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Temperature Sensor Using SCADA

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Abstract—***Automatic temperature control is first step in applications such as industries. The main aim of temperature sensor using SCADA is to sense the temperature and perform the required performance using temperature sensors. It continuously senses the environment temperature and according to it performs its function. It works on the sensation of temperature that when temperature is above 40 degree celsius then fan is on and when temperature is below 23 degree celsius then only a bulb is on which increases the temperature of environment. The project paper focuses on developing a combination of hardware and software to monitor and control various parameters in industry.***

Almost all the Industrial Data Acquisition and control systems today use connection oriented concepts for interfaces. However, the variety of physical shapes and functional commands that each cable or wire based system has also raises numerous problems: the difficulties in locating the particular area affected by the industrial parameter, the complexity in operation of the system, the maintenance issue and so on. The control of temperature by using SCADA-based wireless technology has gained significant industry attention. The control of the temperature of a room has provides effective and efficient role in industry. They have used cables and bulky equipment which require large amount of space, high degree of the maintenance and are easily destroyed by moisture and excessive heat. Additionally, the Data acquisition and control techniques used so far have imposed considerable computational burden and have not provided a consistent and accurate results expected by the employees and their industries.

Keywords— temperature sensor, amplifier, ATMEGA 328

I. INTRODUCTION

An Embedded System is a combination of computer hardware and software, and perhaps additional mechanical or other parts, designed to perform a specific function. An embedded system is a microcontroller-based, software driven, reliable, real-time control system, autonomous, or human or network interactive, operating on diverse physical variables and in diverse environments and sold into a competitive and cost conscious market. An embedded system is not a computer system that is used primarily for processing, not a software system on PC or UNIX, not a traditional business or scientific application. High-end embedded & lower end embedded systems. High-end embedded system generally 32, 64 Bit Controllers used with OS. Examples Personal Digital Assistant and Mobile phones etc .Lower end embedded systems generally 8, 16 Bit Controllers used with a minimal operating systems and hardware layout designed for the specific purpose. Field devices include pumps, heaters, alarms, control valves etc.

Supervisory control and data acquisition (SCADA) is a control system architecture that uses computers, networked data communications and graphical user interface for high level process supervisory management. The SCADA concept was developed as a universal means of remote access to a variety of local control modules. It is one of the most commonly used types of industrial control systems.

The objectives of the SCADA system are as follows:

A. Monitor the system.
B. Obtain control over the system and ensure that required performance is always achieved.
C. In today's world, most of the large-scale industries have become automated. This project concentrates on making automation efficient and economical so that even small scale and medium scale industries get benefited.

Data Acquisition and Control Systems have gained much larger importance in the Industrial field because of the rapid Technological advancement and Security reasons. Whether it is an Industrial workshop, defence go-down or experimental lab of the power plant accurate monitoring of the parameters is the need of the day. It could be the temperature, humidity, gas or light detecting sensor waiting for our command to provide us with information about the measured parameter of the particular area where they are installed. Advantage of the system is that the engineer or worker not only can obtain accurate data about the industrial parameters in remote area, but also there is no need to be physical present over there. The amount of computation required to process the data detected by

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sensors is much greater than that of the mechanical devices. Many of those approaches have been implemented to focus in detection of the single parameter such as temperature.

II. DESIGN AND IMPLEMENTATION

In this temperature sensor using SCADA model, there are couple of major parameters that we need to perform exact task. The first parameter is temperature sensor which is used for obtaining temperature information. The second parameter is amplifier which is used to amplify the signal coming from temperature sensors. From amplifier the signals go to the ADC where analog signal is converted into digital signals. In order to better we need to place the objects where they are safe and the effect of moisture does not reach. The other minor parameters such as LCD and relay are used to show the input and to switch the input and output.

