

# **MechaRush**

by

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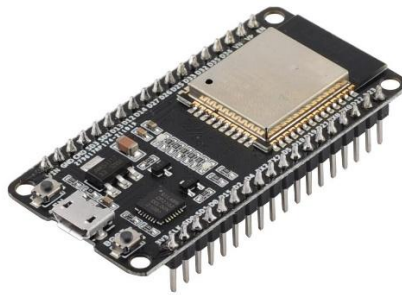
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## **1. Components Used:**

### **1.1 ESP32**



### **Specifications:**

- Microcontroller: Dual-Core 32-bit
- Clock Speed: Up to 240 MHz
- Flash Memory: 4MB
- RAM: 520 KB SRAM
- Connectivity: WiFi (802.11 b/g/n), Bluetooth 4.2 (BLE + Classic)
- GPIO Pins: 34 (capable of ADC, PWM, I2C, SPI, UART)
- Operating Voltage: 3.3V

**Purpose:**

The ESP32 is the central processing unit of the RC car, responsible for handling input signals from the receiver and controlling the motor driver. It also provides wireless communication capabilities via WiFi and Bluetooth if needed for advanced features.

**1.2 BTS7960B****Specification:**

- Operating Voltage: 6V – 27V
- Continuous Current: 43A
- Peak Current: 100A
- PWM Frequency: Up to 25kHz
- Logic Voltage: 3.3V / 5V compatible
- Built-in Protection: Overcurrent, Overtemperature

**Purpose:**

The BTS7960B is a high-power motor driver that controls the speed and direction of the Johnson motor. It takes PWM signals from the ESP32 and provides high-current output to drive the motor efficiently.

**1.3 FSi4X Transmitter and Receiver**

**Specifications:**

- Frequency: 2.4 GHz (AFHDS 2A)
- Channels: 4
- Range: Up to 500 meters (in open space)
- Receiver Voltage: 4.0V – 6.5V
- Transmitter Battery: 4x AA batteries

**Purpose:**

The FS-i4X system provides wireless control for the RC car using a 2.4 GHz radio frequency. The transmitter sends user commands, while the receiver decodes them and sends signals to the ESP32 for further processing.

**1.4 Johnson motor**

**Specifications:**

- Operating Voltage: 12V (varies by model)
- RPM: 900 RPM
- Torque: High (varies by model)
- Current Draw: Typically 0.5A – 5A

**Purpose:**

The Johnson motor is a high-torque brushed DC motor that serves as the primary drive motor of the RC car. It converts electrical energy into mechanical motion, allowing the car to move forward and backward.

**1.5 ESC****Specifications:**

- Input Voltage: 6V – 12V

- Max Current: 30A (model-dependent)
  - Control Signal: PWM (1ms – 2ms)
  - BEC (Battery Eliminator Circuit): 5V/2A (if available)
  - Features: Soft start, overcurrent protection, thermal shutdown

**Purpose:**

The ESC regulates power to the motor based on signals from the ESP32, controlling its speed and direction. It also provides safety features like overcurrent protection and smooth acceleration for better performance.

