SUBJECT: - M&MSA

SUBMITTED BY: -

21BEC130 JAY VADODARIYA

21BEC139 VYOM MISTRY

SUBMITTED TO :-

DR. JAYESHKUMAR PATEL

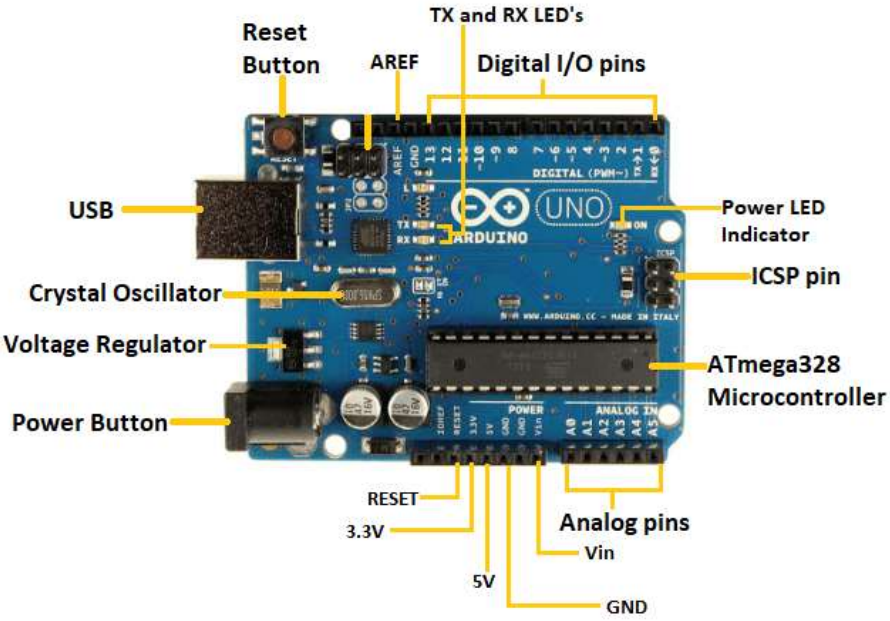
TEMPERATURE CONTROLLED FAN USING ARDUINO

TABLE OF CONTENTS

INTRODUCTION

A Temperature Controlled DC Fan is a system which automatically turns on a DC Fan when the ambient temperature increases above a certain limit. Generally, electronic devices produce more heat. So, this heat should be reduced in order to protect the device. There are many ways to reduce this heat. One way is to switch on the fan spontaneously. We used Arduino to carry out project.

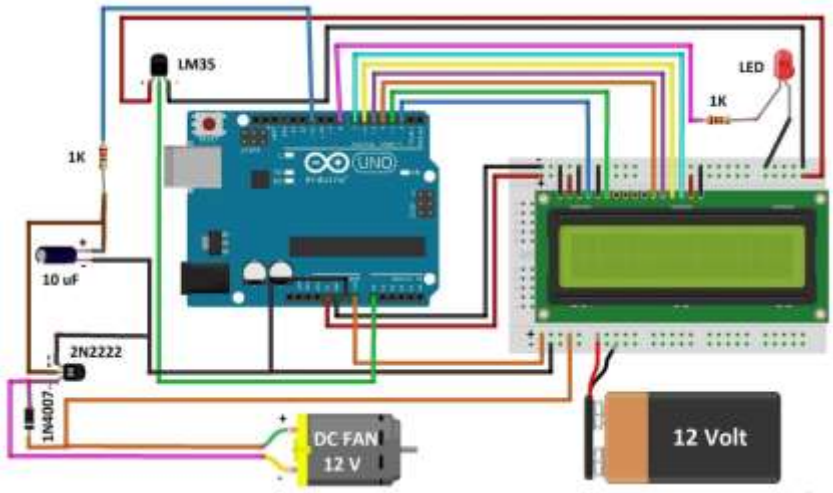
WHAT IS ARDUINO? Arduino is an open-source electronics platform based on easy-to-use hardware and software. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language (based on Wiring), and the Arduino Software (IDE), based on Processing.



ABOUT OUR PROJECT: -Temperature Based Fan Speed Control & Monitoring with Arduino

In this Arduino based project, we built a temperature-controlled fan using Arduino. With this circuit, we will be able to adjust the fan speed in our home or office according to the room temperature and also show the temperature and fan speed changes on a 16x2 LCD display. To do this we will be using an Arduino UNO Board, LCD, LM35 sensor Module, and DC fan that is controlled by using PWM. We designed a Temperature Based Fan Speed Control & Monitoring With Arduino and LM35 Temperature Sensor. The microcontroller controls the speed of an electric fan according to the requirement & allows dynamic and faster control and the LCD makes the system user-friendly. Sensed temperature in Celsius Scale and fan speed in percentage are simultaneously displayed on the LCD panel.

