

## **Temperature Based Fan Speed Controller Using AT89S52 Microcontroller and LCD**

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**Abstract** –Automatic controls play an important role in human way of life. Automation is one way that reduces human operators. Here one gadget is fan that reduces human dependability. The fans are available with speed control, depending on requirement. Generally, when the temperature increased then the speed of fan set high and when temperature is low then the speed of fan set low. In this paper, an automatic solution is suggested for controlling speed of fan. A circuit with temperature sensor LM35, Microcontroller AT89s52, DC motor and few of electronic components is design and implemented to control the fan speed automatically. Here LCD is used to indicate present temperature and speed of the fan of the motor.

**Keywords** –Fan speed, Micro-controller AT89s52, LM35 Temperature Sensor, ADC 0804, DC Motor and circuit design.

### **I. INTRODUCTION**

The speed of a DC motor (FAN) can be varied by many methods and one of them is by using Controller (89S52) to produce Pulse Width Modulation (PWM) signal with variable duty cycle. But, in terms of varying a DC motor speed, there are options of doing it manually or automatically. By manually means that the input data that is to be sent to the microcontroller to determine output voltage supply to the motor by PWM method is determined by the user. But in automatic control to vary a DC motor speed, the input data is not based on online data input from the user, but from programmed code to control the output voltage supply to the motor through PWM by variable input data obtained by sensor interfacing. In this project we can control fan speed. Whole project purpose is that when the temperature will be increase from set temperature then speed of Fan will also increase as actual speed. When the temperature will be decrease then speed of fan will decrease as actual speed and fan off.

### **II.HARDWARE DESCRIPTION**

**2.1 POWER SUPPLY:** - Every circuit requires power for its operation. Here we require +5V D.C. to operate Microcontroller, Relays, and certain ICs. The supply voltage of 230V A.C. is step downed to 12V by using the step-down Transformers. As the circuit requires only the D.C. supply the in fed A.C. is converted to D.C. by using the rectifying unit. The rectifying unit consists of full wave rectifiers comprising diodes for rectification Purpose. Any of the ripples coming out of the rectifying unit is by passed by connecting the Capacitor in parallel. As the micro controller circuit requires only +5V D.C. supply, the outputs is further diminished by the regulator (IC7805) for accurate +5V to the microcontroller circuit. The capacitor (100uf) is connected in parallel for suppressing the ripples.

**2.2 MICROCONTROLLER AT89S52:** - 8-bit Atmel AT89S52 is a powerful microcontroller which provides a highly-flexible Output at lower cost. For use of programming speed of DC Fan can be control. It is provided through Microcontroller. It is control output voltage of fan with help of PWM method. The basic microcontroller circuit means the circuit that requires for the operation of microcontroller. It mainly includes two circuits. Crystal circuit and Reset circuit.

**2.3 TEMPERATURE SENSOR LM35:** - The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The sensor circuitry is sealed and therefore it is not subjected to oxidation and other processes. With LM35, temperature can be measured more accurately than thermistor. The operating temperature range is from -55°C to 150°C. The output voltage varies by 10mV in response to every °C rise/fall in ambient temperature.

**2.4 ADC 0804:-** ADC 0804 is an 8 bit successive approximation analogue to digital converter. The time taken by the ADC to convert analog data into digital form is dependent on the frequency of clock source. Here used single channel ADC for measuring only. Here the input is taken from a preset, which gives different analog signals to the ADC. The output pins of the ADC are connected to LEDs. The control pins of the ADC are connected to the microcontroller AT89C52. ADC0804

