Automatic Fan Controller for Air Conditioning System

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***Abstract*- Now a day the air condition system plays essential role in the embedded system that is used to protect the electronics projects from the damages with the overheat. Usually many electronic devices are heated by daily usage, finally, damages of in its important components. Therefore, the automatic fan controller is used to detect the temperature and cool the components of air condition.**

AIR CONDITIONING SYSTEM

Air conditioning system can perform the dual function such as system cooling and releasing the air. It is located many places such as electronic vehicles, computers, and other places. The air conditioning system consists a fan connected to the motor to rotate with particular speed for removing the heat from the nature to cool the system. There are different types of air conditioning systems, but choosing the right system is depends on many factors that must be considered previously.

The blower fan motor in most air conditioners operates in three modes such as low, medium and high. This system operates in medium speed set by the manufactures. Another speed is set by manually with help of settings. The user selection of a fan speed of the day to day basis is not available. Control must be exercised in selecting the speed lower than the manufactures recommendations. It might cause frosting on the coil. Several advantages from the standpoint of comfort humidity control and energy consumptions. The speed of the automatic fan controller can be controlled by manually or automatically using the microcontroller.

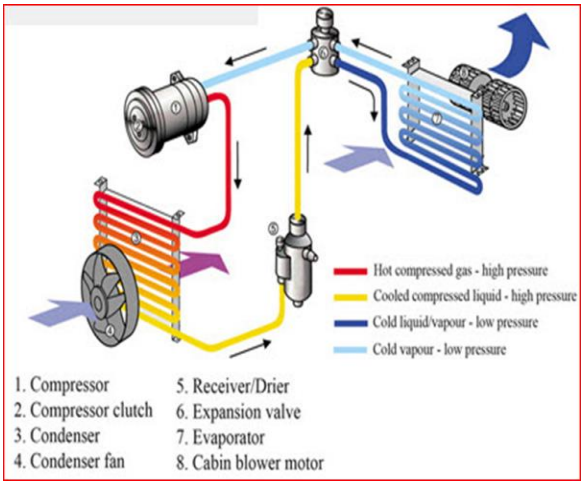


Fig: Air Conditioning System

AUTOMATIC FAN CONTROL FOR AIR CONDITIONING SYSTEM

The automatic air conditioning system can be done by using Electronic circuit using Microprocessor or microcontrollers. Now microcontroller is advanced among all above circuits therefore we are using Microcontroller for air conditioning.

This system designed with microcontroller, FAN, temperature sensor and a DC motor. The temperature sensor is used to detect the temperature of that environment and send that information to the ADC then that result sends to the microcontroller. Then the microcontroller performs the comparison of current temperature and set temperature as per the logic of the program for which microcontroller has already been programmed. The result obtained from the above operation is given through output port of a microcontroller to the LCD display of relevant data and generated pulses as per the logic program which is further fed to the driver circuit to obtain the desired output to fan.

Micro-controller board: The automatic fan controller system using the 8051 family microcontroller, it is the 8-bit microcomputer has consisted 4K bytes of flash memory, timers/counters, 256bytes of RAM memory and a serial communication. The on chip flash allows the program memory to be reprogrammed in-system. The flash memory used to provide a highly flexible and cost effective solution.

