
Room Temperature Controller with ON/OFF Display

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Abstract

The main purpose of this Room Temperature Controller is to control the temperature of the room or any closed spaces whose temperature keeps fluctuating and thus requires a constant watch on the temperature of the room. The use of this system eliminates constant watching on the device by self controlling the temperature of the system.

Our proposed project consists of digital temperature sensors for more accurate temperature control in various industries. Our system overcomes the disadvantages of thermostat/analog systems in terms of accuracy. This system can be used in any firm or organization where it is very important to maintain precise temperatures.

LCD display is used to display the temperature and when the temperature exceeds the set limit, the lamp is switched off in order to control the temperature. The heater is demonstrated with the help of a lamp. After the heater is switched off, the AC(cooling device) is switched ON. Here AC is demonstrated with the help of small fan.

After the AC is switched ON, it remains ON until the temperature reaches below the exceed limit. Thus the system keeps on switching ON/OFF the heater or the AC for automatically controlling the temperature of the system. The system uses a digital temperature sensor in order to detect temperature and pass on the data to the microcontroller. The 8051 microcontroller processes data and sends the temperature to be displayed on LCD screen. The display consists of 7 segment display unit to display up to 4 numbers.]

Keywords : Room, Temperature, AC, ON, OFF, Control

1. Introduction to mini project work

This is a smart room temperature control system. It controls your room temperature using a fan and a room heater. Atmega16 micro-controller is the heart of this system. 16x2 LCD display is used to display information about your room temperature. You can adjust your room temperature between 15 degree to 55 degree Celsius. There are 4 temperature sensors used to sense room temperature accurately. If temperature is lower than defined temperature then system switched ON room heater. If temperature is higher than defined temperature then system switches ON the fan. If temperature is equals to set temperature than room heater and fan both switches OFF.

2. Problem Statement

In big cities, the problem is associated with the space and high installation cost of room temperature controller. Therefore, these are not affordable for middle class. So, we have designed a room temperature controller which works efficiently under any circumstances.

It requires a less installation space.

3. Objectives

- 1) To find the mathematical model of an air conditioning system.
- 2) To design a controller using temperature sensor.
- 3) To analyse the performance of the controller
- 4) Real-time temperature is displayed on its LCD screen.

4. Proposed Methodologies Adopted

Working of the mini project module:- Whenever the temperature of the room the controller switches on the cooling fan to the control the rise in room temperature, if the temperature of the room decreases the controller switches on heater to increases the room temperature

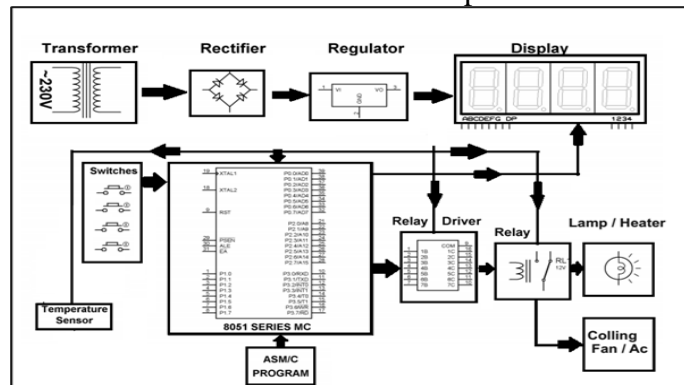


Fig. 1 : Overall block diagram of the project

The project uses a digital temperature sensor LM35 which is interfaced to the Microcontroller. The surface of this 3 pin IC senses the ambient temperature to deliver digital data serially at pin no 1, which is displayed from the Microcontroller by 4 units of 7-Segment common anode display all parallel connected to port '0'. Four push button switches are being interfaced to Microcontroller with pull-up resistors to help to program the set temperature as desired. The output from Microcontroller at pin 25 drives a transistor which in turn drives a relay which switches ON or OFF the heater for maintaining the temperature. The project, however, uses a coil in place of the heater for demonstration purposes. The coil will be normally ON to get switched OFF once the set temperature is reached

