



## Guilherme Martins

{ 2009 01 29 }

### Control your motors with L293D

After long research and trial and error, I've 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](#)

[Once you've decided on batteries, how do you regulate the voltage](#)

\*\*\*\*\*

L293D gives you the possibility to control two motors in both directions - [datasheet](#)

\*\*\*\*\*

#### **The L293D Circuit:**

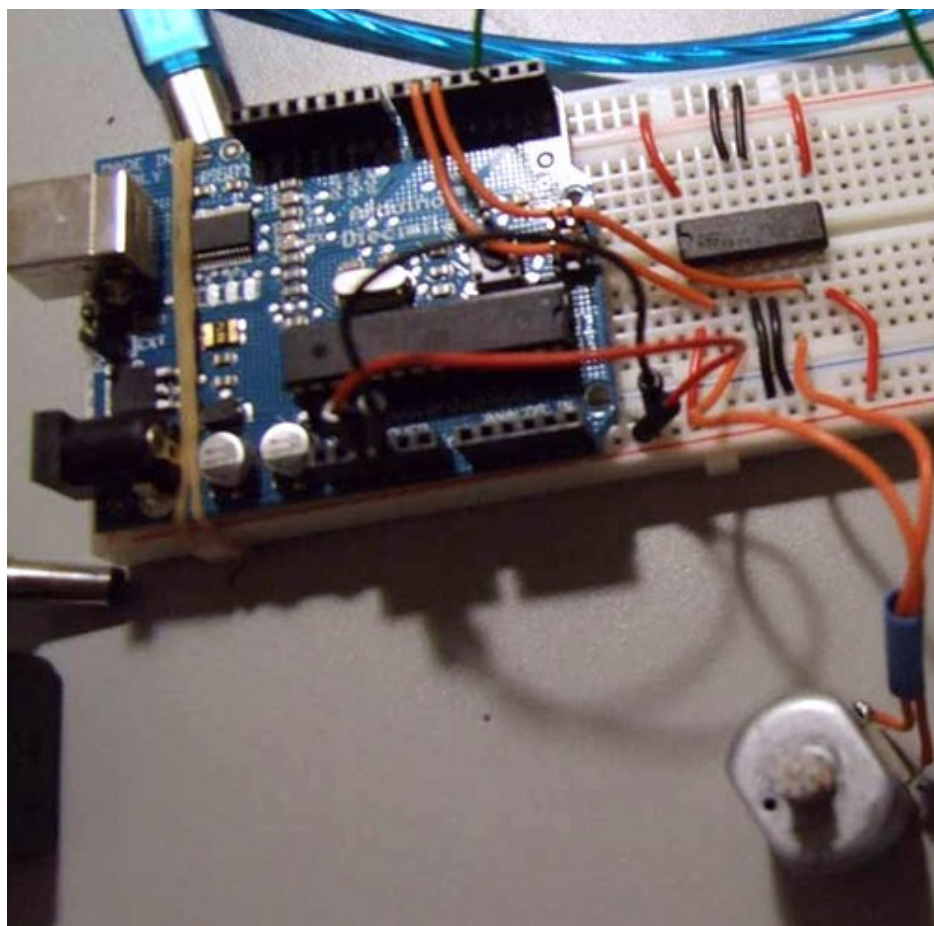
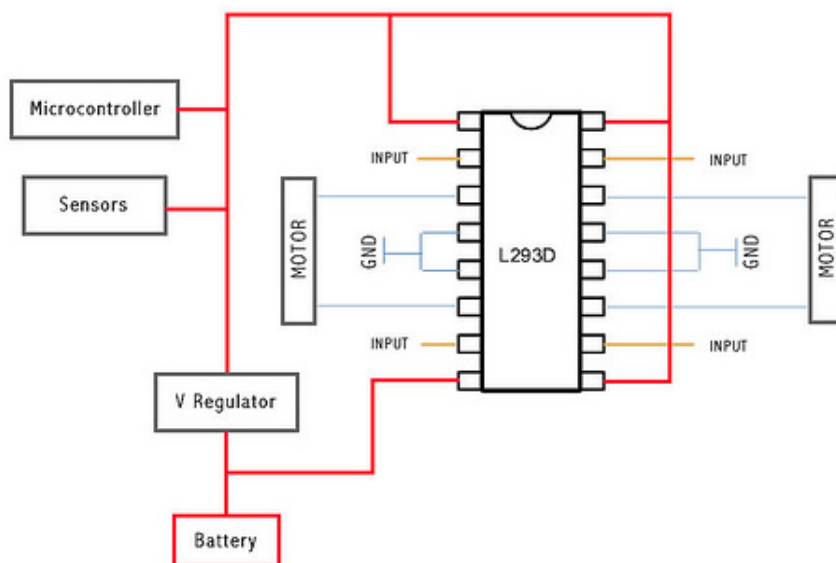
##### **Basic Implementation:**

