

User Guide

4WD Mecanum Wheels Car Kit

Part No: SL0016

Note: The video instruction guide is on our Youtube Channel at -

<https://www.youtube.com/channel/UC2mustF9IWZyO-Syo5o3IGw>

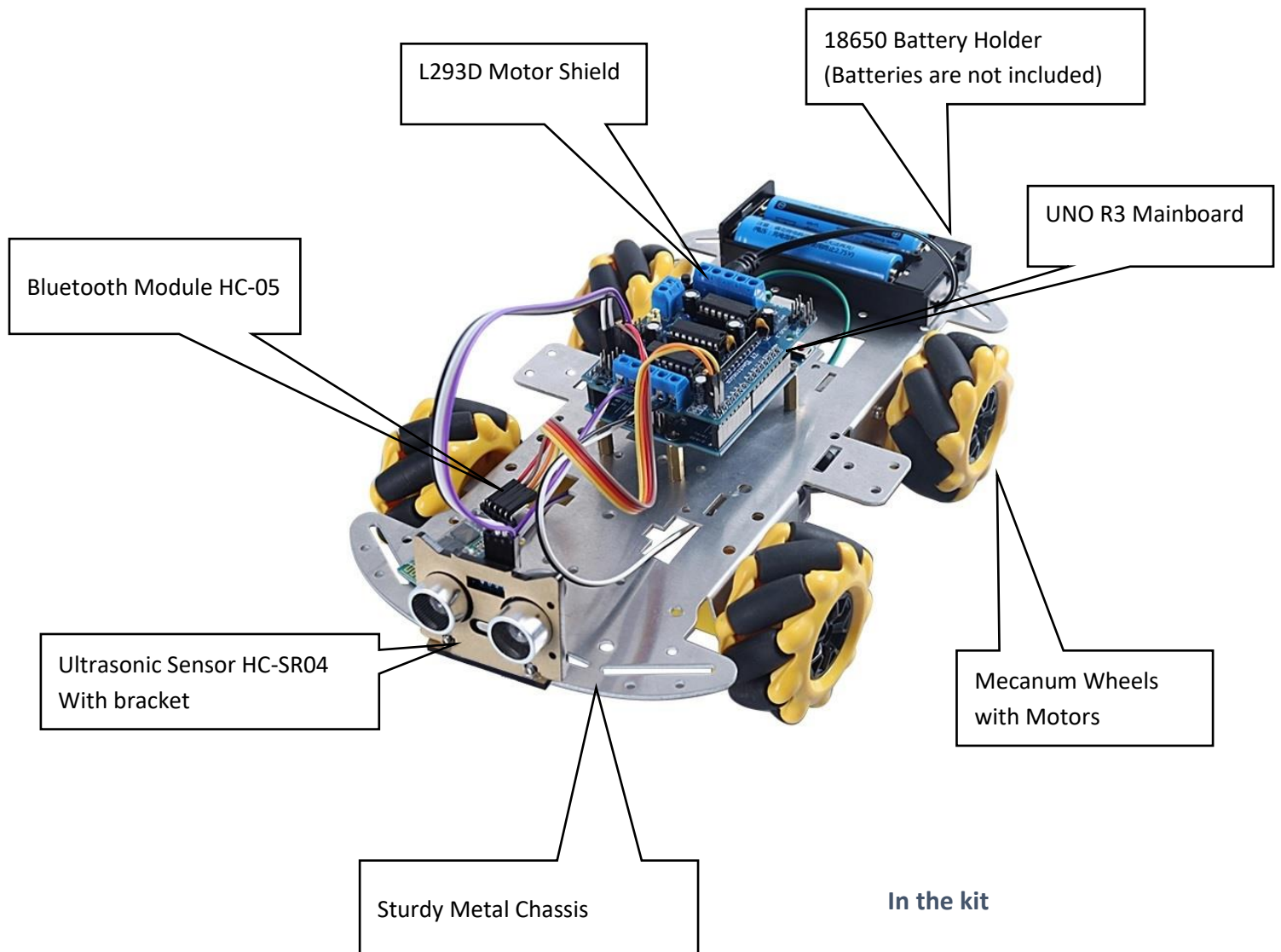


Or, scan this QR Code

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Kit Inclusions



In the kit

- Metal Chassis (Aluminum based alloy)
- UNO R3 ATmega328p Mainboard (Compatible with Arduino IDE) x 1
- Motor shield x1
- Bluetooth module x 1
- Ultrasonic sensor with bracket x1
- Mecanum wheels & hardware x 4
- Motors x 4
- Dupont cables (F-F) pack
- M3 screws and connecting hardware

About the Sensors and modules in the kit

