C1- BS6 LIGHTNING AUTOMATION

INDEX

ABSTARCT

The design here is all about Front wheel steering system with the modern electronics technology with moving headlights. The objective is to design and build a control system based on an electronically operated automatic head light controller called the "Automatic Head Light Dim / Bright Controller" by using LDR circuit."The automatic head light dim / bright controller and headlight alignment according to steering wheel "consists of the LDR sensor circuit, control unit, headlight with gear rack and pinion setup. The sensor is used to identify the pathway on the opposite side vehicle (Light Beam). There is some obstacle on the road, the sensor detects the obstacle (Light Beam) and gives the Dim / bright Light as the output signals.

KEYWORDS: Headlight, nodemcu , LDR Circuit.

GOALS AND OBJECTIVES

1. To provide lighting to the streets such that minimum possible power is consumed during nights.

2. To manage the traffic flow smoothly and efficiently during night.

3. To replace the conventional halogen lamp with the power LED’s in the lighting system.

4. To develop the hardware of control unit. 5. To test and validate the designed system.

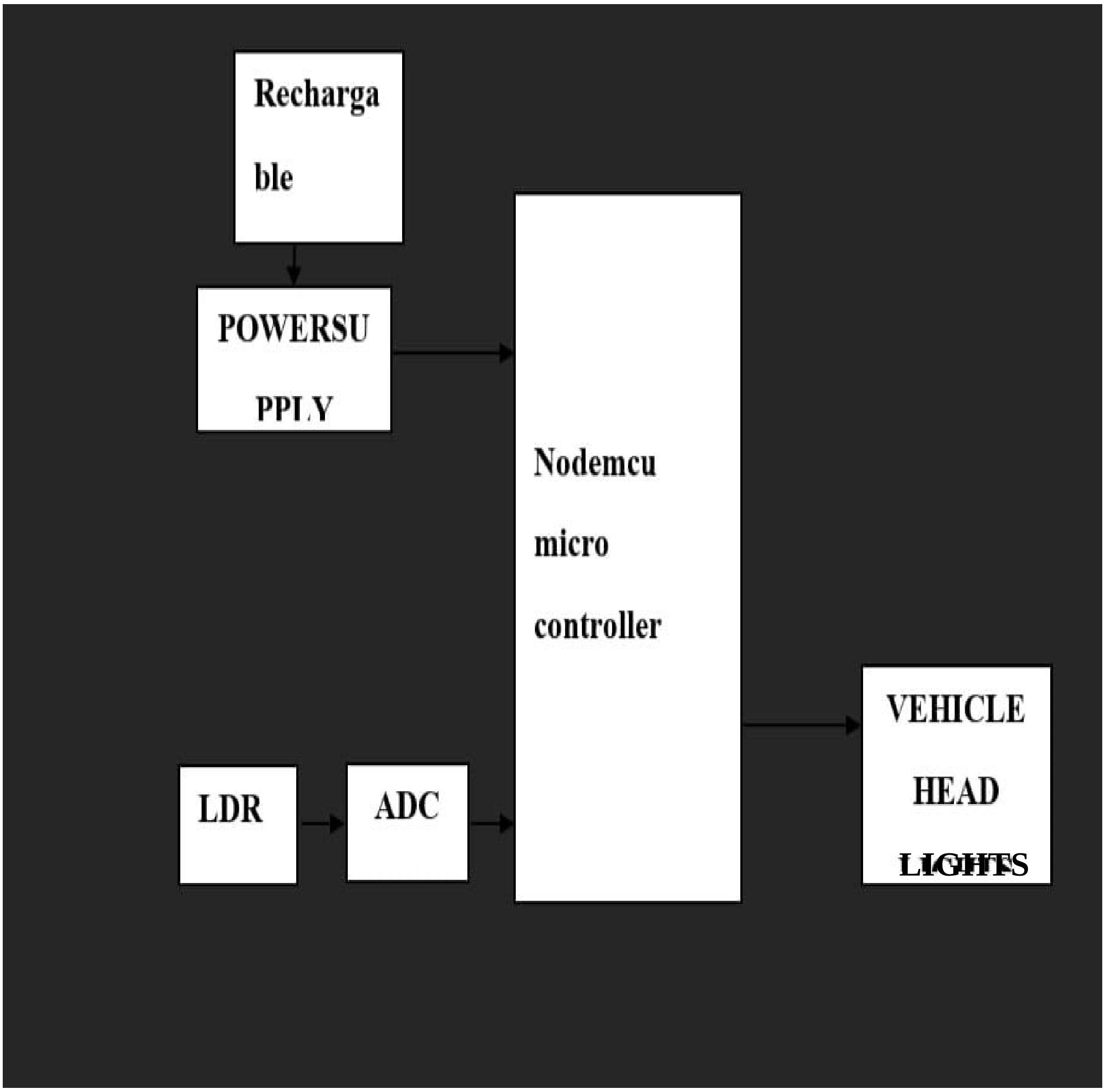
INTRODUCTION

Auto safety is the prevention of car accidents or the minimization of accident-related harmful effects, especially as regards human life and health. Since years, unique safety devices have been built into automobiles, some for the safety of vehicle occupants only and others for the safety of others. We are glad to launch our building program "Automated Head Light Dim / Bright Controller With Automatic Alignment Of Head Light According To The Steering Wheel" which is completely fitted with circuit sensors, dim / bright light circuit and gear rack and pinion system. This is a genuine initiative planned and professionally built for automotive vehicle.It is an integral part of high output. This system has undergone strenuous testing in our automotive vehicles and it is excellent. The most typical steering arrangement is to turn the front wheels using a hand-operated steering wheel that is situated in front of the driver, through the steering column that may include universal joints to enable it to deviate from a straight line somewhat. Other arrangements, for example a tiller or rear-wheel steering, are often found on various types of vehicles. Army vehicles such as tanks, armoured lorry deploy differential steering and that is, the tracks are designed to run at different speeds, or sometimes in opposite directions to change course.As for the Indian road transport scenario, accidents are becoming a day-to-day incident as an effort has been made to eliminate these accidents. The following process happens automatically in the vehicle in our "Automatic Head Lamp Alignment System" project having. They are

1. Automatic head light left and right alignment is based on the rotation of the steering wheel in the left and right direction of the vehicle. 2. In normal, condition the head light in a stable position for the car. 3. The sensor automatically dim and brighten the headlight depending on the size of the headlightcoming in front of the vehicles 4. Automatic head light left and right alignment is based on the rotation of the steering wheel in the left and right direction of the vehicle. 5. In normal, condition the head light in a stable position for the car. 6. The sensor automatically dim and brighten the headlight depending on the size of the headlight coming in front of the vehicles.

PROBLEM STATEMENT Existing methods the BS6 vehicle lights continuosly triggered on irrespective of day and night condition.

BLOCK DIAGRAM



CHAPTER 2
INTRODUCTION TO EMBEDDED SYSTEMS

Many embedded systems have substantially different design constraints than desktop computing applications. No single characterization applies to the diverse spectrum of embedded systems. However, some combination of cost pressure, long life-cycle, real-time requirements, reliability requirements, and design culture dysfunction can make it difficult to be successful applying traditional computer design methodologies and tools to embedded applications. Embedded systems in many cases must be optimizedfor life-cycle and business-driven factors rather than for maximum computing throughput. There is currently little *tool* support for expanding embedded computer design to the scope of holistic embedded system design. However, knowing the strengths and weaknesses of current approaches can set expectations appropriately, identify risk areas to tool adopters, and suggest ways in which tool builders can meet industrial needs. If we look around us, today we see numerous appliances which we use daily, be it our refrigerator, the microwave oven, cars, PDAs etc. Most appliances today are powered by something beneath the sheath that makes them do what they do. These are tiny microprocessors, which respond to various keystrokes or inputs. These tiny microprocessors, working on basic assembly languages, are the heart of the appliances. We call them embedded systems. Of all the semiconductor industries, the embedded systems market place is the most conservative, and engineering decisions here usually lean towards established, low risk solutions. Welcome to the world of embedded systems, of computers that will not look like computers and won't function like anything we are familiar with.

CLASSIFICATION

Embedded systems are divided into autonomous, realtime, networked & mobile categories.

Autonomous systems

They function in standalone mode. Many embedded systems used for process control in manufacturing units& automobiles fall under this category.

Real-time embedded systems

These are required to carry out specific tasks in a specified amount of time. These systems are extensively used to carry out time critical tasks in process control.

Networked embedded systems

They monitor plant parameters such as temperature, pressure and humidity and send the data over the network to a centralized system for on line monitoring.

Mobile gadgets

Mobile gadgets need to store databases locally in their memory. These gadgets imbibe powerful computing & communication capabilities to perform realtime as well as nonrealtime tasks and handle multimedia applications. The embedded system is a combination of computer hardware, software, firmware and perhaps additional mechanical parts, designed to perform a specific function. A good example is an automatic washing machine or a microwave oven. Such a system is in direct contrast to a personal computer, which is not designed to do only a specific task. But an embedded system is designed to do a specific task with in a given timeframe, repeatedly, endlessly, with or without human interaction.

