

# **BUS ALERT SYSTEM**

**BY**

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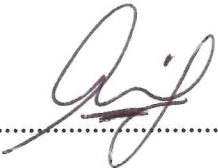
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**A proposal project submitted in fulfillment of the requirement for the award of the  
Diploma of Electrical Engineering (Communication) Department of Electrical  
Engineering Polytechnic Seberang Perai (PSP).**

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## PROJECT REPORT CONFIRMATION

We hereby declare that the work in this report is our own except for quotations and summaries which have been duly acknowledged.

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PUAN NASROLAYUZE BINTI MD SAAD

***Dedicated to,***

***Thanks to Allah,***

*For give us a good health and strength while making this report.*

***Our beloved father and mother,***

*Mohd Zaini bin Mohd Zain & Lolita bt Mohamad Yunus,*

*Ismail bin Ishak & Rusba Aini binti Abu Bakar,*

*Who have always been our epitome of love and always pray for our strength to finish up this report.*

***Our beloved relatives,***

*Our siblings,*

*Thank you for your support and pray.*

***The person who has been very understanding and helpful,***

*Mrs.Nasrolayuze Binti Md Saad,*

*For the support and guidance. Hope that we always be remembered.*

***Our unforgettable friends,***

*Our housemates, our coursemates and all DEP students intake June 2014,*

*Our struggle not yet ends.*

*Finally, friends that always together during this third years study,*

*Hopefully achieved what we aspired.*

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## **ABSTRACT**

Bus alert system is a device that detects the arrival of buses at the bus station. It operates when the bus has parked in the parking lot, it will detect by light dependent resistor (LDR). LDR can adjust by using sensitivity control and it is very useful especially in light or dark sensor circuits. Then, the current will flows to the relay driver and 12Volt relay will produces a clicking sound to notify that the bus has parked on the parking lane. Lastly, the current flows to the lamps (output) that is located at the ticket counter. Lamp 1 is a red colour, it will lights up when there is no bus in the parking lot. Lamp 2 is a green colour, it will lights up when the bus has parked in the parking lot. This project also will help the passengers to save their energy and time from rushing to check that their bus has arrived or not at the parking lane. It can also prevent the passengers from injury, accident or anything happened.

## ABSTRAK

Sistem amaran bas adalah alat yang mengesan ketibaan bas di stesen bas. Ia beroperasi apabila bas itu telah tiba di tempat meletak bas, ia akan dikesan oleh perintang peka cahaya (LDR). LDR boleh diubah dengan menggunakan kawalan sensitiviti dan ia sangat berguna terutama dalam litar pengesan cahaya atau gelap. Kemudian, arus tersebut akan mengalir kepada *relay driver* dan *12 Volts Relay* akan menghasilkan bunyi klik menandakan bas tersebut telah sampai di tempat letak bas. Akhir sekali, arus akan mengalir kepada lampu iaitu *output* yang terletak di kaunter tiket bas. Lampu 1 adalah warna merah, ia akan menyala apabila tiada bas di tempat letak bas. Lampu 2 adalah warna hijau, ia akan menyala apabila bas telah berada di tempat letak bas. Projek ini juga akan membantu penumpang menjimatkan tenaga dan masa mereka dari bergegas untuk memeriksa bahawa bas telah tiba atau tidak di tempat letak bas. Ia juga boleh menghindar dari berlakunya kecederaan atau kemalangan yang tidak diingini.

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**CHAPTER 1**  
**INTRODUCTION**



## **1.1 Background Research**

Bus Alert System is to detect the arrival of the buses at the bus station. It operates using a light-dependent resistor (LDR) circuit. The LDR circuit will detect when the specific bus arrives at the parking lane. Then, it will notify and send the signal to the green and red lamps that are located at the ticket counter. When the bus has parked in the parking lot, the green lamp will light up to show that the parking has been used. When the parking lot is empty, the red lamp will light up as any bus can park in it. This will ensure that the passengers know when the bus arrived without rushing to the bus parking lane.

## **1.2 Problem Statement**

- The passengers do not know whether the bus has arrived or not.
- Waste times and efforts for searching buses at the parking lots.
- Need for an early warning system for the approaching transportation vehicle.

## **1.3 Objective**

- To detect the arrival of the buses at the bus station.
- To save the passengers' energy and time from rushing at the parking lane.
- To create intelligent monitoring system.

## **1.4 Scope of Research**

The advantage of the Bus Alert System is to solve the problem of wasting times and efforts of the passengers to search the bus at the parking lots. This system operates when the bus has parked at the parking lane, the green lamp that is located at the ticket counter will light up to notify the passengers that the bus has arrived. When the parking lots are empty, the red lamp will light up. Thus this system is to facilitate the passengers who are waiting for their bus to arrive without rushing to the parking lane.

## 1.5 Research Interests

- To provide sensor signal processing features that capable to detect the arrival of bus.
- To display the arrival of bus information for passengers through light displays that are located at the ticket counter.

