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Report On

"Automatic railway gate control system"

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in
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Aim: The board which is commonly used in the educational sector is the basis of this paper, aiming to ease lecturers, teachers as well as students of the work, time and effort it takes to clean the board.

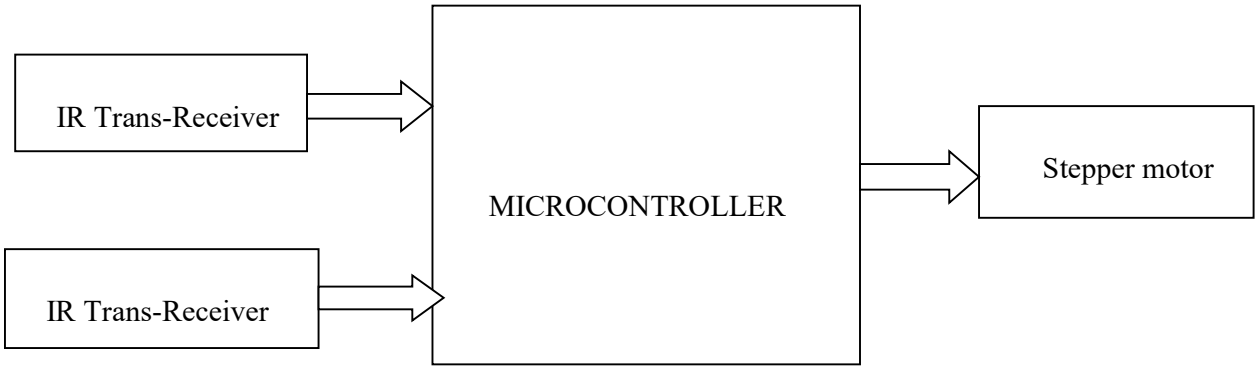
Objective:

There are two main objectives of doing this project.

- First objective is to design a low cost and user friendly whiteboard cleaner machine which can erase the board easily. This machine was created as a convenience to the user to erase the whiteboard.
- Second objective is to enhance the efficiency and accuracy of the movement of duster. The purpose of this objective is to make the movement of this machine accurate although has been used many time. Another purpose of this objective is to make the machine work faster and smoothly. This aims to prevent users from bored waiting for the cleaning process to be done.

Pin diagram of 8051(AT89C15):

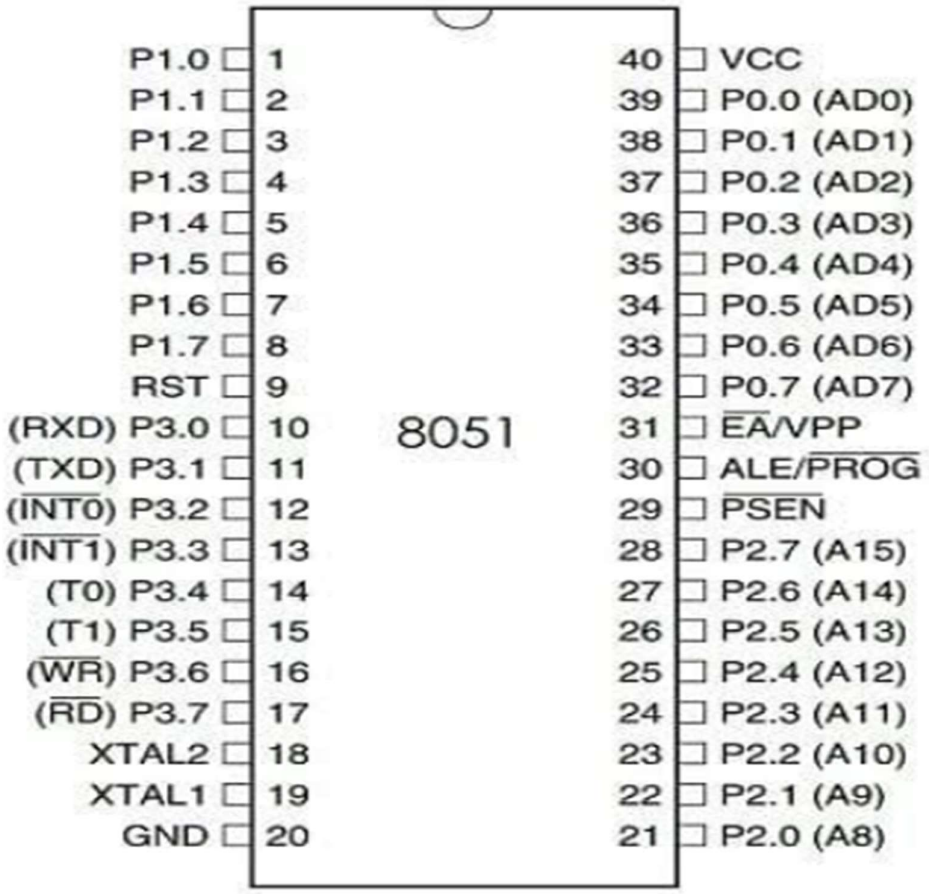
Block diagram :



Microcontroller:

8051 microcontroller is designed by Intel in 1981. It is an 8-bit microcontroller. It is built with 40 pins DIP (dual inline package), 4kb of ROM storage and 128 bytes of RAM storage, 2 16-bit timers. It consists of are four parallel 8-bit ports, which are programmable as well as addressable as per the requirement. An on-chip crystal oscillator is integrated in the microcontroller having crystal frequency of 12 MHz.