CIRCUIT DIAGRAM



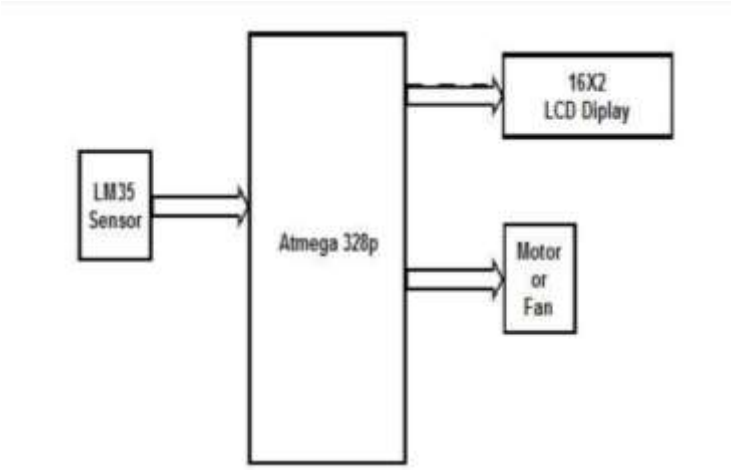
COMPONENTS

I. **Arduino UNO Board –** Arduino is at the heart of the circuit as it controls all functions.
II. **LM35 Temperature Sensor –** LM35 is a precision integrated-circuit whose output voltage is linearly proportional to Celsius temperature. It is rated to operate over a -55°C to 150°C temperature range. It has +10.0mV/Celsius linear-scale factor.
III. **12V DC Fan**
IV. **16x2 LCD Display**
V. **Potentiometer 10K**
VI. **Transistor 2N2222 –** The 2N2222 transistor acts as a switch and controls the fan speed depending upon temperature.
VII. **Resistor 1K**
VIII. **Diode 1N4007 -**1N4007 diode controls the fan from being damaged.
IX. **Capacitor 10uF**
X. **LED 5mm**
XI. **12V Power Supply/Adapter**
XII. **Connecting Wires and Breadboard**

WORKING

Temperature sensor LM35 senses the temperature and converts it into an electrical (analog) signal, which is applied to the Atmega328 microcontroller of the Arduino UNO Board. The analog value is converted into a digital value. Thus, the sensed values of the temperature and speed of the fan are displayed on the LCD. When the temperature exceeds temperature limit the fan starts rotating. A low-frequency pulse-width modulation (PWM) signal, whose duty cycle is varied to adjust the fan's speed is used. It is efficient because the pass transistor is used as a switch.