Hardware

Good software design in embedded systems stems from a good understanding of the hardware behind it. All embedded systems need a microprocessor, and the kinds of microprocessors used in them are quite varied. A list of some of the common microprocessors families are: ARM family, The Zilog Z8 family, Intel 8051/X86 family, Motorola 68K family and the power PC family. For processing of information and execution of programs, embedded system incorporates microprocessor or micro- controller. In an embedded system the microprocessor is a part of final product and is not available for reprogramming to the end user. An embedded system also needs memory for two purposes, to store its program and to store its data. Unlike normal desktops in which data and programs are stored at the same place, embedded systems store data and programs in different memories. This is simply because the embedded system does not have a hard drive and the program must be stored in memory even when the power is turned off. This type of memory is called ROM. Embedded applications commonly employ a special type of ROM that can be programmed or reprogrammed with the help of special devices.

OTHER COMMON PARTS FOUND ON MANY EMBEDDED SYSTEMS

- UART& RS232
- PLD
- ASIC's& FPGA's
- Watch dog timer etc.

DESIGN PROCESS

Embedded system design is a quantitative job. The pillars of the system design methodology are the separation between function and architecture, is an essential step from conception to implementation. In recent past, the search and industrial community has paid significant attention to the topic of hardware-software (HW/SW) codesign and has tackled the problem of coordinating the design of the parts to be implemented as software and the parts to be implemented as hardware avoiding the HW/SW integration problem marred the electronics system industry so long. In any large scale embedded systems design methodology, concurrency must be considered as a first class citizen at all levels of abstraction and in both hardware and software. Formal models & transformations in system design are used so that verification and synthesis can be applied to advantage in the design methodology. Simulation tools are used for exploring the design space for validating the functional and timing behaviors of embedded systems. Hardware can be simulated at different levels such as electrical circuits, logic gates, RTL e.t.c. using VHDL description. In some environments software development tools can be coupled with hardware simulators, while in others the software is executed on the simulated hardware. The later approach is feasible only for small parts of embedded systems. Design of an embedded system using Intel's 80C188EB chip is shown in the figure. Inorder to reduce complexity, the design process is divided in four major steps: specification, system synthesis, implementation synthesis and performance evaluation of the prototype.

SPECIFICATION

During this part of the design process, the informal requirements of the analysis are transformed to formal specification using SDL.

SYSTEM-SYNTHESIS

For performing an automatic HW/SW partitioning, the system synthesis step translates the SDL specification to an internal system model switch contains problem graph& architecture graph. After system synthesis, the resulting system model is translated back to SDL.

IMPLEMENTATION-SYNTHESIS

SDL specification is then translated into conventional implementation languages such as VHDL for hardware modules and C for software parts of the system.

PROTOTYPING

On a prototyping platform, the implementation of the system under development is executed with the software parts running on multiprocessor unit and the hardware part running on a FPGA board known as phoenix, prototype hardware for Embedded Network Interconnect Accelerators.

APPLICATIONS

Embedded systems are finding their way into robotic toys and electronic pets, intelligent cars and remote controllable home appliances. All the major toy makers across the world have been coming out with advanced interactive toys that can become our friends for life. ‘Furby’ and ‘AIBO’ are good examples at this kind. Furbies have a distinct life cycle just like human beings, starting from being a baby and growing to an adult one. In AIBO first two letters stands for Artificial Intelligence. Next two letters represents robot. The AIBO is robotic dog. Embedded systems in cars also known as Telematic Systems are used to provide navigational security communication &entertinment services using GPS, satellite. Home appliances are going the embedded way. LG electronics digital DIOS refrigerator can be used for surfing the net, checking e-mail, making video phone calls and watching TV.IBM is developing an air conditioner that we can control over the net. Embedded systems cover such a broad range of products that generalization is difficult. Here are some broad categories.

Fig 2.1: Embedded Development Life Cycle

- **Aerospace and Defence electronics**: Fire control, radar, robotics/sensors, sonar.

- **Automotive**: Autobody electronics, auto power train, auto safety,car information systems.

- **Broadcast & entertainment**: Analog and digital sound products, camaras, DVDs, Set top boxes, virtual reality systems, graphic products.
- **Consumer/internet appliances**: Business handheld computers, business network computers/terminals, electronic books, internet smart handheld devices, PDAs.
- **Data communications:** Analog modems, ATM switches, cable modems, XDSL modems, Ethernet switches, concentrators.
- **Digital imaging**: Copiers, digital still cameras, Fax machines, printers, scanners.
- **Industrial measurement and control:** Hydro electric utility research & management traffic management systems, train marine vessel management systems.
- **Medical electronics:** Diagnostic devices, real time medical imaging systems, surgical devices, critical care systems.
- **Server I/O:** Embedded servers, enterprise PC servers, PCI LAN/NIC controllers, RAID devices, SCSI devices.

- **Telecommunications**: ATM communication products, base stations, networking switches, SONET/SDH cross connect, multiplexer.
- **Mobile data infrastructures**: Mobile data terminals, pagers, VSATs, Wireless LANs, Wireless phones.

CHAPTER 3

REGULATED POWER SUPPLY:

Introduction:

Power supply is a supply of electrical power. A device or system that supplies electrical or other types of energy to an output load or group of loads is called a power supply unit or PSU. The term is most commonly applied to electrical energy supplies, less often to mechanical ones, and rarely to others.

A power supply may include a power distribution system as well as primary or secondary sources of energy such as

- Conversion of one form of electrical power to another desired form and voltage, typically involving converting AC line voltage to a well-regulated lower-voltage DC for electronic devices. Low voltage, low power DC power supply units are commonly integrated with the devices they supply, such as computers and household electronics.
- Batteries.
- Chemical fuel cells and other forms of energy storage systems.
- Solar power.
- Generators or alternators.

Block Diagram:

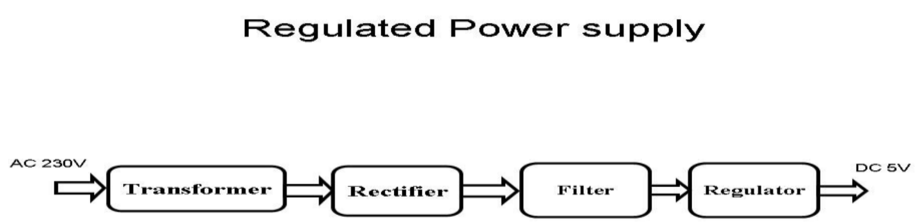


Fig .Regulated Power Supply

The basic circuit diagram of a regulated power supply (DC O/P) with led connected as load is shown in fig:

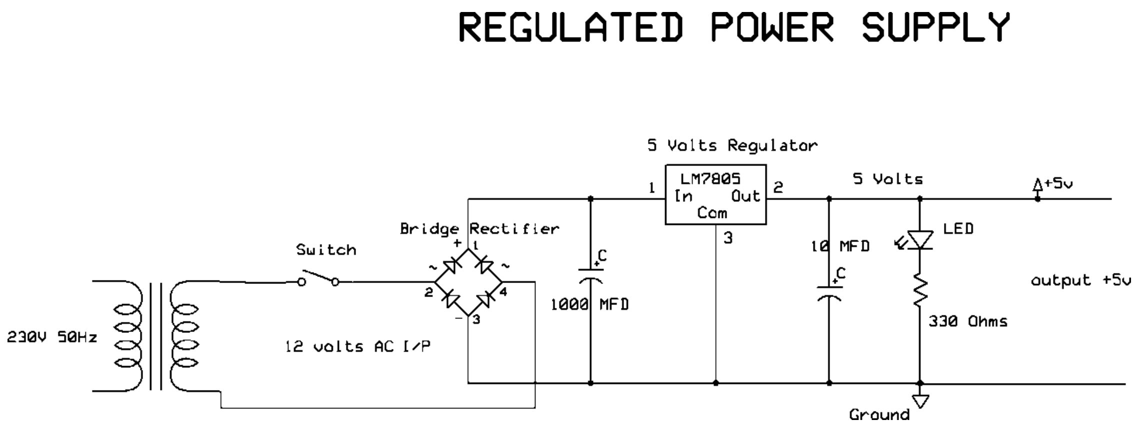


Fig Circuit diagram of Regulated Power Supply with Led connection

The components mainly used in above figure are

- 230V AC MAINS
- TRANSFORMER
- BRIDGE RECTIFIER(DIODES)
- CAPACITOR
- VOLTAGE REGULATOR(IC 7805)
- RESISTOR
- LED(LIGHT EMITTING DIODE)

The detailed explanation of each and every component mentioned above is as follows:

Step 1: Transformation: The process of transforming energy from one device to another is called transformation. For transforming energy we use transformers.

Transformers:

A transformer is a device that transfers electrical energy from one circuit to another through inductively coupled conductors without changing its frequency. A varying current in the first or primary winding creates a varying magnetic flux in the transformer's core, and thus a varying magnetic field through the secondary winding. This varying magnetic field induces a varying electromotive force (EMF) or "voltage" in the secondary winding. This effect is called mutual induction.

If a load is connected to the secondary, an electric current will flow in the secondary winding and electrical energy will be transferred from the primary circuit through the transformer to the load. This field is made up from lines of force and has the same shape as a bar magnet.

