Design & construction of machine overheat Protection & detection system

A Project and Thesis submitted in partial fulfillment of the requirements

for the Award of Degree of

Bachelor of Science in Electrical and Electronic Engineering.

Submitted By

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January 2020

Letter of Approval

Date: January 2020
To
Israt Jahan
Lecturer,
Department of Electrical & Electronic Engineering
Daffodil International University.
Dhaka, Bangladesh.
Subject: Submission of project report.

Dear Sir,

We would like to submit here with the project paper entitled **"Design & construction of machine overheat protection & detection system"** which is being submitted in partial fulfilment of the Degree of Bachelor or of science in Electrical and Electronic Engineering. It was a great pleasure to work on such an important topic under your supervision. The project paper has been prepared according to the instruction and direction that we got time to time from you. In preparing this report, we have tried our best to include all the relevant information to make the report informative and comprehensive.

We would like to express our sincere appreciation and heartiest thanks to you for extensive cooperation while preparing the study report. We would be very happy to give any support in interpreting any part of the paper whenever needed.

Thank you

Respectfully yours,

Md. Imran Hossain Sagor
ID: 163-33-3748
Md. Fayel Ahmedd
ID: 163-33-3683

Certification

This is to certify that this project and thesis entitled “Design & construction of machine overheat protection & detection system ” is done by the following students under my direct supervision and this work has been carried out by them in the laboratories of the Department of Electrical and Electronic Engineering under the Faculty of Engineering of Daffodil International University in partial fulfillment of the requirements for the degree of Bachelor of Science in Electrical and Electronic Engineering. The presentation of the work was held on 01 January 2020.

Signature of the candidates

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Name: Md. Imran Hossain Sagor
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Signature of the supervisor

Israt Jahan

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ISRAT JAHAN
Lecturer
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The project and thesis entitled "Design & construction of machine overheat protection & detection system " submitted by **Name**:**Md.Imran Hossain Sagor ID No:163-33-3748** and **Name: Md. Fayel Ahmedd ID No 163-33-3683** Session: Fall 2019 has been accepted as satisfactory in partial fulfillment of the requirements for the degree of **Bachelor of Science in Electrical and Electronic Engineering** on 25 December 2019.

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Dedicated to

Our Parents

ACKNOWLEDGEMENT

First of all, we would like to thank and praise to “Almighty God” the most gracious the source of knowledge and wisdom endowed to mankind, who conferred us with the power of mind and capability to take this study of exciting ocean of knowledge. Then we would like to thank my parents for their unconditional supports and care during my whole educational period. It is a great honour for us to work under the guidance of our honourable supervisor **Israt Jahan,** Lecturer, Department of Electrical and Electronic Engineering, Daffodil International University, Dhaka for his relentless assistant, scholastic, valuable advice and kind cooperation for the successful progress of the work on “Design & construction of machine overheat protection & detection system.” This could not be possible without his help. We are grateful to our honourable Vice Chancellor **Prof. Dr. Yousuf Mahbubul Islam,** Daffodil International University for providing golden opportunity for achieving our degree of Bachelor of Science in Electrical and Electronic Engineering and his best co-operation. We are also grateful to all the honourable teachers of EEE Department for their cooperation and help in our various activities specially **Prof. Dr. Md.Shahid Ullah,** Departmental Head of Electrical and Electronic Engineering Department, Daffodil International University for his everlasting encouragement and immense cooperation offered in amicable and pleasant manner throughout the project work. Space does not allow us to mention each person by name, but we are deeply grateful to everyone associated with this work. We also wish to give complements to all our respective concern teachers and staffs of our department for their direct and indirect assistance at different times.

Thank you all

ABSTRACT

In modern machines various alerts are installed in machines controllers. They utilize sensors and machine states to show to end-clients different data (for example diagnostics or need of upkeep) or to place machines in a particular mode (for example close down when warm insurance is enacted).. In group generation machines, setting off an alert (for example warm security) in a cluster creation is essential for the nature of the delivered group and results into a high generation misfortune.. In this paper we show the adequacy of Least Squares Support Vector Machines (LS-SVMs) in foreseeing the development of the temperature in a steel creation machine and, as an outcome, potential cautions because of overheating. Thereafter, the Micro controller model is utilized online to estimate the future temperature pattern. At last, in this venture we are recognizing machine overheat by smaller scale controller. Microcontroller comprises of memory, CPU, input yield unit and simple to advanced convertor gadgets. Another framework called accuracy temperature controller, which is a control framework that supplant manual settings of fan agreement to temperature, fan speed increments with increment in temperature and the other way around. The sensor take temperature from outer condition then a microcontroller convert this temperature from simple to computerized by a convertor and contrast it and a put away information and make the appropriate move. The structured framework can measures the temperature of a machine in a processing plant naturally and respond in like manner.

LIST OF FIGURES

LIST OF TABLES

List of Abbreviations

CMOC	Complementary metal oxide semiconductor
CRT	Cathode ray tube
EEPROM	Electrically erasable programmable read-only memory
HVAC	Heating, Ventilation and Air Conditioning
I\O	Input\Output
ISR	Interrupt Service Routine
LED	Light Emitting Diode
N.T.C	Negative Temperature Coefficient
PMD	Polarization Mode Display
RAM	Random Access Memory
RISC	Reduced Instruction Set Computer

List of Symbols

K	Kilo
Ω	Ohms
uF	Microfarad
°c	Degree Celsius
Hz	Hertz
f	Fundamental Frequency
V	Volts
I	Current
C	Capacitance
Q	Charge
P	Power
R	Resistance

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CHAPTER 1
INTRODUCTION

1.1 Introduction:

As of late, server overheating has gotten one of the most significant worries in enormous scale server farms. Because of the contemplations, for example, land and incorporated administration, server farms keep on expanding their processing abilities by sending high-thickness servers (e.g., cutting edge servers). Accordingly, the undeniably high server and in this way control densities can prompt some major issues. Initially, the diminished server space may bring about a more prominent likelihood of warm disappointments for different parts inside the servers, for example, processors, hard circles, and recollections. Such disappointments may cause undesired server shutdowns and administration interruption. Second, despite the fact that a few segments may not bomb promptly, their lifetimes might be fundamentally diminished because of overheating. It is accounted for in that the lifetime of an electronic gadget diminishes exponentially with the expansion of the working temperature. At long last, the created warmth scattering can likewise prompt negative natural ramifications. Consequently, it is significant for every server part to have at a fever underneath its overheating limit. Be that as it may, in the present server farms, how to decisively distinguish whether any part in a server is overheating stays an open inquiry. The present act of identifying and checking an over-warming server can be partitioned into two classifications. The main class is a coarse-grained approach that lone uses the temperature at an intermediary segment, e.g., CPU or at a fixed area, e.g., the server delta, for server overheating checking. This is as opposed to the way that various parts in a server may have diverse overheating edges, which are firmly identified with their separate warm disappointment rates and anticipated lifetime Depending on a solitary.

Scope of Work

1.2 Scope of Work:

Several scopes and guidelines are listed to ensure the project is conducted within its intended boundary. The first scope of this project is to understand theoretical aspect of temperature sensor including working principles, characteristic of the sensor, and quality. From the analyses, a humidity & temperature sensor is chosen to make the system work properly Meanwhile, the second scope of this project is the development of an humidity & temperature based control system. Base on the investigation that previously done, some application of a certain part.

MOTIVATION

1.3 Motivation:

In conventional framework, when the machine working in the business due to over voltage and some incident, machine become overheat it cause to harm in industry subsequently we need a gadget that can control this kind of luck, there we will utilize the warmth locator that decrease the human exertion, if some blunder and any sort of any unsettling influence come in the circuit like over voltage consequently we use heat identifier gadget that give the sign if any paranormal aggravation happens in the circuit.

OBJECTIVE

1.4 Objective:

The principle goal of the project is to design a programmable consecutive exchanging of any heap utilizing inserted framework based small scale controller idea. It utilizes smaller scale controller from the 8051 family, which is of 8-piece. The advancement of this application requires the arrangement of miniaturized scale controller engineering - that is, the

determination of the machines, and composing troubleshooting of the application program. In this venture, the clock assumes a significant job, wherein it is utilized in these modes: the set mode, auto mode and manual mode for controlling various machines.

METHODOLOGY

1.5 Methodology:

A basic heat detector circuit is appeared in the figure that can be utilized as a warmth sensor. In this warmth indicator circuit outline, a potential divider circuit is framed with an arrangement association of thermistor and 100 Ohms opposition. In the event that (Negative temperature Coefficient) N.T.C type transistor is utilized, at that point the opposition of thermistor diminishes in the wake of warming. In this manner, increasingly current moves through the potential divider circuit framed by thermistor and 100 ohms protections. Subsequently, more voltage shows up at the intersection of thermistor and resistor.

