CHAPTER 1
INTRODUCTION

1.1 Introduction

Guest counter with programmed room light controller is a dependable circuit that assumes control over the room lights also the number of guests. At the point when someone goes into the room then the counter is augmented by one worth and the light in the room will naturally turned ON and when any one leaves then the counter is decremented by one value and the light will be only switched OFF until all the persons in the room go out. The all out number of people inside the room is likewise shown on the LCD shows. The microcontroller does the above job. It receives the signals from the sensors, and this signal is operated under the control of software called microcontroller (IDE). Additionally what's more the absolute number of individual in the room be increased worth or decremented worth will consistently be shown in the LCD consequently makes this framework a. [1]

1.2 Background

As a result of the fast growing trend in instrumentation engineering, a good number of electronic instruments that exists in advanced countries should also exist in our country Nigeria. Industrial electronics is a holistic aspect of modern world technology; as such, most of the electronically advanced countries like USA, Japan, Russia, etc cannot sustain their technological advancement without the above mentioned subject.The advent of microelectronics in 1959 by jack kil by, gave rise to the birth of both linear and digital circuits like Operational Amplifiers, Voltage Regulators, IC Timers, Combinational Logic, Structural and Sequential Logic ICs among a host of other digital system components. [2]

The control and computerization of human counters for lodging procedures can be acknowledged utilizing a microcontroller incorporated with an infrared sensor which detects the section of people and

The disclosure of the microcontroller in 1972 denoted the start of small scale program control in gadgets. Microprocessors like 8080, 8086, 8088, Pentium, etc were employed for micro program

control of batch counters in the 20th century but microcontrollers became more preferable for such embedded applications for control frameworks as opposed to the chip which are better for broadly useful applications. Other devices which may be similarly used for such control operations are programmable logic devices (PLDs) such as Complex Programmable Logic Devices (CPLDs), Field Programmable Gate Array (FPGA) among a host of other devices. This automatic room light controller with digital counter contains a Sensor–TSOP 1738 (Infrared Sensor) formed with a combination of infrared diode and photo diode, while the digital readout was formed with LCD display. For control frameworks rather than the chip which are better for broadly useful applications. The micro program which is the driving software is written in assembly language and flashed into the 89c51 microcontroller. I have prevailing with regards to supplanting the arbitrary rationale with microcontroller control rationale for detecting the individual. By using this sensor and its related circuit diagram can count the persons in a given area, put ON/OFF lights automatically, during this project research.[3]

1.3 Objective

- To save the energy & Reduce the electricity bill of the Hall room.
- To reduce the maintenance cost of the Hall room by digitalization.
- To insure the comfort ness of the audience and observer in the Hall room.

1.4 Methodology

In this paper our main aim is visitor counter. The System is based on the interruption of IR beam. An IR pillar is utilized as the wellspring of light bar. Visitor Counter with Automatic Room Light Controller and Microcontroller as the master controller has two sections. The IR transmitter and receiver, diode. It should be powered with It ought to be controlled with 5 volt DC supply and fixed on one side of the door jamb.[4]

1.5 Problem Statement

In this day and age, numerous establishments are made out of a lot of business structures in which room light and fan are not consequently controlled by any stretch of the imagination. In other words, manual systems are employed in many buildings where one has to switch the conference

hall lights and fan on and off. A person can also forget to put off the lights and fan when leaving the smart library reading room. This In operation to control these, this project herein, explores an automated auditorium light and fan controlling system to curb the stemming challenge to numerous institutions, companies and government agencies. The capacity to consequently control light and fan would enable the clients to feel good without physically controlling them. The use of automated control here would further aid in the use of such systems by those who are sick, handicapped or elderly.[5]

1.6 Project Outline

Chapter 1: Introduction

Chapter 2: Overview of the Project

Chapter 3: Design and Implementation

Chapter 4: Hardware Development

Chapter 5: Result and Discussion

Chapter 6: Conclusion

1.7 Summary

Automatic controlling the lights is a time taking and tedious process. We are starting our project, our first target was to fix the goal. We have been attracted to this automatic light control and temperature control fan, visitor countering LCD display. Fire detector with alarm based project that contribute to the modern society there are many digital conference hall in our country.

CHAPTER 2
OVERVIEW OF THE PROJECT

2.1 Introduction

Automatic digital conference hall/class room Lighting System is a microcontroller based project that automatically turn on or off the lights in a smart library reading room. Electricity, being one of the most important resources, must be utilized carefully. We often forget to switch off lights or fans when we leave a conference hall by using this system, we can intentionally forget about the lights as the system will automatically take care of them. The digital World we are living in allows us to use different technologies to automatically perform certain tasks. Such automation is very useful in certain areas like energy consumption, reducing human efforts, improving standard of living etc. The project implemented here is one such project where the microcontroller based system automatically controls the conference hall lights and fans. The most essential electronica home or conference hall or any other place where there is a chance of fire accident is a fire alarm circuit. The fire alarm circuit can be defined as an electronic circuit used for identifying fire accident and alert. Thus, by using the fire alarm circuit, we can avoid financial loss and also save people from dangerous fire accidents. [1]

2.2 Automatic Light Control

The main component of the project is IR Sensor and we have used three of them. The placement of the sensors is important as it will determine the functioning of the project. The sensor placed on the row-1 of the smart library reading room is named as Sensor 1 and the sensor, which is placed on the row 2 is named Sensor 2. Which is placed on therow-3 is named Sensor 3.When a person tries to enter the room, Sensor 1 detects the person first and then Sensor 2.and then sensor 3. This action will indicate the OP-Amplifier that the person is entering in the row 1,2, and 3.[2]

2.3 Temperature Controlled Fan

In this paper for sensing the temperature Thermistor has been used. Here also described that how the speed of a fan can be controlled, based on temperature sensor. A sensor is a type of transducer. In a broader sense, a transducer is sometimes defined as any device that converts energy from one form to another. Besides that, the component that made up the temperature sensor is known as Thermistor. Thermistor is a kind of temperature dependent resistor and its resistance varies depending on the temperature. It can also be used to control the auditorium temperature, depending on the property of Thermistor. [3]

2.4 Fire Detector

The fire alarm project is designed for developing a temperature control system using thermistor. This simple fire alarm circuit using thermistor can be developed on your own over asolderless breadboard by following simple steps. Hence, it can be considered as a fire alarm mini project. [4]

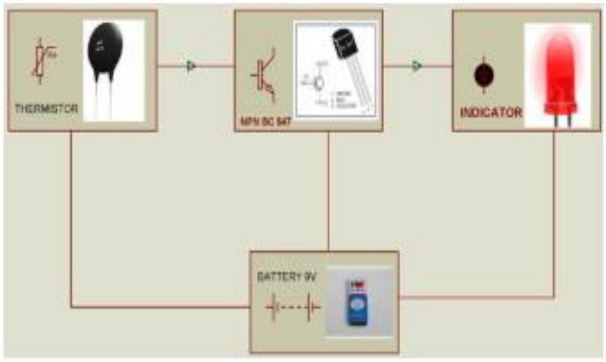

Figure 2.1: Fire Alarm System Block Diagram

2.5 Visitor Counting System

Advanced guest counter is a solid circuit that assumes control over the assignment of checking Number of Persons/Visitors in the Room precisely. When someone goes into the Room then the Counter is Incremented by one and when any one leaves the room then the Counter is Decremented by One. The absolute number of Persons inside the Room is shown on fluid precious stone presentations. The microcontroller does the above activity it gets the sign from the sensors. This task comprises of small scale controller, IR and photograph diode and LCD.IR sensor is consistently radiates the sign and photograph diode is watches the sign if any deterrents comes in

the middle of the IR and PHOTO diode the yield of the photograph diode is given to the microcontroller the check worth is appeared on LCD.[5]

2.6 Summary

A Microcontroller has been utilized for the principle controlling framework. LM35 sensor has been utilized for detecting temperature. The alarm task is intended for building up a temperature control framework utilizing thermistor. The fundamental part of the task is IR Sensor and we have utilized three of them. The situation of the sensors is significant as it will decide the working of the venture. Computerized guest counter is a dependable circuit that assumes control over the errand of including Number of Visitors/out present in the library.

CHAPTER 3

DESIGN AND IMPLEMENTATION

3.1 Introduction

The use of smart device in daily activities increases the quality of life and offer high productivity in turn. This has led to the increase called for benefits such as comfort, Centralize control of appliance, cost reduction, energy. Our BSc final project is to build and Microcontroller visitor counter. Our visitor counter system use in different place such as shopping mall, school, college, university, Trade center, office, High court etc place. There by save our energy, and electricity bill reduce and low maintain cost.

