

Title of the project	:	Wireless DC motor speed and direction control using IR (PWM)
Domain	:	Wireless Communication, Electrical & Embedded Design
Software	:	Embedded C, Keil, Proload
Microcontroller	:	AT89S52
Power Supply	:	+5V, 500mA Regulated Power Supply
Display	:	16 X 2 LCD
Crystal	:	11.0592MHz
Communication Device	:	IR Sensor Module
Transmitter	:	RC5 Remote Control
Receiver	:	TSOP1738
Applications	:	Industries, Process Control, Domestic and Automotives
Developed By	:	M/S Wine Yard Technologies
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WIRELESS DC MOTOR SPEED AND DIRECTION CONTROL USING IR COMMUNICATION

A pulse width modulator (PWM) is a device that may be used as an efficient DC motor speed controller or light dimmer. This project is a versatile device that can control DC devices which draw up to a few amps of current. The circuit may be used in either 12 or 24 Volt systems with only a few minor wiring changes. This device has been used to control the speed of the DC motor and to control brightness of an automotive tail lamp.

A PWM circuit works by making a square wave with a variable on-to-off ratio, the average on time may be varied from 0 to 100 percent. In this manner, a variable amount of power is transferred to the load. The main advantage of a PWM circuit over a resistive power controller is the efficiency, at a 50% level, the PWM will use about 50% of full power, almost all of which is transferred to the load, a resistive controller at 50% load power would consume about 71% of full power, 50% of the power goes to the load and the other 21% is wasted heating the series resistor.

One additional advantage of pulse width modulation is that the pulses reach the full supply voltage and will produce more torque in a motor by being able to overcome the internal motor resistances more easily.

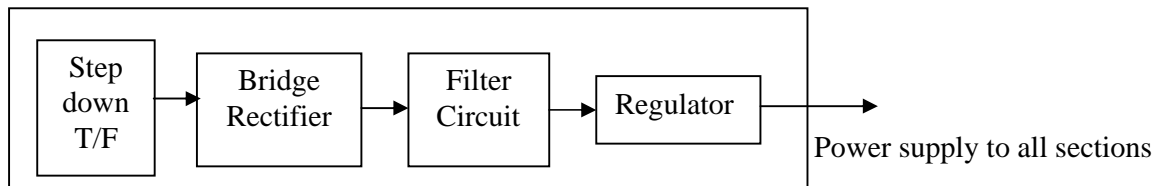
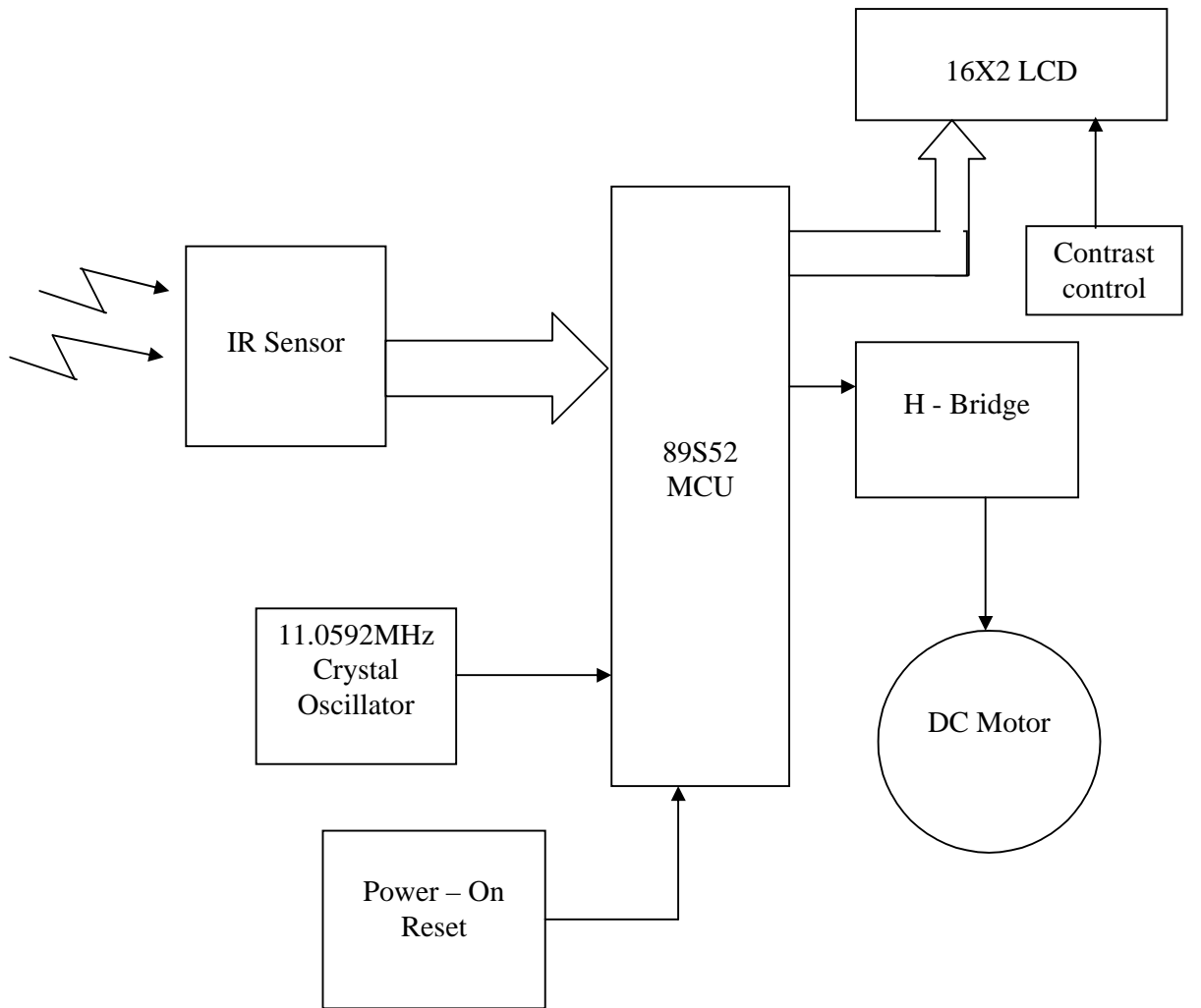
Three switches are used to control the direction of the stepper motor at the transmitter side. The status of these switches is transmitted using IR transmitter and received by the IR receiver. The microcontroller at the receiver will be continuously monitoring the status of these switches received from the decoder and performs the corresponding action.

