

# MULTI FUNCTIONAL ELEVATOR

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## ABSTRACT

Generally an elevator is defined as Lifting device consisting of a platform or cage that is raised and lowered mechanically in a vertical shaft in order to move people from one floor to another in a building. The function of this kind of elevator is simple and we found these elevators in working everywhere, but here the concept is very different, in addition to the normal function, a special feature is incorporated in the system such that the machine carries the people in horizontal direction also, which is quite useful for many groups of people to cross the busy roads. People like physically handicapped, old aged people, and children's can utilize these types of elevators.

The role of multilevel elevators at railway stations is tremendous, presently this system is not existing in our country and many people doesn't know about this, if they came to know about this, then definitely they all will pray to god to implement this system as earliest, because today railway passengers are facing incredible problems, crossing the railway line through over passage with huge luggage is really hell.

**Keywords**—elevator,machine,platform

## I.INTRODUCTION

Due to modernization, the elevator system has become a part and parcel of life as high-rise buildings is a common sight. High-rise building will not be realizable without the implementation of elevators. Elevators play an important part of our daily lives. But almost all elevators worldwide, more than 99% they are in use today are designed to carry the people in vertical direction. Only few elevators designed for special purposes can move in different directions, the hidden technology involved in these elevators is not popular, there by this project work is taken up to high light this technology. To prove the concept practically, a proto type module is constructed using simple technology for the live demonstration.

The main objective of the project is to develop a hardware prototype and software to simulate the multi-functional elevator system, which is quite useful for the people for crossing the railway tracks at railway stations and for crossing the busy Roads. 89C51 microcontroller is used as control system of the elevator. The software of the elevator system is to control the overall elevator system and its algorithm. As for the hardware prototype, it is used to simulate the elevator system with three motors to control the movement and motion of the elevator in vertical and horizontal directions. Push buttons to act as input requests from passengers of the elevator from one side to other end. Limit switches are used and they are arranged at various points of mechanical structure to identify the position of the elevator. The detailed description is provided in following chapters.

## II.ABOUT ELEVATOR

An elevator or lift is a transport device used to move goods or people vertically, from one floor to another. An elevator system provides service between a ground level and upper levels through a single elevator shuttle hoist way system. This is the general description of a simple elevator that travels up and down in vertical direction.

All elevators are required to have communication connection to an outside 24 hour emergency service, automatic recall capability in a fire emergency, and special access for fire fighters' use in a fire. Elevators should not be used by the public if there is a fire in or around the building, and as such numerous building codes require signs near the elevator to state as much. However, emergency evacuations in some countries do allow the use of special 'fire elevators'.

Residential elevators may be small enough to only accommodate one person while some are large enough for more than a dozen. Wheelchair, or platform lifts, a specialized type of elevator designed to move a wheelchair 6 ft (1.8 m) or less, often can accommodate just one person in a wheelchair at a time with a maximum load of 1000 lb (455 kg).

### III. ELEVATOR SYSTEM



Fig 1. Elevator System

A lift is really a device, generally employed for vertical transportation of travelers or freight to various flooring or levels, as with a structure or perhaps a mine. The word elevator generally denotes one with automatic safety products the earliest models were known as hoists. Lifts contain a platform or vehicle travelling in vertical guides inside a shaft or hoist way, with related hoisting and lowering systems along with a power source. The introduction of the current elevator profoundly affected both architecture and also the mode of growth and development of metropolitan areas by looking into making many-storied structures practical. Now-a-days lifts mainly contain a shaft where the vehicle (also referred to as cab) rises and lower. In “traction” lifts the vehicle is drawn up with the aid of steel ropes, which rollover the top of the grooved lever. The burden from the vehicle is generally balanced having a counterweigh

### IV. MICRO CONTROLLER-AN 89C571

A Micro controller consists of a powerful CPU tightly coupled with memory, various I/O interfaces such as serial port, parallel port timer or counter, interrupt controller, data acquisition interfaces-Analog to Digital converter, Digital to Analog converter, integrated on to a single silicon chip. If a system is developed with a microprocessor, the designer has to go for external memory such as RAM, ROM, EPROM and peripherals.