**CHAPTER 2**  
**LITERATURE REVIEW**

## **2.1 Introduction of Bus Alert System**

Bus Alert System is a circuit that have sensor to detect buses when arrived at the parking lots. This system is created to develop a system which indicates directly which bus has arrived at the parking lot. The passengers can spot the lamps which is display as an output at the waiting area without rushing to the bus parking lane.

Besides, bus parking system does not have any intelligent monitoring system. Nowadays, there are parents who do not concerned about their children's safety will asked their children to see if the bus has arrived or not at the bus parking lot. Therefore, this project can also avoid the passengers from injury, accident or anything happened without rushing to the bus parking.

The output display at the ticket counter will notifies the passengers when will the bus arrived at the parking lot and the green bulb will lights up. When the parking lot was empty, the red bulb will appear.

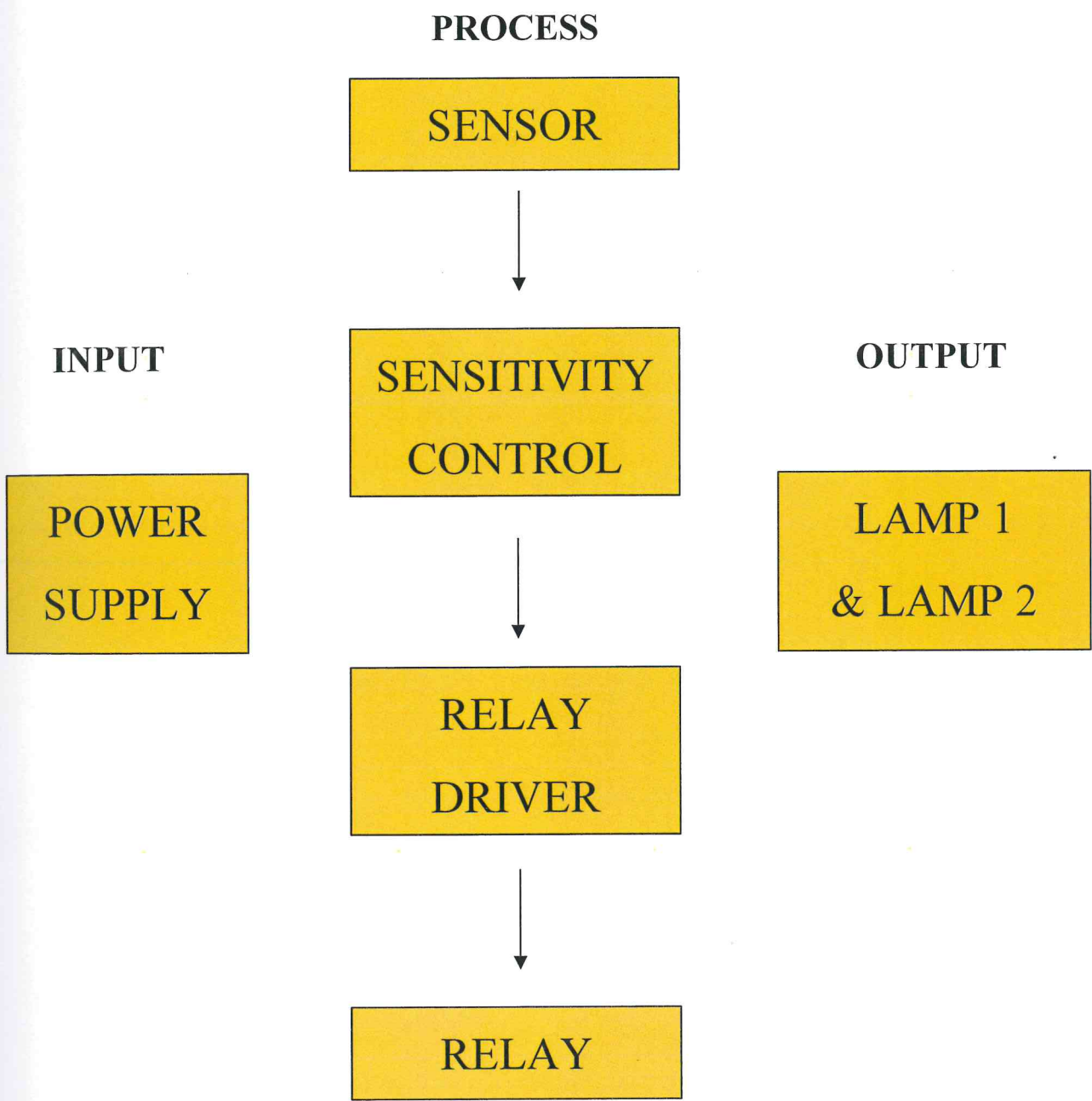
## **2.2 Concept of the Project**

In order to accomplish the project successfully, the concept that are studied in our project are sensitivity control.

## **2.3 Previous Research**

Before this, there was no system to notify the passengers the arrival of the bus at the bus station. It would be inconvenient for the passengers while waiting for the bus at the bus station and wasting their time for too long. Therefore, our project can solve this from happened, especially for the passengers by placing the display output in front of the waiting area.

