AUTOMATIC HOME LIGHT SWITCH

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ABSTRAK

Projek ini membantu pengguna untuk tidak membazirkan aliran elektrik. Kebanyakan orang mengambil mudah apabila keluar rumah terlupa untuk menutup suis lampu. Dengan membangunkan automatik suis lampu rumah yang akan mematikan kuasa apabila tidak ada pengguna tidak di rumah. Apabila lalai, alat ini akan berfungsi jika pengguna tidak menggunakan elektrik secara automatik. Automatik suis lampu rumah adalah satu langkah untuk kita mengurangkan dan menjimatkan elektrik daripada mengalir.

ABSTRACT

This project helps the user not to waste electricity flows. Most people take for granted when going out of the house forgot to close the light switch. By developing automatic home light switch that will turn off power when no user is not at home. By default, this tool will work if the user is not using electricity automatically. Automatic home light switch is a step for us to reduce and save the electricity from flowing.

APPRECIATION

Thanks to Allah s.w.t with a bounty of giving out good health throughout this project, the wood has obtained a wealth of information and knowledge in more detail in connection with the project. On this occasion, we would like to thank all parties involved in the success of this task.

Especially to our supervisor, Mr. Mohd Shafie Bin Abu Hanifah that many provide guidance throughout the project is on the run. Do not forget also to lecturers from the Department of Electrical Engineering as Mr Najib, Mr. Alam and others. Besides, we also want to say a big thank you to our family members and colleagues who have a lot of moral support and cooperation for the realization of these projects enhance business successfully.

All the assistance and cooperation that has been extended highly appreciated because without your help and your support, this project could not be implemented successfully. Services which we can not respond with money because it's very valuable. The final word, which comes from Allah s.w.t and the bad of it comes from our own weaknesses.

LIST OF TABLES

LIST OF DIAGRAMS

SHORT LIST OF WORDS

Short	Word
PCB	The Printed Cicuit Board

CHAPTER 1:
1.0 INTRODUCTION

1.1 PROBLEM STATEMENT

- People always leave the house without turning off the switch
- Conduct electricity wastage

1.2 OBJECTIVES

- To save electric current at the home
- To save a cost of electric current

1.3 SCOPE AND LIMITATION OF PROJECT

This project concentrates on automatic home light switch system based on the use of the home light. To achieve all the objectives, the developer needs to have knowledge on the following elements. In addition, this project can be scope for study. For example, we can give this project to polytechnic and some university. Other than that, based on our project students easily can understand about circuit process. Moreover, it can be make students more understand by lecturer during the teaching and learning process.

1.4 SIGNIFICANT OF PROJECT

The design of automatic home light switch is to save energy. We also made this project for reduce the cost of electricity and we don't want other people waste a electric.

CHAPTER 2:
2.0 LITERATURE REVIEW

2.1 INTRODUCTION

This chapter describes the hardware used in the project to produce this project, which is part of the software and hardware. Description specified with respect to the function of each component as well as the software used. In addition, the description of how the operation of the relay is also worth mentioning.

2.2 PCB WIZARD 3

PCB Wizard 3 is a highly innovative package for designing printed circuit boards. Offering unrivalled productivity through powerful design tools and an ultra-friendly user interface, PCB Wizard 3 is the ideal choice for all your project work. Add to that, a wealth of clever features that do away with the steep learning curve normally associated with PCB packages, and PCB Wizard 3 is hard to beat. It provides a comprehensive range of tools covering all the traditional steps in PCB production, including schematic drawing, schematic capture, component placement, automatic routing, Bill of Materials reporting and file generation for manufacturing. The software is supplied on a CD-ROM and requires Microsoft Windows 95, 98, ME, NT 4.0 (with SP6), 2000, XP, Vista or 7. User guide and instructions are included within the software.

