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(/member/guibot/)

(http://www.guilhermemartins.net)

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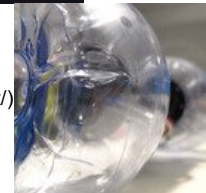
**Bio:** Designer & digital artist

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attaching-components/)

After long research and trial and error, I have came up to a new walkthrough regarding this nice chip, the L293D.

Each project is one project and each one has its own unique power configurations, so you must be aware of the best battery choice and how to distribute voltage through your robot.

I strongly advice you to read the following articles:

Picking Batteries for your Robot (<http://letsmakerobots.com/node/3819>)

Once you've decided on batteries, how do you regulate the voltage

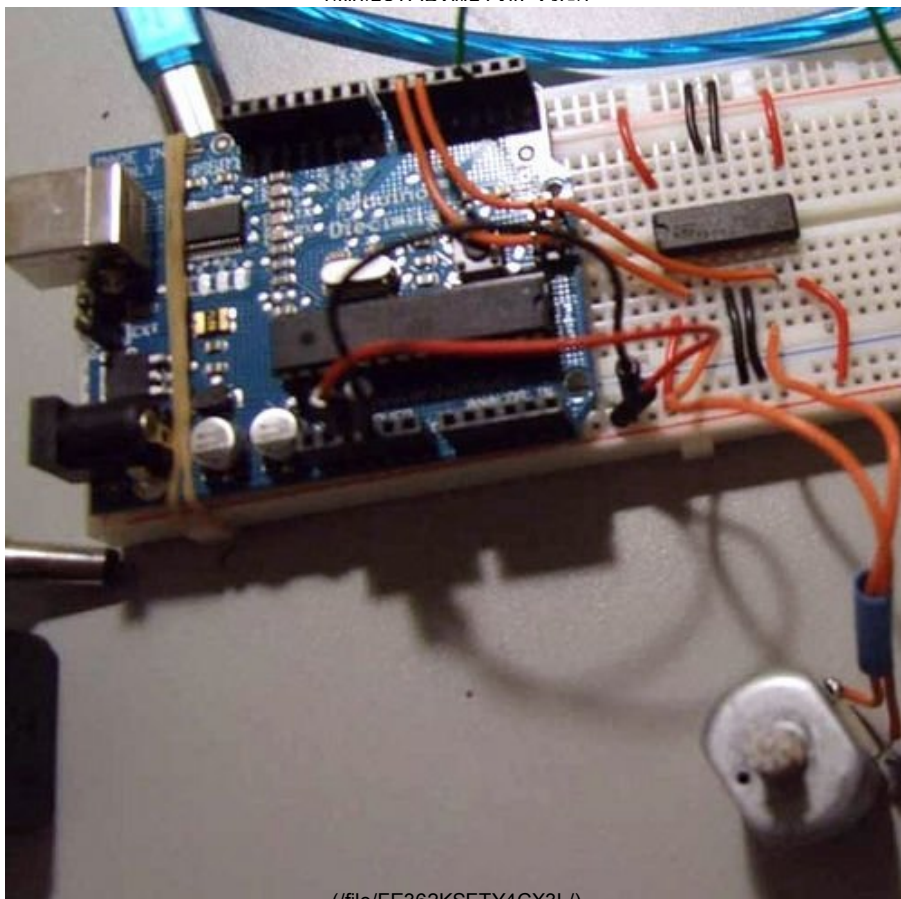
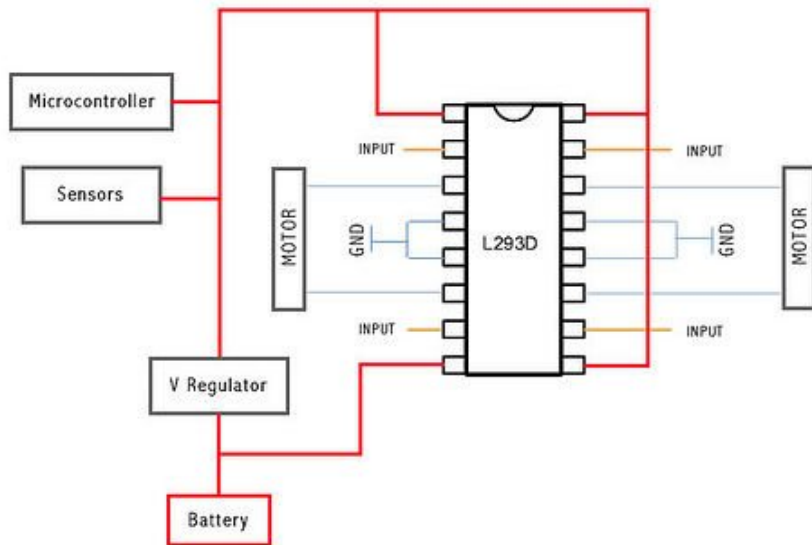
(<http://letsmakerobots.com/node/3880>)

