NETTUR TECHNICAL TRAINING FPUNDATION

DTC-BELUR

PROJECT REPORT GROUP"P"

ON

"IOT BASED COMPRESSOR MONITORING AND CONTROLLING SYSTEM "

PROJECT DONE BY,

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DIPLOMA IN MECHATRONICS

NETTUR TECHNICAL TRAINING FOUNDATION - DHARWAD

PRAJAWANI ROAD , BESIDE CEDOK

DHARWAD-KARNATAKA 58001,2017-2020

Securing your Future with your own Hands

Certificate of Excellence

This is to certify that the dissertation work entitled "IOT BASED COMPRESSOR MONITORING AND CONTROLLING SYSTEM" has been submitted by,

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In partial fulfillment for the award of the Diploma in Mechatronics Training, NTTF in the year 2019-2020

EXAMINER 1 EXAMINER 2

PROJECT GUIDE PRINCIPAL

[Mr. PRAVEEN S] [Mr. SUDHINDRA RAO SUNKAD]

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NETTUR TECHNICAL TRAINING FPUNDATION

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IMS POLICY

We are committed to improve training services through

Systematic training responsive to customer needs and emerging technology

Engagement of stakeholders at all levels

Fulfilling compliance obligations

Protection of environment and prevention of environmental pollution

Providing clean, healthy and safe work environment and preventing ill health and injury

Continual improvement in integrated management system performance

IMS OBJECTIVES

- To train the youth in employable skills throughout holistic training
- To inculcate the culture "produce while learning and learn while producing"
- To keep pace with the technological developments
- To support industries and institutes in dissemination of technical and industrial knowledge and skill
- Enhance the quality status of centers
- Achieve training man hours
- Energy and resource conservation
- Reduction in waste generation
- Ensure accident free work environment
- Compliance to EOHS legal and other requirements

PROJECT SYNOPSIS

The purpose of this project is to control and monitoring the COMPRESSOR from anywhere in the world through internet .

The primary objective of this project is to replace a wiring and switches with node mcu and wireless communication.

Internet of things is an fourth generation of industry which is trending now and in future .

We can control physical object anywhere in the world using applications in android smart phones.

The next future is industry 4.0 ,so we choose this project.

ACKNOWLEDGEMENT

I feel privileged to acknowledge the contribution of several people for the successful completion of the project. My report acknowledges some guidance, supervision and lot of inspiration. It is time to acknowledge my obligations to all who have extended their cooperation directly or indirectly all along my study tenure of project work.

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I take this opportunity to express indebt gratitude to **Mr. SHANKAR MAROL** Vice principal, for his continual support & inspiration to us, which contributed to success of our project.

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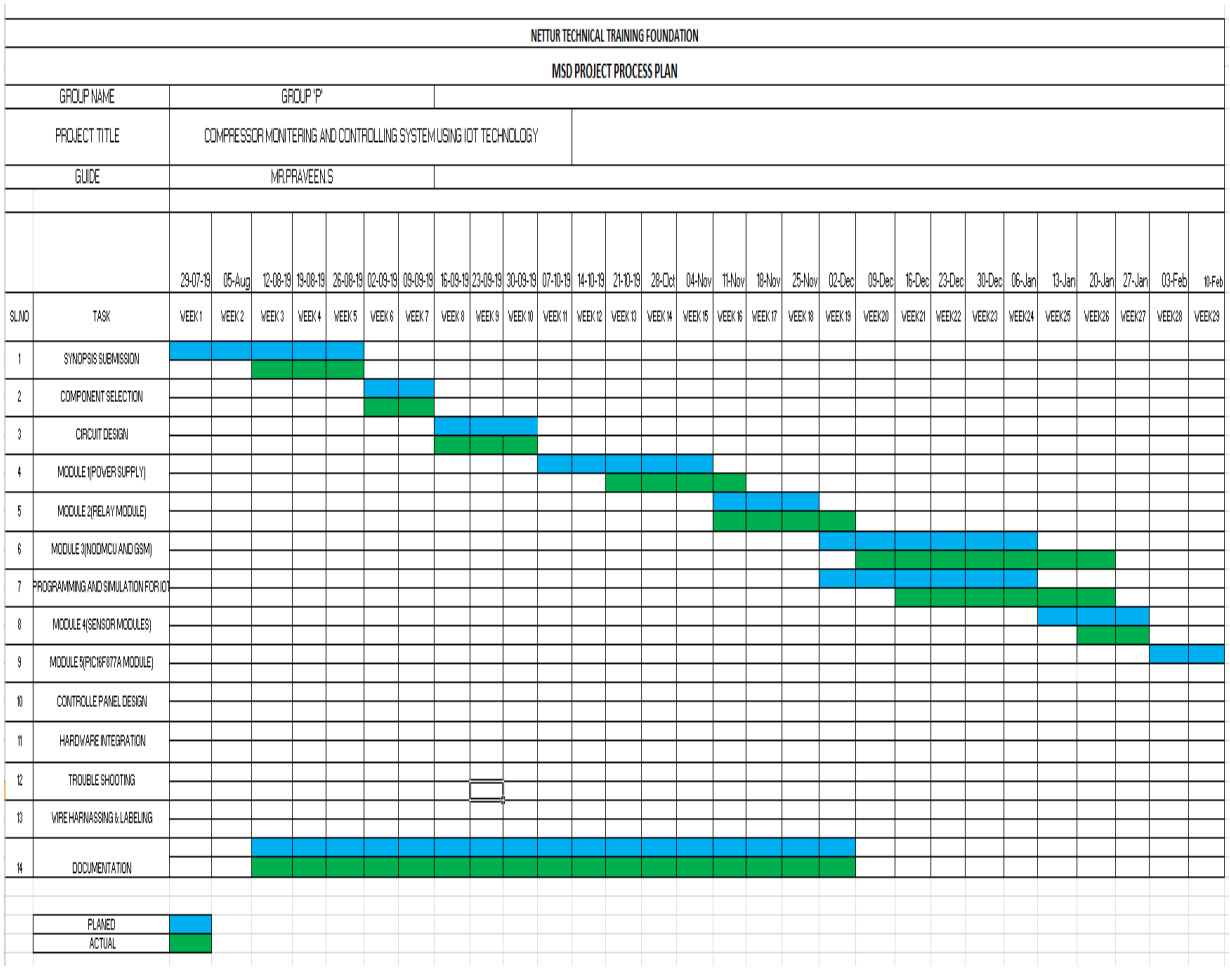
MSD PROJECT PROCESS CHART:



