SMART ROOM POWER SEVER

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Abstract- *Main concept of SMART ROOM POWER SAVER is to measure & to display the number of persons entering or leaving any room. LCD display placed outside the room displays such value. When number of persons inside the room is zero, power supply inside the room can be cut using a relay interface. Depending upon the number of persons present in that room, room appliances like a/c, fan and heater are then controlled automatically.When the number of persons is more than a certain level, the room temperature will be more and hence the AC will start working to bring down the temperature of the room. Similarly, when the number of persons is less than a certain level, the room temperature will be lesser and hence the heater will start working to bring up the temperature of the room.*

Key words- Smart room power saver,Characteristics,Block diagram,Component used.

In this sophisticated world every activity is getting atomized with the help of embedded concepts.All the way so far we have seen that any controlling of parameters,utilizing natural resources for circuit operation,preventing the device from electric disorders,optimizing etc..,is carried out with analogue instruments.So we decided to develop an electronic aid which is helpful for the above purpose which is called as SMART ROOM POWER SAVER.

In automation instrument building we often are confronted by the necessity to precisely control illumination of light,rotational speed of a fan,controlling the devices depending on the detection of human being presence in the room or not,device switching using remote. Their illumination can be controlled by switching ON the number of LED'S as per requirement; depending on the room temperature speed of the FAN or conditioning unit of AC can be controlled as a function of applied voltage.

It monitors the surrounding environment and electrical condition depending on those parameters the embedded system will control the operation of the devices.like,if the room temperature is increased more than the desired temperature the system will automatically controls the speed of the fan,in the other condition it will check for the natural light intensity depending on that microcontroller will control how many set of LED'S should be switched ON,similarly one of the main feature of this project is IR sensor,this sensor is used to detect presence of anybody in the room or not with respect to that the system will control the action of devices such that switching ON/OFF and this project works on the DC

power supply,in presence of sunlight the circuit will work with power generated by the solar cells else with the main power supply [1].

1.1. Characteristics

[A] It counts the number of person entering or exiting the hall.

[B] It controls the power system.If nobody present in the hall,LCD displays zero person,and hence it switches off the power supply.

[c] It keeps a check on the room temperature.When the temperature of the room is less than 20 degree,heater will be ON.When the temperature is in between 20-30 degree, fan will be ON and when the temperature is more then 30 degree A/C will be ON.
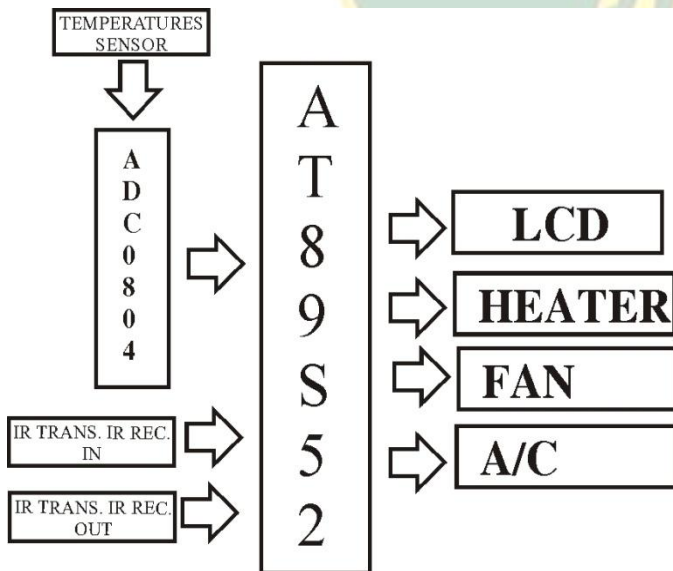
1.1 Block diagram


Fig. 1 Block diagram of the system.

2. Components used

[1] Two pair of IR Sensor

[2] Microcontroller AT89S52

[3] ADC0804

[4] Temp. Sensor LM35

[5] Transistor

[6] Resistance

[7] Diode

[8] Capistors

[9] Regulatoe-7805

[10] Transformer

[11] D.C motor based CD loader

Components details

2.1.IR-Sensor

A infrared sensor is an electronics sensor that measures infrared light radiating from objects in its field of view. They are most often used in PIR-based motion detectors.

Infrared sensor is an electronic device which is used to sense certain characteristics of its surroundings by either emitting and or detecting infrared radiation.Infrared sensors are also capable of measuring the heat being emitted by an object and detecting motion.Infrared waves are not visible to the human eye. In the electromagnetic spectrum,infrared radiation can be found between the visible and microwave regions.The infrared waves typically have wavelenghts between 0.75 and 1000um[2].
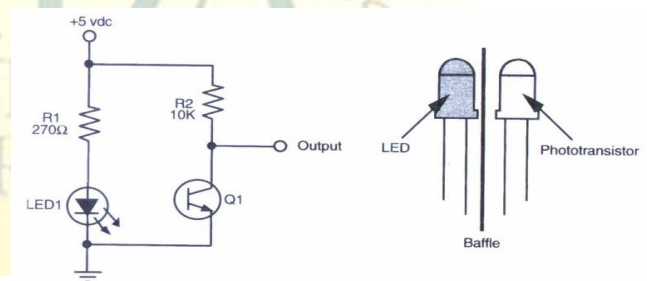
The basic design of the infrared proximity sensor.