PCB Wizard Standard:

- Large database of components
- Schematic design and capture
- Manual PCB design
- Single sided auto-routing
- User-defined components
- Copper pour
- Bill of materials report generator
- Gerber and N.C. drilling export
- Integrated publishing with text, graphics and spell-checking support
- Import circuits from Livewire, order code N29AJ

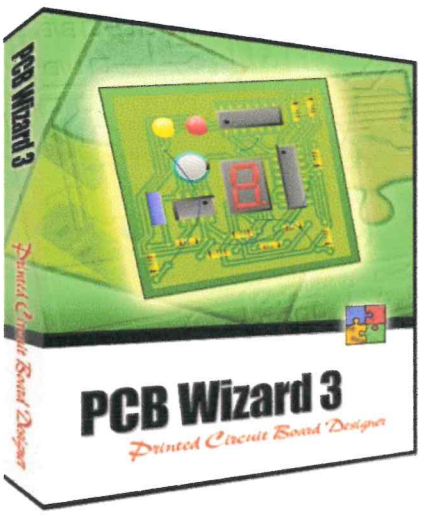


Figure 2.2: PCB Wizard 3

2.3 TIMER 555

IC 555 timer is a well-known component in the electronic circles but what is not known to most of the people is the internal circuitry of the IC and the function of various pins present there in the IC 555 timer is a one of the most widely used IC in electronic and used in various electronic circuits for its robust and stable properties. It works as square-wave form generator with duty cycle varying from 50 % - 100 %. Oscillator and can also provide time delay in circuits. the IC 555 timer is used in many circuits for example one-shot pulse generator in monostable mode as an oscillator in astable mode or in bistable mode to produce a flip/flop type action.

Function pins:

Ground: 0 V supply

Trigger: when the pin voltage falls below 0.33V, the timer is trigged and the output goes high. In the monostable configuration a high to low transition on the trigger pins start the timer.

Output: the output pulses during astable opration and goes high for a set time in monostable opearation.

Reset: if reset is not used, connect it to VCC. If reset falls, a high output will be forced low.

Control voltage: For reliable operation add a 10nF capacitor to ground on this pin.

Threshold: Detects when the voltage on the timing capacitor rises above 0.66VCC and resets the output when this happens.

Discharge: Provides a discharge path from the timing capacitor to grounf when the output is low.

VCC: Positive power supply voltage.

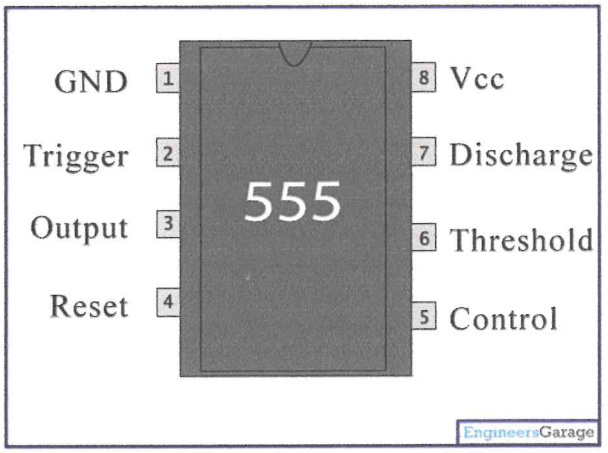


Figure 2.3: Timer

2.4 CAPACITOR

Capacitors store electric energy when they are connected to a battery or some other charging circuit. They are commonly placed in electronic components and are used to maintain power supply while the device is unplugged and without a battery for a short time. The energy within the capacitor prevents the loss of data, with an example being the RAM of a computer. Capacitance is usually measured in the farad unit, which is the equivalent of one coulomb per volt.