2.4 Block Diagram



## CIRCUIT OF BUS ALERT SYSTEM

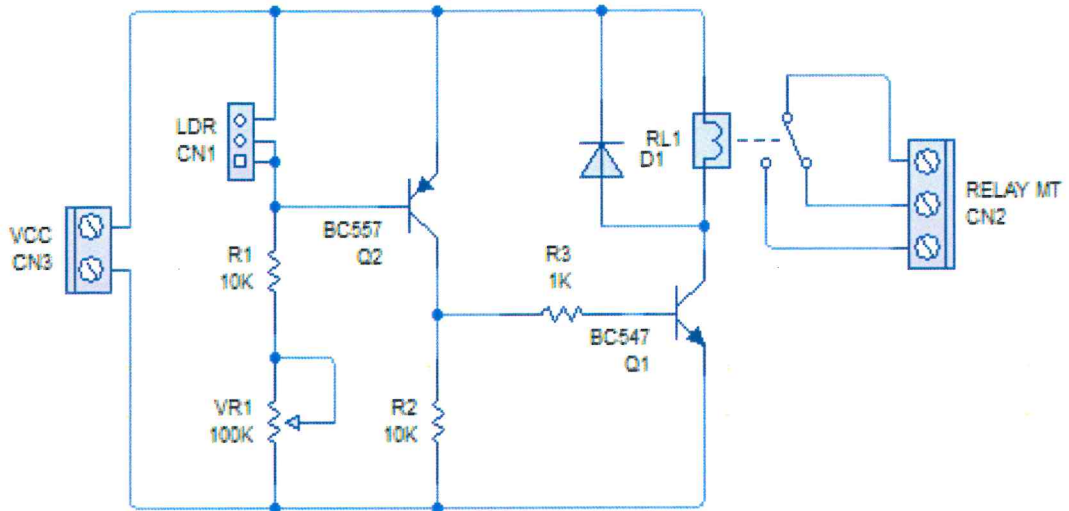


Figure 2.5.1 Circuit of Bus Alert System

## ARTWORK OF BUS ALERT SYSTEM

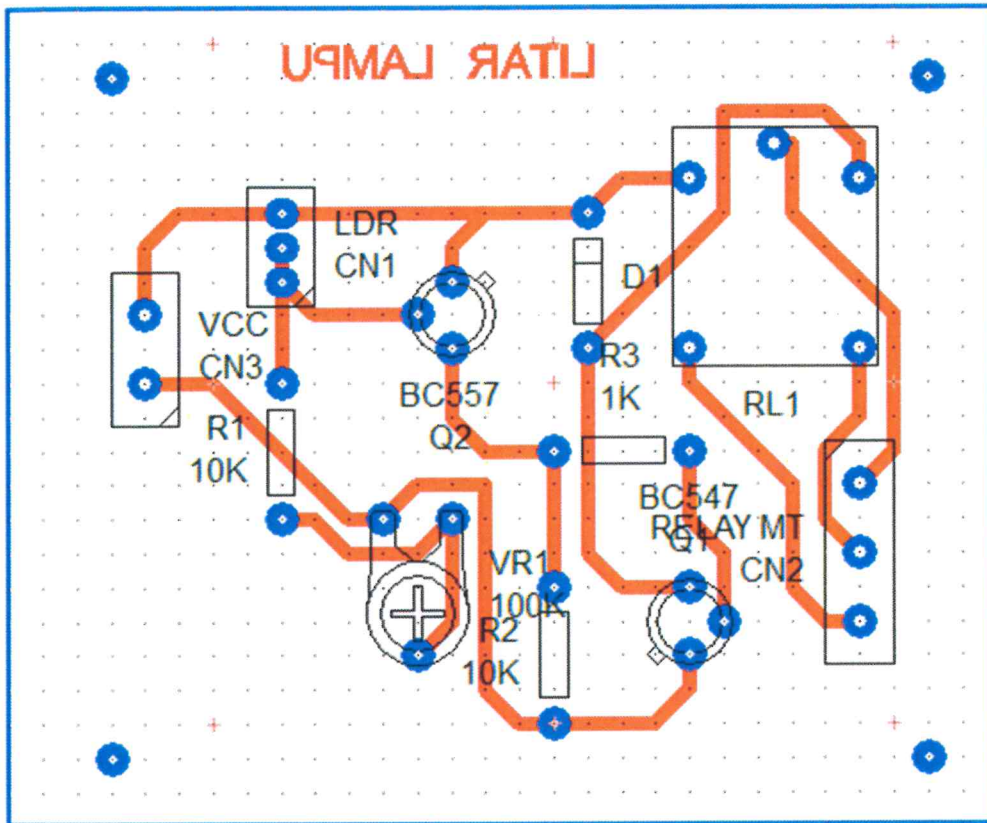


Figure 2.5.2 Artwork of Bus Alert System

## MODEL OF BUS ALERT SYSTEM

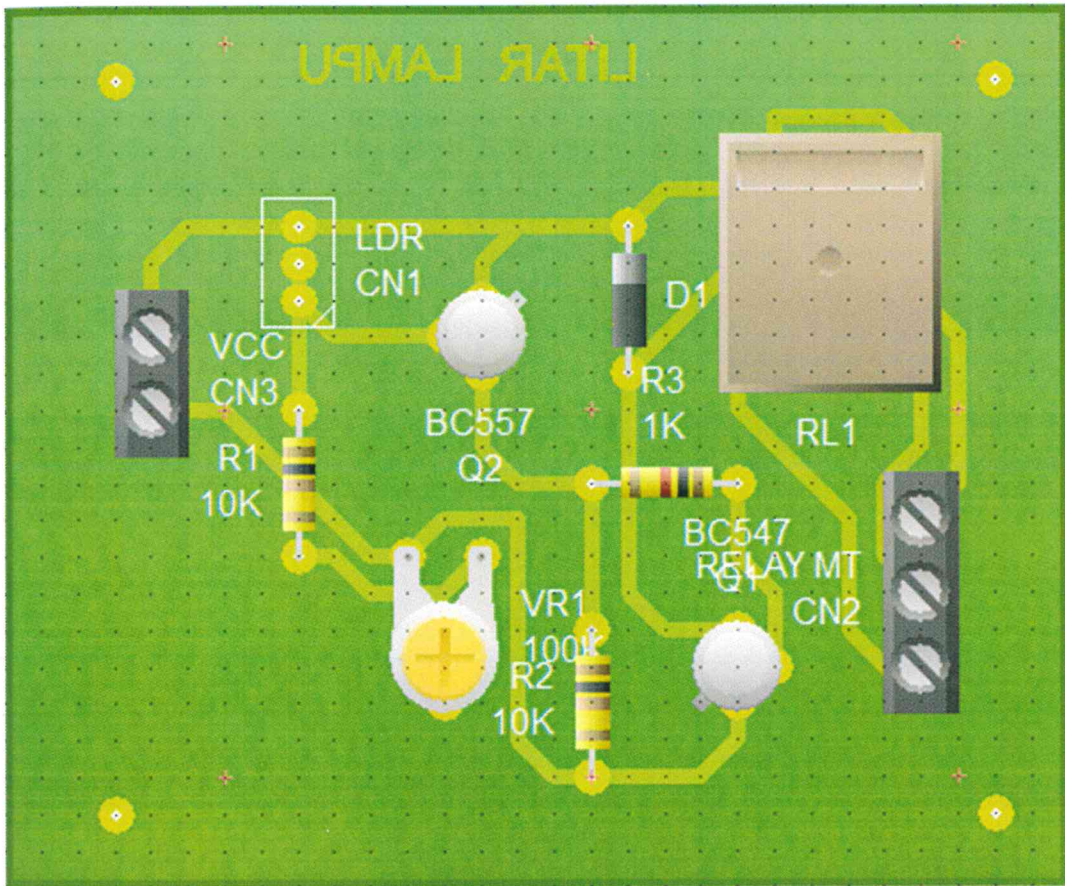


Figure 2.5.3 Model of Bus Alert System



## 2.5 Function of Components

In this LDR circuit, we are using sensor itself, preset, transistor, 12voltage relay, diode, resistors and terminal blocks. Each of these components has their own functions. Thus, we will explain more about the components that we used on this circuit.

### 1. Light sensors – Photoresistor

A light sensor is a device that is used to detect light. There are different types of light sensors such as photocell/photoresistor and photodiodes being used in manufacturing and other industrial applications. A photoresistor is a two-terminal semiconductor device that has an electrical resistance that depends on the light incident on the exposed semiconductor surface. The resistance decreases with increases in incident.

