

HC-05 CONTROL CAR

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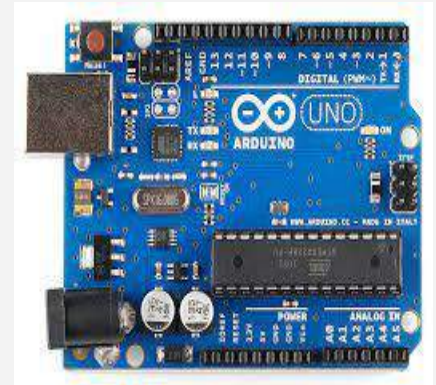
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1. Arduino Board
2. L293D driver
3. DC Motors x 2
4. 9V Battery
5. Bluetooth Module

1. Arduino Board: Arduino is a prototype platform (open-source) based on easy-to-use hardware and software. It consists of a circuit board, which can be programmed (referred to as a microcontroller) and a ready-made software called Arduino IDE (Integrated Development Environment), which is used to write and upload the computer code to the physical board.



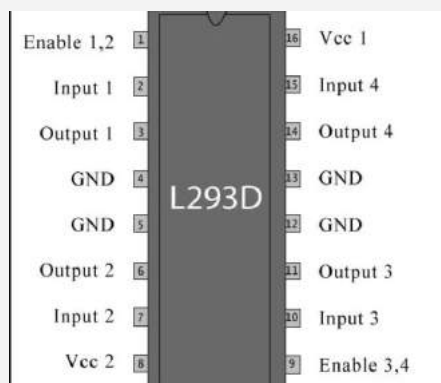
Board used:

Board Name	Operating Volt	Clock Speed	Digital i/o	Analog Inputs	PWM	UART	Programming Interface
Arduino Uno R3	5V	16MHz	14	6	6	1	USB via ATmega16U2

2. L293D driver : A motor driver is an integrated circuit chip which is usually used to control motors in autonomous robots. Motor drivers act as an interface between Arduino and the motors . The most commonly used motor driver IC's are from the L293 series such as L293D, L293NE, etc. These ICs are designed to control 2 DC motors simultaneously. L293D consists of two H-bridges. H-bridge is the simplest circuit for controlling a low current rated motor. We will be referring to the motor driver IC as L293D only.



L293D has 16 pins:



3. DC Motors : A DC motor (Direct Current motor) is the most common type of motor. DC motors normally have just two leads, one positive and one negative. If you connect these two leads directly to a battery, the motor will rotate. If you switch the leads, the motor will rotate in the opposite direction.



4. 9V Battery : The nine-volt battery, or 9-volt battery, is an electric battery that supplies a nominal voltage of 9 volts to operate the whole system.



5. Bluetooth Module : HC-05 is a Bluetooth module which can communicate in two ways. Which means, It is full-duplex. We can use it with most micro controllers. Because it operates Serial Port Protocol (SSP). The module communicates with the help of USART (Universal Synchronous Asynchronous Receiver Transmitter) at the baud rate of 9600. and it also supports other baud rates. So we can interface this module with any microcontroller which supports USART. The HC-05 can operate in two modes. One is Data mode and the other is AT command mode. When the enable pin is "LOW" the HC-05 is in Data Mode. If that pin is set as "HIGH" the module is in AT command mode. Here we operate this module in Data Mode.



SOFTWARE USED

1. Arduinio IDE.
2. Bluetooth RC Car.(application available on playstore)

1. Arduinio IDE : The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. This software can be used with any Arduino board.

2. Bluetooth RC Car:

<https://play.google.com/store/apps/details?id=braulio.calle.bluetoothRCcontroller>

ARDUNIO CODE

```
int m1a = 4;
int m1b = 5;
int m2a = 2;
int m2b = 3;
char val;
void setup()
{
  pinMode(m1a, OUTPUT);
  pinMode(m1b, OUTPUT);
  pinMode(m2a, OUTPUT);
  pinMode(m2b, OUTPUT);
  Serial.begin(9600);
}
void loop()
{
  while (Serial.available() > 0) //for bluetooth
  {
    val = Serial.read();
    Serial.println(val);
  }

  if( val == 'F') //forward
  {
    digitalWrite(m1a, HIGH);
    digitalWrite(m1b, LOW);
    digitalWrite(m2a, HIGH);
    digitalWrite(m2b, LOW);
  }
  else if(val == 'B') //backward
  {
    digitalWrite(m1a, LOW);
    digitalWrite(m1b, HIGH);
    digitalWrite(m2a, LOW);
    digitalWrite(m2b, HIGH);
  }
}
```

```
else if(val == 'L') //left
{
digitalWrite(m1a, LOW);
digitalWrite(m1b, LOW);
digitalWrite(m2a, HIGH);
digitalWrite(m2b, LOW);
}
else if(val == 'R') //right
{
digitalWrite(m1a, HIGH);
digitalWrite(m1b, LOW);
digitalWrite(m2a, LOW);
digitalWrite(m2b, LOW);
}
else if(val == 'S') //stop
{
digitalWrite(m1a, LOW);
digitalWrite(m1b, LOW);
digitalWrite(m2a, LOW);
digitalWrite(m2b, LOW);
}
else if(val == 'I') // front turn
{
digitalWrite(m1a, HIGH);
digitalWrite(m1b, LOW);
digitalWrite(m2a, LOW);
digitalWrite(m2b, LOW);
}
else if(val == 'J') // backward turn
{
digitalWrite(m1a, LOW);
digitalWrite(m1b, HIGH);
digitalWrite(m2a, LOW);
digitalWrite(m2b, LOW);
}
else if(val == 'G') //turn
{
digitalWrite(m1a, LOW);
digitalWrite(m1b, LOW);
digitalWrite(m2a, HIGH);
digitalWrite(m2b, LOW);
}
else if(val == 'H') //turn
```

```
{  
digitalWrite(m1a, LOW);  
digitalWrite(m1b, LOW);  
digitalWrite(m2a, LOW);  
digitalWrite(m2b, HIGH);}}
```

WORKING AND FEATURES

A simple mobile control car will move forward, backward, left, right, turning in any direction and stop control.

The car use Ardunio uno which operate the motor driver l293d. And bluetooth giving Signals to Ardunio.

Bluetooth module connected to the Bluetooth RC car app available on mobile .

Giving instructions from a mobile application to start and move the car in different directions.

FUTURE EXTENSION

- A. Add light sensor for automatically switching on lights in the dark
- B. Ultrasonic sensor to stop the car and change the direction if any obstacle is found.
- C. Give control to the user for controlling car lights.

CONCLUSION

We learnt about new components while building the mobile control car such as the L293D driver, which is used for driving DC motors. Further, we gained deeper insights into how Bluetooth module HC-05 could be used for wireless communication. And finally, we enjoyed exploring the principle working of a mobile control car.