HEAT DETECTOR CIRCUIT

1.4 Heat Detector Circuit:

Let us believe about thermistor having 110 Ohms, and after heating its resistance value become 90 Ohms. At that time, as per potential divider circuit which is enveloping conception specifically voltage divider the voltage across one resistor and the ratio of that resistor's value and the sum of resistances period the voltage across the series combination are equivalent. The input/output connection for this heat detector circuit method, takes the form of a ratio of the output voltage to the input voltage which is given by the voltage divider concept in this particular concept. After all, the output voltage is applied to NPN transistor shown in the circuit in the course of a resistor. A Zennor diode is used to maintain emitter voltage at 4.7 volts, which can be used comparatively. But the base voltage is better than the emitter voltage, then the transistor starts transmission. This is for the reason that as the transistor get previous than 4.7V base Voltage and a buzzer are connected to complete the heat detector circuit which is used for produce sound.

CHAPTER 2
LITERATURE REVIEW

2.1 Introduction:

Prof. Mukesh Tiwari & Mr. Manish Shrivastava (2013) [1] were demonstrated this project to develop machine overheat detection with alert blog known as “heat detector”. This project discussed about the need of such a heat detector that would ease the existing industries area now a days. In the traditional system, several people are required to monitor a machine lot so as to assess the number of free slots and match it with the capacity of a working machine. If this system is replaced with an automated indicator the number of People employed would reduce. The need for each component is also elucidated. The heat detector is the main theme of this project. The board is controlled using a program that is written on it. The program assessed the number of switches squeezes where each switch relates to a space and subtracts it from the limit or the all out number of openings present. The writing likewise portrays the normal anode show used to show the quantity of free spaces determined utilizing the program. Driven is utilized to show the quantity of free spaces that are vacant.

2.2 Discussion:

The project additionally discussed the utilization of an identification frame-work . Kushagra Kumar Choubey & Mousam Sharma (2015) [2] depicted a plan of temperature controller that drives the transfers the framework turning ON/OFF for moderating the temperature. In 1959, Some upgrades were proposed to a straightforward temperature controller utilizing a Pt opposition thermometer as one arm of an air conditioner obstruction connect that was distributed by Wilson and has been working in numerous research facilities. Here a transistor preamplifier is utilized to enact a transfer that turns ON/OFF the framework. In March 2010 out of an IEEE distribution, another insightful temperature control framework dependent on Microcontroller AT89S51 was proposed where the temperature estimation gadget utilized comprises of the 1-Wire transport advanced temperature sensor DS18B20 and the

temperature observing over a specific range could be accomplished. Here in this paper an I2C based Digital Temperature sensor IC is utilized to quantify the temperature that measures with an a lot higher goals and exactness. For the control of temperature with better exactness a PWM signal is utilized to drive a MOSFET that thus controls the present that drives the warming component. Prof.P. V. Gawande. (2013) [4] clarifies the dependability information of fire location and caution frameworks was made coming about to unpleasant evaluations of some disappointment frequencies. No hypothetical or specialized articles on the structure of unwavering quality models of these establishments were found. Assessment records of fire discovery and alert framework establishments by SPEK were contemplated, and moved in electronic information base arranging watched disappointments in disappointment modes (59) and seriousness classes guided by unreservedly composed records in the first information. They are introduced here in unthinkable structure for the first and new addressable frameworks. Populaces were tallied exclusively, however for all establishments required records were not accessible. Along these lines, introduced disappointment frequencies are simply first gauges, which will be refined later. Syed Sayeed Ahmed, et.al (2016) [5] was a time of huge development in the ubiquity of smoke alarms.

2.3 Conclusion:

The project look into the general information base concerning the activity of smoke alarms. The vast majority of the down to earth methods for assessing the reaction of smoke alarms were gotten from this period and have remained to a great extent unaltered. Without anyone else's input, this fact isn't critical. In any case, there have been noteworthy advances in locator innovation since that time, including progressively uniform smoke passage qualities among finder advances, diminished affectability to annoyance (i.e., non-fire) sources, calculation based identification and multi-sensor, multi-criteria recognition. Research into the current trend toward the development of fire detection algorithms and multi-sensor, multi-criteria fire detectors is prevalent in the literature in the last decade [e.g. 1996; Milke and McAvoy, 1997; Rose-Pehrsson, et al., 2000; Wong, et al., 2000]. However, advancement in the research behind predicting the response of common spot-type ionization and photoelectric detectors has been minimal. More fundamental approaches exist to model the detectors, though these methods have not been advanced sufficiently to prove practically useful for modelling smoke detectors.

CHAPTER 3
THEORY

3.1 Introduction

Thermistor Working Procedure with Applications:

A thermistor is a temperature sensor built of semiconductor material that shows an enormous change in obstruction in relation to a modest low alteration in temperature.

Thermistors are cheap, tough, dependable and reacts speedily. As a result of these characteristics thermistors are utilized to gauge basic temperature estimations, however not for high temperatures.

Thermistor is anything but difficult to utilize, modest, tough and react typically to an adjustment in temperature. Thermistors are generally utilized in computerized thermometers and home machines, for example, fridge, broilers, etc.

Dependability, affectability and time steady are the last properties of thermistor that make these thermistors solid, compact, cost-effective, delicate and best to quantify single-point temperature.

Thermistors are accessible in various shapes like pole, circle, dot, washer, etcThis article gives a review of thermistor working standard and applications

3.2 What is Thermistor and How it Works?

A thermistor is a reasonable and effectively realistic temperature touchy resistor, thermistor working rule is,it's obstruction is relies on temperature. At the point when temperature changes, the opposition of the thermistor changes in an anticipated manner. The advantages of utilizing a thermistor is precision and soundness.

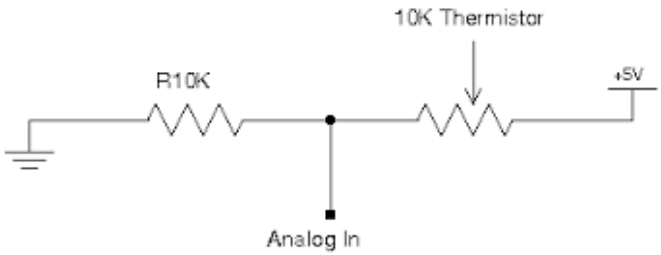


Figure 3.1: thermistor 10k

3.3 Requirements

The Model direction report characterizes least measures for temperature and dampness observing and alert project and segments, and for the operational direction of these project.

3.4 Temperature monitoring systems

Air temperature checking structures and devices should be presented in all temperature controlled. Rooms used to store TTSPPs. Sensors should be arranged in zones where the best capriciousness in temperature is depended upon to occur inside the guaranteed accumulating volume and they should be arranged so as to be insignificantly affected by transient events, for instance, gateway opening.

3.5 Alarm systems

Temperature, and where essential, mugginess caution frameworks ought to be connected to the observing project. At the point when temperature and stickiness going to changed sensor will give a sign to caution.

3.6 Temperature

Thermistor 10k simple temperature and moistness sensor is a composite Sensor contains an aligned advanced sign yield of the temperature and dampness. Use of a devoted mechanized modules group innovation and the temperature and humidity detecting innovation ,to guarantee that the item has high unwavering quality and great long heave security. The sensor incorporates a resistive feeling of wet parts and a NTC temperature estimation gadget, and associated with an elite 8-piece microcontroller.

3.7 How A Thermistor Works

Introduction:

A thermistor is a component that has an opposition that changes with temperature. There are two kinds of thermistor, those with an opposition that expansion with temperature (Positive Temperature Coefficient – PTC) and those with an obstruction that falls with temperature (Negative Temperature Coefficient – NTC).

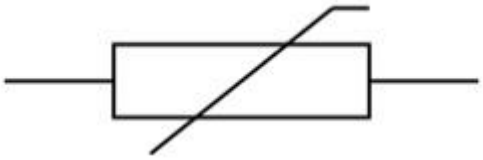


Figure 3.1.2: Thermistor

3.7.1 Temperature co-efficient:

The most common type of thermistors are those in which resistance decreases as the temperature increases (NTC).