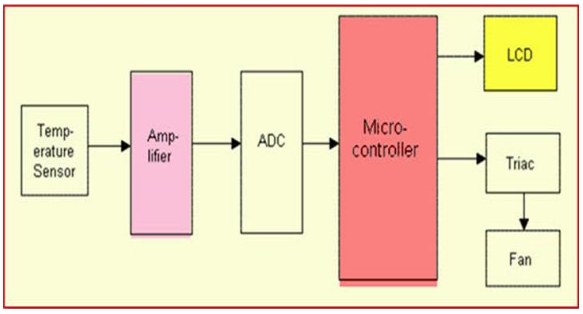
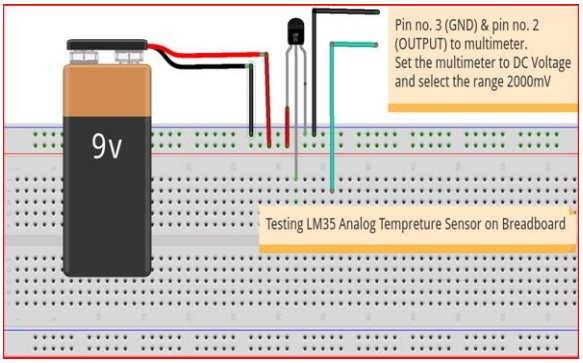
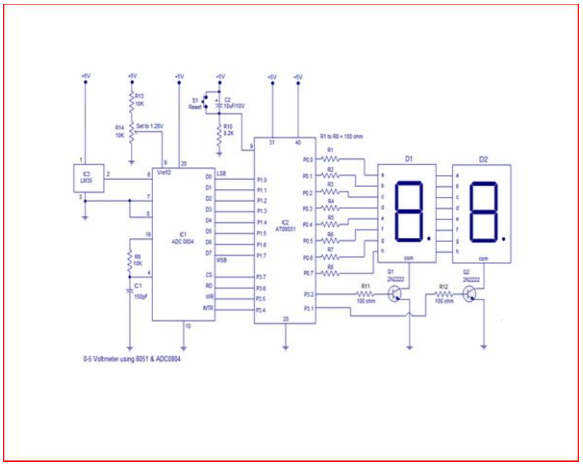


Fig: Temperature Controlled Fan Block Diagram

Temperature Sensor Block: The temperature is used to monitor the temperature at a distance. It is an analogue sensor so it provides analogue outputs in the form of voltage. The sensitivity of the temperature sensor is 10 mV/0C. For 1 0C output of the temperature sensor is 10 MV. For 10 0C outputs of LM35 is 100 mV.





ADC Block: ADC stands for analog to digital converter. The output of signal conditioning is in the analog form. But microcontroller works with values in the digital form of 0's and 1's for this purpose we have to use ADC. In this project we are using ADC that operates in 5V DC. The resolution of an ADC is 20 mV. Therefore, for 20 mV output of ADC is (01) H. And for 100 mV output of the ADC is (05) H.

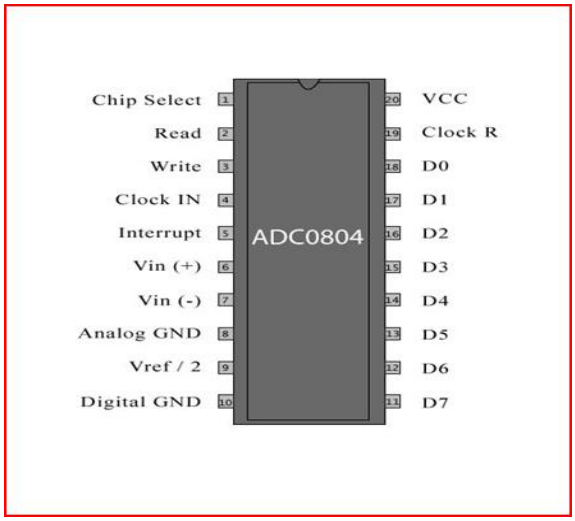


Fig: ADC 0804 Pin diagram

Amplifier Block: Output signal from micro-controller is weak so we have to amplify that signal. Amplifier block amplifies the signal for driving the final control element i.e. output device. For amplification Transistor BC 547 is used.

