BLUETOOTH CONTROLLED WHEELCHAIR FOR DISABLED PERSON

BY

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Penghantaran Laporan Ini Adalah Untuk Memenuhi Keperluan Untuk Penganugerahan Diploma Kejuruteraan Elektronik (Komputer) Di Jabatan Kejuruteraan Elektrik Politeknik Seberang Perai

ABSTRACT

Our project is JOYSTICK(Bluetooth controlled) wheelchair for disabled person. This wheelchair has special features such as buzzer with pushbutton and ldr sensor. Both features is for emergency purpose. The buzzer is mainly for emergency purpose. The buzzer is manually operated which is operated by the user when they need help. The disabled person can quickly press the pushbutton which acts as switch will turn on the buzzer and it will pop out emergency sound. By the way , the LDR sensor will automatically turn on if the wheelchair is heading up to the dark place. So that the person don't need to scare of darkness because our ldr will help to give light in darkness. Our project will be the favourite for many disabled child and adult human being.

Abstrak

Projek yang disiapkan oleh kumpulan kami adalah joystick(bluetoothcontrolled) wheelchair untuk orang kelainan upaya. Wheelchair yang disiapkan oleh kami berkemungkinan besar untuk mendapat sambutan meriah daripada kanak -kanak yang berasa melakukan perkara dengan sendiri dan orang -orang yang ingin pergi ke arah yang ditujui tanpa pertolongan orang lain. Sebenarnya , wheelchair ini mempunyai spesifikasi -spesifikasi seperti buzzer dan ldr sensor untuk kecemasan. Buzzer adalah penyokong utama dalam wheelchair ini. Apabila seseorang itu , berada dalam kecemasan pengguna boleh tekan suis yang dibubuh supaya buzzer itu mengeluarkan bunyi yang kuat untuk mendapat bantuan. Apabila ,kita melihat pada ldr , ldr ini dapat mereaksi kepada tempat -tempat yang gelap. Apabila pengguna masuk ke tempat gelap ldr reaksi kepada tempat gelap dan menyalakan lampu . Oleh itu, pengguna tidak perlu berasa takut kepada temp

APPRECIATION

First and foremost, we would like to take this opportunity to be grateful to the Almight and at the same time we would like to express our sincere appreciation and gratitude to our project supervisor, Pn Azlina Binti Abdul Aziz for her invaluable guidance, encouragement, advice, critics, support given and also time spent throughout the progress of this project.

We also would like to say thanks to our parents and family members and our friends who took initiavite to support us and show interest in everything especially when it comes to financial matter. They also help us to verify the accuracy of the content in this report by giving us some useful ideas. They have spend their considerable time with us to complete this project and report.

Last but not the least, we would like to thank each and every single individual who are involved in supporting and helping us to complete this project whole heartly. In preparing this report, I was in contact with many people, researchers, academicians and practitioners. Without their continued support and interest, this project would not have been the same as presented here. They have contributed toward my understanding and supports us all these years. Thanks for their encouragement, love and emotional supports that they had given to us.

CONTENT

CHAPTER 1

INTRODUCTION

1.0 Introduction

Our project is JOYSTICK(Bluetooth controlled) wheelchair for disabled person. This wheelchair has special features such as buzzer with pushbutton and ldr sensor. Both features is for emergency purpose. The buzzer is mainly for emergency purpose. The disabled person can quickly press the pushbutton which acts as switch will turn on the buzzer and it will pop out emergency sound. By the way , the LDR sensor will automatically turn on if the wheelchair is heading up to the dark place. So that the person don't need to scare of darkness because our ldr will help to give light in darkness. Our project will be the favourite for many disabled child and adult human being.

1.1 Problems Statement

By doing this project , we can overcome ;

1.need an assistant to move chair from a place to another.

2. can't move with their own

1.2 Objective

From this project:

1.to make an manually controlled wheelchair (Bluetooth controlled).

2.to move from one place to another with own effort.

