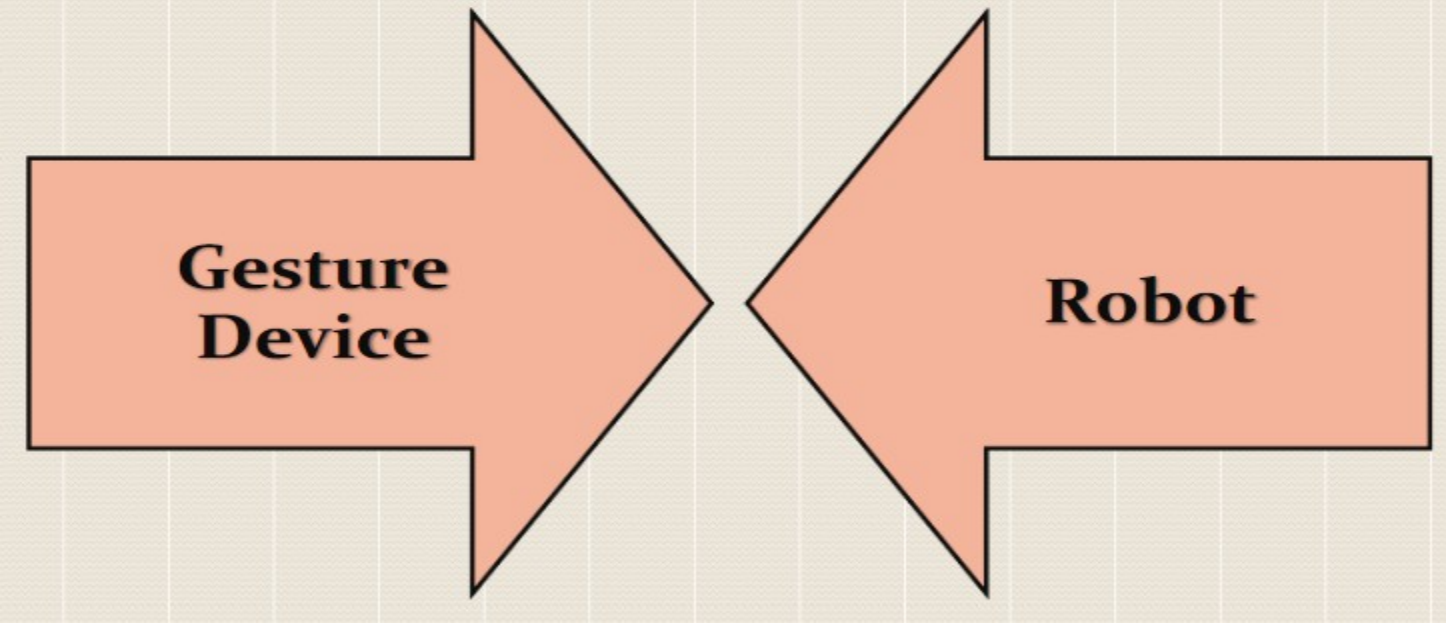
HAND GESTURE CONTROLLED ROBOT

Overview

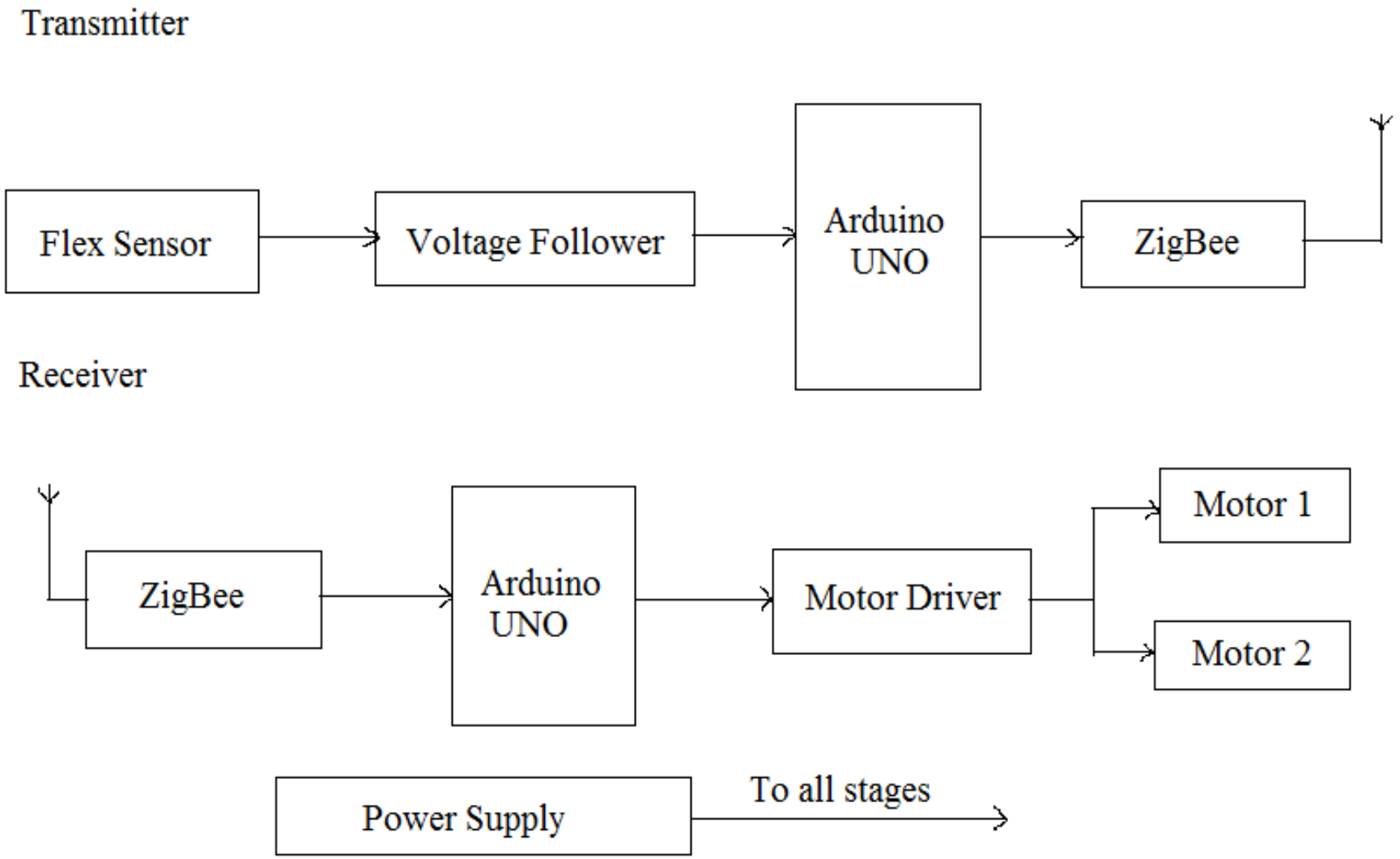
- Introduction
- Block Diagram
- Hardware Requirements
- Software used
- Applications
- References

Introduction

- A gesture is a form of non-verbal communication.
- A gesture controlled robot is a kind of robot which can be controlled by your hand gesture.