The IR rays are transmitted through remote and a receiver named TSOP 1738 receives these rays. Four switches are used at the transmitter end, to control the speed and direction of the dc motor which is connected at the receiver side. Two push-to-on switches are provided for increasing / decreasing the speed of the motor. Two more switches are used to rotate the motor in Clock wise / Counter clock wise direction.

The sensor continuously reads the status of the switches, passes the data to the MCU. Now, it is the job of the controller to read the data and perform the corresponding action i.e., to rotate the stepper motor clockwise, anticlockwise or entirely stop it.

16 X 2 Liquid Crystal display (LCD) is provided at the receiver side to display the status of the stepper motor. ULN driver is used to drive the stepper motor.

This project uses regulated 5V, 750mA & 12V, 500mA power supply. 7805 and 7812 three terminal voltage regulators are used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac out put of secondary of 230/12V step down transformer.



Block Diagram:
Receiver - Wireless DC motor speed and direction control using IR (PWM)

Advantages:

Speed and direction control from remote place

Speed level and direction display on LCD

Reliable and Easy to operate

Scopes for Advancement:

Tachometer can be developed to measure the speed using reed switch

Applications

- Industries are using IR solutions for monitoring, process, control, inventory tracking, data links and bar code reading devices.
- Commercial wireless applications such as door announcers, security and access systems, gate control, remote activation, score board and paging systems.
- Consumer products including electronic toys, home security, gate and garage door openers, intercom, fire and safety systems and irrigation controllers
- Bottle filling systems, visitors counter and conveyer application

REFERENCE

Text Books:

Wireless Communication *By Cruis Leonardo*

IR Applications *By Morris Hamington*

Website:

www.howstuffworks.com

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www.WineYardProjects.com

Magazines:

Electronics for you

Electrikindia

Let us Go Wireless