

CLAP DRAWER

PREPARED BY:

- 1) **MOHAMAD SHAHRUL ASRAF B. ROSLAN** **10DEP14F1052**

- 3) **MUHAMMAD SYAZNEE NUQMAN B. SEAINI** **10DEP14F1048**

**Penghantaran Laporan Ini Adalah Untuk Memenuhi Keperluan Untuk
Penganugerahan Diploma Kejuruteraan Elektronik (Komunikasi) di Jabatan
Kejuruteraan Elektrik Politeknik Seberang Perai**

JUN 2016

ACKNOWLEDGEMENT

For of all, we fell grateful to the Almighty God for establishing our to complete the project for semester four and five.

We wish to express our sincere thanks to our lecturer project, Puan Wan Sabariah binti Wan Ismail, for her guide and discussion for the project and also the providing us with all necessary input of education that us needed.

We place on record, our sincere gratitude to our family, lecturers of Jabatan Kejuruteraan Elektrik and also our friends that helping us in to established this project.

In this opportunities to record our sincere thanks to our parents on their support and encourage from them during this studies in Politeknik Seberang Perai and more accurate in our project.

We also place our record, our sense of gratitude to one and all who, directly or indirectly , have lent their helping hand in this venture.

Thank You.

DECLARATION

We hereby declare that this is the result of our own investigations, except where otherwise stated. We also declare that it has not been previously or concurrently submitted as a whole for any other projects at Seberang Perai Polytechnic.

MOHAMAD SHAHRUL ASRAF BIN ROSLAN


(10DEP14F1052)

.....


Date: 7 OKTOBER, 2016

MOHAMAD SYAZNEE NUQMAN BIN SE'AINI

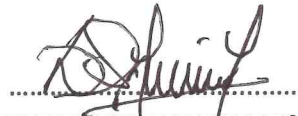
(10DEP14F1048)

.....


Date: 7 OKTOBER, 2016

APPROVAL PAGE

I certify that I have supervised and read this study and that in my opinion, it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as Final Year Project report as partial fulfillment for a diploma of Electronic Engineering (Communication).



[PUAN WAN SABARIAH BINTI WAN ISMAIL]

Supervisor

ABSTRACT

The purpose of this project is to explain the progress of the project during semester 4 and semester 5 for Diploma in Electronic Engineering (communication) field. The theme of this December 2015 session is “application of electric and electronic circuit”. This project was selected for the current technology prefer help student to learning education. This system can be created in software and hardware also hardware only. In this semester 4 and semester 6 all students should done their own project. Our main project is to make sure the student understand the circuit we learn in theory or practical class.

ABSTRAK

Buku laporan projek ini ditulis untuk menerangkan tentang aktiviti projek yang telah dijalankan sepanjang semester 4 dan semester 5 bagi pelajar jurusan Diploma Kejuruteraan Elektronik (komunikasi). Projek pada Disember 2015 bertemakan “aplikasi litar elektrik dan elektronik”. Tema ini dipilih kerana teknologi masa kini yang mengutamakan kajian secara alat bantuan mengajar . Sistem yang dicipta boleh dihasilkan dari segi “software” dan “hardware” dan juga boleh di dalam bentuk “hardware”. Pada semester 4 dan semester 6 ini, semua pelajar harus menghasilkan produk yang berlandaskan tema. Projek ini dapat meningkatkan pengetahuan dan mengaplikasikan setiap litar yang pernah diajar secara teori mahupun secara praktikal.