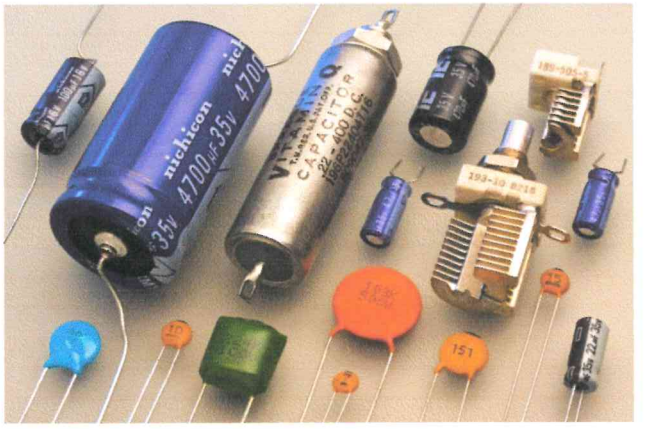


Figure 2.4: Capacitor

2.5 TRANSISTOR

The 2N2222 is a common NPN bipolar junction transistor (BJT) used for general purpose low-power amplifying or switching applications. It is designed for low to medium current, low power, medium voltage, and can operate at moderately high speeds. The 2N2222 is considered a very common transistor, and is used as an exemplar of an NPN transistor. It is frequently used as a small-signal transistor.

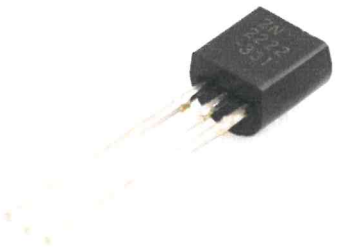


Figure 2.5 : Transistor

2.6 RESISTOR

A resistor is a specialized electrical component that provides resistance as a circuit element. Resistors are passive, which means they are not affected by the current they carry. There are three types of resistors: fixed, variable, special.

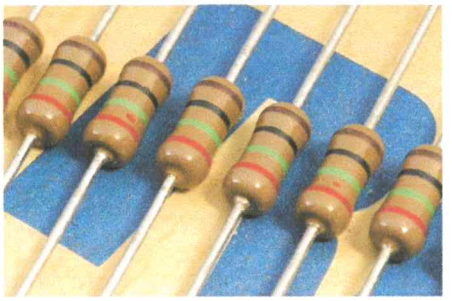


Figure 2.6: Resistor

2.7 SENSOR

A sensor is a device that detects and responds to some type of input from the physical environment. The specific input could be light, heat, motion, moisture, pressure, or any one of a great number of other environmental phenomena. The output is generally a signal that is converted to human-readable display at the sensor location or transmitted electronically over a network for reading or further processing.

Here are a few examples of the many different types of sensors:

- In a mercury-based glass thermometer, the input is temperature. The liquid contained expands and contracts in response, causing the level to be higher or lower on the marked gauge, which is human-readable.

- An oxygen sensor in a car's emission control system detects the gasoline/oxygen ratio, usually through a chemical reaction that generates a voltage. A computer in the engine reads the voltage and, if the mixture is not optimal, readjusts the balance.

- Motion sensors in various systems including home security lights, automatic doors and bathroom fixtures typically send out some type of energy, such as microwaves, ultrasonic waves or light beams and detect when the flow of energy is interrupted by something entering its path.

- A photo sensor detects the presence of visible light, infrared transmission (IR), and/or ultraviolet (UV) energy.

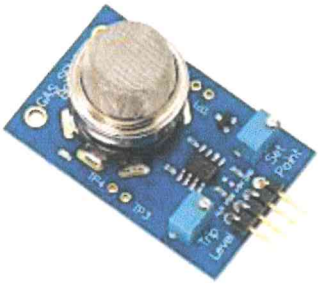


Figure 2.7: Sensor

2.8 TRANSFORMER

A transformer is an electrical device that transfers electrical energy between two or more circuits through electromagnetic induction. Electromagnetic induction produces an electromotive force within a conductor which is exposed to time varying magnetic fields. Transformers are used to increase or decrease the alternating voltages in electric power applications.

A varying current in the transformer's primary winding creates a varying magnetic flux in the transformer core and a varying field impinging on the transformer's secondary winding. This varying magnetic field at the secondary winding induces a varying electromotive force (EMF) or voltage in the secondary winding due to electromagnetic induction. Making use of Faraday's Law (discovered in 1831) in conjunction with high magnetic permeability core properties, transformers can be designed to efficiently change AC voltages from one voltage level to another within power networks.

