

Automatic Elevator Management and Control System Using Microcontroller

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Abstract-The purpose of this project is for effective elevator control system, which can be reprogrammed in a fashion to minimize the congestion on a particular lane by directing the lift on a particular floor using time management scheme. Present scope of the project is to provide an automatic congestion control.

Keywords— Microcontroller 89c51, gearhead motor, reed sensor, step down transformer, optocoupler.

I. INTRODUCTION

In this project, we show the basic elevator system with two floors. Although we show the concept with two floors, it is still possible to show this concept on multiple floors. Also, in this project, we will show two floors with 2 switches on each floor. The lift carries the person to each floor. Along with these 2 switches, we use separate switches for timed operation and priority for any floor. With the help of these switches, the lift automatically chooses a path which includes the path to resolve the congestion.

When we press a start switch, the lift automatically starts and immediately responds to user input. Display is provided for the user to make its selection to go to particular floor. Below is the list of choices user can make.

1. Ground floor input.
 - a) User can go to first floor.

- b) User can go to second floor.
2. First floor input.
 - a) User can go to ground floor.
 - b) User can go to second floor.
3. Second floor input.
 - a) User can go to first floor.
 - b) User can go to ground floor.

For a given condition suppose 2nd floor to ground floor is of factor importance in a time schedule at 6 to 8. This condition is accepted by the system by the programmer as a switch entry and accordingly after 2 hours and three hours all the lift moving up and down use 2nd to ground path to decrease the congestion. For timed operation we are going to use event difference, suppose this type of event has to happen after 2 hours so event is effective after 2 hours and continue its operations for a of default 15 minutes.

DESCRIPTION

- I. In this project, we use the 8051 controller to interface all the inputs and outputs. ^[5]In the input device, we use 10 sensors and one start switch. In output, we use one LCD as a display and one motor to move up-ward and down word. The brain inside the controller is to control all these inputs and outputs and perform perfectly. ^[3]8051 is basically an Intel IC but now in these days it is available with many companies. We use Atmel 89s51 series with advance feature than 8051. Atmel 89s51 is a 40 pin controller with

128 bytes of ram and 4 k byte of ROM inside. Pin no. 40 of the controller is connected to the positive 5 volt power supply. We provide a 5 volt regulated power supply on this pin. Pin no 9 is the reset pin and this pin is connected to a capacitor and resistor network to provide an auto-reset option, when controller is wake-up. For manually reset, we connect one push to on switch in parallel with the capacitor to provide manual reset option. Pin no. 20 is connected to the ground pin. Pin no. 18 and 19 are connected to the external crystal to provide a constant oscillation to the circuit. Two capacitors are grounded from the crystal pins to provide stabilization. All the reed sensors are connected to port p1 and port p3. First floor parking sensors are connected to the p1.0, p1.1, p1.2, p1.3. These four sensors are related to the first floor sensor. Second floor sensors are p1.4, p1.5, p1.6, p1.7. First floor stoppage sensor is p3.2 and second floor stoppage sensor is p3.3. Start switch of this project is p3.0. On this start switch either we connect a start switch or we connect an infra red sensor. In

II. The case of infra red sensor, when the car enters the parking position, the lift senses automatically and starts.

III. Motor of the lift is connected to the p2.0 and p2.1. Output of these pins is connected to the optocoupler circuit. Here we use a pc 817 opto coupler to provide an electrical isolation between motor control circuit and micro controller. Output from the controller is connected to the cathode of infra red led through 470 ohm resistor. When controller is on, the infra red led is on due to negative output from the controller. When infra red LED inside the coupler is on then this light drive the internal phototransistor of the coupler. Output from the coupler is now connected to the H bridge circuit. In the H bridge circuit, we use four transistor circuits with one dc motor. In the H Bridge, we use a four transistor circuit. In this four transistor circuit, two transistors are NPN and two transistors are PNP. With the help of these four transistors,

we control the direction of the motor. Not only we control the direction of motor but also, at the same time these transistors share the load of the motor directly.

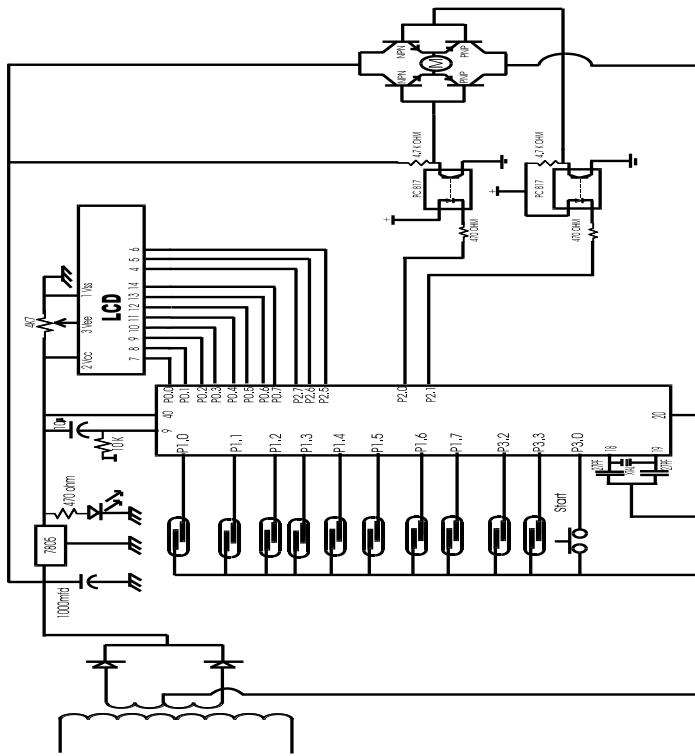
IV. Port p0 of the controller is connected to the LCD directly.