LDRs are light-dependent devices whose resistance decreases when light falls on them and increases in the dark. When a LDR is kept in dark, its resistance is very high. This resistance is called as dark resistance. It can be as high as  $10^{12} \Omega$ . If the device is allowed to absorb light, its resistance will decrease drastically.

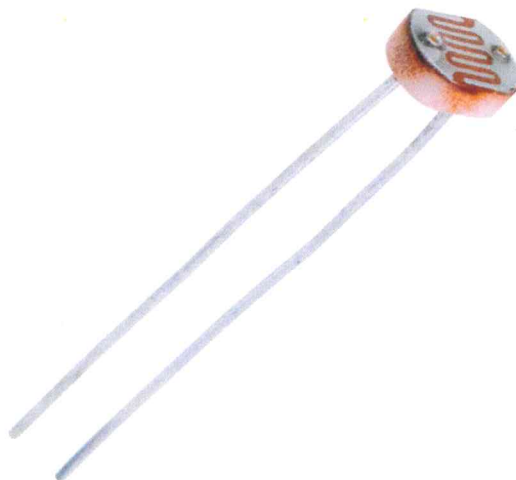


Figure 2.5.1 A Light-dependent Resistor

## Applications of photoresistor :

- Computers, wireless phones and televisions use ambient light sensors to automatically control the brightness of a screen.
- Barcode scanners used in retailer locations work using light sensor technology.
- In space and robotics, for controlled and guided motions of vehicles and robots. The light sensor enables a robot to detect light. Robots can be programmed to have a specific reaction if a certain amount of light is detected.
- Auto flash of camera.