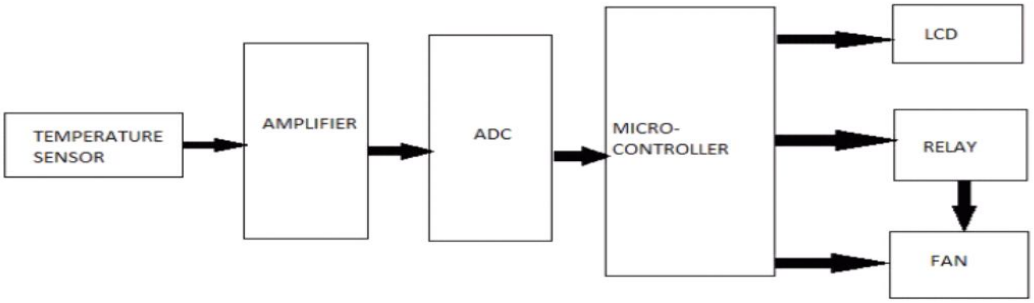

Fig.1: Block Diagram of Temperature sensor using SCADA

III.METHODOLOGY

The equipment's that are used are discussed below:

A. Temperature Sensor

National Semiconductor's LM35 IC has been used for sensing the temperature. It is an integrated circuit sensor that can be used to measure temperature with an electrical output proportional to the temperature (in °C). The temperature can be measured more accurately with it than using a thermistor. The sensor circuitry is sealed and not subject to oxidation, etc. The converter provides accurately linear and directly proportional output signal in mill volts over the temperature range of 0°C to 155°C. It develops an output voltage of 10 mV per degree centigrade change in the ambient temperature. Therefore the output voltage varies from 0 mV at 0°C to 1V at 100°C and any voltage measurement circuit connected across the output pins can read the temperature directly

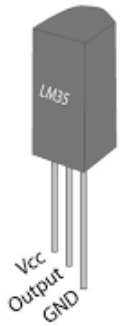

Fig.2: LM35

IV. ADC 0808

The ADC0808, Data acquisition component is a monolithic CMOS device with an 8-bit analog to digital converter, 8-chnnel multiplexer and microprocessor/ microcontroller compatible control logic. The 8- bit A/D converter uses successive approximation as the conversion technique.

Key Specification: Resolution 8 bits, Total unadjusted error +/- ½ LSB and +/- 1 LSB, Single power supply 5 VDC, Low power 15 mW., Conversion time 100µs.

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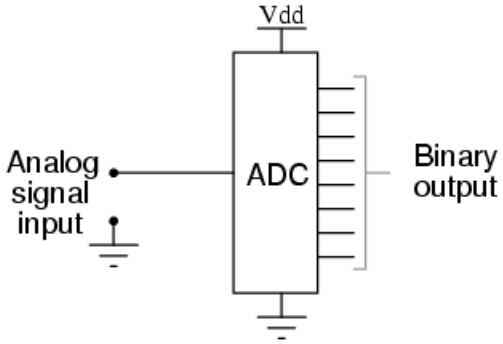

Fig.3: ADC

V. RELAY DRIVER (ULN 2003)

ULN 2003 is a high voltage and high current Darlington transistor array. It consists of seven NPN Darlington pairs that feature high-voltage outputs with common-cathode Clamp diode for switching inductive loads. Relay are components that permit a low-power circuit to control signals or to switch high current ON and OFF which should be electrically isolated from controlling circuit.