The joystick controlled wheelchair is mainly for disabled person. Normally , they didn't have normal body parts like other normal person. So that maybe affect their lifestyle. So by doing this project we will overcome that type situation easily

1.3 Scope and Limitation of Project

Scope project are important element in this project. It can make sure the project can be finished on the time. Because to make a good project there must have a scope.

1.weight- this project is weight considerable (maybe 80g to 1kg)

-maybe didn't have enough force to move the wheelchair.

2.speed –the speed will not the same the normal wheelchair

-less speed for safety issues.

3.Battery life span – maybe need to change the battery occasionally.

-the more the usage the more the battery usage will increase

1.4 Definition of Term

There are several definition that are explain more deeply about the equipment that are used in this project.

I. Definition Arduino Uno

We use ardunio Uno is a microcontroller board based on the Atmega328P.It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains

everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start. This type arduino is cheap and easy to programmable to this project.

II. Definition (PCB) Layout

We use a printed circuit board [PCB] because it can mechanically supports and electrically connects electronics components using conductive tracks, pads and other features etched from copper sheets laminated onto a non- conductive substrate.

III. Definition Cable and Wire

Cable and wire is commonly should be used in project to transmit electricity to the project to power up.

IV. Definition Motor Driver

A motor driver is a little current amplifier; the function of motor drivers is to take a low-current control signal and then turn it into a higher-current signal that can drive a motor. There are many different kinds of motor drivers. At Future Electronics we stock many of the most common types categorized by maximum supply voltage, maximum output current, rated power dissipation, load voltage, packaging type and number of outputs. The parametric filters on our website can help refine your search results depending on the required specifications.

The most common values for maximum supply voltage are 36 V and 52 V. We also carry motor drivers with supply voltage up to 450 V. The number of outputs can be between 1 and 12, with the most common motor drivers having 1, 2 or 4 outputs

V. Definition DC Motor

A DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields.Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor.

DC motors were the first type widely used, since they could be powered from existing direct-current lighting power distribution systems. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings. Small DC motors are used in tools, toys, and appliances. The universal motor can operate on direct current but is a lightweight motor used for portable power tools and appliances. Larger DC motors are used in propulsion of electric vehicles, elevator and hoists, or in drives for steel rolling mills. The advent of power electronics has made replacement of DC motors with AC motors possible in many applications.

VI. Definition Battery & Battery Holder

A battery holder is one or more compartments or chambers for holding a battery. For dry cells, the holder must also make electrical contact with the battery terminals. For wet cells, cables are often connected to the battery terminals, as is found in automobiles or emergency lighting equipment.

VII. Definition Bluetooth

Bluetooth is a telecommunications industry specification that describes how mobile devices, computers and other devices can easily communicate with each other using a short-range wireless connection.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

Before starting this project, we have made the observation and study of all aspects available on relay, vacuum, arduino and bluetooth. There are various aspects that need to be addressed so that the products have a high capacity as well as cost savings. Among the things that are concern is the selection relay, vacuum and arduino analyze the existing design, along with advantages and disadvantages of each tools and combination of relay, arduino and bluetooth. Below we have mentioned some of the study and research that we can do.

2.1 Materials

There are some materials that are used in our project such as:

I. ARDUINO UNO

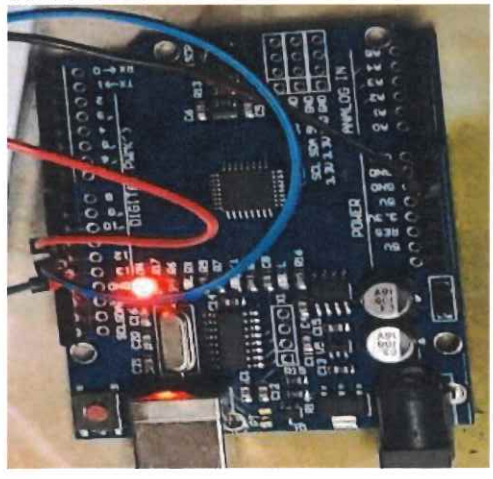

Figure 2.1 Arduino Uno

We use ardunio Uno is a microcontroller board based on the ATmega328P.It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start. This type arduino is cheap and easy to programmable to this project.