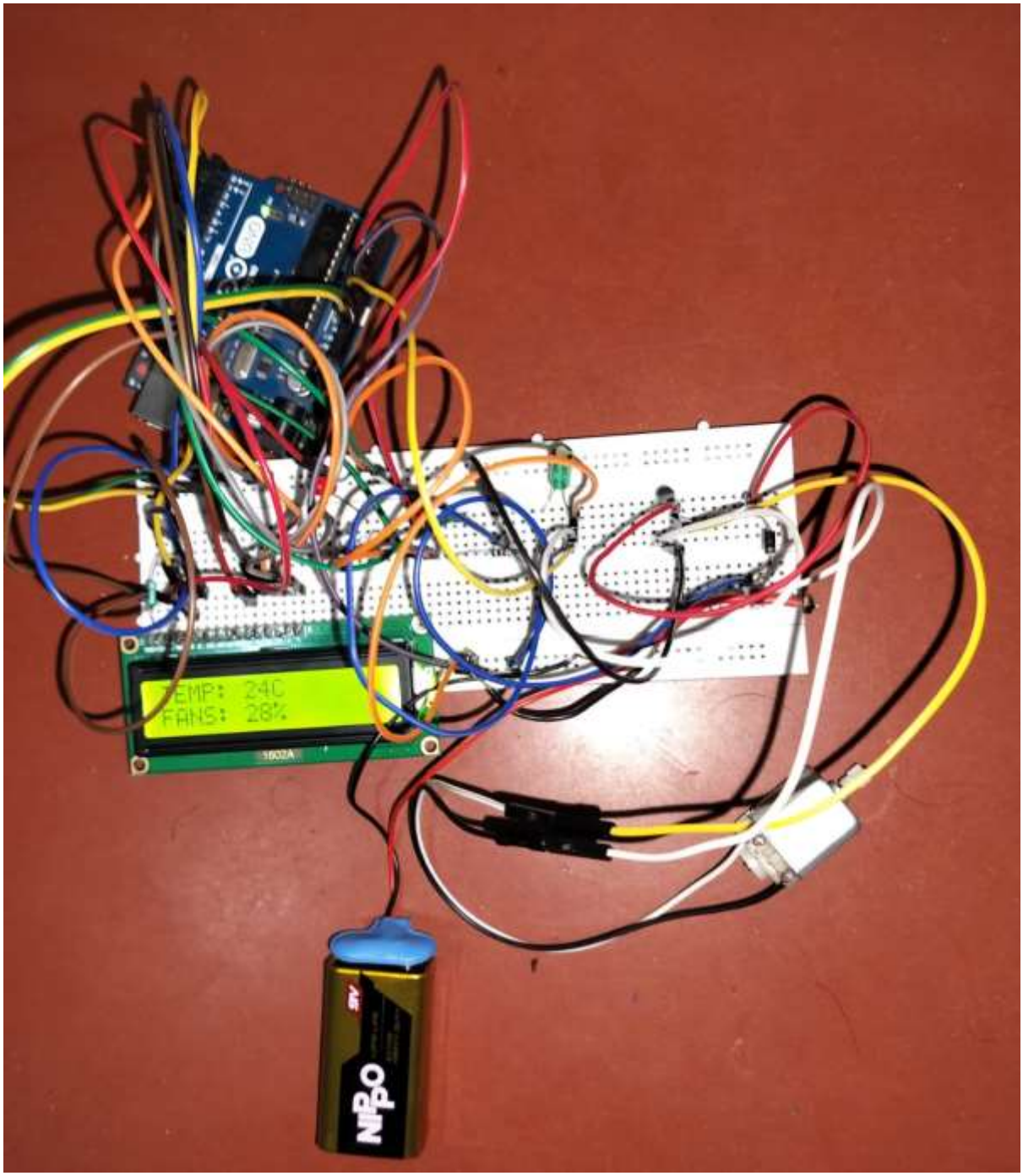
BLOCK DIAGRAM



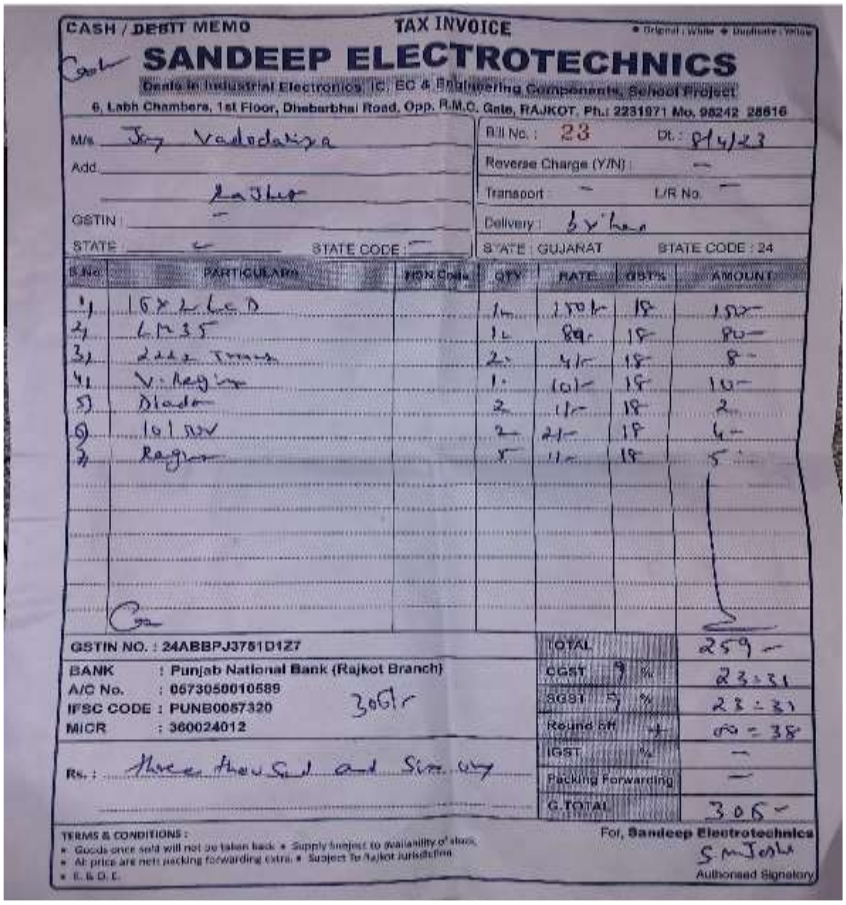
CODE

```
#include <LiquidCrystal.h>
LiquidCrystal lcd(2,3,4,5,6,7);
int tempPin = A0;
int fan = 11;
int led = 8;
int temp;
int tempMin = 10;
int tempMax = 60;
int fanSpeed;
int fanLCD;
int a;

void setup() {
pinMode(fan, OUTPUT);
pinMode(led, OUTPUT);
pinMode(tempPin, INPUT);
lcd.begin(16,2);
Serial.begin(9600);
}

void loop() {
a=analogRead(A0);
temp=a/4.66;
Serial.println(temp);

if(temp<tempMin)
{
fanSpeed = 0;
analogWrite(fan, fanSpeed);
fanLCD=0;
digitalWrite(fan, LOW);
}

if((temp >= tempMin) && (temp <= tempMax))
{
fanSpeed = 45+((temp - tempMin)*4.2) ;

fanLCD = map(temp, tempMin, tempMax, 0, 100);
analogWrite(fan, fanSpeed);
}

if(temp > tempMax)
{
digitalWrite(led, HIGH);
}
else
{
digitalWrite(led, LOW);
}

lcd.print("TEMP: ");
lcd.print(temp);
lcd.print("C ");
lcd.setCursor(0,1);
lcd.print("FANS: ");
lcd.print(fanLCD);
lcd.print("%");
delay(200);
lcd.clear();
}
```

