

Microcontroller Based Elevator System

Radha Singh¹, Pooja Maurya², Dhirendra Pratap Patel³, Prashant Ranjan⁴

^{1, 2, 3}Department of Electronics and Communication Engineering,
United College of Engineering and Management, Naini, Allahabad, India.

⁴Assistant Professor, Department of Electronics and Communication Engineering,
United College of Engineering and Management, Naini, Allahabad, India.

Abstract- In today's society technology is growing at an exponential rate, and elevator is very common example of technology for consuming time of human being Elevator began as hoists. An elevator is platform that can move up and down in vertical direction by a mechanical means. In the past elevator drive mechanism were powered by steam and water hydraulic piston. In today's world, there are intricate governors and switching schemes to carefully control cab needs in any situation, buttons have been giving way to keypads.

In our project, the atmega8 microcontroller based lift system is constructed to simulate as an actual lift in the human life. The elevator control system is one of the important aspects in electronics control module in automotive application. Here elevator control system is designed with different levels. First the elevator control system is implemented for multi-storage buildings. [1]

Keywords— PCB board ; Microcontroller Atmega8 IC; L293D motor; IR sensor module; LCD; Step down Transformer; Push buttons; IC base28 pin; IC base16 pin; burg strip 1*40 male connector ; LM7805; LM7812.

I. INTRODUCTION

Elevator, is a transport device which is very common to us in present days. We use elevator every day to move goods or peoples vertically in a high building such as shopping centre, working office, hotel and many more places. It is a very useful device that moves people to the desired floor in the shortest time.

In this project, Atmega8 microcontroller is used as the primary controller and it consist of various inputs and outputs circuits together with a lift model. The Atmega8 Microcontroller is used to coordinate the functions of various hardware circuitries. Service request circuit or keypad and sensors are used as input. Stepper motor driver circuit, DC motor circuit, seven-segment display, buzzers and various types of LED (light emitting diodes) displays are used as output.

The lift model was constructed to simulate an actual lift in the real life. It can be counted as the output hardware of the system. The software for the system was designed according to the real lift traffic management algorithm. The

combination of the hardware and software perform the simulate function of a basic lift system.[2]

II. METHODOLOGY

In this project we developed the elevator system by using Atmega8 Microcontroller for minimize the travelling time.

By using switch we give command to the microcontroller and floor detect by IR sensor module.

We show the basic elevator system with three floors. In this project we show three floors with three switches. The lift carries the person to each floor. we use separate switches for timed operation and priority for any floor. With the help of these switches, the lifts automatically choose a path when we press a start switch.

The lift automatically starts and immediately responds according to user input. some options are provided for the user to make its

1. When user at ground floor -
User can go to first floor and also can go to second floor.
2. When user at first floor -
User can go to ground floor and also can go to second floor.
3. When user at Second floor -
User can go to first floor and also can go to ground floor.

III. BLOCK DIAGRAM OF ELEVATOR SYSTEM

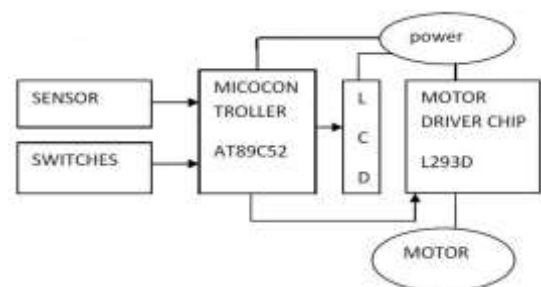


Figure NO.1-Block diagram of elevator system[3]

IV. COMPONENT DESCRIPTION

A. Atmega8 IC -

1. This is the CPU of our project.
2. Its max operating frequency is 16MHz and operating voltage is +5V DC.
3. It receives the command signal from the Buttons and IR sensor through PORT C.
4. Microcontroller ATmega8 is connected to the Motor driver IC (L293D) and it control Motor [4].

B. IR Sensor (Infrared sensor) module-

In IR sensor module 2 parts are present, first one is IR LED and second one is photodiode. It is known as IR pair or photo coupler. The principle of IR sensor is based on LED emission.