II. (PCB) LAYOUT

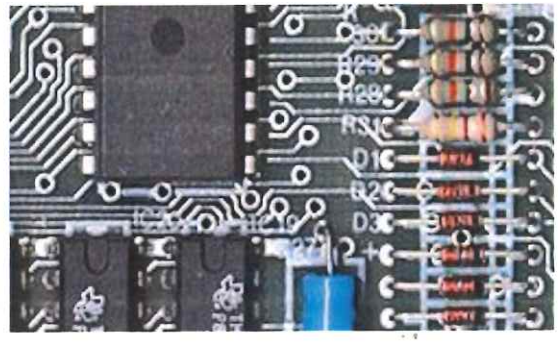

Figure 2.2 shows PCB layout

In this project we use printed circuit board (PCB) because mechanically supports and electrically connects electronic components using conductive tracks, pads and other features etched from copper sheets laminated onto a non-conductive substrate. PCBs can be *single sided* (one copper layer), *double sided* (two copper layers) or *multi-layer* (outer and inner layers). Multi-layer PCBs allow for much higher component density. Conductors on different layers are connected with plated-through holes called vias. Advanced PCBs may contain components - capacitors, resistors.

III. DC MOTOR

Figure 2.3 shows DC motor

A DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor.

DC motors were the first type widely used, since they could be powered from existing direct-current lighting power distribution systems. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings. Small DC motors are used in tools, toys, and appliances. The universal motor can operate on direct current but is a lightweight motor used for portable power tools and appliances. Larger DC motors are used in propulsion of electric vehicles, elevator and hoists, or in drives for steel rolling mills. The advent of power electronics has made replacement of DC motors with AC motors possible in many applications.

IV. WHEELS

These wheels are made for robotics applications and can mount easily onto our motors

Figure 2.4 -wheel

VI. L239D

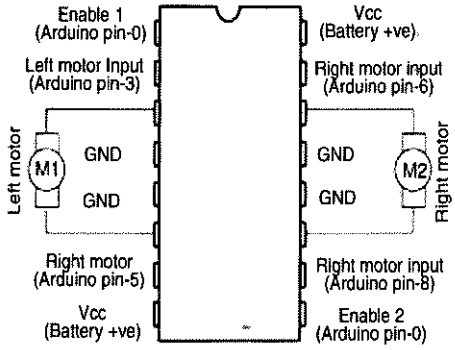

Figure 2.5 the IC L239D configuration

The L239D is an integrated two-circuit H-bridge in a 16-foot package. All circuits, bridges are integrated. The L239D has a high nominal voltage (maximum 36V) and a nominal nominal current of 1.2A, which is suitable for small power applications such as small and medium DC motors. Because it is "all in one" should be the perfect choice for L239D those who do not have much experience in making electronic circuits. There are two H-bridges on each L298D, so you can control two objects with just one chip. Each circuit consists of a source line verse (actually a common line for two bridges), a current sensing line, the end of the H circuit is not connected to the GND but left empty for the user to connect one a small resistor called a sensing resistor. The engine will be connected to OUT1, OUT2 (or OUT3, OUT4 if the bridge is right). An En (EnA and EnB for two bridges) allow the bridges to operate, when En's legs are pulled high, the bridges are ready for operation.

