Transistor
- LDR X2
- Resistors: 100 kilo ohm, 1 kilo ohm and 100ohm
- LED
- 9V Battery
- Battery Connector
- Buzzer
- Laser Head
- LM 358
- 8 pin IC base
- 10 kilo ohm potentiometer
- Veroboard
- Wires

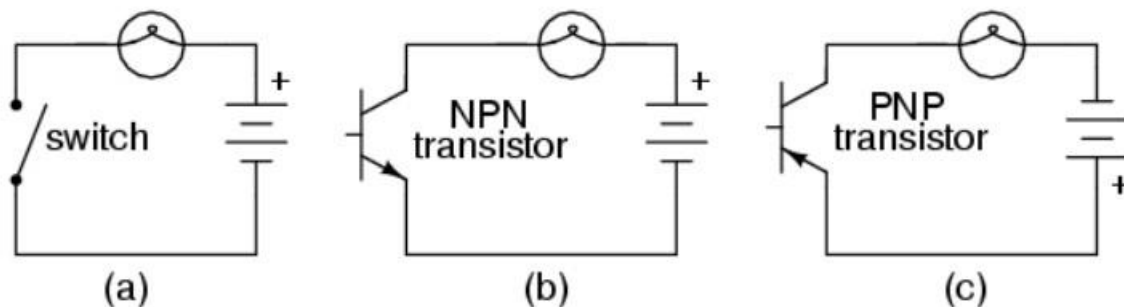


## 2.2 Brief Description of Components:

- **Working principle of BJT as switch:** Suppose we have a lamp that we want to turn on and off with a switch. Such a circuit would be extremely simple, as in the figure below (a).

For the sake of illustration, let's insert a transistor in place of the switch to show how it can control the flow of current through the lamp. Remember that the controlled current through a transistor must go between the collector and the emitter.

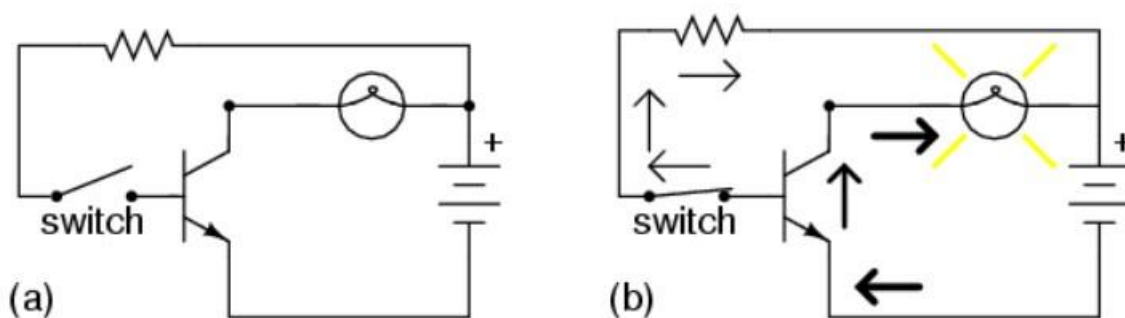
Since it is the current through the lamp that we want to control, we must position the collector and emitter of our transistor where the two contacts of the switch were. We must also make sure that the lamp's current will flow in the direction of the emitter arrow symbol to ensure that the transistor's junction bias will be correct as in the figure below (b) using an NPN transistor.



A PNP transistor could also have been chosen for the job. Its application is shown in the figure above (c). Note that the battery terminal voltages have been flipped from (b) to (c) to support the replacement of the NPN transistor with a PNP transistor.

The choice between NPN and PNP is really arbitrary. All that matters is that the proper current directions are maintained for the sake of correct junction biasing (current flow going with the transistor symbol's arrow).

In the above figures, the base of either BJT is not connected to a suitable voltage, and no current is flowing through the base. Consequently, the transistor cannot turn on. Perhaps, the simplest thing to do would be to connect a switch between the base and collector wires of the transistor as in figure (a) below.



- **Working Principle of LDR:** This resistor works on the principle of photo conductivity. It is nothing but, when the light falls on its surface, then the material conductivity reduces and also the electrons in the valence band of the device are excited to the conduction band. These photons in the incident light must have energy greater than the band gap of the semiconductor material. This makes the electrons to jump from the valence band to conduction.

