

RF Accelerometer All Terrain Robot

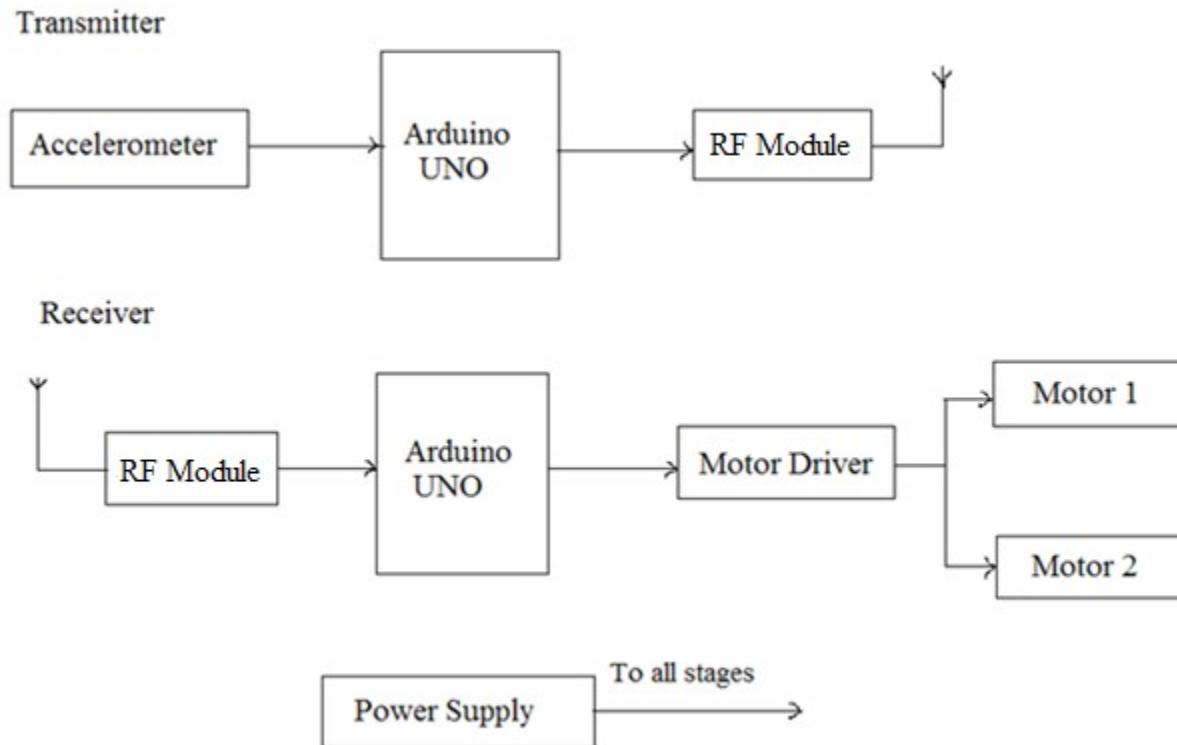
Overview

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- Hardware requirements
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Introduction

- Hand movement to drive a robot
- Accelerometer : Used to detect motion
- In transmitter part an accelerometer and a RF module is used.
- At the receiver end used a RF module to receive data

Block Diagram

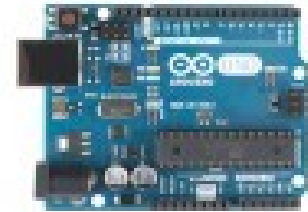


Hardware Requirements

- Microcontroller board – Arduino Uno
- RF transmitter TLP434A with encoder HT12E
- RF receiver RLP434A with decoder HT12D
- Accelerometer – ADXL335
- Motor driver IC
- DC Motor
- Power Supply

Arduino Uno Features

- ATmega328P microcontroller
- Input voltage - 7-12V
- 14 Digital I/O Pins (6 PWM outputs)
- 6 Analog Inputs
- 32k Flash Memory
- 16Mhz Clock Speed



ATmega328P

- 8-bit microcontroller
- 8KB ROM
- 256 bytes RAM
- 3 timers
- 32 I/O pins
- 1 serial port
- 8 interrupt sources

RF transmitter TLP434A with encoder HT12E



- Uses ASK (Amplitude Shift Keying) modulation
- HT12E converts the parallel inputs into serial output.
- Active low transmission enable

RF receiver RLP434A with decoder HT12D



- Uses ASK demodulation
- The chosen pair of encoder/decoder should have same number of addresses and data format.
- HT12D converts the serial input into parallel outputs.

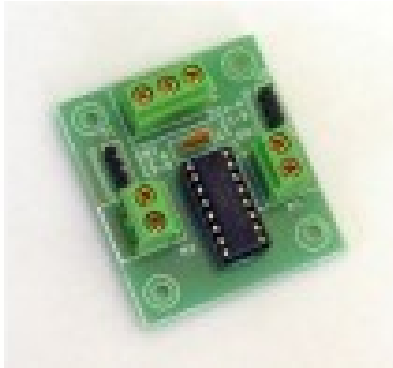
Accelerometer ADXL335

- 3-axis accelerometer



- Measure static acceleration of gravity in tilt sensing applications
- Measures dynamic acceleration from motion, shock or vibration
- Bandwidth can be selected using different capacitor values