This is the most basic implementation of the chip.

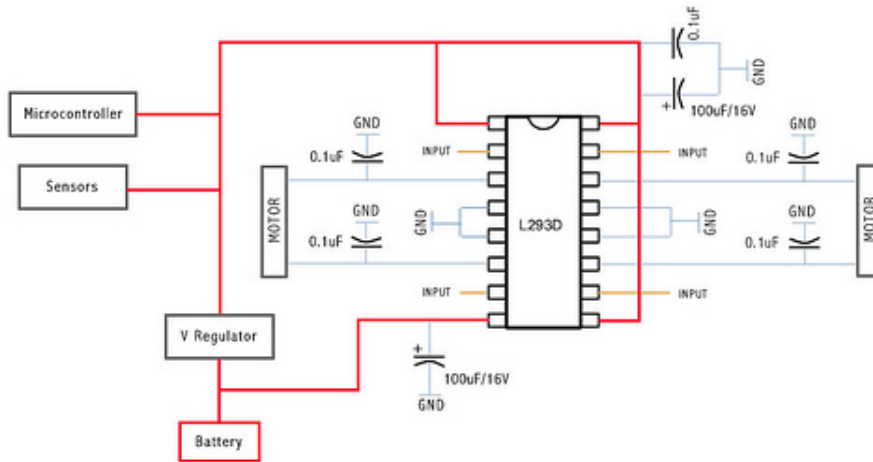
As you can see, a 5V Voltage Regulator is between the battery and pins 1, 9, 16.

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:

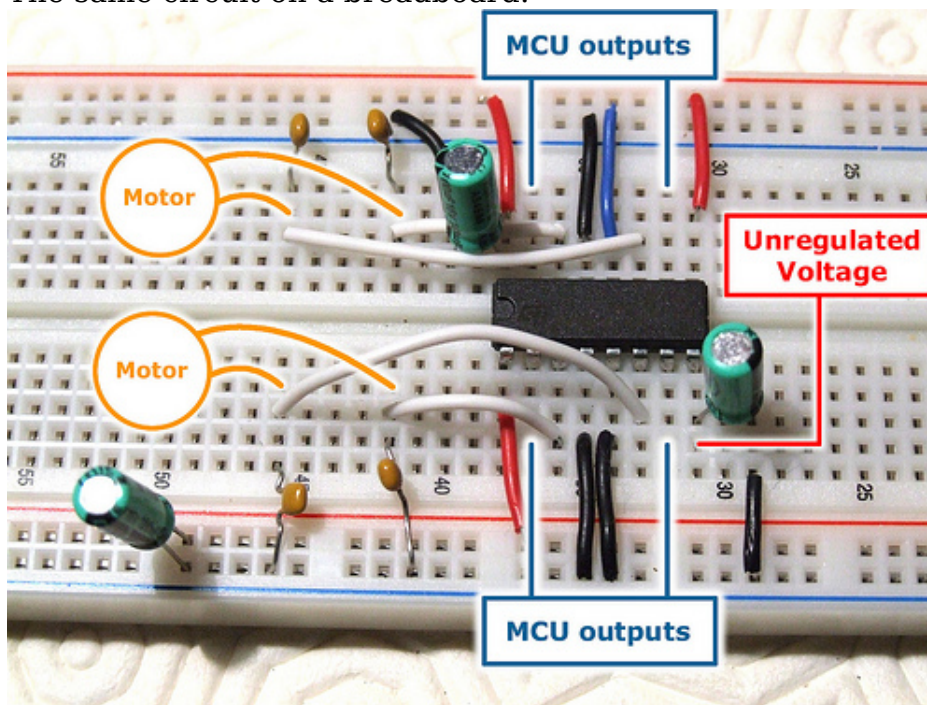


This is the correct Implementation (with the capacitors), and note that pin 8 is feeded by unregulated voltage. This means that if your motors need more than 5V, you should power this pin with that amount of voltage, and the rest of the circuit with 5V.



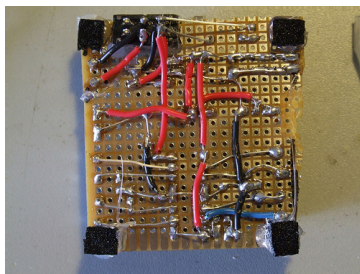
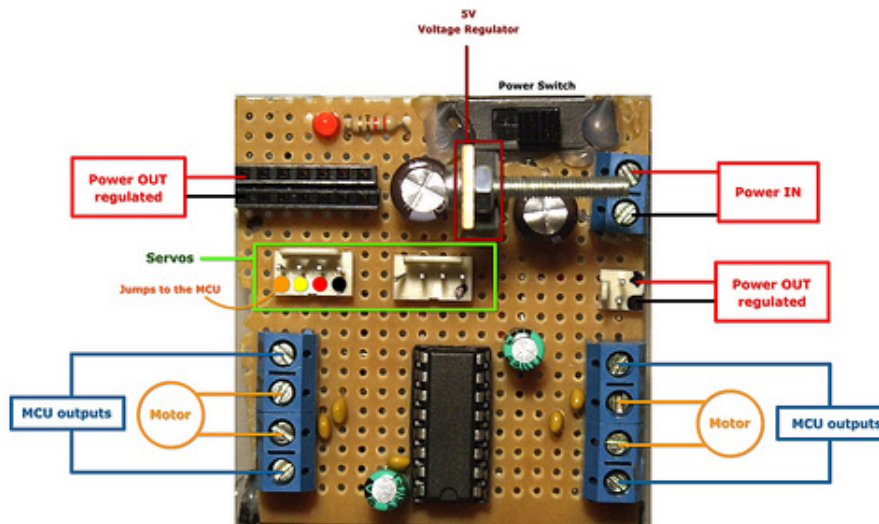
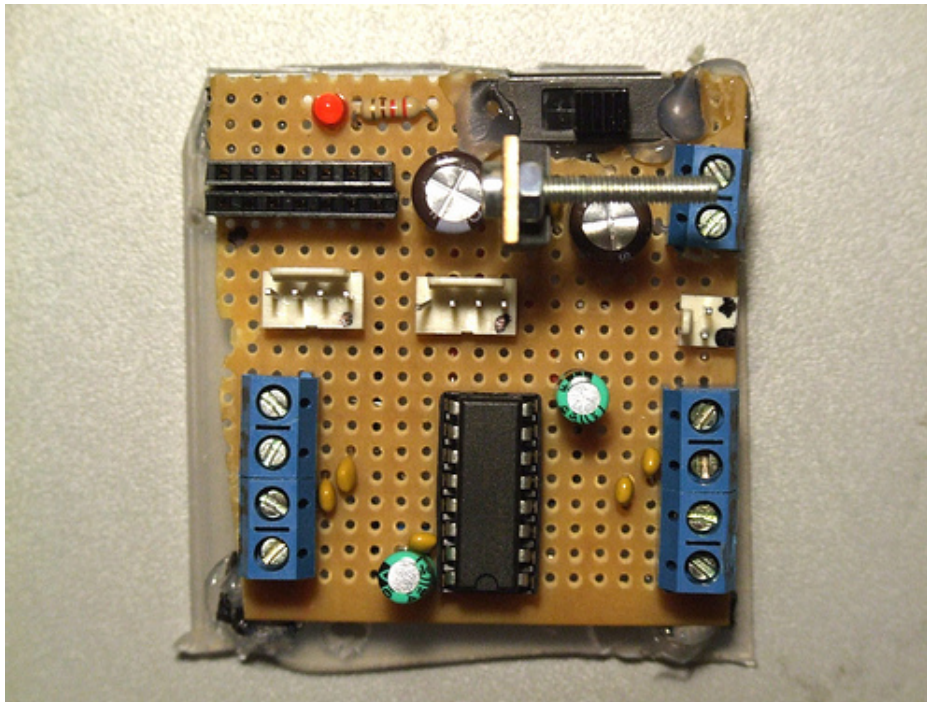
The capacitors stabilize the current.