Before we start building the car kit, let us go through the components used. The kit requires a microcontroller which controls the functioning and controls the car. In this kit, we have used an Arduino compatible ATmega328p (UNO).

Mecanum wheel

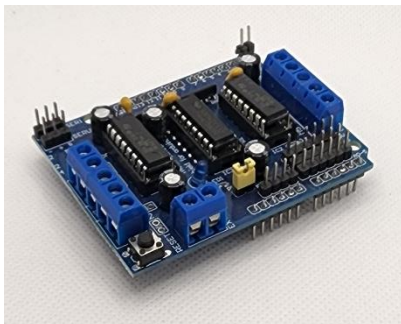


A mecanum wheel is an omnidirectional wheel, with lateral motion also. So essentially, this can move forward, backwards, left and right.

This is enabled by small rollers on the wheel edges.

Our kit includes 4 such wheels, that are 59mm in diameter and powered by 5VDC motors.

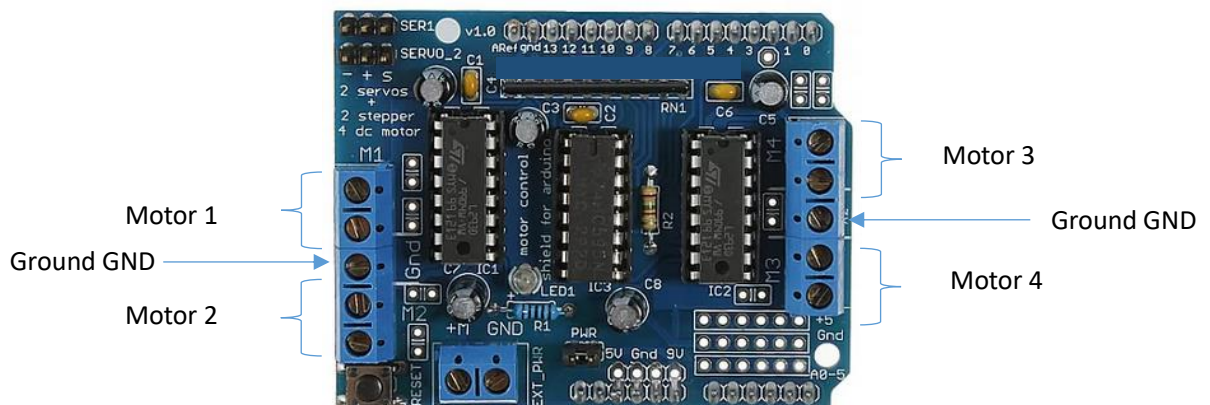
L293D Motor Driver Shield



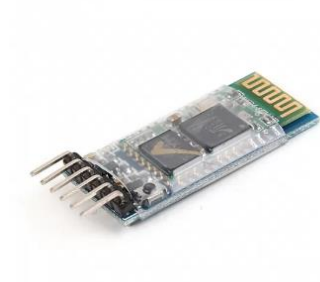
The L293D is a dual-channel H-Bridge motor driver capable of driving a pair of DC motors or single stepper motor.