CONTENT

CONTENT

1	CHAPTER 1 : INTRODUCTION	
1.1	Background of the project	PAGE 1
1.2	Objective of the project	PAGE 2
1.3	Problem statement	PAGE 2
1.4	Problem solution	PAGE 2
1.5	Significant of project	PAGE 3
1.6	Project scope	PAGE 3
2	CHAPTER 2: LITERATURE REVIEW	
2.0	Introduction	PAGE 4
2.1	Clap Switch	PAGE 4-5
2.3	12v DC motor circuit	PAGE 6-7
2.4	Arduino Microcontroller	PAGE 7
3	CHAPTER 3: METHODOLOGY	PAGE 8
3.1	Method used	PAGE 9
	-Process to make a DC motor circuit	PAGE 9
	-Setup the DC motor Circuit.	PAGE 9-11
	-Insert the program into the board and circuit	PAGE 12 -14
	-Etching the clap switch circuit	PAGE 14- 16
	-Soldering the circuit	PAGE 17
	-Making the table	PAGE 18 - 19
	-Block diagram	PAGE 20
3.2	SOFTWARE AND DEVELOPEMENT	PAGE 21 - 23
3.3	HARDWARE AND DEVELOPMENT	PAGE 24
	-RESISTOR	PAGE 24
	-TRANSISTOR	PAGE 24
	-DIODE	PAGE 25
	-DC MOTOR	PAGE 25
	-ARDUINO UNO	PAGE 26
	-RELAY	PAGE 27

	-TRANSFORMER	PAGE 28
	-MIC	PAGE 28
	-CAPACITOR	PAGE 29
3.4	SUMMARY	PAGE 30
4	CHAPTER 4: RESULT AND ANALYSIS	PAGE 31-33
5	CHAPTER 5:CONCLUSION	PAGE 34

CHAPTER 1: INTRODUCTION

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF THE PROJECT

Clap switch drawer is a tool that is designed to make it easier for people to open the drawer without the risk that they have a hand problem or sick like Parkinson person and OKU person. This project give the chance for the OKU and they who have a hand problem can used the drawer like normally person. This project are suitable to many kind of people especially like disabled people. Beside that, this drawer can help the disabled people that they didn't have a strength to open the drawer like normal people, so they can use a sound like coughing or other to open the drawer and keep their document. After that, this project use three circuit. Firstly, clap switching circuit that use of the main switch of this project. It function when we clap or coughing it than the timer that we use is change the timing is to switching "on" and "off". Next circuit, that we use is the DC motor circuit. This circuit are use to open the drawer and close the drawer. Third circuit in this project is microprocessor board that we learn in the Embedded System lab that we call the board as Arduino Board that function to change the direction of DC motor that we follow by how program it.

1.2 OBJECTIVE

This project has objectives which it's be a guide line in process to develop this project.

The objectives are:

- to help the disabled people who have a hand sick like broken arm, Parkinson or etc.
- give the chance to the disabled people who had the problem when use the normal drawer.
- to increase understanding in programming learning.

1.3 PROBLEM STATEMENT

The problem statement faced by the disabled people like had not have a strength to open the drawer like the people have a Parkinson sick or their have broke their arm or etc.

1.4 PROBLEM SOLUTION

All previous problems we're trying to solve them. To help the user that has hand problem used the drawer to keep their document like normally person, with this clap switch and DC motor circuit (with arduino) the hand effort used is less than the normal drawer because by only several clap you can open the drawer.

1.5 SIGNIFICANT OF PROJECT

-this project is important to student who wishes to learn more through the operating principle of clap switch , Arduino and DC motor.

- with this clap drawer , student can learn how to use this drawer by using the arduino and clap switch.

-this project also give more information about the programming and how to troubleshoot the board.

1.6 PROJECT SCOPE

-this project is can be flexiable like carry everywhere.

-this project only in one function not many function.

-the drawer can be open when the sound to far from the microphone.

CHAPTER 2:
LITERATURE
REVIEW

CHAPTER 2

LITERATURE REVIEW

2.0 INTRODUCTION

In this section, we will discuss about and share about all the information that we obtain from the study and research which is vital for us to get the project done. From the research, we also obtain some knowledge theory base AND practically base which can be used for us to successfully complete this project and attain's our objective. Majority materials are article, books, journals and previous work related to the project. The materials will be compiled and used as guidance for us to complete our projects.