Motor Driver IC



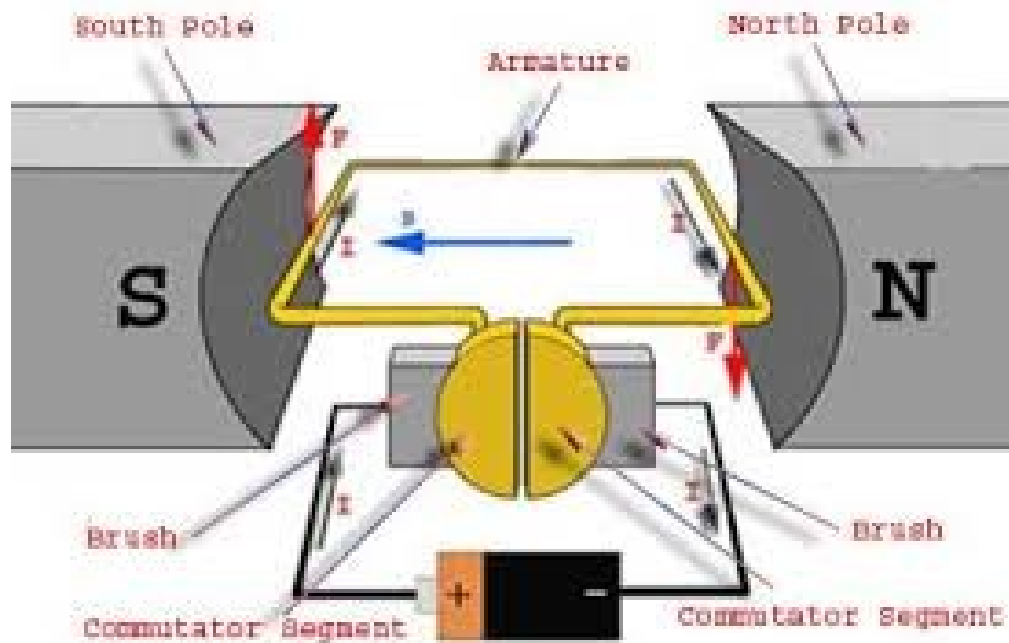
- This Motor Driver Board is designed to Work with L293D IC
- This can control 2 DC Motors, their direction using control lines and their speed using PWM

DC Motor

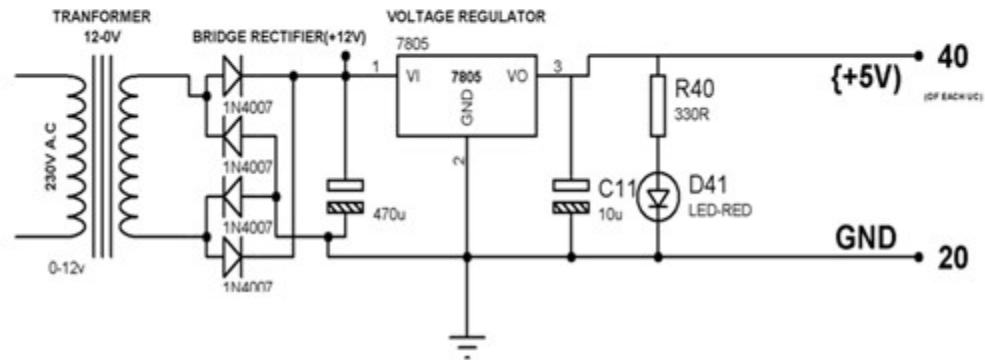
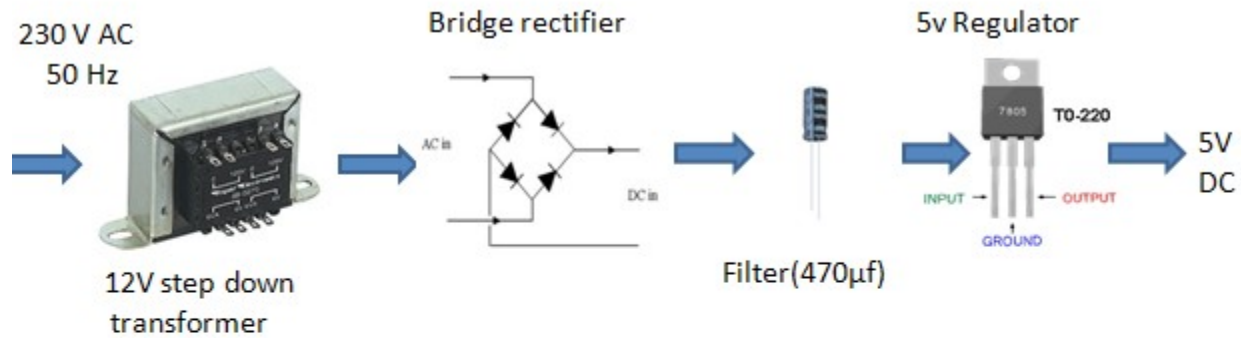


- Converts direct current electrical power into mechanical power
- The very basic construction of a dc motor contains a current carrying armature which is connected to the supply end through commutator segments and brushes are placed within the north south poles of a permanent or an electro-magnet

DC Motor - Construction



Power Supply



Software requirements

- Tool
 Arduino IDE

- Programming languages used
 Embedded C/C++

Advantages

- Code compatibility and expandability across different Arduino boards
- Cost is less as Arduino is open source
- The schematic of Arduino is open source. So for future enhancement of the project the board can be extended to add more hardware
- Advantage of RF over IR is the wide range of control possible

Conclusion

- RF based all-terrain robot using accelerometer has been designed
- RF uses frequency of 434 MHz

References

- www.elementsonline.com
- www.engineersgarage.com
- www.engineerprojects.info
- www.wikipedia.org