

# **RF Dumpster Robot using Arduino**

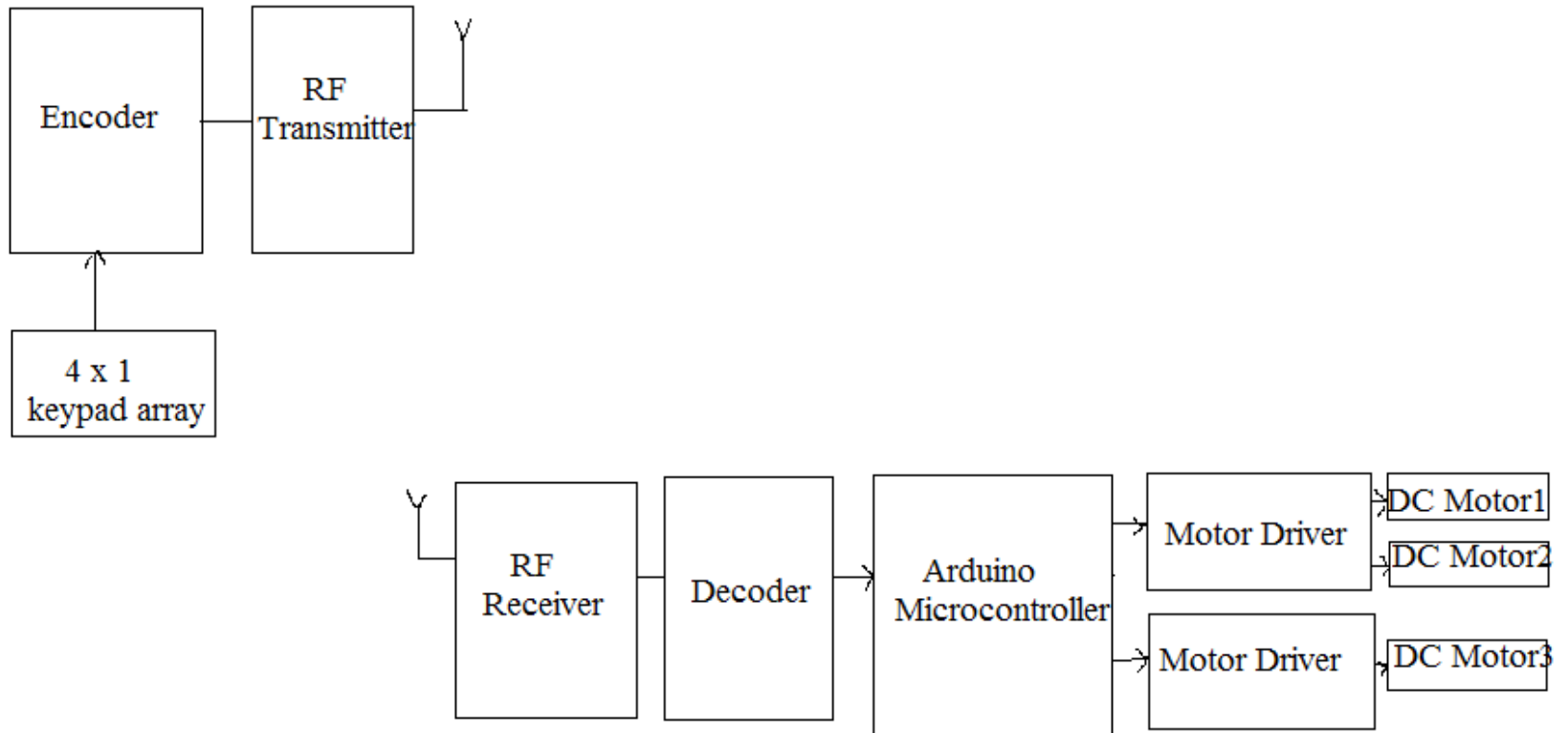
# Overview

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- Hardware requirements
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# Introduction

- Robots reduces human efforts
- RF robots are controlled wirelessly at a frequency of 434 MHz
- Allows maximum range of 200 meters
- RF transmitter has encoder and RF receiver has decoder

# Block Diagram

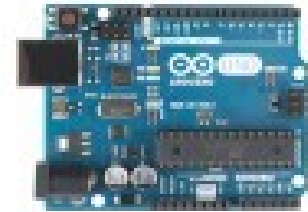


# Hardware Requirements

- Microcontroller board – Arduino Uno
- RF transmitter TLP434A with encoder HT12E
- RF receiver RLP434A with decoder HT12D
- 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

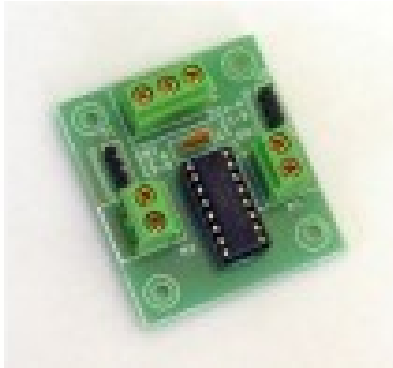


## RF receiver RLP434A with decoder HT12D



- 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.