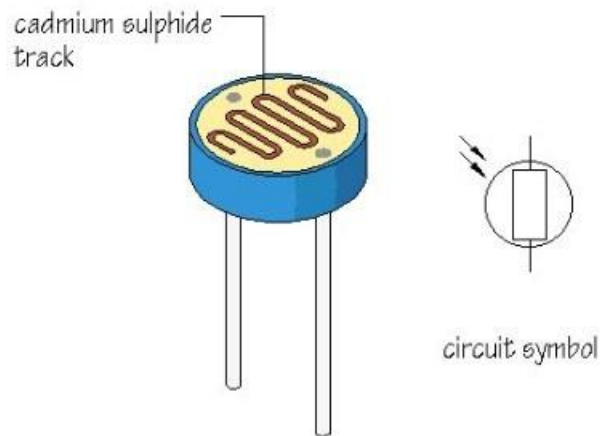
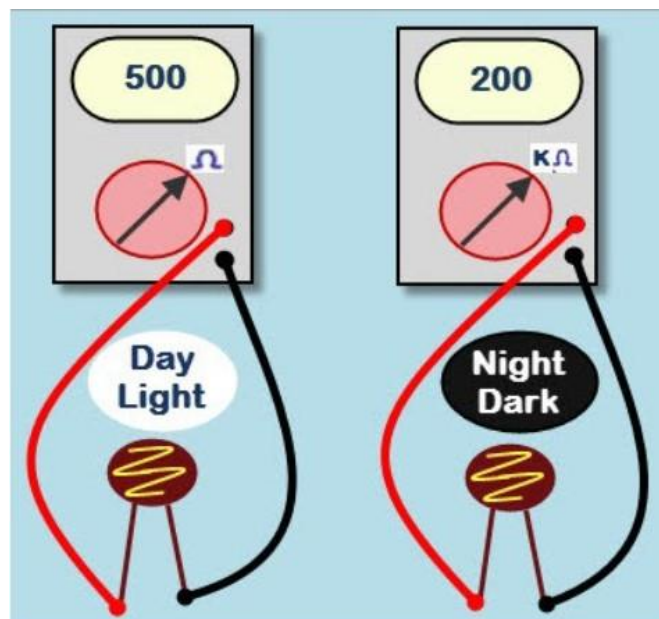


Fig-2.2(LDR)

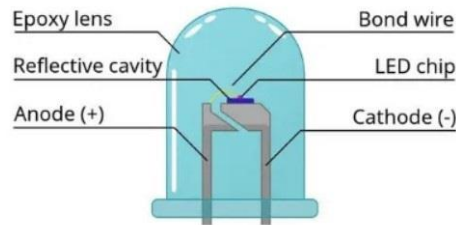
These devices depend on the light, when light falls on the LDR then the resistance decreases, and increases in the dark. When a LDR is kept in the dark place, its resistance is high and, when the LDR is kept in the light its resistance will decrease.

If a constant “V” is applied to the LDR, the intensity of the light increased and current increases. The figure below shows the curve between resistance Vs illumination curve for a particular light dependent resistor.



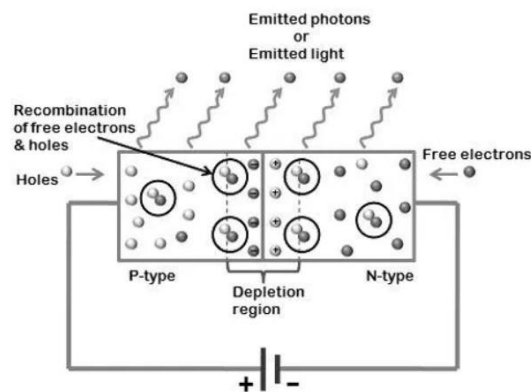
Variation of LDR Resistance with Variation in Light Intensity

- **Working Principle of LED:** An LED is just like a normal p n junction diode, but with light-emitting properties. Its construction and working can be explained as follows.