Since the invention of the first constant potential transformer in 1885, transformers have become essential for the transmission, distribution, and utilization of alternating current electrical energy.[3] A wide range of transformer designs is encountered in electronic and electric power applications. Transformers range in size from RF transformers less than a cubic centimeter in volume to units interconnecting the power gridweighing hundreds of tons.

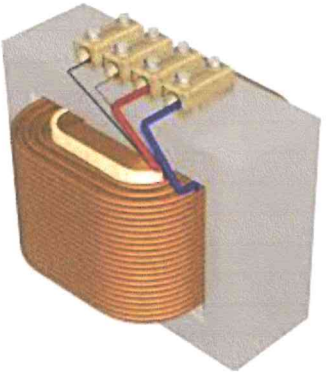


Figure 2.8: Transformer

2.9 Relay

Relay is an electromagnetic device which is used to isolate two circuits electrically and connect them magnetically. They are very useful devices and allow one circuit to switch another one while they are completely separate. They are often used to interface an electronic circuit (working at a low voltage) to an electrical circuit which works at very high voltage. For example, a relay can make a 5V DC battery circuit to switch a 230V AC mains circuit. Thus a small sensor circuit can drive, say, a fan or an electric bulb.

A relay also 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. Relays are used where it is necessary to control a circuit by a low-power signal (with complete electrical isolation between control and controlled circuits), or where several circuits must be controlled by one signal. The first relays were used in long distance telegraph circuits as amplifiers: they repeated the signal coming in from one circuit and re-transmitted it on another circuit. Relays were used extensively in telephone exchanges and early computers to perform logical operations.

Figure 2.8: Relay

CHAPTER 3:

3.0 METHODOLOGY

3.1 INTRODUCTION

Matters discussed in this methodology is related to methods used for designing circuits, workflows and job steps to implement this project. to produce a project, step by step should be conducted to determine its effectiveness. These measures should be carried out with the utmost precision in order to produce a quality project. Moreover, Gantt charts and project flow chart also disclosed.

3.2 CHOOSING THE PROJECT TITLE

Selection of topics is the very first step encountered before starting the work associated with the project. Selection of appropriate project title helps the creative and innovative thinking and knowledge level of the individual in the aspects that involve the use of electrical and electronic products. After an appropriate title is chosen, steps through the selecting circuits associated with the project.

3.3 COMPONENT TESTING

Before the components are assembled and soldered on the PCB, it should be tested first to make sure no problems arise when testing on circuits that have been made. The test is done by installing all components on a project board and tested using a multimeter.

3.4 WORKFLOW AND WORK PROCEDURES

I. Made a circuit

ISIS on the software used to chart the circuit PCB project. after all selected components, circuit design schematic in ISIS Professional workspace. when all component symbols are connected, the component labeled as a reference and is connected to Vdd and Gnd. after that, click Netlist to ARES for PCB circuit design process.

II. Make tracks

PCB circuit will be designed in ARES professional workspace. This software has an auto routing function automatically to check the connection of the circuit designed. after all connection is ready, it is printed to be transferred to the PCB using the latter. PCB circuit designed purpose is to get the actual size before it is transferred to the PCB.

3.4.1 THE PRINTED CIRCUIT BOARD (PCB) PROCESS

I. LIMINATED PROCESS

The circuit is ready to print plastic transference will be transferred to the printed circuit board (PCB) through the process eliminated. before starting the engine eliminated eliminated must be heated first. after plastics transference that have been printed will be affixed to the PCB board. The circuit will be heated in the machine eliminated 10 times.

3.4.1.1 Liminated Process

II. DEVELOPER PROCESS

PCB board has completed the process must be eliminated through a process developer. This process uses water for the transference of plastic attached to the PCB circuit. Once completed, found only a form of circuit which is above the PCB board. PCB board should be washed and dried first before making the next process.

