ABSTRACT

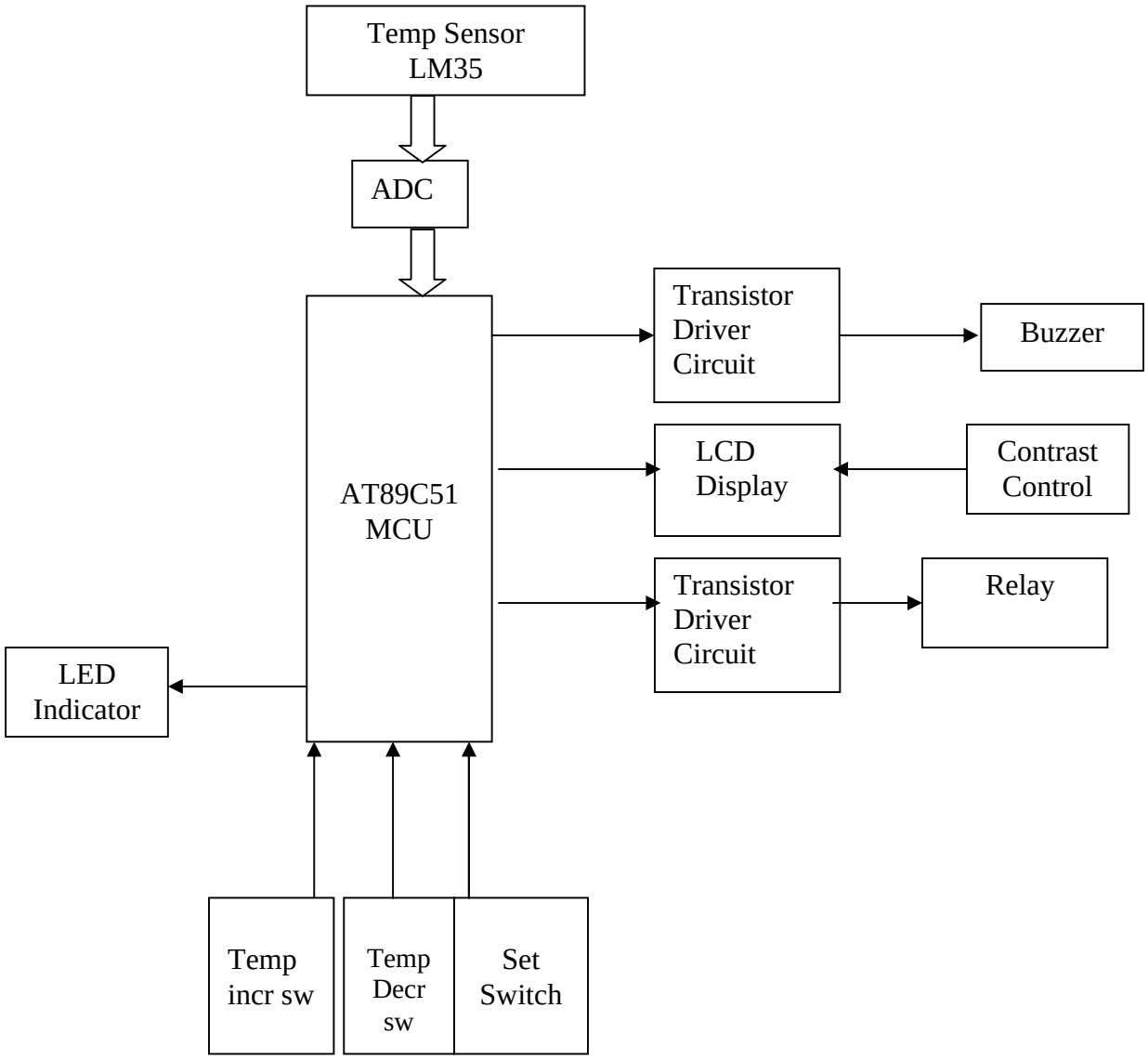
This project is a standalone digital temperature meter that also controls the temperature of the heating element of a device according to its requirement. Use of embedded technology makes this closed loop feedback control system efficient and reliable. Micro controller (AT89C51) allows dynamic and faster control. Push button switches and liquid crystal display (LCD) make the system user-friendly. The sensed and set temperature values are simultaneously displayed on the LCD panel. The circuit is programmed for on/ off control. It is very compact using few components and can be implemented for several applications including air-conditioners, water-heaters, snow-melters, ovens, heat-exchangers, mixers, furnaces, incubators, thermal baths and veterinary operating tables. AT89C51 micro controller is the heart of the circuit as it controls all the functions.

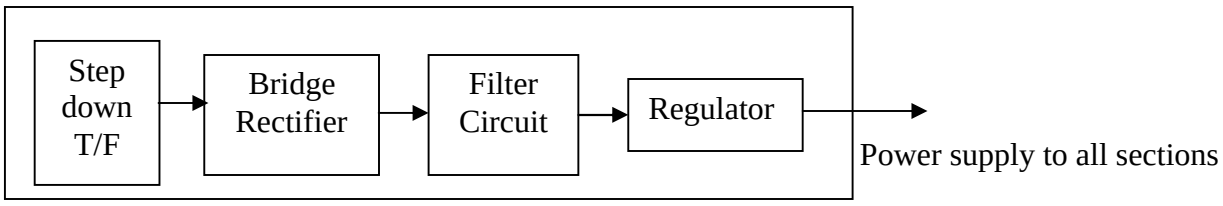
The temperature sensor LM35 senses the temperature and converts it into an electrical signal, which is applied to the micro controller through ADC. The analog signal is converted into digital format by the analog-to-digital converter (ADC). The sensed and set values of the temperature are displayed on the 16x2-line LCD. The micro controller drives a transistor to control the heating element with the help of an electromagnetic relay. The set temperature value can be varied from 1C to 255C using an external PCB mount push on switch

A double pole double throw (DPDT) relay is connected to the micro controller through a driver transistor. The relay requires 5 volts at a current of around 50 mA, which can not be provided by the micro controller. So the driver transistor is added. The relay is used to operate the external heater or to operate any other electrical device. Normally the relay remains off. As soon as pin of the micro controller goes high, the relay operates.

This project uses regulated 5V, 500mA power supply. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac out put of secondary of 230/12V step down transformer. This project is useful in process industries for maintenance and controlling of Boilers temperature.

Block Diagram:





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