Smart Home Automation Using Blynk & ESP32 IoT Projects | WiFi & Manual

by techstudycell

In this IoT project, I have shown how to make IoT based Smart Home Automation Using Blynk & ESP32 to control an 8-channel relay module from the manual switch & smartphone using the Blynk App. If the internet is not available, then you can control the home appliances from manual switches. During the article, I have shown all the steps to make this home automation system.

This ESP32 control smart relay has the following features:
1. Control home appliances with WiFi (Blynk App)

2. Control home appliances with manual switches.

3. Monitor real-time feedback in the Blynk App.

4. Control home appliances manually without internet.

You need just an 8-channel relay module & ESP32 board to make this smart home project.

class="supplies-heading">Supplies: 1. Relays 5v (SPDT) (8 no)

2. BC547 Transistors (8 no)

3. PC817 Optocuplors (8 no)

4. 510-ohm 0.25-watt Resistor (8 no) (R1 - R8)

5. 1k 0.25-watt Resistors (10 no) (R9 - R18)

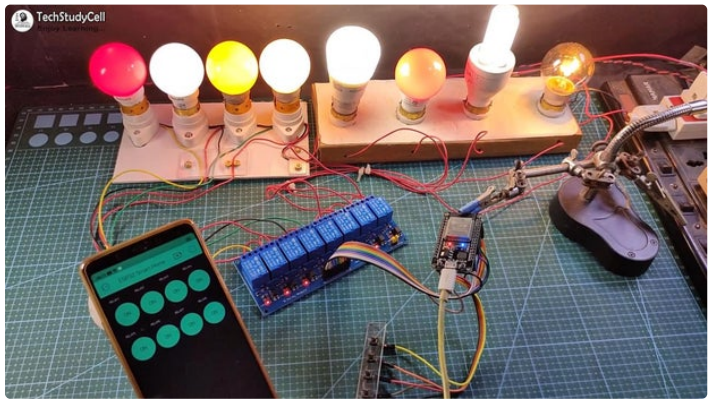
6. LED 5-mm (10 no)

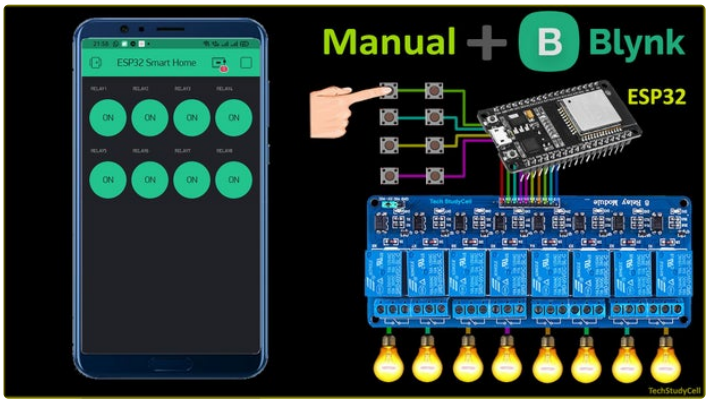
7. 1N4007 Diodes (8 no) (D1 - D8)

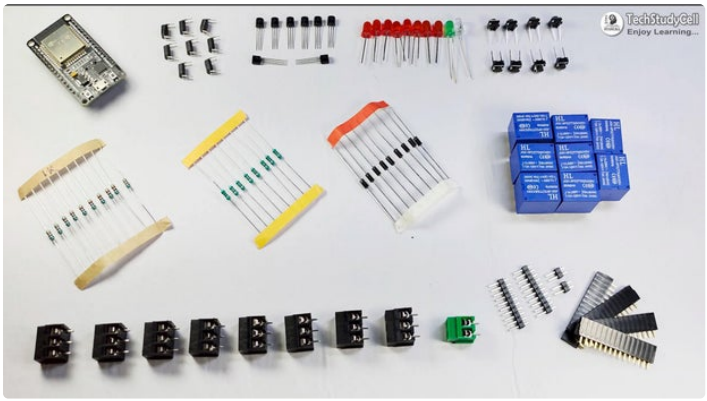
8. Push Buttons (8 no)

