

## **ENERGY EFFICIENT TECHNOLOGY FOR FULL AUTOMISATION OF ESCALATOR**

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### **ABSTRACT:**

Science is basically “passive” observation of the universe, as it exists to generate knowledge. Engineering is making use of that knowledge to meet human need technology have always helped to made dream come true. An escalator is a moving staircase conveyor transport device for carrying people between floors of a building. The device consists of a motor-driven chain of individual, linked steps that move up or down on tracks, allowing the step treads to remain horizontal Escalator are used around the world to move pedestrian traffic in place where elevator would be impractical. Principal areas of usage include department stores, shopping malls, airports, transit system, convention centers, hotels & public buildings. Hence, it requires more energy in order of its working & to save electrical energy. Using load sensors we can use these escalators in automated mode which helps in the conservation of energy. Our research paper involves the scale down model of SPV powered sensor operated escalator system. In this project, an attempt has been made to develop scale-down model of escalator using load sensors at landing platforms. We can use these escalators in Automated mode which helps in the conservation Of energy.

### **INTRODUCTION:**

Escalator was invented by NATHAN AMES a patent solicitor from Saugus Massachusetts in 1859.

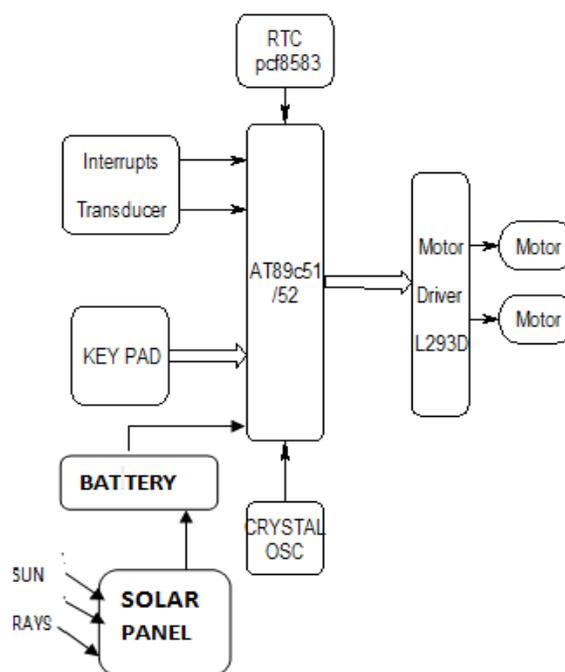
One of the biggest threats to our county facing its development is the power problem. Currently, the electricity shortage is around 25% during peak hours, causing frequent outages and forcing shutdowns at factories and businesses. There are couple of important reasons why India’s electric generation capacity has not improved, even though this sector has been privatized by Indian Government for more than 10 years now. In such case it becomes necessary to think over non-conventional resources.

Modern days escalator find their installation at rounded places they are serving people very were, they are now part of essentialities with

social life. Escalators are typically used in pairs with one going up and the other going down. Some modern escalator in stores and shopping malls has sides, which allow their working to be viewed. Although most escalators are straight, some shopping malls use curved versions. When using escalator, passenger who wish to stand and let them be carried up or down should stand on one side to allow more impatient users to walk past them. However, which side varies from place to place.

Keeping in mind the ever-rising usage of escalator the concept of atomization of escalator along with “Solar Energy Usage” came in to being.

### Block Diagram:



### **Working:**

This project has been implemented with above drawn block diagram which include Micro controller Atmel AT89C51/52, Motor Driver L293D.

For time scheduling RTC PCF8583, Crystal, keypad, clip switch, etc.

The circuit has +5V for driving D.C. motor of 12V unregulated. For this purpose we use step down transformer 12-0-12 center tap where we have connected diode for pure dc supply. We use a capacitor for filter repulsion. In this we require 12v for motor driving circuit and 7805 is used here to provide 5v.

The block of micro controller is based on Intel 8051 Architecture

- 1) Atmel AT89c51/52 is basically used here for providing facilities such as flash memory & easy programming, simple connection & programmer.
- 2) Pin no. 40 is connected to +Vcc of 5V supply & pin no. 20 is grounded.
- 3) In order to execute instructions, pin no.18 & 19 is connected in series with 33pf capacitance whereas pin no. 9(Reset pin) is connected to capacitance 0.1mF whereas this capacitor is connected to Vcc.
- 4) Here Transducer contains lip switch (for prototype only) otherwise it mainly comprises of other sensors like Web Cams (for image processing) with transmitter, Receiver & Weight/Load Sensor.

RTC PCF 8583 is a 8 pin chip. Here a crystal providing frequency of 32.768 KHz is connected between pin no.1 and pin no. 2 which generates clock after 1000ms. This clock pin is connected to micro-controller.

For scheduling purpose, it has its own register bank. In order to interface this bank the IIC protocol is used using SCL &SDA.

For driving L293d chip, 5V is required for its own working and Voltage adjustable of 12V is also connected. For connecting 2 motors, 2 channels are connected.

- 1) When input line show 0-0 condition the motor stops.
- 2) When input line shows 0-1 condition it is in forward direction.
- 3) Similarly, when input line shows 1-0 condition then it is in reverse direction.

Three Switches is connected to controller port pins with respective ground at start this port is high when any key pressed then status of this port will move to temporary register and continued for subroutine selection.

- When 1st key is pressed its automated mode is selected. In this mode, interrupts are initialized and generated.
- When 2nd key is pressed scheduled mode subroutine is called. In this mode, steps starts rotating for particular time schedule but when it is in OFF condition then automated mode is activated.
- When 3rd key is pressed it enters in manual mode, subroutine in these mode & motor remains continuously ON.

Solar Energy is received by solar panels which is then stored in battery in order of the proper working of escalator.

#### **Advantages:**

The advantages are as follows.

- 1) The Escalator can work in both automated & continuous mode.
- 2) Escalator can be made 'ON' only when required, thereby saving electrical energy by avoiding unnecessary running of escalator as an conventional one.
- 3) Escalator in automated mode gives priority the last person arrived there by fulfilling demands of specific situation of number of people approaching to escalator with interference of time interval
- 4) Escalator can be worked on scheduled mode.
- 5) Solar energy can be used as another power source for the escalator.

#### **Application:**

1. Department stores/shopping:
  - ❖ As noted above, a few escalator types were installed in major department stores. Escalators proved instrumental in the layout and design of shopping venues in the twentieth century.
  - ❖ In Departmental Stores and Shopping Malls they are actually used to carry Shoppers & Customers from one floor to the other. It also helps individuals to move along with their Luggage.
2. Public Transportation (Railway station, Airport etc):
  - ❖ It always help passenger to reach desired platform or gate on a given time. It also help

passengers on airport to undergo fast check-in's and check-out's.

3. Factories and other Industrial Production Environments:

❖ Escalators helps to carry its workers between floors four times a day. The machines did not run all day: rather, escalators ran solely to transport employees to/from midday meals and in/out of the mill.

❖ "The profitable and practicable feature of the Escalator, from the viewpoint of the owner, is the increased efficiency of each operator due to the elimination of stair climbing."<sup>1</sup>

4. Military use :

❖ Escalators were also utilized on aircraft carriers such as the , to transport pilots from "ready rooms" to the flight deck.

**CONCLUSION:**

The generation of electricity using these resources is environmental friendly and causes no pollution of any type.

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