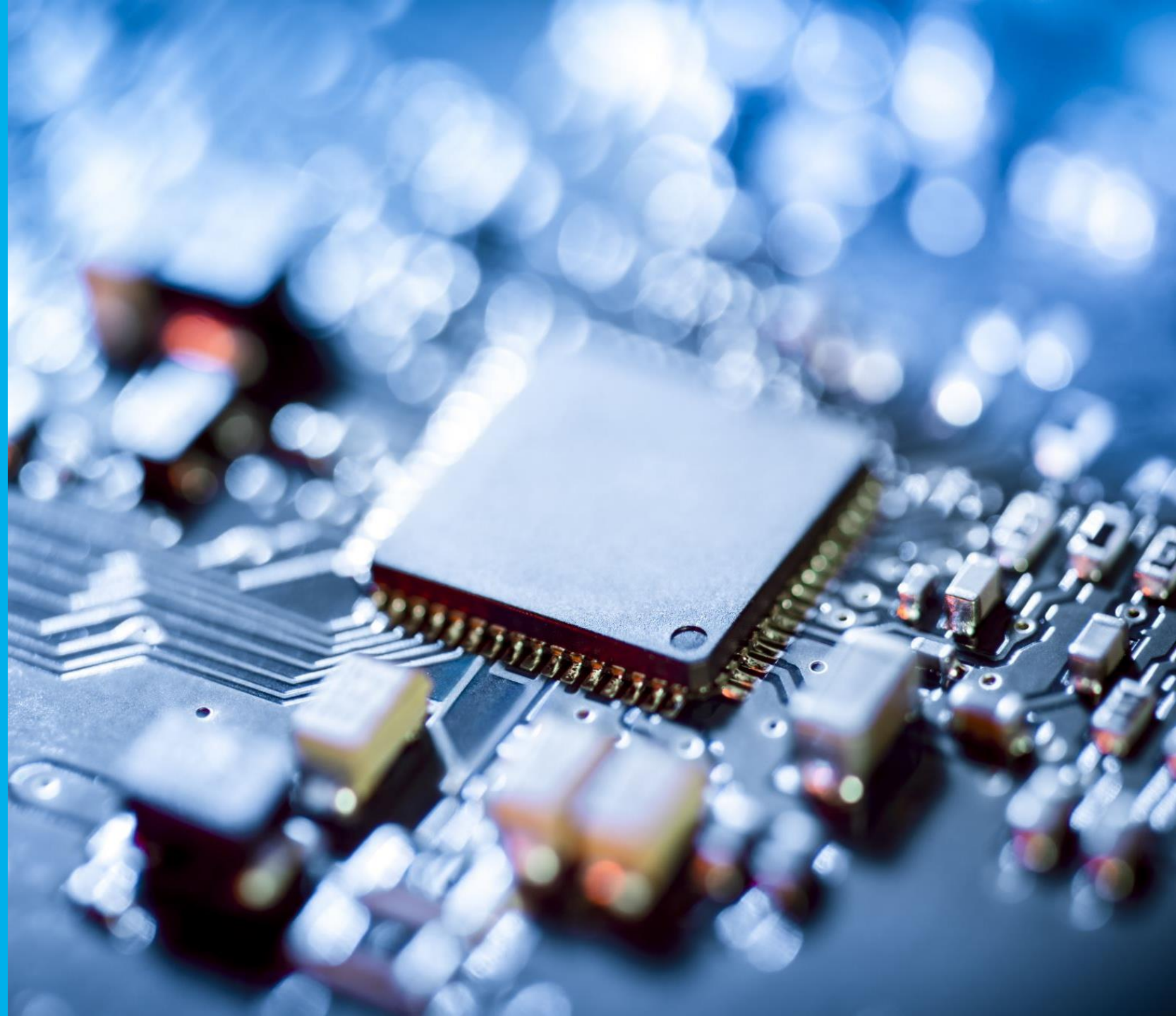
Electronic Parts

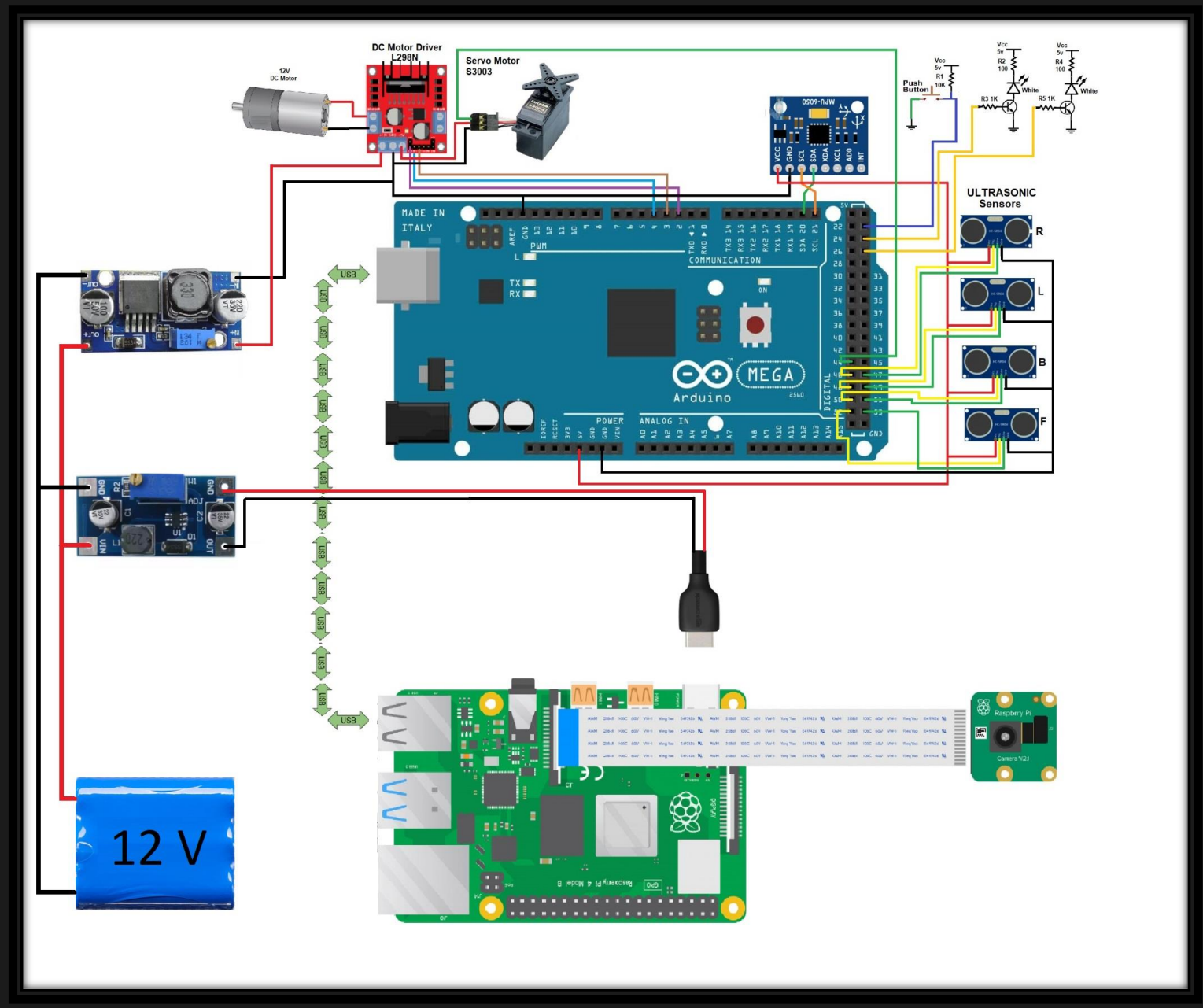
Cosmic Team



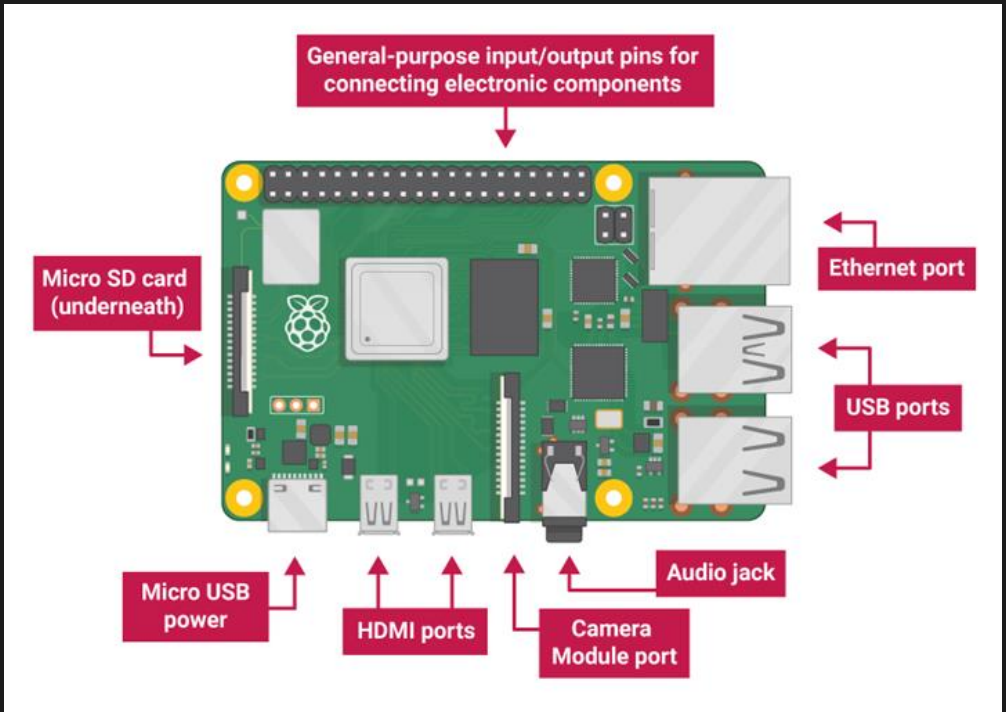
Contents

Main Diagram

The electronic diagram shows the mechanism of connecting the controllers with each other and connecting the Arduino controller to the Ultrasonic sensors, the gyroscope, and the driver, which is used to control the DC motor and the servo. In addition to that, the diagram shows the electric feeding mechanism which raises the voltage using the boost, lowers it using the buck, and how feeds the electronic parts with power. Also, connect the Raspberry Pi controller to the camera.



Raspberry Pi 4



The Raspberry Pi controller is used for three main purposes :

The first is to program the Arduino microcontroller.

The second is reading and processing the camera using the Python language built in its operating system.

Third, sending commands according to what the camera sees of pillars according to their color to the Arduino controller.

Arduino Mega

The Arduino microcontroller is used as the main controller for the electronic parts as follows:

First, control the movement of the servo motor and DC motor throw send commands to the motor driver.