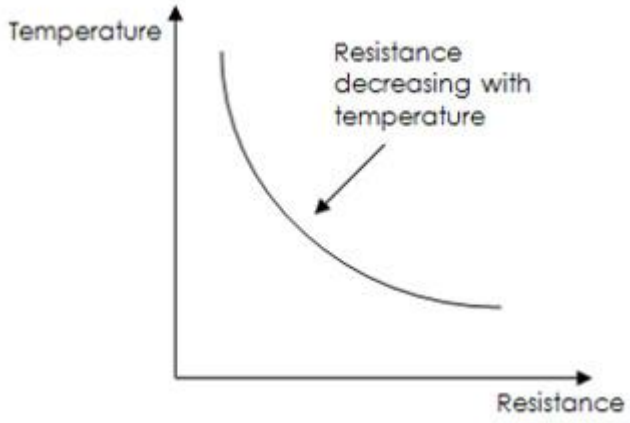


Figure 3.1.3: Characteristic Diagram of thermistor

The sum by which the resistance diminishes as the temperature increments isn't steady, it differs in a non direct way. An equation can be utilized to figure the opposition of the thermistor at some random temperature. Regularly these are determined for you and the data can be found in the gadgets datasheet.

Thermistor Applications:

There are a lot of application for a thermistor, three of the most popular are programmed under.

Temperature sensing:

The majority apparent application for a thermistor is to measure temperature, they are used to do this in a wide range of products such as thermostats.

In rush current limiting:

In this application the thermistor is utilized to at first restrict the progression of current (by having a high obstruction) into a circuit. At that point as the thermistor heats up (because of the progression of power through the gadget) its obstruction drops letting current stream all the more effectively.

Circuit protection:

In this application the thermistor is utilized to secure a circuit by constraining the measure of current that can stream into it. In the event that an excess of current begins to stream into a circuit through the thermistor this makes the thermistor warm up. This thus builds the obstruction of the thermistor lessening the present that can stream into the circuit.

Example:

The circuit appeared underneath shows a straightforward method for developing a circuit that turns on when it goes hot. The reduction in obstruction of the thermistor in connection to the next resistor which is fixed as the temperature rises will make the transistor turn on. The estimation of the fixed resistor will rely upon the thermistor utilized, the transistor utilized and the supply voltage.

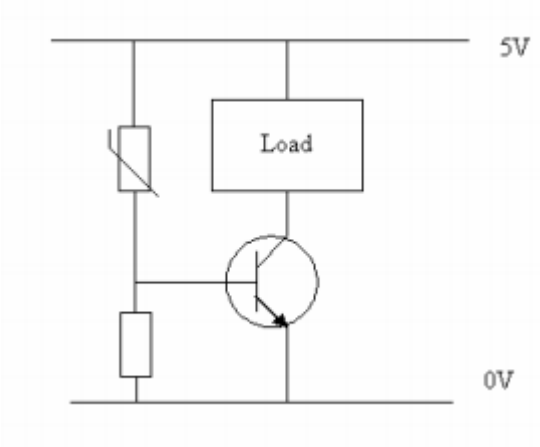


Figure 3.1.4: Circuit Diagram of thermistor

3.7.2. Applications

Air conditioning, dehumidifier, testing and review gear, purchaser merchandise, car, programmed control, information lumberjacks, climate stations, home machines, stickiness controller, therapeutic and other moistness estimation and control.

3.7.3. Features

Minimal effort, long haul solidness, relative stickiness and temperature estimation, great quality, quick reaction, solid enemy of impedance capacity, long separation signal transmission, advanced sign yield, and exact adjustment.

3.8 Microcontroller

A microcontroller is a coordinated chip that is regularly part of an inserted project. The microcontroller incorporates a CPU, RAM, ROM, I/O ports, and clocks like a standard PC, but since they are intended to execute just a solitary explicit errand to control a solitary framework, they are a lot littler and improved with the goal that they can incorporate every one of the capacities required on a solitary chip.

A microcontroller varies from a microchip, which is a broadly useful chip that is utilized to make a multi-work PC or gadget and requires numerous chips to deal with different assignments. A microcontroller is intended to be increasingly independent and free, and capacities as a little, devoted PC.

The incredible preferred position of microcontrollers, instead of utilizing bigger microchips, is that the parts-tally and configuration expenses of the thing being controlled can be kept to a base. They are ordinarily structured utilizing CMOS (corresponding metal oxide semiconductor) innovation, a proficient manufacture strategy that utilizations less power and is safer to control spikes than different strategies. There are additionally various models utilized, yet the transcendent design is CISC (Complex Instruction Set Computer), which permits the microcontroller to contain different control guidelines that can be executed with solitary full scale guidance. Some utilization a RISC (Reduced Instruction Set Computer) design, which actualizes less guidelines, however conveys more noteworthy effortlessness and lower control utilization. Early controllers were ordinarily worked from rationale parts and were normally very enormous. Afterward, microchips were utilized, and controllers had the option to fit onto a circuit board. Microcontrollers currently place the entirety of the required segments onto a solitary chip. Since they control a solitary capacity, some unpredictable gadgets contain numerous chip. Microcontrollers have gotten regular in numerous territories, and can be found in home apparatuses, PC hardware, and instrumentation. They are frequently utilized in autos, and have numerous modern uses too, and have become a focal piece of mechanical apply autonomy. Since they are generally used to control a solitary procedure and execute straightforward guidelines, microcontrollers don't require critical handling power.

Embedded design

A microcontroller can be view as an independent construction with a processor, memory and peripherals and can be utilize as an insert project. Most of microcontrollers being used today are implanted in other hardware, for example, autos, phones, apparatuses, and peripherals for PC frameworks. These are called inserted frameworks. While some inserted frameworks are modern, many have insignificant prerequisites for memory and program length, with no

working framework, and low programming multifaceted nature. Run of the mill information and yield gadgets incorporate switches, transfers, solenoids, LEDs, little or custom LCD shows, radio recurrence gadgets, and sensors for information, for example, temperature, mugginess, light level and so on. Installed frameworks for the most part have no console, screen, circles, printers, or other unmistakable I/O gadgets of a PC, and may need human association gadgets of any sort.

Interrupts

Microcontrollers must give ongoing (unsurprising, however not really quick) reaction to occasions in the inserted framework they are controlling. At the point when certain occasions happen an intrude on framework can flag the processor to suspend preparing the present guidance succession and to start an interfere with administration routine (ISR, or "interfere with handler"). The ISR will play out any handling required dependent on the wellspring of the hinder before coming back to the first guidance arrangement. Conceivable interfere with sources are gadget subordinate, and frequently incorporate occasions, for example, an interior clock flood, finishing a simple to advanced transformation, a rationale level change on an information, for example, from a catch being squeezed, and information got on a correspondence interface. Since control utilization is significant as in battery worked gadgets, hinders May likewise 20 wake a microcontroller from a low power rest state where the processor is ended until required to accomplish something by a fringe occasion.

3.8.1 Programs

Microcontroller programs have to well in the available on-chip program memory, because it would be costly to supply a system with external, flexible, memory. Compilers and assemblers are used to turn high-level language and assembler words codes into a compressed machine code for storage space in the microcontroller's memory. Depending on top of the device, the program memory might be stable, read-only memory that can only be programmed at the factory, or program memory may be field-alterable flash or erasable read-only memory.

3.9 Liquid Crystal Display (LCD)

A fluid precious stone showcase (LCD) is an electro-optical plentiful modulator acknowledged as a slight, level presentation gadget made up of any number of shading or monochrome pixels exhibited before a light source or reflector. It is regularly used in battery-fuelled electronic gadgets since it utilizes extremely modest quantities of electric power.

LCDs have gotten main stream over ongoing years for data show in numerous „smart" machines. They are generally constrained by smaller scale controllers. They make muddled hardware simpler to work.

LCDs come in numerous shapes and sizes yet the most widely recognized is the 16character x 2 lines show. It requires just 11 associations – eight bits for information (which can be diminished to four if vital) and three control lines. It runs with a stockpile voltage of 5v DC and just needs 1mA of current .the showcase difference can be fluctuated by changing the voltage into pin of the presentation, for the most part with a trim pot.

Lately the LCD is finding across the board use supplanting LEDs. This is because of following reasons:

1. The declining costs of LCDs

2. The capacity to show numbers, characters, and illustrations. This is rather than LEDs, which are restricted to numbers and a couple of characters.

CHAPTER 4
ANALYSIS AND SIMULATION

4.1 INTRODUCTION

This chapter gives an explanation on the method and step used in designing the humidity and temperature control system. It includes the description of the design flow, design architecture and detail explanations for the software development as well as hardware development.

