

# BLUETOOTH CONTROLLED BOT USING ARDUINO

In this project, I have designed and developed a Bluetooth Controlled Bot using Arduino, HC-05 Bluetooth module and L298N Motor Driver Model. On the other end of Bluetooth communication, I have used a Smart Phone and a simple android app to control the Bot.

## Prerequisites for Bluetooth Controller Robot:

Apart from Arduino, which is the main controlling module of the project, there are two other important modules.

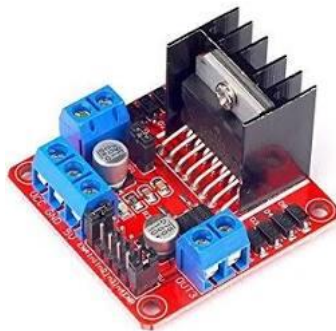
They are the HC-05 Bluetooth Module and the L298N Motor Driver Module.

### HC-05 Bluetooth Module



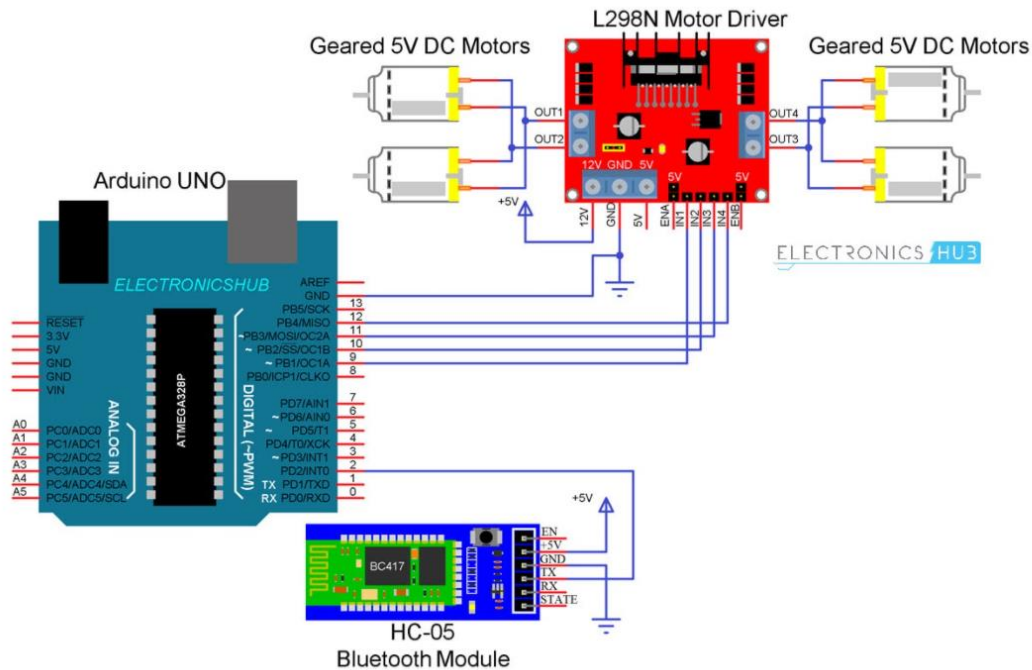
The HC-05 Bluetooth Module is responsible for enabling Bluetooth Communication between Arduino and Android Phone.

### L298N Motor Driver



The L298N Motor Driver Module is responsible for providing the necessary drive current to the motors of the robotic car.

## Circuit Diagram of Bluetooth Controlled Robot



### Components Required:

Arduino UNO  
 L298N Motor Driver Module  
 HC-05 Bluetooth Module  
 Robot Chassis  
 4 x 5V Geared Motors  
 Connecting Wires  
 Battery Holder  
 Power Supply  
 Android Phone  
 Bluetooth Controller App

### Circuit Design:

Coming to the design of the circuit, first is the HC-05 Bluetooth Module. The +5V and GND pins of the Bluetooth Module are connected to +5V and GND of Arduino.

Since I will be only transmitting data related to the Robot's movement from Android Phone to Bluetooth Module and do not intend to receive any data from Arduino, I will connect only the TX pin of the Bluetooth Module to RX Pin of Arduino.

This RX pin of Arduino is based on SoftwareSerial library (Pin 2 and Pin 3 are configured as RX and TX on Arduino). The RX pin of the Bluetooth is left open.

Now, the L298N Motor Driver Module. Digital I/O Pins 9 through 12 of Arduino are configured as Input pins of the Motor Driver and are connected to IN1 through IN4

of the L298N Motor Driver Module. Both the Enable Pins are connected to 5V through provided jumper.

The robot chassis which I am using in this Bluetooth Controlled Robot Car project is supplied with 4 geared motors. Since L298N has slots for only two motors, I have joined the left side motors as one set and the right side motors as other set and connected both these sets to the output of L298N Module.

### **Code:**

Code is provided inside the repository.

### **Android App:**

I have used a simple app called *Bluetooth Controller*, which is installed on an Android Phone to communicate with the Bluetooth Module.

The given Arduino code is written to synchronize with the data configured in the Bluetooth Controller App.

### **Working:**

Assembled the robot, made the necessary connections and uploaded the code to Arduino.

First, in the Android App, I have used 5 keys as Forward, Reverse, Left, Right and Stop. The corresponding data associated with each key is as follows:

Forward – 1  
Reverse – 2  
Left – 3  
Right – 4  
Stop – 5

When a key is pressed, the corresponding data is transmitted to the Bluetooth Module from the Phone over Bluetooth Communication.

In the Arduino code, the Arduino UNO receives any of this data from the Bluetooth Module (as per the key pressed) and performs a simple switch case operation, where each case associated with appropriate instructions to the Motor Driver Input Pins.

For example, if 'Forward' key is pressed in the Android Phone, then '1' is transmitted. Arduino will then make IN1 and IN3 as HIGH and IN2 and IN4 as LOW to achieve a forward motion.

Similarly, other keys correspond to appropriate setting of IN1 – IN4 pins.

### **Limitations:**

- 1) As the range of the Bluetooth Communication is limited (a maximum of 10 meters for class 2 devices for example) the control range of Bluetooth Controlled Robot is also limited.
- 2) We need to make sure that sufficient power is provided to all the modules especially the Bluetooth Module. If the power is not sufficient, even though the Bluetooth Module powers on, it cannot transmit data or cannot be paired with other Bluetooth devices.

### **Applications:**

- 1) Low range Mobile Surveillance Devices
- 2) Military Applications (no human intervention)
- 3) Assistive devices (like wheelchairs)
- 4) Home automation

### **Picture of my model:**