It can be used to drive:

- 4 bi-directional DC motors with 8-bit speed selection (0-255)
- 2 stepper motors (unipolar or bipolar) with single coil, double coil, interleaved or micro-stepping.
- 2 servo motors



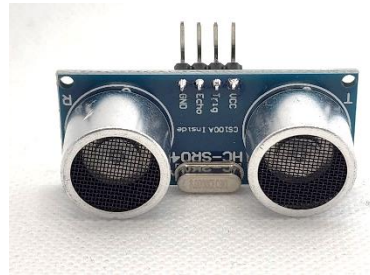
Bluetooth Wireless Module



HC-05 is a Bluetooth Transceiver Module and has TTL Output. HC-05 6 Pin Wireless Serial Bluetooth Module is a Bluetooth module for use with any microcontroller. It uses the UART protocol to make it easy to send and receive data wirelessly with 2.4GHz radio transceiver and baseband. It has CSR Bluecore 04, an external single-chip Bluetooth system with CMOS technology and AFH, Adaptive Frequency Hopping feature.

Voltage supply: 3.5 – 5VDC

Ultrasonic Sensor



This HC-SR04-Ultrasonic Distance Measuring Sensor is a very popular sensor which is found in many applications where it requires to measure distance and detect the objects.

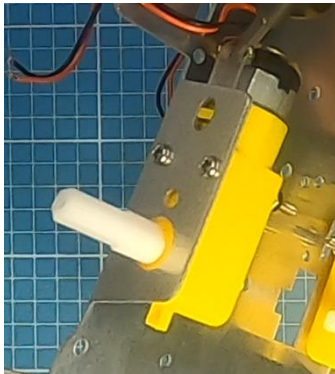
The module has two eyes like projects in the front which form the Ultrasonic transmitter and Receiver.

The HC-SR04 ultrasonic sensor uses sonar to determine the distance to an object like bats or dolphins do. This Ultrasonic Sensor module is a transmitter, a receiver, and a control circuit in one single pack!! It has a very handy and compact construction. It offers excellent range accuracy and stable readings in an easy-to-use package. Its operation is not affected by sunlight or black material like Sharp rangefinders are (although acoustically soft materials like cloth can be difficult to detect).

Voltage supply: 5VDC

Assembling the car kit

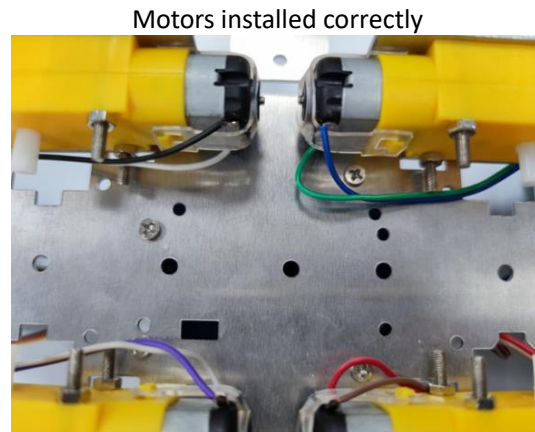
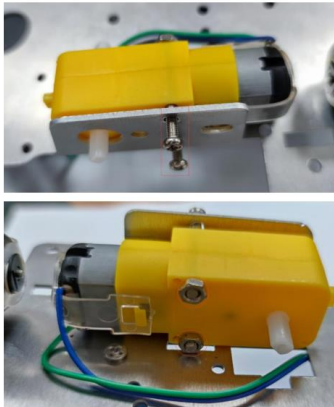
Step 1 – Install the motors



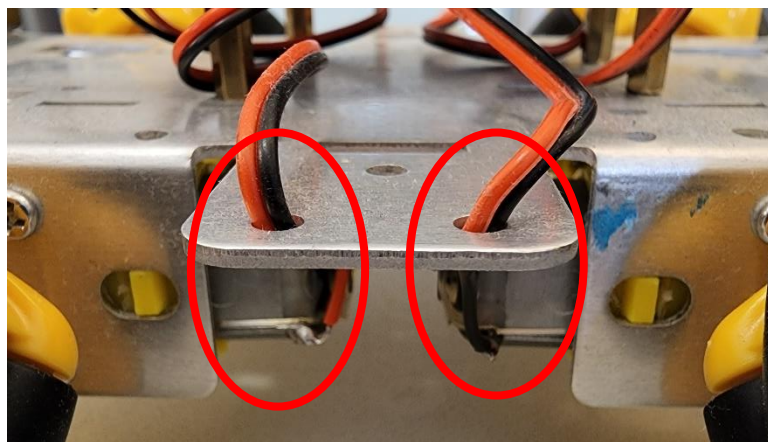
Firstly, please install all the four motors supplied to the main chassis.