4.1.1 Microcontroller chip

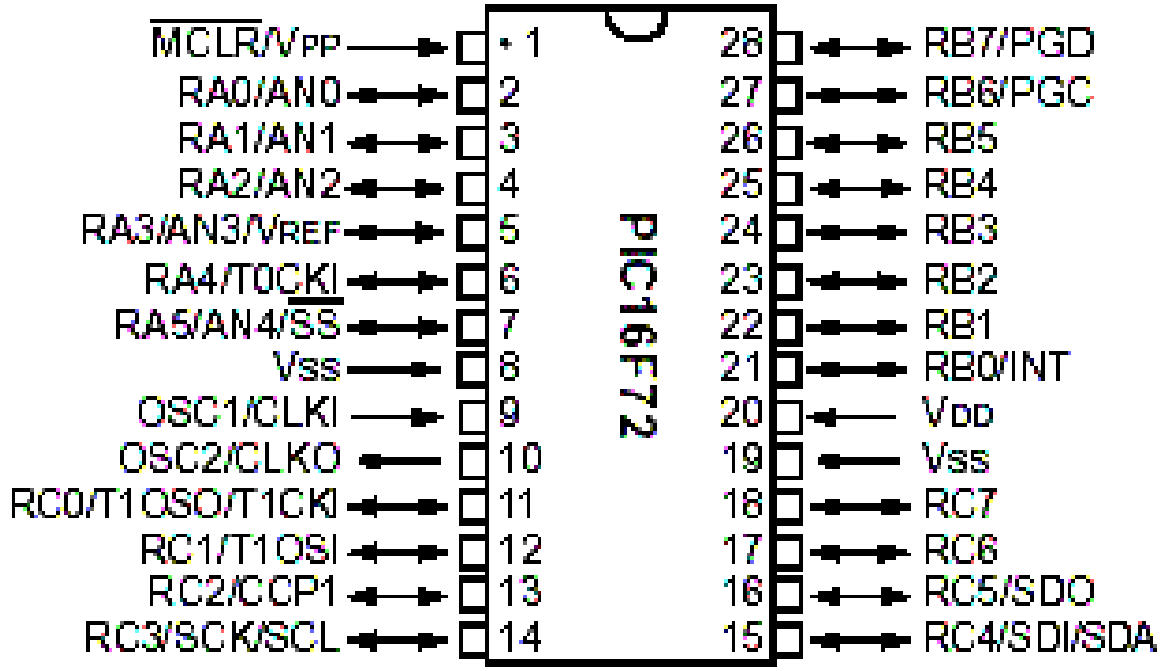


Figure 4.1: Pic16F72

Figure 4.1.1: IC16F72

PIC microcontrollers are a gathering of specific microcontroller chips conveyed by Microchip Technology in Chandler, Arizona. The shortened form PIC signifies "periphery interface controller," notwithstanding the way that that term is now and again used nowadays. A microcontroller is an insignificant microcomputer expected to oversee the action of introduced systems in motor vehicles, robots, office machines, remedial contraptions, convenient radios, treat machines, home mechanical assemblies, and various devices. A normal microcontroller consolidates a processor, memory, and peripherals. The PIC microcontrollers advance to experts and experimenters, especially in the fields of contraptions and mechanical self-rule. Key features fuse wide availability, negligible exertion, straightforwardness of recreating with worked in EEPROM (electrically erasable programmable read-just memory), a wide combination of free application notes, plenteous headway gadgets, and a great deal of information open on the Internet. The PIC microcontrollers every now and again appear under the brand name PIC scaled down scale. Every PIC microcontroller has a great deal of registers that in like manner fill in as RAM (subjective access memory). Specific explanation control registers for on-chip hardware resources are moreover mapped into the data space. Every PIC has a stack that 12 extras return addresses. The stack was not programming open on the past variations of the PIC, yet this limitation was emptied in later devices. To make wearable obstacle acknowledgment structure for ostensibly crippled people respond faster, it should be outfitted with bleeding edge microcontroller to lessen computational multifaceted nature. PIC 16F877A was picked to perceive any switch actuated and make the sound sounds and vibrations. The PIC doesn't have a working system and basically runs the program in its memory when it is turned on.

PIC microcontroller is a little PC on a single facilitated circuit which stores a ton of headings. It contains a processor focus, memory, and programmable data/yield peripherals. PIC is a huge portion in the proposed system which deals with a Micro C programming code which was presented in it. The structure is incorporated by its little measure and insignificant exertion when it is differentiated and various systems that usage separate microchip, input/yield devices, and memory. Mixed sign microcontrollers are typical, consolidating straightforward sections expected to control non progressed electronic structures. PIC microcontroller works at +5 V which can be controlled utilizing the voltage controller (L7805) which monitors voltage at +5 V if the information voltage for it surpasses +5 V. Likewise PIC can't run without utilizing its precious stone oscillator which is utilized to execute the programming code. The PIC is utilized as a continuous preparing component; accordingly, a high recurrence oscillator is utilized.

4.1.2 Overview

The PIC16F72 has a place with the Mid-Range group of the PIC device. A square chart of the device is appeared in Figure 1-1. The program memory contains 2K words, which mean 2048 guidelines, since every 14-piece program memory word is a similar width as every device guidance. The information memory (RAM) contains 128 bytes. There are 22 I/O sticks that are client configurable on a pin-to-stick premise. A few pins are multiplexed with other device capacities

. These functions include:

• External interrupt

• Change on PORTB interrupts

• Timer0 clock input

• Timer1 clock/oscillator

• Capture/Compare/PWM

• A/D converter

• SPI/I2C Table 1-1 details the pin out of the device with descriptions and details for each pin.

