# ESP32

Wi-Fi & Bluetooth Development Board



The ESP32 is a powerful 32-bit microcontroller with built-in Wi-Fi and Bluetooth. It is ideal for IoT, robotics, automation and wireless embedded projects.

## TOP USES

- IoT and Wi-Fi projects
- Bluetooth devices
- Home automation
- Robotics and smart systems

## KEY FEATURES

- Dual-core 32-bit processor
- Wi-Fi and Bluetooth
- Multiple GPIO and ADC pins
- PWM, UART, SPI and I2C
- Low-power modes

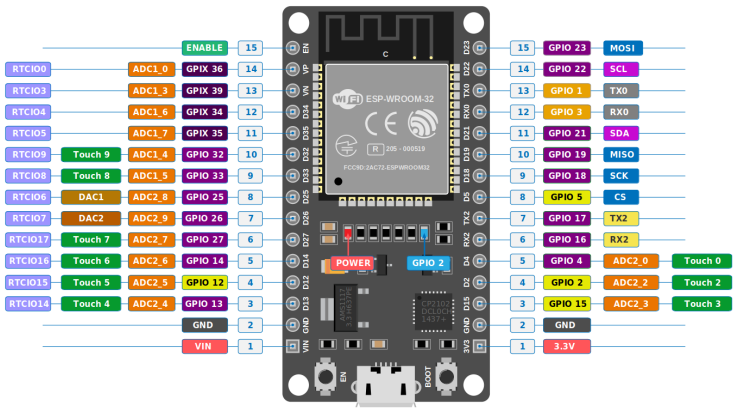
# Technical Specifications

ESP32

| Parameter | Value |
|---|---|
| **Microcontroller** | ESP32 |
| **CPU** | Dual-core 32-bit |
| **Frequency** | Up to 240 MHz |
| **Operating Voltage** | 3.3 V |
| **Wi-Fi** | 2.4 GHz 802.11 b/g/n |
| **Bluetooth** | Classic / BLE |
| **GPIO** | Up to 34* |
| **ADC** | 12-bit* |
| **Communication** | UART / SPI / I2C |
| **Flash** | Typically 4 MB |
| **Logic Level** | 3.3 V |

# Pinout

ESP32




## PIN FUNCTIONS

| Pin | Function | Notes |
|---|---|---|
| **GPIO** | Digital I/O | General-purpose pins |
| **GPIO34-39** | Input only | Digital input |
| **GPIO21** | I2C SDA | I2C data |
| **GPIO22** | I2C SCL | I2C clock |
| **GPIO18/19/23** | SPI | SPI communication |
| **TX/RX** | UART | Serial communication |
| **3V3** | Power | 3.3 V |
| **VIN/5V** | Power | Board input |
| **GND** | Ground | Common ground |

## WIRING NOTES

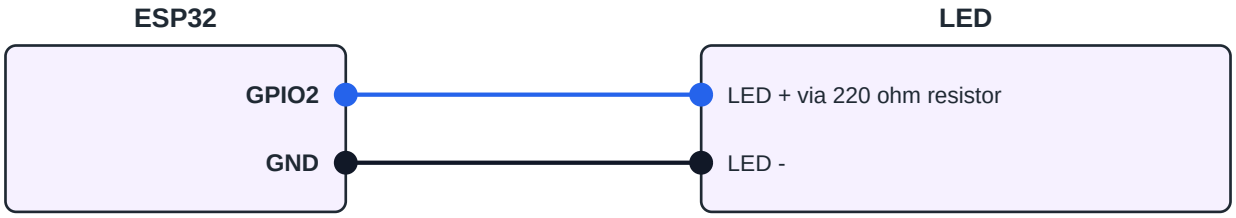
- ESP32 GPIO uses 3.3 V logic.
- Do not apply 5 V directly to GPIO.
- GPIO34-39 are input-only on classic ESP32.

# Example Project

Wi-Fi LED Control

Control an LED wirelessly from a web browser using the ESP32 Wi-Fi connection.

## CIRCUIT




## EXAMPLE CODE

```
#include <WiFi.h>

const char* ssid = "YOUR_WIFI";
const char* password = "YOUR_PASSWORD";
WiFiServer server(80);

void setup() {
  pinMode(2, OUTPUT);
  WiFi.begin(ssid, password);

  while (WiFi.status() != WL_CONNECTED)
    delay(500);

  server.begin();
}

void loop() {
  WiFiClient client = server.available();
  if (!client) return;

  String req = client.readStringUntil('\r');
  client.flush();

  if (req.indexOf("/ON") != -1) digitalWrite(2, HIGH);
  if (req.indexOf("/OFF") != -1) digitalWrite(2, LOW);

  client.println("HTTP/1.1 200 OK");
  client.println("Content-Type: text/html");
  client.println();
  client.println("<h1>ESP32 LED</h1>");
  client.println("<a href='/ON'>ON</a><br>");
  client.println("<a href='/OFF'>OFF</a>");

  client.stop();
}
```

## EXPECTED RESULT

- ESP32 connects to Wi-Fi.
- Open its IP address in a browser.
- Use ON/OFF buttons to control the LED.

# Useful Links

ESP32

| Resource | Link |
|---|---|
| **ESP32 Documentation** | https://docs.espressif.com/projects/esp-idf/en/latest/esp32/ |
| **Arduino ESP32 Core** | https://github.com/espressif/arduino-esp32 |
| **Arduino IDE** | https://www.arduino.cc/en/software |

## COMPATIBLE COMPONENTS

- DHT22
- HC-SR04
- MPU6050
- Relay Module
- OLED I2C
- SG90 Servo

## Need this component?

**Buy ESP32 >>**

https://techzoneegypt.com/p/esp32