If the current is increased, the lines of force move outwards from the coil. If the current is reduced, the lines of force move inwards.

If another coil is placed adjacent to the first coil then, as the field moves out or in, the moving lines of force will "cut" the turns of the second coil. As it does this, a voltage is induced in the second coil. With the 50 Hz AC mains supply, this will happen 50 times a second. This is called MUTUAL INDUCTION and forms the basis of the transformer.

The input coil is called the PRIMARY WINDING; the output coil is the SECONDARY WINDING. Fig: 3.3.4 shows step-down transformer.

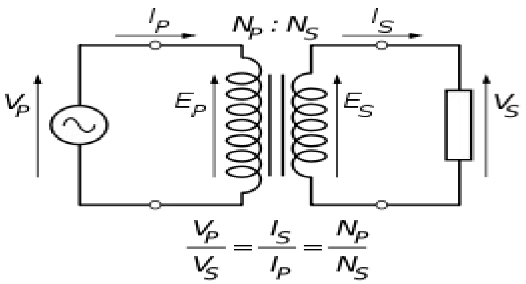


Fig 3.3.3: Step-Down Transformer

The voltage induced in the secondary is determined by the TURNS RATIO.

$$\frac{\text{primary voltage}}{\text{secondary voltage}} = \frac{\text{number of primary turns}}{\text{number of secondary turns}}$$

For example, if the secondary has half the primary turns; the secondary will have half the primary voltage.

Another example is if the primary has 5000 turns and the secondary has 500 turns, then the turn's ratio is 10:1.

If the primary voltage is 240 volts then the secondary voltage will be x 10 smaller = 24 volts. Assuming a perfect transformer, the power provided by the primary must equal the power taken by a load on the secondary. If a 24-watt lamp is connected across a 24 volt secondary, then the primary must supply 24 watts.

To aid magnetic coupling between primary and secondary, the coils are wound on a metal CORE. Since the primary would induce power, called EDDY CURRENTS, into this core, the core is LAMINATED. This means that it is made up from metal sheets insulated from each other. Transformers to work at higher frequencies have an iron dust core or no core at all.

Note that the transformer only works on AC, which has a constantly changing current and moving field. DC has a steady current and therefore a steady field and there would be no induction.

Some transformers have an electrostatic screen between primary and secondary. This is to prevent some types of interference being fed from the equipment down into the mains supply, or in the other direction. Transformers are sometimes used for IMPEDANCE MATCHING.

We can use the transformers as step up or step down.

Step Up transformer:

In case of step up transformer, primary windings are every less compared to secondary winding.

Because of having more turns secondary winding accepts more energy, and it releases more voltage at the output side.

Step down transformer:

Incase of step down transformer, Primary winding induces more flux than the secondary winding, and secondary winding is having less number of turns because of that it accepts less number of flux, and releases less amount of voltage.

Battery power supply:

A battery is a type of linear power supply that offers benefits that traditional line-operated power supplies lack: mobility, portability and reliability. A battery consists of multiple electrochemical cells connected to provide the voltage desired. Fig: 3.3.4 shows Hi-Watt 9V battery

Fig : Hi-Watt 9V Battery

The most commonly used dry-cell battery is the carbon-zinc dry cell battery. Dry-cell batteries are made by stacking a carbon plate, a layer of electrolyte paste, and a zinc plate alternately until the desired total voltage is achieved. The most common dry-cell batteries have one of the following voltages: 1.5, 3, 6, 9, 22.5, 45, and 90. During the discharge of a carbon-zinc battery, the zinc metal is converted to a zinc salt in the electrolyte, and magnesium dioxide is reduced at the carbon electrode. These actions establish a voltage of approximately 1.5 V.

The lead-acid storage battery may be used. This battery is rechargeable; it consists of lead and lead/dioxide electrodes which are immersed in sulfuric acid. When fully charged, this type of battery has a 2.06-2.14 V potential (A 12 volt car battery uses 6 cells in series). During discharge, the lead is converted to lead sulfate and the sulfuric acid is converted to water. When the battery is charging, the lead sulfate is converted back to lead and lead dioxide A nickel-cadmium battery has become more popular in recent years. This battery cell is completely sealed and rechargeable. The electrolyte is not involved in the electrode reaction, making the voltage constant over the span of the batteries long service life. During the charging process, nickel oxide is oxidized to its higher oxidation state and cadmium oxide is reduced. The nickel-cadmium batteries have many benefits. They can be stored both charged and uncharged. They have a long service life, high current availabilities, constant voltage, and the ability to be recharged. Fig: 3.3.5 shows pencil battery of 1.5V.

Fig : Pencil Battery of 1.5V

Step 2: Rectification

The process of converting an alternating current to a pulsating direct current is called as rectification. For rectification purpose we use rectifiers.

Rectifiers:

A rectifier is an electrical device that converts alternating current (AC) to direct current (DC), a process known as rectification. Rectifiers have many uses including as components of power supplies and as detectors of radio signals. Rectifiers may be made of solid-state diodes, vacuum tube diodes, mercury arc valves, and other components.

A device that it can perform the opposite function (converting DC to AC) is known as an inverter.

When only one diode is used to rectify AC (by blocking the negative or positive portion of the waveform), the difference between the term diode and the term rectifier is merely one of usage, i.e., the term rectifier describes a diode that is being used to convert AC to DC. Almost all rectifiers comprise a number of diodes in a specific arrangement for more efficiently converting AC to DC than is possible with only one diode. Before the development of silicon semiconductor rectifiers, vacuum tube diodes and copper (I) oxide or selenium rectifier stacks were used.

Bridge full wave rectifier:

The Bridge rectifier circuit is shown in figure, which converts an ac voltage to dc voltage using both half cycles of the input ac voltage. The Bridge rectifier circuit is shown in the figure. The circuit has four diodes connected to form a bridge. The ac input voltage is applied to the diagonally opposite ends of the bridge. The load resistance is connected between the other two ends of the bridge.

For the positive half cycle of the input ac voltage, diodes D1 and D3 conduct, whereas diodes D2 and D4 remain in the OFF state. The conducting diodes will be in series with the load resistance R_L and hence the load current flows through $R_{L.}$

For the negative half cycle of the input ac voltage, diodes D2 and D4 conduct whereas, D1 and D3 remain OFF. The conducting diodes D2 and D4 will be in series with the load resistance R_L and hence the current flows through R_L in the same direction as in the previous half cycle. Thus a bi-directional wave is converted into a unidirectional wave.

Input Output

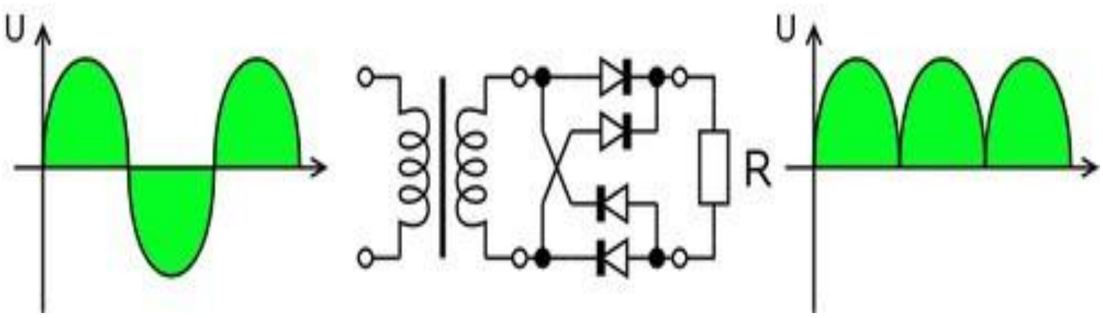


Fig : Bridge rectifier: a full-wave rectifier using 4 diodes

DB107:

Now -a -daysBridge rectifier is available in IC with a number of DB107. In our project we are using an IC in place of bridge rectifier.

Features:

- Good for automation insertion
- Surge overload rating - 30 amperes peak
- Ideal for printed circuit board
- Reliable low cost construction utilizing molded
- Glass passivated device
- Polarity symbols molded on body

- Mounting position: Any
- Weight: 1.0 gram

Fig : DB107

Step 3: Filtration

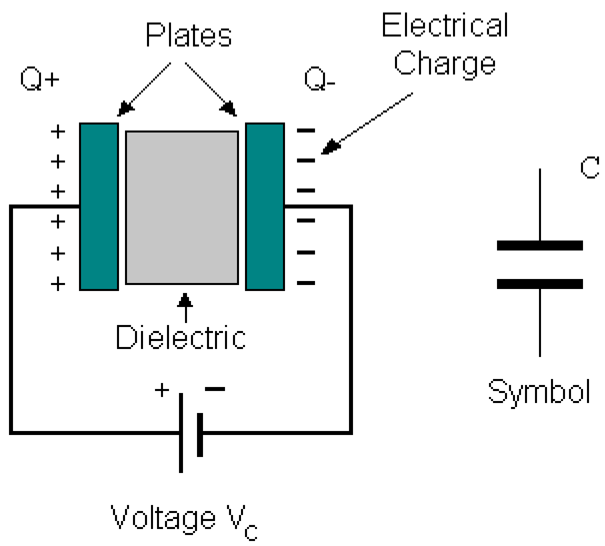
The process of converting a pulsating direct current to a pure direct current using filters is called as filtration.