3.2 Block Diagram

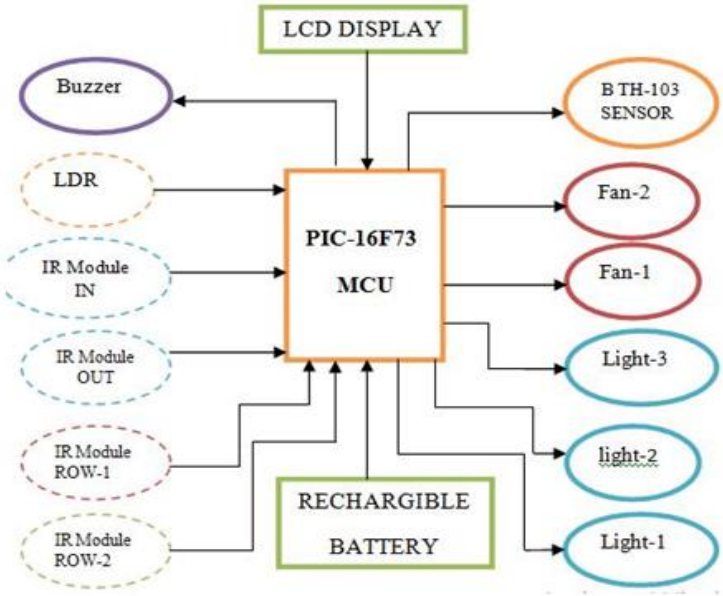

Figure 3.1: Block Diagram of Digital Conference Hall/class room

Microcontroller is the master controller of our project. We are connecting some IR, LDR sensor and some light, temperature control fan. Rechargeable battery uses supply the of the system run. Visitor IN, Out, Present and temperature shown in the LCD display.

3.3 Project Flow chart

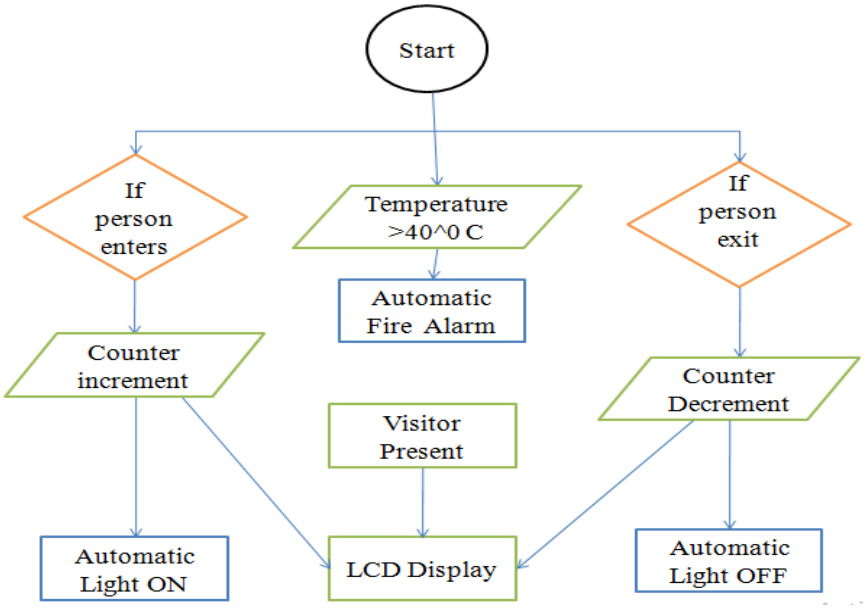

Figure 3.2: Counting and Fire Alarm System Flow Chart

When first step start if the person enters the library then counter increment and automatic light ON and shown in the LCD display. When the temperature grater than40^{0}C then fire alarm create. Visitor present in the library shown in the LCD display. If the person exit from class room then counter decrement and automatic light off and shown in the LCD display.

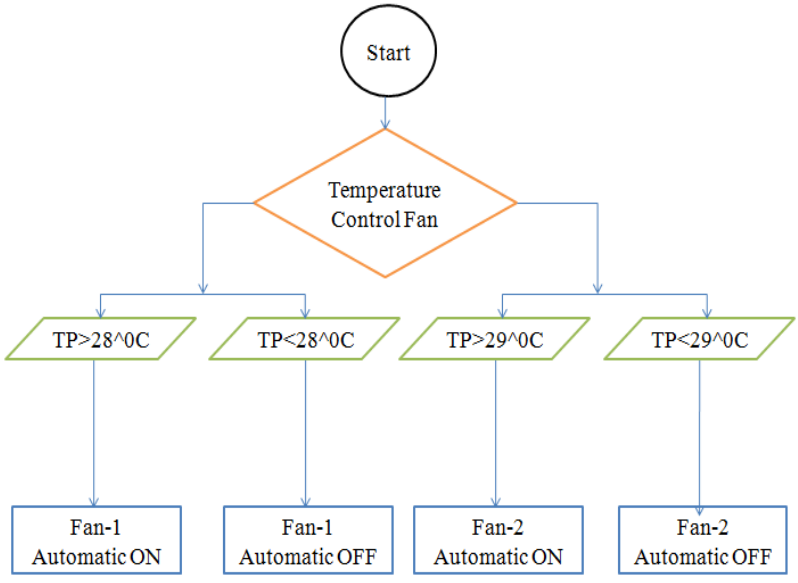

Figure 3.3: Temperature Control Fan Flow Chart

Start temperature control fan if Tp>28^{0}C then fan-1 automatic ON. If Tp<28^{0}C then fan-1 automatic OFF.Fan-2function if Tp>29^{0}C then fan-2 automatic ON. If Tp<29^{0}C then fan-2 automatic OFF.

3.4 Circuit Diagram

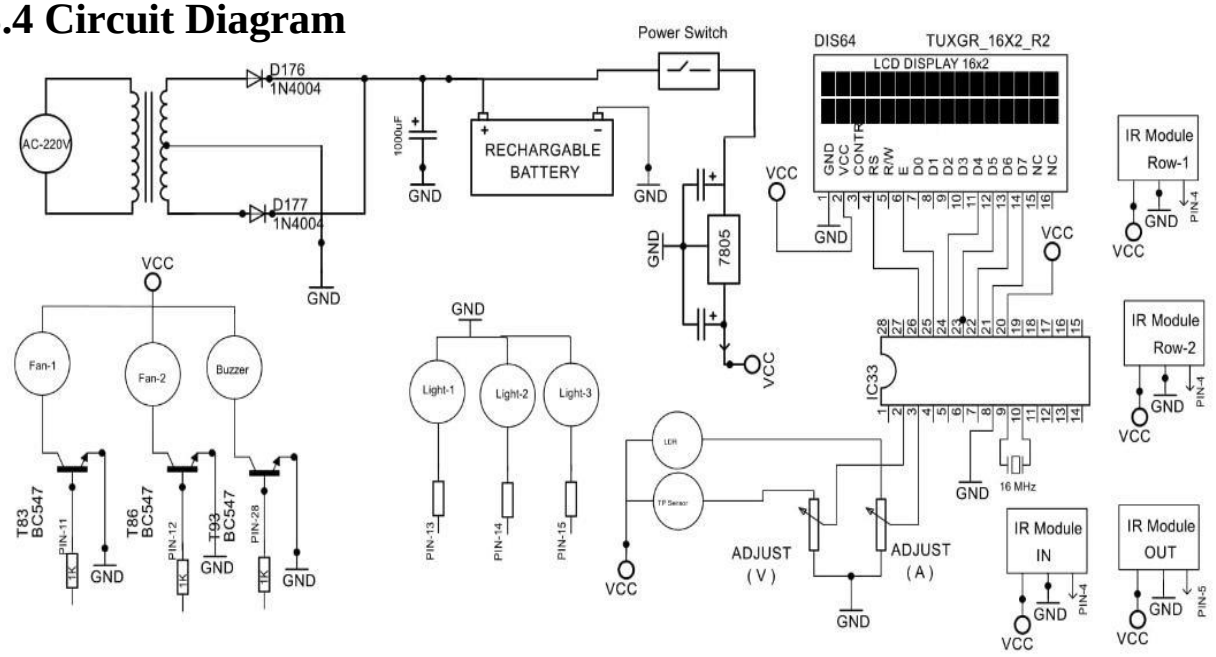

Figure 3.4: Circuit Diagram of digital conference hall

3.5 Working Principle

We know that in any system power is very important. Nothing works without power. We used 12V battery as power source in this project. At first we converted 220V AC supply using step down transformer and we are getting 12V (AC) in secondary. Then to AC to DC we used full wave bridge rectifier. We used two diodes D43, D44 (1N4004) for this rectification. Then we used a capacitor (1000uF) to convert pulsating DC to pure DC. Actually it is a filtering capacitor. We used that output which we got from the capacitor to charge the battery. We used power switch instead of giving the voltage that we got from the battery to the microcontroller. Power will come to the microcontroller from the switch. We know microcontroller or Digital IC need 5V to operate. To convert this 12V to 5V we used Regulator IC (7805). Here we used two Regulator ICs. One is for whole system and the other is for the FAN. Both ICs are connected in parallel. Two Diodes (1N4004) was on the start of the Regulator IC. Three capacitors (220uF) used to filter the output

