Design of microcontroller based wireless SCADA system for real time data

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***Abstract*— The objective of this paper is to describe the observation and construction of a low cost microcontroller based SCADA system for monitoring & accessing the performance of remotely situated device by acquiring and controlling the physical parameters such as temperature on a real time basis. Using SCADA software like LabVIEW along with a low cost microcontroller based data acquisition hardware as DAQ card. The real state monitoring of physical parameters (temperature, solar radiation, humidity, pressure etc.) can be remotely acquired and saved into database files like MSExcel, MSAccess etc and can be communicated with other PC situated at remote location.**

***Keywords*—SCADA, NI LabVIEW, Data Acquisition Card, Temperature, Microcontroller, Sensors, Physical Parameters.**

I. INTRODUCTION

Supervisory Control and Data Acquisition (SCADA) is a process control system that enables a site operator to monitor and control processes that are distributed among various remote sites. A properly designed SCADA system saves time and money by eliminating the need for service personnel to visit each site for inspection, data collection/logging or make adjustments. Supervisory Control and Data Acquisition systems are computers, controllers, instruments; actuators, networks, and interfaces that manage the control of automated industrial processes and allow analysis of those systems through data collection .They are used in all types of industries, from electrical distribution systems, to food processing, to facility security alarms[1],[2] &[4].

This paper is about the work done in implementing a temperature monitor. It monitor the Instruments Working temperature Usually the reaction conducting instruments like hot air oven, furnaces and distillers require these temperature controllers. The range of these temperature monitors should be also wide; hence the appropriate option for the sensor to be used must be done. This paper presents a data acquisition system with LabVIEW interface that is capable to monitor and measure few of most important parameters like temperature.

II. IMPLEMENTATION

The proposed implementation of the system solves the problem of continuous monitoring of data acquisition system[3],[5]&[7]. The data acquisition system developed is a compact, low cost, 8-bit system. Fig. 1 shows the block diagram of the basic elements of the design. The system was designed to be versatile and all operations are under software control. This will allow for future expansion or modifications without the need for major hardware changes. Fig.2 shows the circuit diagram of the DAQ system. The system is connected to a computer through the RS232 serial link to allow user communications and to download recorded data to the computer for subsequent analysis.

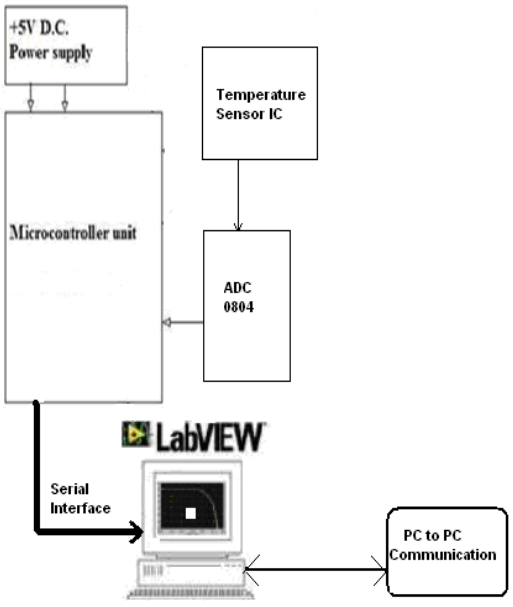

Fig. 1. Block diagram of the DAQ

Serial interfacing between the data acquisition system and the computer is implemented using the MAX232 line driver/receiver which is used to convert TTL (0–5 V) voltage required by the data acquisition system to the -12 V and + 12 V needed by the computer for RS232 communication.

III. IMPLEMENTATION OF SCADA

The Block Diagram for the application used for monitoring and measurement of the temperature is presented below as,