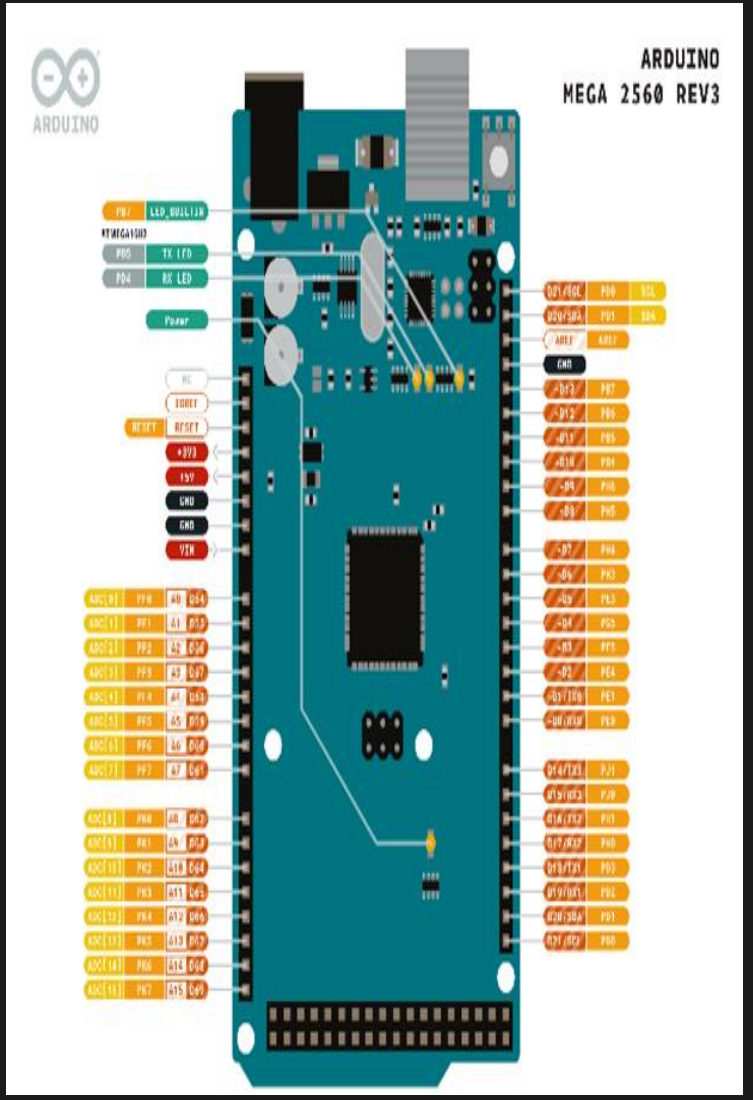
Second, reading the distance of the front, back and side ultrasonic sensors.

Third, read the gyroscope sensor in order to adjust the movement of the steering wheel according to the angle.

Fourth, read the commands sent by the Raspberry Pi controller and take the appropriate action according to the situation.