And before doing so, you might want to take off the protective cover on the chassis. That is totally up to you, and no way interferes with the functioning of the car.

To install the motors, you will require a phillips screwdriver (+).



As you see, each motor has two wires. To avoid messy wiring, that will eventually help with ease of using the car – it is recommended to bring the wires of each motor through the holes on the sides, as below –



Step 2 – Install the wheels

The wheel connects to the motor shaft with the connector, that is hexagonal on one end. Line up the motor shaft and the wheel assembly, and use the screw to connect the two, as shown in image 2.

Image 1: Getting ready



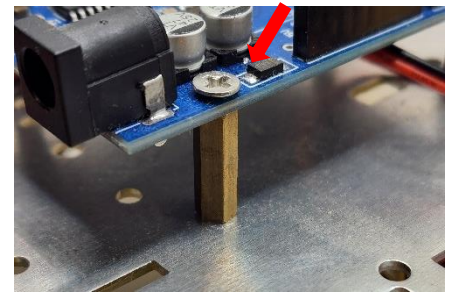
Image 2: Connecting the wheel and motor



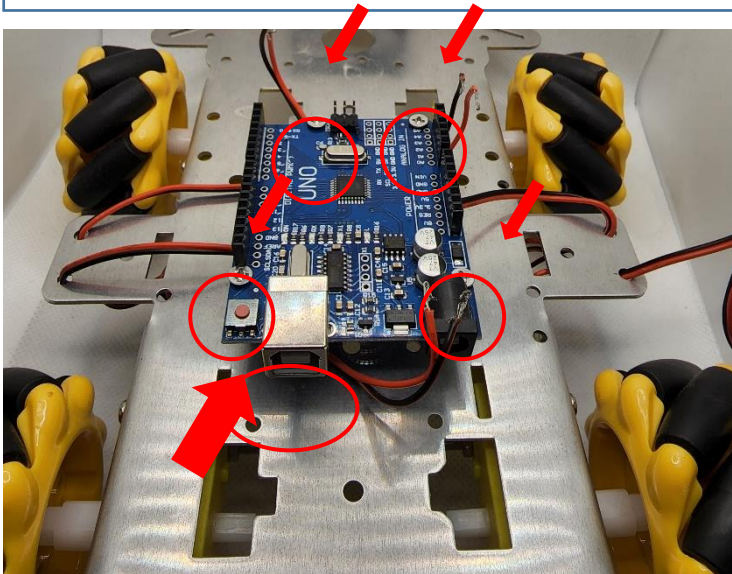
Connect all four wheels in a similar way. The final assembled chassis with all four motors and wheels, is now ready for next steps.

Step 3 – Install the Main board

Install the 4x copper columns supplied, on the chassis by positioning the M3 screws. And then the main board to the columns by the M3 screws.



Note: The four pillars need to align with the holes on the main board.