4.2 PIC16F72 BLOCK DIAGRAM

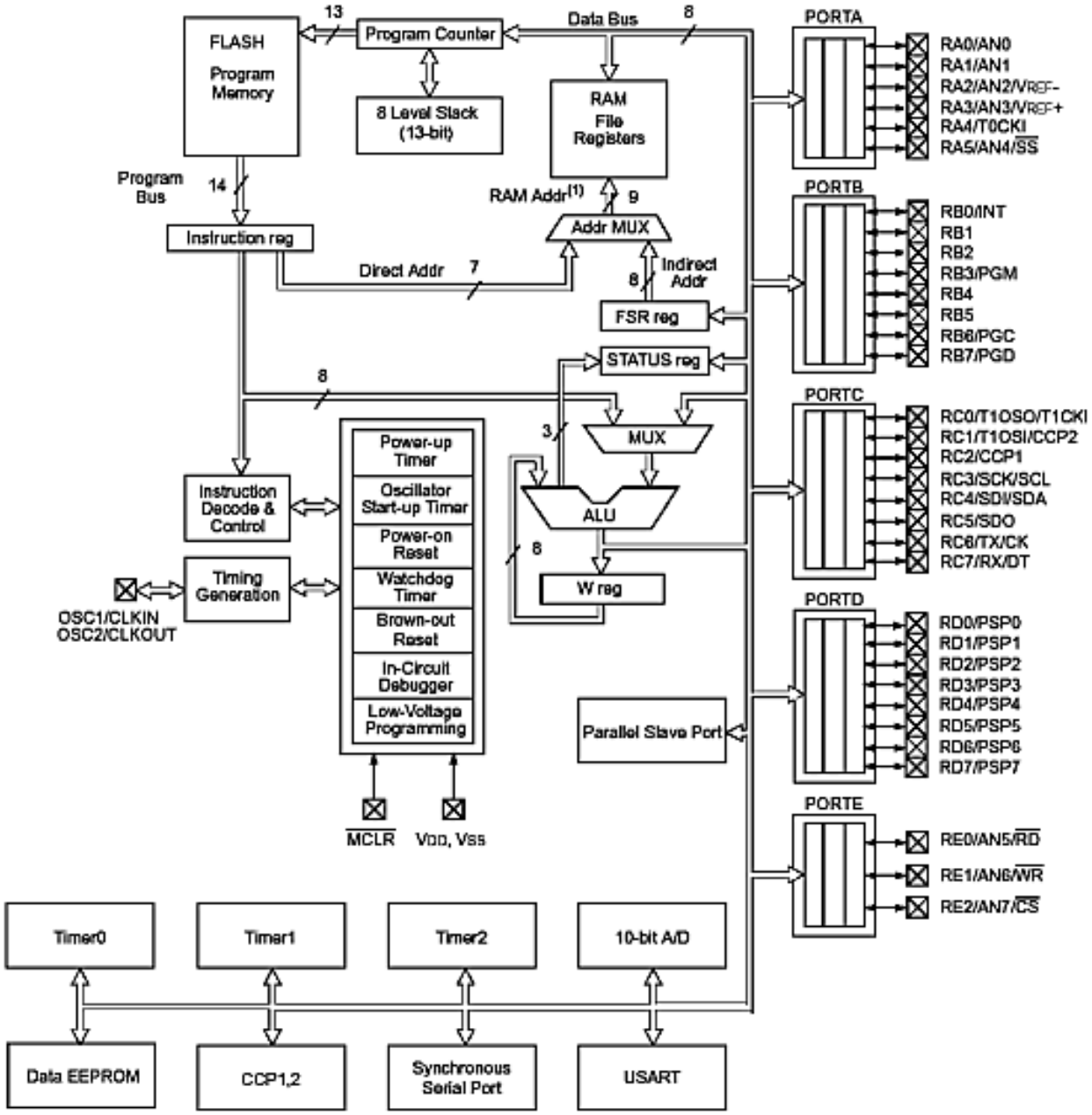


Figure 4.2: Pin Descriptions

					PORTC is a bi-directional I/O port.
RC0/T1OSO/ T1CKI	11	8	I/O	ST	RC0 can also be the Timer1 oscillator output or Timer1 clock input.
RC1/T1OSI	12	9	I/O	ST	RC1 can also be the Timer1 oscillator input.
RC2/CCP1	13	10	I/O	ST	RC2 can also be the Capture1 input/Compare1 output/ PWM1 output.
RC3/SCK/SCL	14	11	I/O	ST	RC3 can also be the synchronous serial clock input/output for both SPI and I^2C modes.
RC4/SDI/SDA	15	12	I/O	ST	RC4 can also be the SPI Data In (SPI mode) or Data I/O (I^2C mode).
RC5/SDO	16	13	I/O	ST	RC5 can also be the SPI Data Out (SPI mode).
RC6	17	14	I/O	ST	
RC7	18	15	I/O	ST	
Vss	8, 19	5, 16	P	—	Ground reference for logic and I/O pins.
VDD	20	17	P	—	Positive supply for logic and I/O pins.

Legend: I = input O = output I/O = input/output P = power
— = Not used TTL = TTL input ST = Schmitt Trigger input

Note 1: This buffer is a Schmitt Trigger input when configured as the external interrupt.
2: This buffer is a Schmitt Trigger input when used in Serial Programming mode.
3: This buffer is a Schmitt Trigger input when configured in RC Oscillator mode and a CMOS input otherwise.

Table 4.1: Pin Difference

4.3 Memory Organization

There are two memory obstructs in the PIC16F72 device. These are the program memory and the information memory. Each square has separate transports with the goal that simultaneous access can happen. Program memory and information memory are clarified in this segment. Program memory can be perused inside by the client code (see Section 7.0). The information memory can additionally be separated into the universally useful RAM and the Special Function Registers (SFRs). The tasks of the SFRs that control the "centre" are depicted here. The SFRs used to control the fringe modules are portrayed in the segment talking about every individual fringe module.

4.3.1 Program Memory Organization

PIC16F72 devices have a 13-piece program counter fit for tending to a 8K x 14 program memory space. The location extend for this program memory is 0000h - 07FFh. Getting to an area over the physically executed location will cause a wraparound. The RESET Vector is at 0000h and the break off Vector is at 0004h.

4.4 Liquid Crystal Display (LCD)

A fluid gem show (LCD) is a flimsy, level electronic visual presentation that uses the light balancing properties of fluid precious stones (LCs). LCs doesn't radiate light straightforwardly. LCDs in this way need a light source and are named "latent" shows. A few kinds can utilize surrounding light, for example, daylight or room lighting. There are numerous sorts of LCDs that are intended for both unique and general employments. They can be upgraded for static content, point by point still pictures, or dynamic, quick changing, video content. They are utilized in a wide scope of utilizations including: PC screens, TV, instrument boards, air ship cockpit shows, signage, and so forth. They are normal in purchaser gadgets, for example, video players, gaming gadgets, tickers, watches, adding machines, and phones. LCDs have uproot cathode beam tube (CRT) shows in a lot of applications. They are normally increasingly minimal, lightweight, versatile, and lower cost. They are accessible in a more extensive scope of screen sizes than CRT and other level board shows. There are two sorts of information transport a client can pick which are 8 piece and 4 piece information transport. For a 8-piece information transport, the showcase requires a +5V supply in addition to 11 I/O lines. For a 4-piece information transport it just requires the inventory lines in addition to seven additional lines. The LCD additionally requires 3 control lines from the microcontroller. In this framework, 8 piece information transports is utilized as this mode is a lot easier to set up than 4 piece information transport.

4.4.1 LCD Control Pins

LCDs are more vitality productive, and offer more secure transfer, than CRTs. Its low electrical force utilization empowers it to be utilized in battery-fueled electronic hardware. It is an electronically-regulated optical gadget made up of any number of pixels loaded up with fluid gems and showed before a light source (backdrop illumination) or reflector to create pictures in shading or monochrome.

Enable (E)	This line enables access to the showcase through R/W and RS lines. At the point when this line is low, the LCD is impaired and overlooks signals from R/W and RS. At the point when (E) line is high, the LCD checks the condition of the two control lines and reacts as needs be.
Read/Write (R/W)	This line decides the bearing of information between the LCD and microcontroller. At the point when it is low, information is kept in touch with the LCD. At the point when it is high, information is perused from the LCD
Register select (RS)	With the assistance of this line, the LCD deciphers the sort of information on information lines. At the point when it is low, a guidance is being kept in touch with the LCD. At the point when it is high, a character is being kept in touch with the LCD.

Table 4.2: LCD Details

Figure 4.3: LCD Display

4.5 L7805CV Linear Voltage Regulator

Figure 4.4: Voltage Regulator

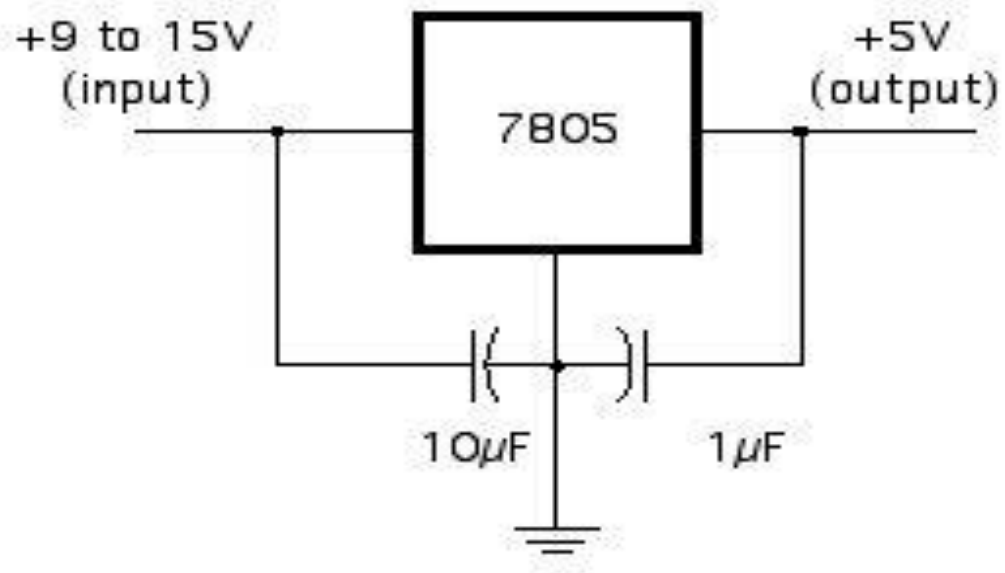


Figure: 4.5: L7805CV Pin Diagram

4.5.1 L7805CV OPERATION

L78 Series of fixed yield voltage controllers are helpful in a wide scope of uses inside the gadgets Industry. The three terminal positive straight voltage controllers can evacuate issues that are connected with single point guideline by giving nearby on-card guideline.

The ST Regulator IC can convey up to 1.5A at the fixed yield voltage, which can go from 5 V to 24 V. The voltage controller offers safe zone insurance with the expansion of inside warm shutdown and current restricting.

4.6 Transformer

Each electrical and electronic gadget that we use in our everyday life will require a power supply. All in all, we utilize an AC supply of 220V 50Hz, yet this power must be changed into the necessary structure with required qualities or voltage extend for giving force supply to various sorts of gadgets. There are different sorts of intensity electronic converters, for example, step-down converter, step-up converter, voltage stabilizer, AC to DC converter, DC to DC converter, DC to AC converter, etc. For instance, consider the microcontrollers that are utilized every now and again for creating many inserted framework based undertaking and units utilized continuously applications. These microcontrollers require a 5V DC inventory, so the AC 220V should be changed over into 5V DC utilizing the progression down converter in their capacity supply circuit.