Block Diagram



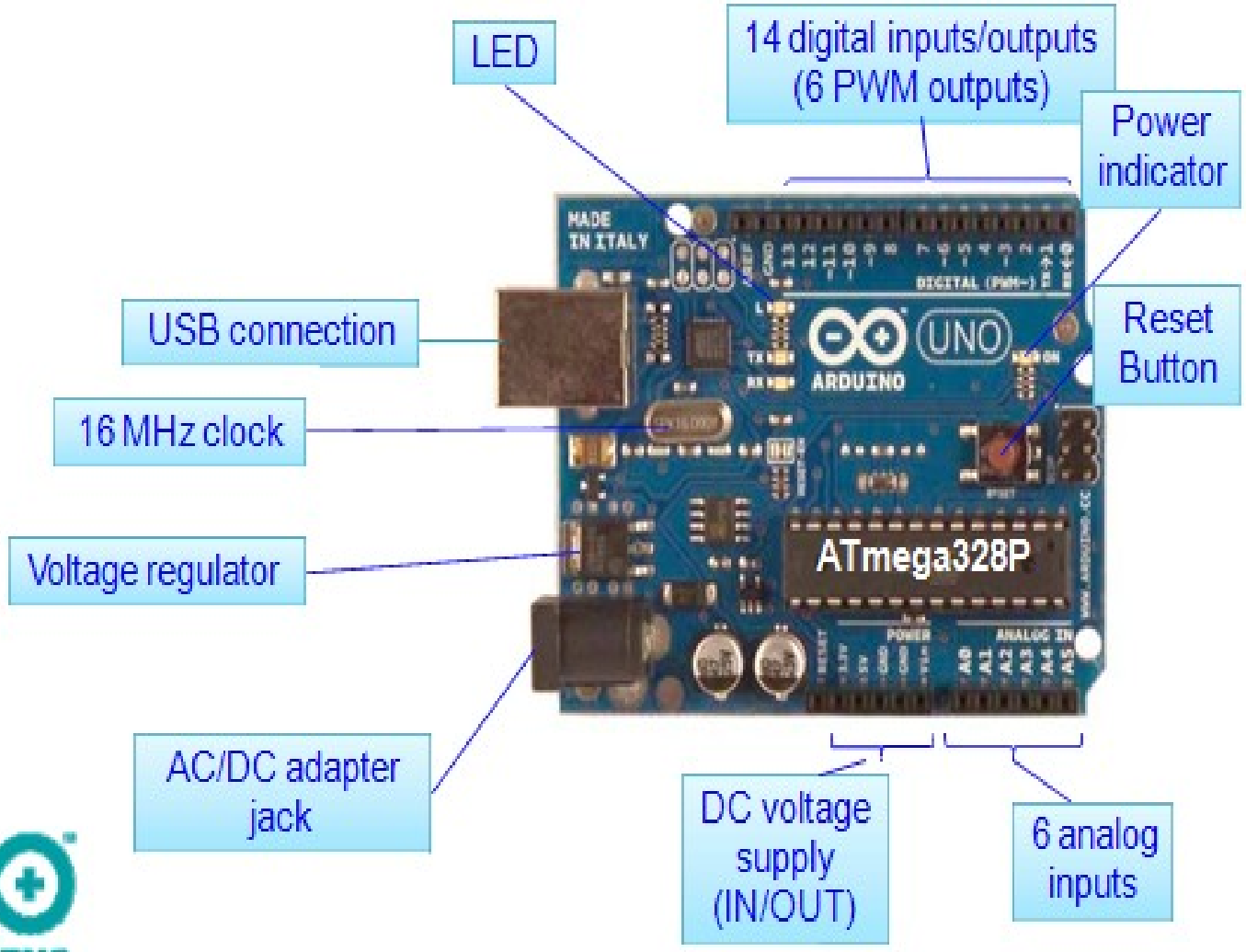
Hardware requirements

- Arduino Uno
- ZigBee Module
- Flex Sensor
- Voltage follower
- DC Motor Driver L293D
- DC Motor
- Power Supply

Arduino UNO

- Microcontroller board based on the ATmega328P.
- 14 digital input/output pins (of which 6 can be used as PWM outputs)
- 6 analog inputs.
- 16 MHz quartz crystal
- A power jack
- Connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

The board...


LED
14 digital inputs/outputs
(6 PWM outputs)
Power
indicator
USB connection
Reset
Button
16 MHz clock
Voltage regulator
ATmega328P
AC/DC adapter
jack
DC voltage
supply
(IN/OUT)
6 analog
inputs
MADE
IN ITALY
UNO
ARDUINO

ZigBee

Zigbee Protocol

- Technological Standard Created for Control and Sensor Networks
- Based on the IEEE 802.15.4 Standard
- Operates at ISM 2.4GHz frequency
- Low data rate
- Low power consumption
- Small packet devices

Motivation for ZigBee

- Low cost
- Secure
- Reliable
- Flexible and extendable
- Low power consumption
- Easy and inexpensive to deploy
- Global with use of unlicensed radio bands
- Integrated intelligence for network set-up and message routing.