OUTPUT



BILL OF MATERIAL



CASH / DEBIT MEMO — TAX INVOICE — Original : White ◆ Duplicate : Yellow

SANDEEP ELECTROTECHNICS

Dealer in Industrial Electronics, IC, EC & Engineering Components, School Project

6, Labh Chambers, 1st Floor, Dhebarbhai Road, Opp. R.M.C. Gate, RAJKOT. Ph.: 2231971 Mo. 98242 28616

M/s Jay Vadodariya — Bill No. : 23 — Dt. : 8/4/23

Add Rajkot — Reverse Charge (Y/N) : —

GSTIN : — — Transport — — L/R No. —

STATE : — STATE CODE : — — Delivery : by hand

STATE : GUJARAT — STATE CODE : 24

S.No.	PARTICULARS	HSN Code	QTY.	RATE	GST%	AMOUNT
1	16x2 LCD		1	150/-	18	150/-
2	LM35		1	80/-	18	80/-
3	2222 Trans		2	4/-	18	8/-
4	V. Reg		1	10/-	18	10/-
5	Diode		2	1/-	18	2/-
6	1N4007		2	2/-	18	4/-
7	Regu		5	1/-	18	5/-

GSTIN NO. : 24ABBPJ3751D1Z7

BANK : Punjab National Bank (Rajkot Branch)
A/C No. : 0573050010589
IFSC CODE : PUNB0057320
MICR : 360024012

TOTAL	259/-
CGST 9 %	23.31
SGST 9 %	23.31
Round off +	00.38
IGST %	—
Packing Forwarding	—
G.TOTAL	306/-

Rs. : Three Hundred and Six only

TERMS & CONDITIONS :
- Goods once sold will not be taken back. • Supply subject to availability of stock.
- All price are nett packing forwarding extra. • Subject To Rajkot Jurisdiction
- E. & O. E.

For, Sandeep Electrotechnics
S.M.Joshi
Authorised Signatory

APPLICATIONS OF TEMPERATURE CONTROLLER

The applications areas of this project are:

• air-conditioners	• water-heaters
• thermal baths	• veterinary operating tables.
• snow-melters	• Ovens
• heat-exchangers	• Mixers
• furnaces	• Incubators

SUMMARY

The temperature controller senses the room temperature and coverts it into an analog voltage accordingly which is then converted to a digital value in the microcontroller and can be used to controller the temperature using the DC fan. Thus, temperature controller is a device which has a wide range of different applications. Our project can act as a temperature controller for those applications.