In the following diagram, the system bus connects all the support devices to the CPU. The system bus consists of an 8-bit data bus, a 16-bit address bus and bus control signals. All other devices like program memory, ports, data memory, serial interface, interrupt control, timers, and the CPU are all interfaced together through the system bus.
The pin diagram of 8051 microcontroller looks as follows



- Pins 1 to 8 − These pins are known as Port 1. This port doesn't serve any other functions. It is internally pulled up, bi-directional I/O port.

- Pin 9 − It is a RESET pin, which is used to reset the microcontroller to its initial values.

- Pins 10 to 17 − These pins are known as Port 3. This port serves some functions like interrupts, timer input, control signals, serial communication signals RxD and TxD, etc.

- Pins 18 & 19 − These pins are used for interfacing an external crystal to get the system clock.

- Pin 20 − This pin provides the power supply to the circuit.

- Pins 21 to 28 − These pins are known as Port 2. It serves as I/O port. Higher order address bus signals are also multiplexed using this port.

- Pin 29 − This is PSEN pin which stands for Program Store Enable. It is used to read a signal from the external program memory.

- Pin 30 − This is EA pin which stands for External Access input. It is used to enable/disable the external memory interfacing.

- Pin 31 − This is ALE pin which stands for Address Latch Enable. It is used to demultiplex the address-data signal of port.

- Pins 32 to 39 − These pins are known as Port 0. It serves as I/O port. Lower order address and data bus signals are multiplexed using this port.

- Pin 40 − This pin is used to provide power supply to the circuit.

Pin configuration, i.e. the pin can be configured as 1 for input and 0 for output as per the logic state.

- Input/Output (I/O) pin − All the circuits within the microcontroller must be connected to one of its pins except P0 port because it does not have pull-up resistors built-in.

- Input pin − Logic 1 is applied to a bit of the P register. The output FE transistor is turned off and the other pin remains connected to the power supply voltage over a pull-up resistor of high resistance.

Port 0 − The P0 (zero) port is characterized by two functions −

- When the external memory is used then the lower address byte (addresses A0A7) is applied on it, else all bits of this port are configured as input/output.

- When P0 port is configured as an output then other ports consisting of pins with built-in pull-up resistor connected by its end to 5V power supply, the pins of this port have this resistor left out.

Input Configuration

If any pin of this port is configured as an input, then it acts as if it “floats”, i.e. the input has unlimited input resistance and in-determined potential.

Output Configuration

When the pin is configured as an output, then it acts as an “open drain”. By applying logic 0 to a port bit, the appropriate pin will be connected to ground (0V), and applying logic 1, the external output will keep on “floating”.

In order to apply logic 1 (5V) on this output pin, it is necessary to build an external pullup resistor.

Port 1

P1 is a true I/O port as it doesn't have any alternative functions as in P0, but this port can be configured as general I/O only. It has a built-in pull-up resistor and is completely compatible with TTL circuits.

Port 2

P2 is similar to P0 when the external memory is used. Pins of this port occupy addresses intended for the external memory chip. This port can be used for higher address byte with addresses A8-A15. When no memory is added then this port can be used as a general input/output port similar to Port 1.

Port 3

In this port, functions are similar to other ports except that the logic 1 must be applied to appropriate bit of the P3 register.

DC MOTOR

A DC motor is an electrical machine that converts electrical energy into mechanical energy. In a DC motor, the input electrical energy is the direct current which is transformed into the mechanical

Working principle of DC motor

When kept in a magnetic field, a current-carrying conductor gains torque and develops a tendency to move. In short, when electric fields and magnetic fields interact, a mechanical force arises. This is the principle on which the DC motors work.

STEPPER MOTOR

A stepper motor is an electric motor whose main feature is that its shaft rotates by performing steps, that is, by moving by a fixed amount of degrees. This feature is obtained thanks to the internal structure of the motor, and allows to know the exact angular position of the shaft by simply counting how may steps have been performed, with no need for a sensor. This feature also makes it fit for a wide range of applications.

Algorithm:

Code:

```
#include<reg51.h>
#include<stdio.h>
Sbit ir1=0x80;
Sbit ir2=0x81;
Void delay(unsigned int);
Void main()
{
        While(1)
        {

If(ir1==1)

{

P2=0x09;

Delay(1000);

}

Else

{

P2=0x00;

}


If(ir2==1)

{

        P2=0x0c;
        Delay(1000);
```

```
}

Else

{

        P2=0x00;

}
}
}

Void delay(unsigned int count)

{

Unsigned int n,k;
For(n=0;n<count;n++)
For(k=0;k<100;k++);
}
```

Features:

1. The system will consist of 2 IR trans-receiver pairs.
2. Micro controller based circuit design.
3. Automatic train sensing & gate controlling.
4. Bidirectional gate controlling or Bidirectional train sensing.
5. If required PC based GUI for better interface.
6. The gate will be closed till the whole train passes out.
7. The opening of gate will be sensor based not delay based.

Result:

By taking trial of our machine and gathering all information of other methods, we have got following result.

The machine shows a desired effect for erasing of board in minimum time with minimum marking remains on board.

Conclusion:

The construction of an automatic Board wiper system that provides the learning Environment with an improved wiping system on boards Can be wholly applied in schools, institution, colleges, Business and office environment thereby easing them of The pain, effort, energy and time it costs to wipe a board And opening new doors into a whole new world of Technology. This work can be further improved on by Adding remote control functionality via the use of Embedded systems. Also, improvements can be achieved By segmenting the system so that users can select what Part of the board surface to clean. This system would Surely make learning more interesting to both tutors and Students.