A Report on
Home Automation using Blynk App
for

Mini Project 1-a (REV- 2019 'C' Scheme) of Second Year, (SE Sem-III)

in

Electronics & Telecommunication Engineering

by

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Name of Mini Project Guide

UNIVERSITY OF MUMBAI
AY 2021-2022

CERTIFICATE

This is to certify that the project entitled **Home Automation using Blynk app** is a bonafide work of

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submitted to the University of Mumbai in partial fulfillment of the requirement for the award of **Mini Project 1-a (REV- 2019 'C' Scheme) of Second Year, (SE Sem-III)** in **Electronics & Telecommunication Engineering** as laid down by the **University of Mumbai** during the academic year **2021-22**

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                              Head of Department   **Principal**

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ABBREVIATION

1. V: Volt
2. USB: Universal Serial Bus
3. SD3 Serial Data pin3
4. Node MCU: Node Microcontroller unit.
5. SPDT: Single Pole Double Throw.
6. DC: Direct Current
7. SDA: Serial Data Pin
8. GND: Ground
9. VCC: Voltage At the Common Collector

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LIST OF TABLES

CH-1. INTRODUCTION

1.1 Need :-

IOT or internet of things is an upcoming technology that allows us to control hardware devices through the internet. Here we propose to use IOT in order to control home appliances, thus automating modern homes through the internet. This system uses 4-loads to demonstrate as house Appliances Controlling. Our user friendly interface allows a user to easily control these home appliances through the internet Worldwide. For this system we use an NodeMCU (Node Microcontroller Unit).This microcontroller is interfaced with a Relay modem to get user commands over the internet. Relays are used to switch loads. The entire system is powered by a 5V Adaptor/Charger (Microtype). After receiving user commands over the internet, NodeMCU processes these instructions to operate these loads accordingly and display the system status on an Smart Phone Display. Thus this system allows for efficient home automation over the internet. In this we have used the Blynk Community Application for controlling the Home Appliance all over the world. With this IOT project, we can control home appliances from the smartphone and manual switches. If there is no WiFi available then you can control the relay module from manual push buttons. With this smart home project, we can also monitor the real-time status of the relay module in the Blynk app. If WiFi is available the ESP8266 will automatically connect with the WiFi.

1.2 Definition :-

Home automation or domotics : It is building automation for a home, called a smart home or smart house. A home automation system will monitor and/or control home attributes such as lighting, climate, entertainment systems, and appliances. It may also include home security such as access control and alarm systems. When connected with the Internet, home devices are an important constituent of the Internet of Things ("IoT").

CH-2. COMPARATIVE STUDY

Paper 1:

Home automation project using Wi-Fi: This paper explains prototype implementation of new home automation system using Wi-Fi technology. This System supports a wide range of home automation devices like power, management components and security components.

Paper 2:

Android and Arduino Wi-Fi Control Home Devices with ESP8266 : This project show you how to monitor some data in your home precisely using Arduino Wi-Fi shield. Arduino Uno board and the system will form an autonomous solution to monitor one or more sensors in your home.

Paper 3:

RASPBERRY PI HOME AUTOMATION WITH WIRELESS SENSORS USING SMART PHONE: This project presents a low cost home control and monitoring system. An embedded microprocessor & microcontroller, with IP connectivity were used for accessing and controlling appliances using Smart phone app. This system doesn't require a server.

CH-3. PROBLEM STATEMENT

Today people are looking at ways and means to better their life-style using the latest technologies that are available. Any new facility for home appliance that promises to enhance their life-style is grabbed by the consumers. The more such facilities and appliances are added, it becomes inevitable to have easy and convenient methods and means to control and operate these appliances. Conventional wall switches are located in different parts of a house and thus necessitates manual operations like to switch on or off these switches to control various appliances. It gets virtually impossible to keep track of appliances that are running and also to monitor their Performances. And Aim is to Built an system which controls home appliances with less efforts, like control using mobile.

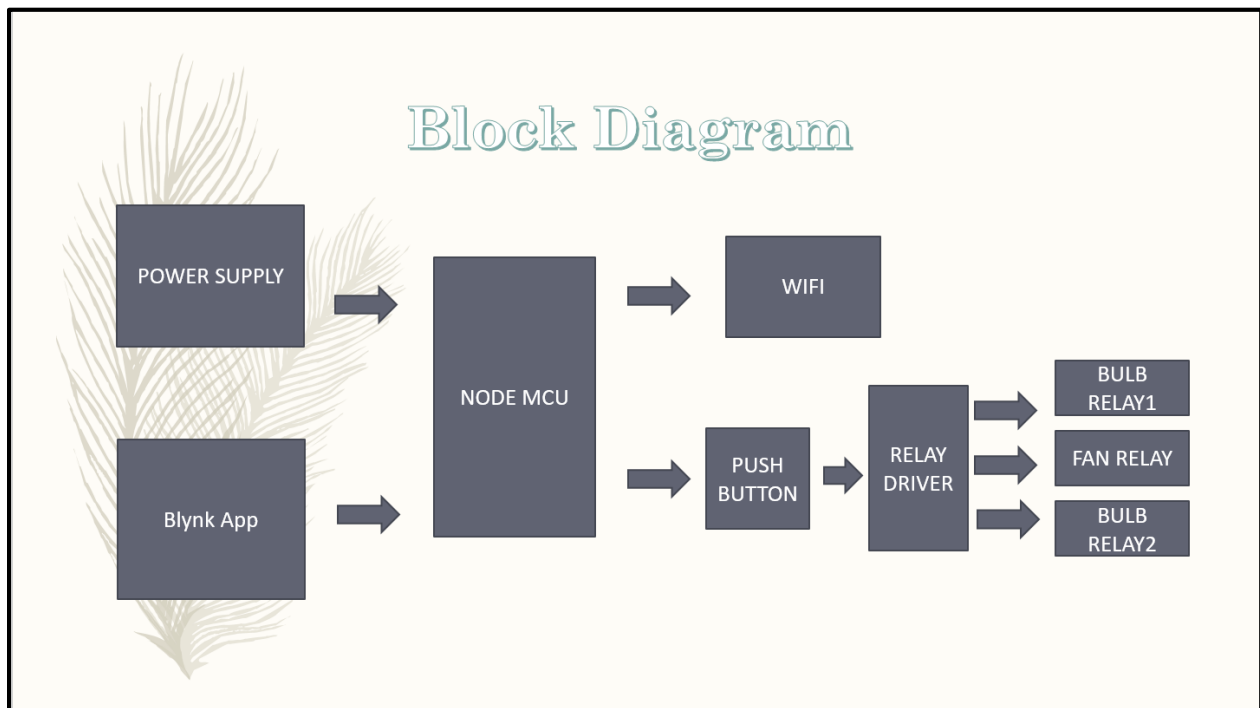# CH-4. Mini Project DESIGN (PRINCIPLE AND WORKING)

4.1 BLOCK DIAGRAM

Figure 4.1.1:- Block Diagram of Home Automation using Blynk app.

