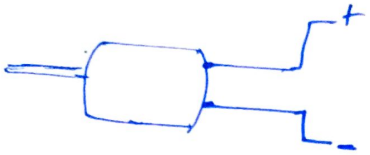
Arduino - Advanced

(1/2/19)

DC - Motors (without Gear)



* They have two wires comming out
* One should be connected to +ve & other to -ve
* Swapping the wires will change direction of rotation

* Brushes can wear out over time if it is run faster for long time
* They usually require 5V, (but can also run with 1-5V battery)

External Controllers

* Motors are usually controlled by external controller
* The power supply is also external & not taken from arduino board.
* ~~Motor controller also~~

Controlling Speed:

* PWM

* Motor controller receives PWM signals from arduino & amplifies it according to voltage ratings of the motor

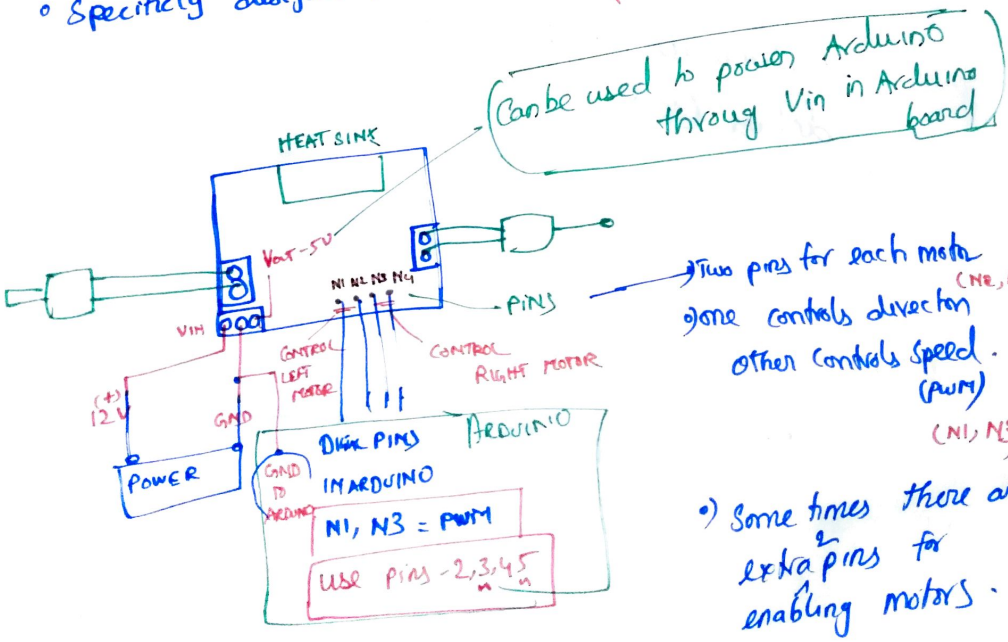
Controlling direction

Motor controller, internally switches +ve & -ve to change direction

L298N MOTOR CONTROLLER

- Can connect two motors
- Specifically designed for DC motors

Voltage: 4.5V – 36V
Current: Max 2A per each channel



SKETCH

```
int SPEED1_PIN = 5
int DIRECTION1_PIN = 4
int SPEED2_PN = 3
Int DIRECTION2_PIN=2

Void Setup()
{
  PinMode (__, OUTPUT)
      :
  (For all pins)
}

Void loop()
{
  digital write (DIRECTION1_PIN, HIGH)
  digital write (DIRECTION2_PIN, LOW)      } direction
  analog write (SPEED1_PIN, 50)            } PWM
  analog write (SPEED2_PN, 158)
  delay (1000);
}
```

NOTE:

When direction is swapped, (SPEED VALUE SHOULD BE REVERSE)

SPEED: Analog 50 = Analog 255 - 50 = 208

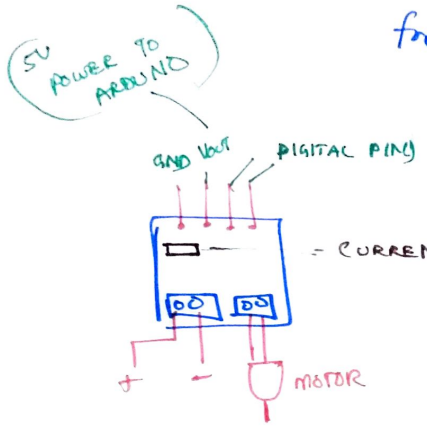
DRV8871 Adafruit motor Controller

VOLTAGE : 6.5V — 45V
Peak current = 3.6A

* Can use same sketch as L298
* Can control only one motor

Min voltage From supply ≥ 6.5V

* No heat sink (Therefore, Not suitable for continous work)



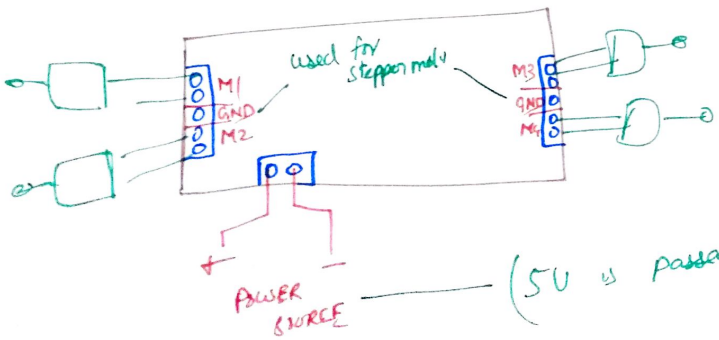
We can solder resistor to control max current

Eg: To limit to 3A FORMULA PROVIDED ON DATASHEET

Resistor = $\frac{64}{3}$ = 21.3kΩ

ADAFRUIT MOTOR SHIELD

× uses I2C (Address changable
× Even if you connect many motor, only the 2 I2C pins on arduino are used
× Sketch depends on Adafruit_motorshield.h library



(5V is passed on to Arduino below.)

DC - MOTOR WITH GEAR

- Needs More ~~Current~~ Voltage
- Rated at 12V
- Can move sturdy objects
- Works with all the previously discussed motor controllers.