

# Automated Cooling System

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**Abstract**— In today's society, advancement in technology has made life easier by providing us with higher level of knowledge through the invention of different devices. However, each technological innovation harbors the potential of hidden threats. One major threat is deteriorating efficiency, main cause behind it is overheating and environment debris. While debris can be filtered but overheating of component causes decrease in life span of components and deterioration in efficiency. This increasing battle with overheating issue has lead to birth of many cooling methods and exhaust system but u cannot know when a coin flip like way all method are not efficient and cost effective and completely reliable so we take it as a challenge to design cost effective and well efficient cooling system .

**Keywords**— Minimum 7 keywords are mandatory, keyword must reflect the overall highlighting words of research. This must be of Time New Roman Front of size 10.

## INTRODUCTION

### Definition

Automated Cooling System is device which can be used to maintain temperature of your processor, graphic cards, hard disk, and motherboard by effectively controlling air flow in cabinet whether you need to overclock / video editing / gaming / complex computation process.

It is suitable for Server Racks, Personal Computing and WorkStation where computation process varies accordingly.

Automated Cooling System (ACS) is low budget system which allow user to connect up to 5 fans maximum (may vary) which are guided by software which continuously monitor temperature and controls fans on and off time period.

It has three features:

- \* Notify user about system overheating and warns user to save work before system trips off.
- \* Allow user to input temperature, which should be maintained by ACS.
- \* Allow user to input temperature, when system should start and should turn off after decreasing temperature.

### Objective

Objective to design Automated Cooling System is to overcome overheating issues which Detroit efficiency and life span of PC components or causes to permanent break.

Automated Cooling System is designed in such a way that it intelligently controls temperature of component and thus increase efficiency and lifespan of PC component.

Cost is another factor that was taken into account where Water/Oil Cooling cost around 10000 Rs, Automate Cooling System cost 1500 Rs (Excluding fan cost) and 3000 Rs (Including Fan cost).

## Scope

Automated Cooling System is scalable design it can be configured in large server to small personal computing system.

Automated Cooling System when configured with Large Server admin does not have to log in to control panel each time to see temperature Automate Cooling System provides on board LCD display which shows temperature relatively.

Automated Cooling System can be configured with Workstation, Large Server, Personal Computers and Office System.

## Project Profile

Technology: .Net(VB.net),Bascom,Flash Magic, SinaProg

Front End: Automated Cooling System Software

Back End: Embedded System

Others: USBASP Driver

## System Modules/ Modularization of System

### **User Module**

- **Connection**
  1. Connect by Port No and Baud Rate
  2. Disconnect
- **Output Temperature**
  1. Motherboard Temperature
  2. Graphic Card Temperature
  3. Cabinet Temperature
  4. Outside Temperature
- **Input Temperature**
  - ◆ Manual Mode
  - ◆ Automatic Mode

## Test Cases

<u>Condition</u>	<u>Without System(Avg temp)</u>	<u>With system(Avg temp)</u>
No processor fan(default)	40 C	37
No processor fan & no system fan	46 C	41
Both system fans	35 C	32
Idle Graphic Card	38 C	35
Graphic Card in use(sort time)	40 C	36
Graphic Card in use(longtime/High use )	48 C	42
Normal Use	38 C	33