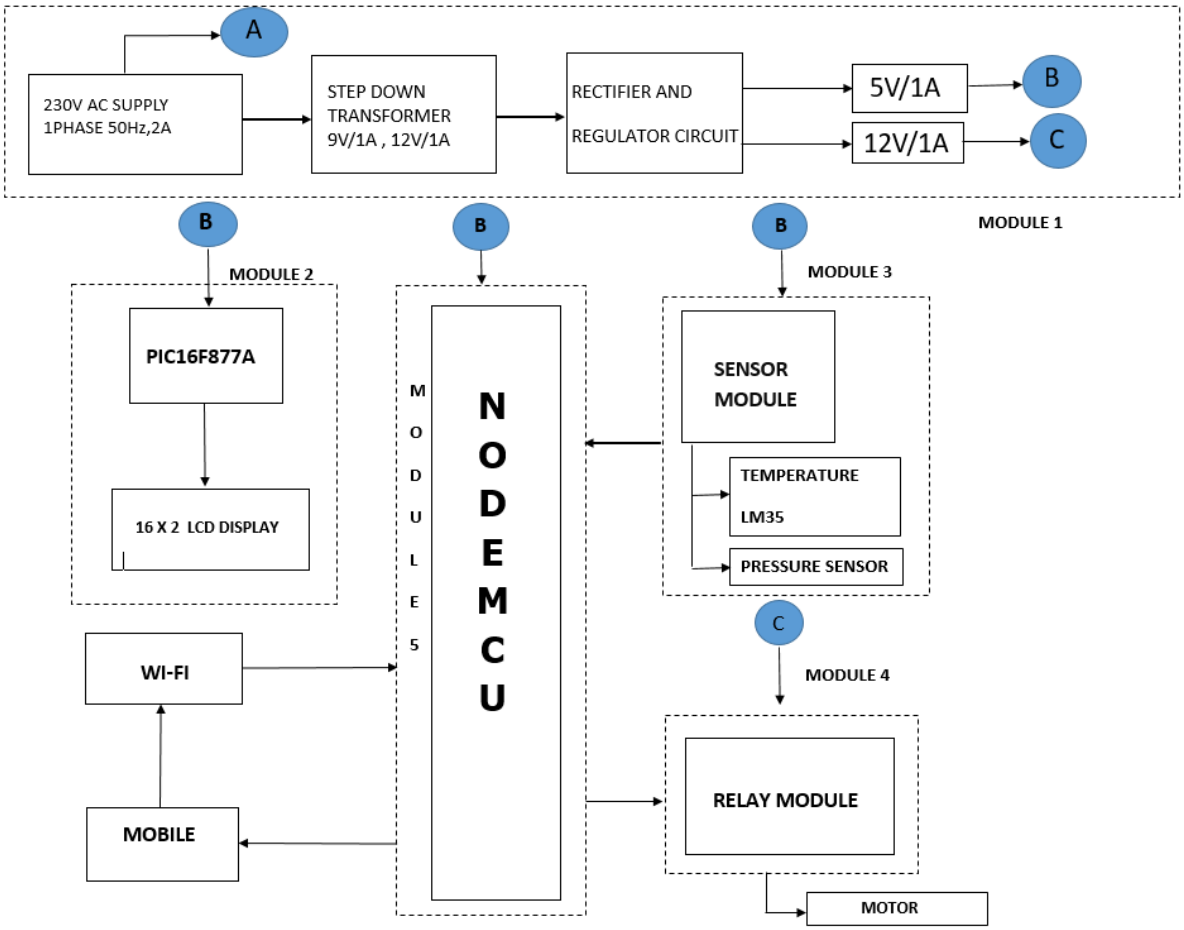
INTRODUCTION

- Internet of things [IOT] is an fourth generation of industry which is trending now and in future
- Main aim of our project is to monitoring and controlling the industry through internet.
- sensors and actuators are the main components of this project which interfaces to the controller Node MCU
- Industry 4.0 is trending now.
- We can control physical object anywhere in the world using applications in android smart phones
- The next future is industry 4.0, so we choose this project.

THE PROJECT CONSISTS OF MAJOR PARTS LIKE

Module 1	**POWER SUPPLY 12V AND 5V**
Module 2	**2 CHANNEL RELAY BOARD**
Module 3	**NODE MCU ESP8266**
Module 4	**ALL SENSORS AS A MODULE**
Module 5	**PIC DEVELOPMENT BOARD**
Module 6	**CONTROL PANEL BOARD**

MODULAR BLOCK DIAGRAM



- In this block diagram there are 7 modules but we considered all sensors as a one module so totally there are 5 modules.
- we are using two node MCU for controlling and monitoring purpose
- the sensors like temperature and pressure sensors are used for monitoring purpose. For controlling we are using led , fan, Relay, and motors.

PROJECT BRIEF:

AIM:

The aim is to build a **"IOT BASED COMPRESSOR MONITOR AND CONTROLLING SYSTEM"**

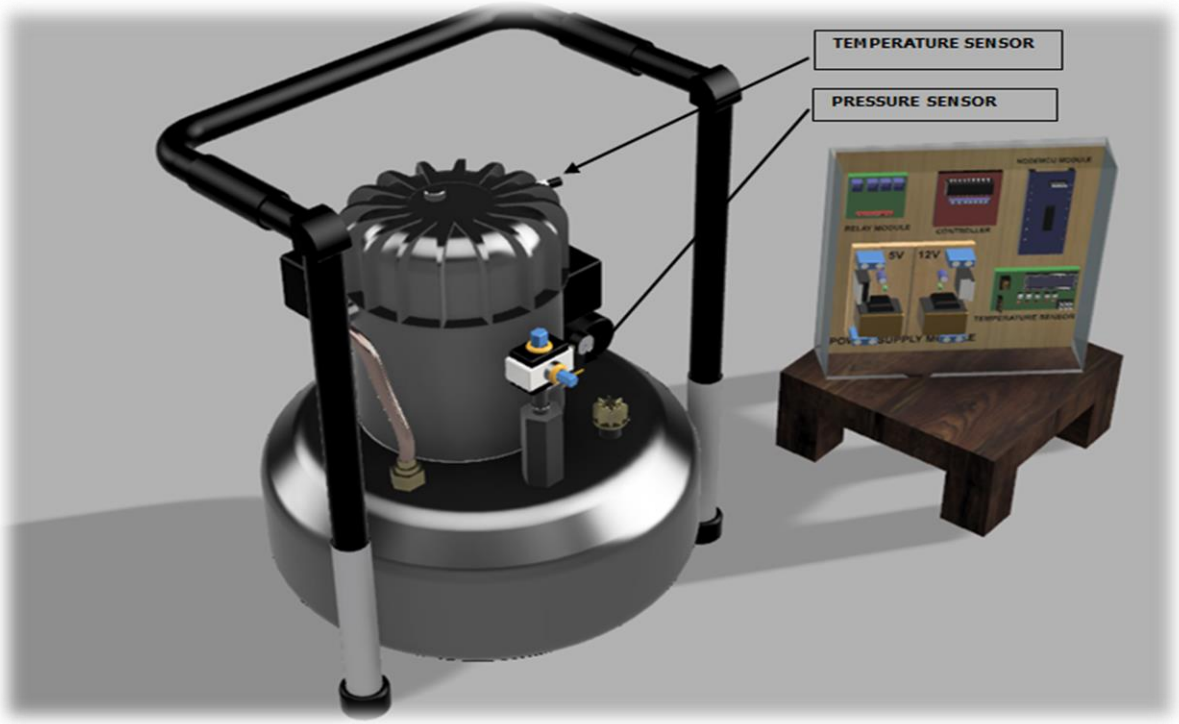
WORKING:

- The aim of the project is to providing the communication between the mobile and the industrial devices using IOT technology.
- In this project the NODEMCU ESP8266(WIFI module) is used as a controller.
- A Wi-Fi module is used for to receive the commands over the internet which sent by the mobile app.
- The relay module is connected to the WIFI module. The WIFI module controll the Relay (ON/OFF) By making the push button ON and OFF which is done in the blynk app.
- Pressure sensor SKU237545 is used for measuring the pressure.
- Temperature sensor DS18B20 is used to measuring the temperature.
- Both of the sensors are connected to the NODEMCU ESP8266.After reading the data from these sensors the NODEMCU will send the data to the blynk app through the internet.
- The user can be monitor the temperature and pressure of compressor as well as controll the compressor through the mobile any where and any time.

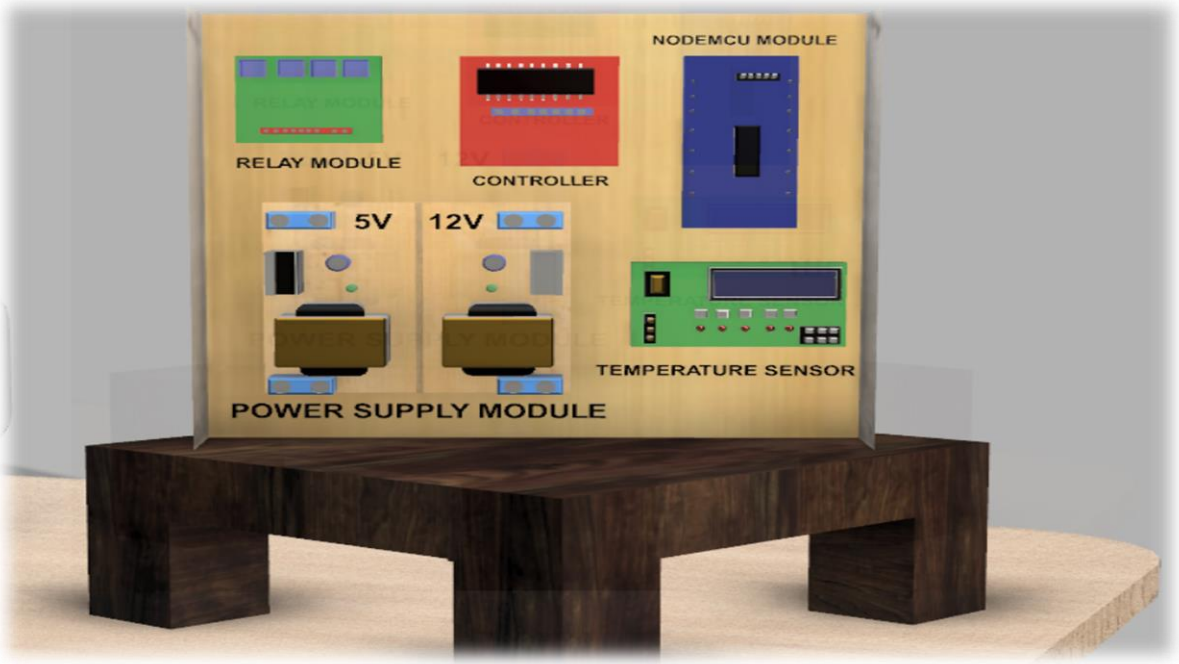
PROJECT TARGET:

- ON/OFF COMPRESSOR
- Temperature Monitoring
- Pressure Monitoring
- Running hours
- Temperature Notification
- Service notification

