

# AC Controller

**Guide** : Dr . Prashanth Vooka

**Duration** : May 2024- Jul 2024

**Place** : Indian Institute of Technology Tirupati

**Objective** : To operate a manually controlled AC control panel through a remote to avoid physical interaction/manual operation.

**Hardware Components** : ESP32, Breadboard, Servo Motors, Push Buttons, Jumper wires, Powering Sources.

**Software Components** : Arduino IDE, AutoCAD.

## **Idea & Project Implementation :**

In our professor's room, the AC control panel was placed slightly out of convenient reach, requiring him to physically approach it every time he needed to adjust the settings. To address this issue, our professor assigned us the task of developing a remote-controlled solution for operating the AC without direct interaction with the panel.

After thorough research, we decided to use **two ESP32 microcontrollers** connected via **Bluetooth** (chosen over Arduino UNO due to ESP32's dual Wi-Fi/Bluetooth support and low power consumption). The system was powered using portable power banks for efficiency.

We began by designing a **3D-printed enclosure** using CAD modelling, ensuring precise dimensions to securely hold the AC control panel along with the servo mechanisms.

For implementation:

- The **first ESP32** was connected to a laptop and programmed (using the Arduino IDE) to establish a Bluetooth link with the second ESP32. This unit was interfaced with **servo motors**, which were mounted on the 3D-printed frame to physically press the AC buttons.
- The **second ESP32** was connected to a breadboard with **four push buttons**, each corresponding to an AC function: **Power On/Off, Mode, Temperature Increase, and Temperature Decrease**.

The servos were programmed such that:

- When a button was pressed, the respective servo's blade would rotate **45 degrees clockwise or counterclockwise** from its neutral position.
- This movement would press the corresponding AC button and then **return to its original position** after a short delay.

The final design allowed seamless remote operation—users could adjust the AC settings effortlessly by pressing the designated buttons, eliminating the need to manually access the control panel.

### **Working Demonstration :**

[https://drive.google.com/file/d/1HC\\_-TvLYQifWNf2FdAEdOGNbuyLeEV65/view?usp=sharing](https://drive.google.com/file/d/1HC_-TvLYQifWNf2FdAEdOGNbuyLeEV65/view?usp=sharing)

### **Conclusion :**

We successfully created a working remote control system for the AC using ESP32 and servo motors—it's simple, practical, and can easily be expanded for smarter features down the line. We could make it even better in the future by adding things like app control or voice commands to fit into a modern smart home setup.