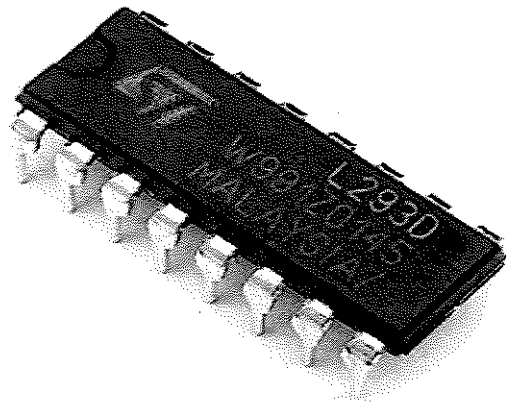

Figure 2.5(b) IC L239D

VII. MALEFEMALE WIRE

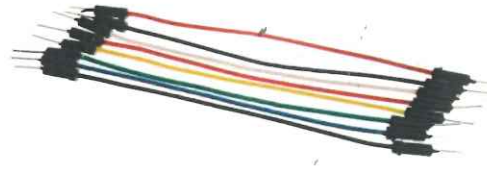

Figure 2.6 –jumper wire

A **jump wire** (also known as jumper, jumper wire, jumper cable, DuPont wire, or DuPont cable – named for one manufacturer of them) is an electrical wire or group of them in a cable with a connector or pin at each end (or sometimes without them – simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering. Individual jump wires are fitted by inserting their "end connectors" into the slots provided in a breadboard, the header connector of a circuit board, or a piece of test equipment.

VIII. Chair for wheelchair model

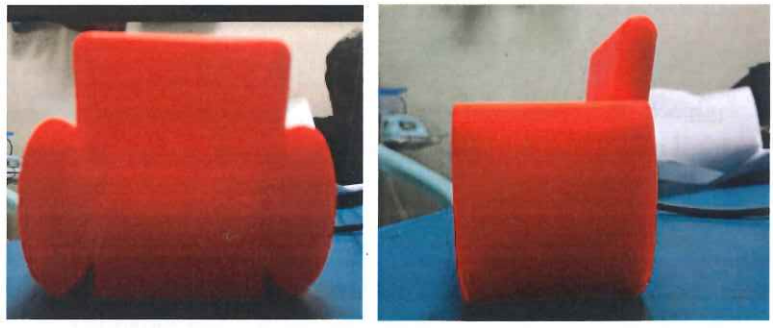

Figure 2.6 shows wheelchair (3d printed chair)

-The wheelchair that used for project.
-made of 3d type printer

IX. LED

-light-emitting diode, a semiconductor diode that glows when a voltage is appliedò

Figure 2.7 shows led

X.LDR SENSOR

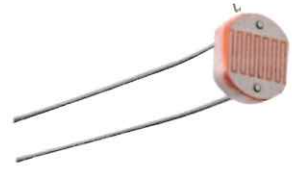

Figure 2.8 shows ldr sensor

- A **photoresistor** (or **light-dependent resistor**, **LDR**, or **photoconductivecell**) is a light-controlled variable resistor. The resistance of a photoresistor decreases with increasing incident light intensity; in other words, it exhibits photoconductivity. A photoresistor can be applied in light-sensitive detector circuits, and light-activated and dark-activated switching circuits.

A photoresistor is made of a high resistance semiconductor. In the dark, a photoresistor can have a resistance as high as several megohms (MΩ), while in the light, a photoresistor can have a resistance as low as a few hundred ohms. If incident light on a photoresistor exceeds a certain frequency, photons absorbed by the semiconductor give bound electrons enough energy to jump into the conduction band. The resulting free electrons (and their hole partners) conduct electricity, thereby lowering resistance. The resistance range and sensitivity of a photoresistor can substantially differ among dissimilar devices. Moreover, unique photoresistors may react substantially differently to photons within certain wavelength bands.

A photoelectric device can be either intrinsic or extrinsic. An intrinsic semiconductor has its own charge carriers and is not an efficient semiconductor, for example, 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 bandgap. Extrinsic devices have

impurities, also called dopants, added whose ground state energy is closer to the conduction band; since the electrons do not have as far to jump, lower energy photons (that is, 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.[1]

CHAPTER 3

METHODOLOGY

3.0 Introduction

This chapter is discussed about the methodology that has been used to complete this project. It was planned properly by getting the correct information from various sources from references book, journal, articles, internet and others. It also include interview session with our supervisor to get the information, advices and guidelines to complete this proposal report. All of the data and useful information were determined to analyze to get the best result. Generally there are several level to reach the complete product analysis which is

1) Design analysis to the available product.
2) Design concept based on the sketching and analysis drawing.
3) Produce the product concept.
4) Produce the real concept.