2.1 CLAP SWITCH

Firstly, clap switch circuit. The sound of clap is received by a small microphone that is shown biased by resistor R1 in the circuit. The microphone changes sound wave in to electrical wave, which is further amplified by Q1. Transistor Q1 is used as common emitter circuit to amplify weak signals received by the microphone. Amplified output from the collector of transistor Q1 is feed to the Bistable Multivibrator circuit also known as flip-flop circuit.

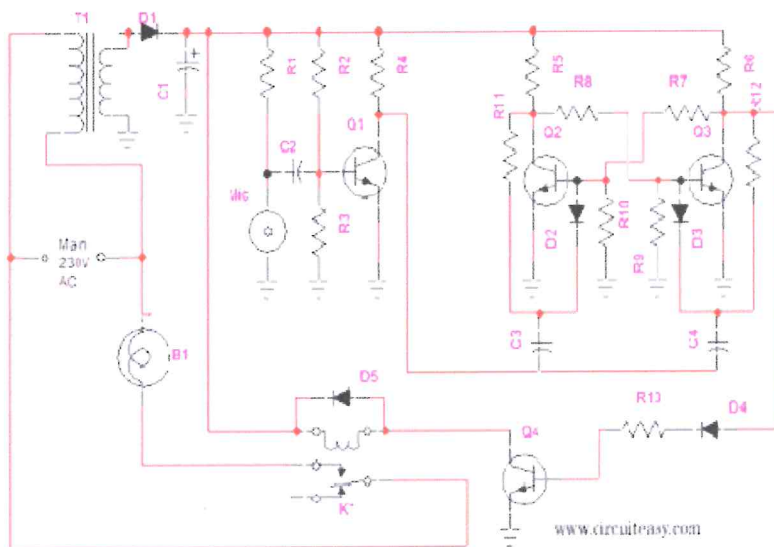


FIGURE 1 :CLAP SWITCH CIRCUIT

Example of clap switch diagram:

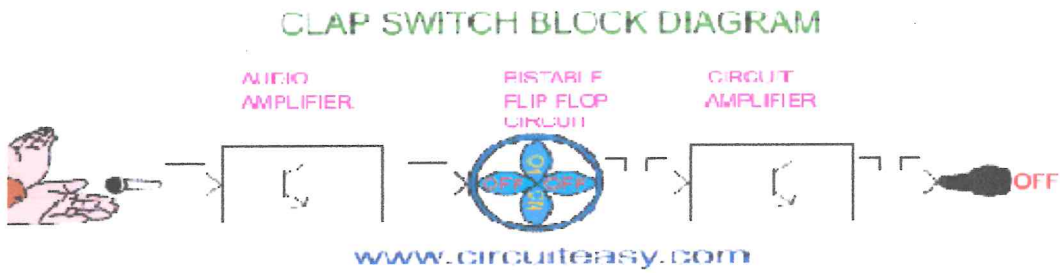


FIGURE 2: CLAP SWITCH BLOCK DIAGRAM

Audio amplifier :

catch the sound(claps), change the sound to an electric signal and sent to the bistable Flip Flop circuit.

Bistable flip flop circuit:

it containing the 555 timer. It will an mini switches for this circuit that will be "ON" and "OFF".

Circuit amplifier :

receive the signal and show the output like the bulb will be light on.

2.2 12V DC MOTOR CIRCUIT

The DC motor is used to rotate in clockwise or the anti-clockwise that be on when we set it with the another component. In this project DC motor is used for rotate the gear that we apply to our drawer and make it as lock we shutdown the circuit with the clap switch. This 12v DC motor is function when the input was in 12v but when the input is more than that it will be not work or broken.