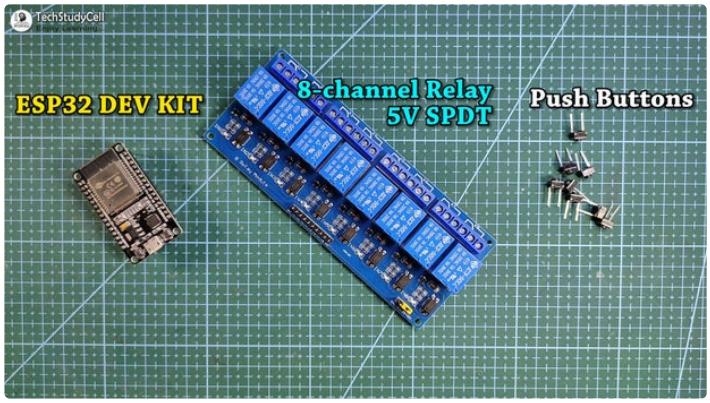
9. Terminal Connectors

10. 5V DC supply









https://youtu.be/o1e5s_5p3FU

Step 1: Circuit Diagram of the ESP32 Project

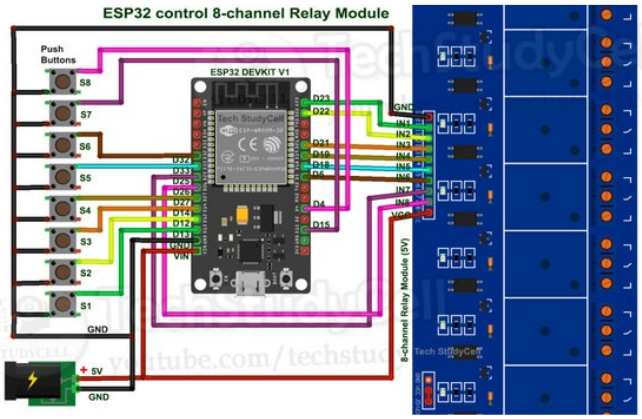
This is the complete circuit diagram for this home automation project. I have explained the circuit in the tutorial video.

The circuit is very simple, I have used the GPIO pins **D23, D22, D21, D19, D18, D5, D25** & **D26** to control the 8 relays.

And the GPIO pins **D13, D12, D14, D27, D33, D32, D15** & **D4** connected with push buttons to control the 8 relays manually.

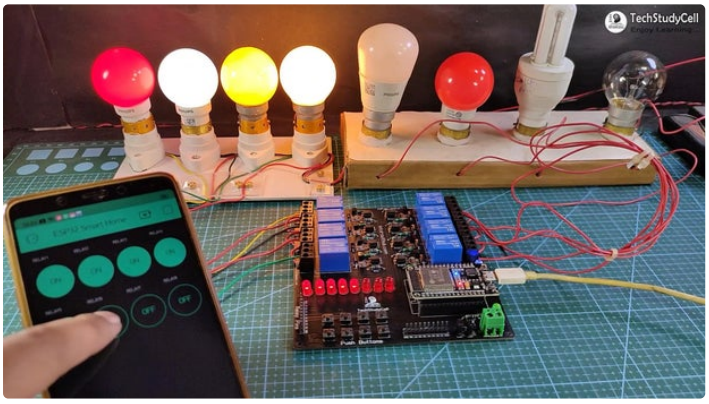
I have used the **INPUT_PULLUP** function in Arduino IDE instead of using the pull-up resistors.

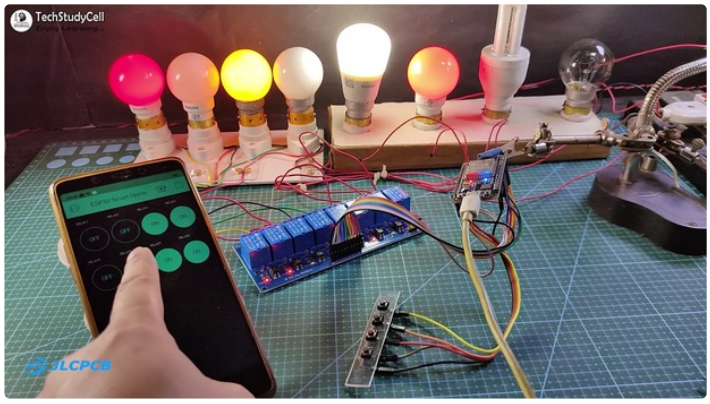
I have used a 5V mobile charger to supply the smart relay module.



Step 2: Control Relays With Internet Using Blynk

If the ESP32 module is connected with the WiFi, then you can control the home appliances from Blynk App and push-buttons. You can control, monitor the real-time status of the relays from anywhere in the world with the Blynk App.