FIGURE 3.1: BLOCK DIAGRAM FOR BLUETOOTH WHEELCHAIR

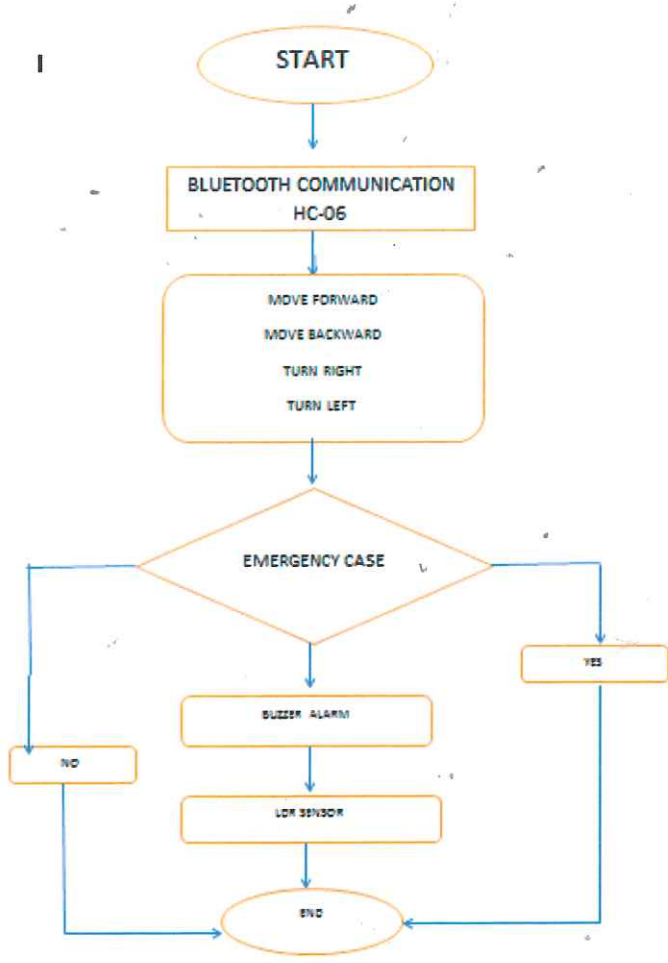

Figure 3.1 shows flow chart of the project

FIGURE 3.2: PROJECT FLOW CHART

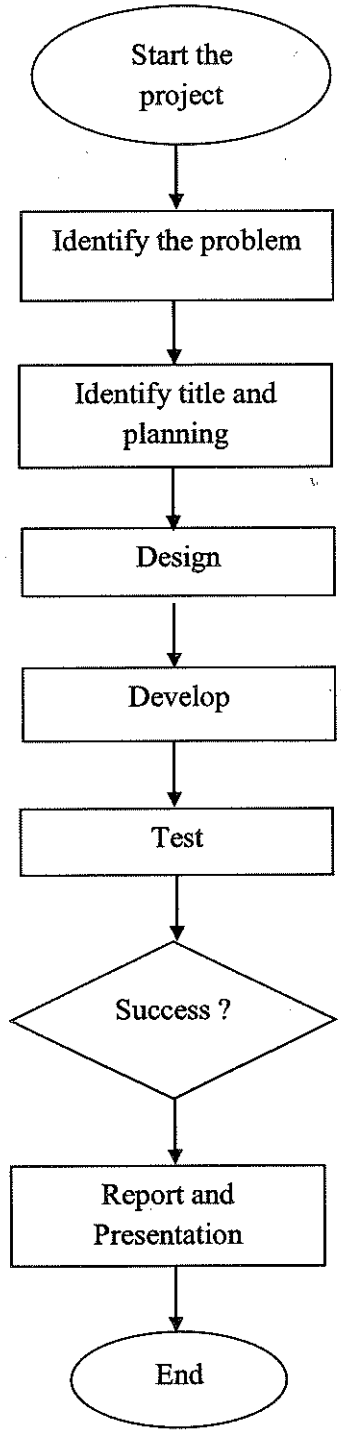

Figure 3.2 shows the flow chart

3.3 GANTT CHART

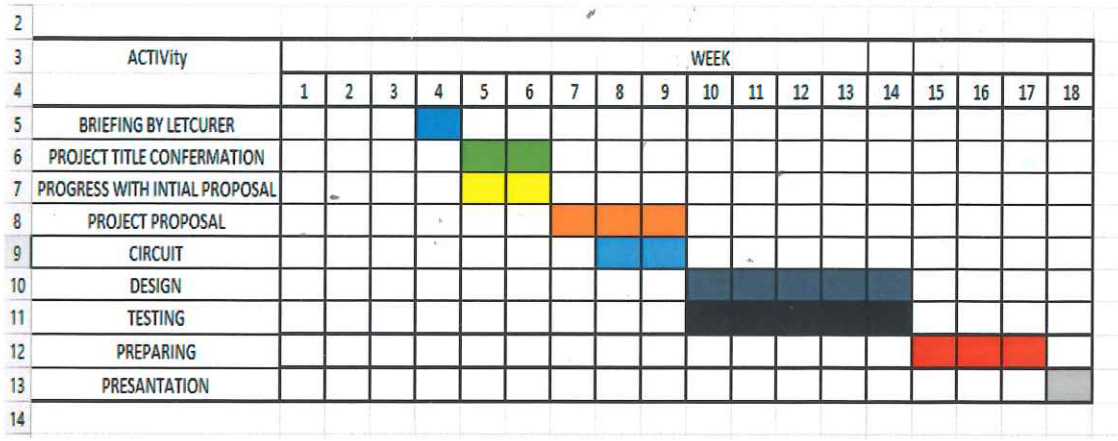

Figure 3.3 shows Gantt chart

3.4 PROJECT COST TABLE

Component	Cost
Arduino UNO	RM45
Bluetooth	RM 20
M-F Rainbow Cable	RM 11
DC Motor	RM30
Basic Electrical Components	RM 10
LDR	RM 5
Buzzer	RM 1.50
Hot Glue Gun	RM 15
Perspex	RM 50
Batteries	RM 20
TOTAL	RM 216.50

Table 3.4.1 Estimated Cost

3.5 Draw Schematic Diagram of circuit using PROTEUS.

PROTEUS V8.4 allows professional engineers to run interactive simulation of real designs ,and to reap the reward of this approach to circuit simulation .And then, a range of simulator models for popular micro-controller and a set of animated models for related peripheral devices such as CT-ARDUINO UNO and LCD displays, resistor and more.IT is possible to simulate complete micro-controller system and thus to develop the software for them without access to a physical prototype.IN a world where time to market is becoming more important his is a real advantage .Structurally, 6 Professional separated into two main components, which is ISIS 7.

Professional and ARES 7 Professional .ISIS 7 Professional mainly involved on circuit designing and simulation .In our project we use Proteus to design a schematic diagram.