Fig. 2 IPR-Sensor.

2.2.Microcontroller

A microcontroller is a small computer (SoC) on a single integrated circuit containing a processor core,memory and programmable input/output peripherals[3].It is like single chip computer that is often embedded into other systems to function as processing/controlling unit.In our daily life the remote control we are using probably has microcontrollers inside that do decoding and other controlling functions. It is also used in automobiles, washing machines, microwave ovens, toys … etc, where automation is needed.

2.3.ADC0804

8-Bit μP Compatible A/D Converters

The ADC0804 is a very commonly used 8-bit analog to digital convertor.It is a single channel IC i.e. it can take only one analog signal as input.The digital output varies from 0 to a maximam of 255.The step size can be adjusted by setting the refrence voltage at pin 9.When this pin is not connected ,the default reference voltage is the operating voltage i.e. Vcc [4].

2.4.Temp. Sensor LM35

Precision Centigrade Temperature Sensors

The LM35 is an integrated circuit sensor that can be used to measure temperature with an electrical output proportional to the temperature(in ^{0}C).We can measure temperature more accurately than a using a thermistor.The sensor circuitry is sealed and not subject to oxidation,etc. It generates a higher output voltage than thermocouples and may not require that the output voltage be amplified. It has an output voltage that is proportional to the Celsius temperature.It does not require any external calibration or trimming and maintains an accuracy of +/-0.4 ^{0}C at the room temperature and +/-0.8^{0}C over a range of 0 ^{0}C to +100^{0}C[5].

2.5.Transistor

A transistor is a semiconductor device used to amplify or switch electronic signals and electrical power.It is composed of semiconductor material with at least three terminals for connection to an external circuit[6].Transistors are three terminal active devices made from different semiconductor materials that can act as either an insulator or a consuctor by the application of a small signal voltage. The transistor's ability to change between these two states enables it to have two basic functions:- Switching or Amplification. There are mainly two types of transistor:- (1) PNP (2) NPN

2.6.Resistance

The electrical resistance of an electrical conductor is a measure of the difficulty to pass an electric current through that conductor.The inverse quantity is electrical conductance,and is the ease with which an electric current passes.Electrical resistance shares some conceptual parallels with the notion of mechanical friction.The SI unit of electrical resistance is the ohm, while electrical conductance is measured in Siemens(S)[7].

2.7.Diode

A diode is a two- terminal electronic component that conducts primarily in one direction.Diode has low resistance to the flow of current in one direction and high resistance in the other. It is a semi conductor

device that made up of a sandwich of P-type semi conducting material, with contacts provided to connect the p-and n-type layers to an external circuit[8].The main function of the diode is to allow an electric current to pass in one direction.If the positive terminal of the battery is connected to the P-type material (cathode) and the negative terminal to the N- type material (anode), a large current will flow.This is called forward current or forward biased. If the terminals connected in reverse order a very little current will flow and tis is called reverse current or reverse biased.

2.8.Capacitor

It is an electronic component whose function is to accumulate charges and then release it.It is a passive two terminal component used to store electrical energy temporarily in an electric field.The forms of practical capacitors vary widely but all contain at least two electrical conductors separated by a dielectric.An ideal capacitor is characterized by a single constant value[9].

2.9.Regulatoe-7805 and Power supply

Most of the digital circuits operate on 5 volt DC supply which is obtained by the circuits like step down transformer, bridge rectifier and 7805 voltage regulator IC[10].7809 is a voltage regulator integrated circuit.Regulator -7805 is a member of 78xx series of fixed linear voltage regulator ICs.The main function of voltage regulator IC to maintain the output voltage at constant voltage.It has three pins:- Input pin(5V-18V),Ground pin(0V) and Output pin (5V).

2.10.Transformer

A transformer is an electrical device that transfers energy between two or more circuit through electromagnetic induction.Electromagnetic induction produces an electromotive force within a conductor which is exposed to time varing magnetic fields.It is used to used to increase or decrease the alternating voltages in electric power applications[11].

2.11.D.C Motor based c.d. loader

Fig.3. D.C Motor based cd loder

3.Conclusion

In this paper a smart energy management is presented based on a set of sensor,microcontroller....etc to minimize the domestic energy waste according to human habits .A proposed scenario is suggested for daily routine to maximize the occupant's energy saving.By using smart room power saver total power can be consumed.If one unit of power is saved at consumer level we can save two units of power at power station.Thus the importance of power saving and

need of a smart system increase.Such a smart power saving system is suggestd in this paper that can save power and increase comfort level of the user with maximum expenditure.The components used in this system like microcontroller,sensors,diodes....etc are readily available and cheap.By this technology a strong relation between the saving in power and saving in cost is obtain.

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