International Journal of Progressive Research in Science and Engineering
Volume-2, Issue-1, January-2021
www.ijprse.com

Design and Hardware Implementation of Automation of Classroom Using 8051 Microcontroller

Hymavathi M[1], Swapna M[1], Sravani Devi V[1], Naga Sruthi M[1], Md Abdul Khadar Riza[1]

[1] *Student, Department of Electrical and Electronics Engineering,Vignan's Institute of Information & Technology(A),Visakhapatnam, India.*

Corresponding author: swapnamajji207@gmail.com

Abstract: - This project is to design cost effective automation system which can be easily incorporated in academic institution especially in the class rooms to conserve the energy. Lights and fans switched ON and OFF as for density of the students entering in the class room. The implementation made simpler by using sensor to detect person and compact circuitry built using 8051 microcontrollers. Which is useful to academic institutes to save money on their power bills and contribute in reducing the emissions? Present scenario of energy crisis not only demands to increase generation of energy but also to utilize it as per legitimate greenhouse gases in environment.

Key Words:— Sensors, 8051 Microcontroller, Automation, Energy Conservation.

I. INTRODUCTION

Present scenario of energy crisis demands to increase generation of energy. And also need to utilize carefully to conserve at public places like educational institutions. The aim of this project is to design cost effective automation system which can be easily incorporated in academic institution especially in the class rooms to conserve the energy.

Example: we consider a class room B-23 which consists of 6 fans, 6 lights, 6 bulbs and the power consumed by the fan is 75 watts. The power consumed by the tube light is36 watts. The watts consumed by the flourocent lamp is 60 watts. And the wattage consumption of whole room is product of number of fans, wattage of fan, number of working hours and number of days divided by1000 then the total wattage of the classroom will be given below Actually in India for first 150 units the government charges 2.55 Rs and for next 250 units 4.80 Rs from 800 to1000 to 5.00 Rs for total units consumed by B-23 room is 307.8 units and total amount is 757.44 Rs.

The implementation made simpler by using sensor to detect person and compact circuitry built around 8051 microcontroller programs.

Table. 1.3. Calculations of total units consumed in one month

Loads	Number of items	Number of wattage	Number of working hours	Number of days	Total calculation	Total number of units consumed
Fans	6	75	10	30	(6*75*10*30)/1000	135units
Tube light	6	36	10	30	(6*36*10*30)/1000	64.8units
Flourocent lamp	6	60	10	30	(6*60*10*30)/1000	108 units

This system inculcate discipline in the students by giving no option but to occupy the front row first and back bencher to come front and then only have the comfort of fan and light. At the same time want to help the academic institutes to save money on their power bills and contributes in reducing the emission of green house gases in environment.

II. PROPOSED SYSTEM

A classroom mostly consists of a fan and a tube light at least. Many a times it is observed that it's the human nature

IJPRSE
Progressive Research
International Journal of Progressive Research in Science and Engineering
Volume-2, Issue-1, January-2021
www.ijprse.com

and we tend to forget to switch off the lights when we leave the house. This leads to more of energy consumption and wastage of energy. The same scenario can also happen with the classroom. Hence it is considered as one of the most important issue that needs to be addressed. The same system is not only dedicated to solve the problems of class room but the same can also be used in home automation application. The said system can be used to keep a track on the devices that are on in the classroom when we are not present. This will lead to automation plus the energy consumption factor that will save energy. The system will operate with the help of a relay module. The relay controls the circuit functions and acts as an interface between input and output circuits. The system will also require a communication network channel that helps to transmit messages between the application at the user end and the hardware at the system end.

A. Block diagram:

The following fig. 1. Shows the schematic block diagram of proposed system. In this block diagram the microcontroller 89C51 is main component of whole circuit.