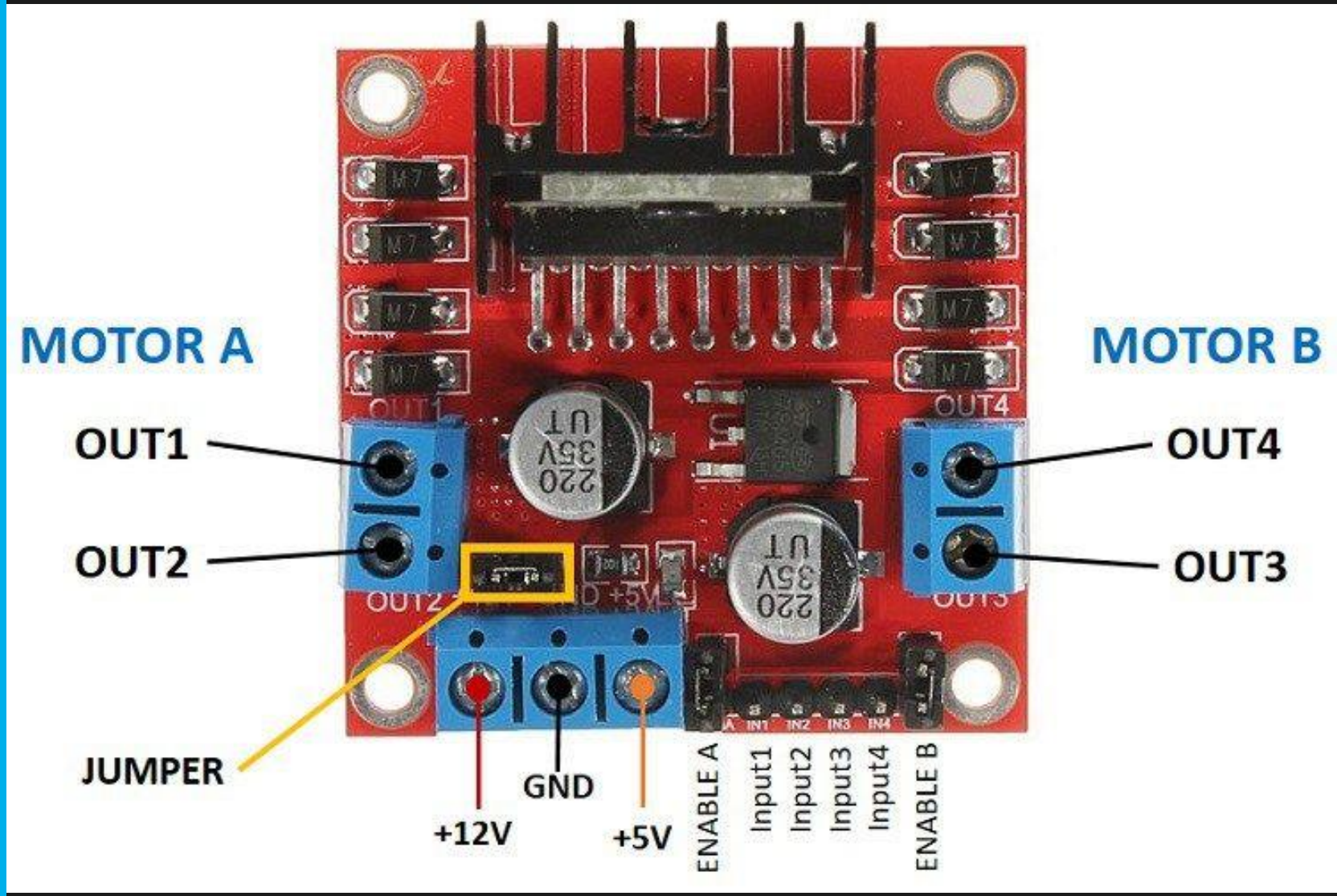
Fifth, read the push button to start the vehicle.

It is worth noting that the Arduino Nano has been replaced by the Arduino Mega due to the interference on the Arduino Nano pins when using PWM, as we found that the solution to this problem is using the Arduino Mega.