of Regulator IC. One capacitor will filter the input of the Regulator IC. Rest two capacitors will filter the output. An output of the system will directly go to the microcontroller (Pic16F-73) Model. This microcontroller battery voltage pin is 19 and 20. The 19 number pin is for negative and 20 number pin is for positive. We used a crystal of CLK speed 16MHZ for microcontroller CLK pulse. It was set to the microcontroller 9 and 10 number pin. A temperature sensor was connected to the pin Number 2 and 3 Number pin is for LDR. Two variables are used to control LDR and temperature sensor. The 1 number pin is a reset pin. 4 to 7 number pin is for IR sensor. The output of IR sensor is which comes to the microcontroller using OP-AMP. Two OP-AMP are used for four outputs. The 8 number pin is for Gnd. FAN 1 and 2 are connected with microcontroller 11 and 12 number pin then 13 to 15 numbers is for LED. The pin Number 21 to 26 is used for LCD Display (16x2). The last 28 number pin is for with the Buzzer.

3.6 Summary

We can find here the project flowchart, Block diagram, circuit diagram, and project output diagram and understood clearly. The circuit diagram was built and the device was IR sensor, Temperature sensor, LDR, Microcontroller, resistor, capacitor and diode, IC etc. According to program CODE the device was sending data shown in the LCD display.

CHAPTER 4

HARDWARE DEVELOPMENT

4.1 Introduction

We are living in the embedded world. You are surrounded with many embedded product and your daily life largely depend on the proper functioning's of these gadgets, television, radio, CD, layer of your living room, washing machines or microwave oven in your kitchen, card readers, access controllers, palm device of tour work space enable to many of your takes very effectively apartment from all these.

4.2 Require Components

- Microcontroller
- Center tap transformer
- Resistor
- Variable resistor
- Capacitor
- Diode
- Voltage regulator
- IR Transmitter and Receiver
- LED
- Buzzer
- LCD
- Transistor
- DC Battery
- Varo board
- LDR Sensor
- Switch
- Some wire
- Cristal oscillator

- OP-Amplifier
- Temperature sensor
- Fan

4.3 Micro Controller (PIC16F73)

A Microcontroller is a chip which is a solitary Chip. That implies the chip incorporates a microchip name (CPU) just as some regularly utilized. A controller is also utilized to control some procedure or part. Most commonly the chip application is use for checking a house. However temperature increases, the controller makes the open position. In the event that the temperature goes over a specific limit, the chip control system is activated.[5]

Figure 4.1: PIC16F73 Microcontroller Chip

As the procedure of a scaling down proceed, majority of the system required for a controller were assemble right onto the one chip. A one chip PC or microcontroller was invent. A microcontroller is a profoundly incorporated chip, which incorporates, on one chip, all or the vast majority of the parts required for a controller. It could be known as a "one-chip-arrangement". It normally work with:

- CPU (Central Processing Unit or the chip).
- EEPROM / EPROM / PROM / ROM (Read Only Memory).
- RAM (Random Access Memory).
- Input / Output devices (serial, parallel, ADC, DAC etc).
- Timers.
- Interrupt controller.

- Embedded Controller.
- ADC converter.
- Calculators.
- PWM function generators.

4.3.1 Programmable Integrated Circuit (PIC)

PIC controllers are a group of little RISC controllers which is utilized in implanted application. PIC controllers are the created by the organization "Microchip". Writing can be acquired from the Microchip site. The development of the 8-piece MCU piece of the overall industry is a demonstration of the PIC miniaturized scale MCUs capacity to address the issues of many. Its development has made the PIC miniaturized scale design one of the best three models accessible in the general market today. This development was powered by the Microchip vision of the advantages of an ease OTP arrangement.

4.3.2 Pin Diagram of PIC16F73 Microcontroller

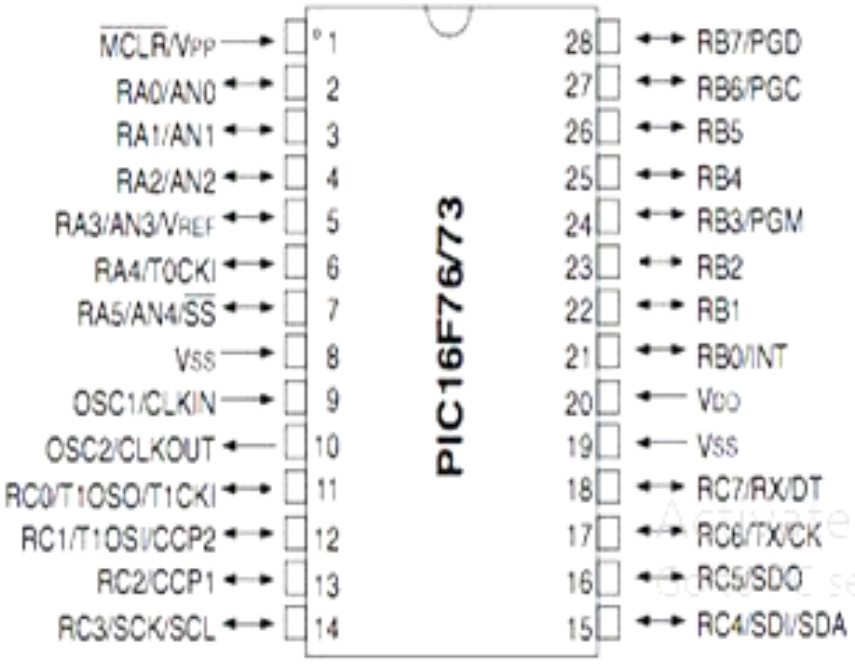

Figure 4.2: Pin Diagram of PIC16F73 Microcontroller

4.3.3 Microcontroller Pin Connection

Pin Number	Description
1	MCLR/VPP - Master Clear Reset
2	RA0/AN0 - Port A
3	RA1/AN1 - Port A
4	RA2/AN2 - Port A
5	RA2/AN3/VREF - Port A
6	RA4/T0CKI - Port A
7	RA5/AN4/SS - Port A
8	Vss– Ground
9	OSC1/CLKI - Oscillator Input
10	OSC2/CLKO - Oscillator Output
11	RC0/T1OSO/T1CKI - Port C
12	RC1/T1OSI - Port C
13	RC2/CCP1 - Port C
14	RC3/SCK/SCL-Port C
15	RC4/SDI/SDA-Port C
16	RC5/SDO-Port C
17	RC6-Port C
18	RC7-Port C
19	Vss-Ground
20	Vdd-Positive Power Supply
21	RB0/INT-PortB
22	RB1-Port B
23	RB2-PortB

Table 4.1: Showing Technical Specifications

4.3.4 Function of Microcontroller

The program memory contains 2K words, which mean 2048 guidelines, since every 14-piece program memory word is a similar width as every gadget guidance. The information memory (RAM) contains 128 bytes. There are twenty two I/O sticks that are client configurable on a stick to-stick premise. A few pins are multiplexed with other gadget capacities.

These functions include,

- External interrupt.
- Change on PORTB interrupt.
- Timer0 clock input.
- Timer1 clock/oscillator.

- Capture/Compare/PWM.
- A/D converter.
- SPI/I2.