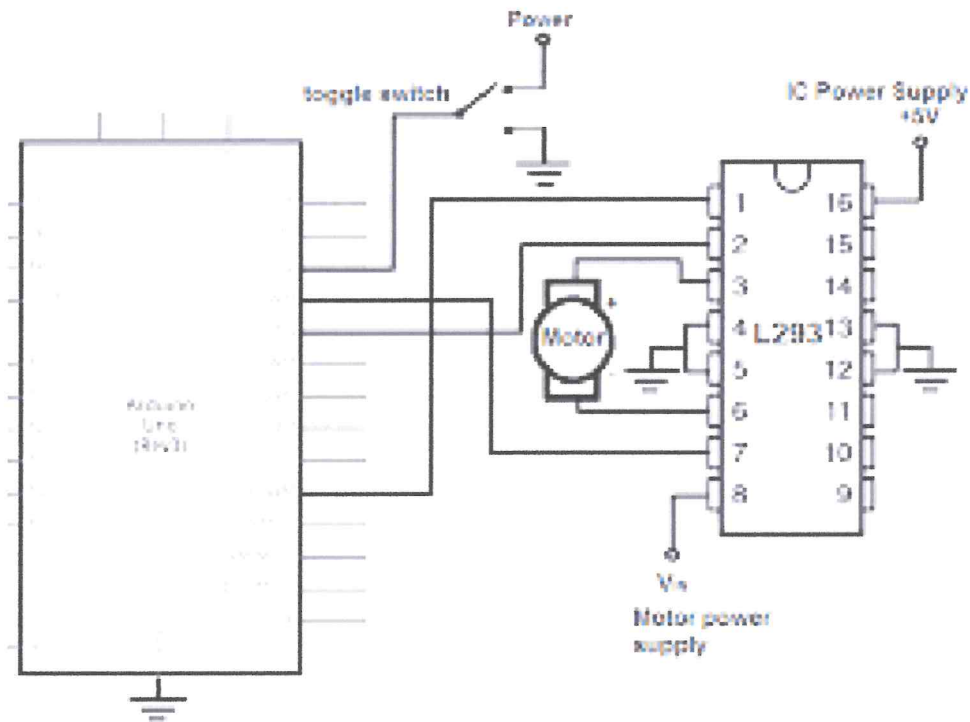


FIGURE 3 : 12V DC MOTOR CIRCUIT WITH ARDUINO

1) TRANSISTOR: A semiconductor with all solid and non-moving part to pass a charge. It can amplify and switch electrical power and electronic signals. Transistor are made of semiconductor material with three or more terminals used to connect to an external circuit.

2) RESISTOR: Control the flow of current to other components. It will avoid the component from broken.

3) DIODES: 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 check valve.

4) JUMP WIRE: Connect the DC motor with the another component that we use in this circuit board.

2.3 ARDUINO MICROCONTROLLER

Arduino UNO microcontroller:

The 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 , 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 the UNO without worrying too much about doing something wrong , worst case scenario you can replace the chip for a few dollars and start over again. "UNO" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The UNO board and version 1.0 of Arduino software (IDE) were the reference versions of Arduino, now evolved to newer releases. The UNO board is the first in a series of USB Arduino board reference models for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of the board.

CHAPTER 3:
METHODOLOGY

CHAPTER 3

METHODOLOGY

As it has been noted earlier the clap drawer scheme corresponds of several subsystems.



FIGURE 4 : CLAP DRAWER

3.1 METHOD USED

This chapter will briefly discuss several method used in order to do the project. The methods used to gather the useful information of the project. Those methods are :

-PROCESS TO MAKE THE DC MOTOR CIRCUIT WITH ARDUINO UNO BOARD PROGRAMS:

Method to make the **DC MOTOR CIRCUIT WITH ARDUINO UNO BOARD PROGRAMS** have many steps to achieve the process such as setup the DC motor with the electronic component, apply the arduino uno to the circuit, insert the program to the arduino board and test the circuit function.

- setup the DC motor Circuit.