XBee

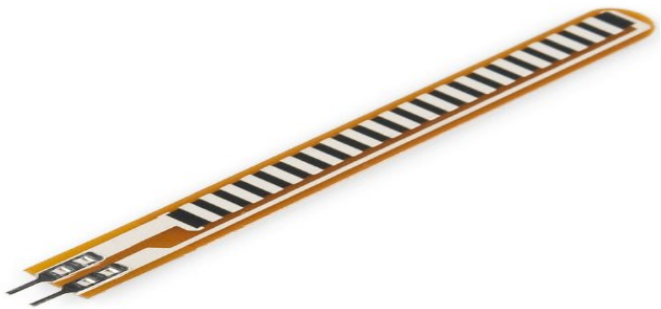
- Operate with Zigbee protocol
- Operate within the ISM 2.4 GHz frequency band
- Used in low cost low power wireless sensor networks

Contd…

Specification	XBee
Supply Voltage	2.8 VDC – 3.4 VDC
RF Power	0 dBm, 1 mW
Outdoor Distance (LOS)	300 ft (90 m)
Indoor Distance	100 ft (30 m)
Current Draw, Receive	45 mA
Current Draw, Transmit	50 mA
Current Draw, Sleep	< 10 µA
RF Data Throughput	250 kbps
Operating Frequency, Channels	2.4 GHz, 16 Channels
Receiver Sensitivity	-92 dBm

Flex Sensor

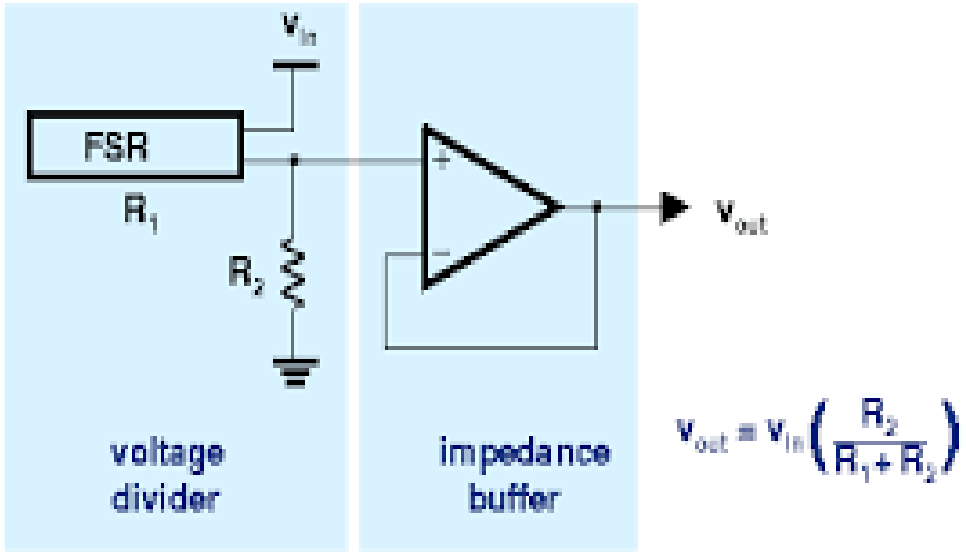
- A flex sensor changes its output when it is bent or when force is applied on it.
- The sensor has two output wires.
- The resistance between these two wires varies when the sensor is bent or when subjected to a force.
- They convert the change in bend to resistance.
- The more the bend more the resistance value.



Voltage Follower

- To avoid loading effect and isolate the output from the signal source, voltage follower or impedance buffer is used with flex sensor