4.2 BLOCK DIAGRAM DESCRIPTION

When a person comes in front of an Ultrasonic Sensor in a distance between 1-3cm the ultrasonic distance sensor gets activated and it sends the message to the Arduino board which activates the temperature sensor (MLX90614 sensor).
Once the sensor gets activated it starts reading the temperature and if the temperature rises above 37°C the buzzer connected with the device will start ringing which indicates the temperature of the particular person is more than the normal temperature and he/she will not be allowed to enter the campus/premises.
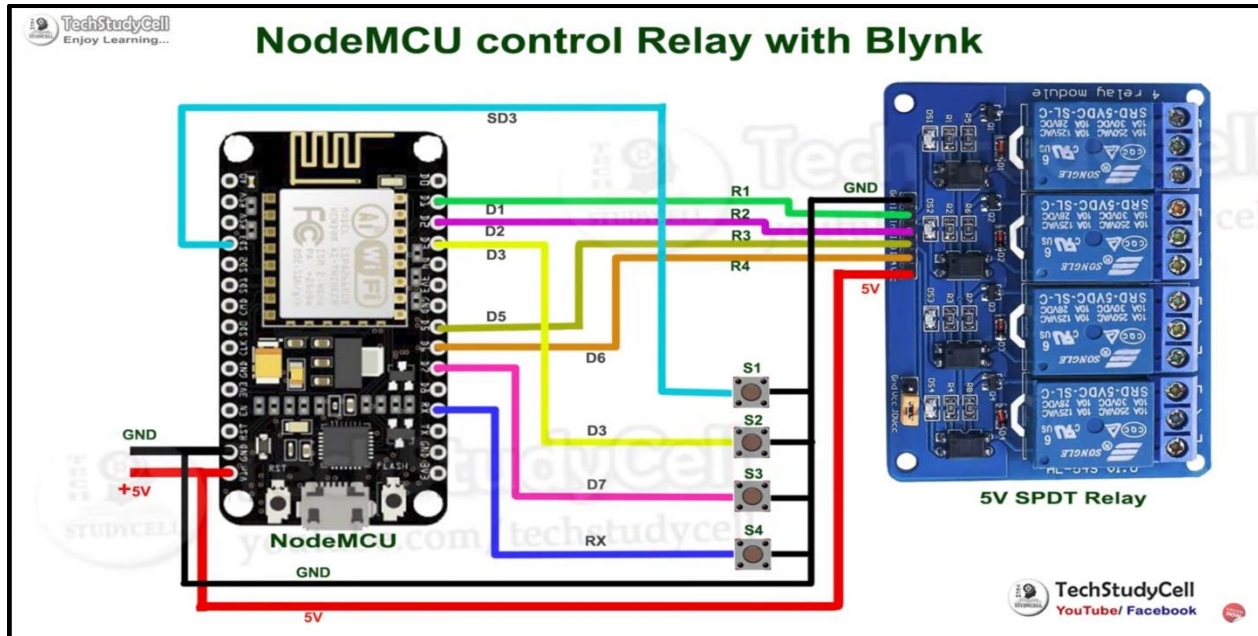
4.3 a) CIRCUIT DIAGRAM

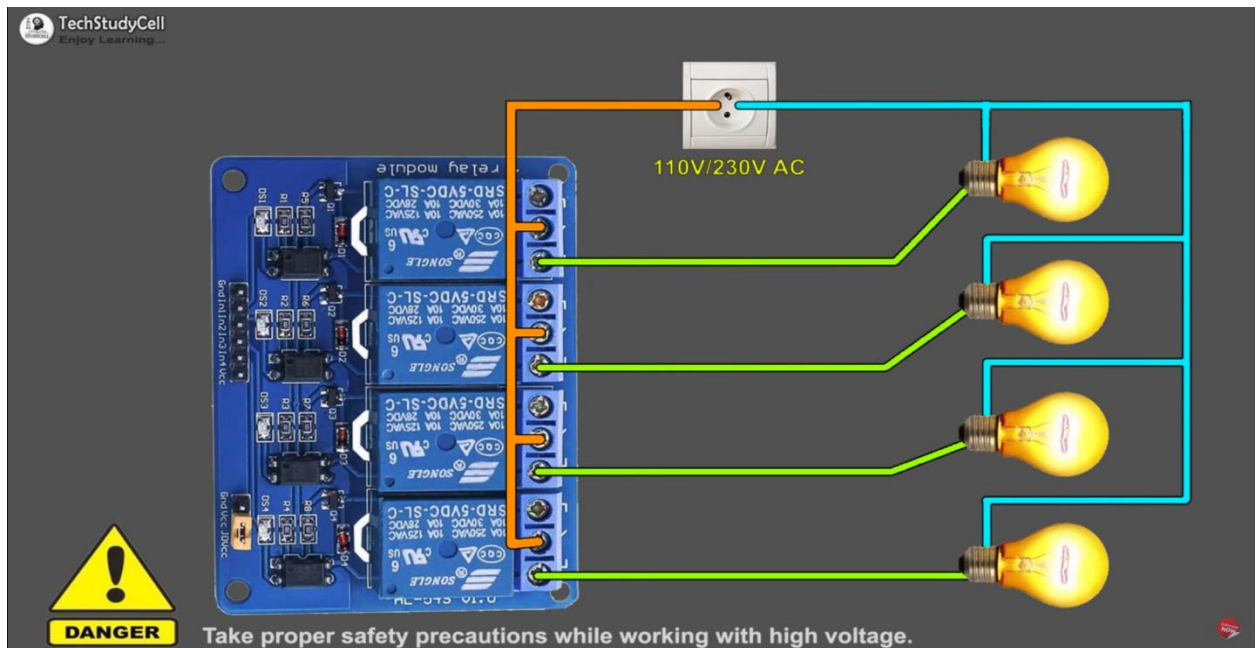Figure 4.3.1: Circuit Diagram of Home Automation using Blynk app.