The process of the setup the DC motor is all about we connect the component such as resistor, transistor and diode to this circuit. First at all, take the beard board and put the resistor and connect the resistor transistor and diode. Such as like this:



FIGURE 5 : CONNECT TRANSISTOR & RESISTOR

Next, connect the circuit wire the jumper to make it ground. The jumper must from the diode and the resistor. Such as like this:

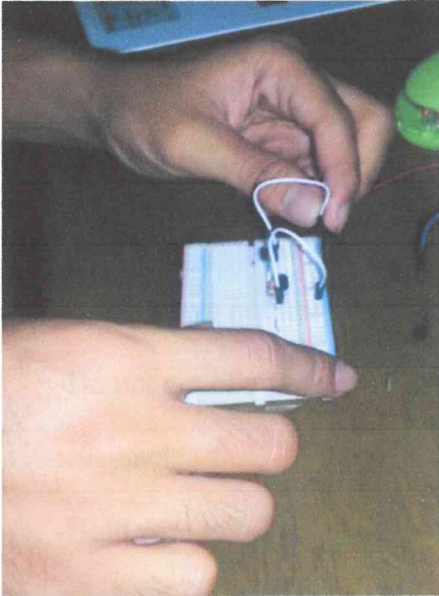


FIGURE 6 : MAKE A GROUND JUMPER

Next, connect the arduino board UNO to the circuit that we build before. Like this:

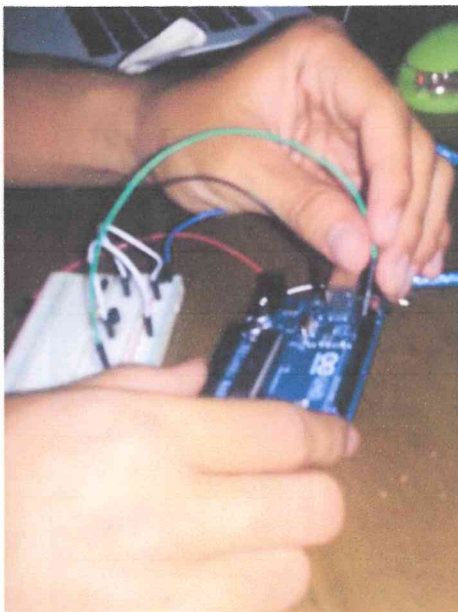


FIGURE 7 : CONNECT THE ARDUINO UNO WITH THE CIRCUIT

Connect the jumper to the DC motor by using the soldering process. Soldering is process of joining two metals together with soldering iron by the use of a solder to form a dependable electrical joint.

- Soldering should be performed only in a well-ventilated area
- Use smoke absorber
- Soldering iron is very hot. Never touch tip of the soldering iron with hand
- Never leave hot iron down on anything other than an iron stand.
- Do not cut of a grounding prong on an iron plug to make it fit an ungrounded receptacle
- Hold wire to be heated with tweezers, pliers or clamps to avoid receiving burns on fingers from object that are heated.
- Wash the and with soap and water after soldering

Then, connect the DC motor in that circuit. Like this:

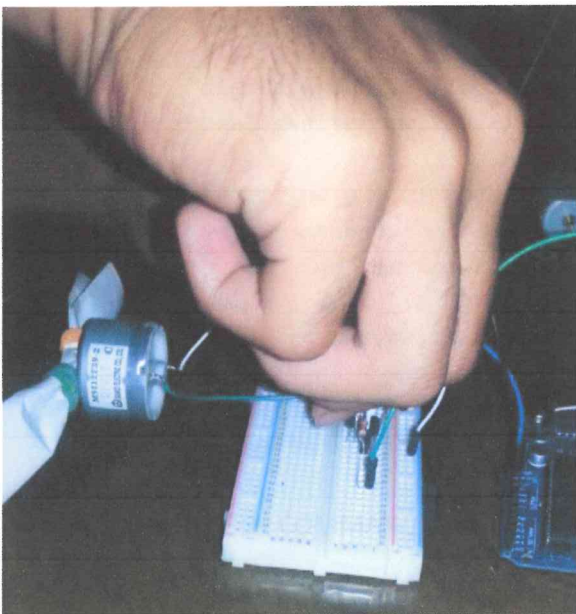


FIGURE 8 : CONNECTED DC MOTOR

- insert the program into the board and circuit:

Write the programs by using the Arduino software for the arduiono UNO board with the command to make it has the output like we want. The programs must be like this;

- - - -

```
const int pwm = 2 ;    //initializing pin 2 as pwm
const int in_1 = 8 ;
const int in_2 = 9 ;

//For providing logic to L298 IC to choose the direction of the DC motor

void setup()
{
  pinMode(pwm,OUTPUT) ; //we have to set PWM pin as output
  pinMode(in_1,OUTPUT) ; //Logic pins are also set as output
  pinMode(in_2,OUTPUT) ;
}

void loop()
{
  //For Clock wise motion , in_1 = High , in_2 = Low

  digitalWrite(in_1,HIGH) ;
  digitalWrite(in_2,LOW) ;
  analogWrite(pwm,255) ;

  /*setting pwm of the motor to 255
  we can change the speed of rotaion
  by chaning pwm input but we are only
  using arduino so we are using highest
  value to driver the motor */

  //Clockwise for 3 secs
  delay(3000) ;
}
```

FIGURE 9 : COMMAND OF THE PROGRAM

```
//For brake
digitalWrite(in_1,HIGH) ;
digitalWrite(in_2,HIGH) ;
delay(1000) ;

//For Anti Clock-wise motion - IN_1 = LOW , IN_2 = HIGH
digitalWrite(in_1,LOW) ;
digitalWrite(in_2,HIGH) ;
delay(3000) ;

//For brake
digitalWrite(in_1,HIGH) ;
digitalWrite(in_2,HIGH) ;
delay(1000) ;
}
```

FIGURE 10: COMMAND OF THE PROGRAM

Apply this programs to the board the USB cable. Like this:

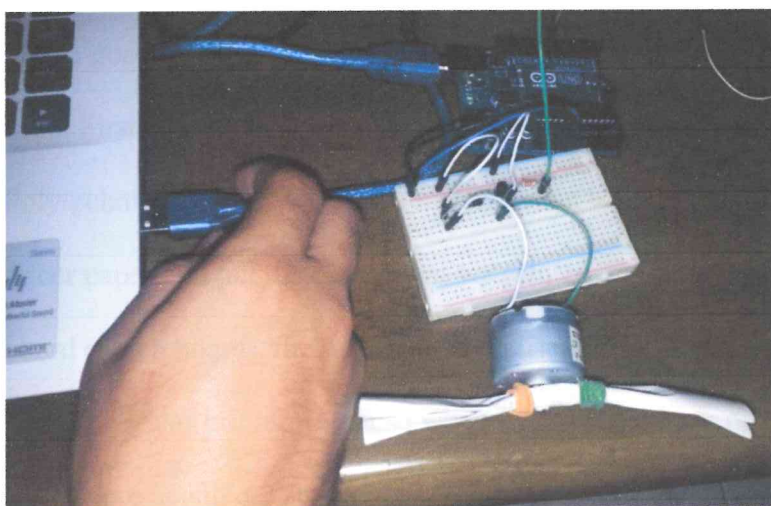


FIGURE 11: APPLY THE PROGRAM IN THE CIRCUIT

And finally, run the arduino UNO board and see the input like this:

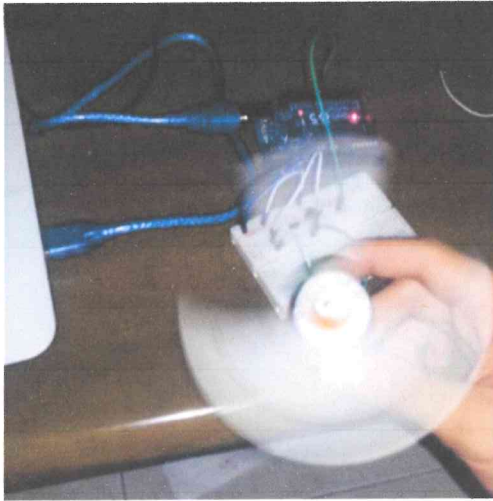


FIGURE 12: RUN THE ARDUINO UNO BOARD

-etching the clap switch circuit:

In this process we need some apparatus to make sure our etching process is on the good condition. Trace circuit process has two processes that we can used. Firstly, is used the UV tracer machine that has at the etching lab at Polytechnic Seberang Perai. This work when we printing the circuit on the tracer paper and put the circuit that we printed on the tracer paper to the UV board (green board). the printer that we used must be the laser type one not just the regular printer. Because when we used the laser one, the circuit we get is more detailed. We back to the tracer process. Put the circuit on the UV board and then close the UV machine and let it tracer your drawing into your board. After a few minutes, open the UV machine and took the board into the sodium substances and we can see the circuit is on the board and ready to be etching process. For the etching process we took the board with the circuit on it into the etching machine and set the time for the etching process. In that machine it has liquid that function to remove the copper side

into the circuit form. After the etching process we must wash the board with the water to remove the liquid that we use for etching process.



FIGURE 13: (cut the tracer paper with the circuit on it)



FIGURE 14: (put the UV board on tracer machine)



FIGURE 15: (Set the time of the tracer machine)



FIGURE 16:(put on etching machine)

Next, second tracer technical process is more economy and save value. In this process we use the copper board, photo paper, iron and news paper. Firstly for this process we must printed our circuit into the photo paper. When we used photo paper the circuit is more shape than use the regular paper. Take the photo paper on the copper board and cover it with the news paper. Then, iron it until the circuit was stick on the copper board. After it stick with the board use the water to removed the photo paper. If the circuit was break we need the lathering process to repair the circuit. Lathering process is used some sticker that have it own shape like circle, straight line and curve line. After lathering process check the circuit, if the circuit is not break anymore it mean it ready to etching process. Etching process like usually etching process. After the etching process, we must drill the hole to put the components by using table drill that have in lab polytechnic seberang perai.

- soldering the circuit

After we get through the another process, it time to soldering the component. By refer to the circuit that we build in PCB wizard application. Firstly, arrange the component on board. Make sure the component is in the right hole and the right place. It to avoid the component in the wrong place. If the component is in wrong place our circuit will be shock or broke down. To make sure the component not move before soldered it, we must bend the leg of the component.

After we done arrange the component on the board, we heat the soldering iron and make sure it in the suitable temperature made the perfect soldering result. We can apply the soldering technical that have learn in the repair equipment class in semester 3.

For the soldering process. Firstly, put the soldering iron on the leg of component and make sure the that iron is on the board at same time. If the the temperature of the board is not enough same like the component the soldering result we get the bubble on it. So, it must in the same temperature at the same time to make sure the solder is in perfect condition. After the soldering process is done, we used the cutter to cut off the leg of component to get the clean and smart board. If we done cut it off, so the circuit in risked to be shock circuit. If the circuit is broke down it will wasted our time to build a new board.

-making the table

In this method, we just used our design to make this clap drawer which that we sketch the design in a paper and start build that table. Firstly, in this making table we needed some apparatus that we can used like hand tools like hammer, saw, tape, ruler, marker, woods, play woods and nails.

Measure the wood and saw it into four at the same size and combine it with a nails to make it in square shape. Next, cut another wood in smaller than the first square to make it drawer, then put the play wood under the drawer to make it base and put the roller in right and left the drawer. And finally make it legs.