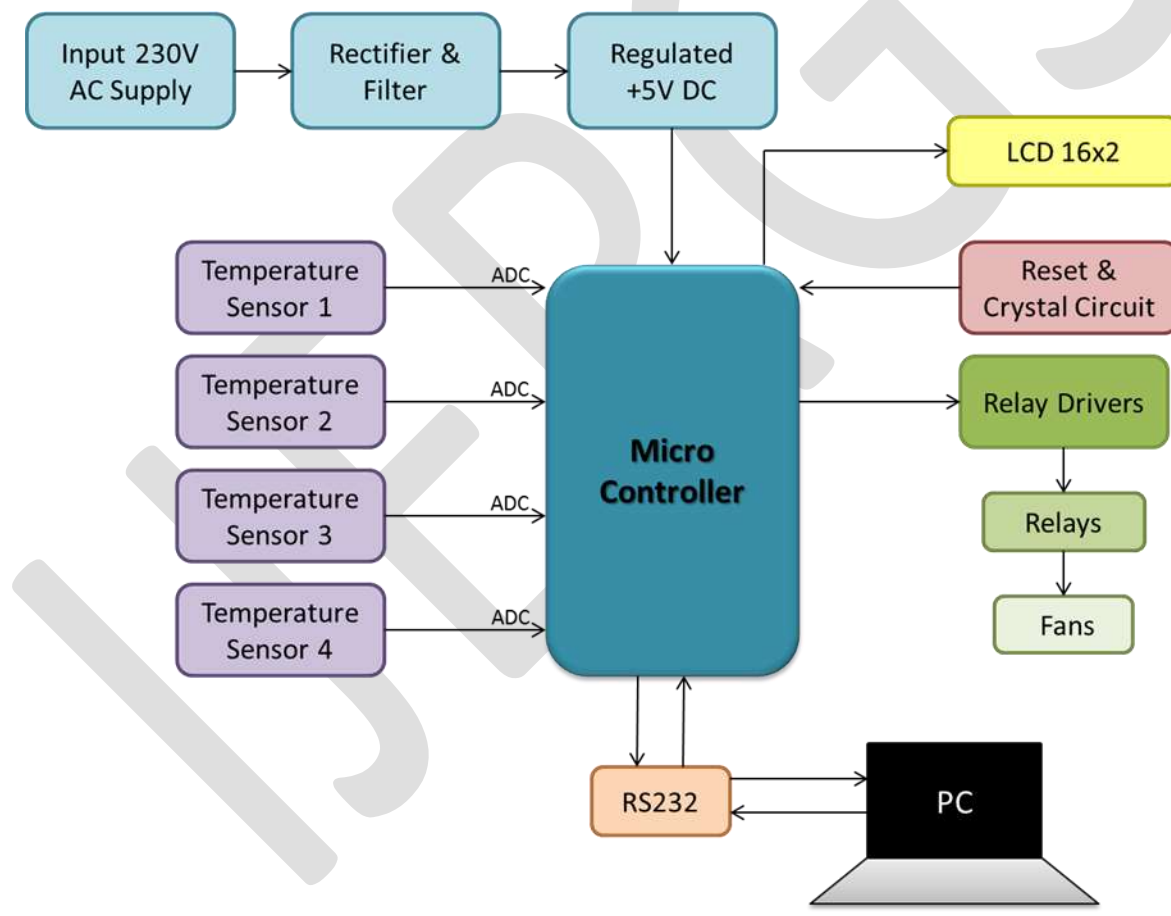
## Hardware Requirement Analysis

1. PCB
2. ATMega16A Controller
3. 100 uF Capacitor
4. IC 7805
5. LED(red)
6. Push button
7. 11.0592 MHz crystal

8. DC female socket
9. ISP socket
10. LCD 16x2
11. 3 pin female wire
12. Relay 12V
13. LM35 temperature sensor
14. 2 pin green Socket
15. 10 pin male female wire
16. 3 pin male socket
17. 1k resistor
18. 18 pin IC socket
19. 40 pin IC socket
20. 33 pF capacitor
21. 1N4007 diode
22. ULN2803

## System Design

### • Block Diagram



## IMPLEMENTATION

### • Hardware and Software Requirement

Automated Cooling System desktop application is developed only for windows using VB.net which provide intuitive tools and ease core structure to develop software.

Automated Cooling System application can be installed with 3-simple clicks on any windows machine and gets instantly ready for working.

Prolific Usb-To-Serial Driver need to be installed to establish connection of system with device.