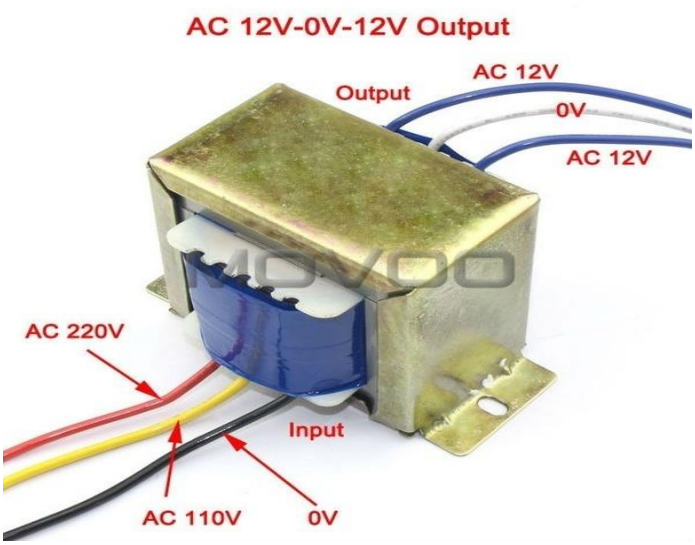


Figure 4.6: Transformer

4.7 Voltage regulator:

A voltage controller produces a fixed yield voltage of changes to its info voltage or burden conditions. The voltage controller must be steady with its condition. Here we use IC 7805 voltage Regulator. IC 7805 is a 5V Voltage Regulator that limits the voltage yield to 5V and draws 5V directed force supply. The voltage source in a circuit may have variances and would not give the fixed voltage yield. The voltage controller IC keeps up the yield voltage at a steady worth.

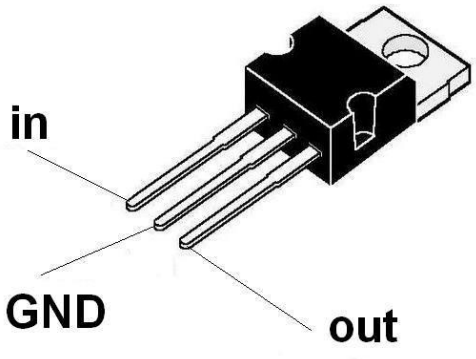


Figure 4.7: Voltage regulator

4.7.1 Pin Description:

IC 7805 is a 5V Voltage Regulator that confines the voltage yield to 5V and draws 5V directed force supply. It accompanies arrangement to include heat sink. The most extreme incentive for contribution to the voltage controller is 35V. It can give a fixed consistent

voltage stream of 5V for higher voltage contribution till the edge furthest reaches of 35V. On the off chance that the voltage is close to 7.5V, at that point it doesn't deliver any warmth and thus no requirement for heat sink. In the event that the voltage input is increasingly, at that point abundance power is freed as warmth from 7805.It directs a relentless yield of 5V if the info voltage is in fierceness of 7.2V to 35V. Consequently to stay away from power misfortune attempt to keep up the contribution to 7.2V. In some hardware voltage change is lethal (for example Microcontroller), for such circumstance to guarantee steady voltage IC 7805 Voltage Regulator is utilized. IC 7805 is a progression of 78XX voltage controllers. The name the last two digits 05 indicates the measure of voltage that it controls. Thus a 7805 would control 5v and 7806 would direct 6V, etc. The schematic given beneath tells the best way to utilize a 7805 IC, there are 3 pins in IC 7805, pin 1 takes the information voltage, GND of both information and out are given to stick 2, pin 3 delivers the yield voltage.

Pin no.	Function	Name
1	Input voltage (5V-18V)	Input
2	Ground (0V)	Ground
3	Regulated output; 5V (4.8V-5.2V)	Output

Table: 4.3: Pin Details

4.8 Resistor (1Kohm)

1k ohm Resistors are used for variable current and they resist the current flow and 1k ohm the extent to which they do this is calculated in ohms (Ω).

Figure 4.8: 1k ohm

4.9 Resistor (560kohm)

560k ohm resistor work at display backlight**,** at all times control the backlight.

Figure 4.9: 560k ohm

4.10 Resistor (3K3 ohm)

3k3 ohm resistor work the compare control, 3k3 ohm are control the contrast.

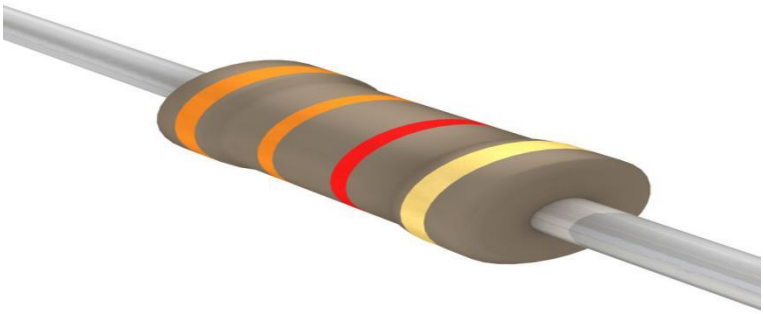


Figure 4.10: resistor 3k3 ohm

4.11 Diode 1N4007

DIODE 1N4007- change ac to dc and control of the ac to dc system.

Figure 4.11: Diode 1N4007-T

4.1 2 1000 uF/25V Electrolytic Decoupling Capacitor:

Capacitor is a fundamental segment of our task. We can utilize the capacitor in various numerous applications. Utilizing capacitor in a microcontroller its must in light of the microcontroller is an advanced gadget with quick exchanging edges which utilizes a lot of current for an exceptionally brief timeframe at each change. The capacitors supply the huge measure of current required with the goal that the power supply doesn't droop during that time making clamour. The principle capacity of a capacitor is putting away electric charge. A charged capacitor could be utilized as a voltage source. It is in every case best to utilize an assortment of capacitors on the power supply pins of the microcontroller to give a low impedance wideband stockpile. In our work we utilized Electrolytic decoupling capacitors 1000uF/25V. These capacitors are extraordinary transient/flood silencers and function admirably in high-voltage and sound applications. Excellent spiral electrolytic capacitors. Capacitors are utilized for a few purposes like planning, smoothing power supply, coupling, sifting, tuning for radio framework, putting away vitality and so forth.

Figure 4.12: 1000 uF/25V Electrolytic Decoupling Capacitor

4.12 7Amps 250V AC or 10Amps 28V DC Relay

This is a Single post twofold toss (SPDT) type hand-off with 5 pins in a 3D shape type bundle and appraised to work at 12VDC.

Load Current Max.: 7Amps 250V AC or 10Amps 28V DC.

Coil Resistance: 360-440 Ohms.