The same circuit on a breadboard:



**Soldered on a pcb and ready to go:**





This is the back of the circuit, click for high resolution photo.

```
// 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);
}
```

\*\*\*\*\*

update 26/4/09

\*\*\*\*\*







My 1st instructable :)



Share me:

Posted by [guibot](#) on Thursday, January 29, 2009, at 5:34 am. Filed under [L293D](#), [Tutorials](#). Tagged [Arduino](#), [board](#), [breadboard](#), [circuit](#), [dc](#), [diagram](#), [easy](#), [L293D](#), [Motor](#), [Motor Driver](#), [Robot](#), [schematic](#), [Servo](#), [tip](#), [Tutorial](#), [walkthrough](#). Follow any responses to this post with its [comments RSS](#) feed. You can [post a comment](#) or [trackback](#) from your blog.

## { 24 } Comments

1.  Ricardo Vieira | February 5, 2009 at 6:38 pm | [Permalink](#)  
Hi!!  
Rely nice job...  
I'm having some difficulties. So you can post the back of the assembled circuit.  
Thanks a lot
2.  GUI | February 5, 2009 at 7:03 pm | [Permalink](#)  
Sure.. please wait until tomorrow ;)
3.  GUI | February 6, 2009 at 7:12 pm | [Permalink](#)  
Hi, there´s the photo, I hope it helps.  
Good luck
4.  [Mário](#) | February 6, 2009 at 8:23 pm | [Permalink](#)  
Aquele parafuso no transistor é para efeitos de dissipação de energia certo?
5.  GUI | February 6, 2009 at 10:37 pm | [Permalink](#)  
é sim :)
6.  Ricardo Vieira | February 25, 2009 at 2:22 pm | [Permalink](#)  
Utilizas-te apenas um capacitador no regulador de voltagem??  
Quais é que são as diferenças entre o ic L293d e o L293NE?


7.  GUI | [February 25, 2009 at 4:29 pm](#) | [Permalink](#)

O regulador de voltagem tem 2 condensadores de 470uf cada, como podes ver na fotograia está um de cada lado.

Desconheço as diferenças entre a L293D e L293NE, consulta as datasheets.

8.  Ricardo Vieira | [February 26, 2009 at 5:10 pm](#) | [Permalink](#)


desculpa 1 condensador de 0,1uf

9.  GUI | [February 26, 2009 at 10:52 pm](#) | [Permalink](#)


ele está lá, mas está por baixo do parafuso por isso não se vê

10.  Ricardo Vieira | [February 27, 2009 at 6:09 pm](#) | [Permalink](#)


eu sei que ele está lá vesse, mas no outro guia para o qual tu tens o link no inicio da pagina está o esquema com 2 condensadores de 0.1uf e tu só utilizas um. Não é preciso o segundo? Era isso que eu queria saber

11.  GUI | [February 27, 2009 at 11:55 pm](#) | [Permalink](#)

estão lá os dois, e um deles está de baixo do parafuso por isso não se vê :)

12.  Reuben | [October 15, 2009 at 5:35 pm](#) | [Permalink](#)

I saw the link to the letsmakerobot's web site about power regulators, but could you show a breadboard or schematic picture of what you used as a power regulator? I'm having a tricky time picturing it from your complete PCB pictures. Thank you.

13.  GUI | [October 15, 2009 at 11:44 pm](#) | [Permalink](#)

Hi!