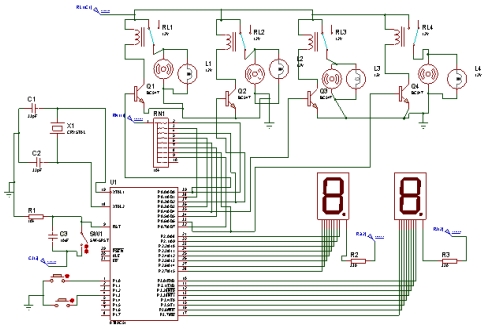


Fig.1. Block diagram of Automation System

III. HARDWARE DESIGN

1. *Power supply:*

For our project we require a +5v power supply. This power supply can be designed using voltage regulator IC 7805.

2. *Micro-controller 89C51*:

The IC 89C51 is a low-power, high-performance CMOS 8-bit microcomputer. It has 4K bytes of Flash Programmable and Erasable Read Only Memory (PEROM). The device is produced by using Atmel high density non-volatile memory technology and it is corresponding with MCS-51™ instruction set and pin-out. By combining an all-round 8-bit CPU with Flash memory on a monolithic chip, the Atmel AT89C51 becomes a powerful microcomputer, which provides a highly flexible and cost effective solution in so many embedded control applications.

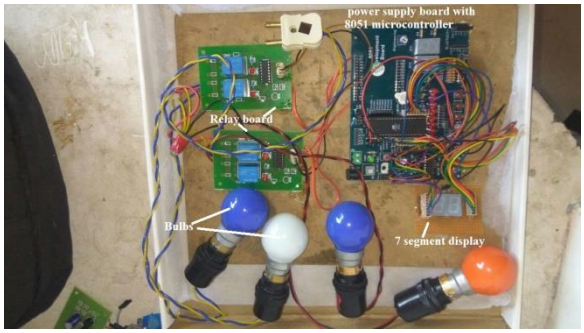


Fig.2. Prototype Model of automation system

3. *Relay Driver:*

Output of micro-controller is not sufficient to drive the relay directly. Therefore, to drive the relay we are using relay driver i.e. transistor as switch. We used transistor IC ULN2804. This IC has 8 transistors in it.

4. *Relay:*

Relay is electromechanical switch. This electromechanical switch is used to turn ON-OFF the Loads.

5. *Seven segment:*

The **seven segments displays** are the oldest yet one of the efficient types of display used in embedded applications. This display has nothing more than 8 LED inside it. So to make an LED of a particular segment glow we just have to power common pin along with the segment pin. This way we can power more than one segment at a time to represent the numeric number 0-9 and also few Alphabets as shown on the graphic image below. We also have an option to show a decimal point using the DP pin.

Software

- Keil µVision IDE
- Proteus

Hardware

- AT89C52 Microcontroller (40 Pin, 4V-5.5V, 0Hz-33MHz).
- Relays (5 Pin mini Relay 10A, 250V AC).

- Relay driver (ULN2003, 5V TTL, CMOS, 14 PIN IC).
- Common Anode Seven Segment Display (10-20mA, 1.8V-2.2V)
- Lamps (230V, 50Hz, 0Watts).
- LED

IV. Software Simulations

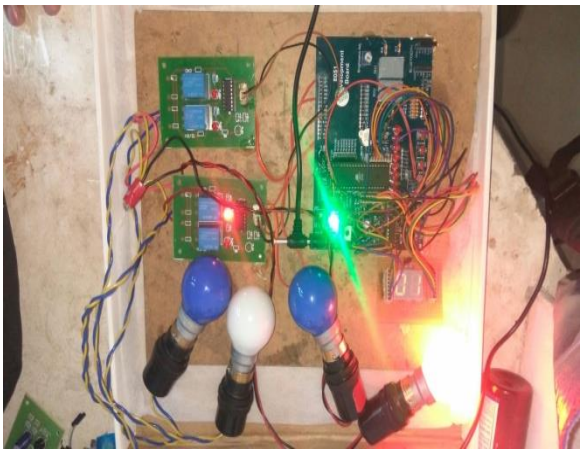
The Keil C51 is the most popular 8051 C compiler in the world. It provides more features as compared to other C compiler. The C51 Compiler allows you to write 8051 microcontroller applications in C which have the efficiency and speed of assembly language. [7] In the C51Compiler, it gives you full access to all resources of the 8051.