3.6 Simulate the Circuit Using Proteus

After completing the circuit assembly and configuration, now it's time to verify whether the source code compiled is virtually accurate or not. Proteus offer a whole lot variety virtual devices.IN fact, simulation using oscilloscope and function generator can be done using Proteus .Even virtual hyper terminal is provided to demonstrate how your code perform in real world without really doing the hardware section yet.

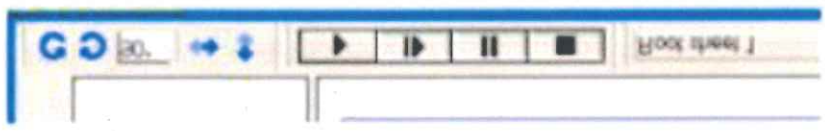

Figure 3.6.1 Toolbar of Proteus simulation.

3.7 Process of Circuit Design.

Design the circuit diagram.

After decide what kind of project that we want to build .We need to make a research about the circuit, electronic component that we need to used, hardware and so on .These things actually can help us to make a better in designing circuit .For example, we need to know the size, foot of component, polarity of the component, the component method compilation and etc. to make a circuit diagram.

In the first step in Circuit Designing process is make a circuit diagram that can be used in the next process. Among steps in the circuit diagram are:

i. Before the circuit is produced the things that we need to be emphasized are the position of symbols and components used in the schematic circuit. Once we know the entire production circuit, the circuit can be drawn using software, namely Proteus ISIS Professional.

ii. Then make sure that the connection of the components is correct.