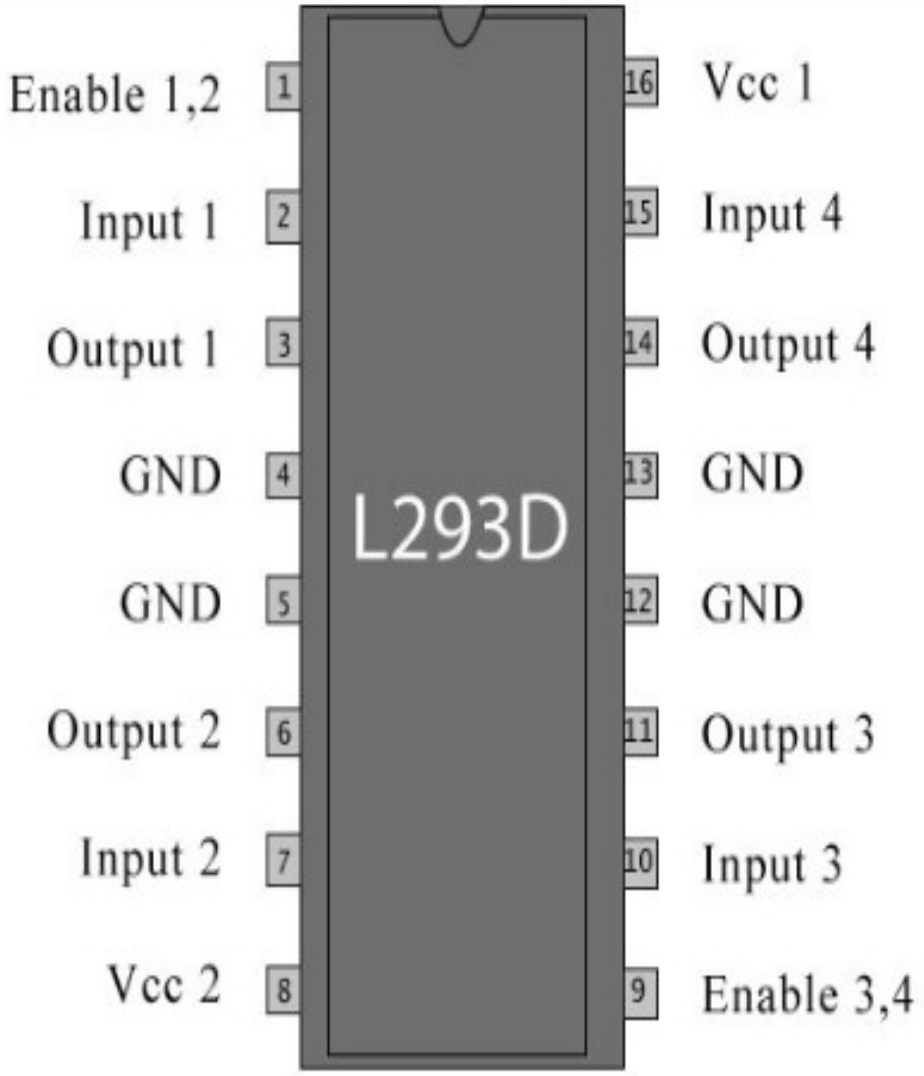
Basic flex sensor circuit



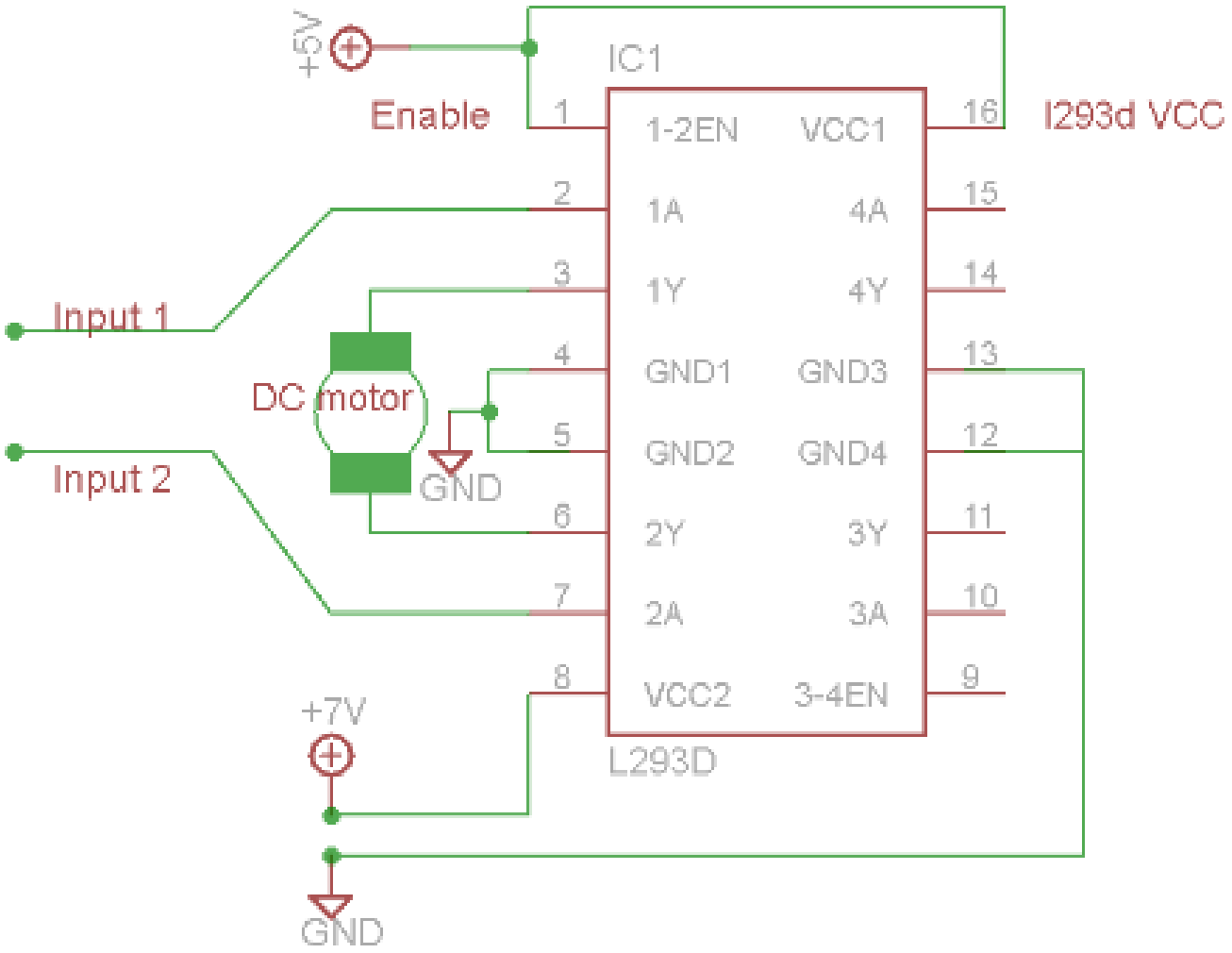
DC Motor Driver(L293D)