LED Fig-2.3

Like an ordinary diode, the LED diode works when it is forward biased. In this case, the n-type semiconductor is heavily doped than the p-type forming the p-n junction. When it is forward biased, the potential barrier gets reduced and the electrons and holes combine at the depletion layer (or active layer), light or photons are emitted or radiated in all directions. A typical figure blow showing light emission due electron-hole pair combining on forward biasing.



- **9V Battery & Battery Connector:**



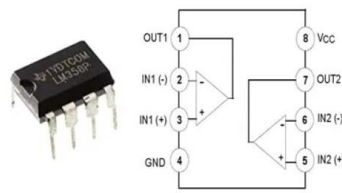
- **Buzzer:** A buzzer or beeper is an audio signalling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, train and confirmation of user input such as a mouse click or keystroke.



- **Laser Head:** A laser is a device that emits light through a process of optical amplification based on the stimulated emission of electromagnetic radiation. The word "laser" is an acronym for "light amplification by stimulated emission of radiation".



- **LM-358:** The LM358 contains two independent high gain operational amplifiers, low power, dual channel op-amp, high gain with internal frequency compensation. Single power supply will be required to operate both op-amps in LM358. We can also use a split power supply. The device has low power supply voltage. LM358 IC can also be used as transducer standard operational amplifier and it is suitable for our needs. It can handle voltage from 3V to 32V DC supply and current up to 20mA per channel. It consists of 8 pins which contains two operational amplifiers.
- In this IC we have two operational amplifier which can we use as a comparator. LM- The low power drain also makes the LM358 a good choice for battery operation. Generally we obtain signal from sensor are usually have small rating. We cannot do anything with this rating for example we obtain 0.3V from sensor. By using 0.3V we cannot ON/OFF led or relay. The LM-358 IC get signal from the sensor and compare to the reference voltage. Then this IC will decide whether the voltage is greater or less than reference voltage by giving output high or low.



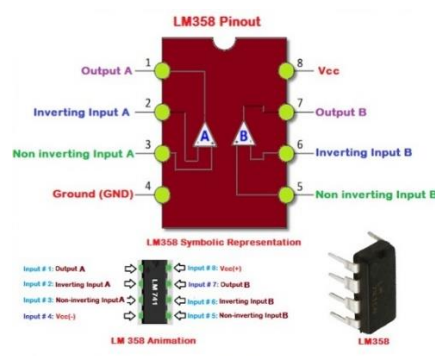
If we want to use it as comparator we can give voltage from 3V to 32V. If we want to use the LM-358 as operational amplifier then we will give the voltage from  $\pm 1.6V$  to  $\pm 16V$ . Pin 8 is main power supply input. LM-358 contains two operation amplifier the input of the first amplifier is pin 2 and pin 3 and the output is pin 1, if we want to use the second amplifier the input for this amplifier is at pin 5 and 6 and the output is at pin 7.

If we want to compare two signals then we will give one signal at pin 2 and the other signal at pin 3. The voltage of pin 2 will be compared with that of pin 3, and the voltage of pin 6 is compared with that of pin 5, corresponding to two independent outputs: 1OUT and 2OUT.

When the input at non-inverting (+) pin 2 is greater than input at inverting input (-) pin 3, similarly When the input at non-inverting (+) pin 5 is greater than input at inverting input (-) pin 6 the output of both op-amps will be high.

When the input at non-inverting (+) pin 2 is less than input at inverting input (-) pin 3, similarly When the input at non-inverting (+) pin 5 is less than input at inverting input (-) pin 6 the output of both op-amps will be low.

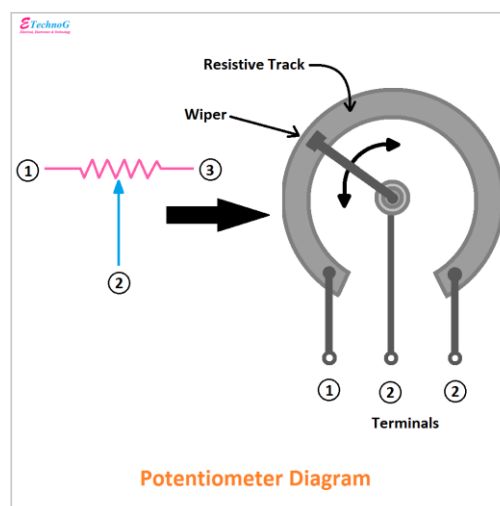
No pull-up resistor is required at the output of LM358.