FIGURE 17:(measure the wood and also cut the wood)



FIGURE 18 :(combine the wood make it to be a table)



FIGURE 19:(cut the roller in the table size)



FIGURE 20: (brush the paint on it)



FIGURE 21:(the result of the table)

-block diagram

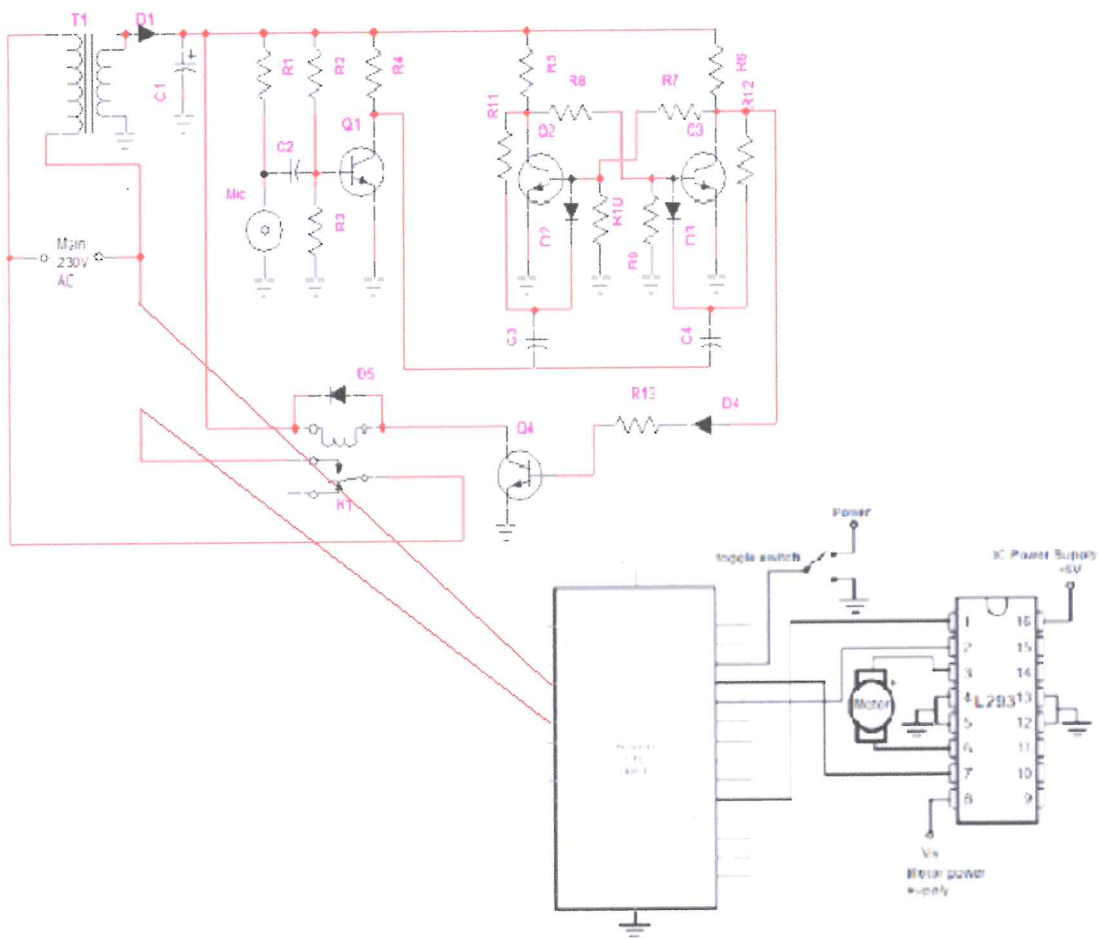


FIGURE 22: BLOCK DIAGRAM OF COMBINATION OF THE CIRCUIT