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Industrial Plant Automation Using SCADA

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Abstract: SCADA is the abbreviation of "Supervisory Control and Data Acquisition."SCADA system basically used in industry for process automation. Process automation is in the sense of data acquisition as well as controlling.
This system represents, a mobile phone as supervisory system and PC used as a base station for storing and controlling the data as well as for further processing. The wireless communication between the mobile phone and the base station is performed by using GSM module. The supervisor of the plant can see the status of parameter without visiting the site. Therefore this system reduces the maintenance cost and necessity of continuous monitoring. Therefore this system increases the productivity and performance of the Plant. This System presents a low cost automation scheme which can be easily extended for more complicated control schemes including wireless control.
Keywords: Mobile phone, GSM module, Sensors, Remote monitoring system, ARM.

I. INTRODUCTION

Supervisory Control and Data Acquisition (SCADA) is a process control system used in industrial automation. It allows to site operator to monitor and control processes which placed at remote locations. A well designed SCADA system eliminates the complexity of monitoring and controlling of plants. It is time saving and cost reducing system thereby eliminating the need for personal attention to visit each site for inspection, data acquisition or make adjustments. SCADA systems having computers, controllers, actuators, networks, and interfaces that allows automatic process controlling and also allows data analysis through data acquisition. They are widely used in all types of industries. SCADA system performed both the operations such as data acquisition and supervisory control. Mobile Supervisory Control and Data Acquisition (referred to as Mobile SCADA) is the use of SCADA with the mobile phone for supervisory control**.**

A. Automation

Automation or automatic control, is the use of various control systems for operating equipment such as machinery, processes in factories, boilers and heat treating ovens, switching on telephone networks, steering and stabilization of ships, aircraft and other applications and vehicles with minimal or reduced human intervention, with some processes have been completely automated. Automation has been achieved by various means including mechanical, hydraulic, pneumatic, electrical, electronic devices and computers, usually in combination.
The benefit of automation includes labor savings, savings in electricity costs, savings in material costs, and improvements to quality, accuracy and precision. There are various type of automation such as Robotics, PLC, HMI, SCADA .In this project we use SCADA system for controlling and monitoring.

B. SCADA

Supervisory Control and Data Acquisition (SCADA) is a process control system used in industrial automation. It allows to site operator to monitor and control processes which placed at remote locations. A well designed SCADA system eliminates the complexity of monitoring and controlling of plants. SCADA is the abbreviation of "Supervisory Control and Data Acquisition", used in industry for process automation. In this project the GSM is chosen for the wireless communications. Supervisor of the plant can see the status of parameter without visiting the site. To reduce the maintenance cost and necessity of continuous monitoring and increases productivity and performance of the Plant this system is used.

II. PURPOSE

Supervisory Control and Data Acquisition (SCADA) is a process control system used in industrial automation. It allows to site operator to monitor and control processes which placed at remote locations. A well designed SCADA system eliminates the complexity of monitoring and controlling of plants. It is time saving and cost reducing system

III. LITERATURE REVIEW

Abhijeet Ghadage, at all [2016][1] **,** has proposed the system which represents Process automation is in the sense of data acquisition as well as controlling. The wireless communication between the mobile phone and the base station is performed by using Bluetooth application protocol. The test result have indicated that the mobile phone based SCADA integration using Bluetooth data transfer scheme could enhance the performance of Plant and Machinery in a day without causing an increase in the response time of SCADA function. Therefore this system reduces the maintenance cost and necessity of continuous monitoring. This project effectively proposed, a Android enable mobile phone has been integrated into SCADA system as a supervisory controller. Therefore it is not necessary the SCADA work with a PC. Since the data monitoring and controlling process of a plant is performed by means of Bluetooth base station so there is no need of extra hardware for communication. In the industrial automation wireless communication is more efficient and practicable which reduces the process complexity of plant.

Neeraj Khera, Sumit Balguvhar[2015][2], has set the objective 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. 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.

The waveform 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.