Figure 4.3.2: Circuit Diagram of **5V SPDT** Relay .

4.3 b) WORKING:-

- Wifi Home automation works with the help of Blynk app. This app consist of various types of buttons and it can also work with the push button.
- We can also address the real time status of Home-automation and the Blynk app.
- The Blue LED on the Node MUC indicates that it is connected to WiFi . It can also work without WiFi with the help of push button according to which button is being pressed Blynk app will work only when the WiFi is on and LED light turns Blue and at same time it can be also controlled with push buttons.
- Switch buttons can also be used insteed of push buttons.
- We can operate the appliances through wifi using our smart phones.

CH-5. COMPONENTS/TOOLS TO BE USED

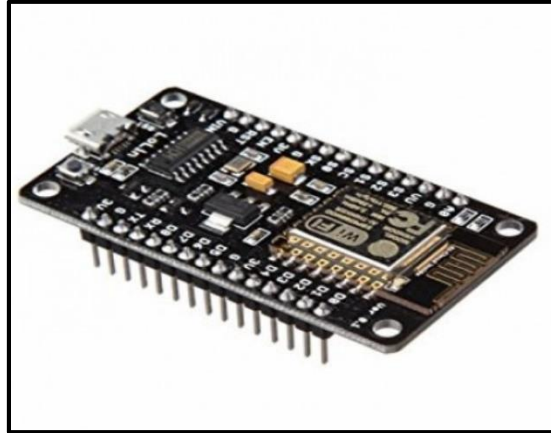## 5.1 COMPONENTS

1. **Node MUC :**

Figure 5.1.1a: Node MCU

The Heart Of Home Automation, Used to Process the Information/Commands/Instruction provided by the User or Owner, Its function is to Process the data & Pass the signal to the Relay and Switch the loads as per given Input.
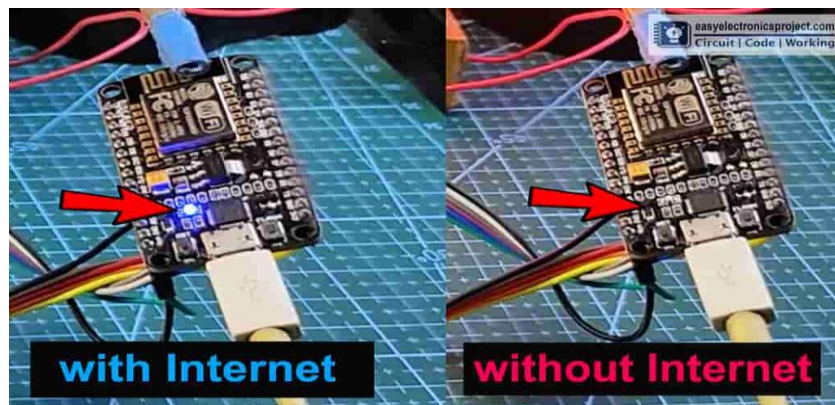

Figure 5.1.1b: Node MCU
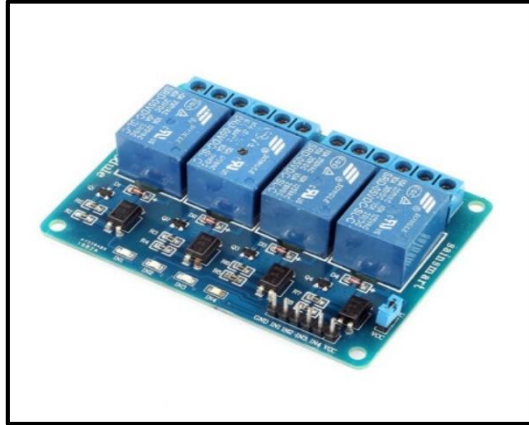
2. **5v SPDT Relay Module:**

Figure 5.1.2: 5v SPDT Relay

Basically the output of microcontroller is in Mili-volts so this output volt is not sufficient to run the bulky load output. This is a 5V 4-channel relay interface board, and each channel needs a 15 -20mA driver current. It can be used to control various appliances and equipment with large current. It is equipped with high current relays that work under AC 250V 10A or DC 30V 10A. It has a standard interface that can be controlled directly by microcontroller.