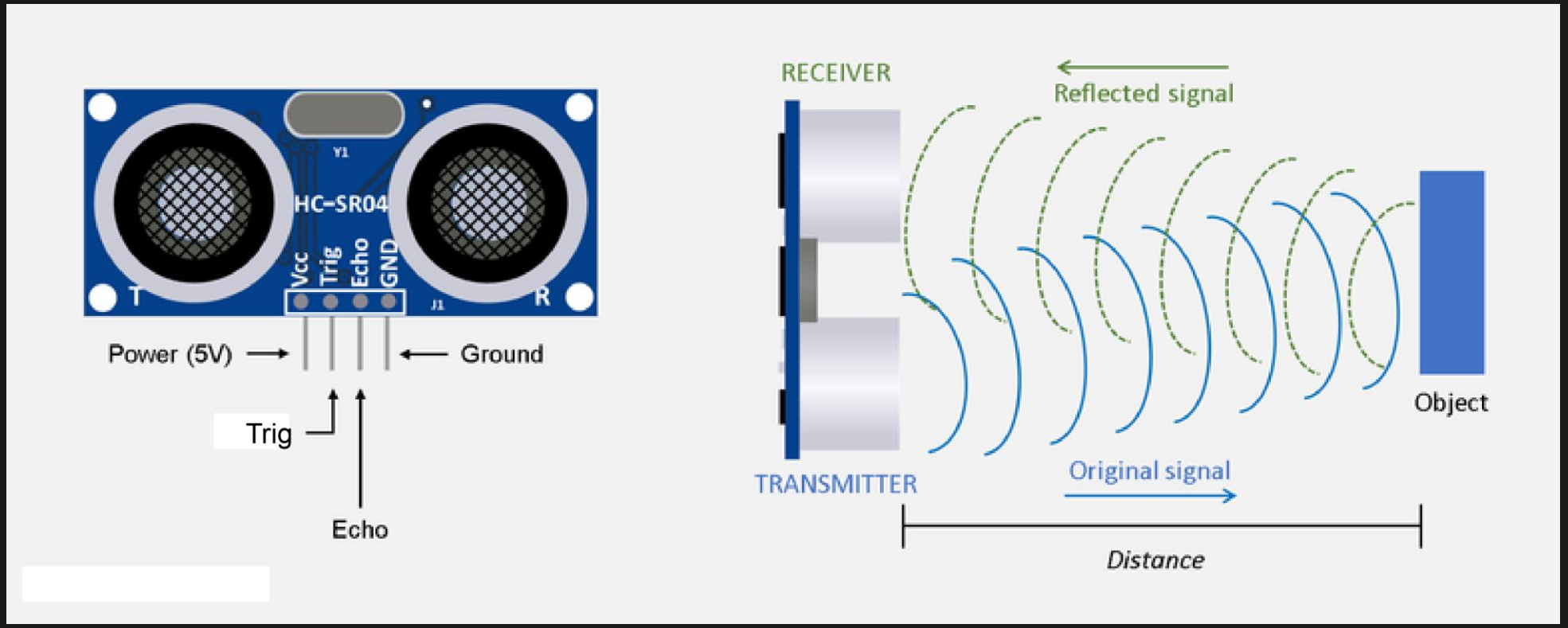


L298N Motor Driver

The motor driver used to determine the speed of the DC motor and to move forward and backward, in addition to controlling the movement of the servo motor.