Figure 4.13: Relay

CHAPPTER 5

HARDWARE DEVELOPMENT

5.1 Block Diagram

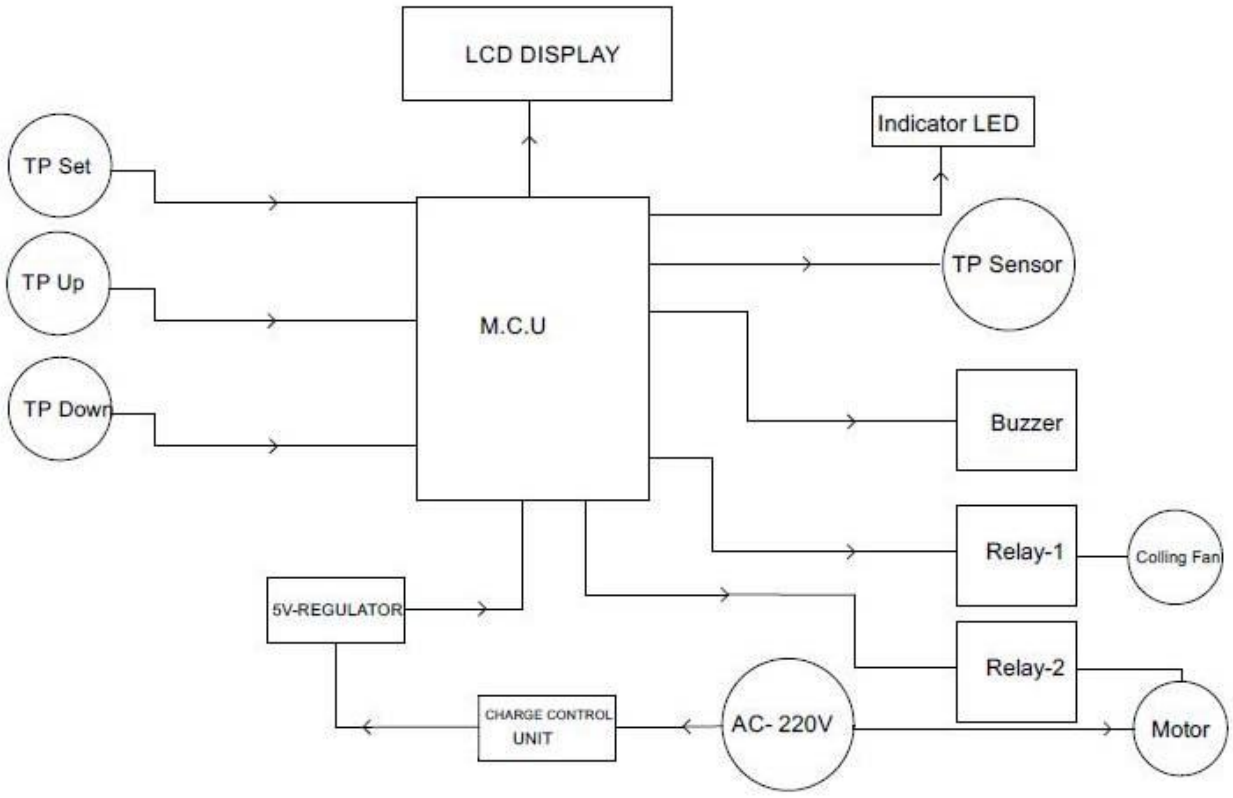


Figure 5.1: Block Diagram

5.2 Circuit Diagram:

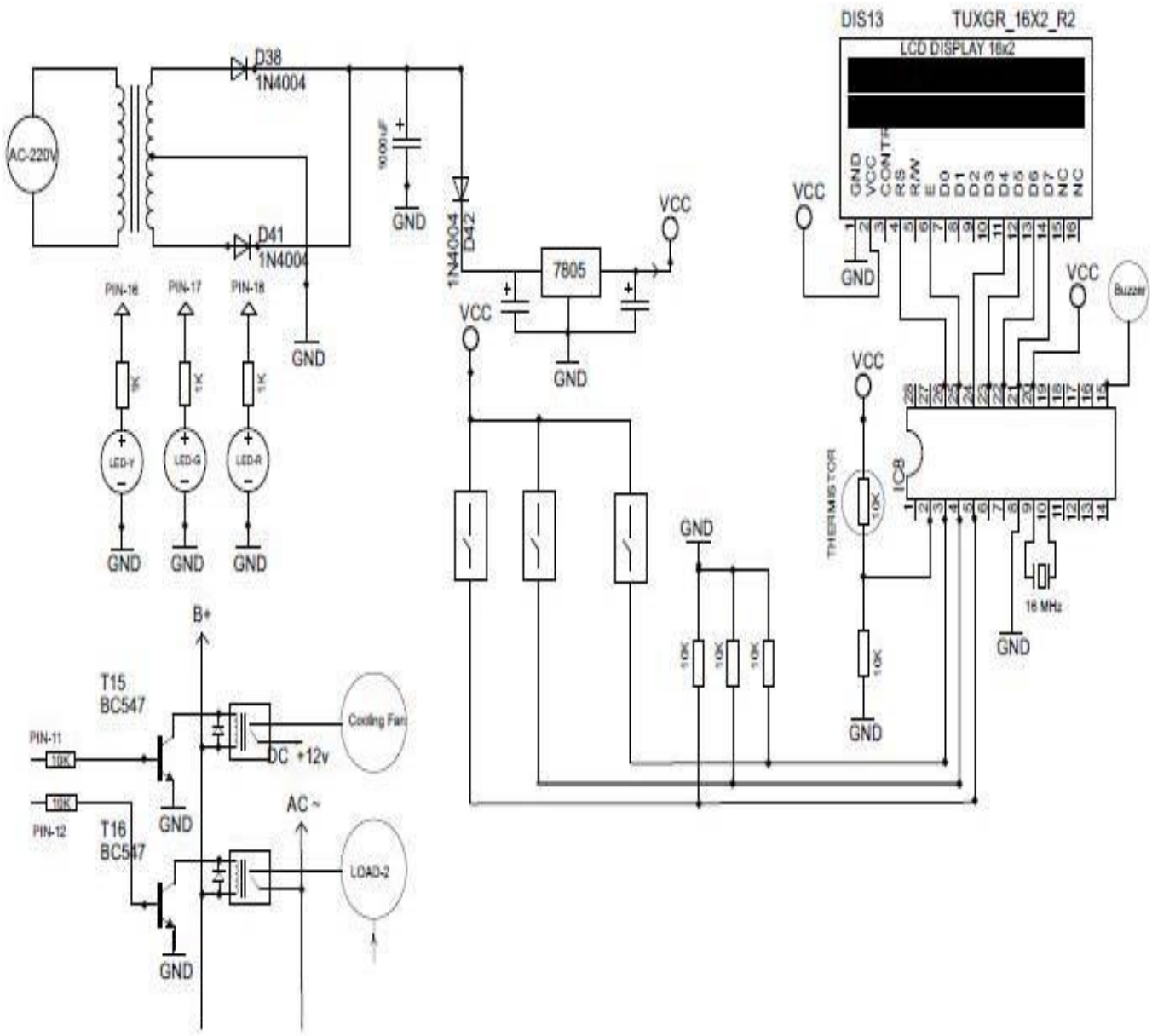


Figure 5.2: Circuit Diagram

5.3 Project Circuit Working Principle

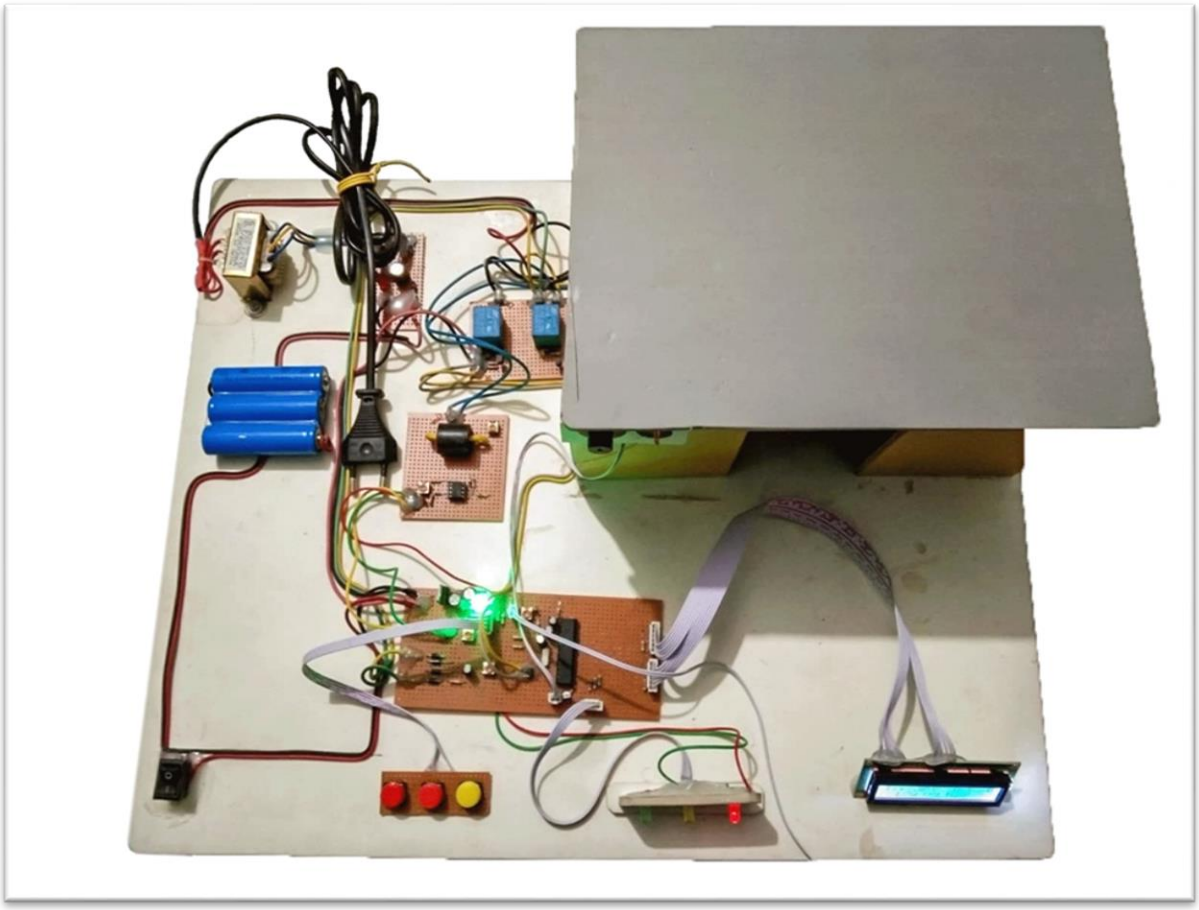


Figure 5.3: Project Circuit Working Principle

When the Temperature & Humidity were growing up the relay will be operate one by one according to the assigned MC program .In normal case all LED's will be operate . When temperature will more than 34 °c relay 2(H1) will be operate and LED will getting off .As like this at temperature 35 °c & 36 °c relay 3(H2) & relay 4 (H3) will operate & LED's will getting off respectively.