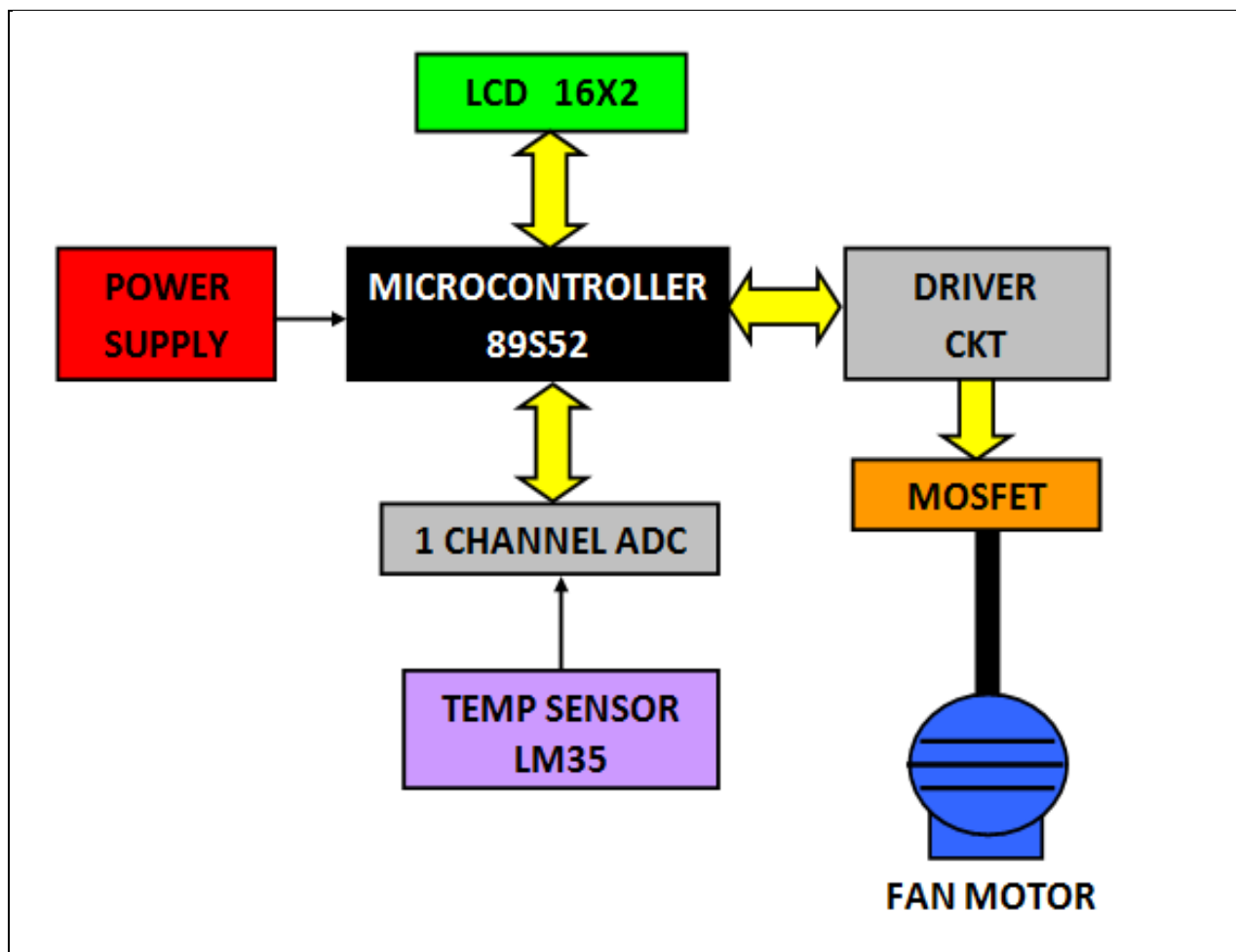
can be given clock from external source. A suitable RC circuit is connected between the Clock IN and Clock R pins to use the internal clock

**2.5 12V DC MOTOR:** - High efficiency, high quality low cost DC motor. Very easy to use and available in standard size Nut and threads on shaft to easily connect and internal threaded shaft for easily connecting it to wheel. 100 RPM at 12V DC motors, RPM can vary when operating from 3 to 15V, 5kgcm torque, 3000RPM base motor, 6mm shaft diameter with internal hole, 125gm weight, Same size motor available in various rpm, No-load current = 60 mA(Max), Load current = 300 mA(Max).

**2.6 LCD:** - A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. The first line indicate name of project and second line indicate speed and temperature.

### III. METHODOLOGY

#### 3.1 BLOCK DIAGRAM



**Figure1. Block Diagram**

Here we require +5V D.C. to operate Microcontroller, Relays, and certain ICs. Power is obtain all components through the power supply. Microcontroller is used for controlling speed of dc motor through programming. Temperature sensor is used for sensing the temperature. Adc is used for analog to digital converter. Mosfet is used for generating speed. Control circuit is used for controlling speed of motor. Lcd is used for indicate speed of motor as well as temperature.