So as to run the appliances on 230v we require an Relay module so the output is fed to the relay module according to given input to the relay module it will generate output and drive various appliances and load e.g. Lamp, Fan ,Tube light ,T.V, etc.

3. Push Buttons:

Used for Manual purpose so that we can on or off the switches manually .

Figure 5.1.2: Switches

4. Connecting wires:

Jumper wires were used for the connection of Node MCU to 5v SPDT Relay. Normal wires were used for connecting the bulbs, power supply, etc.

5. Smart phone :

Used for controlling Purpose, for giving command and gain output , for this blynk Android app is required.

5.2 SOFTWARE USED

The Arduino Integrated Development Environment is a cross-platform application that is written in functions from C and C++.

It is used to write and upload programs to Arduino compatible boards, but also, with the help of third-party cores, other vendor development boards.

The Arduino Integrated Development Environment - or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions, and a series of menus.

It connects to the Arduino and Genuino hardware to upload programs and communicate with them.

CH-6. PROPOSED EXECUTIONS STEPS

6.1 Implemention of components:
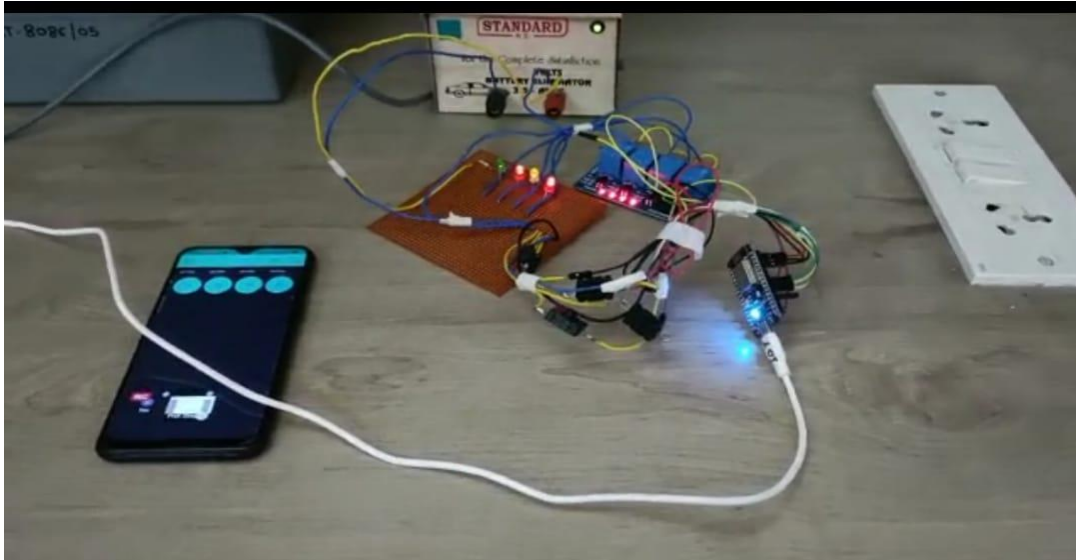
– Arduino is used in controlling the system.

– Home automation is used to control the Electrical home appliances from anywhere with the help of any android phone.

– Arduino is connected with the Node MCU , which is further connected to the Relay module and the switches .

 – D1, D2, D5 ,D6 are connected to the Relay module with the Node MCU .D3, D7, RX, SD3 is connected to the switches from the NODE MCU and this switches are also connected to the ground wire which is connected from Node MCU to the Module.

– The module then has connection with the LEDs .With the help of Blynk app which is connected to the wifi and Node MCU , we can easily control the Automation process .

– If the LEDs are on then it will blink in the app .

– From there we can on or off the LEDs .

– The control of the LEDs can be done by both from the switches as well as from the app.