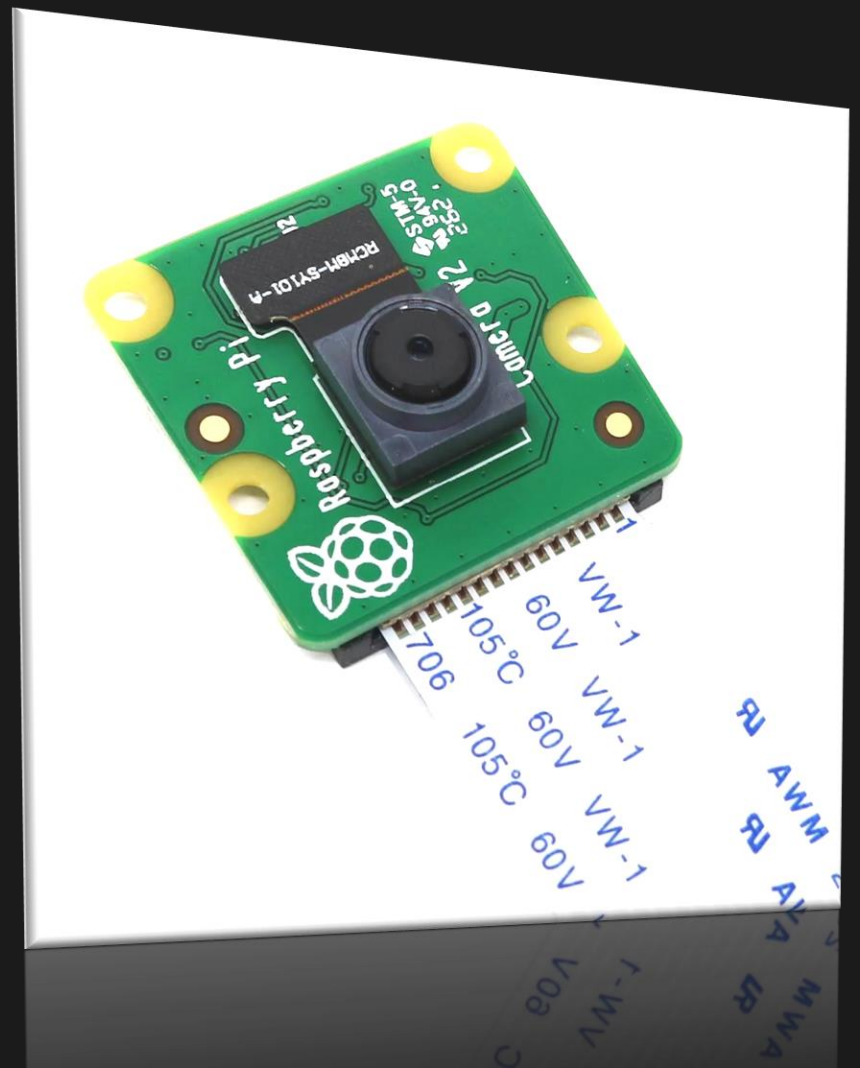


Ultrasonic Distance Sensor



Four sensors are used to determine the distance, a sensor for the front, two sensors for the sides, and sensor for the back , these sensors are implementing to determine the direction of the vehicle's movement and other things.

Raspberry Pi Camera



An 8-megapixel camera with a Raspberry Pi controller is used.

Battery

- The battery is used to provide the vehicle with the necessary power, as it consisted of three lithium batteries connected together in series with an internal voltage regulator of 12 volts.