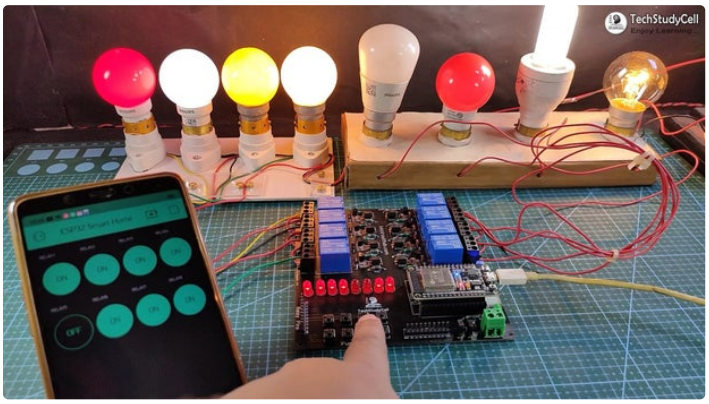


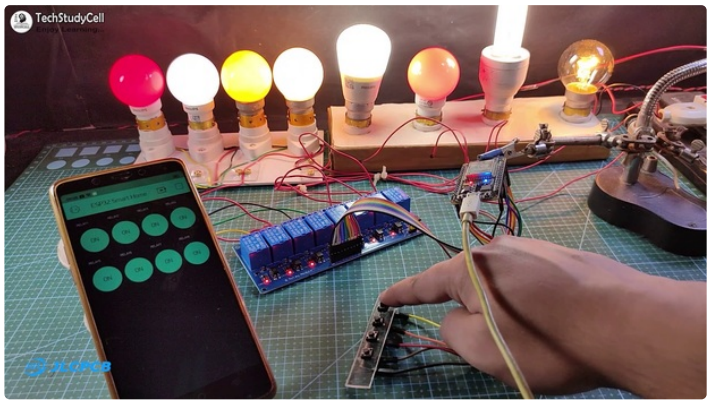


Step 3: Control Relays Without Internet Using Push-buttons

If the WiFi is not available, you can control the relays from the pushbuttons.

The ESP32 will check for the WiFi after every 3 seconds. When the WiFi is available, the ESP32 will automatically connect with the WiFi.



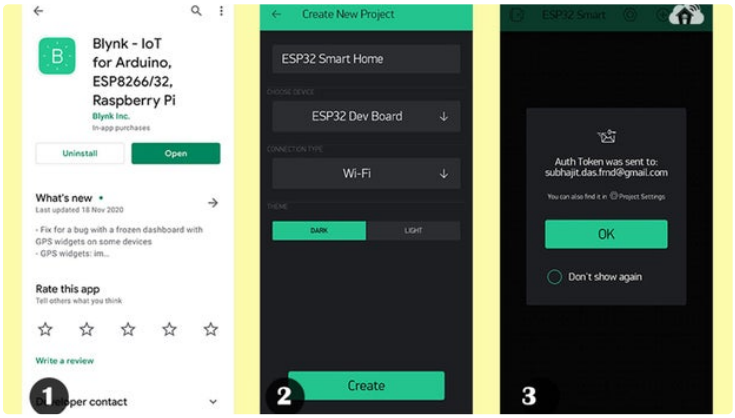


Step 4: Configure the Blynk App for the ESP32

1. Install the **Blynk App** from the Google play store or App store. Then create an account and tap on the **New Project.**

2. Give the **name to the project,** select **ESP32 Dev Board**, Connection type will be WiFi. Then tap on **Create**.

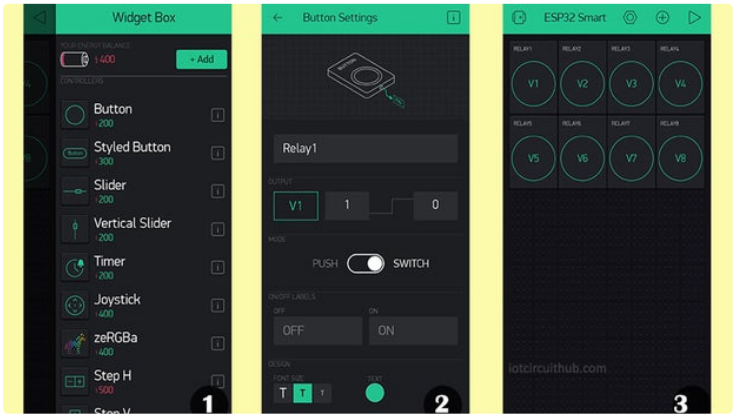
3. Blynk will send an authentication token to the registered email id. Tap on OK.