# Motor Driver IC



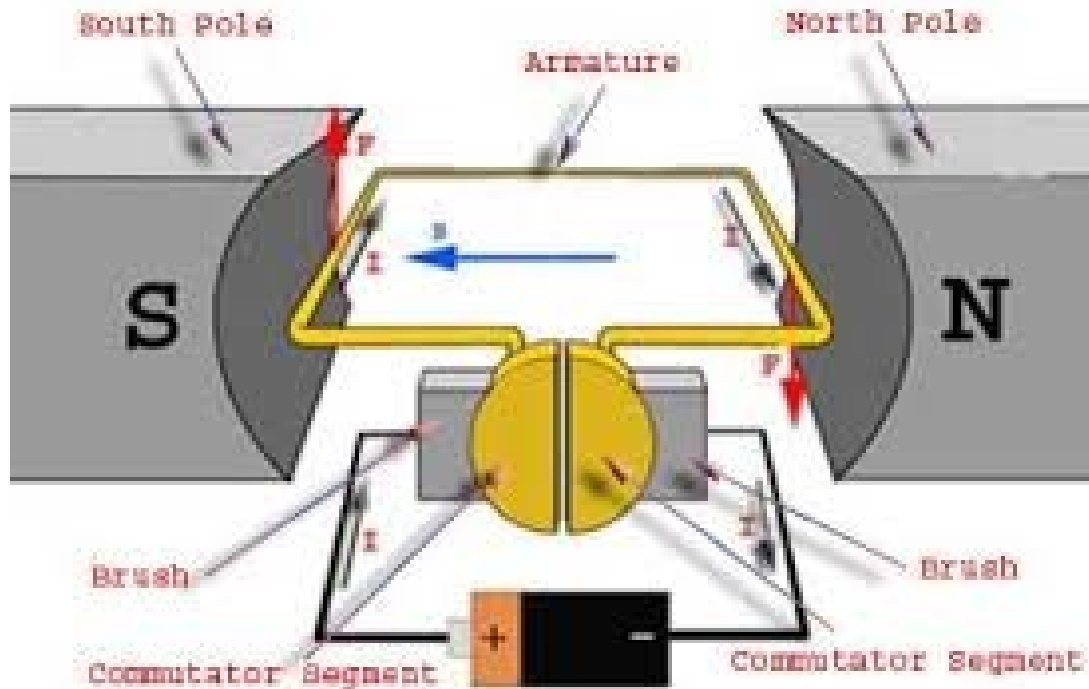
- This Motor Driver Board is designed to Work with L293D IC.
- This can control 2 DC Motors, their direction using control lines and their speed using PWM.

# DC Motor

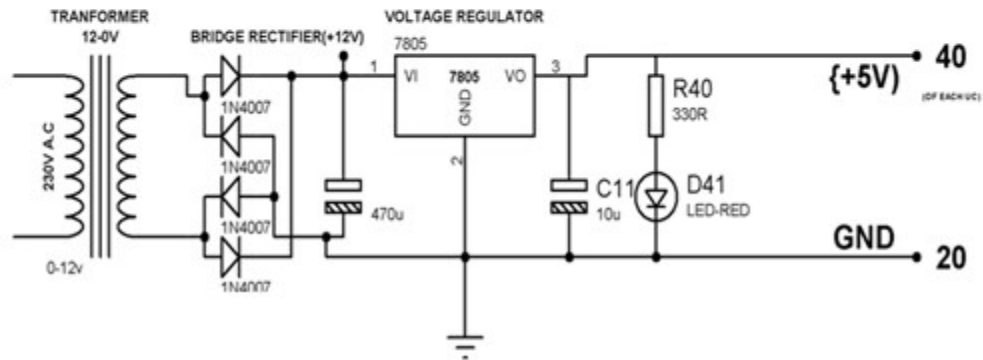
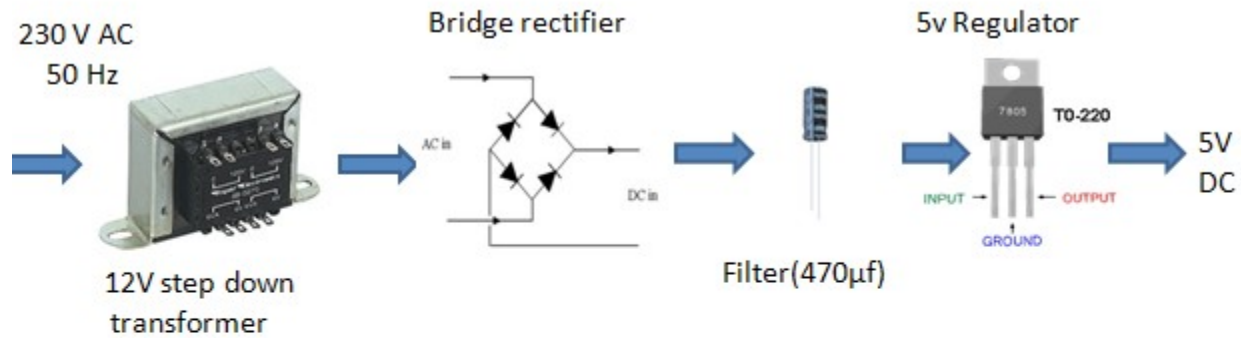


- Converts direct current electrical power into mechanical power
- The very basic construction of a dc motor contains a current carrying armature which is connected to the supply end through commutator segments and brushes are placed within the north south poles of a permanent or an electro-magnet

# 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 features
- Advantage of RF over IR is the wide range of control possible

# Future Work

- The robotic system can also be integrated with a programmable logic controller (PLC) to customize the process of industrial automation.



# Conclusion

- RF based dumpster robot using Arduino microcontroller developed
- RF uses frequency of 434MHz

# References

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- [www.engineerprojects.info](http://www.engineerprojects.info)
- [www.wikipedia.org](http://www.wikipedia.org)