- **Screen Layout**

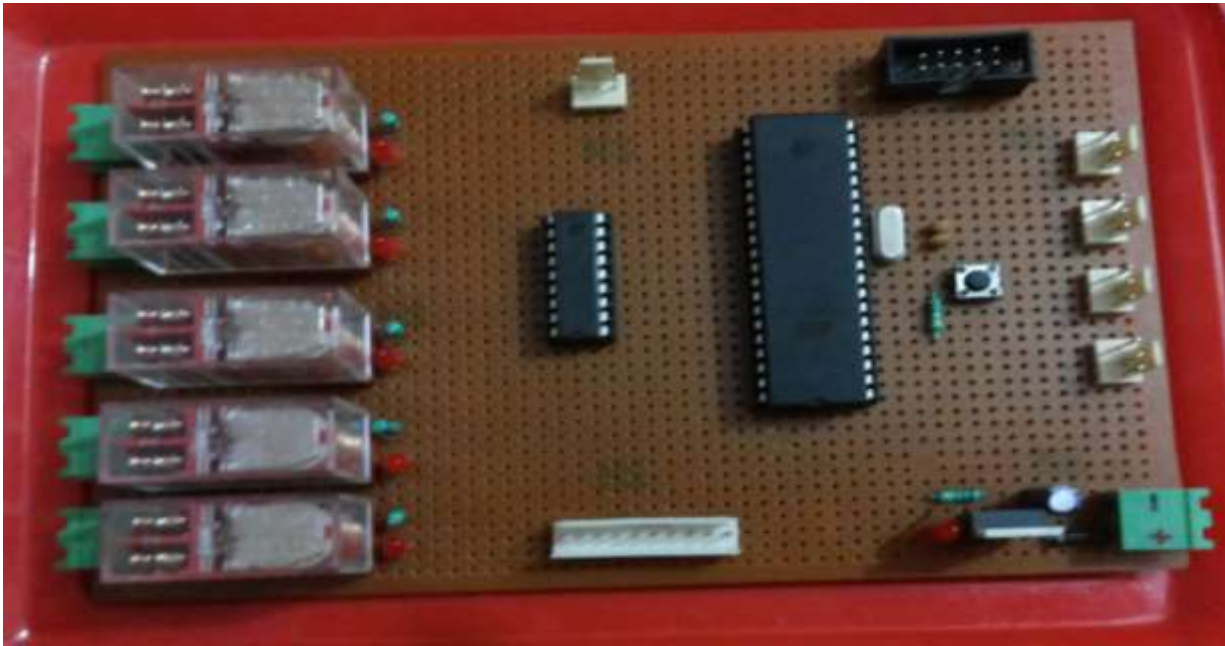


Figure: Circuit Diagram

**Start-up Screen**

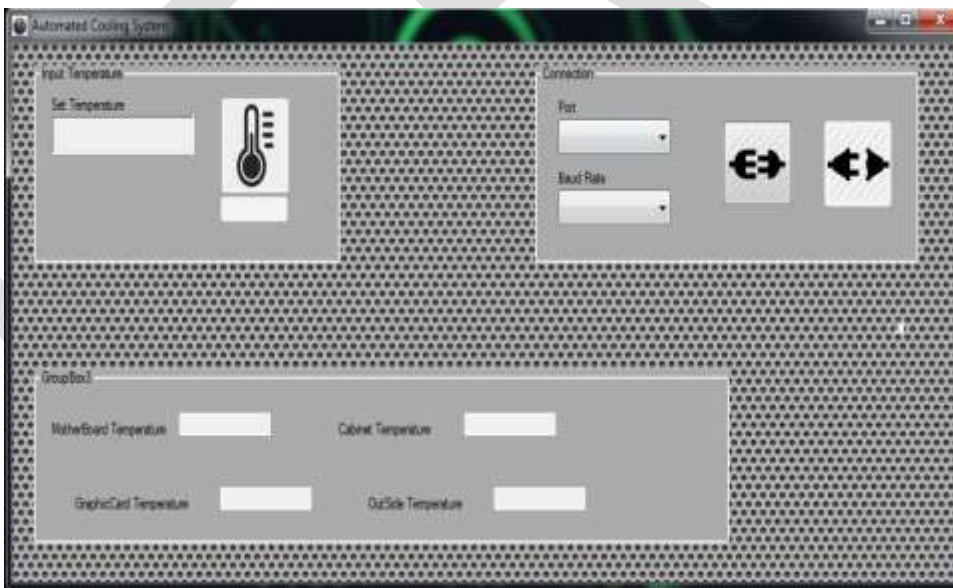


Figure: Automated Cooling System Desktop Application

This is Automated Cooling System desktop application from where user will be able to setup connection with device and control automatic and manual mode of device.

### Power-Saving Mode



Figure: Power Saving Mode

Initially when system starts device is default loaded to Power Saving Mode in which two fans are kept on 1 Outflow Fan, 1 Inflow Fan to maintain system temperature and save power.