Step 5: Add the Button Widgets in Blynk App

Then add 8 button widgets to control the 8 relays. Here I have used virtual pins V1, V2, V3, V4, V5, V6, V7, V8 for 8 buttons. And mode will be Switch.

I have explained all the details in the tutorial video.



Step 6: Code for Blynk ESP32 Home Automation

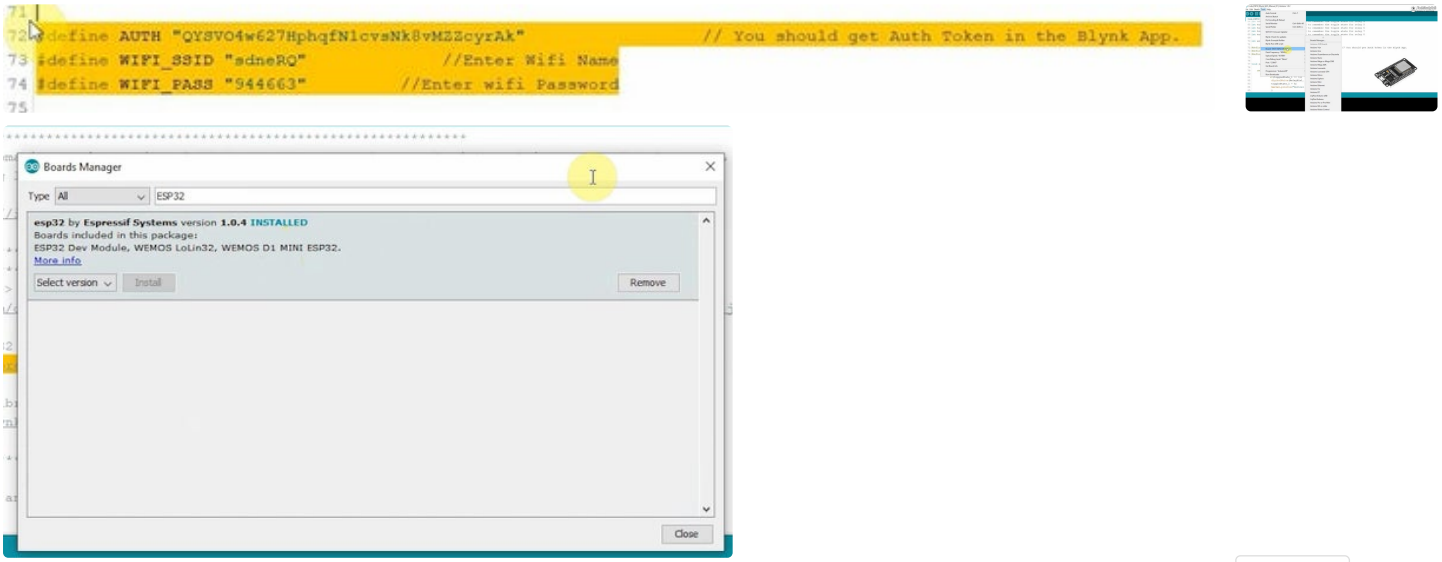
In the Tutorial video, I have explained all the steps to program the ESP32 DEV KIT V1 using Arduino IDE.

Before uploading the code you have to install the ESP32 board and Blynk library.

Then enter the WiFi name, WiFi password & Blynk Auth Token in the code.

Select the DOIT ESP32 DEVKIT V1 board and proper PORT.

Then upload the code to ESP32 Board.