6.2   PCB layout :
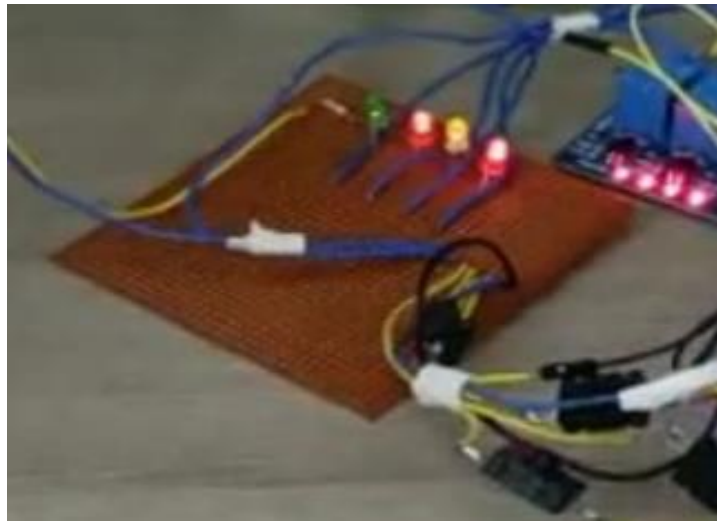
- On the zero PCB board, the ground of Node MCU and the ground of Relay is connected.
- Also the 4 LED's are souldered on the PCB board.

CH-7. TROUBLESHOOTING

7.1 PROBLEMS / FAULTS IN PROJECT

1. Problem in Connections.
2. The code in the Arduino IDE was throwing errors.
3. There was problem in Wi-Fi connection while executing for many times.

7.2 SOLUTION FOR PROBLEMS / FAULTS IN PROJECT

1. The proper connection was made in the hardware part, with the help of circuit diagram.
2. The error was in the USB port so we have used another laptop to upload the code, and it was uploaded successfully.
3. Libraries installation were pending in the software of Arduino IDE.
4. For Wi-Fi , we have again generated the authentication code and the problem was being solved.

REFERENCES

1. P Pavan Kumar, G Tirumala Vasu "Home Automation System and Security System using Arduino". International Journal of Emerging Trends in Engineering Research. Vol. 3, No.6, Pages: 190-194(2015).

2. Mahesh N. Jivani "GSM Based Home Automation System Using App-Invertor for Android Mobile Phone" International Journal of Advanced Electrical, Electronics And Instrumentation Engineering. Vol.

3. Issue 9, September 2014. [3]. R Piyare and M.Tazil. 2011."Bluetooth Based Home Automation System Using Cell Phone".IEEE 15th International Symposium on Consumer Electronics .

4. Arduino Development Environment, http://arduino.cc/en/guide/Environment

APPENDIX

Datasheet of Components

1. **Node MCU :**

Pin Category	Name	Description
Power	Micro-USB, 3.3V, GND, Vin	**Micro-USB:** Node MCU can be powered through the USB port **3.3V:** Regulated 3.3V can be supplied to this pin to power the board **GND:** Ground pins **Vin:** External Power Supply
Control Pins	**EN, RST**	The pin and the button resets the microcontroller
Analog Pin	A0	Used to measure analog voltage in the range of 0-3.3V
GPIO Pins	GPIO1 to GPIO16	Node MCU has 16 general purpose input-output pins on its board

SPI Pins	SD1, CMD, SD0, CLK	Node MCU has four pins available for SPI communication.
UART Pins	TXD0, RXD0, TXD2, RXD2	Node MCU has two UART interfaces, UART0 (RXD0 & TXD0) and UART1 (RXD1 & TXD1). UART1 is used to upload the firmware/program.
I2C Pins		Node MCU has I2C functionality support but due to the internal functionality of these pins, you have to find which pin is I2C.

Table 1.1 Node MCU Pin Configuration

2. 5v SPDT Relay

Pin Number	Pin Name	Description
1	Coil End 1	Used to trigger(On/Off) the Relay, Normally one end is connected to 5V and the other end to ground
2	Coil End 2	Used to trigger(On/Off) the Relay, Normally one end is connected to 5V and the other end to ground
3	Common (COM)	Common is connected to one End of the Load that is to be controlled
4	Normally Close (NC)	The other end of the load is either connected to NO or NC. If connected to NC the load remains connected before trigger
5	Normally Open (NO)	The other end of the load is either connected to NO or NC. If connected to NO the load remains disconnected before trigger.

Table 1.2 5v SPDT Relay Pin Configuration