Here we use port p0 with the data pins of THE ASCII CODE. LCD displays only the ASCII code. In the programming, we convert the digital code in to ASCII code by adding 30h in any binary number. So to provide a data in the LCD, we send these codes by the 8 data lines. These data lines from the controller is from the p0.0 to p0.7

V. P2.5, p2.6, p2.7 is connected to the control pins of the LCD. On this control pin, we select the command register, data register and the enable pin. We use the command and the data register pins to send the data and command separately.

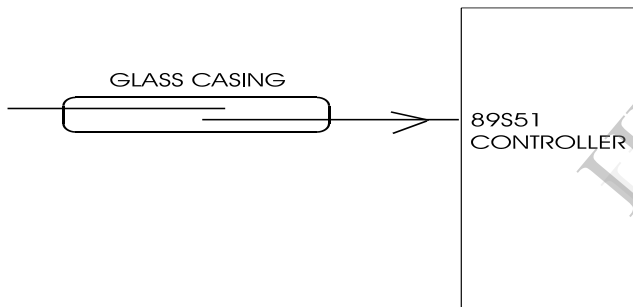
II.SENSOR

In this project, we use a reed switch as a sensor. Reed switch is a special magnetic proximity sensor. When this reed sensor is activated by an external magnetic field, the reed sensor is activated automatically. In the reed sensor, there are two wires inside the glass casing. When an external magnetic field affects the sensor, these plates join together and become short automatically. We use this sensor in our project to sense the position of the lift on floor. When the lift moves, it searches the reed sensor for stoppage. We paste one magnet with the lift and when the lift move up-wards, then magnet searches the sensor. As the sensor is sensed by the magnet, the lift stops there automatically. So whenever we want to stop the lift or check the position of the vehicle, we search the magnetic sensor. When any car is parked on the desired position, the sensor activates and provides a signal to the controller. The controller checks the change of voltage on this pin and saves this data for auto sensing logic.



precision process for the motor shaft and the helical gear, as a result, we could make remarkable reduction in noise level to 10 db .We have 20 types of gear head, including dedicated gear head of 1/3~1/180,which can be easily connected with the motor .

If you need a ratio greater than 1/180, you can use inter-decimal gear head (1/10).to assemble the motor and the gear head adjust the assembling faces together and turn slowly to complete the assembly. When doing the assembly special care should be taken neither to exert excessive force on the motor shaft nor to hit inside of the gear head otherwise, the gear will get damaged resulting in a abnormal noise and a shortened lifetime of the motor. When assembling the motors gear head use a specified bolt of that motor that motor to avoid a gap between the assembling faces for a motor equipped with a cooling fan leave a space at least 10cm from the fan cover to prevent the motor’s in-take hole from being clogged.



GEARHEAD MOTOR

The ^[2]gear head is an instrumental device that not only reduces the revolution speed of the motor but also makes the torque change according to the gear ratio characteristics of the gear head low noise type with the big delivery capability precise revolution speed according to the reduction ratio good durability within the permissible torque wide spectrum of the reduction ratio according to necessary speed the gear ratio in the engaging gears is a value obtained by dividing a number of the teeth in the driving gear .We have gone through

OPTICAL-COUPLER

An ^[7]optical-coupler is a device that uses a short optical transmission path to transfer a signal between elements of a circuit, typically a transmitter and a receiver, while keeping them electrically isolated — since the signal goes from an electrical signal to an optical signal back to an electrical signal, electrical contact along the path is broken.

The function of optical couplers can be compared to the function of relay couplers.

Optical couplers are used:

- As logical de couplers for input / output systems
- As logical elements free from chatter, for digital applications
- For the galvanic separation between control circuit (input unit such as detector) and power circuit (output unit such as actuator) of a control system. Combined with the Woertz MPS system, optical couplers on PCB have can quickly and easily be mounted on DIN rails in control cabinets.

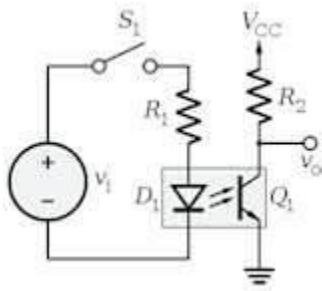


fig. Circuit diagram of optical coupler

Advantages compared to single relay couplers:

- (a) Shorter response time than relays
- (b) High operating security: LED indicates any failure
- (c) Long life expectancy: no contact oxidation
- (d) Chatter-free switching
- (e) High power even in the case of inductive loads

The advantage of optical couplers is that they can be used in most cases where galvanic separation and secure switching are necessary.

CONCLUSION

Present scope of the project is to provide an automatic congestion control. And hence found its importance in various

fields of applications .It can be extended for multi-stories as well.

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