Filters:

Electronic filters are electronic circuits, which perform signal-processing functions, specifically to remove unwanted frequency components from the signal, to enhance wanted ones.

Introduction to Capacitors:

The Capacitor or sometimes referred to as a Condenser is a passive device, and one which stores energy in the form of an electrostatic field which produces a potential (static voltage) across its plates. In its basic form a capacitor consists of two parallel conductive plates that are not connected but are electrically separated either by air or by an insulating material called the Dielectric. When a voltage is applied to these plates, a current flows charging up the plates with electrons giving one plate a positive charge and the other plate an equal and opposite negative charge. This flow of electrons to the plates is known as the Charging Current and continues to flow until the voltage across the plates (and hence the capacitor) is equal to the applied voltage Vcc. At this point the capacitor is said to be fully charged and this is illustrated below.



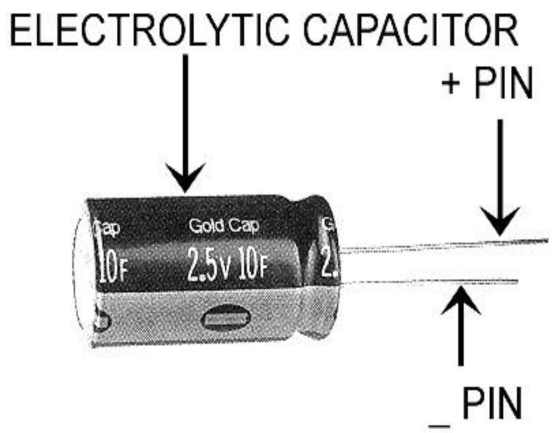


Fig:Construction Of a Capacitor **Fig :Electrolytic Capaticor**

Units of Capacitance:

Microfarad (μF) 1μF = 1/1,000,000 = 0.000001 = 10^{-6} F

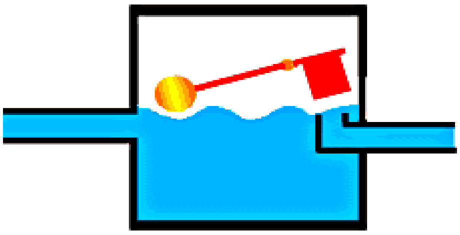
Nanofarad (nF) 1nF = 1/1,000,000,000 = 0.000000001 = 10^{-9} F

Pico farad (pF) 1pF = 1/1,000,000,000,000 = 0.000000000001 = 10^{-12} F

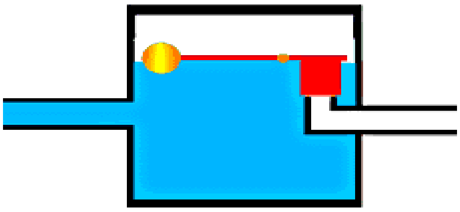
Operation of Capacitor:

Think of water flowing through a pipe. If we imagine a capacitor as being a storage tank with an inlet and an outlet pipe, it is possible to show approximately how an electronic capacitor works.

First, let's consider the case of a "coupling capacitor" where the capacitor is used to connect a signal from one part of a circuit to another but without allowing any direct current to flow.



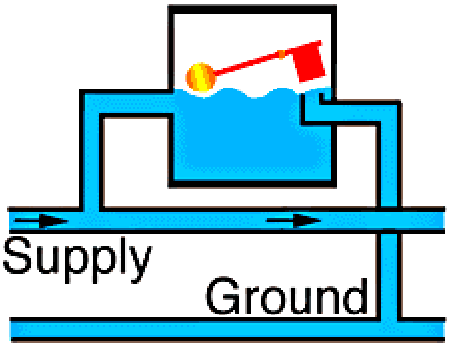
If the current flow is alternating between zero and a maximum, our "storage tank" capacitor will allow the current waves to pass through.



However, if there is a steady current, only the initial short burst will flow until the "floating ball valve" closes and stops further flow.

So a coupling capacitor allows "alternating current" to pass through because the ball valve doesn't get a chance to close as the waves go up and down. However, a steady current quickly fills the tank so that all flow stops.

A capacitor will pass alternating current but (apart from an initial surge) it will not pass d.c.



Where a capacitor is used to decouple a circuit, the effect is to "smooth out ripples". Any ripples, waves or pulses of current are passed to ground while d.c. Flows smoothly.

Step 4: Regulation

The process of converting a varying voltage to a constant regulated voltage is called as regulation. For the process of regulation we use voltage regulators.

Voltage Regulator:

A voltage regulator (also called a 'regulator') with only three terminals appears to be a simple device, but it is in fact a very complex integrated circuit. It converts a varying input voltage into a constant 'regulated' output voltage. Voltage Regulators are available in a variety of outputs like 5V, 6V, 9V, 12V and 15V. The LM78XX series of voltage regulators are designed for positive input. For applications requiring negative input, the LM79XX series is used. Using a pair of 'voltage-divider' resistors can increase the output voltage of a regulator circuit.

It is not possible to obtain a voltage lower than the stated rating. You cannot use a 12V regulator to make a 5V power supply. Voltage regulators are very robust. These can withstand over-current draw due to short circuits and also over-heating. In both cases, the regulator will cut off before any damage occurs. The only way to destroy a regulator is to apply reverse voltage to its input. Reverse polarity destroys the regulator almost instantly. Fig: 3.3.10 shows voltage regulator.

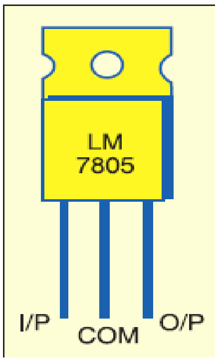


Fig : Voltage Regulator

Resistors:

A resistor is a two-terminal electronic component that produces a voltage across its terminals that is proportional to the electric current passing through it in accordance with Ohm's law:

$$V = IR$$

Resistors are elements of electrical networks and electronic circuits and are ubiquitous in most electronic equipment. Practical resistors can be made of various compounds and films, as well as resistance wire (wire made of a high-resistivity alloy, such as nickel/chrome).

The primary characteristics of a resistor are the resistance, the tolerance, maximum working voltage and the power rating. Other characteristics include temperature coefficient, noise, and inductance. Less well-known is critical resistance, the value below which power dissipation limits the maximum permitted current flow, and above which the limit is applied voltage. Critical resistance is determined by the design, materials and dimensions of the resistor.

Resistors can be made to control the flow of current, to work as Voltage dividers, to dissipate power and it can shape electrical waves when used in combination of other components. Basic unit is ohms.

Theory of operation:

Ohm's law:

The behavior of an ideal resistor is dictated by the relationship specified in Ohm's law:

$$V = IR$$

Ohm's law states that the voltage (V) across a resistor is proportional to the current (I) through it where the constant of proportionality is the resistance (R).

Power dissipation:

The power dissipated by a resistor (or the equivalent resistance of a resistor network) is calculated using the following:

$$P = I^2R = IV = \frac{V^2}{R}$$

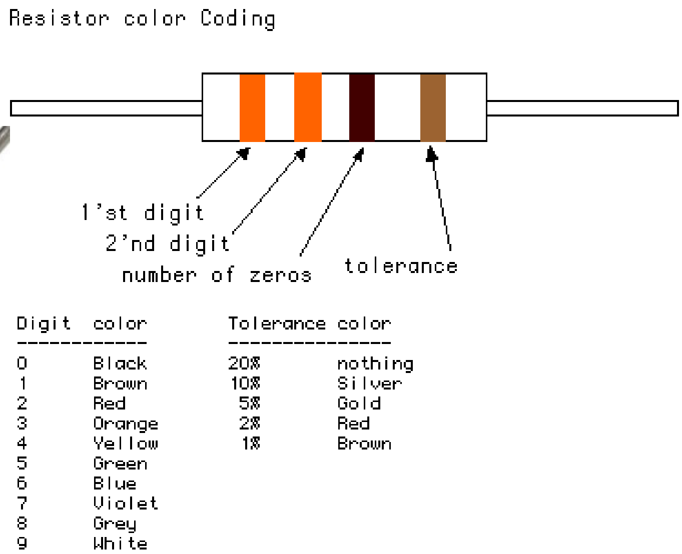
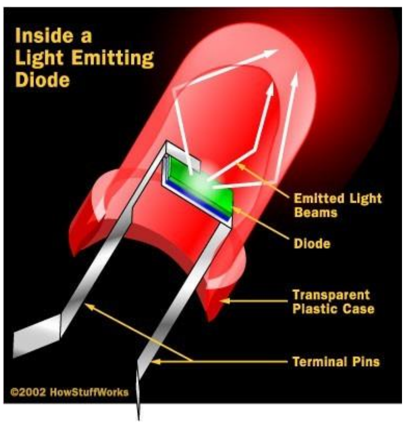


Fig : Resistor **Fig : Color Bands In Resistor**

LED:

A light-emitting diode (LED) is a semiconductor light source. LEDs are used as indicator lamps in many devices, and are increasingly used for lighting. Introduced as a practical electronic component in 1962, early LEDs emitted low-intensity red light, but modern versions are available across the visible, ultraviolet and infrared wavelengths, with very high brightness. The internal structure and parts of a led are shown below.