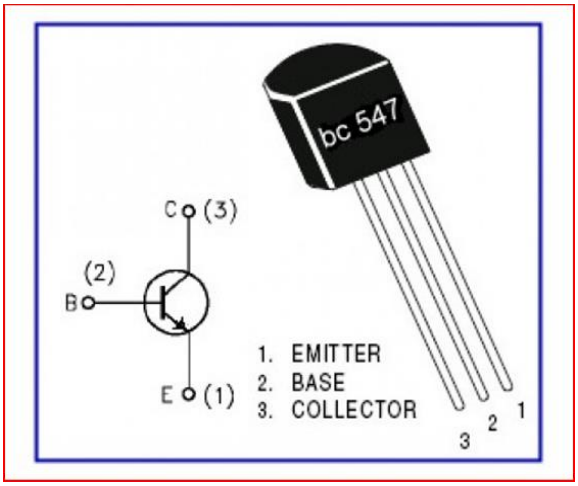


Fig: BC 547 Transistor

Output Block: The automatic fan controller is using a FAN as output device. The fan speed is controlled by the varying of voltages. If temperature is above set point, then Fan is ON so that the temperature will start to decrease then cooling the system. If the

temperature comes to normal state, then fan automatically switches off the fan.

Fig: Fan

Display Block: In this project we are using 16 X 2 intelligent LCD display to display the college name, temperature set point and very important is the temperature of "Temperature Controlled Fan".

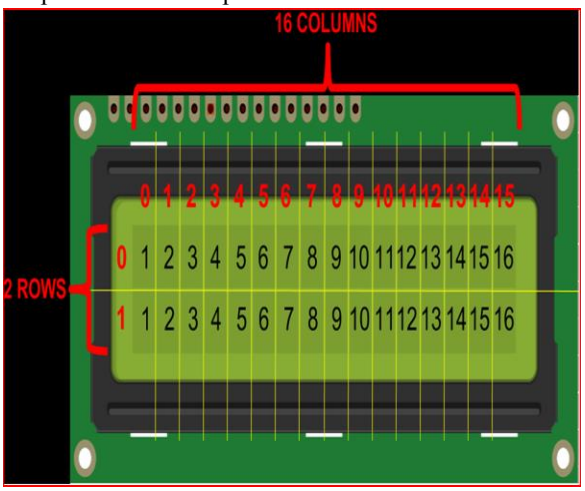


Fig: 16X2 LCD

Power Block: For our project we require + 5 Volt, – 5 Volt and +12V supply. +5 Volts and. 5Volts is given to Micro-controller board, Temperature sensor, Signal conditioning, ADC, etc. +12 Volts is used to drive the relay.