In the case of Humidity: When the humidity will under 85 the relay 1 (Rh) will getting operate as the rate of humidity are being assigned on program.

CHAPTER 6
RESULTS AND DISCUSSIONS

6.1 Introduction

This part contains the outcomes acquired and discourses about the undertaking. We have additionally secured exchanges about points of interest, detriments and confinement of current form of the assurance framework.

6.2 Project Circuit Applications

- Used to observe the temperature and humidity
- This system we can used as a Incubator
- Used to save the industry due to increase the temperature

6.3 Communication Process: Serial Interface

The fascinating thing with regards to this module is the convention that utilizations to move information. All the sensor readings are sent utilizing a solitary wire transport which lessens the expense and expands the separation. So as to send information over a transport you need to depict the manner in which the information will be moved, with the goal that transmitter and recipient can comprehend what says one another. This is the thing that a convention does. It depicts the manner in which the information are transmitted. On DHT-11 the 1-wire information transport is destroyed up with a resistor to VCC. So if nothing is happened the voltage on the transport is equivalent to VCC.

Communication Format can be separated into three stages

1) Request.
2) Response.
3) Data Reading.
4 How to Identify Bits:
5. End Of Frame:
6. Logic Analyzer Snapshots:

1. Request:

To make the DHT-11 to send you the sensor readings you need to send it a solicitation.
The solicitation is, to pull down the transport for more than 18ms so as to give DHT time to comprehend
it and afterward pull it up for 40uS.

2 Response:

What comes after the solicitation is the DHT-11 reaction. This is a programmed answer from DHT which shows that DHT got your solicitation. The reaction is ~54uS low and 80uS high.

3 Data Reading:

What will come after the reaction is the sensor information. The information will be stuffed in a parcel of 5 fragments of 8-bits each. Absolutely 5×8 =40bits.
Initial two fragments are Humidity perused, fundamental and decimal. Following two are Temperature perused in Celsius, necessary and decimal and the last portion is the Check Sum which is the whole of the 4 first fragments. On the off chance that Check Sum's worth isn't equivalent to the aggregate of the initial 4 sections that implies that information got isn't right.

4 How to Identify Bits:

Each piece sent is a follow of ~54uS Low in the transport and ~24uS to 70uS high relying upon the estimation of the bit.
Bit '0' : ~54uS Low and ~24uS High
Bit '1' : ~54uS Low and ~70uS High

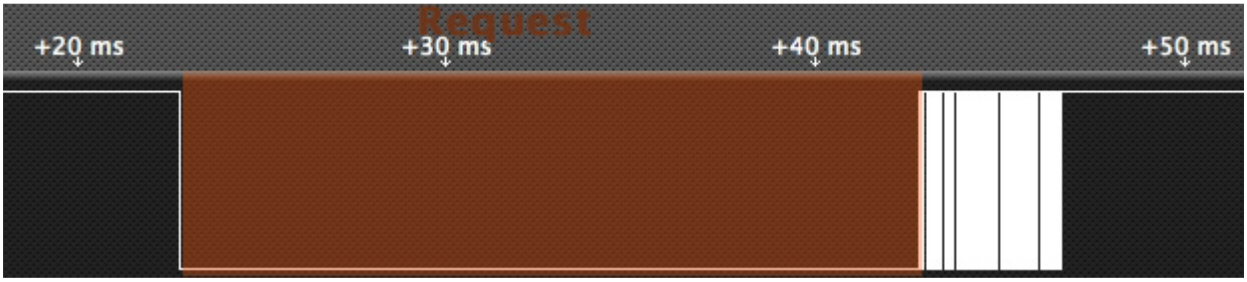
5. End Of Frame:

Toward the finish of parcel DHT sends a ~54uS Low level, pulls the transport to High and goes To rest mode.

.

6. Logic Analyzer Snapshots:

In the going with picture you can see the requesting sent from the MCU to the DHT and following the package. Since the sales has incredibly long length as ought to be evident is about 20mS and package gotten is in us we can't see the data bits. So it is stretched out in next view



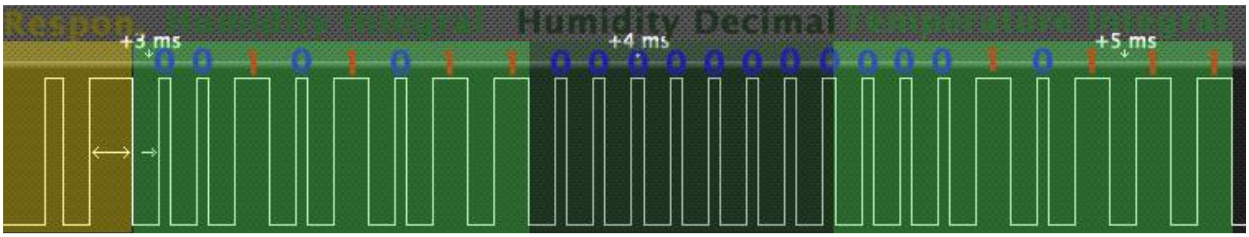


Figure 6.1: Logic Analyzer Snapshots

If we zoom at the data bits we can convert the values. You can see after the Request follows the Response, and Data bits. I have drawn some colour notes to be more reasonable.
If we interpret the above data we have.

Humidity 0b00101011.0b000010000 = 43.0% (43 is integral part and .0 is decimal part)

Temperature 0b001010111 = 23 C.

The most recent two segments can't be seen in this image as of zoom

6.4 Implementation:

What we need to do to read a DHT-11 sensor is:

1) Send request

2) Read response

3) Read all data segment and keep it to a buffer

4) Sum the segments and check if the result is the same as Check Sum

On the off chance that the Check Sum is right, the qualities are right so we can utilize them. On the off chance that Check Sum isn't right we evacuate the parcel. To read the data bits can use a counter and start count Seconds of High level. For counts > 24uS

we replace with bit '1'. For counts <=24 we replace with bit'0'

6.5 Advantages:

1. Very easy to implement
2. High reliability
3. Digital output
4. Speed operation

6.6 Disadvantages:

1. It has limited long term stability
2. It is sensitive to dewing and certain aggressive substance
3. It is difficult to use bellow 0 temperature
4. Long-term measurement is limited due to required water reserve and wick maintenance.

6.7 Applications Temperature Sensors:

- HVAC (Heating, Ventilation and Air Conditioning) Systems
- Weather Stations
- Medical Equipment for measuring humidity
- Home Automation Systems
- Automotive and other weather control applications
- We can use this kind of project in such kind of farm where always need a constant temperature.
- We can use it also in agricultural research.
- In Industries

CHAPTER 7
CONCLUSIONS

7.1 Conclusions:

The project "demonstrating and reproduction of machine overheating discovery with alert" has been effectively structured and tried. It has been developed by integrating features of all the hardware components used and software also in which we have used C language. Nearness of each module has been contemplated out and set cautiously in this manner adding to the best working of the unit. Besides, utilizing exceptionally progress microcontroller and with the assistance of developing innovation the venture has been effectively executed. We conclude that by implementing these systems we can access the live data and control the device interfaced with our system.

7.2 Limitations of the Work:.

A few degrees and rules are leaned to guarantee the task is led inside its expected limit. The primary extent of this venture is to comprehend hypothetical part of temperature sensor including working standards, normal for the sensor, and quality. From the examinations, a stickiness and temperature sensor is picked to make the framework work appropriately Mean while, the second extent of this venture is the improvement of a mugginess and temperature based control framework. Base on the examination that recently done, some utilization of a specific part.

7.3 Future Scopes of the Work:

The practicality of the internal model control approach with prescient control system has been built up. So as to consider the practical issue more information streams have to be considered. Though, the representative for such a construction is probably going to be increasingly mind boggling. The genuine temperature process has the opportunity variation conduct. The neural arrange should be retrained disconnected, to get the great model attributes. In any case, web based preparing of the procedure could be a decent exercise to tackle this issue. Likewise, the utilization of the diverse neural system demonstrating strategies for example, spiral premise work, intermittent systems can be investigated as choices in the web based preparing.

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