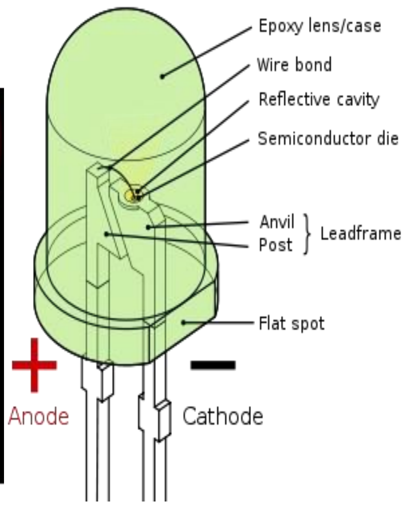


Fig : Inside a LED **Fig : Parts of a LED**

Working:

The structure of the LED light is completely different than that of the light bulb. Amazingly, the LED has a simple and strong structure. The light-emitting semiconductor material is what determines the LED's color. The LED is based on the semiconductor diode.

When a diode is forward biased (switched on), electrons are able to recombine with holes within the device, releasing energy in the form of photons. This effect is called electroluminescence and the color of the light (corresponding to the energy of the photon) is determined by the energy gap of the semiconductor. An LED is usually small in area (less than 1 mm^2), and integrated optical components are used to shape its radiation pattern and assist in reflection. LEDs present many advantages over incandescent light sources including lower energy consumption, longer lifetime, improved robustness, smaller size, faster switching, and greater durability and reliability. However, they are relatively expensive and require more precise current and heat management than traditional light sources. Current LED products for general lighting are more expensive to buy than fluorescent lamp sources of comparable output. They also enjoy use in applications as diverse as replacements for traditional light sources in automotive lighting (particularly indicators) and in traffic signals. The compact size of LEDs has allowed new text and video displays and sensors to be developed, while their high switching rates are useful in advanced communications technology. The electrical symbol and polarities of led are shown in fig:

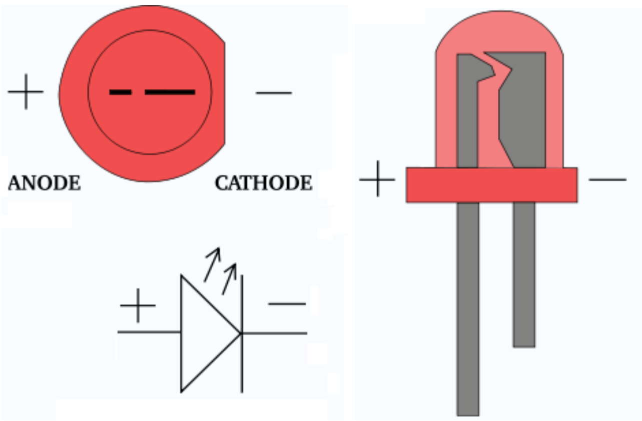


Fig : Electrical Symbol & Polarities of LED

LED lights have a variety of advantages over other light sources:

- High-levels of brightness and intensity
- High-efficiency

- Low-voltage and current requirements
- Low radiated heat
- High reliability (resistant to shock and vibration)
- No UV Rays
- Long source life
- Can be easily controlled and programmed

Applications of LED fall into three major categories:

- Visual signal application where the light goes more or less directly from the LED to the human eye, to convey a message or meaning.
- Illumination where LED light is reflected from object to give visual response of these objects.
- Generate light for measuring and interacting with processes that do not involve the human visual system.

LDR

Working

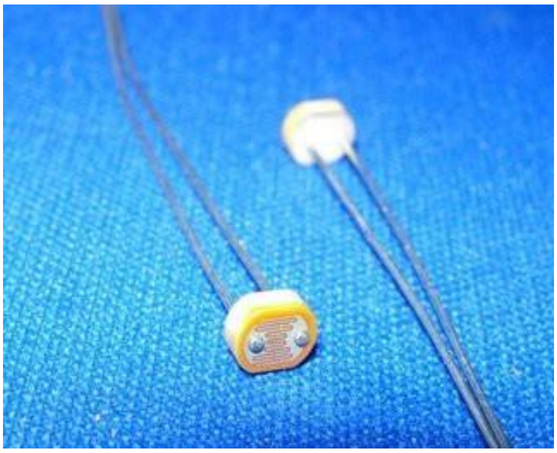
A photo resistor or Light Dependent Resistor or CdS Cell is a resistor whose resistance decreases with increasing incident light intensity. It can also be referred to as a photoconductor. A photo resistor is made of a high resistance semiconductor. If light falling on the device is of high enough frequency, 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.

A photoelectric device can be either intrinsic or extrinsic. An intrinsic semiconductor has its own charge carriers and is not an efficient semiconductor, e.g. silicon. In intrinsic devices the only available electrons are in the valence band, and hence the photon must have enough energy to excite the electron across the entire band gap. Extrinsic devices have impurities, also called dopants, added whose ground state energy is closer to the conduction band; since the electrons don't have as far to jump, lower energy photons (i.e., longer wavelengths and lower frequencies) are sufficient to trigger the device. If a sample of silicon has some of its atoms replaced by phosphorus atoms (impurities), there will be extra electrons available for conduction. This is an example of an extrinsic semiconductor.

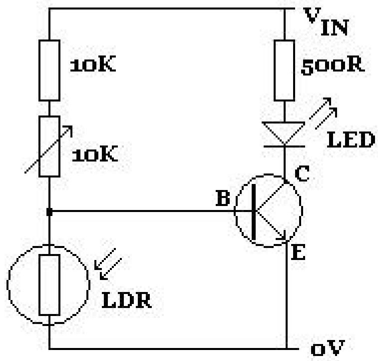
A Light Dependent Resistor (LDR, photoconductor, or photocell) is a device which has a resistance which varies according to the amount of light falling on its surface. They will be having a resistance of 1 MOhm in total darkness, and a resistance of a 1 to 10 of kOhm in bright light. A photoelectric device can be either intrinsic or extrinsic.

Applications:

An LDR can even be used in a simple remote control circuit using the backlight of a mobile phone to turn on a device - call the mobile from anywhere in the world, it lights up the LDR, and lighting can be turned on remotely!

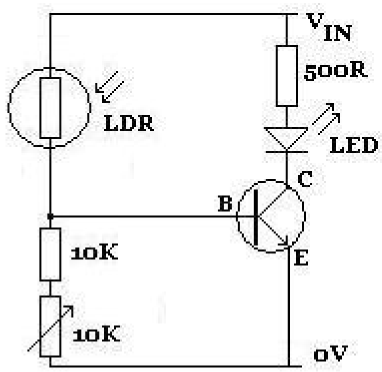


There are two basic circuits using light dependent resistors - the first is activated by darkness, the second is activated by light.

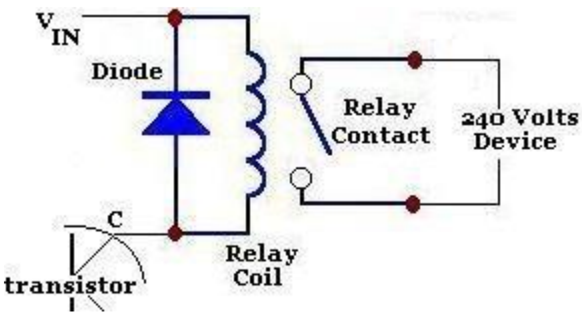


In the circuit diagram on the left, the led lights up whenever the LDR is in darkness. The 10K variable resistor is used to fine-tune the level of darkness required before the LED lights up. The 10K standard resistor can be changed as required to achieve the desired effect, although any replacement must be at least 1K to protect the transistor from being damaged by excessive current.

By swapping the LDR over with the 10K and 10K variable resistors , the circuit will be activated instead by light. Whenever sufficient light falls on the LDR (manually fine-tuned using the 10K variable resistor), the LED will light up.



The circuits shown above are not practically useful. In a real world circuit, the LED (and resistor) between the positive voltage input (Vin) and the collector (C) of the transistor would be replaced with the device to be powered.



Typically a relay is used - particularly when the low voltage light detecting circuit is used to switch on (or off) a 240V mains powered device. A diagram of that part of the circuit is shown above. When darkness falls (if the LDR circuit is configured that way around), the relay is triggered and the 240V device - for example a security light - switches on.