Proteus Software:

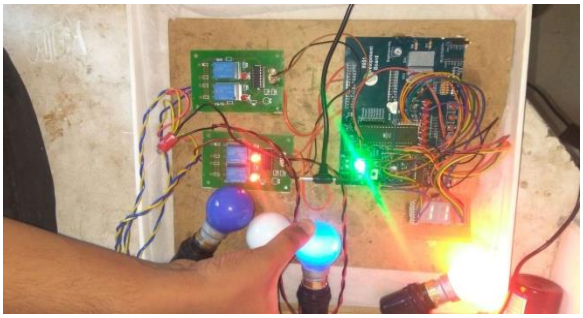
ISIS provides the development environment for PROTEUS VSM, our revolutionary interactive system level simulator. This product combines mixed mode circuit simulation, micro-processor models and interactive component models to allow the simulation of complete micro-controller based designs.

ISIS provides the means to enter the design in the first place, the architecture for real time interactive simulation and a system for managing the source and object code associated with each project. In addition, a number of graph objects can be placed on the schematic to enable conventional time, frequency and swept variable simulation to be performed.

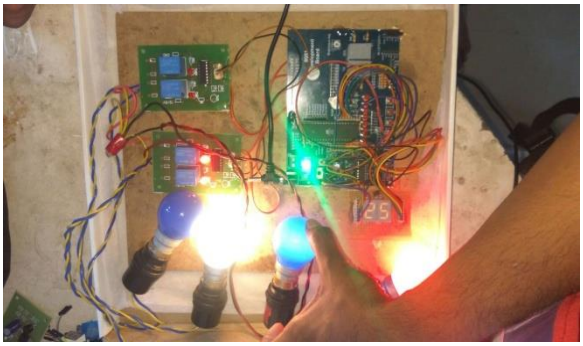
V. Results And Conclusion



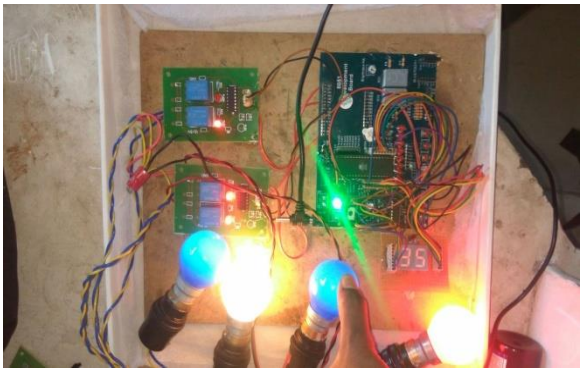
Case1: First bulb is in ON condition when count is greater than 0 and less than 10.



Case2: First and second bulb are in ON condition when count is greater than 10 and less than 20.



Case3: Three bulbs are in ON condition when count is greater than 20 and less than 30.



Case4: All the four bulbs are in ON condition when count is greater than 30 and less than 50.

By this automation of loads in class room we were able to minimize an economical expense along energy conservation. And we can improve desiplane in students**.**

References

[1]. Automatic room light intensity detection and control using a microprocessor and light sensors, Ying-Wen Bai; Dept. of Electronics. Eng., Fu-Jen Catholic Univ., Taipei; Yi-Te Ku.

[2]. Kadam Shah, Prakash Savaliya and Mitesh Patel "Automatic Room Light Controller With Bidirectional Visitor Counter" (IJICTRD) International Journal of ICT Research and Development | Vol-1 Issue-4 | ISSN: 2395-4841.

[3]. Automatic room light controller with bi-directional counter (vol-1 issue-4) ISSN: 2395-4841.

[4]. B wannarka, Rachel; ruhl,Kathy(may 2008).”Seating arrangements that promote positive academic and behavioural outcomes: A review of empirical research”.Support for learning.23(2):89-93.Doi:10.1111/j.14679604.2008.00375.X.Retrived 17 September 2001.