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Automatic Blackboard Cleaner

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Abstract — *Now a days almost everything is getting automated and there is need of automation to reduce human efforts and to make our life easy. It is often seen while cleaning blackboard with duster teacher have to cover their mouth by one hand and clean the blackboard by other. This technology was developed by us taking into consideration some comfort for teachers and reduce the time required to clean the board. This project is based on combine principles of mechanical and electronics. The present automatic blackboard cleaner is to provide an attachment for blackboards in the form of a power driven erasing apparatus which can be set in operation by the throw of a switch, thus eliminating the drudgery of manually cleaning blackboards.*

Keywords-*Power supply,8051 Microcontroller, DC Motor, Limit Switches, Rack and Pinion.*

I. INTRODUCTION

An automatic Blackboard cleaner is a system that is used to clean the board automatically. Moreover chalk dusts not only harm the human but also the machines. Equipments that are used in the class rooms like projectors when exposed to the chalk dusts which is not heavy get easily settle on the equipments. This is one of the reasons for heat production in the equipments, when large amount of heat is produced the equipment may wear out before its actual life period ends. The Real Time Automated Blackboard Cleaner can be used in the class rooms to avoid the above faced problems and to modernize the class rooms. The dc motors are used to drive the assembly and it is interfaced to 8051 microcontroller which is used to control motor movement and switches. We have used rack and pinion arrangement to move the strip horizontally on the blackboard and limit switches are used to detect the boundary of the board. By using same controller we can control many things in our classroom like curtains, door locks, fan, tube light, etc

II. LITERATURE REVIEW

There are number of ideas that can be implemented to reduce the human efforts and save the energy as well time. Now days there are many automatic machines related to similar or different technology. This is the method in which two dc motor to move the strip horizontally on the blackboard to this strip we will stick the sponge which will clean the board as soon as it moves horizontally from left to right and again from right to left.

An automatic blackboard cleaner comprises of blackboard plate including plate upper edge and lower edge which are arranged in spaced in parallel relationship on which rack is arranged and through the motor will move pinion on the rack horizontally in forward and backward direction.

III. SYSTEM DESCRIPTION

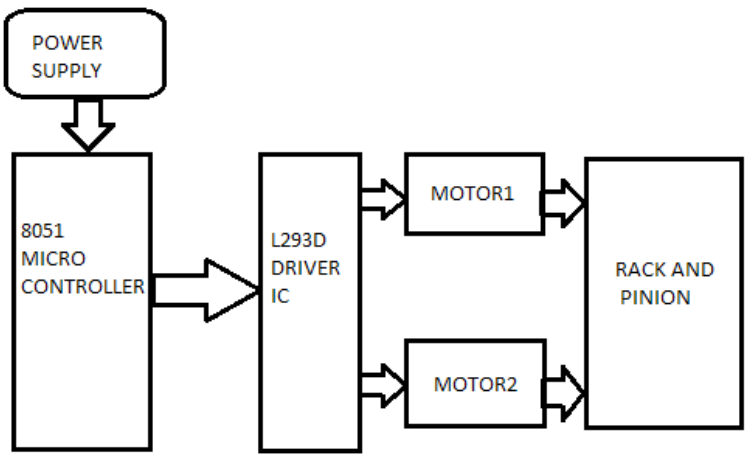

Fig1:Block diagram of automatic blackboard cleaner.

The block diagram of Automatic blackboard cleaner is shown in the fig1.It consists of power supply,8051 microcontroller IC,L293D driver IC,2 DC motors, Rack and pinion arrangement.

POWER SUPPLY:A Power supply is an electrical device that supplies electric power to an electrical load. The primary function of power supply is to convert electrical current from a source to the correct voltage, current and frequency to power the load.

MICROCONTROLLER: It is the main part of the project in this project we have used AT89C51 microcontroller. It is low power high performance CMOS 8bit microcontroller It is compatible with industry standard 80C51 instruction set and pin out. The 89C51 is a powerful microcontroller which provides highly flexible and cost effective solution to many embedded control applications.

L293D:It is driver IC used to drive the DC motor. The L293D devices are quadruple high current half H drivers. The L293D is designed to provide bidirectional drive currents up to 600mA and voltages from 4.5 to 36V.The L293D is designed to drive inductive loads such as relay, solenoid, DC and bipolar stepping motor.
MOTORS: In this system we have used two dc motors which are used to drive the pinion and will move in clockwise direction in first phase and in anticlockwise direction in the second phase. Microcontroller output is connected through driver IC to the motors.

RACK AND PINION:A Rack and Pinion is a type of linear actuator that comprise a pair of gears which converts rotational motion into linear motion
A circular gear called the "Pinion" engages teeth on a linear "Gear" bar called the "Rack". In this system we have connected this arrangement at the output of the dc motors. This system will work in two phases in first it will move from left to right and in second phase it will move from right to left. Synchronous motor will run the pinions linearly on the rack carrying the connecting strip with duster attach to it by bearing arrangement.

LIMIT SWITCHES: Limit switch are going to play minor role in this system for stopping the pinion and rotating one gear clockwise and another anticlockwise. Four limit switches are used to detect the boundary of the blackboard. A microcontroller used to control motor and switches.

IV.ADVANTAGES

Its construction is simple and requires less maintenance. It bares low cost, reduces human efforts, thus, saving time to complete the project. It is useful in college and school application.

V. APPLICATIONS & FUTURE SCOPE

It can be used this in classrooms, offices, schools. This project focuses on the development and implementation of microcontroller based automated blackboard cleaner. We can also use small water sprinkler to spray the water on the board which will save energy, time and eliminate the load on the motor. We can implement various automations in our classroom such as we can automatically control the curtains, fans, tube light, door locks,etc.

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