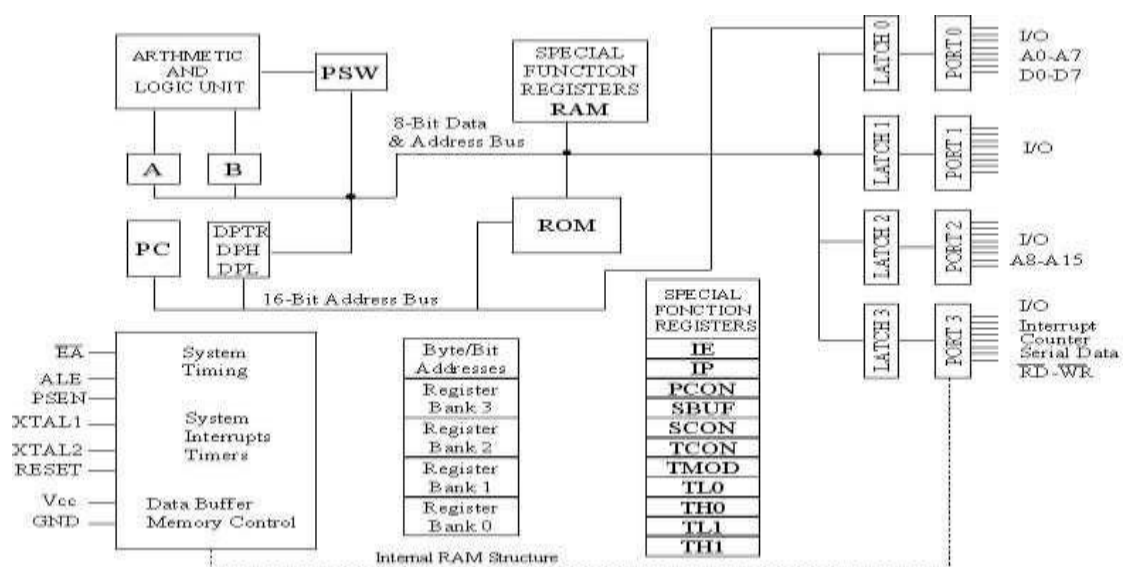


Fig2. FUNCTIONAL BLOCK DIAGRAM OF MICROCONTROLLER

## V. MECHANICAL CONSTRUCTION

This project work comes under the subject of Mechatronics; generally Electro Mechanical Machines are called as Mechatronics. Mechatronics has been defined as the synergistic integration of mechanical devices, electronics and software. Mechatronics is viewed as encompassing topics ranging from embedded microprocessor control of “intelligent” products, to robotics and manufacturing automation. It is associated particularly with the enhancement of products, machinery and processes with electronics and computers.

Mechatronics has allowed entirely new classes of machinery to be created. The addition of some inexpensive electronics and a simple computer or microcontroller can radically change the functionality of a machine. Mechatronics combines mechanical engineering, electronics and computing. It is the enabling technology of computer-automated manufacturing through the use of robots and automated machine tools. Mechatronics may concern individual machines such as robots, or manufacturing systems automated in their entirety. Mechatronic engineers use computers and other digital control systems to control industrial processes. They bring electronic, material and mechanical sciences together with robotics, manufacturing and packaging techniques to create a diverse range of products. These range from everyday products such as washing machines, cameras, photocopiers and anti-lock car brakes, to miniaturized substitutes for human organs, to powerful and precise computer-controlled machine tools used in manufacturing. This course was the first of its kind in Australia, and is in high demand by local and overseas students.

## VI. CALCULATION

### ABOUT FRAME

Total Vertical height of the frame = 54cm  
 Total horizontal length of the frame = 68cm  
 Distance between the two rods = 16.5cm

### ABOUT ELEVATOR

The length of the elevator = 16cm  
 The width of the elevator = 5.5cm  
 The height of the cabin = 10cm  
 The height and length of the elevator = 8cm\*8cm  
 The weight it can with stand the elevator is = 3kgs

### ABOUT SLIDING CHANNEL

Total length of sliding channel before expansion = 51cm total  
 length of sliding channel after expansion = 92 cm

### ABOUT RACK AND PINION

Total length of horizontal part 1 rack is = 60cm  
 Total length of horizontal part 2 rack is = 10cm  
 Total height of vertical rack is = 30cm  
 Number of teeth on pinion is = 21teeth  
 Total length covered by pinion on horizontal part 1 rack is = 41cm  
 Total length covered by pinion on horizontal part 2 rack is = 6cm  
 Total number of rack teeth covered by pinion on horizontal part 1 = 234 tooth  
 Total number of rack teeth covered by pinion on horizontal part 2 = 34 tooth  
 Total number of rack tooth covered by pinion on vertical = 97 tooth  
 Speed of the motor = 30 rpm

## VII. CONCLUSION

The work focus on “Multi-Functional Elevator” was created and developed effectively. For that demonstration purpose a prototype module is built and answers are acceptable. While developing this prototype, I've consulted couple of experts individuals who're getting understanding in the area of mechatronics which professionals working at different organizations fit in with Hyderabad assisted us while fabricating the prototype. As it is a prototype, an easy working multi-functional elevator is built. Instantly this is often implemented by utilizing solar power placed on the top from the construction. As it is a prototype, much amount isn't invested so, I made use of rack and pinion mechanism to be able to alter the rotational motion to straight line motion since i can't use hydraulic or counterweight mechanism within this prototype. The entire machine is built with in your area available components particularly the mechanical components are utilized within this project work are acquired from mechanical fabricators. A few of the modifications must execute within the design to really make it just as real working system with respect to the needs. All mechanical transmission section including electronic hardware is mounted for this structure. Durable battery can also be covered within the structure, whereas the Solar power will be stored outdoors to capture the sun's ray's energy, it's not mounted within the structure.

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