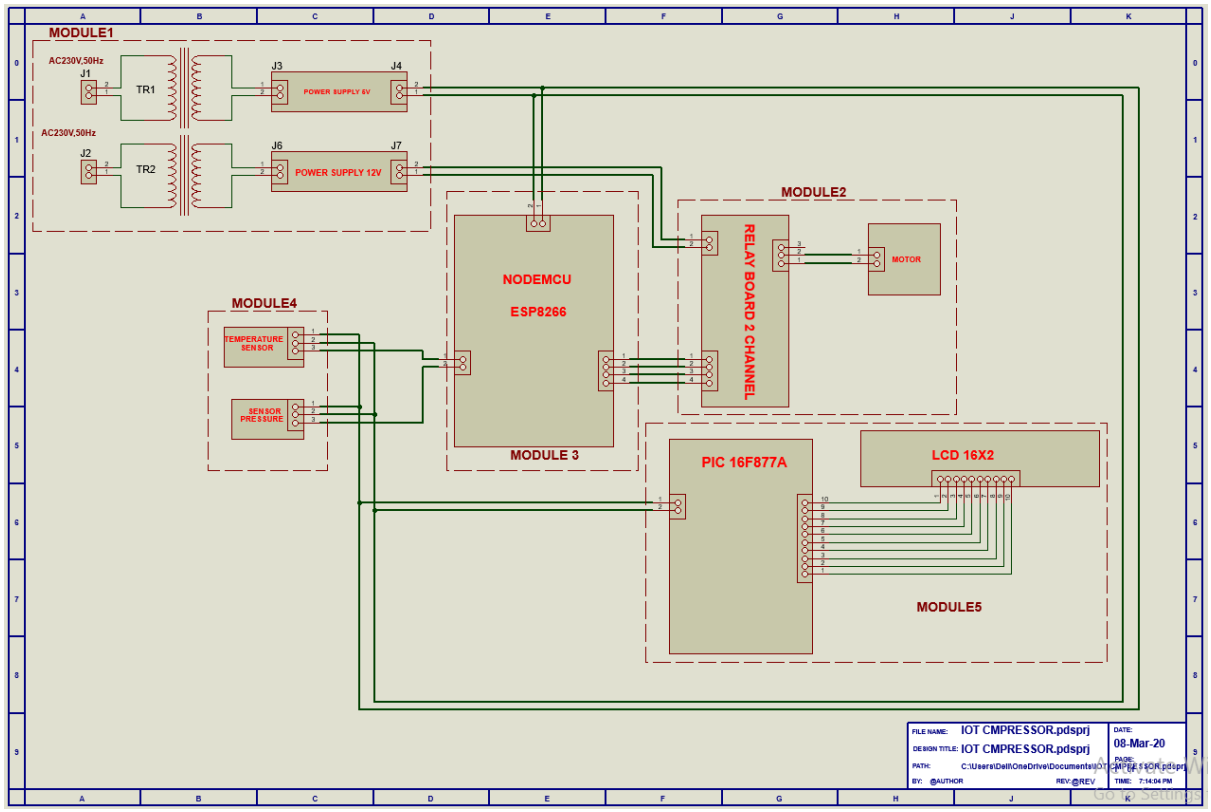
HARDWARE LAYOUT – 3D



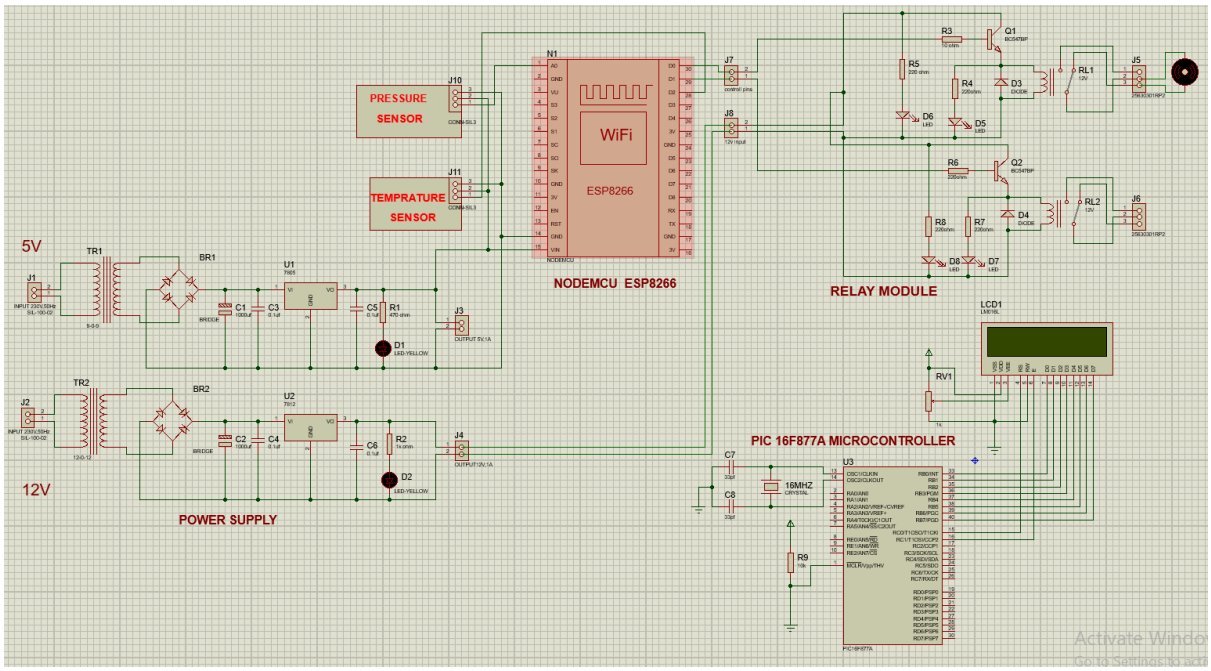
CONTROLE PANEL:



INTER CONNECTION DIAGRAM



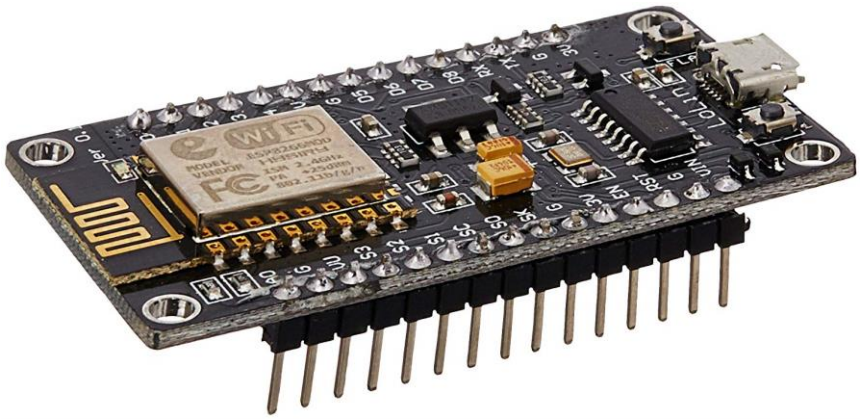
SCHEMATIC DIAGRA



ABSTRUCT

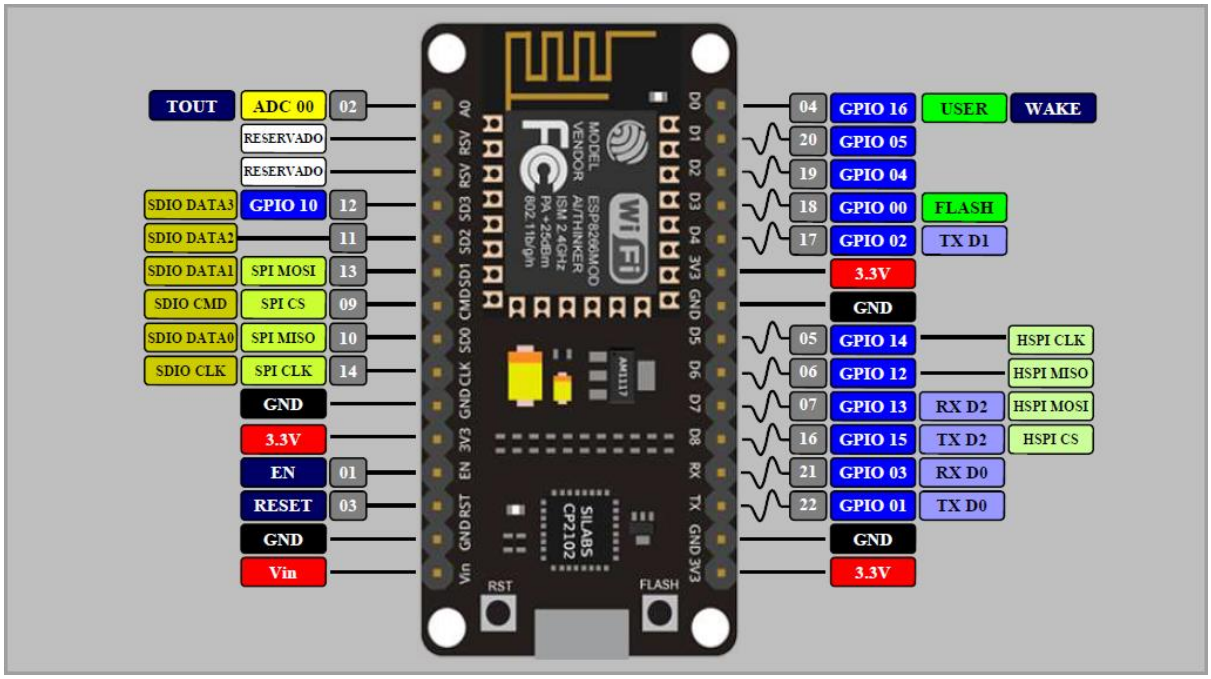
MODULE1 : NODE MCU

WHAT IS Node MCU?