4.4 Center Taped Transformer

The activity and hypothesis behind a Center tapped transformer is fundamentally the same as an ordinary optional transformer. An essential voltage will be initiated in the essential curl I1and I3) and because of attractive acceptance the voltage will be moved to the optional loop. Here in the optional curl of a center tapped transformer, there will be an extra wire (T2) which will be set precisely at the focal point of the auxiliary loop, subsequently the voltage here will consistently be zero. On the off chance that we consolidate this zero potential wire (T2) with either T1 or T2, we will get a voltage of 12V AC. On the off chance that this wire is overlooked and voltage crosswise over T1 and T2 is viewed as then we will get a voltage of 24V AC. This component is helpful for the capacity of a full wave rectifier. Give us a chance to consider the voltage given by the principal half of the auxiliary curl as Va and the voltage over the second 50% of the optional loop as Vb as appeared in the chart beneath this feature is very useful for the function of a full wave rectifier.

Figure 4.3: Center Taped Transformer with Symbol

Let us consider the voltage given by the first half of the secondary coil as Va and the voltage across the second half of the secondary coil as Vb as shown in figure in 4.3.

As we know the voltage across the coil depends on the number of turns on the primary and secondary coil. Using the turn's ratio formulae we can calculate the secondary voltage as:

$$Va=(Na/Nb)*Vp$$

$$Vb=(Nb/Nb)*Vp$$

Where:

Va=Voltage across the first half of secondary coil

Vb= Voltage across the secondary half of secondary coil

Vp= Voltage across the primary coil

Na= Voltage across the first half of secondary coil

Nb= Number of turn in the first half of secondary coil

Nb= Number of turn in the secondary half of secondary coil

4.4.1 Specifications

- Step-down Centre tapped Transformer
- Input Voltage: 220V AC at 50Hz
- Output Voltage: 24V, 12V or 0V
- Output Current: 1A
- Vertical mount type
- Low cost and small package

4.4.2 Applications

- Rectifier circuits
- AC-AC step down
- Full wave rectifiers

4.5 Resistor

A resistor is a passive two-terminal an electrical component that implements electrical resistance as a circuit element. In electronic circuits, resistors are used to reduce current flow, adjust signal levels, to divide voltages, bias active elements, and terminate transmission lines, among other uses.

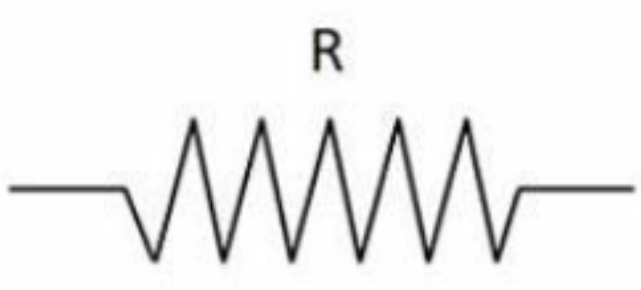

Figure 4.4: Resistors

High-power resistors that can dissipate many watts of electrical power as heat, may be used as part of motor controls, in power distribution systems, or as test loads for generators. Fixed resistors have resistances that only change slightly with temperature, time or operating voltage. Variable resistors can be used to adjust circuit elements (such as a volume control or a lamp dimmer), or as sensing devices for heat, light, humidity, force, or chemical activity.

The electrical function of a resistor is specified by its resistance: common commercial resistors are manufactured over a range of more than nine orders of magnitude. The nominal value of the resistance falls within the manufacturing tolerance, indicated on the component.

4.5.1 Variable Resistor

A resistor restricts current flow in an electrical circuit without switching the current off. A variable resistor allows more control over current flow by changing the amount of resistance.

When resistance increases in a variable resistor, the amount of current that is allowed to flow in a circuit decreases.

Figure 4.5: Variable Resistor

Two basic components make up variable resistors. The resistive material is the first component and is called the element.

The second component, called the wiper or brush, is used to set the resistance, and is often controlled with a knob or sliding switch. There are several different kinds of variable resistors. At Future Electronics we stock many of the most common types categorized by Type, Number of Turns, Tolerance, Rated Power, Nominal Resistance and Packaging Type. The parametric filters on our website can help refine your search results depending on the required specifications. The most common sizes for Rated Power are 250 MW and 500 MW. We also carry variable resistors with Rated Power up to 37 W. Variable Resistors can be Potentiometer, Trimmer or Turns Counting Dial type. Variable Resistors can be found in

- Audio control
- Television
- Motion control
- Home Electrical Appliances
- Oscillators

4.6 Capacitor

The capacitor is a component which has the ability or “capacity” to store energy in the form of an electrical charge producing a potential difference (Static Voltage) across its plates, much like a small rechargeable battery. There are many different kinds of capacitors available from very small capacitor beads used in resonance circuits to large power factor correction capacitors, but they all do the same thing, they store charge. In its basic form, a capacitor consists of two or more parallel conductive plates which are not connected or but are electrically separated either by air.

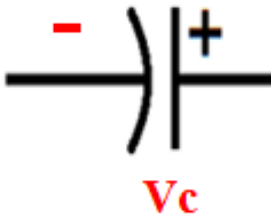

Figure 4.6: Electrolytic Capacitor

4.6.1 Standard Units of Capacitance

- *Micro-Farad (ft.) $1\mu F = 1/1,000,000 = 0.000001 = 10^{-6}$ F*
- *Nano-Farad (nF) $1nF = 1/1,000,000,000 = 0.000000001 = 10^{-9}$ F*
- *Pico-Farad (pF) $1pF = 1/1,000,000,000,000 = 0.000000000001 = 10^{-12}$ F*

4.7 Diode

A diode is a specialized electronic component with two electrodes called the anode and the cathode. Most diodes are made with semiconductor materials such as silicon, germanium, or selenium. Some diodes are comprised of metal electrodes in a chamber evacuated or filled with a pure elemental gas at low pressure. Diodes can be used as rectifiers, signal limiters, voltage regulators, switches, signal modulators, signal mixers, signal demodulators, and oscillators.

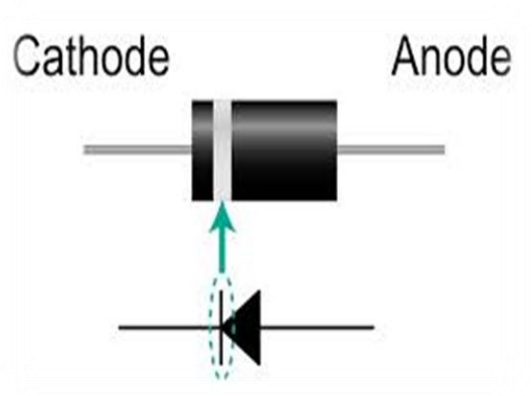

Figure 4.7: Diode

The fundamental property of a diode is its tendency to conduct electric current in only one direction. When the cathode is negatively charged relative to the anode at a voltage greater than a certain minimum called forward break over, then current flows through the diode. If the cathode is positive with respect to the anode, is at the same voltage as the anode, or is negative by an amount less than the forward break over voltage, then the diode does not conduct current. This is a simplistic view, but is true for diodes operating as rectifiers, switches, and limiters. The forward break over voltage is approximately six tenths of a volt (0.6 V) for silicon devices, 0.3 V for germanium devices, and 1 V for selenium devices. The above general rule notwithstanding, if the cathode voltage is positive relative to the anode voltage by a great enough amount, the diode will conduct current. The voltage required to produce this phenomenon, known as the avalanche voltage, varies greatly depending on the nature of the semiconductor material from which the

device is fabricated. The avalanche voltage can range from a few volts up to several hundred volts.When an analog signal passes through a diode operating at or near its forward break over point, the signal waveform is distorted. This nonlinearity allows for modulation, demodulation, and signal mixing. In addition, signals are generated at harmonics, or integral multiples of the input frequency.Some diodes also have a characteristic that is imprecisely termed negative resistance. Diodes of this type, with the application of a voltage at the correct level and the polarity, generate analog signals at microwave radio frequencies.Semiconductor diodes can be designed to produce direct current (DC) when visible light, infrared transmission (IR),or ultraviolet (UV) energy strikes them. These diodes are known as photovoltaic cells and are the basis for solar electric energy systems and photo sensors.

4.8 Voltage Regulator

Usually, we start with an unregulated power supply ranging from 9volt to 12volt DC. To make a 5volt power supply, IC 7805 voltage regulator as shown in figure has been used.Voltage sources in a circuit may have fluctuations resulting in not providing fixed voltage outputs. A voltage regulator IC maintains the output voltage at a constant value. 7805 IC, a member of 78xx series of fixed linear voltage regulators used to maintain such fluctuations, is a popular voltage regulator integrated circuit (IC). The xx in 7805 indicates the output voltage it provides. 7805 IC provides +5 volts regulated power supply with provisions to add a heat sink.