Hence, IR LED emits IR radiation and photodiode sense that radiation .the resistance of photodiode vary due to IR radiation falling on photodiode. When light is fall onto the photodiode voltage drop generate across the voltage comparator (LM358). Due to this voltage drop IR sensor sense the objects. In our project IR LED and photodiode are present in parallel.

When object come in front of IR pair ,the IR light gets reflected by the Object and absorbed by the photodiode. Here we use IR sensor module for the floor detection.

C. Motor driver IC (L 293D)-

It is 16 pin IC which use to control the rotation of DC motor. In this IC there are two enable pins i.e. pin1 and pin9. This is necessary to high pin1 and pin9 for driving the motor. In our project we use DC gear motor for rotation in both directions i.e. clockwise rotation and anticlockwise rotation respectively. Here we use motor driver IC for movement lift in up and down vertically. [6]

D. Voltage Regulator (LM 7812, 7805)-

It is use for over current protection and it also maintains constant DC voltage level.

LM 7812 convert the input voltage into required voltage level, this output is used to drive the motor.

LM 7805 convert 12V DC into 5V DC .5V DC used for enable the microcontroller Atmega8,motor driver IC(L293D) and LCD. 5V DC is also required for enabling the push buttons an IR sensor module. [5]

E. LCD –

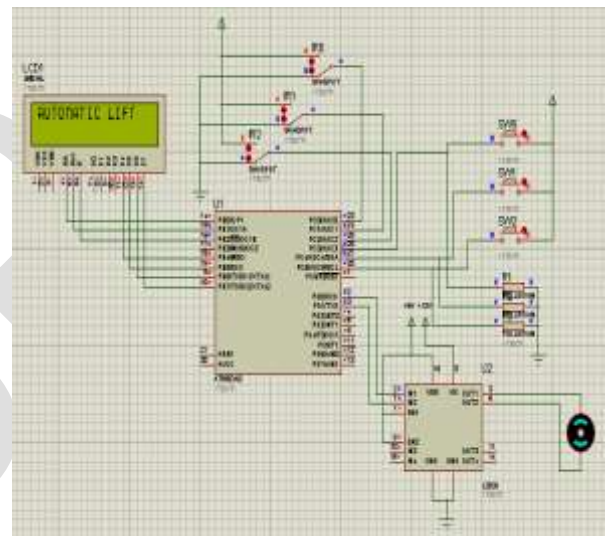
In this project we use 16*2 LCD to display the floor .LCD screen an electronic display which is widely used .A 16*2 LCD display is very basic module and it is very useful in

different devices and circuit. These modules are prefer over seven segment and other multi segment LEDs. A 16*2 LCD means it can display 16 characters per line and there are two such lines. In this LED each character is displayed in 5*7 pixel matrix. This LCD has two registers namely Command and Data.[8]

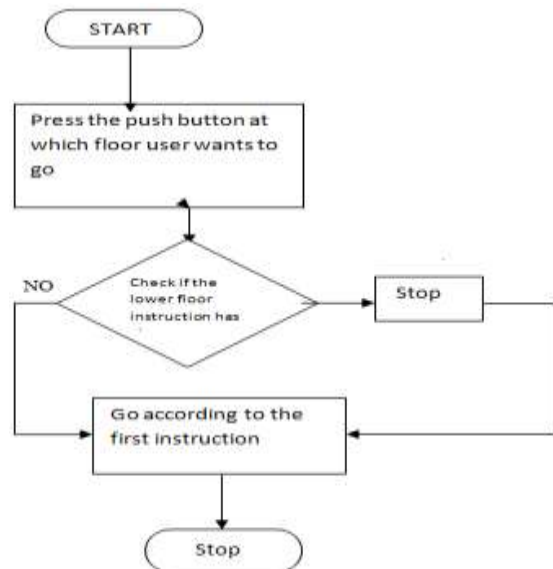
F. PUSH BUTTON-

Push button switches are the classic momentary switch. These switches have really nice , tactile,”clicky “feedback when we press them. They come in all sorts of flavours :big ,small ,colourful ,illuminated .They might be terminated as through whole ,surface mount.[9]

