

WIRE LESS DC MOTOR SPEED AND DIRECTION CONTROL USING IR

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ABSTRACT

In most real-world applications of DC motors, maximum speed is not always required, there are situations where only 50%, 25% or any fraction of the full speed may be needed to achieve the needed action. Direction of rotation are often times needed to be reversed based on work demand, for instance, in robotics, the forward, backward, eastward and westward movements may be necessary, thereby necessitating the need for modification of the natural direction and speed of dc motor. This project is significant in that; it enables flexible application of dc motor in areas like robotics, levitation and other industrial can successfully substitute gear system in some automobile applications. The work centered around PIC18F2550 microcontroller. H bridged transistorized circuit was designed and constructed for the direction control. The PIC18F2550 was programmed using micro C language to generate the required pulse width modulated (PWM). The PWM signal successfully alter duty cycle of the supply voltage to the DC motor by incremental alteration of 8% of the full value by pressing High and Low speed keypad respectively and therefore control the speed. Radio frequency (RF) technique, simulation prototype was designed using protest design suite, tested and found 96% efficient. From the result of this work, it was satisfactorily concluded that: The speed and direction of dc motor can be controlled using RF remote in the range of 0 to 20m with advantages in traction, robotics and other industrial applications where human direct contact could be hazardous. The project is recommended for industrial applications, like paper mills, rolling mills, printing machine tools, excavators and cranes. It is also applicable to robotics enthusiasts as it will enable remote robotic operation and applications. The project will equally be useful in the industrial product application like toys, home security, gate and garage door opener, irrigation controllers and many more.

Keywords: DC motor, H bridged, Radio frequency (RF) technique.

1. INTRODUCTION

To control the dc motor in simple,easy and reliable manner we are using radio frequency technology in this project.When we connect battery to the panel and switch on the switch we will get a red led light on the transmitter module by this we can know whether the battery is working or not.The battery is of 12V it is converted into 5V DC Voltage by the help of 7805 voltage regulator.We use controlled rectifier to convertfixed dc voltage into variable dc voltage.The input is given through transmitter module using binary codes. Receiver will receive the code,through the program which is written in Embedded C is dumped into the Arduino Board and hence the motor runs and shows the direction(i.e., Clockwise or Anti-Clockwise direction)in the LCD display.The main motto of this project is to make the motor run accurately and precisely with the given input.

2. METHODOLOGY

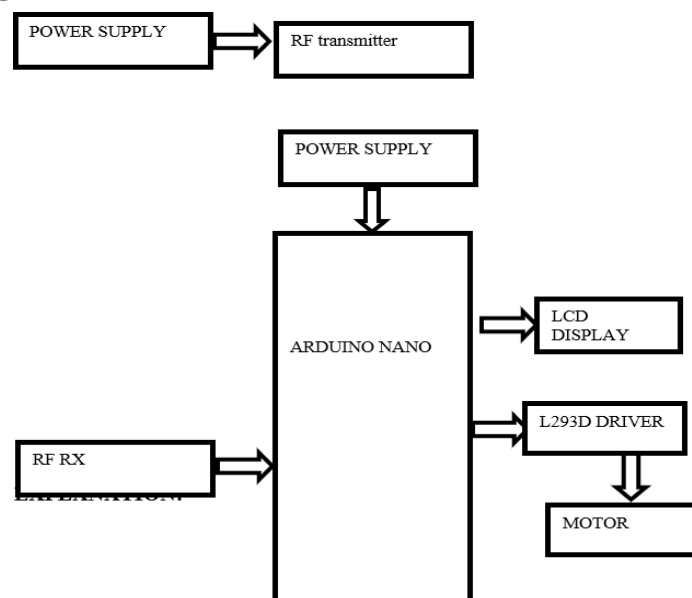


Fig:1

The power supply is connected to the transmitter and when the switch is ON the led glows in red to indicate that the battery is under working condition.

The transmitter is connected through receiver using battery connections. The power supply is of 12V then it changes to 5V with the help of 7805 voltage regulator, then after converting the voltage power supply will go to the Arduino board. Then we can give the input in transmitter using binary code starting from 0-8 in numbers. First four binary codes will make the motor to rotate in clockwise direction and next four binary codes will make the motor to rotate in anti-clockwise direction. When we give the first input the receiver will receive and send the information to the Arduino board which is inbuilt with micro controller and program is also written in that so the motor can rotate. But motor should rotate and give direction at the same time so the connection from Arduino and h-bridge are given to motor so that motor will rotate in any one direction and speed can be measured also. Now from motor the connections are given to LCD Display by that we can see in which direction the motor is rotating and the percentage of speed also. So based on the pulse we give the speed and direction of the motor is controlled.

3. RESULTS AND DISCUSSION

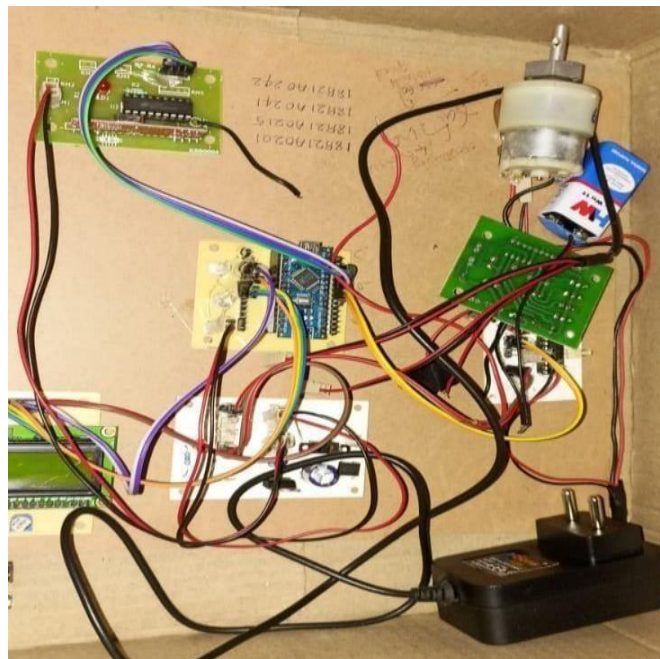


Fig:2 Transmitter, and receiver of speed and direction control of dc motor.

The constant 5V voltage source is used to give the supply to the whole assembly. The one point of that supply is connected to the rectifier bridge, which is used for the polarity protection. Other terminal of supply is connected to the 7805 voltage regulator. It can be used to regulate the voltage, across that regulator two capacitors are connected for smoothing purpose. The RF 433 Transmitter is used to generate the radio waves for communication between these whole assemblies. The range of the radio waves is about 3 KHz to 300 GHz. The RF 433 Receiver is used to receive the radio waves. The encoder is used to convert the parallel input signal of 4 push buttons into the serial output. The decoder decodes that signal and gives it to the microcontroller. The Arduino Nano is used to control the duty cycle of the pulse and simultaneously the terminal voltage is varied and also the speed will be varied. The Arduino consists of 4 ports out of which port 0 is used for given input signal in terms of digital form either 0 or 1. When pin 2.1 has a signal 1 then the transistor Q1 is ON then transistor Q4 will be ON, motor will rotate in clockwise direction. When port 2.2 has a signal 1 then transistor Q2 is ON then transistor Q3 will be ON and motor rotates in anticlockwise direction. Hence direction control is achieved. For adjusting the duty cycle the speed will be controlled from Arduino.

4. CONCLUSION

The speed and direction control is achieved by using radio frequency technology. Hence the motor is controlled by Arduino inbuilt with micro controller and the speed is controlled by using H-Bridge by giving the pulses using binary codes with help of push buttons in transmitter. The percentage of speed and direction of motor are displayed on the LCD Display according to the input we give.

All the main points of the research work are written in this section. Ensure that abstract and conclusion should not be the same. Graph and tables should not be used in conclusion.

5. REFERENCES

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