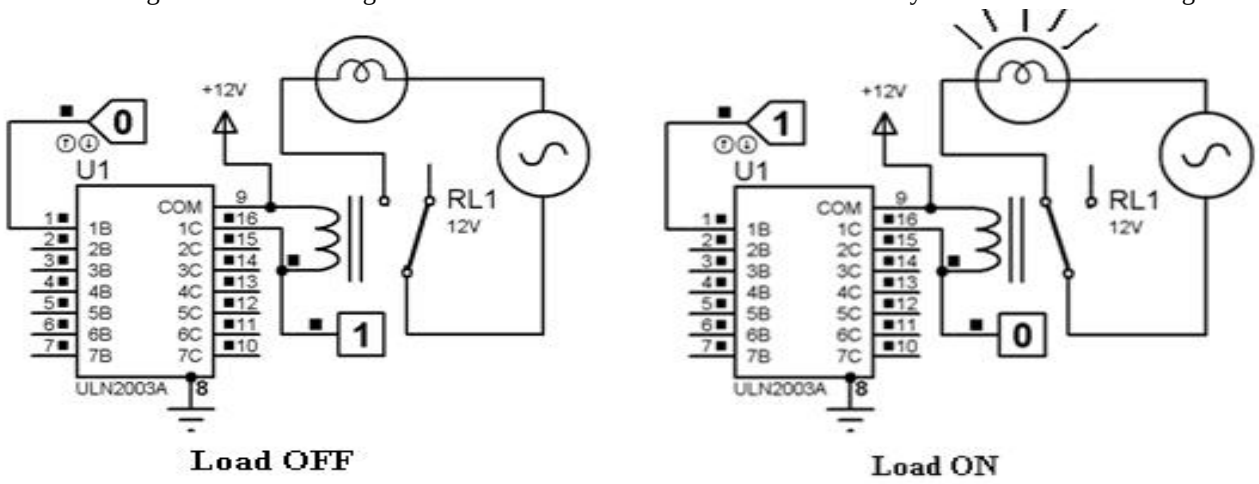

Fig.4 Relay Driver

VI. LCD

LCD is used to display the digital value of the parameter that are detected by the sensors. LCD creates images on a flat surface by shining light through a combination of liquid crystals and polarized glass. The technology differs from CRT because a CRT uses a beam of electrons projected through a large glass tube to create images.

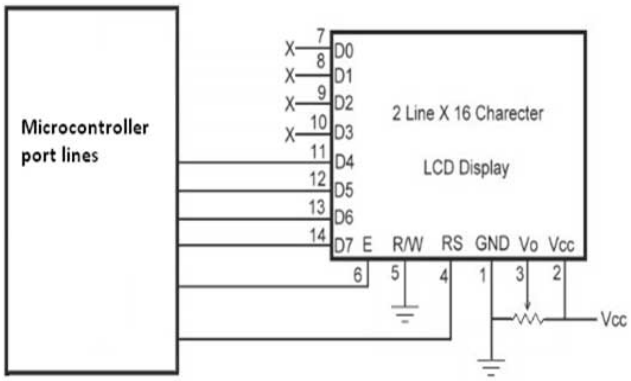

Fig.5 LCD

VII. CONCLUSION

The main aim of this project is to run the DC motor fan and to glow bulb when temperature sense by the temperature sensor is greater than 40 degree Celsius (reference point). In this project we have used IC for the programming of microcontroller. We have presented here a research on advances in electronic technologies microcontrollers and sensors which offers researchers variety of new and inexpensive sensing, monitoring and control capability. The concept of hardware designs, software programs and development effort are met freely available to all which helps to facilitate and expand the adoption of this capabilities. The open source hardware Arduino development platform has great potential for remote room temperature monitoring application. Temperature information is transmitted wirelessly to registered user who is an android user.

This paper has presented the Microcontroller based temperature controller is a simple whereas a useful circuit with a which the temperature can be controlled with the aid of a LM 35 temperature sensor. The circuit can be made useful in practical area where the circuit can be connected to a device whose temperature has to be controlled at a particular limit say a room with a heater whose temperature can be set to a particular value. Similar another application is that the circuit os being used in the green house farming for the production of particular crops in any season according to the temperature it required.

In future the circuit can be enhanced by connecting a GSM module to the circuit so that in industrial area when a machine process the set temperature, we can inform the control room by sending message, or else a call to control room manager so that damage to the machine can be avoided by disconnecting the equipment with GSM technology.