- **8 pin IC base:** Commonly, the 8 pin IC base is used in prototypes / PCB circuit design testing. They can be joined end to end when working with ICs with more than 8 pins. The contacts of the IC base are tin-plated to reduce oxidation. This is an 8 pin IC socket that is used as a base for 8 pin ICs with DIP package.



- **10 kilo ohm potentiometer:** As discussed above, a Potentiometer is a resistor with three terminals. Out of the three terminals – one is varying, whereas the rest two are fixed. It is an electric component used to measure the unknown voltage by comparing it with the known one, which can be drawn by a cell or any of the other supply sources. In other words, it is a device used for measuring the EMF (electromotive force), and internal resistance of a given cell. A Potentiometer can also be used to vary the resistance for measuring the potential differences. Although the most common use of Potentiometer is to control volume in radios and other audio-related electronic equipment, they are also helpful in manufacturing electronic components that provide a way of adjusting circuits to obtain the correct outputs.



According to Ohm's law,

$$V = IR$$

Where  $I$  is current,  $R$  is total resistance, and  $V$  is voltage.

Now,  $R = \rho L/A$  and  $V = I (\rho L/A)$ .

Where  $\rho$  is resistivity and  $A$  is the cross-sectional area.

With  $\rho$  and  $A$  constant,  $I$  is also constant for a rheostat. Hence,

$$L\rho/A = K$$

$$V = KL$$

$$E = L\rho x/A = Kx$$

Where x: length of Potentiometer wire, E: cell with Lower EMF, and K: constant.

As the potential difference is zero (0) and there's no flow of current, the galvanometer has null detection. So, x is considered as the length of the null point. Ultimately, the unknown electromotive force can be found by using K and x, as shown below:

$$E = L\rho x/A = Kx$$

Since the EMF here includes two cells, let  $L_1$  and  $L_2$  be the null point length of the first cell and second cell with EMF  $E_1$  and EMF  $E_2$  accordingly. So,

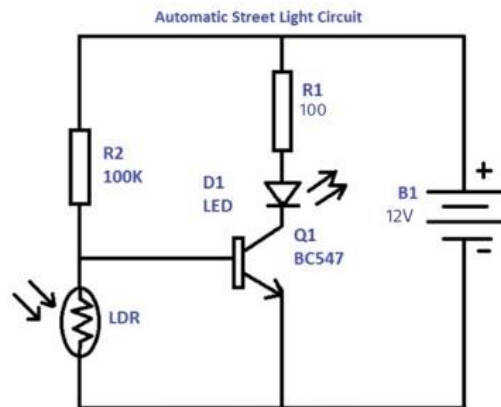
$$E_1/E_2 = L_1/L_2$$

- **Veroboard:** Veroboard is a brand of stripboard, a pre-formed circuit board material of copper strips on an insulating bonded paper board which was originated and developed in the early 1960s by the Electronics Department of Vero Precision Engineering Ltd (VPE). It was introduced as a general-purpose material for use in constructing electronic circuits - differing from purpose-designed printed circuit boards (PCBs) in that a variety of electronics circuits may be constructed using a standard wiring board.

- **Wires:**



### 3.1 Circuit Diagram of an Automatic Parking Light and its Working Principle:



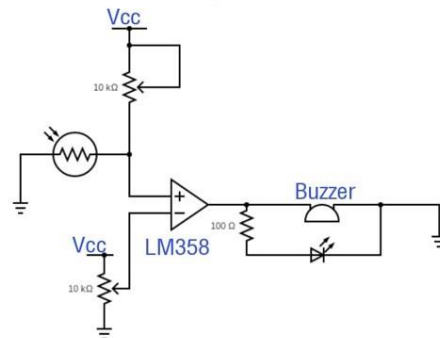
working principle of LDR is that it gives less resistance in high light intensity and high resistance in low light intensity (ie) it gives high resistance in dark or night and low resistance in day or light.