## 2. Transistor

A bipolar transistor is a semiconductor device that acts as a variable resistor. It is made up of three alternating layers, which form two P-N junctions,

Emitter : heavily doped region that supplies majority current carriers.

Base : thin and lightly doped region that controls current flow through the transistor.

Collector : large, lightly doped region used to collect current carriers from emitter.

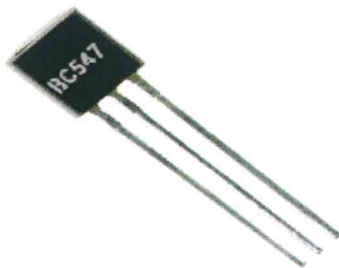


Figure 2.5.2 A transistor BC547

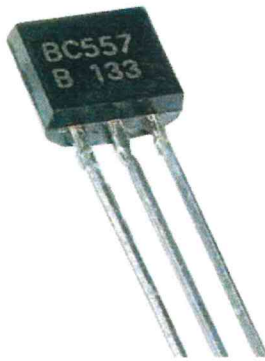


Figure 2.5.3 A transistor BC557

Applications of transistor :

- Amplifiers
- Voltage and current regulators
- Electronic switches

There are two types of standard transistors, NPN and PNP, with different circuit symbols. The letters refer to the layers of semiconductor material used to make the transistor. Most transistors used today are NPN because this is the easiest type to make from silicon. The leads are labelled base (B), collector (C) and emitter (E).

### 3.Preset

A preset is a three legged electronic component which can be made to offer varying resistance in a circuit. The resistance is varied by adjusting the rotary control over it. The adjustment can be done by using a small screw driver or a similar tool. The resistance does not vary linearly but rather varies in exponential or logarithmic manner. Such variable resistors are commonly used for adjusting sensitivity along with a sensor.

The variable resistance is obtained across the single terminal at front and one of the two other terminals. The two legs at back offer fixed resistance which is divided by the front leg. So whenever only the back terminals are used, a preset acts as a fixed resistor. Presets are specified by their fixed value resistance.

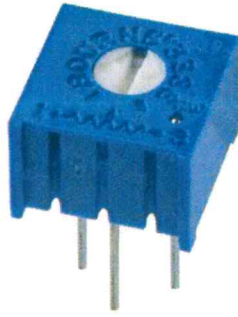


Figure 2.5.4 A preset

#### 4.12 Volt Relay

A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state relays. Since relays are switches, the terminology applied to switches is also applied to relays; a relay switches one or more *poles*, each of whose contacts can be *thrown* by energizing the coil.

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.

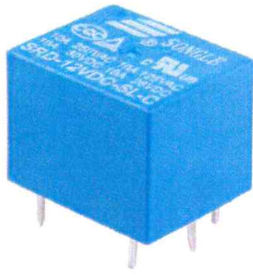


Figure 2.5.5 A 12V Relay

## 5.Diode

In electronics, a diode is a two-terminal electronic component that conducts primarily in one direction (asymmetric conductance); it has low (ideally zero) resistance to the flow of current in one direction, and high (ideally infinite) resistance in the other. The main common function of a diode is to allow an electric current to pass in one direction (called the diode's forward direction), while blocking current in the opposite direction (the reverse direction). Thus, the diode can be viewed as an electronic version of a check valve. This unidirectional behaviour is called rectification, and is used to convert alternating current (AC) to direct current (DC), including extraction of modulation from radio signals in radio receivers - these diodes are forms of rectifiers.

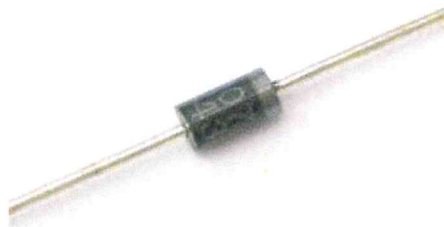


Figure 2.5.6 A 1N4007 Transistor

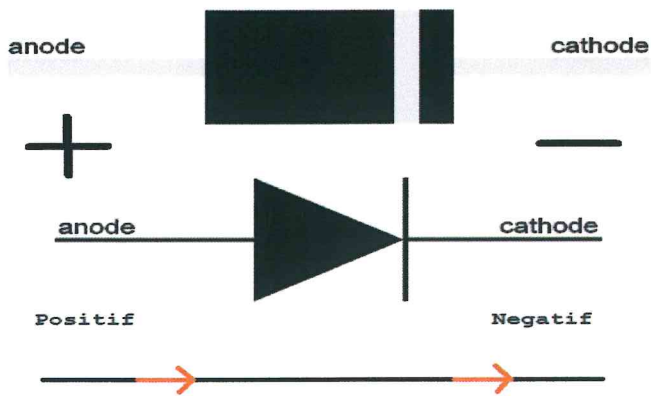


Figure 2.5.7 A transistor symbol

## 6.Resistor

A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. In electronic circuits, resistors are used to reduce current flow, adjust signal levels, to divide voltages, bias active elements, and terminate transmission lines, among other uses. High-power resistors that can dissipate many watts of electrical power as heat may be used as part of motor controls, in power distribution systems, or as test loads for generators. Fixed resistors have resistances that only change slightly with temperature, time or operating voltage. Variable resistors can be used to adjust circuit elements (such as a volume control or a lamp dimmer), or as sensing devices for heat, light, humidity, force, or chemical activity.