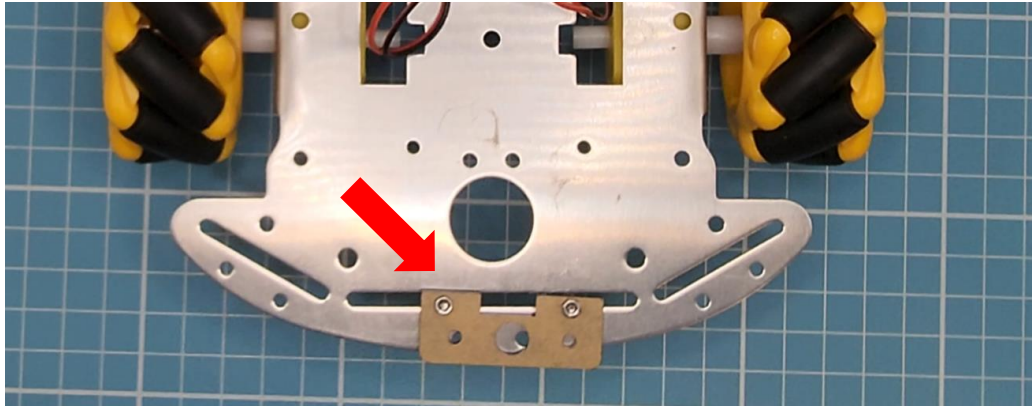


Please remember to tighten the M3 screw at the back of the chassis, so that it properly holds the copper columns

Note: The board's USB end facing, as that way the holes will line up correctly with the chassis.

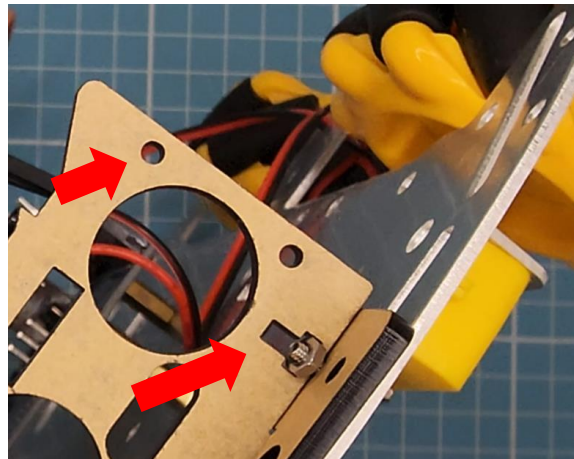
Step 4 – Install the Ultrasonic sensor

Firstly, assemble the ultrasonic bracket base plate as shown below. Please be careful while installing the lower screws and do not over tighten or exert excess force.

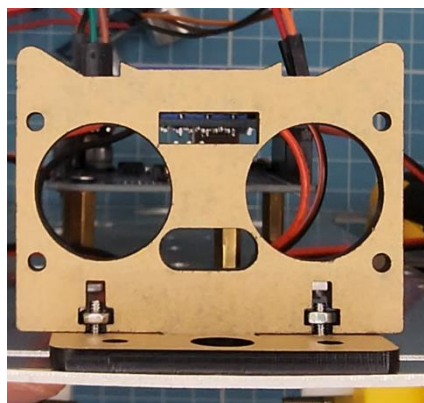


Then attach the holder on top of the base plate, and insert the screws in the groove, as below

Please Note : Do not over tighten, else that might break the acrylic holders



The final assembled holders look as above, and insert the Ultrasonic sensor through. Also note that there are 4 small holes on the sides, that line up with holes on the ultrasonic sensor. You might want to use the provided screws to secure the sensor, or leave this secondary step.



Step 5 – Making the Connections

- a. Connect the motors to the terminals labelled M1, M2, M3 and M4. Follow the **GREEN colour** coding.