## **1.6 Miscellaneous Components:**

1.6.1 Jumper Wires

1.6.2 Connecting Wires

1.6.3 Switch

1.6.4 Tyres

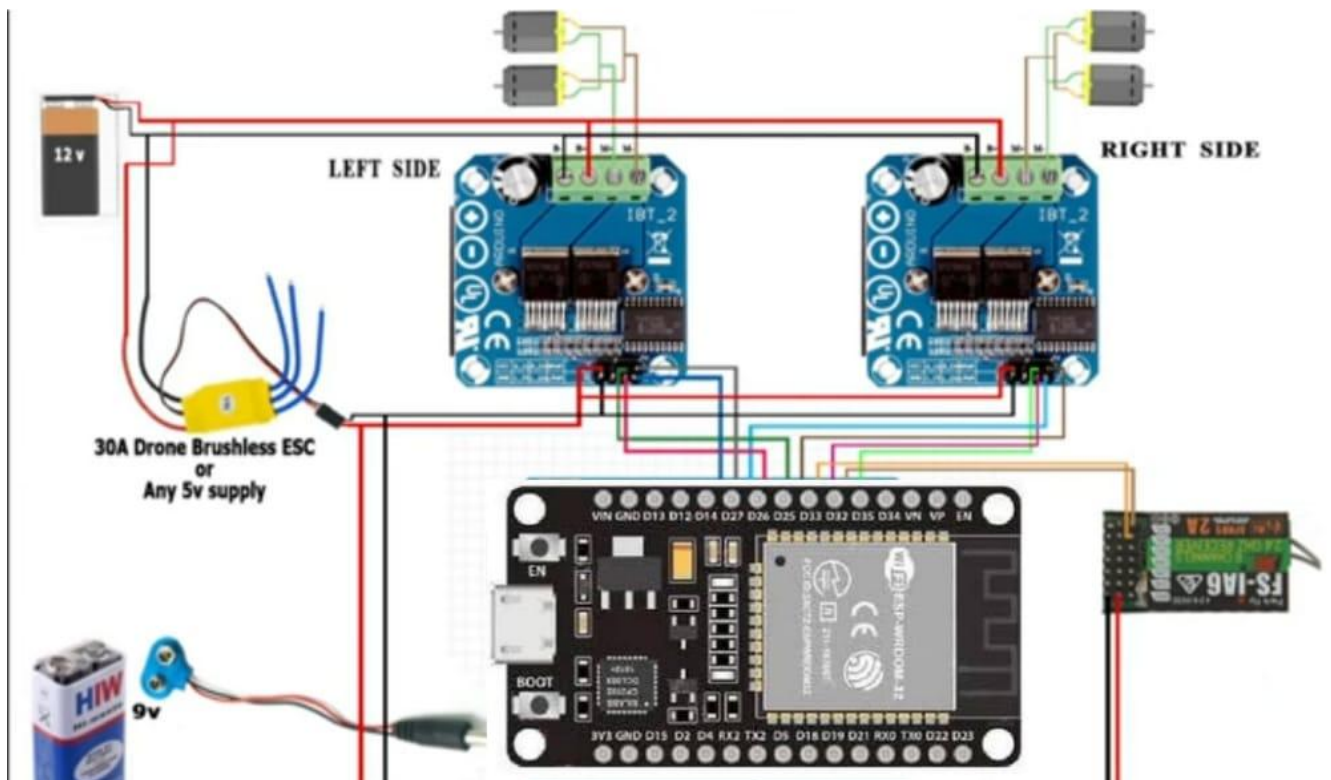
1.6.5 Rechargeable Battery

1.6.6 Wooden Chassis Board

1.1.1 Bread Board