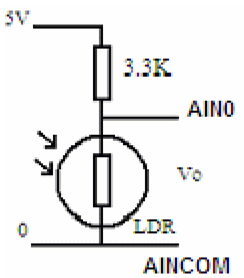
Measure Light Intensity using Light Dependent Resistor (LDR):

The relationship between the resistance RL and light intensity Lux for a typical LDR is

RL = 500 / Lux Kohm

With the LDR connected to 5V through a 3.3K resistor, the output voltage of the LDR is

Vo = 5*RL / (RL+3.3)



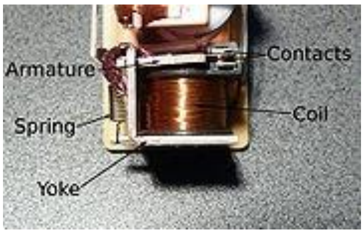
Reworking the equation, we obtain the light intensity

Lux = (2500/Vo - 500)/3

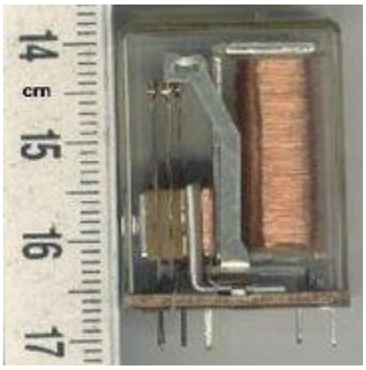
RELAY:

A **relay** is an electrically operated switch. Many relays use an electromagnet to operate a switching mechanism, but other operating principles are also used. Relays find applications where it is necessary to control a circuit by a low-power signal, or where several circuits must be controlled by one signal. The first relays were used in long distance telegraph circuits, repeating the signal coming in from one circuit and re-transmitting it to another. Relays found extensive use in telephone exchanges and early computers to perform logical operations. A type of relay that can handle the high power required to directly drive an electric motor is called a contactor. Solid-state relays control power circuits with no moving parts, instead using a semiconductor device triggered by light to perform switching. Relays with calibrated operating characteristics and sometimes multiple operating coils are used to protect electrical circuits from overload or faults; in modern electric power systems these functions are performed by digital instruments still called "protection relays".

Basic design and operation:



Simple electromechanical relay



Small relay as used in electronics

A simple electromagnetic relay, such as the one taken from a car in the first picture, is an adaptation of an electromagnet. It consists of a coil of wire surrounding a soft iron core, an iron yoke, which provides a low reluctance path for magnetic flux, a movable iron armature, and a set, or sets, of contacts; two in the relay pictured. The armature is hinged to the yoke and mechanically linked to a moving contact or contacts. It is held in place by a spring so that when the relay is de-energized there is an air gap in the magnetic circuit. In this condition, one of the two sets of contacts in the relay pictured is closed, and the other set is open. Other relays may have more or fewer sets of contacts depending on their function. The relay in the picture also has a wire connecting the armature to the yoke. This ensures continuity of the circuit between the moving contacts on the armature, and the circuit track on the printed circuit board (PCB) via the yoke, which is soldered to the PCB.

When an electric current is passed through the coil, the resulting magnetic field attracts the armature and the consequent movement of the movable contact or contacts either makes or breaks a connection with a fixed contact. If the set of contacts was closed when the relay was De-energized, then the movement opens the contacts and breaks the connection, and vice versa if the contacts were open. When the current to the coil is switched off, the armature is returned by a force, approximately half as strong as the magnetic force, to its relaxed position. Usuallythis force is provided by a spring, but gravity is also used commonly in industrial motor starters. Most relays are manufactured to operate quickly. In a low voltage application, this is to reduce noise. In a high voltage or high current application, this is to reduce arcing.

If the coil is energized with DC, a diode is frequently installed across the coil, to dissipate the energy from the collapsing magnetic field at deactivation, which would otherwise generate a voltage spike dangerous to circuit components. Some automotive relays already include a diode inside the relay case. Alternatively a contact protection network, consisting of a capacitor and resistor in series, may absorb the surge. If the coil is designed to be energized with AC, a small copper ring can be crimped to the end of the solenoid. This "shading ring" creates a small out-of-phase current, which increases the minimum pull on the armature during the AC cycle.

By analogy with the functions of the original electromagnetic device, a solid-state relay is made with a thyristor or other solid-state switching device. To achieve electrical isolation an opt coupler can be used which is a light-emitting diode (LED) coupled with a photo transistor.

Types

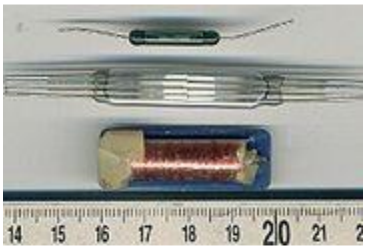
Latching relay

Latching relay, dust cover removed, showing pawl and ratchet mechanism. The ratchet operates a cam, which raises and lowers the moving contact arm, seen edge-on just below it. The moving and fixed contacts are visible at the left side of the image.

A **latching relay** has two relaxed states (bistable). These are also called "impulse", "keep", or "stay" relays. When the current is switched off, the relay remains in its last state. This is achieved with a solenoid operating a ratchet and cam mechanism, or by having two opposing coils with an over-center spring or permanent magnet to hold the armature and contacts in position while the coil is relaxed, or with a remanent core. In the ratchet and cam example, the first pulse to the coil turns the relay on and the second pulse turns it off. In the two coil example, a pulse to one coil turns the relay on and a pulse to the opposite coil turns the relay off. This type of relay has the advantage that it consumes power only for an instant, while it is being switched, and it retains its last setting across a power outage. A remanent core latching relay requires a current pulse of opposite polarity to make it change state.

Reed relay

A **reed relay** has a set of contacts inside a vacuum or inert gas filled glass tube, which protects the contacts against atmospheric corrosion. The contacts are closed by a magnetic field generated when current passes through a coil around the glass tube. Reed relays are capable of faster switching speeds than larger types of relays, but have low switch current and voltage ratings.



Mercury-wetted relay

A **mercury-wetted reed relay** is a form of reed relay in which the contacts are wetted with mercury. Such relays are used to switch low-voltage signals (one volt or less) because of their low contact resistance, or for high-speed counting and timing applications where the mercury eliminates contact bounce. Mercury wetted relays are position-sensitive and must be mounted vertically to work properly. Because of the toxicity and expense of liquid mercury, these relays are rarely specified for new equipment. See also mercury switch.

Polarized relay

A **polarized relay** placed the armature between the poles of a permanent magnet to increase sensitivity. Polarized relays were used in middle 20th Century telephone exchanges to detect faint pulses and correct telegraphic distortion. The poles were on screws, so a technician could first adjust them for maximum sensitivity and then apply a bias spring to set the critical current that would operate the relay.

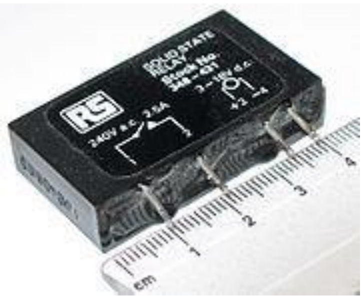
Machine tool relay

A **machine tool relay** is a type standardized for industrial control of machine tools, transfer machines, and other sequential control. They are characterized by a large number of contacts (sometimes extendable in the field) which are easily converted from normally-open to normally-closed status, easily replaceable coils, and a form factor that allows compactly installing many relays in a control panel. Although such relays once were the backbone of automation in such industries as automobile assembly, the programmable logic controller (PLC) mostly displaced the machine tool relay from sequential control applications.

Contactor relay

A **contactor** is a very heavy-duty relay used for switching electric motors and lighting loads. Continuous current ratings for common contactors range from 10 amps to several hundred amps. High-current contacts are made with alloys containing silver. The unavoidable arcing causes the contacts to oxidize; however, silver oxide is still a good conductor. Such devices are often used for motor starters. A motor starter is a contactor with overload protection devices attached. The overload sensing devices are a form of heat operated relay where a coil heats a bi-metal strip, or where a solder pot melts, releasing a spring to operate auxiliary contacts. These auxiliary contacts are in series with the coil. If the overload senses excess current in the load, the coil is de-energized. Contactor relays can be extremely loud to operate, making them unfit for use where noise is a chief concern.

Solid-state relay



Solid state relay, which has no moving parts

25 A or 40 A solid state contactors

A **solid state relay** (**SSR**) is a solid state electronic component that provides a similar function to an electromechanical relay but does not have any moving components, increasing long-term reliability. With early SSR's, the tradeoff came from the fact that every transistor has a small voltage drop across it. This voltage drop limited the amount of current a given SSR could handle. As transistors improved, higher current SSR's, able to handle 100 to 1,200 Amperes, have become commercially available. Compared to electromagnetic relays, they may be falsely triggered by transients.

Solid state contactor relay

A **solid state contactor** is a very heavy-duty solid state relay, including the necessary heat sink, used for switching electric heaters, small electric motors and lighting loads; where frequent on/off cycles are required. There are no moving parts to wear out and there is no contact bounce due to vibration. They are activated by AC control signals or DC control signals from Programmable logic controller (PLCs), PCs, Transistor-transistor logic (TTL) sources, or other microprocessor and microcontroller controls.

Buchholz relay

A **Buchholz relay** is a safety device sensing the accumulation of gas in large oil-filled transformers, which will alarm on slow accumulation of gas or shut down the transformer if gas is produced rapidly in the transformer oil.