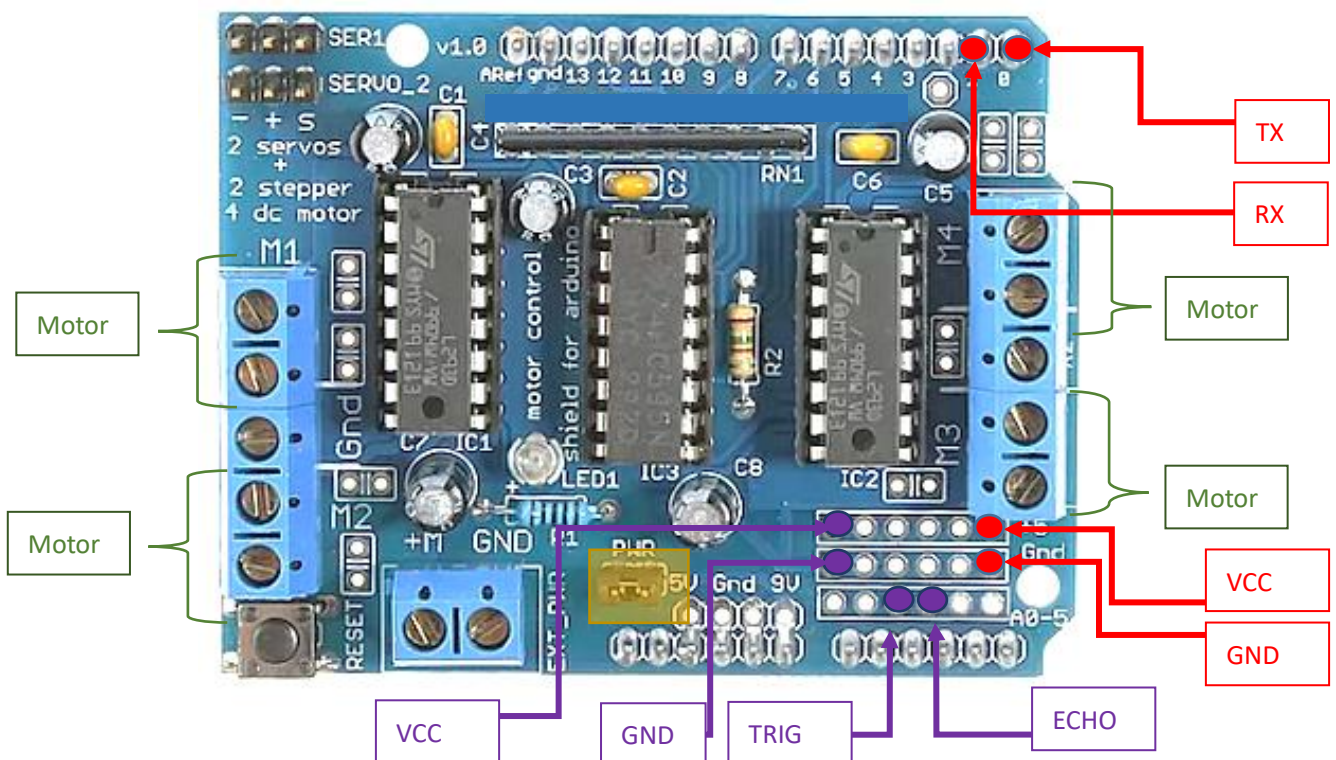
- b. Note the jumper and ensure it is in place. (The jumper is removed when an external power source is used for the motor, in our case it is not) . Shown in **YELLOW** colour coding
- c. Connect the Bluetooth module to the motor shield by using the connecting wires included in the kit, and please follow the **RED** colour coding.

| Bluetooth Module | Pin on Motor shield |
|------------------|---------------------|
| VCC | 5V |
| GND | GND |
| RX | TX Pin (Label-1) |
| TX | RX Pin (Label-0) |

- d. Connect the ultrasonic sensor to the motor shield by using the connecting wires included in the kit, and please follow the **PURPLE** Colour coding for connecting.

Ultrasonic Sensor

| Ultrasonic Sensor | Pin on Motor shield |
|-------------------|---------------------|
| VCC | 5V |
| GND | GND |
| ECHO | A3 |
| TRIG | A2 |



Step 6 – Sample Code Explanation

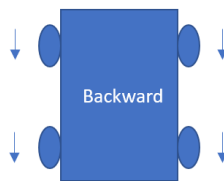
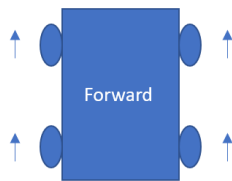
Download the sample code from <https://bit.ly/3NYs0Bb>

Please note: When uploading the code to the mainboard, remove the Motor Shield altogether. After the code is successfully uploaded on the Arduino IDE (or your application of choice), then install the motor shield back on the mainboard. Else the code would not upload correctly, and you would see an error message when uploading.