\*\*\*\*\*

L293D gives you the possibility to control two motors in both directions -  
datasheet

(<http://www.datasheetcatalog.org/datasheet/texasinstruments/l293d.pdf>)

## Step 1: Basic implementation



This is the most basic implementation of the chip.

As you can see, a 5V Voltage Regulator is between the battery and pins 1, 9, 16.

Pin 8 gets power before the VReg, if your motor needs for example 6V you should put 6V directly in this pin, all the other pins should not get more than 5V.

This will work with no problem at all, but if you want to do the right implementation take a look at the next example:

Figure 1: Schematic diagram and photographs of the hardware implementation. The schematic shows a microcontroller (MCU) connected to sensors, a V Regulator, and a Battery. The MCU is connected to two motors via L293D motor drivers. The hardware implementation shows the physical components on a breadboard, including the MCU, sensors, V Regulator, Battery, and two motors connected to the L293D motor drivers.

### Step 3: Arduino code

```
// Use this code to test your motor with the Arduino board:

// if you need PWM, just use the PWM outputs on the Arduino
// and instead of digitalWrite, you should use the analogWrite command

// ----- Motors
int motor_left[] = {2, 3};
int motor_right[] = {7, 8};

// ----- Setup
void setup() {
  Serial.begin(9600);

  // Setup motors
  int i;
  for(i = 0; i < 2; i++){
    pinMode(motor_left[i], OUTPUT);
    pinMode(motor_right[i], OUTPUT);
  }
}

// ----- Loop
void loop() {

  drive_forward();
  delay(1000);
}
```

```
motor_stop();  
Serial.println("1");
```

```
drive_backward();  
delay(1000);  
motor_stop();  
Serial.println("2");
```

```
turn_left();  
delay(1000);  
motor_stop();  
Serial.println("3");
```

```
turn_right();  
delay(1000);  
motor_stop();  
Serial.println("4");
```

```
motor_stop();  
delay(1000);  
motor_stop();  
Serial.println("5");  
}
```

```
// ----- Drive
```

```
void motor_stop(){  
digitalWrite(motor_left[0], LOW);  
digitalWrite(motor_left[1], LOW);  
  
digitalWrite(motor_right[0], LOW);  
digitalWrite(motor_right[1], LOW);  
delay(25);  
}
```

```
void drive_forward(){  
digitalWrite(motor_left[0], HIGH);  
digitalWrite(motor_left[1], LOW);  
  
digitalWrite(motor_right[0], HIGH);  
digitalWrite(motor_right[1], LOW);  
}
```

```
void drive_backward(){  
digitalWrite(motor_left[0], LOW);  
digitalWrite(motor_left[1], HIGH);  
  
digitalWrite(motor_right[0], LOW);  
digitalWrite(motor_right[1], HIGH);  
}
```

```
void turn_left(){  
digitalWrite(motor_left[0], LOW);  
digitalWrite(motor_left[1], HIGH);  
  
digitalWrite(motor_right[0], HIGH);  
digitalWrite(motor_right[1], LOW);  
}
```


```
void turn_right(){  
digitalWrite(motor_left[0], HIGH);
```

```
digitalWrite(motor_left[1], LOW);

digitalWrite(motor_right[0], LOW);
digitalWrite(motor_right[1], HIGH);
}
```

## Control your motors with L293D and Arduino by guibot (/member/guibot/) in arduino (/tag/type-id/category-technology/channel-arduino/)

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**lurt (/member/lurt)**

a month ago

Reply

Can i use this circuit to control different motors (not at once), i have 9v, a 12v and a 24v. I know that the capacitors must be able to handle the voltage, but do i need capacitors with different farad ratings for each motor-setup?

Thank you for your replies!

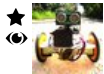


**palki gupta (/member/palki gupta)**

a month ago

Reply

how should i control speed (increase and decrease)? i am using 1000rpm geared motors( simple motors that work as if they are 300rpm), l293d motor drivers, 12V heavy battery, hc-05 bluetooth module.



**guibot (/member/guibot)** (author) ▶ palki gupta (/member/palki gupta)

Reply

you should use PWM - pulse width modulation  
<https://www.arduino.cc/en/Tutorial/PWM>

a month ago



**MdS (/member/MdS)**

a month ago

Reply

How i connect our arduino to l293d motor bridge please sir help me



**comodore (/member/comodore)**

8 years ago

Reply

Hi I like your Instructables very much! Great job! I have a question that I think you may know the answer to. I need a small chip like this one that I can program and put it in a circuit so when it activates by a sensor ( in my case I want to put a light sensor (LDR))When light hits the light sensor It turns on a motor for a period of time (lets say 5 seconds). Then when the sensor finds it self in the dark it turns on the motor ( again for 5 sec) BUT IN THE opposite DIRECTION. All in All When there is lite it turns on the motor for 5 sec on one side (lets say left) when there is no light it turns the motor for 5 sec (on the oposite side, right) Do you know such a chip that will enable me to program it and make it do what I described??? Thank you! Stanislav



**emmjul (/member/emmjul)** ▶ comodore (/member/comodore)

8 years ago

Reply

You can use the same setup, simply save the states of the ldr and you can check if there was light before and have the arduino reverse the motor->


```
if ( pin 1 = high)
{
```

```
turn right
5 sec
}
if (pin 1 = low)
{
turn left
5 sec
}
```

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Hope I could help

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**ParasS6 (/member/ParasS6)** ▶ emmjul (/member/emmjul) 2 months ago

Reply

Sir I am working with Arduino. I want to control god idle leg up and down with help of geared motor forward and reverse action please give me suggestions.



**comodore (/member/comodore)** ▶ emmjul (/member/emmjul) 7 years ago

Reply

THANK YOU SO MUCH!!! OK, so I just upload this to the Arduino? On what pins do I connect the motor, LDR, power??? I needed someone to write the code because I am a complete n00b in programing... THANK YOU! Could you please now just help me, to say, put it together, like on what pins do I connect the motor, LDR, power... Can I remove the ATmega chip and use it with out the Arduino board, connecting the components directly to the chip? Thank you!



**emmjul (/member/emmjul)** ▶ comodore (/member/comodore) 7 years ago

Reply

no you can't, it's just pseudocode so you can get an idea what you have to programm, sadly I don't own an arduino so I can't write it for you. sry



**comodore (/member/comodore)** ▶ emmjul (/member/emmjul) 7 years ago

Reply

Well... Thanks anyway... Thanks, you helped me! :D



**guibot (/member/guibot)** (author) ▶ comodore (/member/comodore)

Reply

The Arduino board is fully programable, you can see more info at [www.arduino.cc](http://www.arduino.cc) 8 years ago



**ViditJ (/member/ViditJ)** ▶ guibot (/member/guibot)

10 months ago

Reply

heya m making a line follower but my motors are not working according to arduino they just run when supply is given plz do guide me  
viditsmartboy1808@gmail.com



**adre76 (/member/adre76)** ▶ ViditJ (/member/ViditJ)

10 months ago

Reply

Can you post the arduino code and a photo of connections so we can see ?





**comodore (/member/comodore)** ▶ guibot (/member/guibot) 8 years ago Reply

Yea, but I need something smaller, much much smaller like a chip...




**guibot (/member/guibot)** (author) ▶ comodore (/member/comodore) 8 years ago Reply

there are arduino clones of many sizes, or can build your customized arduino only with the essencial components, I have build one with the ATtiny85. You can find more details at <http://lab.guilhermemartins.net/?p=539> (http://lab.guilhermemartins.net/?p=539)

## Control your motors with L293D and Arduino

guibot (/member/guibot/) in arduino (/tag/type-id/category-technology/channel-arduino/)

check the following links:

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([http://store.fundamentallogic.com/ecom/index.php?main\\_page=index&cPath=15](http://store.fundamentallogic.com/ecom/index.php?main_page=index&cPath=15))

<http://www.arduino.cc/en/Main/ArduinoBoardNano>

(<http://www.arduino.cc/en/Main/ArduinoBoardNano>)



**comodore (/member/comodore)** ▶ guibot (/member/guibot) 8 years ago Reply

Thank you!



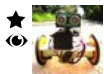
**Eirinn (/member/Eirinn)** ▶ comodore (/member/comodore) 8 years ago Reply

Once you've programmed the arduino you can remove the chip, add a crystal and it can act alone with a power source - you don't always need a smaller arduino ;)



**comodore (/member/comodore)** ▶ Eirinn (/member/Eirinn) 8 years ago Reply

Great, that is good to hear... I am new in programing and electronic... :P  
Why do I need a crystal, actually what does a crystal do??? How should it be connected? What chip should I use? Thank you!



**guibot (/member/guibot)** (author) ▶ comodore (/member/comodore) 8 years ago Reply

this might interest you

<http://lab.guilhermemartins.net/?p=539> (<http://lab.guilhermemartins.net/?p=539>)



**comodore (/member/comodore)** ▶ guibot (/member/guibot) 8 years ago Reply

Thanks!



**guibot (/member/guibot)** (author) ▶ comodore (/member/comodore) 8 years ago Reply

and this :)

<http://lab.guilhermemartins.net/?p=817> (<http://lab.guilhermemartins.net/?p=817>)



**comodore (/member/comodore)** ▶ guibot (/member/guibot) 8 years ago Reply

Thanks! x2 :D





**Eirinn (/member/Eirinn)** ▶ **comodore (/member/comodore)** 8 years ago [Reply](#)

I recommend the Arduino Duemillanove, it's relatively easy to use and program and the crystal (i have no idea besides this) is just to make it functional outside the board it's in. The arduino Duemillanove uses the AtMega328. ps: a "crystal" is just a component like a resister or capacitor, it's not a diamond or a ruby :P

## Control your motors with L293D and Arduino.

**comodore (/member/comodore)** ▶ **Eirinn (/member/Eirinn)** 8 years ago [Reply](#)

**guibot (/member/guibot/)** in [arduino \(/tag/type-id/category-technology/channel-arduino/\)](#)

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I have the Arduino Duemillanove ... Are there types of crystals, if yes, which type should i use? Are there separate chips that you can buy, without the whole board? On the chip it self hod do i know where should i hock up the sensor, power, motor, crystal... Yes, I am a n00b! ;) Thank you!

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**Eirinn (/member/Eirinn)** ▶ **comodore (/member/comodore)** 8 years ago [Reply](#)

I will answer you honestly; i don't know. But googling goes a long way ;)



**comodore (/member/comodore)** ▶ **Eirinn (/member/Eirinn)** 8 years ago [Reply](#)

:P Thanks!



**narnian (/member/narnian)** ▶ **comodore (/member/comodore)** 8 years ago [Reply](#)

Any of the microcontrollers whether PIC or AVR can do this. But you will still need support components for regulating power and possibly programming interface, so yes the Arduino is a little big, but you may find you need the same components in any case.



**comodore (/member/comodore)** ▶ **narnian (/member/narnian)** 8 years ago [Reply](#)

Well, maybe, but the problem is I can't fit the Arduino into the case... I think that I I just program the chip and solder all the components... I would save much space... So should I use this chip? How do I actually program it, the chip that is? As I said, I need something small..like a bug circuit with the programed chip that turns on the motor when it gets a signal for a defined amount of time... Thanks!



**dagenius (/member/dagenius)** ▶ **comodore (/member/comodore)** 8 years ago [Reply](#)

If that is all you are looking to do, then a pickaxe 08-M coupled with the circuit in this instructable should do the trick. the cheapest 08-M that I found was about \$3.00 USD.



**comodore (/member/comodore)** ▶ **dagenius (/member/dagenius)** 8 years ago [Reply](#)

And how do you program them? Thanks!



**dagenius (/member/dagenius)** ▶ **comodore (/member/comodore)** 8 years ago [Reply](#)

the chips have a serial in, serial out(also a in0), and a ground to share with a serial cable. They do take a little more diy to use, because the breakout boards sold on the internet are terrible, and you can make one much smaller, cheaper, and funner with a perf board, solder, pic, and



various components. The pic must be programmed with a certain resistor setup that can be found all over the internet.



**comodore** (/member/comodore) ▶ dagenius (/member/dagenius)

Reply

Ah ok thanks! I think I am going to use an arduino, that is the arduino chip thanks!