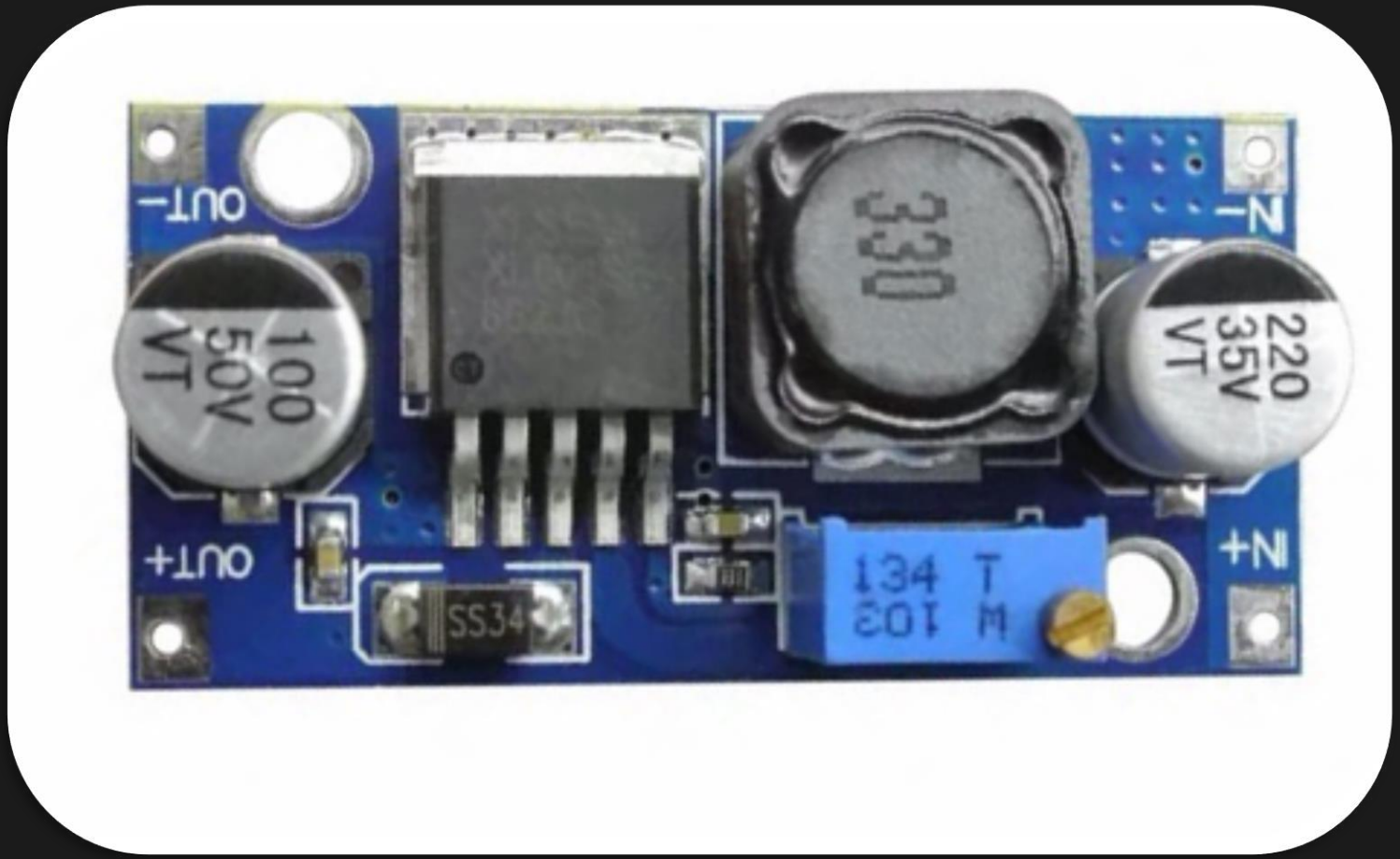
Boost

- This module is intended to raise the voltage, as it is used as an input to the driver in order to increase the vehicle speed.

Buck

This circuit is designed to reduce voltage, as it was used to supply power to the Raspberry Pi controller

It is worth noting that the Arduino microcontroller is powered by the Raspberry Pi through a USB cable



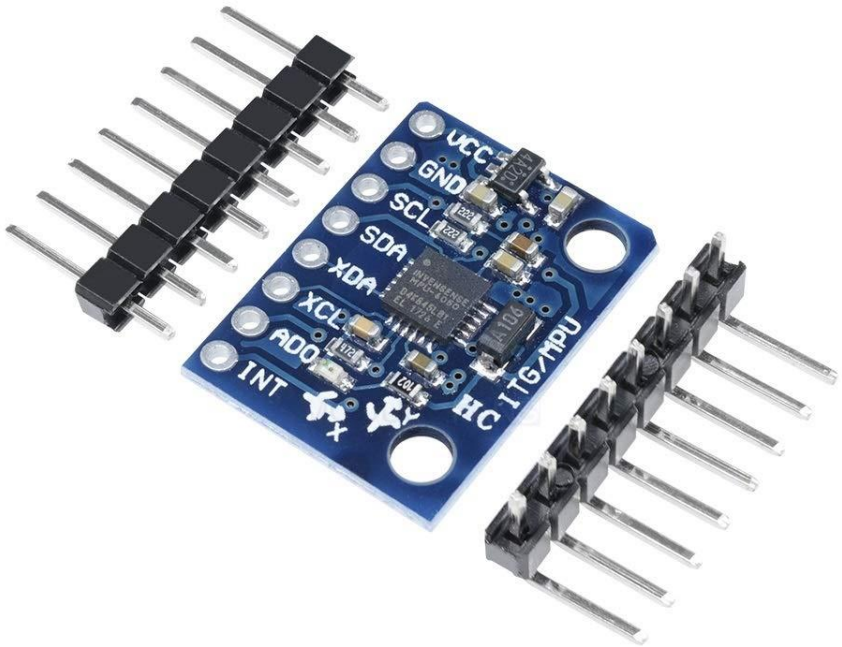
DC Motor

- The DC motor is mechanically connected to the back wheels for the vehicle movement.

Servo Motor

The servo motor is used to control the direction of the vehicle by turning the steering wheel

Gyroscope



The gyroscope specializes in calculating the starting angle, where the initial angle is zero, and any change on the angle is calculated , and this helps in controlling the movement of the vehicle.

Thank you

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