- Node MCU is an open source IOT platform based on ESP8266 -12E.
- It is one of the most stable ESP8266 Boards.
- Node MCU supports a variety of development environments. Eg. node Lua , Arduino etc.
- The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor.
- It can be integrated with sensors and actuators
- It includes firmware which runs on the ESP8266Wi-Fi SoC from Espress if Systems, and hardware which is based on the ESP-12 module.
- The term "Node MCU" by default refers to the firmware rather than the development kits. The firmware uses the Lua scripting language.
  - It is based on the Lua project, and built on the Espress if Non-OS SDK for ESP8266.
- NodeMCU was created shortly after the ESP8266 came out. On December 30, 2013
- Another important update was made on 30 Jan 2015, when Devsaurus ported the NodeMCU project, enabling NodeMCU to easily drive LCD, Screen, OLED, even VGA displays.
- By summer 2016 the NodeMCU included more than 40 different modules

PIN DIAGRAM OF NODEMCU:



I/O PORTS OF NODEMCU:

I/O index	ESP8266 pin
0 [*]	GPIO16
1	GPIO5
2	GPIO4
3	GPIO0
4	GPIO2
5	GPIO14
6	GPIO12
7	GPIO13
8	GPIO15
9	GPIO3
10	GPIO1
11	GPIO9
12	GPIO10

FEATURES

Arduino like hardware IO:

- Advanced API for hardware IO, which can dramatically reduce the redundant work for configuring and manipulating hardware. Code like arduino, but interactively in Lua script.

Nodejs style network API:

- Event- driven API for network application, which facilities developers writing code running on a 5mm*5mm sized MCU in Nodejs style. Greatly speed up your IOT application developing process.

Lowest cost WI-FI:

- Less than $2 WI-FI MCU ESP8266 integrated and easy to prototyping development kit. We provide the best platform for IOT application development at the lowest cost.

Writing sketches/program:

- Programs written using arduino software (IDE) are called sketches. These sketches are written in the text editor and are saved with the file extention.ino.
- The editor has features for cutting/pasting and for searching/replacing text. The message area gives feedback while saving the exporting and also display errors.
- The console displays text output by the arduino software (IDE),including complete error messages and other information. The bottom right hand corner of the window displays the configured board and serial port.
- The tool bar buttons allow you to verify and upload programs, create, open, and save sketches, and open the serial monitor.

Verify

Check your code for errors compiling it.

Upload

Compiles your code and uploads it to the configured board. See uploading below for details.

Open

Present a menu of all the sketches in your sketchbook, clicking one will open it within the current window overwriting its content.

Save

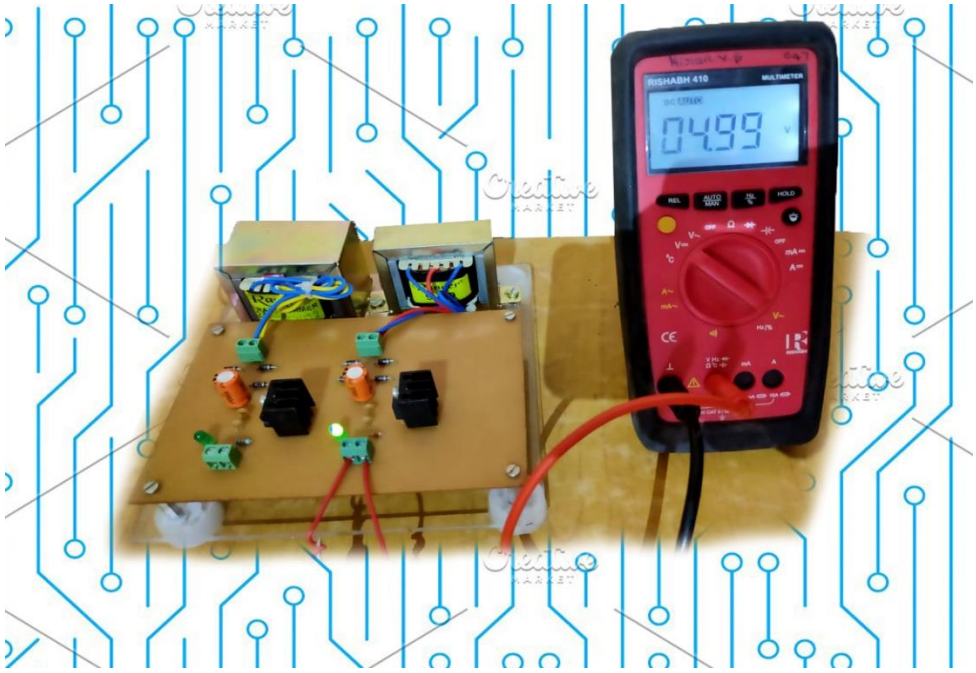
Save your sketch.

Serial monitor

Open the serial monitor.

MODULE 2

5V-POWER SUPPLY



- 5v power supply is used for PIC boards and node mcu and for all sensors.
- 5v power supply by using regulator IC 7805, input voltage range is 7v to 35v and current up to 1A.
- Regulator we are using here to give the fixed output voltage and current.
- Here we are using the step-down transformer for our desired output voltage.
- We used 9-0-9, 2A step-down transformer because the regulator IC need 7v minimum voltage for that reason we are using this transformer.
- Diode we are used here is 1N4007 because it will convert the AC to DC with high current.
- Capacitors , IC's, resistors etc…. many other components are used in this module.

DESIGN FOR 5V POWER SUPPLY

1) SELECTION OF REGULATOR IC:-

LM 7805:-
Input voltage range =7v-35v.
Output voltage range = V max 5.2v, V min 4.8v.

2) SELECTION OF TRANSFORMER:-

Stepdown transformer :- secondary voltage is greater then the primary voltage.(rectifier has is own voltage drop 1.4v)
V sec=7v + 1.4v
V sec= 8.4v (peak value)

3) SELECTION OF DIODE:-

1N4007=Capable of withstanding a higher reverse voltage of 1000V, 1A

4) SELECTION OF CAPACITOR :-

C= IMAX × T discharge / (voltage before discharge-voltage after discharge)

C=1×5ms (12.72 - 7V)
C=0.875 mf
C=875μF
C= nearly =1000uf

5) RIPPLE FACTOR:-

Y=0.6928
Y=1 / (4sqrt3FRC)
C=1 / (4sqrt3 F R Y)
C=1 / (4*1.7*50*100 *0.6928)
C=0.000428 WHICH IS <1

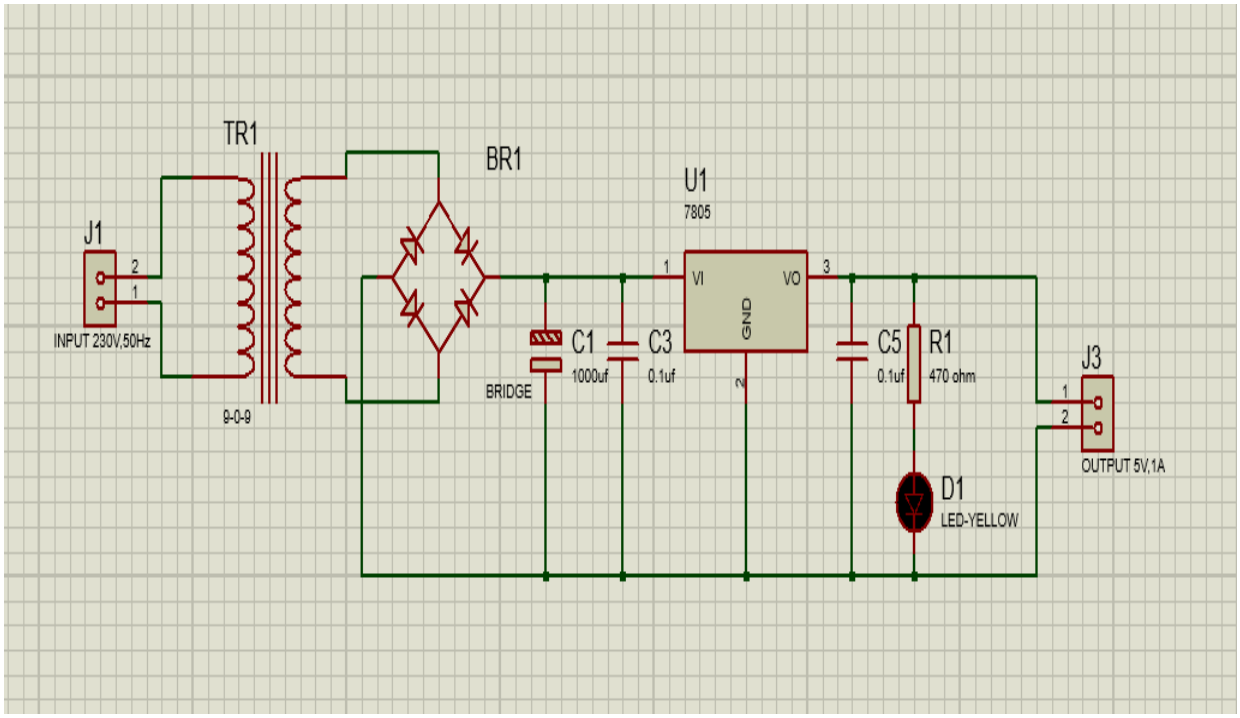
SELECTING THE VALUE OF RESISTOR R1:

- Output voltage of regulator= 5V
- Current rating of LED=15MA
- Value of resistor R1= v/I = 5/15x10^-3 = 333 ohms
- The selected resistor R1v=470 ohm

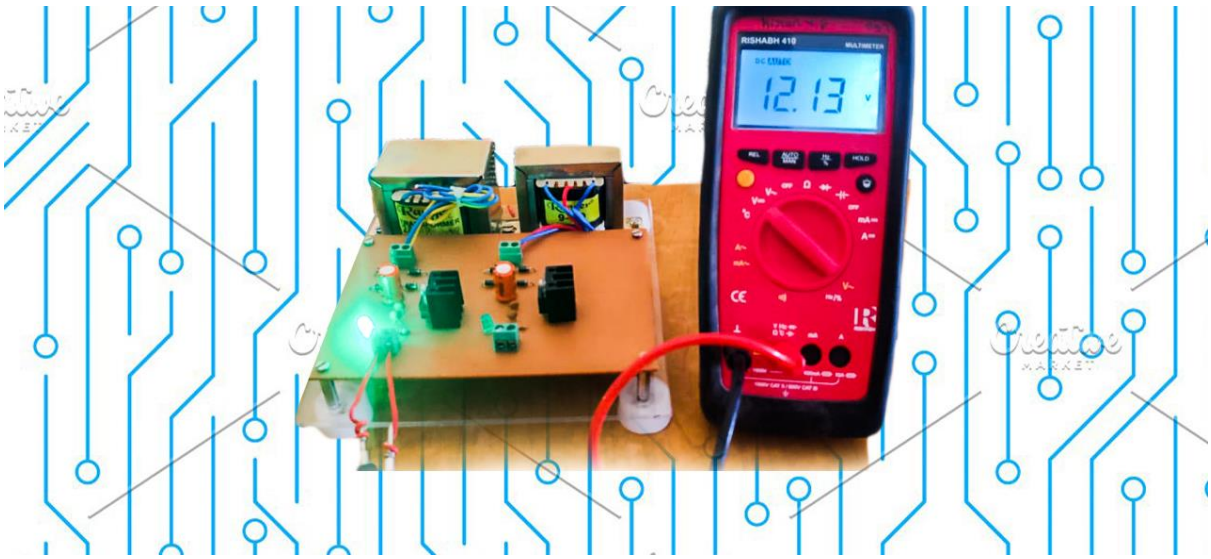
SELECTING THE INDICATOR LED (LED1):

- LED 1 = GREEN, 2.5V,15mA

CIRCUITE DIAGRAM OF 5V.1A POWER SUPPLY:



12V POWER SUPPLY



- 12v power supply is used for relay boards and fan,motor.
- 12v power supply by using regulator IC 7812, input voltage range is 7v to 35v and current up to 1A.
- Regulator we are using here to give the fixed output voltage and current.
- Here we are using the step-down transformer for our desired output voltage.
- We used 12-0-12, 2A step-down transformer because the regulator IC need 7v minimum voltage for that reason we are using this transformer.
- Diode we are used here is 1N4007 because it will convert the AC to DC with high current.
- Capacitors, IC's, resistors etc…. many other components are used in this module.

DESIGN FOR 12V POWER SUPPLY

1) SELECTION OF REGULATOR IC:-

LM 7812:-
Input voltage range =13v-35v.
Output voltage range =V max 12.2v, V min 11.8v.

2) SELECTION OF TRANSFORMER:-

Stepdown transformer :- secondary voltage is greater then the primary voltage.(rectifier has is own voltage drop 1.4v)
V sec = 10v + 1.4v
V sec = 11.4v (peak value)

3) SELECTION OF DIODE:-

1N4007 = Capable of withstanding a higher reverse voltage of 1000v , 1A

4) RIPPLE FACTOR:-

Y=0.6928
Y=1/(4sqrt3FRC)
C=1/(4sqrt3 F R Y)
C=1/(4*1.7*50*100 *0.6928)
C=0.000428 WHICH IS <1

5) SELECTION OF CAPACITOR:-

C= IMAX × T discharge/ (voltage before discharge-voltage after discharge)
C=1×5ms / (16.97 - 13V)
C=1.25 mf
C=1259Uf

- In market 1000μF capacitor is available.
  C=1000 μF,25 V.

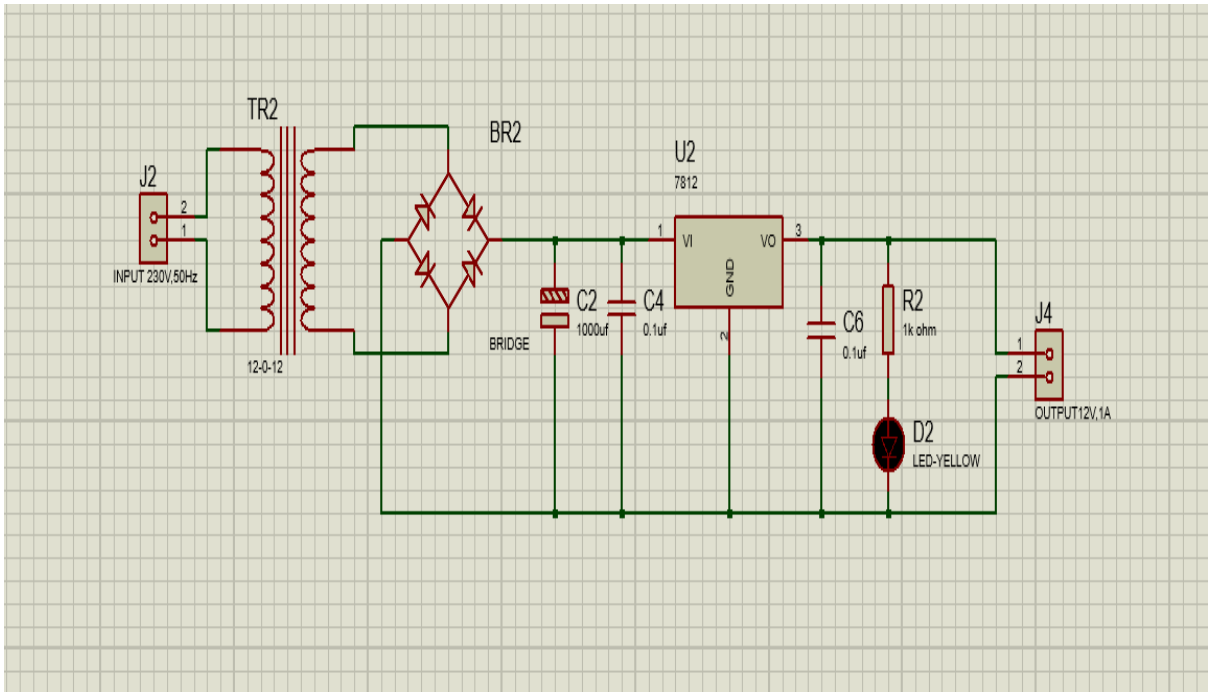
SELECTING THE VALUE OF RESISTOR R1:

- Output voltage of regulator= 12V
- Current rating of LED=15MA
- Value of resistor R1= v/I = 12/15x10^-3 =800 ohms
- The selected resistor R1v=1K ohm

SELECTING THE INDICATOR LED (LED1):

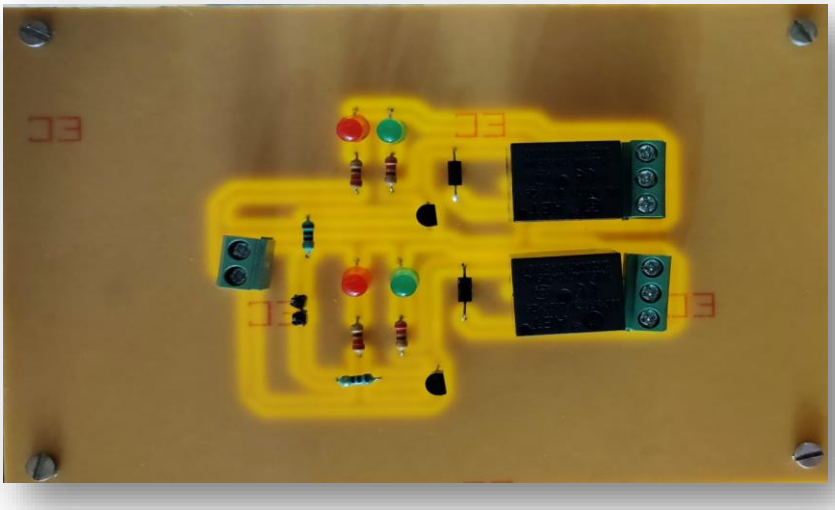
- LED 1 = GREEN, 2.5V,15mA

CIRCUITE DIAGRAM OF 12V.1A POWER SUPPLY:

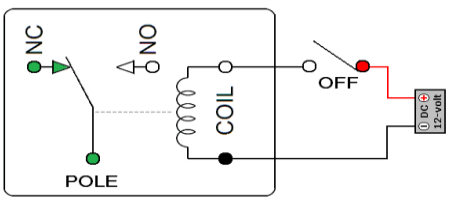


MODULE 3

8-CHANNEL RELAY



- 2- Channel 12v relay module.
- This is a 12v 2-channel relay board, able to control various appliances, and other equipments with large current.
- A relay is an electrically operated switch.
- Many relays use an electromagnet to mechanically operate the switch and provide electrical isolation between two circuits.
- Max voltage can apply from 8.6v to 21.6v and current up to 5A.
- In our project we are using the relay as a actuating the fans and compressor on/off .

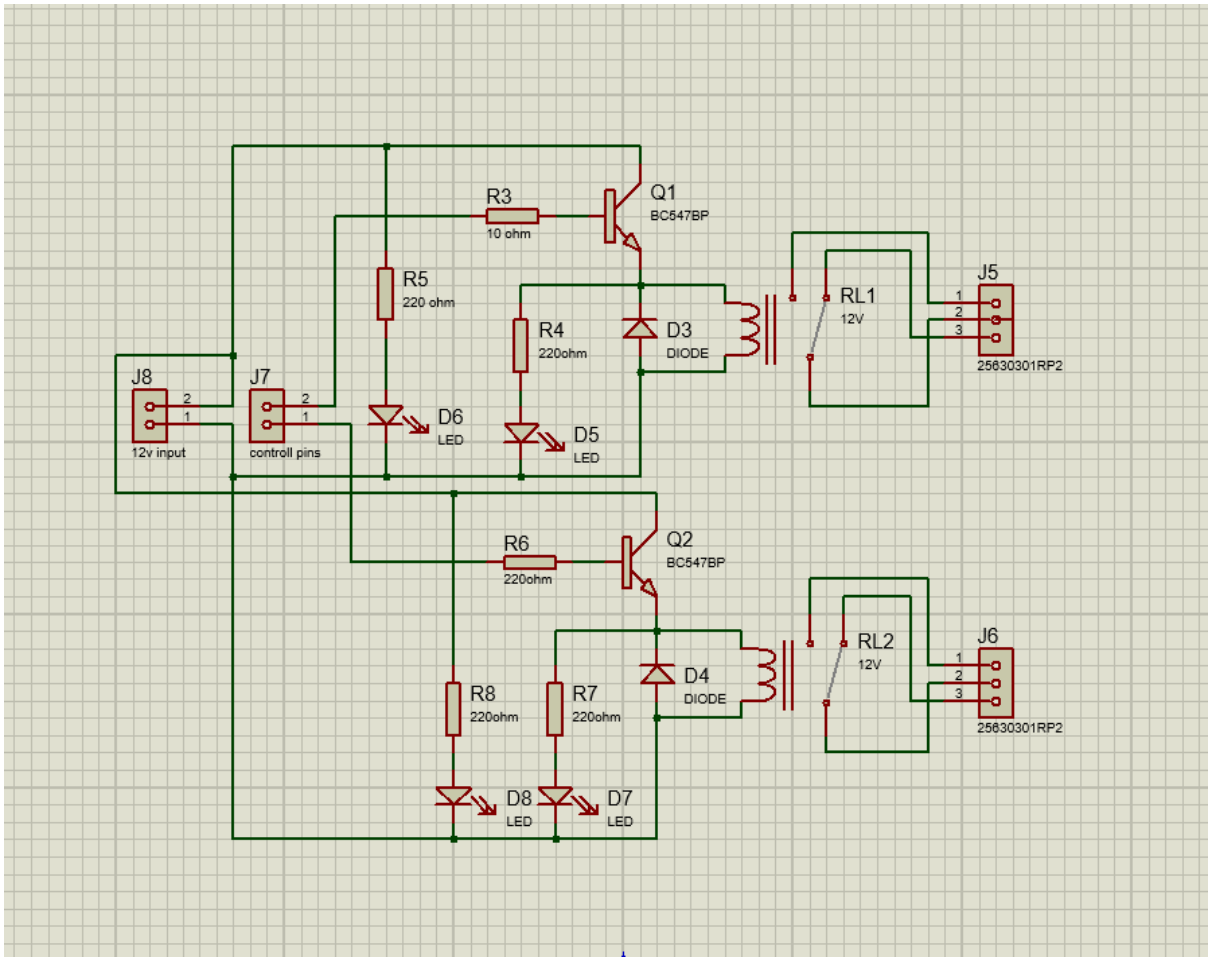


- This is the internal connection of the all relay
- A relay is an electrically operated switch.
- Many relay use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid state relays.

MAIN PARTS OF RELAY:

- Electromagnet
- Movable armature
- Switch point contact
- Spring

CIRCUITE DIAGRAM OF 2CHANNEL RELAY BOARD:



MODULE 4-ALL SENSORS AS A MODULE

SENSOR 1-TEMRATURE SENSOR(DS18B20)

- The DS18B20 is one wire programmable digital temperature sensor from maximum integrated.
- The sensor works with the method of 1 wire communication. It requires only the data pin connected to the NODEMCU with pull up resistor.
- In our project we are using this sensor is to detect the outer temperature of the compressor.
- Whenever it will detect the signal it will send to our IOT web page.
- Usable with 3.0V to 5.5V and 1mA of current.
- Usable temperature range: -55 to 125°C (-67°F to +257°F) with decent accuracy of ± 5.

- It is having a quick response to the input and it will give the output.

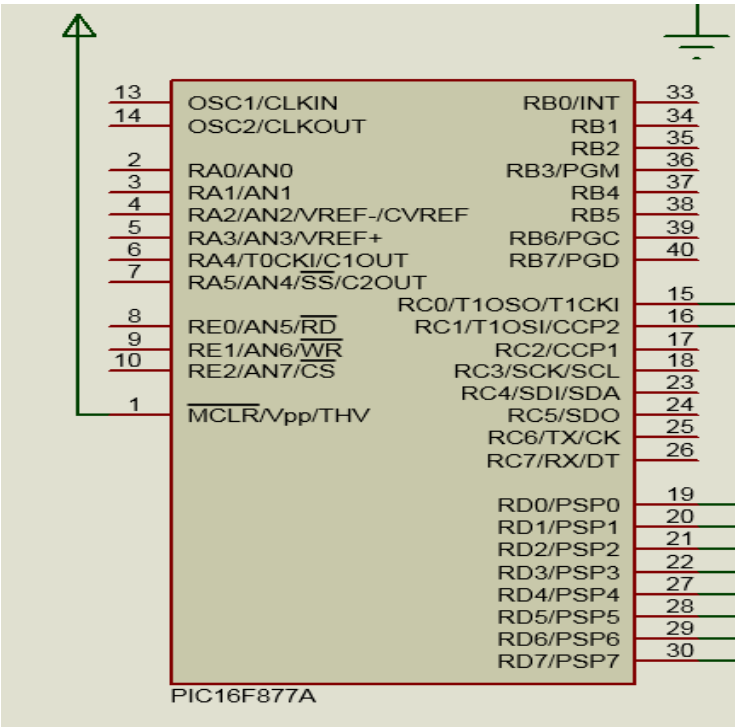
SENSOR 2-PRESSURE SENSOR(SKU237545)

