**Hardware Components**

| **S.No** | **Component Name** | **Quantity** | **Description** |
| --- | --- | --- | --- |
| 1 | ESP32 Dev Board | 1 | Main Wi-Fi enabled microcontroller |
| 2 | VC-02 Voice Recognition Module | 1 | Offline voice control via HEX commands |
| 3 | Relay Module (4-Channel) | 1 | Controls appliances like fan, light, TV, etc |
| 4 | Jumper Wires | 1 set | For internal connections |
| 5 | Power Booster (XL6009) | 1 | Boosts voltage when using battery supply |
| 6 | Breadboard / PCB | 1 | Organizes wiring layout and connections |
| 7 | Home Appliances (Fan, Light, TV, Cooler) | 4 | Real-world devices being automated |

**⚙ Wiring Connections**

| **ESP32 Pin** | **Connected To** | **Function Description** |
| --- | --- | --- |
| GPIO16 | Relay Channel 1 | Controls Fan (Active LOW) |
| GPIO17 | Relay Channel 2 | Controls Light (Active LOW) |
| GPIO18 | Relay Channel 3 | Controls TV (Active LOW) |
| GPIO19 | Relay Channel 4 | Controls Cooler (Active LOW) |
| GPIO21 | VC-02 TX | Voice module → ESP32 (Receive) |
| GPIO22 | VC-02 RX | ESP32 → Voice module (Transmit) |
| 5V/VIN | Relay + VC-02 VCC | Power supply line |
| GND | Common Ground | Shared ground for all components |

**🔌 Power Supply Configuration**

| **Source** | **Usage** |
| --- | --- |
| USB / Regulated 5V | Powers the ESP32 board |
| Stable 5V (via XL6009) | Required for Relay Module and VC-02 |
| Common GND | Essential for all components to function |