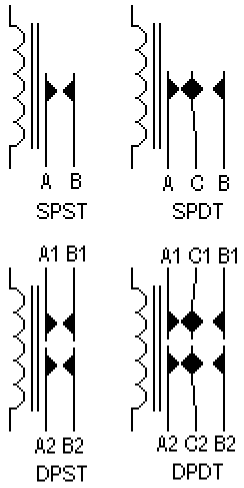
Forced-guided contacts relay

A **forced-guided contacts relay** has relay contacts that are mechanically linked together, so that when the relay coil is energized or de-energized, all of the linked contacts move together. If one set of contacts in the relay becomes immobilized, no other contact of the same relay will be able to move. The function of forced-guided contacts is to enable the safety circuit to check the status of the relay. Forced-guided contacts are also known as "positive-guided contacts", "captive contacts", "locked contacts", or "safety relays".

Overload protection relay

Electric motors need over current protection to prevent damage from over-loading the motor, or to protect against short circuits in connecting cables or internal faults in the motor windings. One type of electric motor overload protection relay is operated by a heating element in series with the electric motor. The heat generated by the motor current heats a bimetallic strip or melts solder, releasing a spring to operate contacts. Where the overload relay is exposed to the same environment as the motor, a useful though crude compensation for motor ambient temperature is provided.

Pole and throw:



Circuit symbols of relays. *"C" denotes the common terminal in SPDT and DPDT types.*

The diagram on the package of a DPDT AC coil relay

Since relays are switches, the terminology applied to switches is also applied to relays. A relay will switch one or more *poles*, each of whose contacts can be *thrown* by energizing the coil in one of three ways:

- Normally-open (**NO**) contacts connect the circuit when the relay is activated; the circuit is disconnected when the relay is inactive. It is also called a **Form A** contact or "make" contact.
- Normally-closed (**NC**) contacts disconnect the circuit when the relay is activated; the circuit is connected when the relay is inactive. It is also called a **Form B** contact or "break" contact.

- Change-over (**CO**), or double-throw (**DT**), contacts control two circuits: one normally-open contact and one normally-closed contact with a common terminal. It is also called a **Form C** contact or "transfer" contact ("break before make"). If this type of contact utilizes”make before break" functionality, then it is called a **Form D** contact.

The following designations are commonly encountered:

- **SPST** – Single Pole Single Throw. These have two terminals which can be connected or disconnected. Including two for the coil, such a relay has four terminals in total. It is ambiguous whether the pole is normally open or normally closed. The terminology "SPNO" and "SPNC" is sometimes used to resolve the ambiguity.
- **SPDT** – Single Pole Double Throw. A common terminal connects to either of two others. Including two for the coil, such a relay has five terminals in total.
- **DPST** – Double Pole Single Throw. These have two pairs of terminals. Equivalent to two SPST switches or relays actuated by a single coil. Including two for the coil, such a relay has six terminals in total. The poles may be Form A or Form B (or one of each).
- **DPDT** – Double Pole Double Throw. These have two rows of change-over terminals. Equivalent to two SPDT switches or relays actuated by a single coil. Such a relay has eight terminals, including the coil.

The "S" or "D" may be replaced with a number, indicating multiple switches connected to a single actuator. For example 4PDT indicates a four pole double throw relay (with 14 terminals).

Applications:

Relays are used to and for:

- Control a high-voltage circuit with a low-voltage signal, as in some types of modems or audio amplifiers,
- Control a high-current circuit with a low-current signal, as in the starter solenoid of an automobile,

- Detect and isolate faults on transmission and distribution lines by opening and closing circuit breakers (protection relays),

A DPDT AC coil relay with "ice cube" packaging

- Isolate the controlling circuit from the controlled circuit when the two are at different potentials, for example when controlling a mains-powered device from a low-voltage switch. The latter is often applied to control office lighting as the low voltage wires are easily installed in partitions, which may be often moved as needs change. They may also be controlled by room occupancy detectors in an effort to conserve energy,
- Logic functions. For example, the boolean AND function is realised by connecting normally open relay contacts in series, the OR function by connecting normally open contacts in parallel. The change-over or Form C contacts perform the XOR (exclusive or) function. Similar functions for NAND and NOR are accomplished using normally closed contacts. The Ladder programming language is often used for designing relay logic networks.
  - Early computing. Before vacuum tubes and transistors, relays were used as logical elements in digital computers. See ARRA (computer), Harvard Mark II, Zuse Z2, and Zuse Z3.
  - Safety-critical logic. Because relays are much more resistant than semiconductors to nuclear radiation, they are widely used in safety-critical logic, such as the control panels of radioactive waste-handling machinery.
- Time delay functions. Relays can be modified to delay opening or delay closing a set of contacts. A very short (a fraction of a second) delay would use a copper disk between the armature and moving blade assembly. Current flowing in the disk

maintains magnetic field for a short time, lengthening release time. For a slightly longer (up to a minute) delay, a dashpot is used. A dashpot is a piston filled with fluid that is allowed to escape slowly. The time period can be varied by increasing or decreasing the flow rate. For longer time periods, a mechanical clockwork timer is installed.

Relay application considerations:

A large relay with two coils and many sets of contacts, used in an old telephone switching system.

Several 30-contact relays in "Connector" circuits in mid 20th century 1XB switch and 5XB switch telephone exchanges; cover removed on one

Selection of an appropriate relay for a particular application requires evaluation of many different factors:

- Number and type of contacts – normally open, normally closed, (double-throw)

- Contact sequence – "Make before Break" or "Break before Make". For example, the old style telephone exchanges required Make-before-break so that the connection didn't get dropped while dialing the number.
- Rating of contacts – small relays switch a few amperes, large contactors are rated for up to 3000 amperes, alternating or direct current
- Voltage rating of contacts – typical control relays rated 300 VAC or 600 VAC, automotive types to 50 VDC, special high-voltage relays to about 15 000 V
- Coil voltage – machine-tool relays usually 24 VAC, 120 or 250 VAC, relays for switchgear may have 125 V or 250 VDC coils, "sensitive" relays operate on a few mill amperes
- Coil current
- Package/enclosure – open, touch-safe, double-voltage for isolation between circuits, explosion proof, outdoor, oil and splash resistant, washable for printed circuit board assembly
- Assembly – Some relays feature a sticker that keeps the enclosure sealed to allow PCB post soldering cleaning, which is removed once assembly is complete.
- Mounting – sockets, plug board, rail mount, panel mount, through-panel mount, enclosure for mounting on walls or equipment
- Switching time – where high speed is required
- "Dry" contacts – when switching very low level signals, special contact materials may be needed such as gold-plated contacts
- Contact protection – suppress arcing in very inductive circuits
- Coil protection – suppress the surge voltage produced when switching the coil current
- Isolation between coil circuit and contacts
- Aerospace or radiation-resistant testing, special quality assurance
- Expected mechanical loads due to acceleration – some relays used in aerospace applications are designed to function in shock loads of 50 *g* or more
- Accessories such as timers, auxiliary contacts, pilot lamps, test buttons
- Regulatory approvals

- Stray magnetic linkage between coils of adjacent relays on a printed circuit board.

Advantages of relays:

- Relays can switch **AC and DC**, transistors can only switch DC.
- Relays can switch **high voltages**, transistors cannot.
- Relays are a better choice for switching **large currents** (> 5A).
- Relays can switch **many contacts** at once.

Disadvantages of relays:

- Relays are **bulkier** than transistors for switching small currents.
- Relays **cannot switch rapidly** (except reed relays), transistors can switch many times per second.
- Relays **use more power** due to the current flowing through their coil.
- Relays **require more current than many ICs can provide**, so a low power transistor may be needed to switch the current for the relay's coil.

AC BULB

Fig:Incandescent (left) and fluorescent (right) light bulbs turned on

An **electric light** is a device that produces visible light from electric current. It is the most common form of artificial lighting and is essential to modern society,providing interior lighting for buildings and exterior light for evening and nighttime activities. In technical usage, a replaceable component that produces light from electricity is called a **lamp**. Lamps are commonly called **light bulbs**; for example, the incandescent light bulb.[3] Lamps usually have a base made of ceramic, metal, glass or plastic, which secures the lamp in the socket of a light fixture. The electrical connection to the socket may be made with a screw-thread base, two metal pins, two metal caps or a bayonet cap.

The three main categories of electric lights are incandescent lamps, which produce light by a filament heated white-hot by electric current, gas-discharge lamps, which produce light by means of an electric arc through a gas, and LED lamps, which produce light by a flow of electrons across a band gap in a semiconductor.

Before electric lighting became common in the early 20th century, people used candles, gas lights, oil lamps, and fires.[4] Humphry Davy developed the first incandescent light in 1802, followed by the first practical electric arc light in 1806. By the 1870s, Davy's arc lamp had been successfully commercialized, and was used to light many public spaces.[5] The development of a steadily glowing filament suitable for interior lighting took longer, but by the early twentieth century inventors had successfully developed options, replacing the arc light with incandescents.

The energy efficiency of electric lighting has increased radically since the first demonstration of arc lamps and the incandescent light bulb of the 19th century. Modern electric light sources come in a profusion of types and sizes adapted to many applications. Most modern electric lighting is powered by centrally generated electric power, but lighting may also be powered by mobile or standby electric generators or battery systems. Battery-powered light is often reserved for when and where stationary lights fail, often in the form of flashlights, electric lanterns, and in vehicles.

Different types of lights have vastly differing efficiencies and color of light.