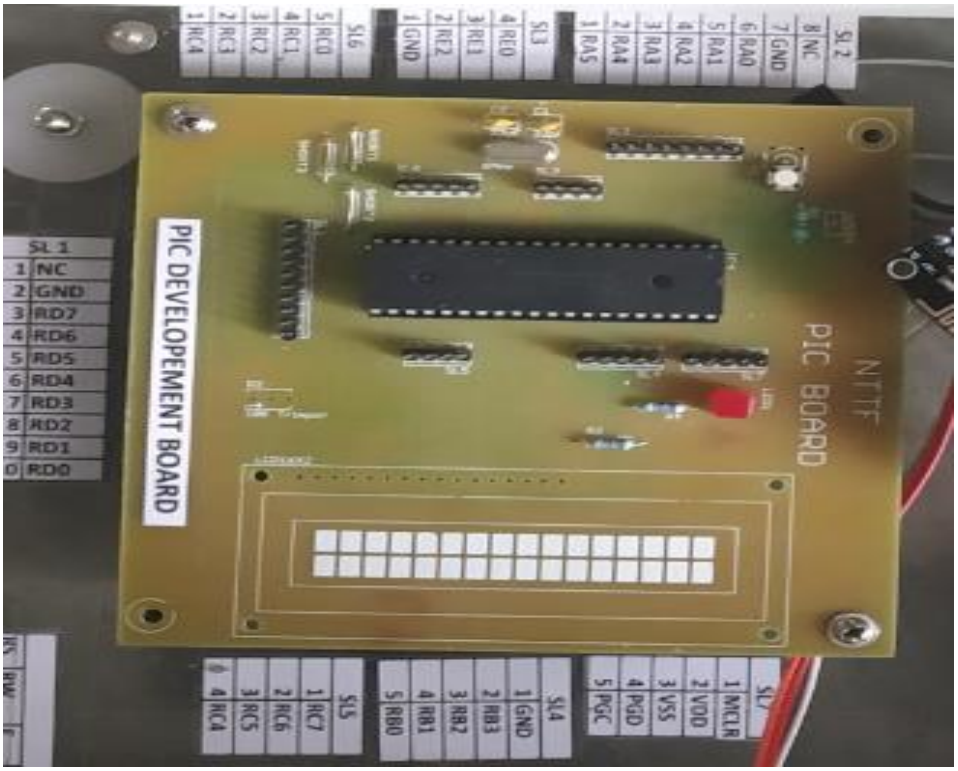
- A pressure sensor is a device for pressure measurement of gases or liquids, A pressure sensor usually acts as a transducer.
- Pressure is an expression of the force required to stop a fluid from expanding.
- A pressure sensor works by converting pressure into an analogue electrical signal.
- The force applied will deflect the diaphragm inside the pressure transducer. The deflection of the internal diaphragm is measured and converted into an electrical output.
- The main advantage of this sensor in our project is it's easy to connect with controller.
- In this project it is use to check pressure inside the air compressor & Whenever it will detect the signal it will send to our IOT web page.

Pressure range	0 to 1. 2 MPa
Output range	0.5v – 4.5v
Current rating	10mA
Pressure type	Gauge Pressure
Power supply	5v DC

MODULE 6

PIC DEVELOPMENT BOARD





EXPLAINATION

- This PIC board is used in our project to display our project name continuously
- To do this PIC development board some components are required that is crystal, resisters, capacitor, IC PIC16F877A and LCD 16x2.
- LCD is connected with PIC controller in port d.
- According to the delay the name of the project will continuously display the name

PROGRAM FOR PIC16F877A

```
LIST P=16F877A

#INCLUDE<P16F877A.INC>

_CONFIG 0X3F7A

START:

BSF STATUS,RP0

MOVLW 0X00

MOVWF TRISD

BCF TRISC,0

BCF TRISC , 1

BCF STATUS , RP0

BCF PORTC,1

MOVLW 0X38

MOVWF PORTD

CALL CLK

MOVLW 0X0C
```

```
MOVWF PORTD
CALL CLK
MOVLW 0X01
MOVWF PORTD
CALL CLK
MOVLW 0X80
MOVWF PORTD
CALL CLK
BSF PORTC,1
MOVLW 'C'
MOVWF PORTD
CALL CLK
MOVLW 'O'
MOVWF PORTD
CALL CLK
MOVLW 'M'
MOVWF PORTD
CALL CLK
MOVLW 'P'
MOVWF PORTD
CALL CLK
MOVLW 'R'
MOVWF PORTD
CALL CLK
MOVLW 'E'
MOVWF PORTD
```

```
CALL CLK
MOVLW 'S'
MOVWF PORTD
CALL CLK
MOVLW 'S'
MOVWF PORTD
CALL CLK
MOVLW 'O'
MOVWF PORTD
CALL CLK
MOVLW 'R'
MOVWF PORTD
CALL CLK
BCF PORTC,1
MOVLW 0X0C0
MOVWF PORTD
CALL CLK
MOVLW 0X01
MOVWF PORTD
CALL CLK
MOVLW 0X80
MOVWF PORTD
CALL CLK
BSF PORTC,1
MOVLW 'M'
MOVWF PORTD
```

```
CALL CLK
MOVLW 'O'
MOVWF PORTD
CALL CLK
MOVLW 'N'
MOVWF PORTD
CALL CLK
MOVLW 'I'
MOVWF PORTD
CALL CLK
MOVLW 'T'
MOVWF PORTD
CALL CLK
MOVLW 'O'
MOVWF PORTD
CALL CLK
MOVLW 'R'
MOVWF PORTD
CALL CLK
MOVLW 'I'
MOVWF PORTD
CALL CLK
MOVLW 'N'
MOVWF PORTD
CALL CLK
MOVLW 'G'
```

```
MOVWF PORTD
CALL CLK
BCF PORTC,1
MOVLW 0X0C0
MOVWF PORTD
CALL CLK
MOVLW 0X01
MOVWF PORTD
CALL CLK
MOVLW 0X80
MOVWF PORTD
CALL CLK
BSF PORTC,1
MOVLW 'S'
MOVWF PORTD
CALL CLK
MOVLW 'Y'
MOVWF PORTD
CALL CLK
MOVLW 'S'
MOVWF PORTD
CALL CLK
MOVLW 'T'
MOVWF PORTD
CALL CLK
MOVLW 'E'
```

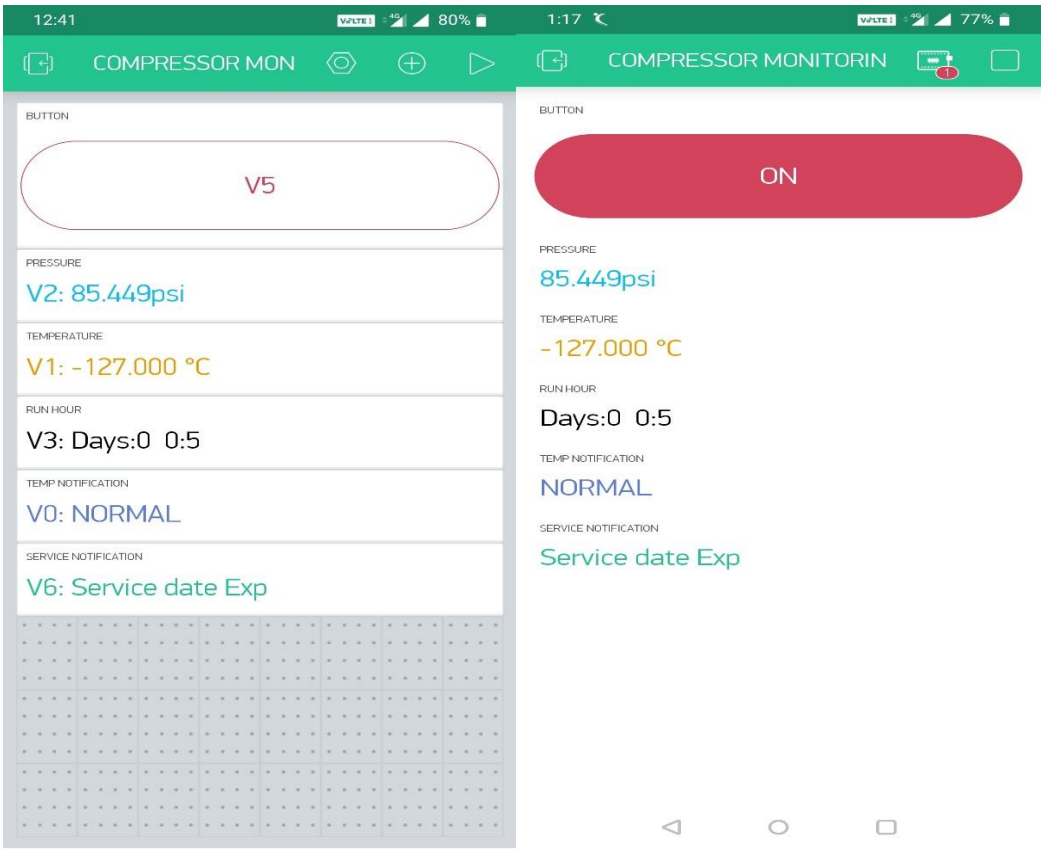
```
MOVWF PORTD
CALL CLK
MOVLW 'M'
MOVWF PORTD
CALL CLK
MOVLW '-'
MOVWF PORTD
CALL CLK
MOVLW 'S'
MOVWF PORTD
CALL CLK
MOVLW 'T'
MOVWF PORTD
CALL CLK
MOVLW 'A'
MOVWF PORTD
CALL CLK
MOVLW 'R'
MOVWF PORTD
CALL CLK
MOVLW 'T'
MOVWF PORTD
CALL CLK
MOVLW 'E'
MOVWF PORTD
CALL CLK
```

```
MOVLW 'D'
MOVWF PORTD
CALL CLK
MOVLW '.'
MOVWF PORTD
CALL CLK
MOVLW '.'
MOVWF PORTD
CALL CLK
MOVLW '.'
MOVWF PORTD
CALL CLK
GOTO START
CLK:BSF PORTC,0
CALL DELAY
BCF PORTC,0
DELAY:MOVLW 0X01
MOVWF 0X20
L2:MOVLW 0X07MOVWF 0X21L1:MOVLW 0X0FFMOVWF 0X22L:DECFSZ
0X22,1GOTO L
DECFSZ 0X21,1
GOTO L1
DECFSZ 0X20,1
GOTO L2
RETURN
END
```