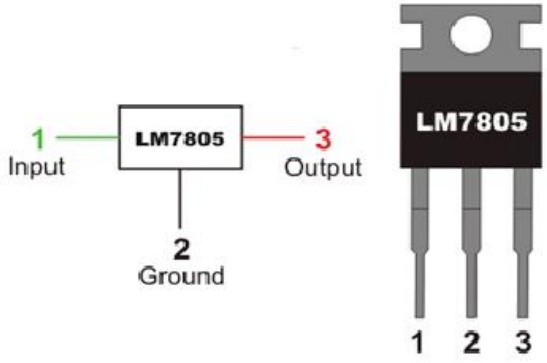

Figure 4.8: Pin Diagram of IC 7805

4.9 IR Proximity Sensors

Infrared technology addresses a wide variety of wireless applications. The main areas are sensing and remote controls. In the electromagnetic spectrum, the infrared portion is divided into three regions: near infrared region, mid infrared region and far infrared region.

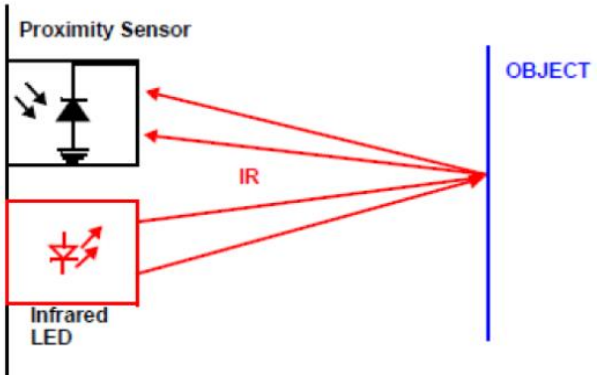

Figure 4.9: IR Proximity Sensors

The wavelengths of these regions and their applications are shown below.

- Near infrared region — 700 nm to 1400 nm — IR sensors, fibre optic
- Mid infrared region — 1400 nm to 3000 nm — Heat sensing
- Far infrared region — 3000 nm to 1 mm — Thermal imaging

The frequency range of infrared is higher than microwave and lesser than visible light.For optical sensing and optical communication, photo optics technologies are used in the near infrared region as the light is less complex than RF when implemented as a source of signal. Optical wireless communication is done with IR data transmission for short range applications.An infrared sensor emits and/or detects infrared radiation to sense its surroundings. The working of any Infrared sensor is governed by three laws: Planck's Radiation law, Stephen – Boltzmann law and Wien's Displacement law. Planck's law states that "every object emits radiation at a temperature not equal to 0^0K. Stephen – Boltzmann law states that "at all wavelengths, the total energy emitted by a black body is proportional to the fourth power of the absolute temperature". According to Wien's Displacement law, "the radiation curve of a black body for different temperatures will reach its peak at a wavelength inversely proportional to the temperature".The basic concept of an Infrared

Sensor which is used as Obstacle detector is to transmit an infrared signal, this infrared signal bounces from the surface of an object and the signal is received at the infrared receiver.There are five basic elements used in a typical infrared detection system an infrared source, a transmission medium, optical component, infrared detectors or receivers and signal processing. Infrared lasers and Infrared LED's of specific wavelength can be used as infrared sources. The three main types of media used for infrared transmission are vacuum, atmosphere and optical fibres. Optical components are used to focus the infrared radiation or to limit the spectral response. Optical lenses made of Quartz, Germanium and Silicon are used to focus the infrared radiation. Infrared receivers can be photodiodes, phototransistors etc. some important specifications of infrared receivers are photosensitivity, directivity and noise equivalent power. Signal processing is done by amplifiers as the output of infrared detector is very small.

4.9.1 IR Transmitter & IR Receiver

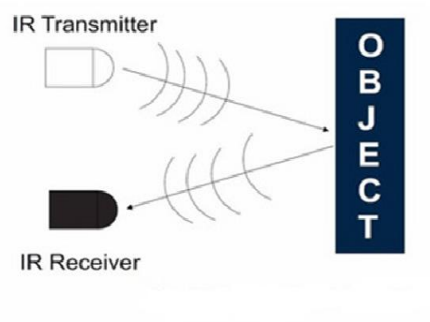

Figure 4.10: IR Tx& IR Rx

4.9.2 IR Transmitter

Infrared Transmitter is a light emitting diode (LED) which emits infrared radiations. Hence, they are called IR LED's. Even though an IR LED looks like a normal LED, the radiation emitted by it is invisible to the human eye.The picture of Infrared LED is shown below.

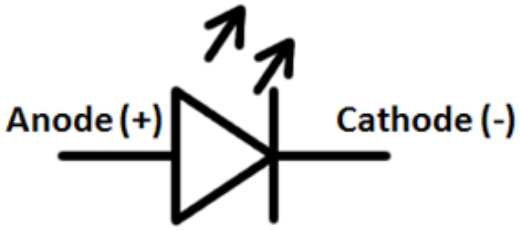

Figure 4.11: IR Transmitter LED

4.9.3 IR Receiver

Infrared receivers are also called as infrared sensors as they detect the radiation from an IR transmitter. IR receivers come in the form of photodiodes and phototransistors. Infrared Photodiodes are different from normal photo diodes as they detect only infrared radiation. The picture of a typical IR receiver or a photodiode is shown below.

Figure 4.12: IR Receiver LED

4.9.4 Working Mechanism

An IR sensor is basically a device which consists of a pair of an IR LED and a photodiode which are collectively called a photo-coupler or an opto-coupler. The IR LED emits IRradiation, reception and/or intensity of reception of which by the photodiode dictates the output of the sensor. Now, there are so many ways by which the radiation may or may not be able to reach the photodiode.

4.10 Light Emitting Diode (LED)

A light-emitting diode (LED) is a semiconductor device that emits visible light when an electric current passes through it. The output from an LED can range from red (at a wavelength of approximately 700 nanometers) to blue-violet (about 400 nanometers). Some LEDs emit infrared (IR) energy (830 nanometers or longer); such a device is known as an infrared-emitting diode (IRED).An LED or IRED consists of two elements of processed material called P-type semiconductors and N-type semiconductors. These two elements are placed in direct contact, forming a region called the P-N junction. In this respect, the LED or IRED resembles most other diode types, but there are important differences. The LED or IRED has a transparent package, allowing visible or IR energy to pass through. Also, the LED or IRED has a large PN-junction area whose shape is tailored to the application.

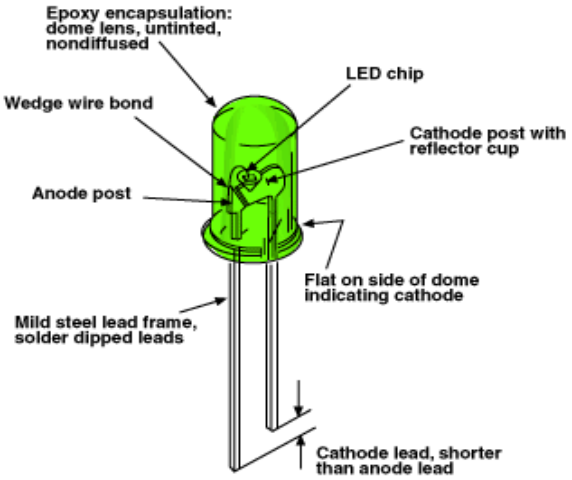

Figure 4.13: Light Emitting Diode

4.11 Buzzer

A buzzer is an audio signaling device, which may be mechanical, electro mechanical, or piezoelectric.Typical uses of buzzers and beepers include alarm devices,timers and confirmation of user input such as a mouse click or keystroke.

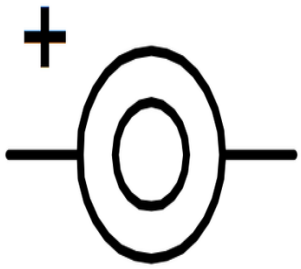

Figure 4.14: Buzzer 5v DC

This buzzer can be used by simply powering it using a DC power supply ranging from *4V to 9V*. A simple *9V* battery can also be used, but it is recommended to use a regulated *+5V or+6V DC* supply. The buzzer is normally associated with a switching circuit to turn ON or turn OFF the buzzer at required time and require interval.