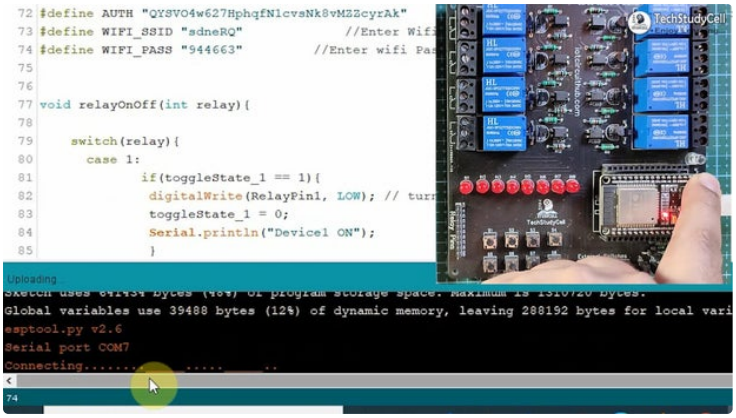


Download

https://www.instructables.com/ORIG/FIP/XU5O/KJEAGEAB/FIPXU5OKJEAGEAB.ino

Step 7: Program the ESP32 With Arduino IDE

While uploading the code to ESP32, if you see the "**Connecting...._____**" text, then press the **BOOT** button of the ESP32.

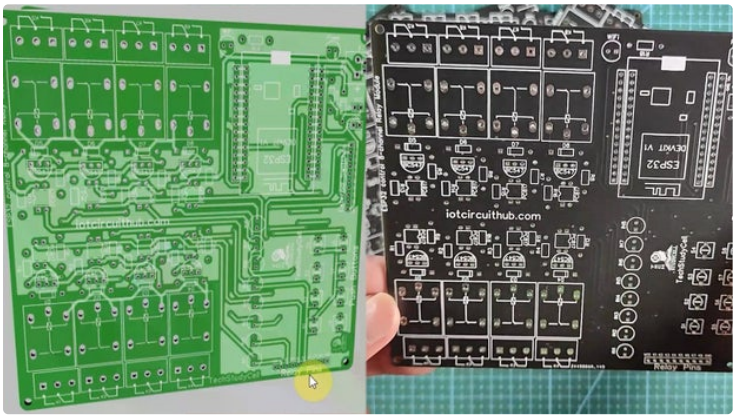


Step 8: Designing the PCB

To make the circuit compact and give a professional look, I have designed the PCB after testing all the features of the smart relay module on the breadboard.

You can download the PCB Gerber file of this home automation project from the following link:

https://drive.google.com/uc?export=download&id=1Y8rXnczq6baxAKOrBEE8aro-uqcK0J93

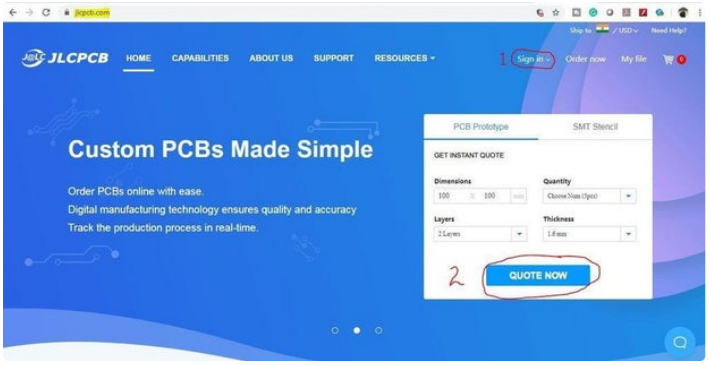


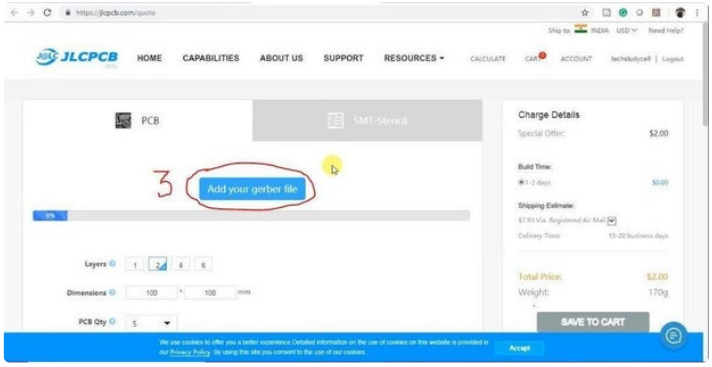
Step 9: Order the PCB

After downloading the Garber file you can easily order the PCB
1. Visit https://jlcpcb.com and Sign in / Sign up