The reason is a communication conflict caused by the TX and RX (Send, Receive) pins, that are connected to the Bluetooth module on pins 0 and 1 on the motor shield. So, one needs to remove the motor shield from the mainboard before uploading the code.

Code Explanation:

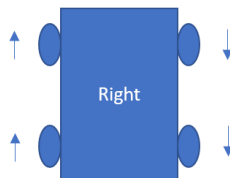
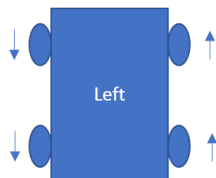
The car has 4 basic motions mapped in the APP – Forward (F), Backward (B), Left(L) and Right(R). And these can be easily changed in the code, and remapped accordingly in the APP settings.



Speed is increased by '+' symbol, and decreased by '-'.

And letter 'S' stops the car altogether.

The arrows show the direction of wheels.



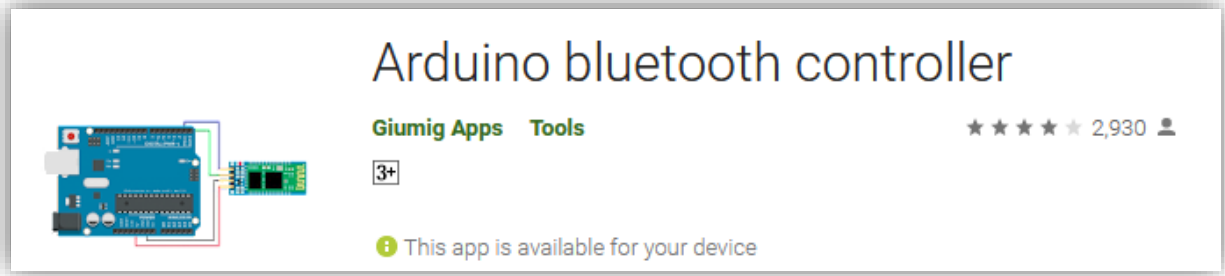
You can change this in the code to move the wheels in different combination(s).

To test your changes, use the serial monitor to send an input to the main board.

In this sample code, we have set the car to halt if the distance of the obstacle is less than 15cm (approximately). The front ultrasonic sensor checks the distance from the front object when the car is instructed to move forward, and if the distance is less than 15cm, then the car halts there.

Step 7 – Play Time!

Look for the APP – ‘Arduino Bluetooth Controller’ in your phone’s Google play Store.



In Google Play store, -

<https://play.google.com/store/apps/details?id=com.giumig.apps.bluetoothserialmonitor>

In iOS, look for the APP ‘Bluetooth for Arduino’ -

<https://apps.apple.com/us/app/id1505096526>

After connecting the Bluetooth module, enter the controller mode and map the keys as per the program code as shown in image 2.

Image 1 – Choose the controller mode

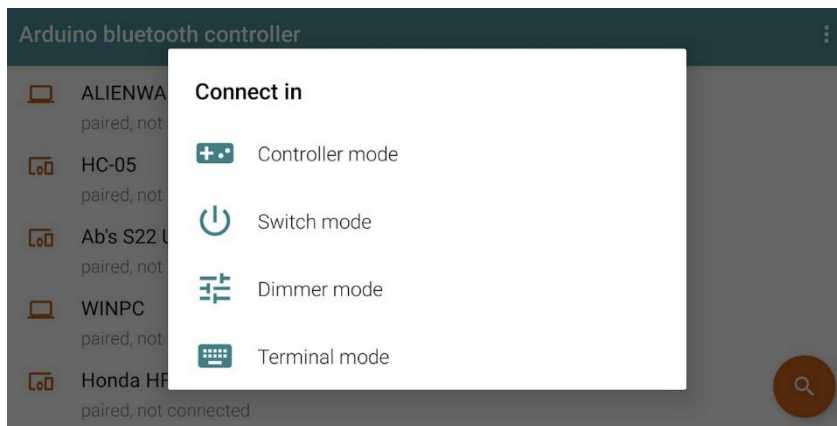


Image 2 – Map the controller keys, in the setting menu