4.11.1Applications of Buzzer

- Alarming Circuits, where the user has to be alarmed about something
- Communication equipment's
- Automobile electronics.
- Portable equipment's due to its compact size.

4.12 LCD Display

A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines.

Figure 4.15:LCD Display

4.12.1 Pin Description

Pin No	*Function*	*Name*
1	*Ground (0V)*	*Ground*
2	*Supply voltage; 5V (4.7V – 5.3V)*	*Vcc*
3	*Contrast adjustment; through a variable resistor*	V_{EE}
4	*Selects command register when low; and data register when high*	*Register Select*
5	*Low to write to the register; High to read from the register*	*Read/write*
6	*Sends data to data pins when a high to low pulse is given*	*Enable*
7	*8-bit data pins*	*DB0*
8		*DB1*
9		*DB2*
10		*DB3*
11		*DB4*
12		*DB5*
13		*DB6*
14		*DB7*
15	*Backlight V_{CC} (5V)*	*Led+*
16	*Backlight Ground (0V)*	*Led-*

Table 4.2: Showing LCD Pin Specifications

4.13 Transistor

A bipolar transistor is a semiconductor device commonly used for amplification. The device can amplify analog or digital signals. It can also switch DC or function as an oscillator. Physically, a bipolar transistor amplifies current, but it can be connected in circuits designed to amplify voltage or power.

There are two major types of bipolar transistor, called *PNP* and *NPN*. A PNP transistor has a layer of N-type semiconductor between two layers of P-type material. An NPN transistor has a layer of P-type material between two layers of N-type material. In P-type material, electric charges are carried mainly in the form of electron deficiencies called *holes*. In N-type material, the charge carriers are primarily electrons.

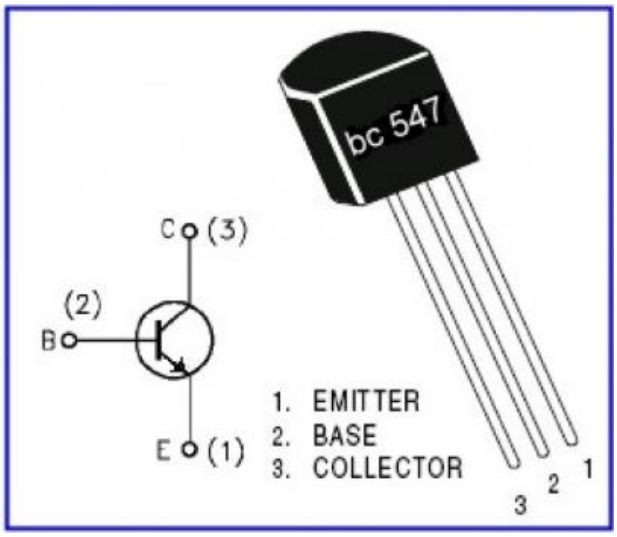

Figure 4.16:Transistor Pin diagram with Symbol

4.14 Introduction of Battery

Batteries are often used in PV systems for the purpose of storing energy produced by the PV array during the day, and to supply it to electrical loads as needed (during the night and periods of cloudy weather). Other reasons batteries are used in PV systems are to operate the PV array near its maximum power point, to power electrical loads at stable voltages, and to supply surge currents to electrical loads and inverters. In most cases, a battery charge controller is used in these systems to protect the battery from overcharge and over discharge.

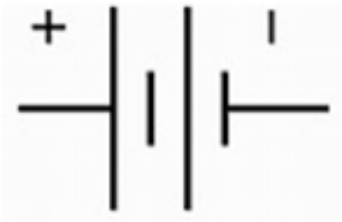

Figure 4.17: Battery

4.15 Connecting Wires

A wire is a single, usually cylindrical, flexible strand or rod of metal. Wires are used to bear mechanical loads or electricity and telecommunications signals. Wire is commonly formed by drawing the metal through a hole in a die or draw plate. Wire gauges come in various standard sizes, as expressed in terms of a gauge number. The term *wire* is also used more loosely to refer to a bundle of such strands, as in 'multi stranded wire', which is more correctly termed a wire rope in mechanics, or a cable in electricity.

4.16 Vero Board Copper DIL Strip Board

Strip board is the generic name for a widely used type of electronics prototyping board characterized by a 0.1 inch (2.54 mm) regular (rectangular) grid of holes, with wide parallel strips of copper cladding running in one direction all the way across one side of the board. It is commonly also known by the name of the original product Vero board, which is a trademark, in the UK, of British company Vero Technologies Ltd and Canadian company Pixel Print Ltd. In using the board, breaks are made in the tracks, usually around holes, to

divide the strips into multiple electrical nodes. With care, it is possible to break between holes to allow for components that have two pin rows only one position apart such as twin row headers for IDCs. Strip board is not designed for surface-mount components, though it is possible to mount many such components on the track side, particularly if tracks are cut/shaped with a knife or small cutting disc in a rotary tool.

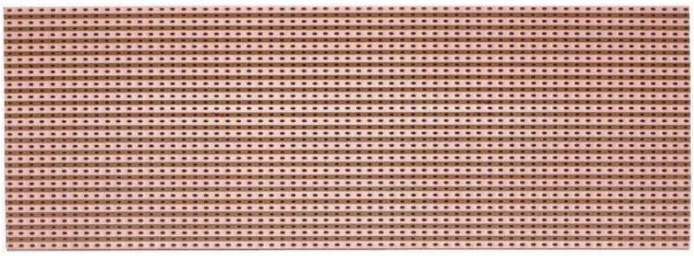

Figure 4.18: Vero Board Copper DIL Strip Board

4.17 Light Dependent Resistor

LDRs or Light dependent resistors are very useful especially in light/dark sensor circuits. Normally the resistance of an LDR is very high, sometimes as high as 1000000 ohms, but when they are illuminated with light resistance drops dramatically. Electronic onto sensors are the devices that alter their electrical characteristics, in the presences of visible or invisible light. The best-known devices of this type are the light dependent resistor (LDR), the photo diode and the photo transistors. Light dependent resistors as the name suggests depend on light for the variation of resistance.LDR are made by depositing a film of cadmium sulphide or cadmium solenide on a substrate of ceramic containing no or very few free electrons when not illuminated. The longer the strip the more the value of resistance.When light falls on the strip, the resistance decreases. In the absence of light the resistance can be in the order of 10K ohm to 15K ohm and is called the dark resistance.Depending on the exposure of light the resistance can fall down to value of 500 ohms. The power ratings are usually smaller and are in the range 50mW to 0.5W. Though very sensitive to light, the switching time is very high and hence cannot be used for high frequency applications. They are used in chopper amplifiers. Light dependent resistors are available as disc 0.5cm to 2.5cm. The resistance rises to several Mega ohms under dark conditions.The below figure shows that when the torch is turned on, the resistance of the LDR falls, allowing current to pass through it is shown in figure.

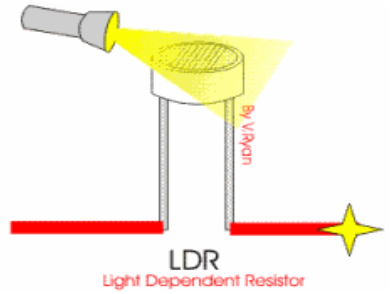

Figure 4.19: Light Dependent Resistor

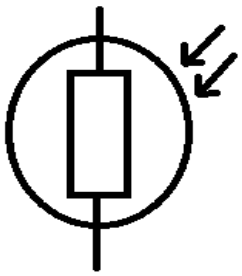

Figure 4.20: Symbol of Light Dependent Resistor

The basic construction and symbol for LDR are shown in above figures respectively. The device consists of a pair of metal film contacts separated by a snakelike track of cadmium sulphide film, designed to provide the maximum possible contact area with the two metal films. The structure is housed in a clear plastic or resin.

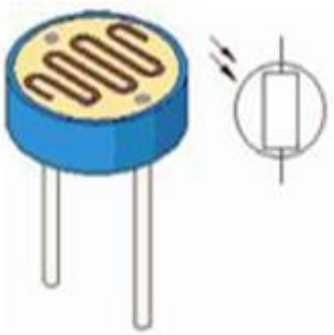

Figure 4.21: Practical Light Dependent Resistor

4.18 Project Look

Figure 4.22: Final Project Look

4.19 Summary

We are use some electrical device such as step-down transformer, resistor, capacitor, diode,Variable resistor, voltage regulator, dc battery,IR Transmitter and receiver some LED etc.