2. Click on the QUOTE NOW button.

3 Click on the "Add your Gerber file" button. Then browse and select the Gerber file you have downloaded.

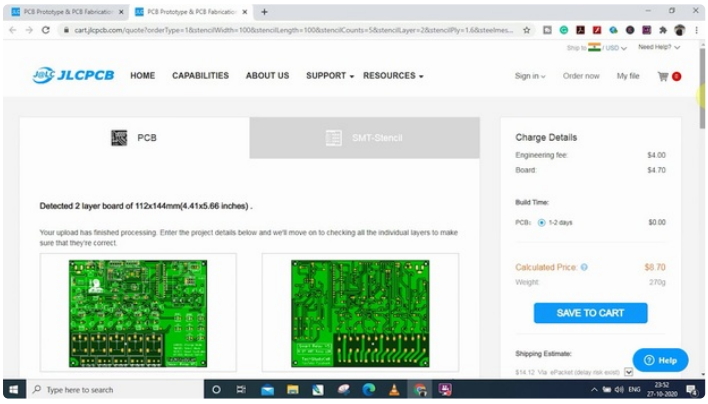


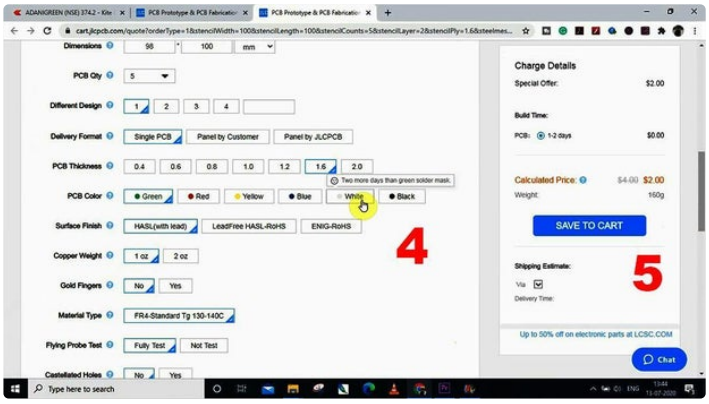


Step 10: Uploading the Gerber File and Set the Parameters

4. Set the required parameter like Quantity, PCB masking color, etc

5. After selecting all the Parameters for PCB click on SAVE TO CART button.





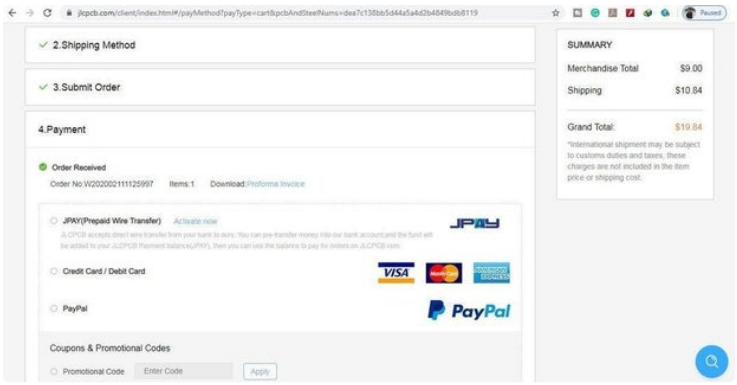
Step 11: Select Shipping Address and Payment Mode

6. Type the Shipping Address.

7. Select the Shipping Method suitable for you.

8. Submit the order and proceed for the payment.

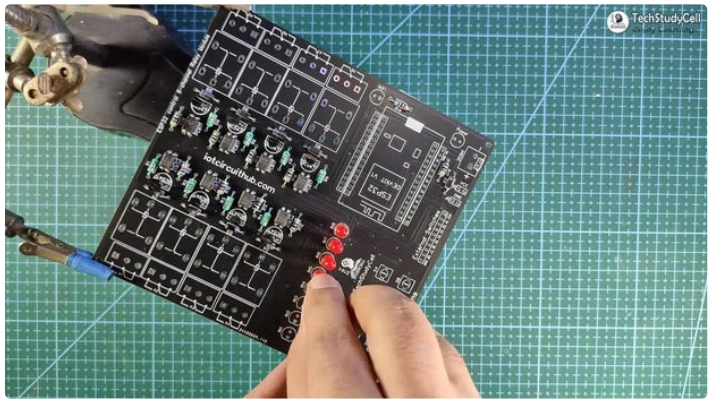
You can also track your order from the JLCPCB.com. My PCBs took 2 days to get manufactured and arrived within a week using the DHL delivery option. PCBs were well packed and the quality was really good at this affordable price.