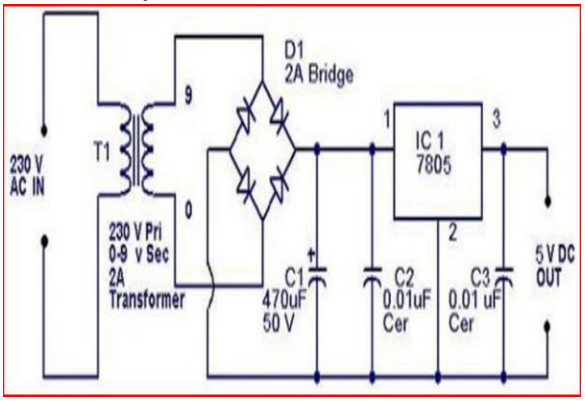


Fig: Power supply block diagram using bridge rectifier

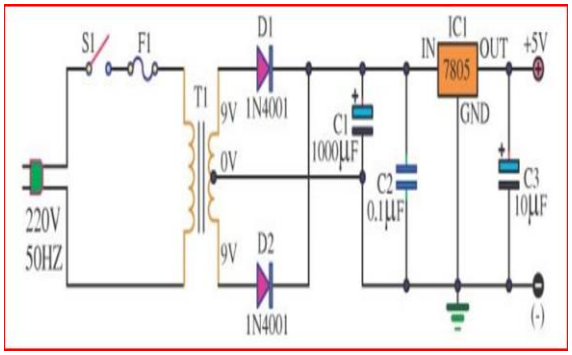


Fig: Power supply block diagram using centre tapped transformer

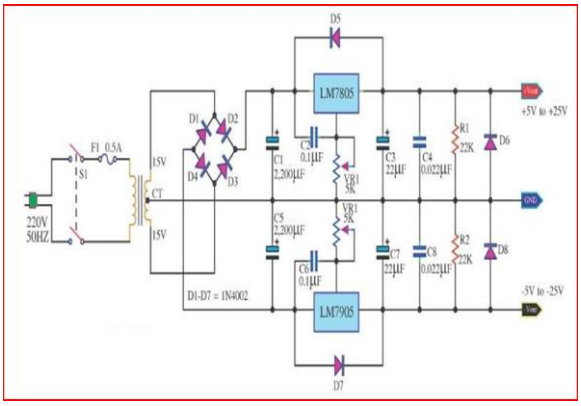


Fig: Positive and Negative Regulated Power Supply

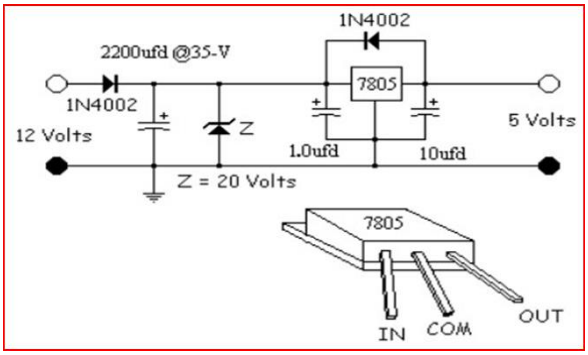


Fig: 7805 Voltage Regulator

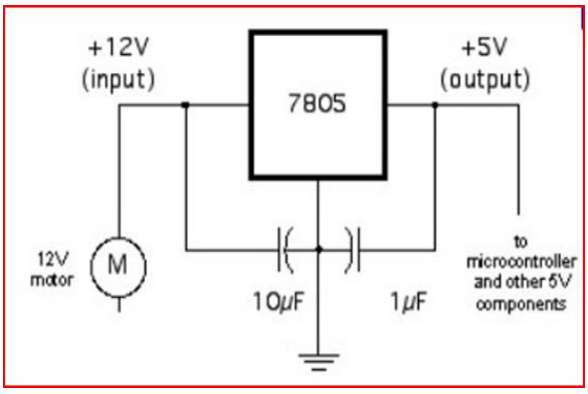


Fig: 7805 Voltage Regulator

Automatic Fan Controller Project:

This automatic fan controller project is used to monitor the temperature of the load without human intervention by the predetermined temperature limits using a Thermistors. If the temperature increases beyond a certain limit, then a lamp is switched on to bring the temperature to normal value.

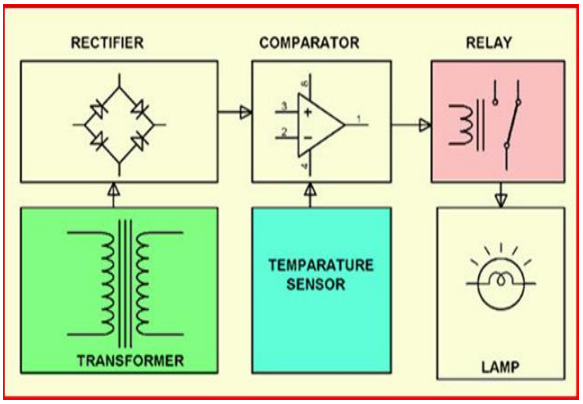


Fig: Automatic Fan Controller Project

The automatic fan controller circuit uses a Thermistors along with an operational amplifier is used for monitoring the input voltages. The Thermistors temperature sensor is used to detect the temperature. If the temperature exceeds the predefined limit, then the Thermistors will give a signal to operational amplifier to activate the lamp using a relay to retain the temperature at that value.

Advantages of Air Conditional Fan

The advantages of automatic fan control for air conditioning system mainly includes the following.

- Quick cooling
- More cooling and less moisture removable
- Good for day time when cooling loads are low and humidity high
- Energy efficient, partly because it removes less moisture.
- Low speed settings

REFERENCES

[1] Electronics for you
[2] Micro controller applications
[3] Electrical for u