Here we use transistor as a two-way switch. If the voltage through base is greater than 5V it send through the emitter. If the voltage through base is less than 5V the it sends through collector. During night the LDR gives a high resistance as a result the voltage passing through the base will become less than 5V so the LED glows.

During day time LDR gives a low resistance as a result the voltage through base is greater than 5V which switches the current to the emitter. This turns LED off.



## 3.2 Circuit Diagram of an Automatic Car Parking Alarm and its Working Principle:



A simple, cheap and effective laser based security system is developed in this project. Let us see the working of this project. First, the Op – Amp circuit acts as a comparator i.e. it compares the voltages at the inverting and non – inverting terminals and produces an output accordingly. The LDR – 10 KΩ resistor Voltage divider is connected to the non – inverting terminal of Op –Amp and a POT is connected to the inverting terminal. Assume, the laser pointer is placed directly in line of sight to the LDR and the light from the laser is continuously being incident on LDR. In this situation, the resistance of LDR falls down to few Ohms (or tens of Ohms) and as a result, the voltage at the non – inverting terminal will be less than that at the inverting voltage. The output of the Op – Amp is low and the transistor is OFF.

If the laser light is blocked by an intruder from falling on the LDR (even for a small duration), the resistance of the LDR goes to few hundreds of Ohms and as a result, the output of the Op –Amp will be HIGH. This will turn on the Transistor. As the output of the transistor is connected to the Trigger Pin (Pin 2) of the 555 Timer IC, if the transistor is ON, the trigger pin gets a short low pulse and as a result, the output of the 555 becomes HIGH. This will activate the alarm by turning ON the buzzer. Since, the 555 Timer IC is configured as a Bi – Stable Multivibrator, a small active low trigger pulse at the trigger pin will set its output to HIGH and in order to reset it we need to push the reset button. Until the reset push button is pushed, the alarm will stay on hence, we can place the reset button at a secret location so that only the owner can disable the alarm.

## **4.1 Advantages:**

1. By using this Automatic system for street light controlling, we can reduce energy consumption because the manually operated street lights are not switched off properly even the sunlight comes and also not switched on earlier before sunset.
2. Used in some clocks, alarms and other electronic devices that are semi-dependent on sunlight.
3. Used in Digital cameras to perceive how much light camera sees and adjust the picture quality accordingly.
4. Photo resistors are applied, most of which involve recognizing the presence of light.
5. Burglar alarm systems
6. Laser Security System can be used in safety lockers in our homes, where even if the locker's code is hacked, it acts as an additional layer of security.

## **4.2 Disadvantages:**

1. In sunny and rainy days, ON and OFF time differ noticeably which is one of the major disadvantage of using timer. circuits or manual operation for switching the street light system.
2. Batteries of the automatic street light system are required to be replaced a few times
3. Automatic street light system requires a higher investment in comparison to conventional street lights.
4. Risk of theft of the automatic street light system is relatively higher since they are non-wired and are expensive.
5. The laser security system works only if the laser is obstructed. If the intruder passes without obstructing the laser, it is considered as a failure.
6. In order to secure a larger area, we need more lasers and corresponding sensors.

**5.1 Future Scope:** We can save the energy for the future use and we can control the losses of the power. We can implemented this project for the home lamp or night lamp of the room. This is used for the signals. We are focusing on Entrance identification with laser security with this project assuming as our minor work. In future in will be very helpful to the society.

**6.1 Conclusion:** More effective in case of cost, manpower and security as a compare with today's running complicated and complex light controlling systems. Automatic Street Light Controlling System puts up a very user-friendly approach and could increase the power. This The Streetlight controller using ldr based Light intensity & traffic density, in the todays up growing countries will be paper elaborates the design and construction of automatic street control system circuit. Circuit works properly to turn street lamp ON/OFF.

After designing the circuit which controls the light of the street as illustrated in the previous in the previous sections. LDR sensor and the photoelectric sensors are the two main conditions in working the circuit. If the two conditions have been satisfied the circuit will do the desired work according to specific program.

Laser Security System can be used in safety lockers in our homes, where even if the locker's code is hacked, it acts as an additional layer of security.

Apart from security systems, this laser-based setup can also be used to check if pets or babies crossed a certain boundary.