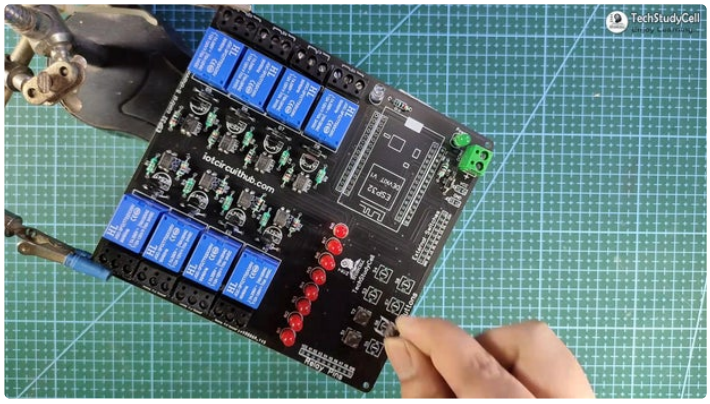


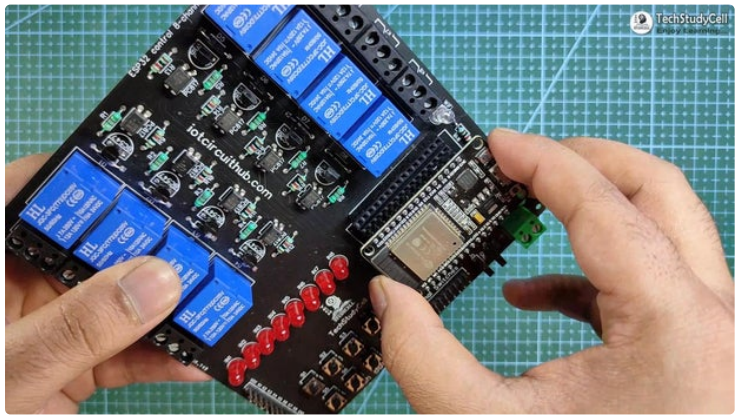
Step 12: Solder All the Components on PCB

After that, I have soldered all the components as per the circuit diagram.

Then connect the ESP32 board with PCB



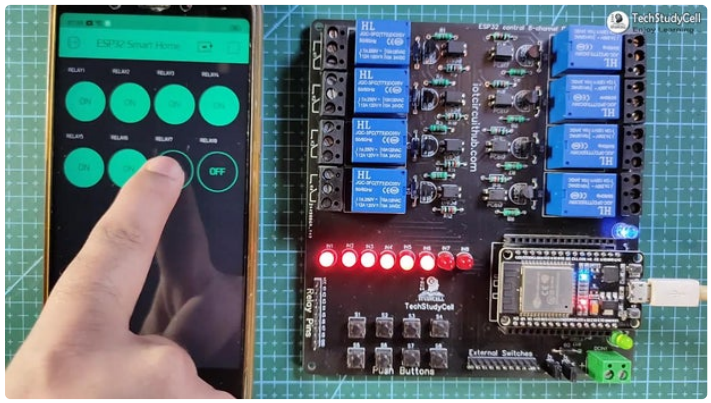


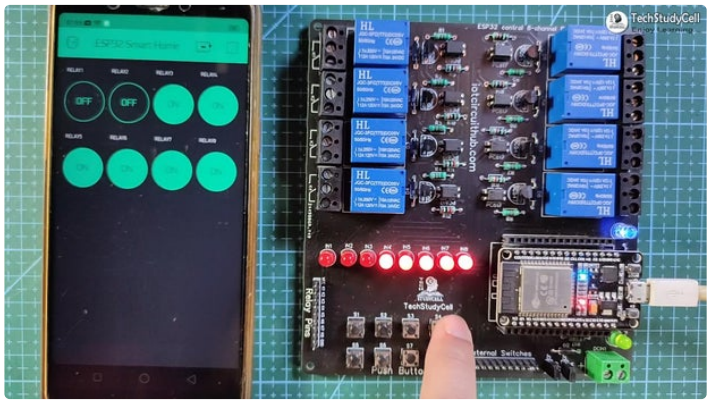


Step 13: Testing the ESP32 Home Automation Circuit

After uploading the code, if the ESP32 connects with the WiFi, the blue LED will turn on.

Then you can control the relay module from Blynk App and push-button.