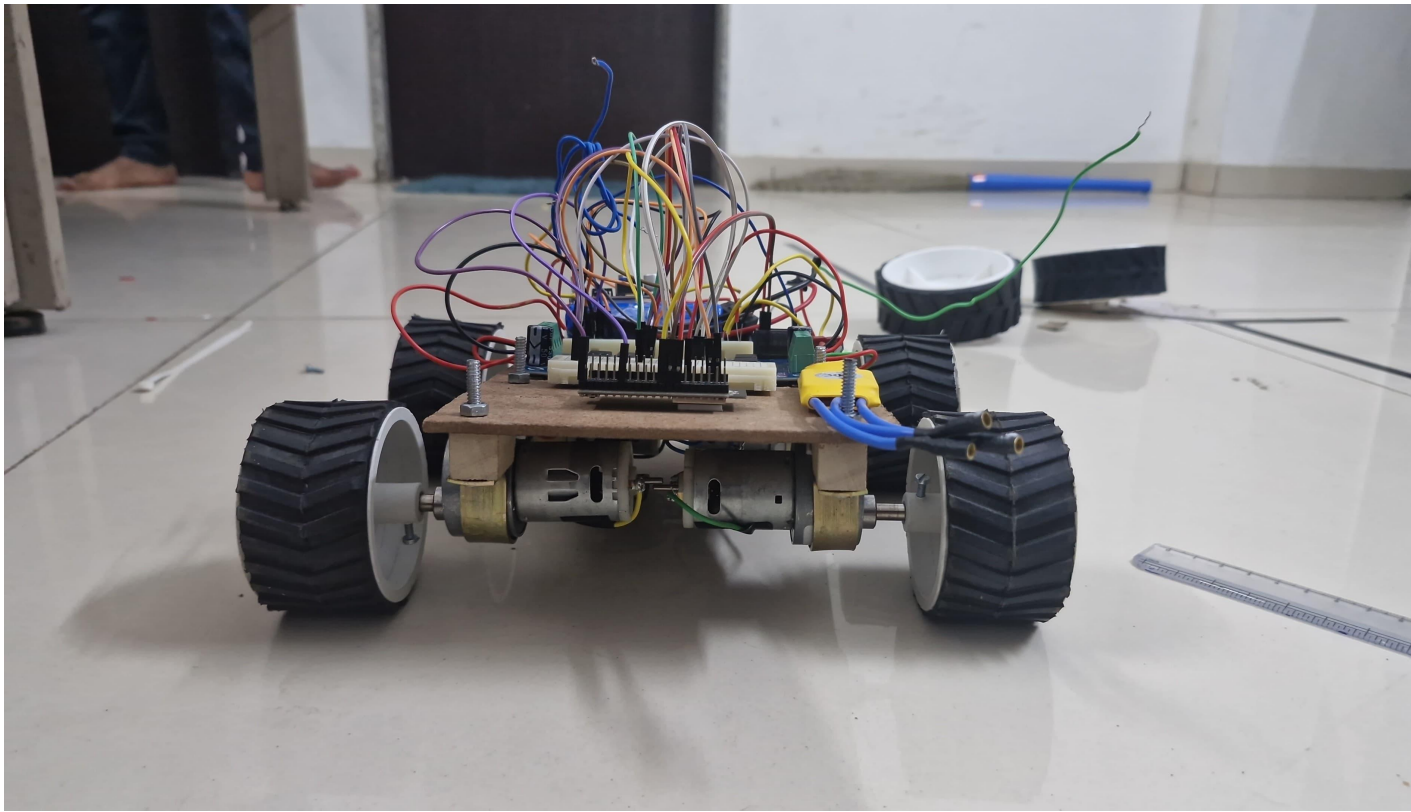
1.1.2 Controller Circuit

## **2. Circuit Diagram:**

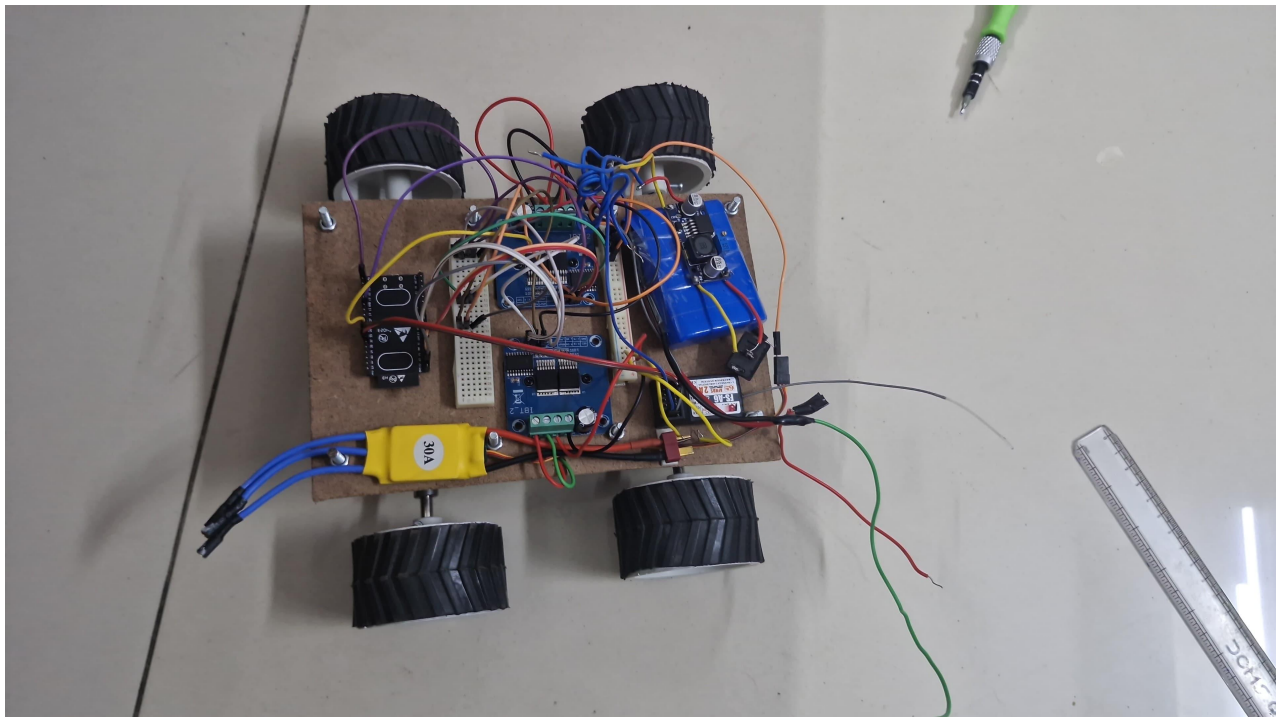


### 3. Photos of the Car:

Front view:



Top View:





Side Views:

