# SMART ELECTRIC FAN SYSTEM USING ARDUINO ATMEGA328

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**Abstract- The smart electric fan system controls the regulation of fan speed based on the temperature of the room .The system is developed with the help of ATMEGA328 MICROCONTROLLER which can be used  to control the speed of an electric fan based on the changes in temperature of its surrounding using temperature sensor LM35DZ .Its flexibility and reliable functioning controls the action of regulation without human intervention.**

*Index Terms*- **Temperature, Arduino, LM35, PWM technique, automatic control, ATMEGA328, switching.**

## I.    INTRODUCTION

These days switching of different level of speeds is achieved only with the help of human support and it is not maintained properly according to the temperature of the surroundings .These results in unnecessary waste of useful energy, which is one of the highly required energy need to be saved a lot .This also includes unwanted participation of human in the regulation of speed. In order to overcome this situation we developed "THE SMART ELECTRIC FAN SYSTEM" which is controlled based on the temperature of the surroundings where it is used. Fan or air conditioner need not to be used during cold days. Air regulation should be

Needed as per our wish. This can be done only through manual effort.to avoid this inconvenience a sophisticated automatic control of the fan speed should be needed .for that the smart electric fan has been designed.

## II.    BLOCK DIAGRAM
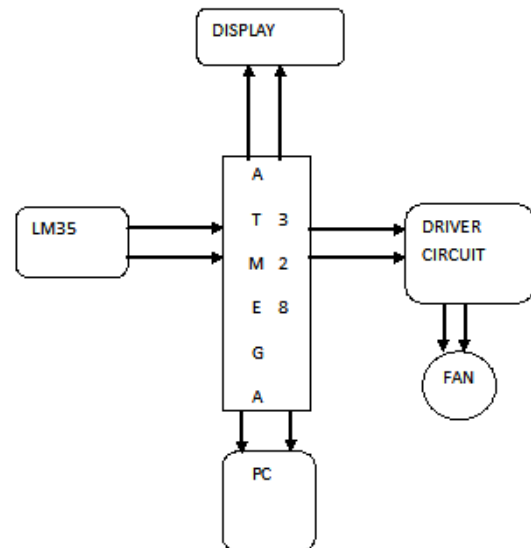


Accurate centigrade temperature is sensed using LM35 temperature sensor. LM35  sensor works on the basis of  the common fact  , as temperature increases, the voltage across a diode increases at a  known  rate. The IC has output of 10mv/degree centigrade. In theoretical experimentation when the temperature is 45 degree then the output of sensor will be 450mv or 0.45v .The sensed temperature will be the input for the microcontroller ATMEGA328.The microcontroller is programmed using AURDINO software. Based on the program the driver circuit will rotate the fan wings. The rotational speed of the fan and the room temperature will displayed using LCD.

## III. HARDWARE DESCRIPTION

### LM35:-

The LM35 series are precision integrated-circuit Calibrated Directly in degree Celsius (Centigrade) .Its Linear scale factor + 10 mV/°C .Its Ensured Accuracy is 0.1 degree Celsius .This will make it as an advantage over linear temperature. It is rated from −50°C to +150°C. It is more suitable for Remote Applications.
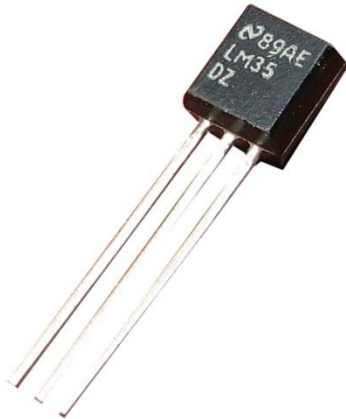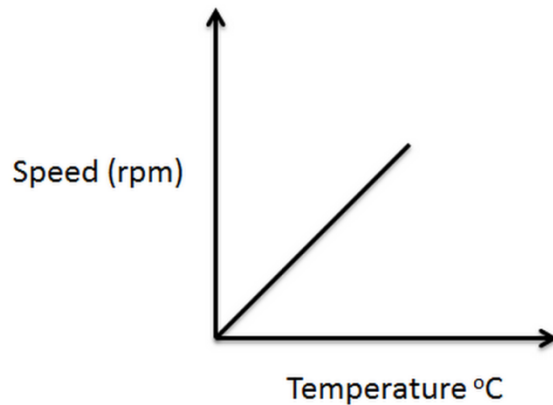


### ATMEGA328:-

It is a 28 pin micro-controller Chip .It includes analog pins, digital pins, clock, receiver,
 transmitter and reset pin .Its act like intelligence. It can be easily reprogrammable so we can easily modify the program as our wish.
It has PWM techniques.
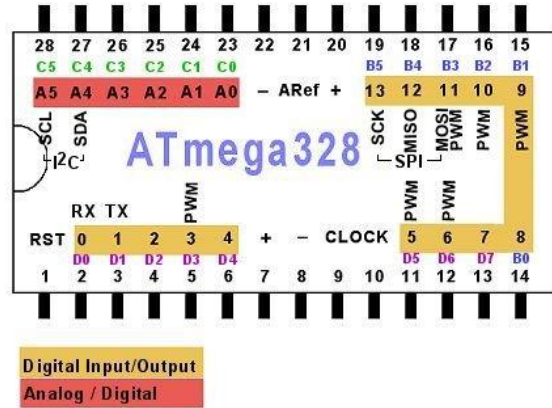




### DRIVER CIRCUIT:-



### L293D LOGIC TABLE:-

| PIN 2 | PIN 7 | ROTATION |
|-------|-------|----------|
| LOGIC 0 | LOGIC 0 | NO ROTATION |
| LOGIC 0 | LOGIC 1 | ANTI CLOCKWISE |
| LOGIC 1 | LOGIC 0 | CLOCKWISE |
| LOGIC 1 | LOGIC 1 | NO ROTATION |

## IV. DEVICE DESCRIPTION

L293D will be used as a motor driver. It means if we want to operate a motor at 9V then we need to provide a supply of 9v across VSS motor supply.

### LCD:-

The display unit will shows the various temperature levels as well as the speed of the fan according to that temperature.
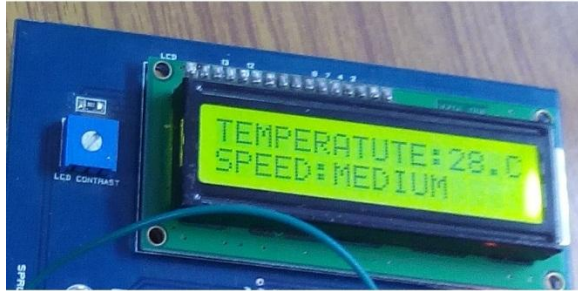
## V. SOFTWARE DESCRIPTION

The language has been used here is 'C'. The reason is that it is very compatible when working with Arduino .The program to control the fan speed automatically according to the various temperature levels was written on ATMEGA328 microcontroller chip using this 'C' language.

| TEMPERATURE | RPM | SPEED |
|---|---|---|
| Below 20°C | >350 | Very low |
| 20°C - 25°C | 500 | Low |
| 26°C - 30°C | 850 | Medium |
| 31°C - 35°C | 1500 | High |

*ranges of temperature* the respective speed of the fan will be displayed in LCD.

The graph will tells about the relationship between the speed and temperature. Clearly it shows the fan speed get increase when the temperature will increase.

## VI. CONCLUSION

The micro-controller to control the fan speed based on the surrounding temperature conditions has been successfully programmed. The output speed of the fan and temperature of the room *have been displayed in LCD.*

## REFERENCE

Khairi, Muhammad an Ghani, Bin Abd.,2007,MICROCONTROLLER Based Smart Fan System, University Malaysia Pahang.
B.Ram., 2010, Fundamentals Of Microprocessors And Microcontrollers, Dhanpath Raj Publications, New Delhi.