Take a look into these tutorial: <http://itp.nyu.edu/physcomp/Tutorials/ArduinoBreadboard>

Check the first five photos, the power regulator circuit is very well explained ;)

14.  HL | [April 10, 2010 at 8:12 pm](#) | [Permalink](#)

Hi there. Thanks for the wonderful instructable. I do have a question though.

I understand from your instructable that L293D is controlled by MCU inputs.

Is it necessary L293D and the MCU to share the same power source?? for example common ground.

This is urgent. hope to hear from you guys soon.

thanks.



15.  Primos | July 1, 2010 at 8:27 pm | [Permalink](#)

Hi.. I would just like to ask, what is the purpose of the capacitors? Thanks for your answers in advance!

16.  Primos | July 1, 2010 at 8:30 pm | [Permalink](#)

Ups... Sry... I didn't see..

The capacitors stabilize the current.

17.  Nuno | August 21, 2010 at 8:01 pm | [Permalink](#)


sr. Guilherme eu sou muito novo nestas andanças e queria ajuda .  
no compilador do Arduino o código "void turn\_right() {, da-me erro o que se passa?  
não vou matar mais a cabeça, por isso peço ajuda .  
OBRIGADO

18.  JOSH | February 9, 2011 at 11:56 am | [Permalink](#)


can we use the L293D without using MCU?tnx

19.  Mya | May 8, 2012 at 11:09 am | [Permalink](#)

hi, i like your code at most... but i can't understand.. why you don't use transistor between input1 and input2 to enable motor...?

20.  anne | September 4, 2012 at 3:36 am | [Permalink](#)


hi! i am a student and i have a project just like this one. i have difficulties in analyzing how i can make connections for the servo motor in the l293d ic.. can you help me? can you give me a schematic diagram of the board you constructed w/ the servo motor connections? thanks!

21.  GUI | September 4, 2012 at 7:47 am | [Permalink](#)


there are no transistors in this circuit...

22.  GUI | September 4, 2012 at 7:49 am | [Permalink](#)

hi, the servo motor is directly connected to the arduino digital pin, the l293d is there to control two dc motors

23.  anne | September 4, 2012 at 3:05 pm | [Permalink](#)

so does that mean i can control the forward,reverse and stop of the servo motor (i am currently working on a unicycle robot) directly to the arduino? can you guide me with the program? thank you very much

24.  [GUI](#) | September 4, 2012 at 3:48 pm | [Permalink](#)

I think you are misunderstanding two different things, one thing is a servo-motor, other thing is a dc motor

servo motor has limited rotation, normally goes from 0° to 180°

dc motor is a continuous rotation motor and to control it you need some kind of controller, in this post I am showing how to control it with an L293D

I believe you are trying to connecting a dc motor to the L293D, I don't have any schematic available at the moment but you can find many googling a bit

## { 4 } Trackbacks

1. [L293 Basic Setup « Tactile Sound](#) | October 22, 2008 at 4:18 am | [Permalink](#)

[...] L293 Basic Setup I've got the basic DC motor setup going with an external power running parallel. This is running on the Arduino BT. The picture shows the wire setup for it. The main reference for this bit was from Guilherme Martins - Project Showroom. [...]

2. [Guilherme Martins : bigbro update](#) | February 3, 2009 at 8:41 am | [Permalink](#)

[...] completed the new motor driver board, now I feel that I am ready to continue with the development of this [...]

3. [Carro telecomandado automatizado « 42 Lactors](#) | August 10, 2009 at 10:44 pm | [Permalink](#)

[...] Decidi utilizar a H-bridge que tinha comprado para o outro projecto e utilizando os esquemas deste site : <http://lab.guilhermemartins.net/l293d-custom-motor-driver/> [...]

4. [Ligações Ponte-H « ... Apontamentos](#) | October 17, 2010 at 11:07 pm | [Permalink](#)

[...] versão original (em ingles), deste artigo pode ser consultada em <http://lab.guilhermemartins.net/2009/01/29/l293d-custom-motor-driver/> e todos os créditos devem ser dados ao autor do mesmo. Categories: Arduino, Beta, Robotica [...]

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