CHAPTER 5

RESULT AND DISCUSSION

5.1 Result

We have connected all the equipment's properly and finally we get Digital conference hall. Automatic light and fan control by sensor. We can easily measure temperature in the hall room. When the digital conference hall catch fire then the buzzer will give alarm automatically. On the basis of ingoing visitor and outgoing visitor, light, fan and temperature control device will work automatically. In this way proper utilization of electricity can be insured. Hence-

- We can save the energy & reduce the electricity bill of the Hall room.
- We can help to reduce the maintenance cost by digitalization
- Insure the comfortless of the audience and observer in the Hall room.

5.2 Project Menu Case

Figure 5.1: When the Person one IN and Present One Condition. Figure 5.2: When thePerson three IN and Out two with Present One Condition. Figure 5.3: When the temperature is 28^0C then fan-1 ON. Figure 5.4: When the temperature is 29^0Cfan-2 ON. Figure 5.5: When the temperature is 40^0C then buzzer will be fire alarm.

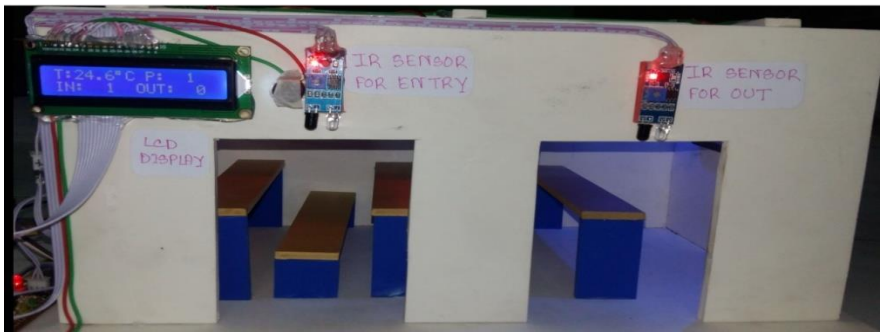

Figure 5.1: Person IN and Present Condition

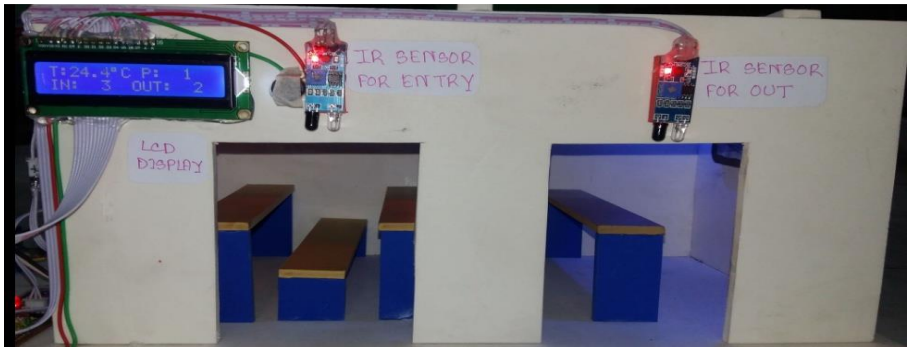

Figure 5.2: IN and Out with Present Condition

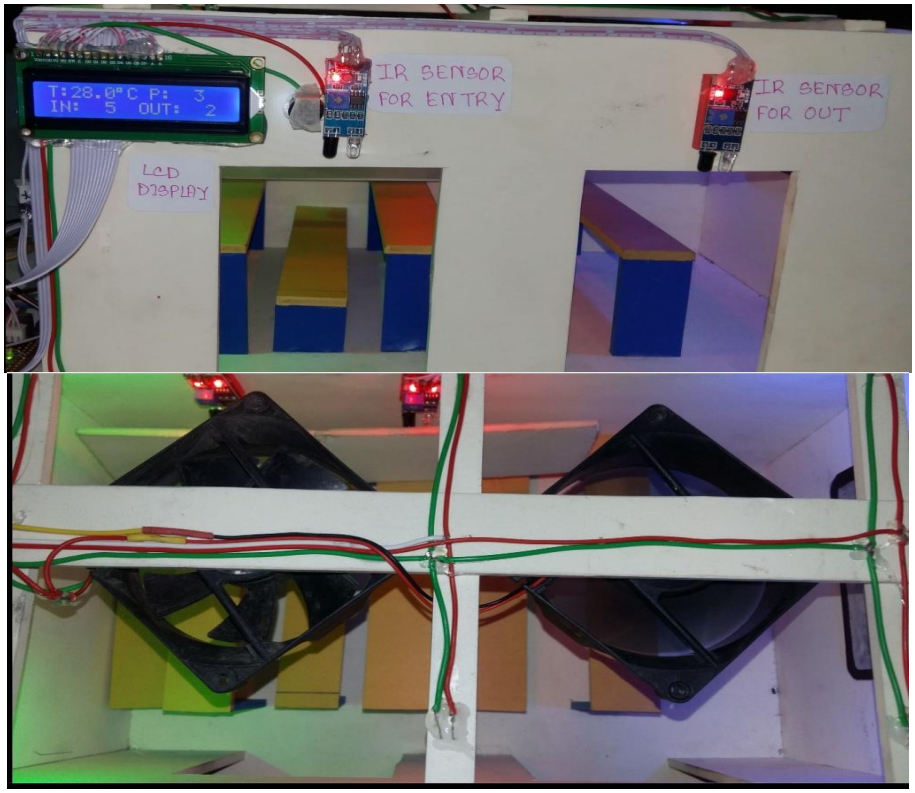

Figure 5.3: Fan One ON Condition

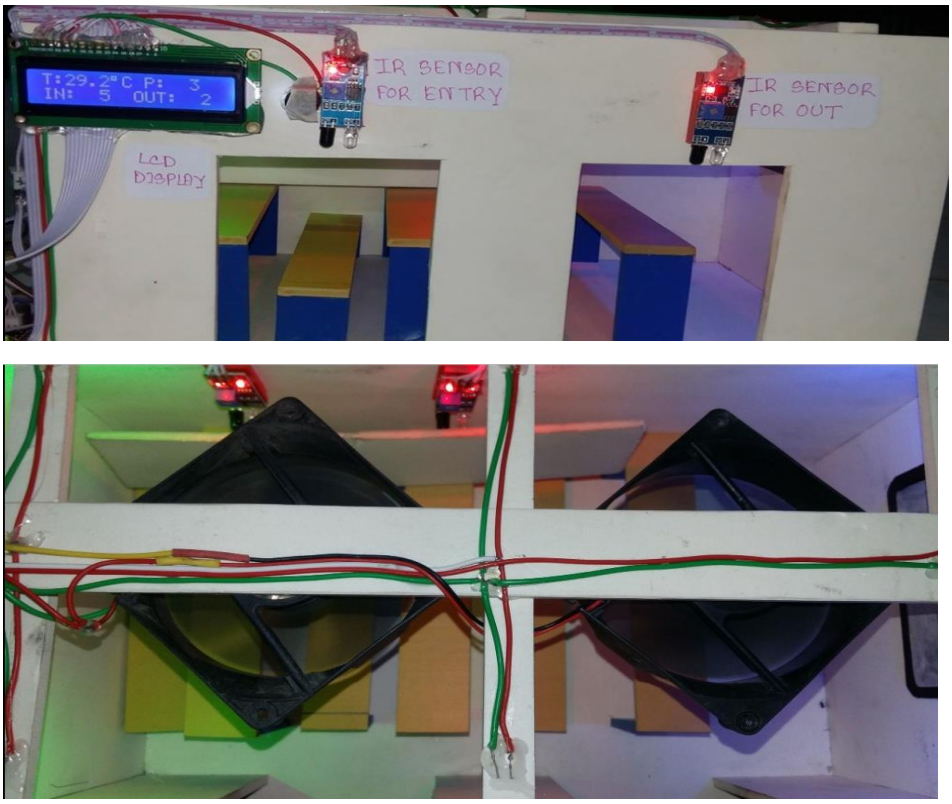

Figure 5.4: Fan Two ON Condition

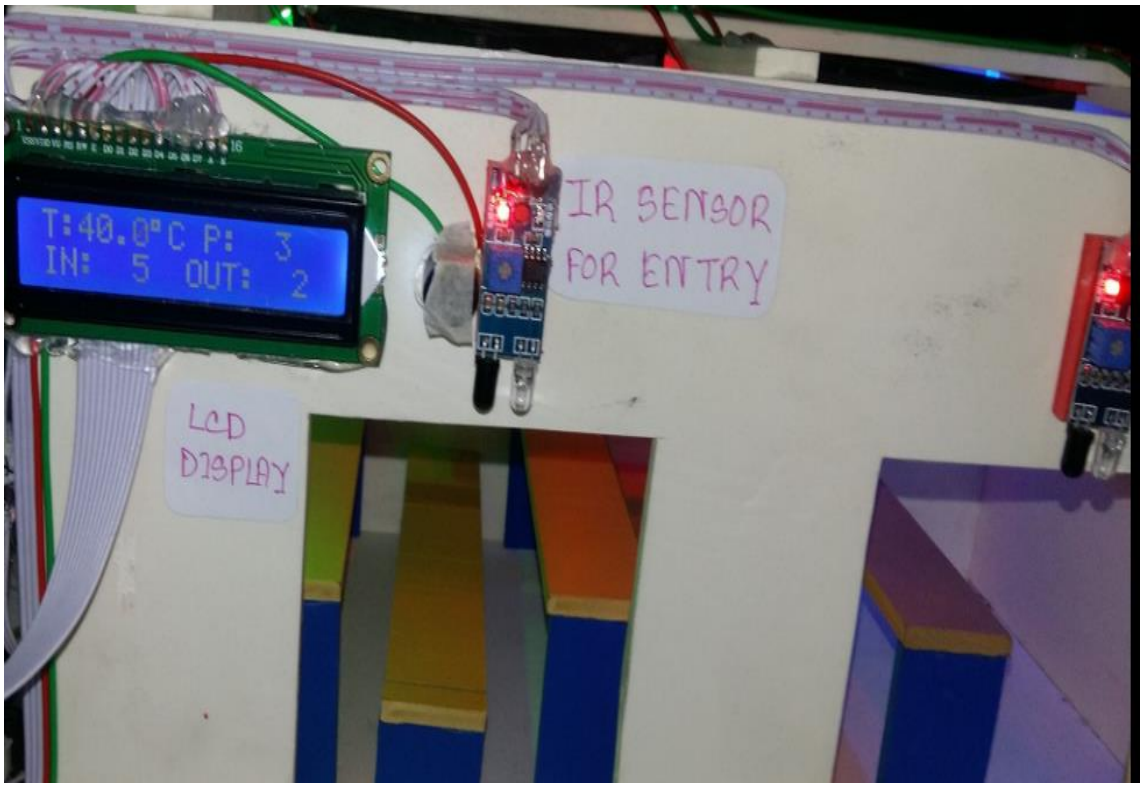

Figure 5.5: Fire Alarm

5.3 Advantage of Project

- Main advantage of this project is to help in energy conservation.
- In terms of Security it helps to check unauthorized entrances and exits. The display helps to alert and show the number of persons present.
- Low cost and very easy to implement.
- No need of human intervention.

5.4 Application

- Auditorium
- Community center
- Meeting room
- Class room

5.5 Discussion

The aim of our project is to make a controller based model to count the number of person entering into the digital conference hall. Automatic light and fan control of the digital conference hall. It is made to prevent unwanted electric power waste in schools, colleges, houses and other working places. This whole process is automatically operated by using its sensors. The project aims were to reduce the side effects of the current lighting system and find a solution to save power. In this project first thing to do is to prepare the inputs and outputs of the system to control the loads.

CHAPTER 6

CONCLUSIONS

6.1 Conclusion

The automated state of the system gives the product certain flexibility and the potential to be integrated with some of the other household systems into a universal household. This design began the framework for a more complex and more functional product. The concept of an automatic digital conference hall and visitor counter. It can be also used fire detector and alarm circuit can be built upon not just for household usage but for such settings as hotels, schools, hospitals, industrial purpose or businesses.

6.2 Limitations of the Work

Maximum 255 person count of the system.

6.3 Future Scopes

- GSM Based visitor IN,OUT,Present SMS system.
- Enter and exit person camera facing system and automatic send face picture in the control room.

REFERENCES

