

Component	ESP32 Pin	Function / Description	Notes
Left Motor PWM (ENA)	4	PWM speed control for left motor	Connect to ENA on L298N or motor driver
Left Motor Forward (IN1)	2	Direction control: forward	Connect to IN1 on motor driver
Left Motor Reverse (IN2)	18	Direction control: reverse	Connect to IN2 on motor driver
Right Motor PWM (ENB)	5	PWM speed control for right motor	Connect to ENB on L298N or motor driver
Right Motor Forward (IN3)	19	Direction control: forward	Connect to IN3 on motor driver
Right Motor Reverse (IN4)	21	Direction control: reverse	Connect to IN4 on motor driver
Ultrasonic Trigger (TRIG_PIN)	12	Sends trigger pulse to ultrasonic sensor	HC-SR04 or similar
Ultrasonic Echo (ECHO_PIN)	13	Reads echo pulse from ultrasonic sensor	HC-SR04 or similar
Status LED	14	Visual indication of obstacle detection	HIGH = obstacle, LOW = clear
WiFi		Built-in WiFi ESP32 acts as Access Point	SSID: "RC-Car", IP: 192.168.4.1
WebServer	N/A	Hosts dashboard & joystick interface	Port 80, handles /, /joy, /dist

◆ Additional Notes:

- **Motor Driver:** The code assumes an H-Bridge driver like **L298N** or **TB6612FNG**.
- **PWM Pins:** ESP32 can use analogWrite() with these pins (hardware PWM).
- **Ultrasonic Sensor:** Make sure TRIG pin gets a 10µs pulse; ECHO reads distance in cm.
- **LED Pin:** Optional, just shows if obstacle is detected (distance ≤ 40 cm).
- **Joystick Input:** Handled via web dashboard over WiFi.