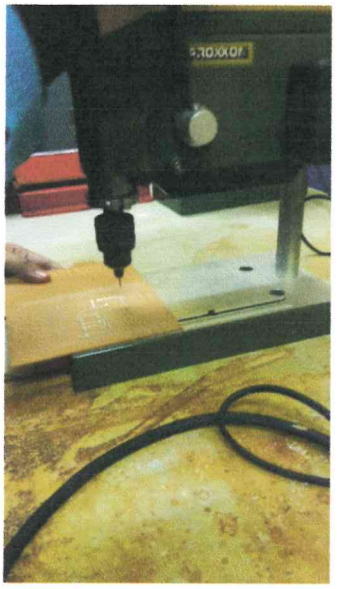
III. ETCHING PROCESS

Before performing the etching process to make sure that no track is cut off. if there is a track that has been lost, a connecting track by using a permanent marker pen. Etching process is performed using acid to remove the copper unneeded. Once completed, the PCB board inserted into the etching machine for a few minutes. PCB board that has been completed through the etching process put in stripper machine to clean it of impurities board.

3.4.1.2 Etching Process

IV. DRILLING PROCESS

Drilling process used to drill a hole the size of a component by component by using the punch (Drill) according to the size of the foot component. In this process, a hole punched in the form of a hole to be drilled on the PCB board. Heavy things should be taken during this process is being careful not to crack the PCB board.



3.4.1.3 Drilling Process

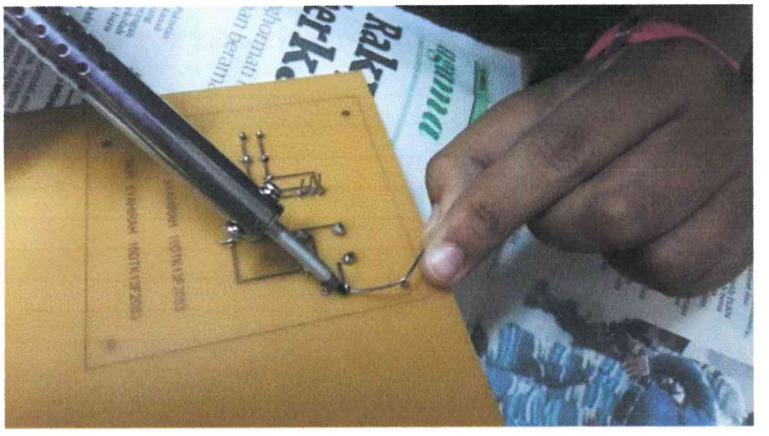
v. COMPONENT ASSEMBLY PROCESS

After the drilling process is carried out, the components mounted on the PCB board. After these components in place, legs slightly bent so that the component parts are not dislodged or knocked down. After placing the components, soldering process is carried out. Make sure that the soldering is done on components neatly and arranged to prevent the circuit from connecting

VI. SOLDERING PROCESS

Soldering goal is to connect two pieces of metal of low melting temperature of the metal to be soldered. Soldering eyes cleaned and heated before use. Tin bonded together with a soldering iron component and is held at an angle of 30 degrees to allow process is done well, beautiful and right. Tin melting and soldering iron in order to lift the melted tin component attached to the foot.

Desoldering pump (sucker) is used when the soldering process generated messy or there is an excess of tin on the PCB. Tin melted before and soldered sucker sucked out again to get better results. After soldering then cut away the excess using a cutter. Should be careful not to cut the solder. Lastly, do a test by using a multimeter to determine its effectiveness.



3.4.1.4 Soldering Process

3.4.2 STARTING A MODEL PROJECT

When the circuit as planned, construction work continued model. 'BLACK BOARD' is used to model and use it cut to size desired size. The pieces are cut board listed using glue gun trigger. Make sure the wiring is neat and orderly. To ensure that this system, switch on the power supply should be turned off first.

3.4.2 INSTALLATION OF CIRCUIT TO MODEL

After the circuits are functioning properly, the circuit assembly is done in the model. The model was established according to a predetermined size for each of these projects. Punched holes as appropriate for the installation of transformers, relays and other. After the installation is done, every component is labeled as reference. Furthermore, the model is decorated to look neat and attractive. Once everything is in good condition, the project is ready for use.

3.5 THE FLOW CHART OF THE PROJECT

The flow chart used to describe the process of a project carried out by using certain symbols. Users can understand the whole system would be guided by the flow chart.