7 years ago

## Control your motors with L293D and Arduino

by guibot (/member/guibot) in UME1 (/member/UME1) /tag/type-id/category-technology/channel-4 months ago

Reply



Please help me !!! I just burns my 2 L293D ic's, yeah its heat up during I am controlling my Car, I am using NI -CD 8 AA 700mAH 9.6 V Battery, the positive of battery attach to the IC VSS(Pin 8) and negative of IC attach to the Arduino gnd. Someone reply me please .....

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**chrisjlionel** (/member/chrisjlionel) ▶ UME1 (/member/UME1)

Reply

Add heat sinks to the ground pins as shown in the data sheet of L293DNE

4 months ago



**floren.vanolden** (/member/floren.vanolden) ▶ UME1 (/member/UME1)

Reply

Wrong way round maybe? High voltage on low voltage input?

10 months ago



**hiponiaE** (/member/hiponiaE)

8 months ago

Reply

Hello about the L293D motor IC what are the other replacement for it.? I mean, there is no available stock of the said IC and im going to use it im project arduino and bluetooth car. So, is there other value of IC as replacement for it.? Any help would be greatly appreciated, thank you.



**chrisjlionel** (/member/chrisjlionel) ▶ hiponiaE (/member/hiponiaE)

Reply

L298N is more efficient and powerful than L293DNE

4 months ago



**sonamt4** (/member/sonamt4)

6 months ago

Reply

sir i have one doubt .....

what is difference between I293d ic and I293den



**chrisjlionel** (/member/chrisjlionel) ▶ sonamt4 (/member/sonamt4)

Reply

both were the same.

4 months ago



**eslame15** (/member/eslame15)

7 months ago

Reply

How to calculate the value of capacitors If you use a different value of the battery differs from 16 volts?



**guibot** (/member/guibot) (author) ▶ eslame15 (/member/eslame15)

Reply

I am not an engineer and I might be wrong with this:

7 months ago

one rule of thumb is to always duplicate the value of your VCC, for instance, if you use 12v, you should use a capacitor rated for 24v.

I just hope an engineer give you a better explanation :)



**VishalA24** (/member/VishalA24)

7 months ago

Reply

I have made a lie follower robot using arduino and L293D and 2 geared toy motors. I have used two 9 volts battery (1 for arduino and one for L293D). It works properly but the problem is that the batteries drain up too quickly. i.e. both fresh batteries will last only 10-15 minutes. I am using your L293D basic implementation, will advance implementation i.e. using capacitors will help.

## Control your motors with L293D and Arduino

by guibot (/member/guibot/) in arduino (/tag/type-id/category-technology/channel-arduino/)

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Regards (/id/Control-your-motors-with-L293D-and-Arduino/)

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Vishal Ahuja



**guibot** (/member/guibot/) (author) ▶ VishalA24 (/member/VishalA24)

Reply

7 months ago

You should not expect too much from 9v batteries.. use 4 x or 6 x 1.2 AA rechargeable batteries and you will be fine.  
Good luck!



**VishalA24** (/member/VishalA24) ▶ guibot (/member/guibot/) 7 months ago

Reply

Thanx. Will definately try it.  
One more thing, what is the use of advance implementation of L293D i.e. in which you are using capacitors.  
Vishal Ahuja



**tysweat** (/member/tysweat)

a year ago

Reply

If you want simpler code, I wrote an Arduino library for the L293D motor controller. You can find it at <https://github.com/tysweat/arduino-L293D>  
(<https://github.com/tysweat/arduino-L293D>)



**Dinsy** (/member/Dinsy) ▶ tysweat (/member/tysweat)

7 months ago

Reply

Thanks! That just answered a whole bunch of questions I had.



**LourisaP** (/member/LourisaP) ▶ tysweat (/member/tysweat) a year ago

Reply

can i control 2 motors?



**sepon** (/member/sepon)

a year ago

Reply

Can i controll the Speed of this motors?



**floren.vanolden** (/member/floren.vanolden) ▶ sepon (/member/sepon)

Reply

10 months ago

You can do pwm, pulsating the input for speed control



**guibot** (/member/guibot/) (author) ▶ sepon (/member/sepon) a year ago

Reply

Sure you can, speed can be assign using PWM (pulse width modulation).

Use the following commands:  
analogWrite(pinMotorA, value);  
digitalWrite(pinMotorB, LOW);

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by guibot (/member/guibot/) in arduino (/tag/type-id/category-technology/channel-arduino/)



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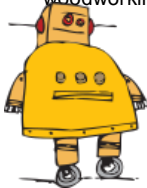
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