3.8 Etching

Etching is a "subtractive" method used for the production of printed circuit boards. Acid is used to remove unwanted copper from a prefabricated laminate. This is done by applying a temporary mask that protects part of the laminate from the acid and leaves the desired copper layer untouched .Etching is where the excess copper is removed to leave the individual tracks or traces as they as they are sometimes called. Buckets, bubble tanks, and spray machines lots of different ways to etching, but most firms currently use high pressure conveyerised spray equipment .Many different slow controlled speed etches used for surface preparation to the faster etches used for etching the tracks. Some are best used in horizontal spray process equipment while others are best used in tanks.

3.9 Risk of Etching

i. There is a risk of injuries due to the chemicals involved.

ii. The quality of the result depends on several factors which you won't be able to master completely by using good machinery.

iii. There is the problem of waste disposal. Toxic chemicals require a proper disposal service.

3.10 Safety

Since the work involve dangerous chemical and power tools, we will need to take the necessary safety precautions:

i. Wear safety equipment during the whole process-gloves, protection glass and an apron.

ii. Work near an emergency eyewash station a first aid box and a phone.

iii. Familiarize yourself with the proper use of all equipment and tools in the lab-if you are unsure of anything, ask a supervisor of the project.

3.11 Etching Process

Etching is the process of using acid to remove coppers that not need on the PCB (PRINTED CIRCUIT BOARD).This acid is Acid Ferric Chloride III. is used to remove that coppers

Figure 3.11.1 (PCB) Developer and is Acid Ferric Chloride

The steps of the etching process are:

i. Print the schematic onto photo paper and cut it with the same size of PCB board.

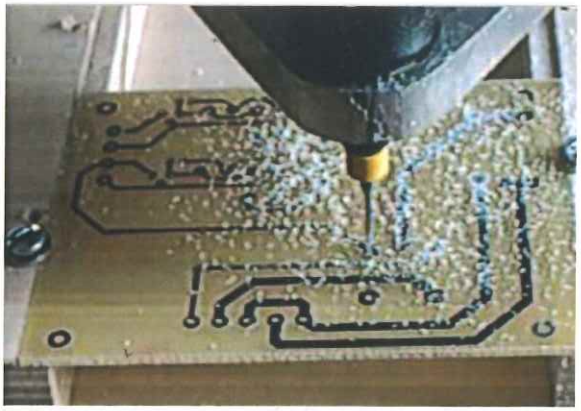

Figure 3.11.2 Etching process

ii. Put the schematic diagram on PCB board.

iii. Etch the circuit onto the PCB Board together with photo paper .It's to make PCB paper joined with board.

iv. This process takes about 120 second under 140.

Figure 3.11.3 Removing Chemical from PCB Board

3.12 Drilling Process

3.12.1 Material and Equipment:

- Bench clamp or support
- Dot punch or sharp tool
- Drilling machine or hand drill
- 1mm bits

Introduction of Drilling Process

After the etching process finished, the PCB will be punched using hand drilling machine. Hole is necessary to mount component (example; resistor, CT- Arduino, LCD and etc.).Before drilling, a dot punch is used to mark the hole position. This serves as a shallow guide for the drill bit to align easily while drilling .Any other sharp pointed tool can be used to do the marking .Points/eye drill used must be appropriate to the hole to be punched between 0.75 to 1.0mm.

The purpose of this process is to facilitate the installation work on the circuit components of the PCB .During drilling ,do not be pressed too strong because it may cause eye drill broken up and dangerous for the people around. Hold the drill steady and drill in straight slowly. The hole be drilled with little force applied.

Insert the Component

Foot of component was inserted into the drilled hole that has been completed that are installed must be inspected prior to use multimeter to find out whether these components are in good condition or not. This process is quite important because we should insert the component correctly to avoid from circuit failure. Besides, some components have their own pole like diode, capacitor and other else. After finished the inserting process, we check it once again with schematic to make sure all the component were at the position or holes.