VIII. ACKNOWLEDGMENT

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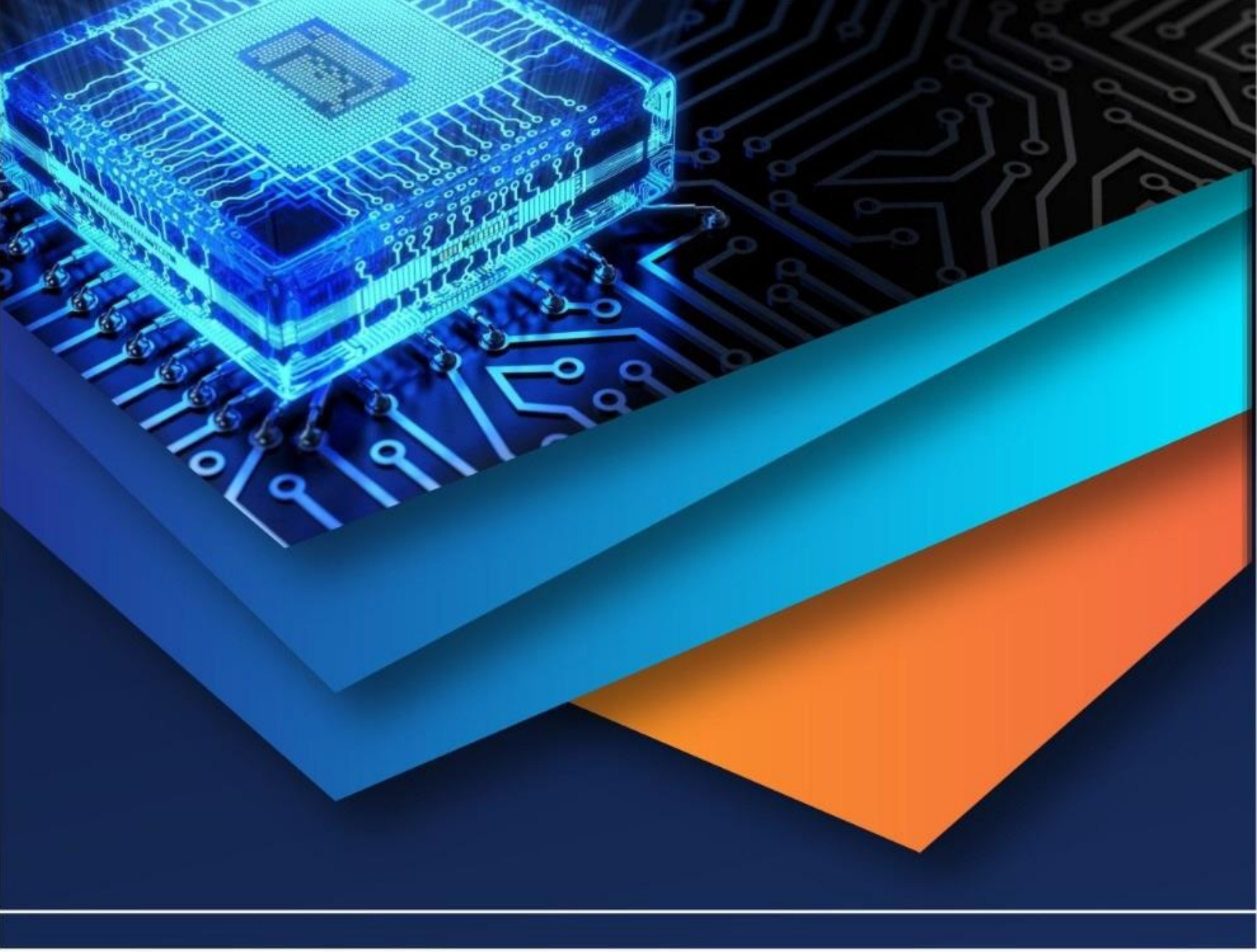

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