Name	**Optical spectrum**	**Nominal efficacy (lm/W)**	**Lifetime (MTTF) (hours)**	**Color temperature (kelvin)**	**Color**	**Color rendering index**
Incandescent light bulb	Continuous	4–17	2-20,000	2,400–3,400	Warm white (yellowish)	100

Halogen lamp	Continuous	16–23	3,000–6,000	3,200	Warm white (yellowish)	100
Fluorescent lamp	Mercury line + Phosphor	52–100 (white)	8,000-20,000	2,700–5,000*	White (various color temperatures), as well as saturated colors available	15–85
Metal halide lamp	Quasi-continuous	50–115	6,000-20,000	3,000–4,500	Cold white	65–93
Sulfur lamp	Continuous	80–110	15,000-20,000	6,000	Pale green	79
High pressure sodium	Broadband	55–140	10,000-40,000	1,800–2,200*	Pinkish orange	0–70
Low pressure sodium	Narrow line	100–200	18,000-20,000	1,800*	Yellow, no color rendering	0
LED lamp	Line plus phosphor	10–110 (white)	50,000–100,000	Various white from 2,700 to 6,000*	Various color temperatures, as well as saturated colors	70–85 (white)
Electrodeless lamp	Mercury line + Phosphor	70–90 (white)	80,000–100,000	Various white from	Various color temperatures,	70–85 (white)

				2,700 to 6,000*	as well as saturated colors	

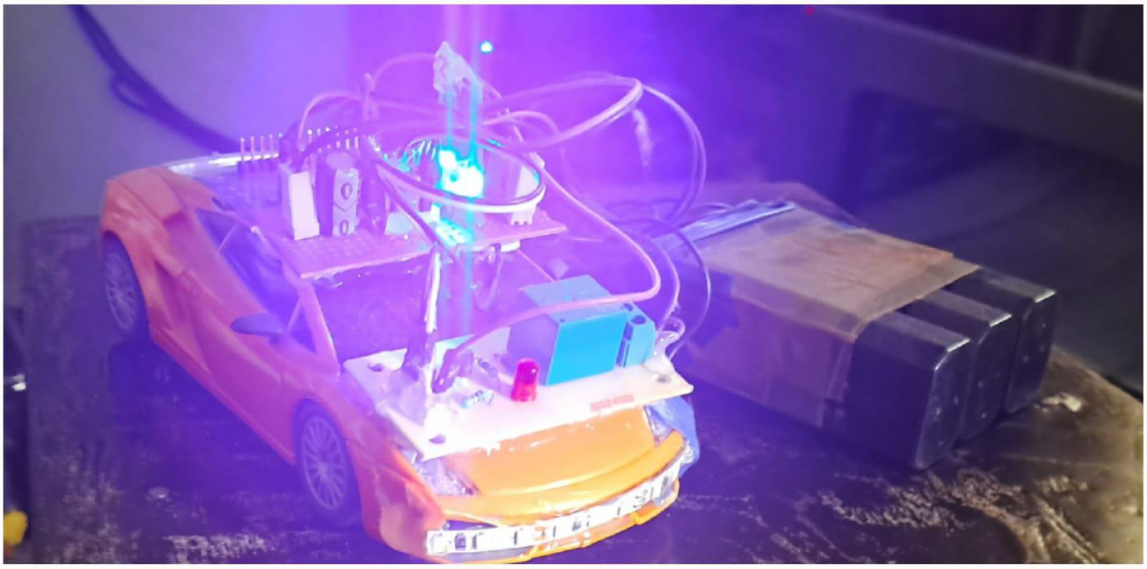
*Color temperature is defined as the temperature of a black body emitting a similar spectrum; these spectra are quite different from those of black bodies.

The most efficient source of electric light is the low-pressure sodium lamp. It produces, for all practical purposes, a monochromatic orange/yellow light, which gives a similarly monochromatic perception of any illuminated scene. For this reason, it is generally reserved for outdoor public lighting usages. Low-pressure sodium lights are favoured for public lighting by astronomers, since the light pollution that they generate can be easily filtered, contrary to broadband or continuous spectra.

CHAPTER 4: PROJECT DESCRIPTION

In this using LDR sensor to detect the DAY and NIGHT ,when the day time the BS6 vehicle head lights ON, if the night time BS6 vehicle head light are OFF automatically .the electromagnetic type relay is used to trigger the BS6 vehicle head light based on day and night condition.

LDR circuit with relay can operate a relay to switch on the lights or it can load any AC circuits, when it senses darkness. LDR is used as a light sensor. Its resistance is low and about 100 ohms in bright light but increases to 10-mega ohm in more dark. Control unit consist of a battery & photo- conductivity plate. When the photoconductivity plate senses light, the resistance varies and control unit sends signal to the relay, which is operated by the battery. Then the feedback mechanism works & gives signal to dim and bright the headlight.



CODE:

```
#define LED D0
#define LDR D1
void setup() {
  // put your setup code here, to run once:
Serial.begin(9600);
pinMode(LED,OUTPUT);
pinMode(LDR,INPUT);
}

void loop() {
  // put your main code here, to run repeatedly:
int a=digitalRead(LDR);
Serial.println(a);
delay(200);
if(a==1)
{
  digitalWrite(LED,HIGH);
  delay(500);

}
else
{
  digitalWrite(LED,LOW);
  delay(500);
}
}
```

FIREBASE CODE:

```
#include <WiFi.h>
#include <FirebaseArduino.h>

// WiFi credentials
const char* ssid = "your_wifi_ssid";
const char* password = "your_wifi_password";

// Firebase credentials
const char* firebaseProjectId = "your_firebase_project_id";
const char* firebaseApiKey = "your_firebase_api_key";

WiFiClient espClient;
FirebaseData firebaseData;

void setup() {
  WiFi.begin(ssid, password);
  while (WiFi.status() != WL_CONNECTED) {
    delay(1000);
  }
  Firebase.begin(firebaseProjectId, firebaseApiKey, espClient);
}

void loop() {
  int hour = Firebase.getInt("lights/schedule/night/startTime");
  int minute = Firebase.getInt("lights/schedule/night/endTime");

  if (hour <= DateTime.now().hour() && minute <= DateTime.now().minute()) {
    Firebase.set("lights/status", "on");
  } else {
    Firebase.set("lights/status", "off");
  }

  delay(60000);
}
```

CHAPTER 6: ADVANTAGES DISADVANTAGES

Advantages:

1. Conservation of Non Renewable energy sources.
2. Energy saving by atomatic BS6 vehicle head light
3. Efficient and low cost design.
4. Low power consumption.
5. No human being requires

Disadvantages:

1. There was a chance to reduce the life time og the BS6 vehicle head lights
2. Periodic Monitoring and Maintenance is required.
3. A drastic environmental change cannot be tolerated by the equipment.

Applications:

1. This energy can be utilized for simple house hold appliances also.
2. This energy can be stored and utilized as backup power supply mainly in industries.

CHAPTER 7: RESULTS

III. LDR SENSOR MECHANISM

Figure: 6 LDR Sensor Mechanism

Result:

LDR circuit with relay can operate a relay to switch on the lights or it can load any AC circuits, when it senses darkness. LDR is used as a light sensor. Its resistance is low and about 100 ohms in bright light but increases to 10-mega ohm in more dark. Control unit consist of a battery & photo- conductivity plate. When the photoconductivity plate senses light, the resistance varies and control unit sends signal to the relay, which is operated by the battery. Then the feedback mechanism works & gives signal to dim and bright the headlight.

Conclusion:

Thus, we implemented and presented "**BS6 vehicle head light controlling using nodemcu** " successfully. A model, which can bring greatness in the field of automotive safety and in automobile manufacturing. The problems which the headlight and steering system were facing at earlier time, it can be resolved by the technology which we have mentioned in this paper. Our work can be deployed in the upcoming vehicles, which will be added benefit and can reduce the risk factor in driving vehicles in various pathways.

Future Scope:

Our project "**BS6 vehicle head light controlling using nodemcu**" is mainly intended to charge a battery using the solar energy. This project has a solar plate, battery and nodemcu regulator. The solar plate, voltage sensor and a battery are interfaced to the regulator.

The circuit uses a 12 volt solar panel and a variable voltage regulator nodemcu . The solar panel consists of solar cells each rated at 1.2 volts. 12 volt DC is available from the panel to charge the battery. Charging current passes through D1 to the voltage regulator IC LM358 By adjusting its Adjust pin, output voltage and current can be regulated.

VR is placed between the adjust pin and ground to provide an output voltage of 9 volts to the battery. Resistor R3 Restrict the charging current and diode D2 prevents discharge of current from the battery. Transistor T1 and Zener diode ZD act as a cut off switch when the battery is full. Normally T1 is off and battery gets charging current.

When the terminal voltage of the battery rises above 6.8 volts, Zener conducts and provides base current to T1. It then turns on grounding the output of to stop charging.

This project can be extended in a way such that the output from the solar plate is increased. This can be done by increasing the dimensions of the solar plate.

REFERENCES

The sites which were used while doing this project:

1. www.wikipedia.com

2. www.allaboutcircuits.com

3. www.microchip.com

4. www.howstuffworks.com