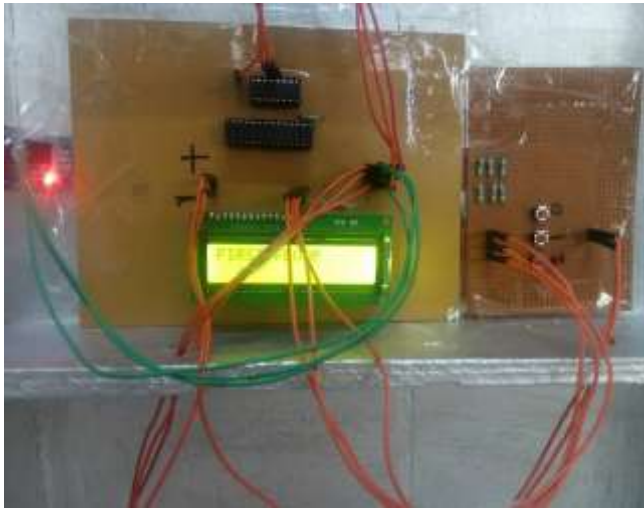
V. SIMULATED CIRCUIT DIAGRAM



VI. FLOW CHART



VII. HARDWARE IMPELEMENTATION



VIII. CONCLUSION

We use ATmega8 microcontroller and IR sensor module to design the elevator system. Movement of elevator is done with the help of DC gear motor which is controlled by motor driver IC(L293D).We design the circuit on Proteus and done the simulation by the embedded AVR programming.IR sensor module are used to detect the floor for vertical movement of elevator. In this project we design three floor building model to establish the elevator system.

This elevator system is used to transports goods and human .With the help of this elevator user can go any desired floor in less time .This is very smooth process and simply controlled. This elevator system is easily can be establish in many stories buildings, shopping mall, hospital .Microcontroller based elevator system is easily controlled and interfacing is simple .

FUTURE SCOPE

Present work is carried out using C coding in future and this can be done using other programming languages..

Microcontroller can be replaced by Programmable Logic Controller.

Further scope in design, operator console board may be used for display and keypad design.

ACKNOWLEDGMENT

It is a pleasure to thank many people whose support made this thesis possible very easily.

We would like to take this opportunity to express my gratitude, respect and sincere thanks to my project guide Mr Prashant Ranjan for his guidance, support and insight.

We are grateful to our HOD Prof.(Dr.) Nandita Pardhan for their support, instruction and guidance.

Our special thanks go to our Lab Instructor Rohit Srivastava for their help in PCB Design and working of the project.

We would like to thank faculty members and staff of the department of Electronics and Communication Engineering, United College of Engineering and Management for their extreme help throughout course.

REFERENCES

- [1]. Department Of Measurement and Information Systems, "Microcontroller based elevator controlling system", version: FLV-V02.1, 1989 (Project report in Hungarian).
- [2]. Cheah, Siew Hoon (2006) Microcontroller Based Lift Control System. Faculty of Electrical & Electronic Engineering, Universiti Malaysia Pahang.
- [3]. Poorvi Behre, Viveka Nema, and Bhupendra Badoniya, Congestion-Free Elevator Control Using Microcontroller, International Journal of Scientific & Engineering Research Volume 4, Issue 1, January-2013 1, ISSN 2229-5518.
- [4]. MaykePredco, Hand book of Microcontroller atmega8(MC GrawHill,co ,USA)1999.
- [5]. Muhammad Rashid (13 January 2011). Power Electronics Handbook. Elsevier. pp. 609-. ISBN 978-0-12-382037-2.
- [6]. <https://www.engineersgarage.com/electronic-components/1293d-motor-driver-ic>.
- [7]. www.nex-robotics.com > Products > Motors and Accessories.
- [8]. www.microcontroller-project.com/16x2-lcd-working.html.
- [9]. <https://learn.sparkfun.com/tutorials/switch-basics>.