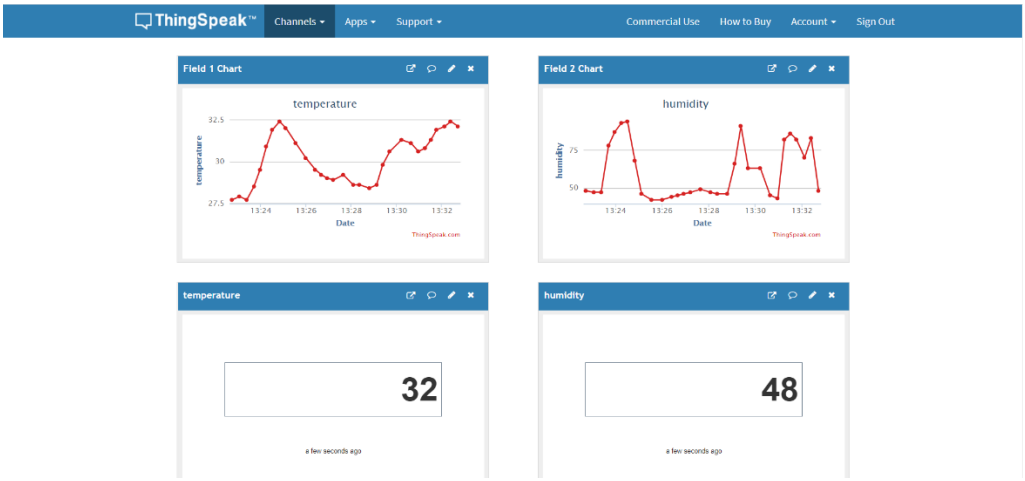
BLYNK APPLICATION

- Blynk is a new platform that allows you to quickly build interfaces for controlling and monitoring your hardware projects from your iOS and Android device.
- After downloading the Blynk app, you can create a project dashboard and arrange buttons, sliders, graphs, and other widgets onto the screen.
- Whatever your project is, there are likely hundreds of tutorials that make the hardware part pretty easy, but building the software interface is still difficult.
- In our project we have controlling and monitoring parts.
- Here we are using the blynk app for controlling part in our project.
- And also to see the fuel level in the tank by the graphical method.
- The app is connected with the node MCU to perform the tasks.
- Through the app we are sending the signal to the node MCU to perform the selected function.

BLYNK APP DESIGN OF OUR PROJECT



THINGSPEAK



- ThingSpeak is an open source internet of things (IoT) application and API to store and retrieve data from things using the HTTP protocol over the Internet or via a Local Area Network.
- ThingSpeak enables the creation of sensor logging applications, location tracking applications, and a social network of things with status updates.
- ThingSpeak was originally launched by ioBridge in 2010 as a service in support of IoT applications.
- ThingSpeak has integrated support from the numerical computing software MATLAB from Math work
- It is easy to understand the data analysis.
- It is very easy to set the data limit and the data will updates according to the timing what we set.
- In our project using this website to show the temperature data in graphical method.

PROGRAM FOR MONITORING AND CONTROLLING:

```
#include <DallasTemperature.h>
#include <OneWire.h>
#include<EEPROM.h>

#define ONE_WIRE_BUS 4
#define Pressure_sensor A0
#define Load D0
/* Comment this out to disable prints and save space */
#define BLYNK_PRINT Serial
int Hr = 0,Min = 0,Sec = 0,Day = 0,oldtime;
int Hr_Addr = 00,min_Addr = 01,day_Addr = 02;
int pinValue,notification = 0;
OneWire oneWire(ONE_WIRE_BUS);

DallasTemperature sensors(&oneWire);
#include <ESP8266WiFi.h>
#include <BlynkSimpleEsp8266.h>
char auth[] = "mN4XOe1f8Ehlkfj3oyf8lUSxvOVoLFms";
char ssid[] = "iotesp";
char pass[] = "123456789";

BLYNK_READ(V1) // Widget in the app READs Virtal Pin V5 with the certain
frequency
{
// This command writes Arduino's uptime in seconds to Virtual Pin V5
Blynk.virtualWrite(1, 10);
}

BLYNK_WRITE(V5) // V5 is the number of Virtual Pin
{
pinValue = param.asInt();
}

void setup()
{
Serial.begin(9600);
sensors.begin();
Blynk.begin(auth, ssid, pass);
//  EEPROM.write(Hr_Addr,0);
//  EEPROM.write(min_Addr,0);
//  EEPROM.write(day_Addr,0);
Day = EEPROM.read(day_Addr);
```

```
Hr = EEPROM.read(Hr_Addr);
Min = EEPROM.read(min_Addr);
pinMode(D0,OUTPUT);
digitalWrite(D0,LOW);
delay(1000);
}

void loop()
{
Blynk.run();
Serial.print("button ");
Serial.println(pinValue);
sensors.requestTemperatures();                  // Send the command to get
temperatures
Serial.println("Temperature is: ");
float val1 = sensors.getTempCByIndex(0);
Serial.println(val1);   // Why "byIndex"? You can have more than one IC
on the same bus. 0 refers to the first IC on the wire
Blynk.virtualWrite(1, val1);
if(Min > 3)// Service notification
{
Blynk.virtualWrite(6, "Service date Exp");
}
else
{
Blynk.virtualWrite(6, "----");
}
if(val1 > 50)
{
Blynk.virtualWrite(0, "OVER TEMPERATURE");
digitalWrite(Load,LOW);
}
else
{
Blynk.virtualWrite(0, "NORMAL");
if(pinValue == 1)
{
digitalWrite(Load,HIGH);
}
else
{
digitalWrite(Load,LOW);
}
//      Blynk.run();
}
float val = analogRead(Pressure_sensor);
val = (val *175)/1024;
```

```
Serial.print("Pressure: ");
Serial.println(val);
Blynk.virtualWrite(2, val);
Serial.println(pinValue);
if(pinValue == 1)
{
if((millis() - oldtime) >900)
{
Sec ++;
oldtime = millis();
Serial.println(Sec);
}
if(Hr >= 24)
{
Day = EEPROM.read(day_Addr);
Day++;
EEPROM.write(day_Addr,Day);
Hr = 0;
}
if(Min >= 60)
{
Hr = EEPROM.read(Hr_Addr);
Hr++;
EEPROM.write(Hr_Addr , Hr);
Min = 0;
}
if(Sec >= 60)
{
//     Min = EEPROM.read(min_Addr);
Min++;
EEPROM.write(min_Addr,Min);
Sec = 0;
}
String buff = "Days:"+String(Day)+"  "+String(Hr)+":"+String(Min);
Serial.println(buff);
Blynk.virtualWrite(3, buff);

}
else
{
oldtime = millis();
}
}
```

BILL OF MATERIALS

SL NO	ITEM DESCRIPTION	SPECIFICATION	SYMBOL	QUANTITY	COST (RS)	ONLINE COST(RS)
1	POWER SUPPLY	DC 5V,12V	P1,P2	EACH1	638	
2	NODEMCU	ESP8266	U1	1	399	461
3	MICROCONTROLLER	ATMEL 89C51	MC1	1	320	390
4	PRESSURE SENSOR	SKU 237545	PS1	1	979	1020
5	TEMPARATURE SENSOR	DS18B20 NTC TYPE	TS1	1	350	400
6	RELAY MODULE	5V,0.5 4CHANNEL	R1	1	250	259
7	CONNECTING WIRES	SINGLE STRAND		AS REQUIRED	170	210
8	ACRYLIC SHEET	20*20,4MM		1	640	589
9	NUT&BOLTS	DIA3MM,50MM		AS REQIRED	209	250
11	MULTI STRAND WIRE	5METER		AS REQUIRED	120	190
TOTAL					4075	3769

ADVANTAGES

- LOW COST CONTROLLING AND MONITORING PROJECT
- EASY USAGE
- NO MAINTENANCE
- ONE TIME INVESTMENT
- REDUCES HUMAN EFFORT
- 24X7 WORK

APPLICATIONS

- FACTORY AUTOMATION
- INDUSTRIAL APPLICATION
- HOME AUTOMATION
- OFFICE AUTOMATION

CONCLUSION

- DESIGNED THE CIRCUIT
- CREATED THE MECHANICAL STRUCTURE
- LEARNED THE IOT CONCEPT
- LEARNED REAL TIME APPLICATION SYSTEM
- LEARNED HOW TO CREATE APPS AND GRAPHS

REFERENCES

- WWW.YOUTUBE.COM
- WWW.WIKIPEDIA.COM
- WWW.THINGSPEAK.COM
- WWW.BLYNKCOMMUNITY.COM
- WWW.ARDUINO.COM
- WWW.INSTRUCTABLES.COM

SOFTWARES USED

- FUSION 360
- PROTEOUS
- MPLAB IDE
- PIK KIT 3
- ARDUINO
- BLYNK
- THINGSPEAK
- EAGLE
- MS OFFICE