

POWER SAVER SYSTEM BASED ON VISITOR COUNT WITH TEMPERATURE AND LIGHT SENSING

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ABSTRACT

Wastage of electricity is one of the main problem which we are facing nowadays due to our negligence and forgetfulness. This project was designed to avoid all such situations and to implement it in normal household and industrial applications. This project works on three modules; Digital Visitor Counter (DVC), Automatic Room Light Controller (ARLC) and Temperature Sensing (TS), which are controlled by Microprocessor 16F877. Module DVC counts the number of persons entering or leaving any room like conference hall, cinema hall, etc. This function is implemented using a pair of Infrared sensor. Module ARLC turns light ON and OFF using relay interface. When a person enters, room lights are turned ON but remains OFF if light in the room is sufficient or number of persons inside room is zero. In module TS ,sensor senses the temperature changes. At room temperature cooling devices remain OFF and when temperature increases above room temperature cooling devices become operative. The project conserves more electric power as it collaborates the knowledge of electric and digital study.

Keywords: ARLC, Digital Visitor Counter, Infrared Sensor, Relay, Temperature Sensor.

I. INTRODUCTION

Electricity has always remained a prime necessity of life as it is impossible to imagine our life without it. But the major problem is associated with its generation costs, which is increasing by every passing day and putting undue burden on the consumers as they are forced to pay huge electricity bills. To overcome this problem, a powerful and efficient solution for energy efficient lighting can be adopted to save energy by optimizing home appliances, such as fans, lights, tube lights, etc. based on a person's presence in the room using different wireless technologies like IR, Zigbee. This project focusses on designing and developing a controller based model to count the number of persons visiting particular room by using sensors and accordingly lights up the room. This project is a reliable circuit that takes over the task of controlling lights and temperature as well as counting the number of persons/visitors in the room very accurately. When somebody enters into the room then

the counter is incremented by one and the light in the room will be switched ON only when light is insufficient and when one leaves the room the counter is decremented by one. The light will be switched OFF when all persons had left the room. Temperature sensing is done to operate under above room temperature conditions and remains inoperative otherwise. The total number of persons inside the room are displayed on the display segment. The whole process is managed by a microcontroller which receives the signal from the sensors and this signal is operated under the control of software which is stored in ROM. Microcontroller 16F877A continuously monitor the Infrared Receivers. When any object pass through the IR Receiver, IR rays falling on the receiver are obstructed, which is sensed by the microcontroller. As this project uses two Infra red sensors, it can also be used as Bidirectional person counter in public places to help avoiding overcrowding and congestion.