[1] Prof, Asha Rawat**"**Automated Room Light Controller with Visitor Counter**"**, *Imperial Journal of Inter Disciplinary Research*, Vol. 2, Issue 4, 2016

[2] Sonali K. Pawar**"**Automatic Room Light Controller Using Microcontroller And Visitor Counter **"**, *Ijictrd– International Journal Of Ict Research And Development* Vol-1 Issue-4, 6,August,2016.

[3] Kausiksen**"**AUTOMATED FIRE DETECTION AND CONTROLLING SYSTEM.**"**,

International Advanced Research Journal in Science, Engineering and Technology Vol. 2, Issue 5, May 2015.

[4] Gaurav Waradkaret**"**Automated Room Light Controller with Visitor Counter**"**,*Imperial Journal of Interdisciplinary Research* (IJIR) Vol-2,Issue 4, 2016

[5] Kimbleyet**"**Automatic Room Light Controller Using Microcontroller And Visitor Counter **"**, *IJRET: International Journal of Research in Engineering and Technology* Vol.05 Issue, 03 Mar-2016,

[6] F. J. Perez-Pinal, C. Nunez and R. Alvarez (2005), "A Novel Speed Control Fan and Room Light Controller By Using A Microcontroller", *IEEE 36th Power Electronics Specialists Conference, (PESC'05),* pp. 1339- 1345

[7] Sibuskaraet**"**Automatic Lighting Controller SibuSkaria**"**,*International Journal of Engineering Research and Development* Vol.10, Issue 2, 2014.

APPENDIX

Programming code

```
#include <16F73.h>
#use delay (clock = 16000000)

#define FAN1 PIN_C0
#define FAN2 PIN_C1
#define LOD1 PIN_C2
#define LOD2 PIN_C3
#define LOD3 PIN_C4
#define BUZ PIN_C7

void setup(void);
void LOD_CTRL(void);
voidadc_read(void);
voidlcd_show(void);
unsigned int COUNT,COUNT1,LDR,IR1,IR2,IR3,IR4,IN,OUT,PRESENT;
floattp=0,
////////////////////////////////////////////////////////////////////////////
////////////////////////////////////////////////////////////////////////////
lcd_gotoxy(1,1);
printf(lcd_putc, "   WELCOME TO   ");
lcd_gotoxy(1,2);
printf(lcd_putc, "     Sonargon University      ");
delay_ms(1500);
}
////////////////////////////////////////////////////////////////////////////
voidadc_read(void)
{
set_ADC_channel(0);
```

```
delay_ms(1);
tp = read_adc();
tp = tp * 0.2;

set_ADC_channel(1);
delay_ms(1);
   LDR = read_adc();
}
////////////////////////////////////////////////////////////////////////////
void LOD_CTRL(void)
{
if( TP > 28 )
  {
output_high(FAN1);
  }
if( TP > 29 )
  {
output_high(FAN2);
  }
if( TP < 28 )
output_LOW(FAN1);
output_LOW(FAN2);
  }
if( TP > 40 )
  {
adc_read();
lcd_show();

output_HIGH(BUZ);
delay_ms(100);
output_LOW(BUZ);
```

```
delay_ms(100);
 }
}

  ////////////////////////////// VISITOR COUNTER

IR1 = input(PIN_A2);
IR2 = input(PIN_A3);
IR3 = input(PIN_A4);
IR4 = input(PIN_RA5);
IF(! IR1)
{
IN++;delay_ms(500);
}
IF(! IR2)
IOUT++;delay_ms(500);
}
  PRESENT= ( IN - OUT );

 ////////////////////////////////////

IF(PRESENT >= 1 )
{ output_HIGH(LOD1);}

 {
if( LDR < 40 && IR3)
 }
{ output_HIGH(LOD2);}

 {
if( LDR < 40 && IR4)
```

```
 }
{ output_HIGH(LOD3);}
ELSE
{ output_LOW(LOD1);output_LOW(LOD2);output_LOW(LOD3);}
 }

}
////////////////////////////////////
voidlcd_show(void)
{
lcd_gotoxy(1,1);
printf(lcd_putc, "T:%2.1f%cC  ",TP);
lcd_gotoxy(10,1);
printf(lcd_putc, "P:%3u ",PRESENT);

lcd_gotoxy(1,2);
printf(lcd_putc, "IN:%3u  OUT:%3u  ",IN,OUT);
}
////////////////////////////////////////////////////////////////////////////
```