- L293D has quadruple high current half-H drivers.
- Wide Supply-Voltage Range: 4.5 V to 36 V
- High-Noise-Immunity Inputs
- Output Current 600mA Per Channel
- Peak Output Current 1.2A Per Channel.

Pin Diagram

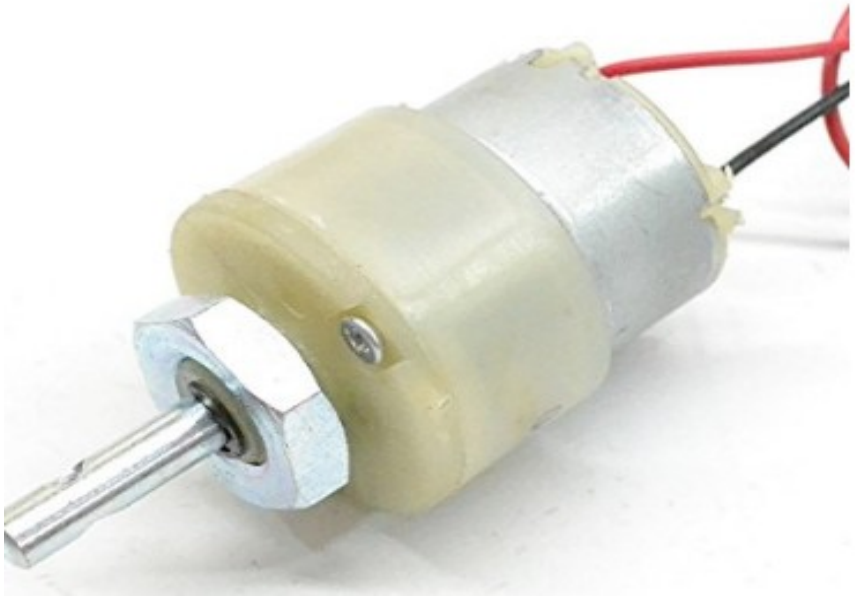

L293D
Enable 1,2
1
Input 1
2
Output 1
3
GND
4
GND
5
Output 2
6
Input 2
7
Vcc 2
8
16
Vcc 1
15
Input 4
14
Output 4
13
GND
12
GND
11
Output 3
10
Input 3
9
Enable 3,4