Resistors are common elements of electrical networks and electronic circuits and are ubiquitous in electronic equipment. Practical resistors as discrete components can be composed of various compounds and forms. Resistors are also implemented within integrated circuits.



Figure 2.5.8 A resistor

## **7. Terminal Block**

A terminal block is a screw-type electrical connector where the wires are clamped down to the metal part by a screw. It is a connector which allows more than one circuit to connect to another circuit. It often contains two long aluminium or copper strips that are designed to connect different components. These strips create a bus bar for power distribution that is sent to the connected components. A barrier strip is composed of several screw terminals.

## 2.6 Introduction of Power Supply

A power supply is an electronic device that supplies electric energy to an electrical load. The primary function of a power supply is to convert one form of electrical energy to another and sometimes referred to as electric power converters. Some power supplies are discrete, stand-alone devices, whereas others are built into larger devices along with their loads.

Depending on its design, a power supply may obtain energy from various types of energy sources, including electrical energy transmission systems, energy storage devices such as a batteries and fuel cells, electromechanical systems such as generators and alternators, solar power converters, or another power supply.

All power supplies have a power input, which receives energy from the energy source, and a power output that delivers energy to the load. In most power supplies, the power input and output consist of electrical connectors or hardwired circuit connections. Some power supplies have other types of inputs and outputs as well, for functions such as external monitoring and control.