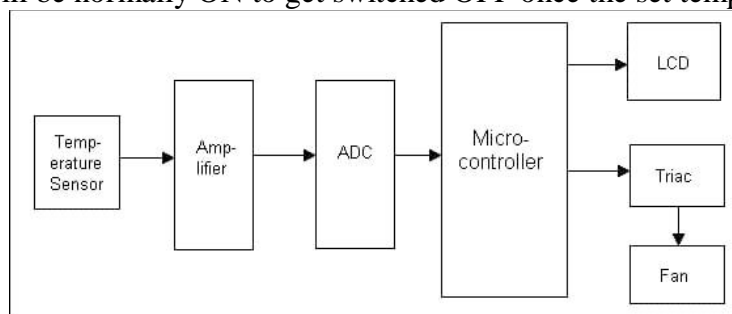


Fig. 2 : Schematic diagram of the mini project work

5. Tools used (hardware / software)

Hardware specification : 8051 series microcontroller, 7-Segment Displays, LED, Voltage regulator, 12v Transformer, Crystal, Push buttons, Cooling fan, Temperature sensor, Diodes, Relay, Lamp.

Software specification: MC programming language: embedded C

Proposed block diagram :- Transformer, Rectifier, Regulator, LED display, 8051 microcontroller etc, The fire alarm working principle is based on thermistor used in the fire alarm circuit.

6. Results & Discussions

Our project consists of both simulation and experimentation.

With the help of Keil μ Vision IDE a simple C language program is dumped into 8051 microcontroller.

The room temperature controller using 8051 microcontroller system will solve the daily problems where AC's do not work properly due to low voltage , normally in rural areas .

Medical applications and food industry.

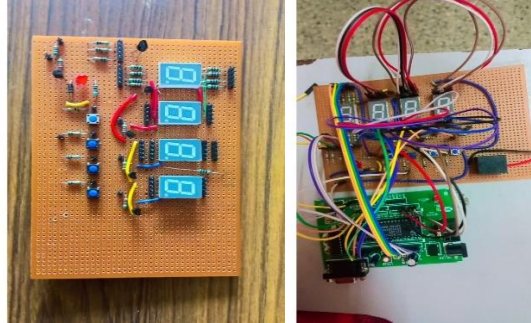


Fig. 3 : Hardware designed by the mini project students

4. Conclusions

The project main objective is to control temperature of the proposed system in order to keep humidity/temperature in preset value. This system is quite useful because it is simple in use ,low in cost and power consumption and its small size. It is used in food industry for humidity control, for medical purpose-in incubators. In seed-testing for incubation. Used to maintain room Temperature according to requirements. The project can be enhanced in the future by increasing the number of fans ; so, it will help in industries and for medical purpose

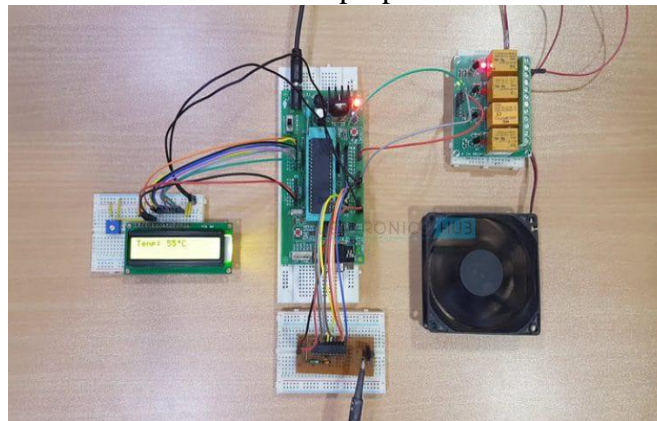


Fig. 4 : LED Display unit to control the room temperature

5. Advantages

It manages automatically temperature of the room.

Less expensive then air-conditioned.

It reduces electric power consumption

Easily install at any place

6. Applications

It can used in offices, class rooms, kitchens, living rooms, bed rooms etc.

It manages temperature in tunnel sand mines

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