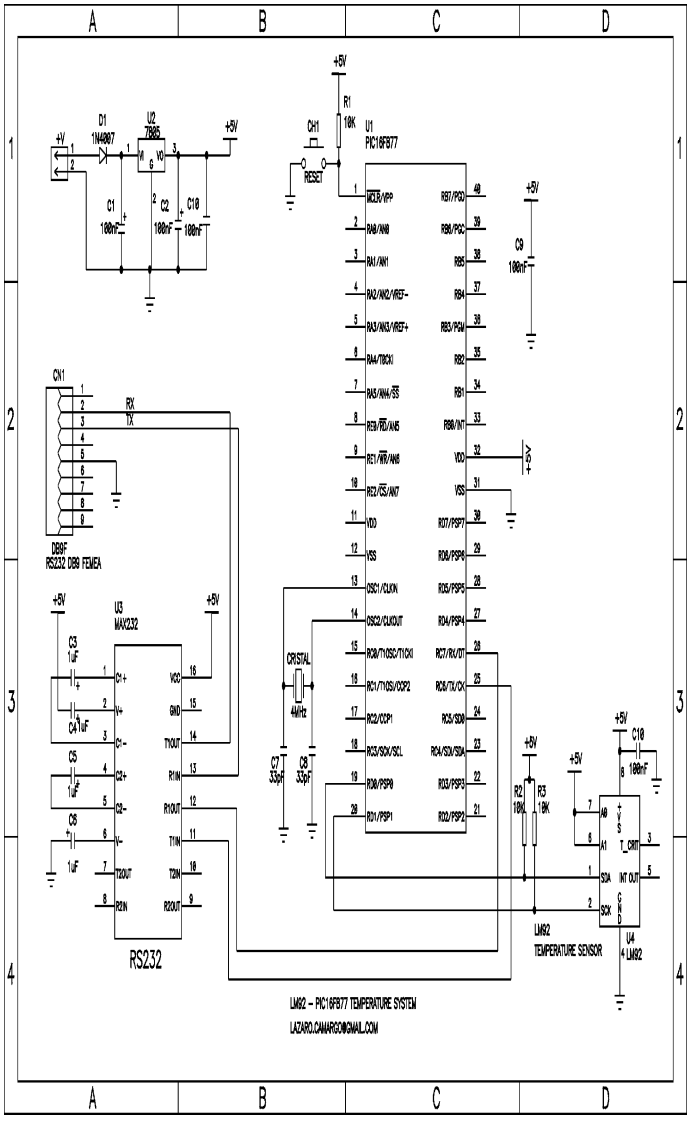

Fig.2 Circuit diag. of the data acquisition system

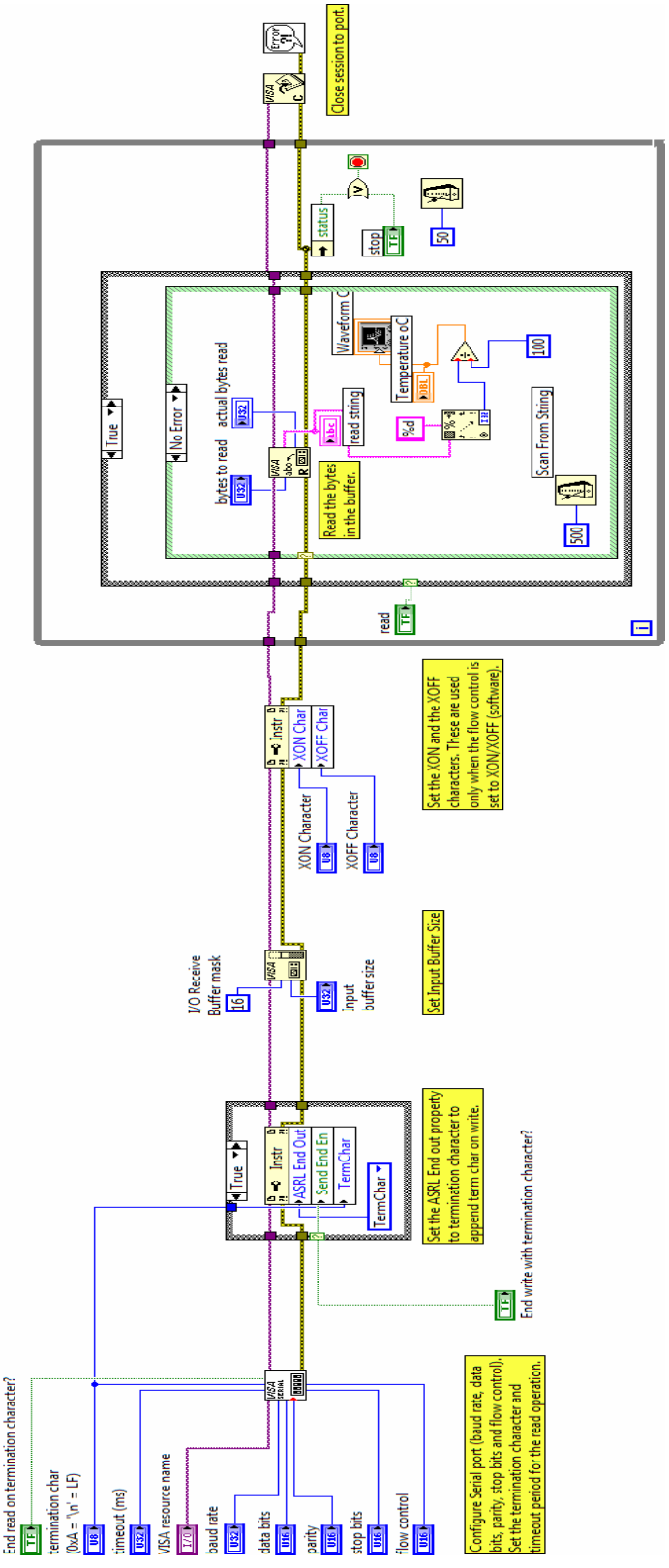

Fig3. Fig. 3 Block Diagram to display the acquired data from sensors.

The Block Diagram for the application used for monitoring and measurement of the temperature is presented in Fig.3 as,

The Front panel for the application used for monitoring and measurement of the temperature is presented in Fig.4 below as,

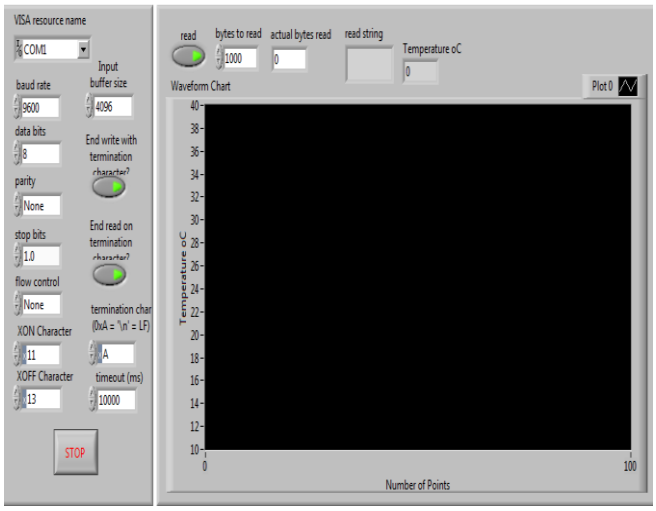

Fig. 4 Front panel to display the acquired data from sensors.

IV. Results and Conclusions

The waveform for the real time acquisition of the temperature data is shown in the Front panel in Fig.5 as:

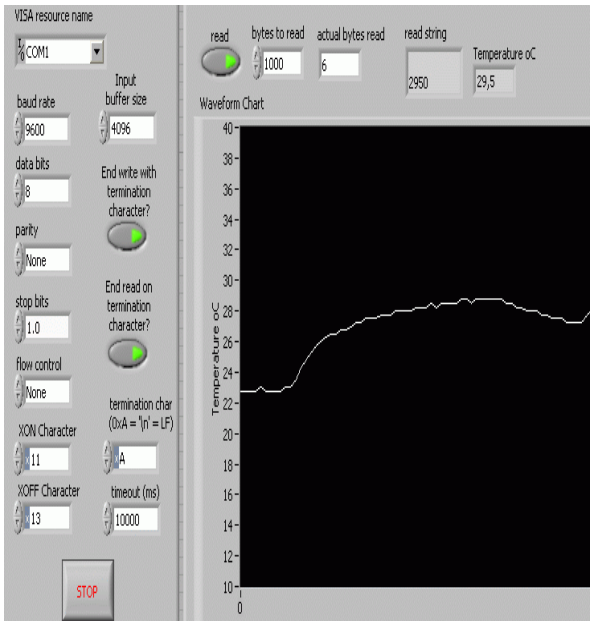

Fig.5 Real Time Acquisition of the Temperature data

The wavefrom data can be saved from the Waveform Graph array points in to database file like MsExcel or Spreadsheet by using export to database file option in the waveform graph and this file can be communicated with other PC situated at the remote location for analysis of the data. So the plant/process controller at the remote location has the data of the process available to him. The Data socket programming feature of LabVIEW[8],[9] can also be used for moment to moment communication of the data to other PC but using file transfer the whole interval data can be communicated.

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