### Automatic Mode (Software)

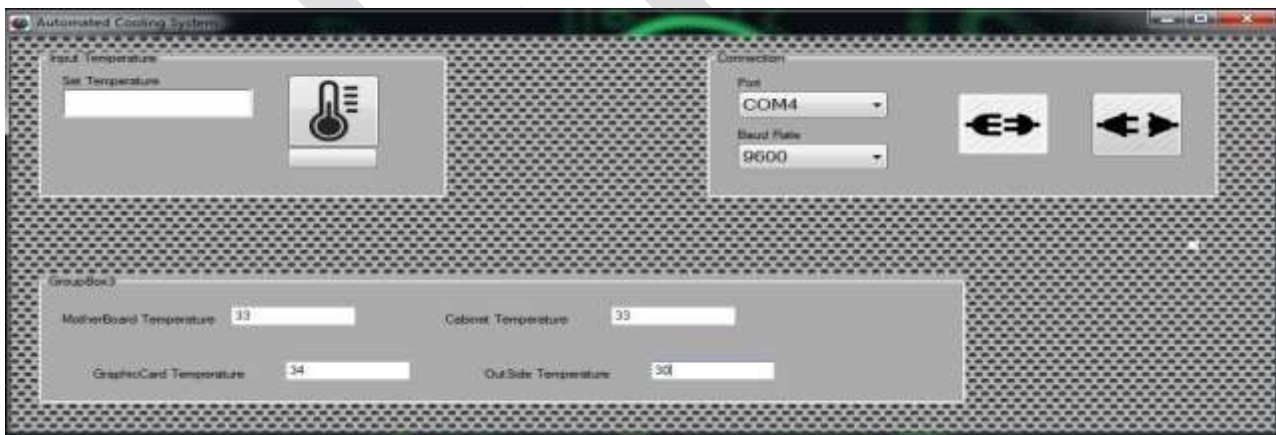


Figure: Automatic Mode (Software)

When software establishes connection it switches device to automatic mode and read temperature from device of respective field.

### Automatic Mode (Hardware)



Figure: Automatic Mode (Hardware)

Device has been switched to Automatic Mode when software establishes connection to device. Automatic Mode intelligently calculates difference between temperature and control on/off of each fan respectively.

### Manual Mode (Software)

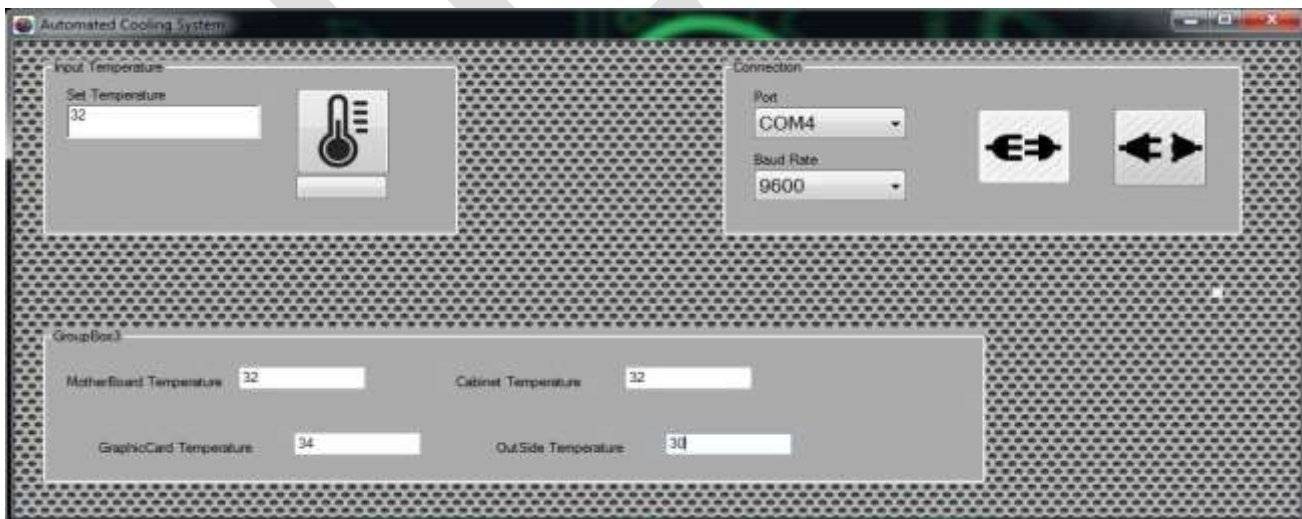


Figure: Manual Mode (Software)

When User give temperature to software and press manual button it reads temperature given by user and compare to temperature of other field if temperature of given field is higher it will turn on/off fans automatically to bring down temperature.

### Manual Mode (Hardware)



*Figure: Manual Mode (Hardware)*

Device has switched to Manual Mode and is controlling on/off of fan on basis of software sending instruction.

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## CONCLUSION

Limitations of this system are:

1. It cannot reduce temperature below room temperature.
2. User cannot control the rotation speed of fans, he can simply switch on or off.
3. It can only give warning on very high temperature that can harm computer it cannot switch off entire system (If System is on manual mode).

There are so many types of cooling systems in market, with our system we have tried to shown that Air-flow cooling system can be as good as the other type of cooling systems. There are several ways of cooling but in our system we have tried our best to keep it simple, cost efficient and more dependent. Because it switches off the fans when they are not needed it lowers the power consumption, it do not required any maintenance and it also provide control of fans to user we can conclude that our system is a good way of overcome overheating.

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