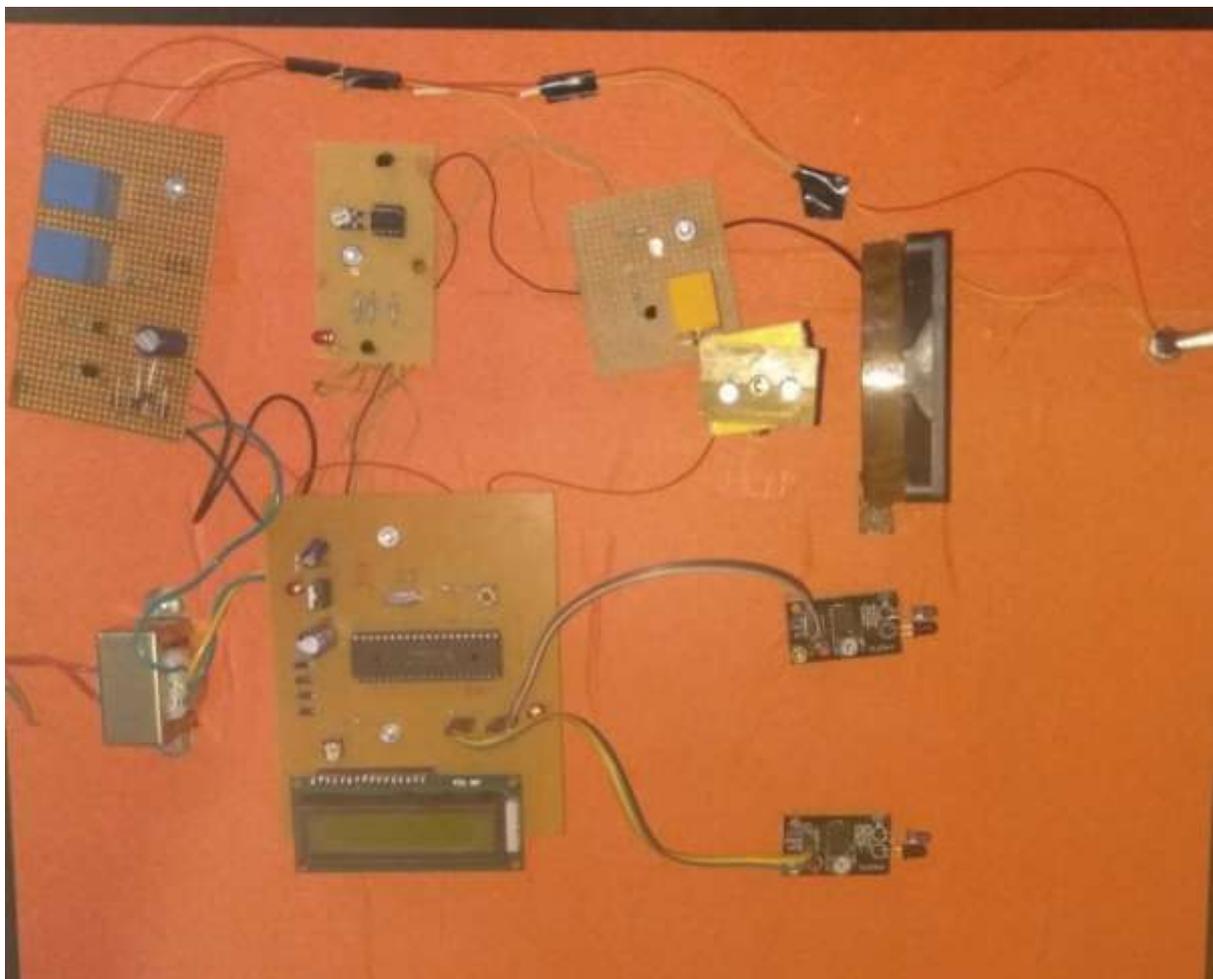


Fig 1. Project Circuit View

II. SYSTEM OF ARCHITECTURE

Design specifications are as mentioned in the following table

Voltage regulator fixes unregulated dc output to a constant voltage so that output reaches uninterrupted to the appliance. The diodes in the circuit along with capacitors handle elevated efficient signal conveyal.

- **Crystal Oscillator**

A crystal oscillator is an electronic oscillator circuit that uses the mechanical resonance of a vibrating crystal of piezoelectric material to create an electrical signal with a precise frequency. Its function is to keep track of time, to provide stable clock signal for digital Integrated circuits and to stabilize frequency for radio transmitters and receivers.

- **LM35A Temperature Sensor**

A temperature sensor is a device which is designed specifically to measure the hotness or coldness of an object. LM35 is a precision IC temperature sensor with its output proportional to the temperature (in °C). The operating temperature range is from -55°C to 150°C. LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry easy.



Fig 3. Temperature Sensor

- **LM358 IC**

LM358 IC is a great, low power and easy to use dual channel op-amp IC. It consists of two internally frequency compensated, high gain, independent op-amps. It removes necessity of dual supply and permits direct sensing close to GND and VOUT.

- **Microcontroller 16F877A**

MC 16F877A belongs to a class of 8-bit microcontrollers of RISC architecture. It has 8kb flash memory for storing a written program. Memory made in FLASH technology can be programmed and cleared more than once, thus it makes this microcontroller suitable for device development. It is usually used for storing important data that must not be lost if power supply suddenly stops.

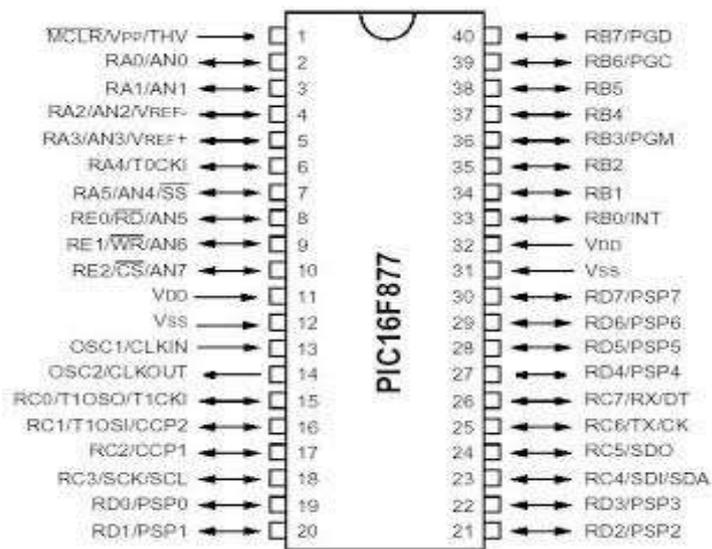


Fig 4. Pin Diagram of MC 16F877A

- **LCD**

The display section consists of 16*2 LCD, which is used to display summary project and provides a useful interface for the user, debugging an application giving it a professional look.

- **Relay Driver Circuit**

In relay driver circuit there are transistors, diodes and relays. Relay driver circuit is used to control the light. Microcontroller cannot drive relay directly so output signal from microcontroller is passed to the base of the transistor, which activates the particular relay so that it can select particular device to operate. Relay controls the charge flowing to the load.



Fig 5. Relay Driver Circuit

B. Software Description



Fig 6. Flow Chart

III. FUTURE SCOPE

1. By using this concept we can send this data to a remote location using mobile or internet.
2. Voice Alarm System can be added to indicate that room is full and more persons can't enter inside.
3. We can acquaint the code lock module, which enables password for opening the door.

IV. CONCLUSION

This project is easy to implement in normal household and industrial applications. It deals with the usage of the energy in this competitive world of electricity and is efficient enough to let someone know about the accuracy of the persons entering or leaving the room. It not only teaches us about the functioning of the electricity but also to preserve electricity even in the electricity based project. In today's digital world, technology is very advanced and things are preferred to be done automatically without any human efforts. This project helps to reduce human efforts and conserve resources. More over the system is intelligent enough to take decision on its own and is economical as the components used are readily available and inexpensive.

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