## CIRCUIT OF POWER SUPPLY

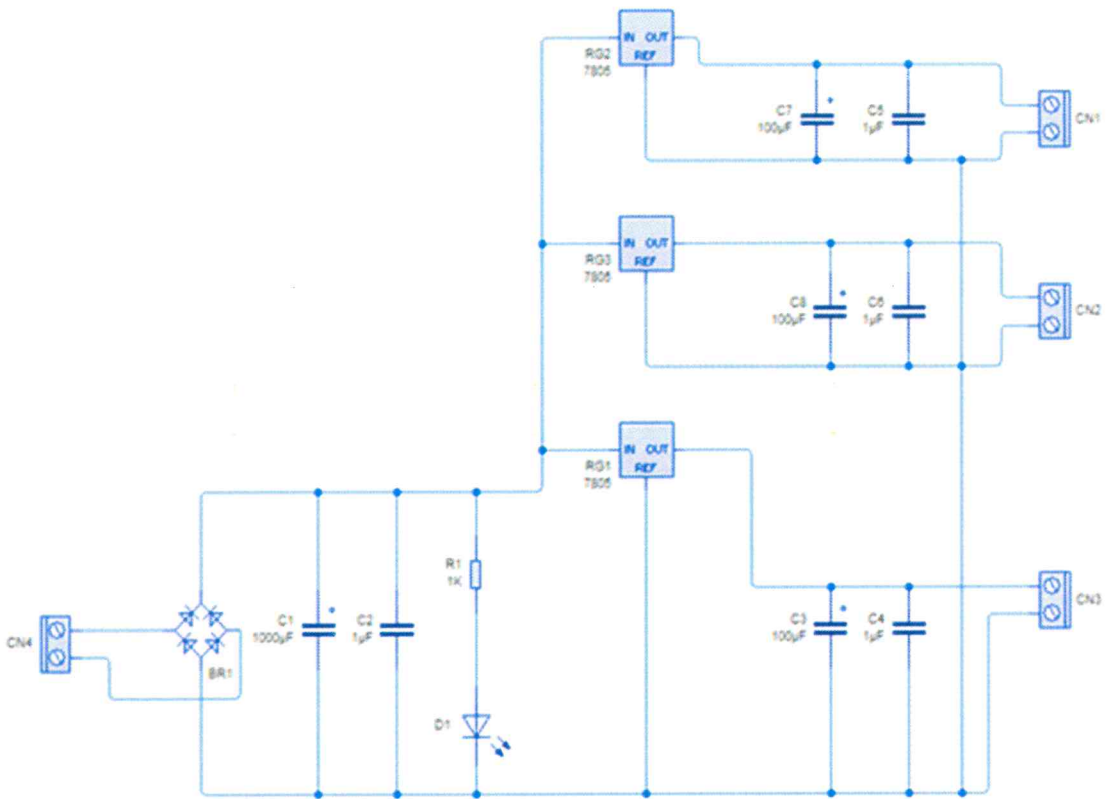


Figure 2.6.1 Circuit of Power Supply

## ARTWORK OF POWER SUPPLY

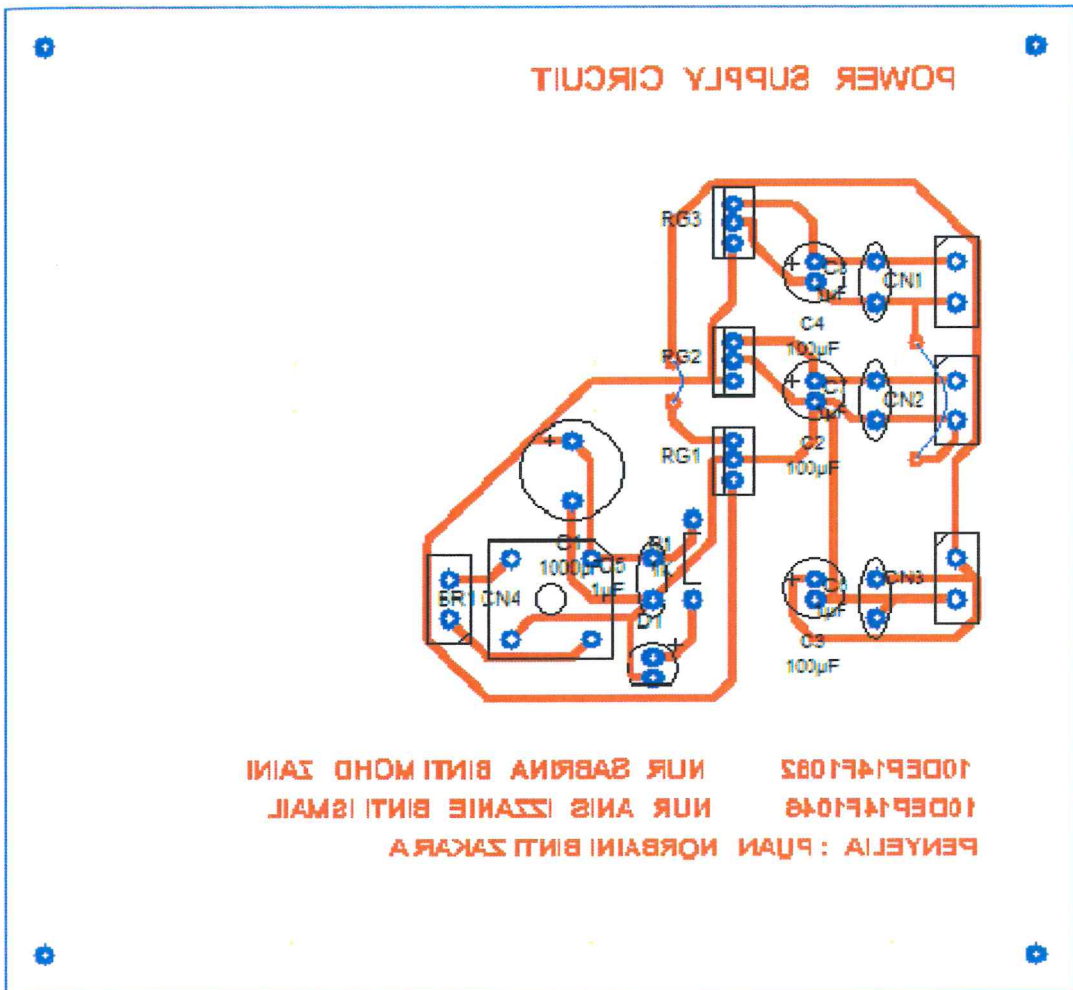


Figure 2.6.2 Artwork of Power Supply

## MODEL OF POWER SUPPLY

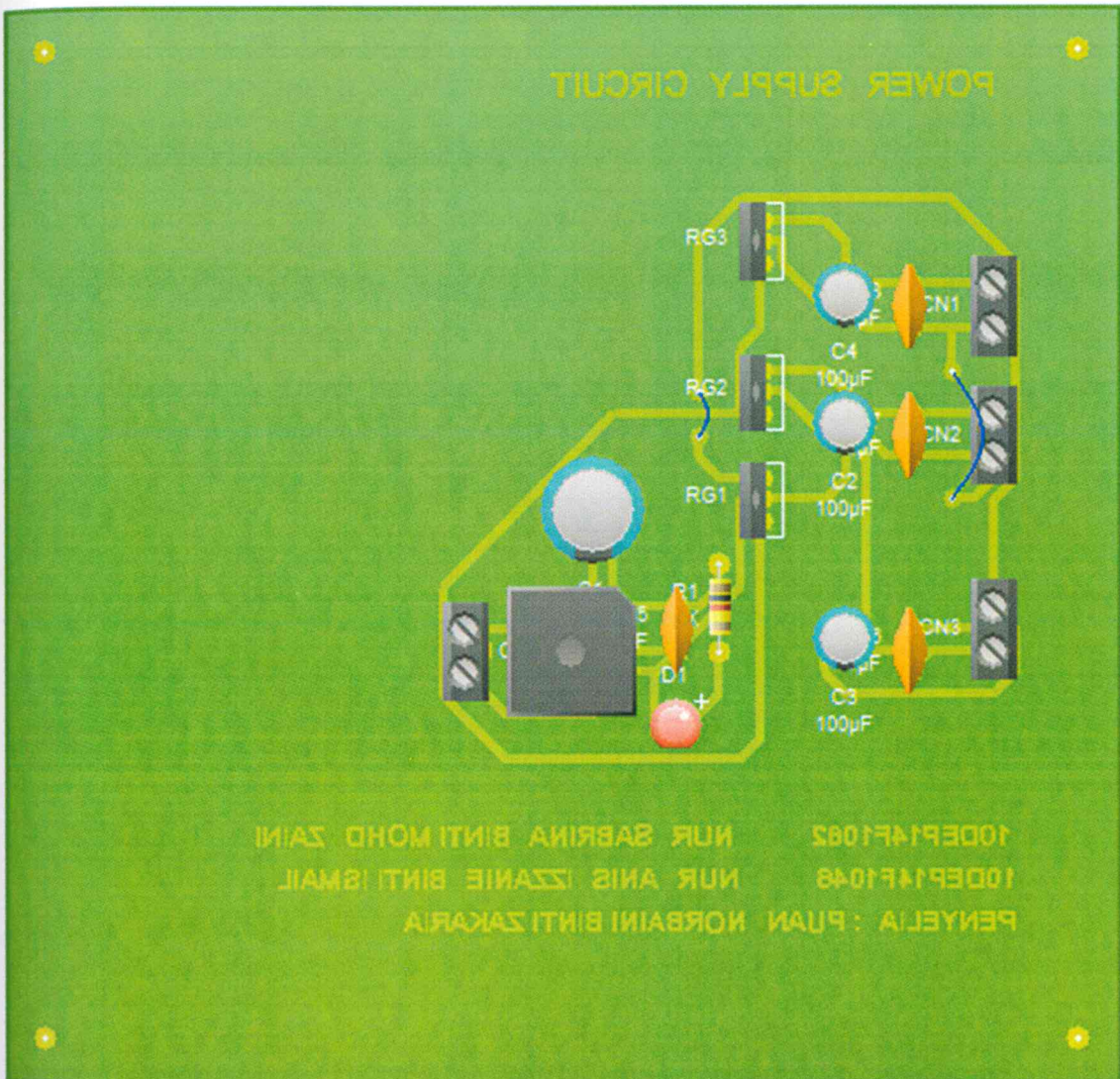


Figure 2.6.3 Model of Power Supply

**CHAPTER 3**  
**METHODOLOGY**

### 3.1 Step Preparation Projects

Here is the sequence of process that need to be follow to make the projects.

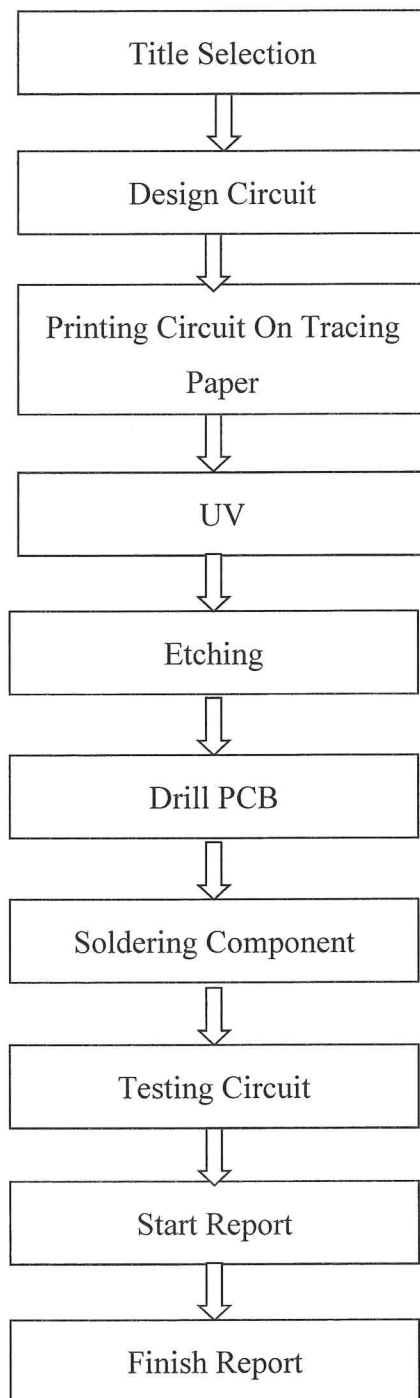


Figure 3.1.1 : Step preparation projects

## 3.2 PCB Wizard Overview

PCB Wizard is a strong application that can be used for designing circuit boards whether they are single sided or double sided printed. PCB Wizard is loaded with all the necessary tools that are needed at each step of PCB circuit designing.

PCB Wizard has a very simple and intuitive interface that has all the tools nicely placed and the component and wires that are needed for the circuit designing. Electronic Workbench is also a great alternative of PCB Wizard. A large library of components has also been provided for the ease of use in PCB designing. These components can be easily inserted into your project and there is no need to draw them from scratch.

### a) Features of PCB Wizard

Below are some noticeable features which we will experience :

- Used for designing single as well as double sided printed circuit boards.
- Simple interface.
- Components can be inserted easily.
- No need to draw components.
- Light on system.