Circuit Diagram

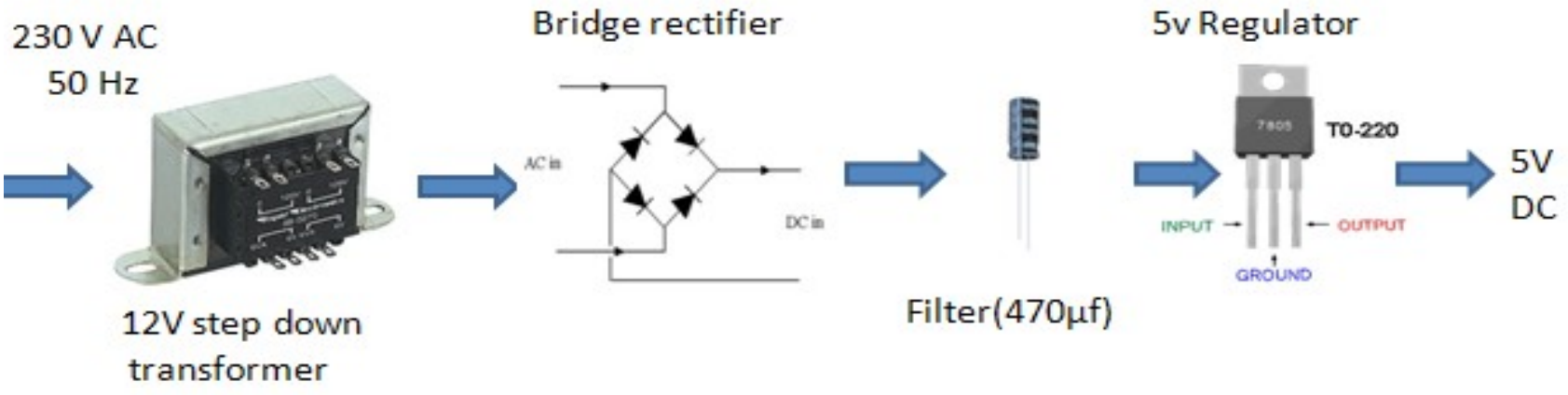


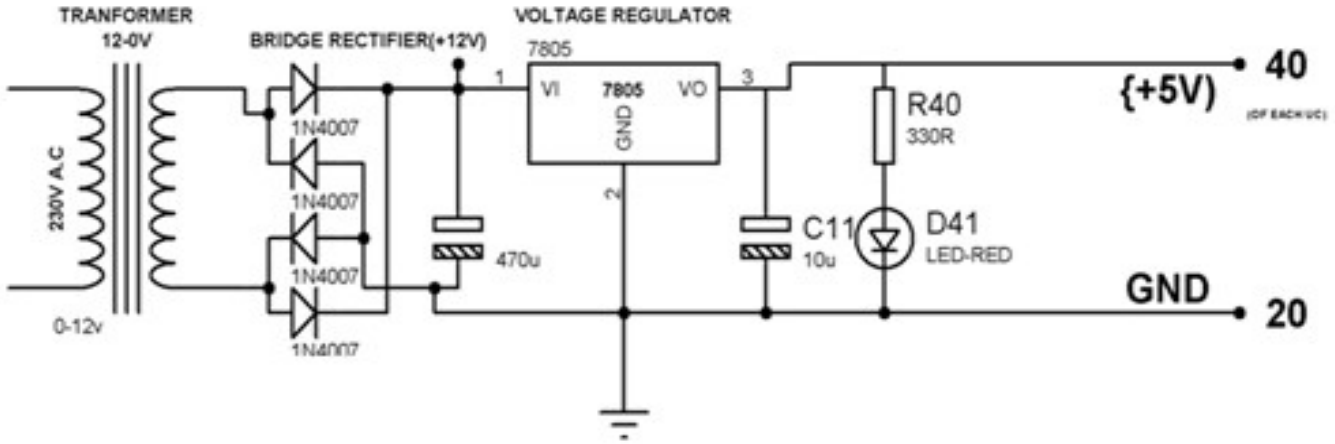
DC Motor

- 10 to 200RPM 12V DC motors with Gearbox
- 6mm shaft diameter with internal hole
- No-Load Current=60mA(max)
- Load Current=300mA(max)



Power Supply





Software Used..

- Arduino IDE

Programming Languages Used..

- Embedded C/C++

Application

- Hospitals
- Industrial robots
- Automobiles

References

- www.arduino.org
- www.beyondlogic.org
- www.wikipedia.org
- www.elementzonline.com
- www.elementztechblog.wordpress.com

Questions????

THANK YOU