

Mini Project: RC Car

The electronic components and modules used in the project are shown as below.

Components included:

9x Jumper (Male/Female)

1x Bluetooth HC-06

1x Motor Driver L298 mini

2x DC motor

1x Breadboard

1x Raspberry Pi 1 B+

1x Remote Car battery

Initially, we gather the information about how to program a code that could able to control the RC car with our android smart phone. There are plenty of examples can be found from the internet. However, they are all done by using an Arduino board. Hence, the coding for Arduino board is not capable to the Raspberry Pi. Then, we try to understand the code that used for the Arduino Board and modify it to the code that could be used for Raspberry Pi.

For example, `pinMode` in Arduino is mean to `gpio_config` in Raspberry Pi. Next, `digitalWrite(pin,HIGH)` and `digitalWrite(pin,LOW)` in Arduino is mean to `gpio_set` and `gpio_clr` in Raspberry Pi.

On the other hand, the motor driver is connected to the battery that is pre-installed on the Remote Control Car. Next, the Raspberry Pi is connected to a Power Bank battery to for input voltage. The complete connection of the circuit is shown as the figure 1.

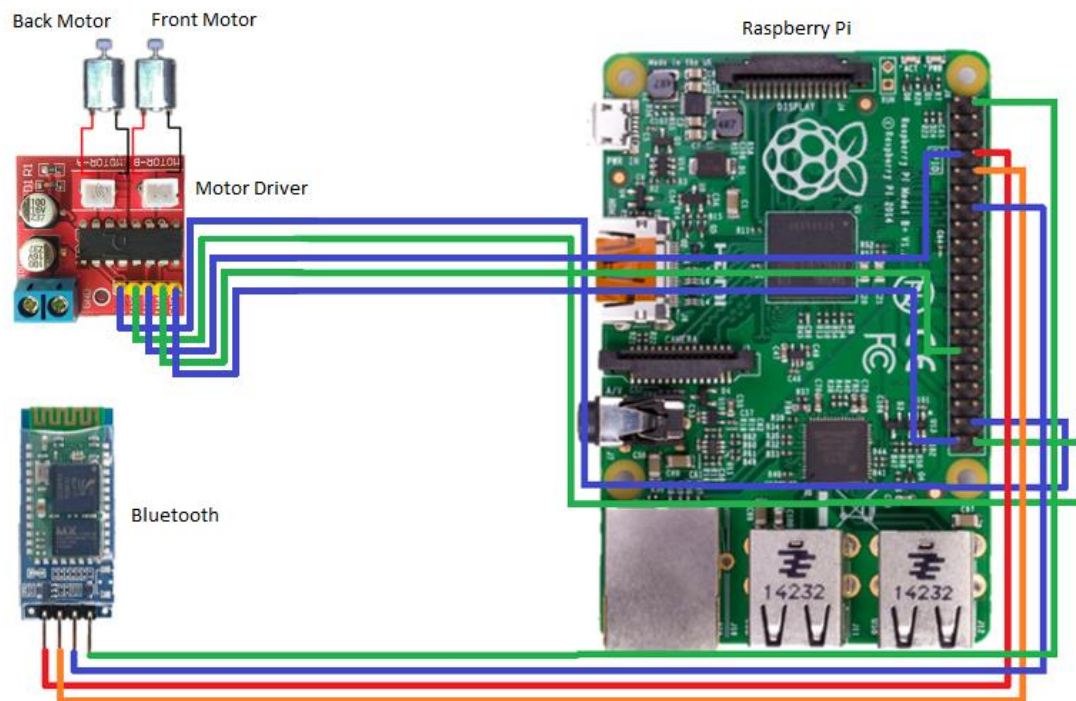
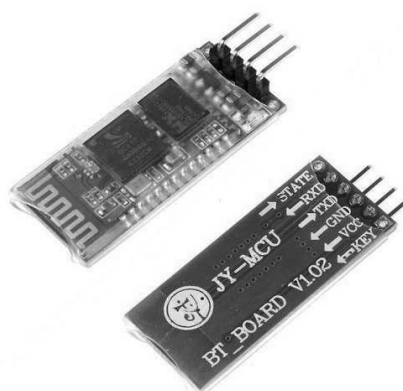


Figure 1: Remote Control car connection diagram

Modules

Bluetooth



Bluetooth HC-06 is a class 2 slave Bluetooth module designed for transparent wireless serial communication. Once it is paired to a master Bluetooth device such as PC, smart phones and tablet, its operation becomes transparent to the user. All data

received through the serial input is immediately transmitted over the air. When the module receives wireless data, it is sent out through the serial interface exactly at it is received. The HC-06 will work with supply voltage of 3.6VDC to 6VDC, however, the logic level of RXD pin is 3.3V. A Logic Level Converter is recommended to protect the sensor if connect it to a 5V device.

Features:

- Bluetooth v2.0
- 2.4GHz band frequency
- Default baud rate: 9600
- Power supply: 3.6V to 6V DC

Pins:

- **VCC** is indicated in the range of 3.6V-6V. The module worked for both with 3.3V and 5V.
- **GND**: Ground
- **TXD**: serial output of the module, to be connected to RX of the microcontroller. Note that this signal is using 3.3V logic level
- **RXD**: serial input of the module, to be connected to the TX of the microcontroller. Note that this signal is using 3.3V logic levels.

Motor Driver



It is ideal for motorized drive modules, battery powered smart cars, toy cars and robots. The supply voltage can be 2V ~ 10V, two DC motors or 4-wire 2-phase stepper motors can be operated, forward or reverse can be reached, it is possible to set

the rotation speed. Each can provide 1.5A continuous current, peak current up to 2.5A, thermal protection and can be automatically restored.

Features:

Built-in low-circuit-resistance MOS switch operation, minimal heat, coolant-free, small size, low power consumption, ideal for pile-running applications.

Small size, light weight, zero wait current is the ideal choice for your car model.

Product parameters:

The dual H-bridge motor drive can operate two DC motors or a four-wire two-phase step motor.

The module supply voltage is 2V-10V.

The signal input voltage is 1.8-7V.

Single operation current 1.5A, peak current 2.5A, low standby current (less than 0.1uA).

The built-in common-mode transmission will not malfunction when the input pin slide is released.

Internal thermal protection circuit with hysteresis effect (TSD), without worrying about engine shutdown.

Application

Android device



Figure 1: BlueTerm

(<https://play.google.com/store/apps/details?id=es.pymasde.blueterm&hl=en>)

The application used to control the car is BlueTerm. We used Blueterm to control our remote car. When we want the car to move forward, we enter command 'U' in the BlueTerm command line and the car will move I forward direction. Command 'D' for backward, command 'L' is to enable the car to turn left, command 'R' for right and command 'S' for stop all the direction of the remote car. When the command 'U' is entered the selected GPIO will sent logic HI to In4 and logic LO to In3, In2 and In1. As shown below the table 1.

Direction(command)	MOTOR A		MOTOR B	
	In1	In2	In3	In4
U(forward)	0	0	0	1
D(backward)	0	0	1	0
L(left)	0	1	0	0
R(right)	1	0	0	0
S(stop)	1	1	1	1

Table 1: Direction of RC car

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