### 3.1.1. FLOW CHART

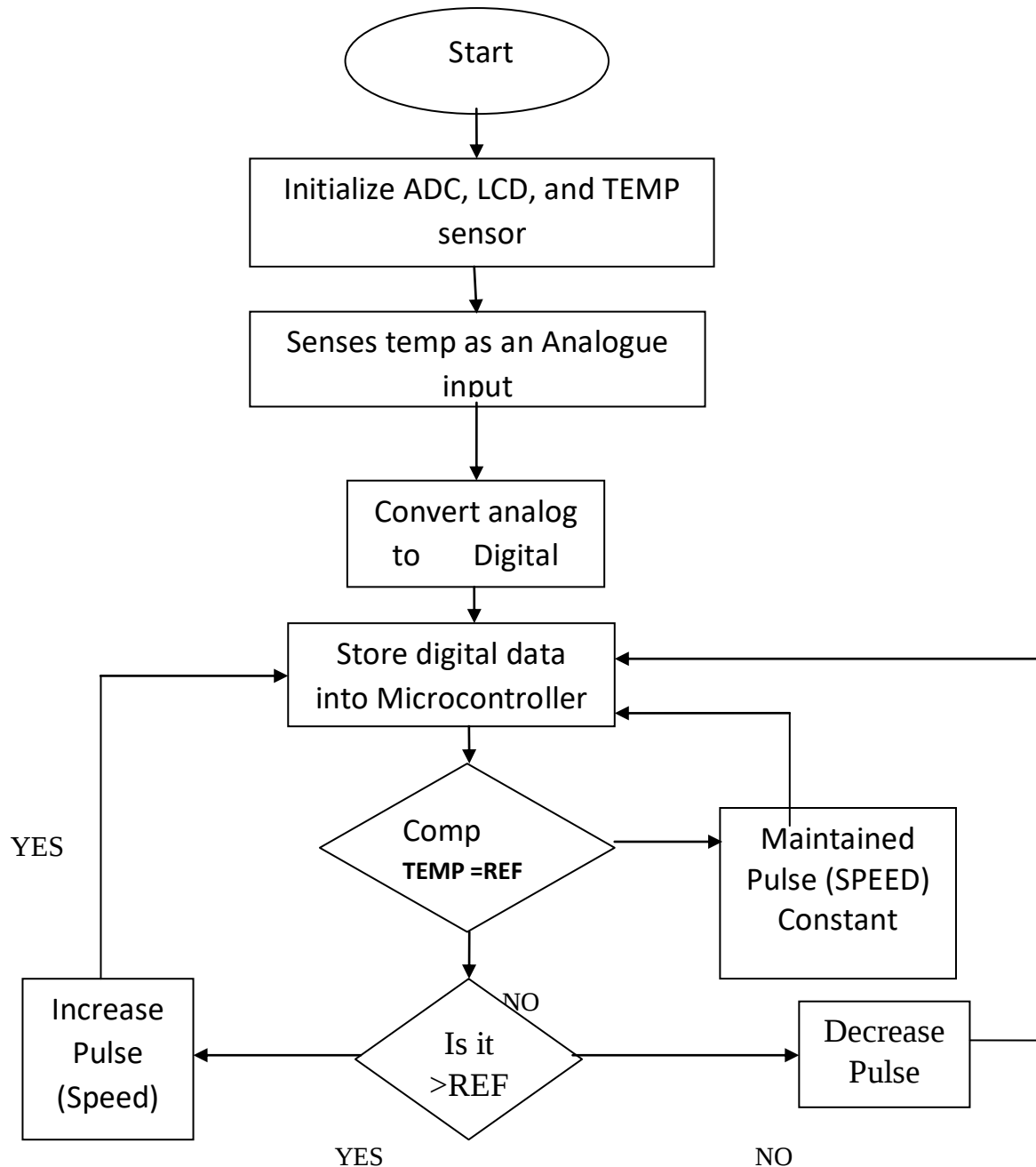


Figure2. Flow Chart

In this project power supply system is supply power to all the component of the circuit. Here we require +5V D.C. to operate Microcontroller, Relays, and certain ICs. The supply voltage of 230V A.C. is step downed to 12V by using the step-down Transformers. Temperature sensor LM35 senses the temperature. ADC 0804 is a single Channel, 8 bit successive approximation analogue to digital converter. Initialized Adc convert analog data to digital form and this data store in microcontroller. Microcontroller compare this data and when the temperature increase from the set temperature then the it given signal to speed control circuit. Speed controller circuit generate more speed with increasing temperature. When the temperature is decreases from set temperature then fan off. Here used two switches first is increasing temperature and second is decreasing temperature which is set temperature by manually. High efficiency, high quality low cost DC motor is used in it. Lcd shows both data temperature and speed of motor. Here used 16\*2 Lcd. The first line of Lcd indicate name of project and second line indicate speed in rpm and temperature in celcius We can obtained temperature verses speed of motor graph.

### IV. CONCLUSION

This paper introduces the efficient and accurate method of Fan Speed controller using AT89s52 Microcontroller and Lcd. A novel design of speed control of fan based on room temperature using PWM technique is proposed in this paper. We can obtain linear graph between two parameters Speed of Fan and Temperature.

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