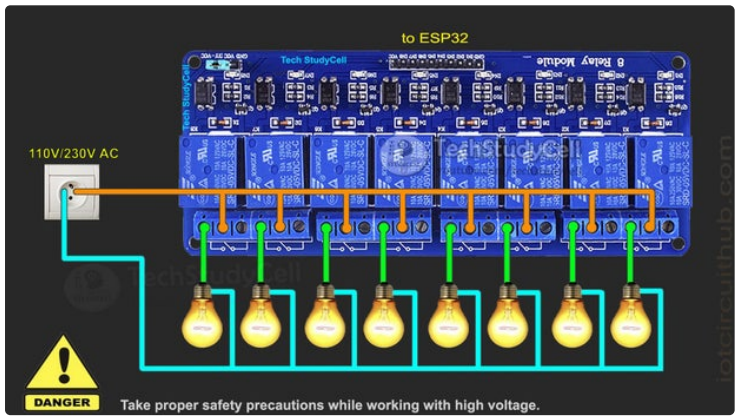




Step 14: Connect the Home Appliances

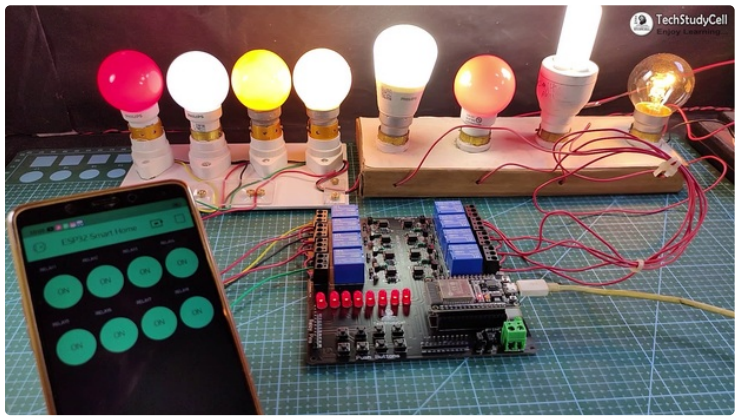
Connect the 8 home appliances as per the circuit diagram. Please take proper safety precautions while working with high voltage.

Connect 5-volt DC supply with the PCB. (I have used my old mobile charger)



Step 15: Turn ON the Supply

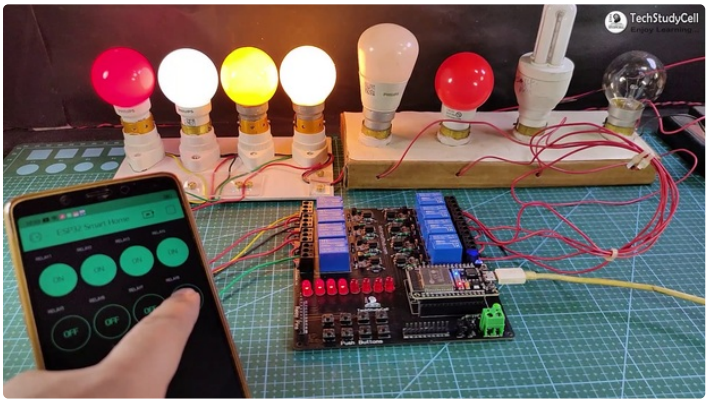
Turn on the 110V/230V supply and 5V DC supply.

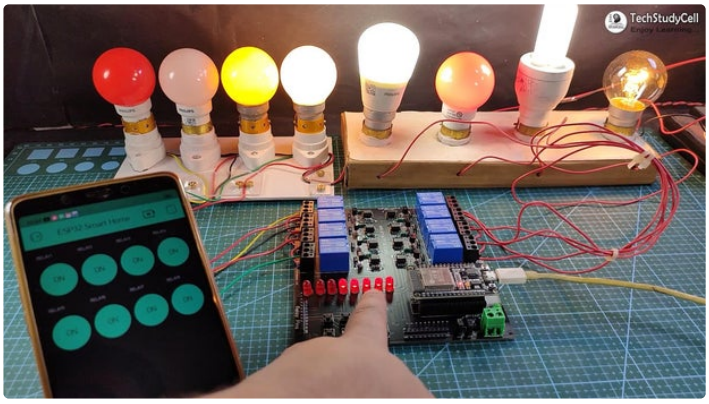


Step 16: Finally!!

Now you can control your home appliances in a smart way.
I hope you have liked this home automation project. I have shared all the required information for this project. I will really appreciate it if you share your valuable feedback.

Also if you have any query please write in the comment section. Thank you & Happy Learning.


TechStudyCell


TechStudyCell