IV. PROPOSED SYSTEM

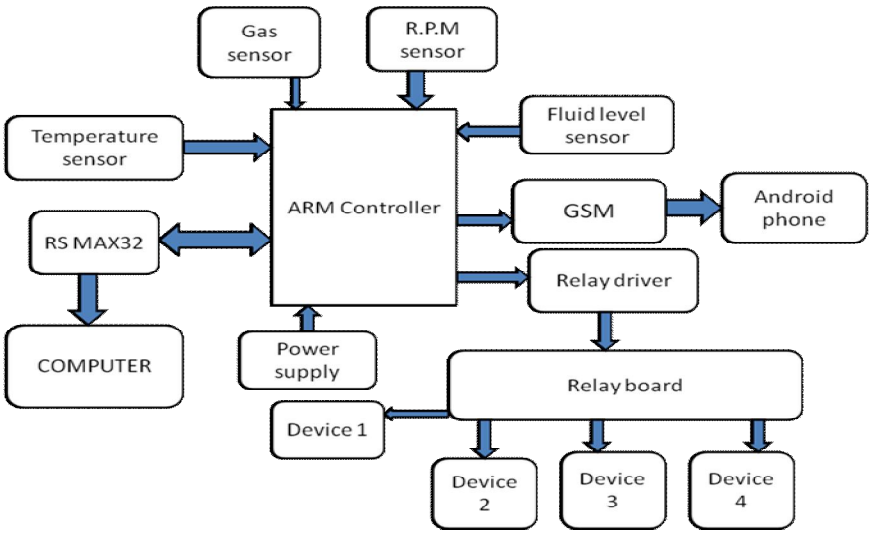

Fig.4.1 Block diagram of Automation based industrial plant using SCADA

The block diagram of proposed system has shown above. The proposed system has four main components

A. Master Unit

Master Unit consists of PC and ARM 7. It is the main part of the system and located at the centre of system. It is installed at site of plant where actual process is running.

B. Remote Unit

This unit is installed at the remote location from where we can monitor and control actual process. Remote unit collect the required data about the process and send it to the master unit.

C. Communication Mode

It works as communication medium between Master Unit and Remote Unit. It transmitted required data between these two units. Proposed system uses GSM module as a communication medium.

D. Software

It required for interfacing between hardware and user. It drives the hardware and provides Graphical User Interface.

E. GSM Functionality

1) The GSM has been programmed using Cscape software to facilitate the messaging service. By using Escape we can determine what message we would like to receive, what are the parameters which we would like to monitor, etc.

2) messages will be delivered to the mobile number which has been specified in the program while configuring. Multiple mobile numbers can also be given and all the mobile numbers would receive the same message. Even groups can be created under which a set of mobile numbers can be assigned.

V. RESULT

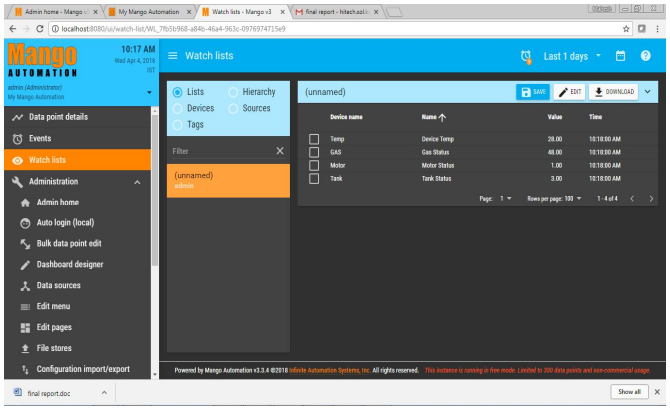

Fig 5.1(a): The configuration of all parameter

Device Name	Name (increased)	Value
Temperature	Device Temp	28.00
Gas	Gas Status	48.00
Motor	Motor Status	1.00
Tank	Tank Status	3.00

Fig 5.1(b) : The configuration of all parameter

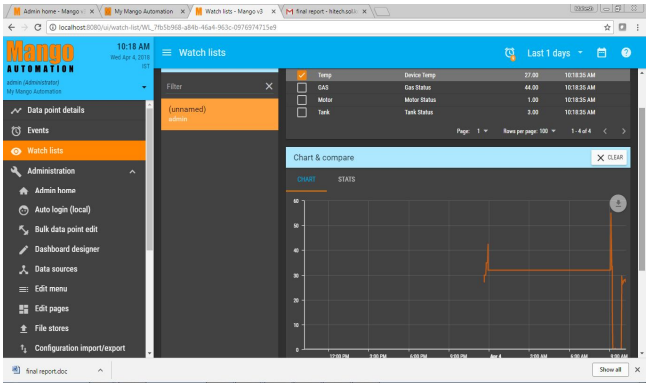

Fig 5.2: Temperature

Above figure shows the change in temperature. In This project set point for temperature is 28 and here measured temperature is 27, so this figure shows the change in temperature analog as well as digitally.

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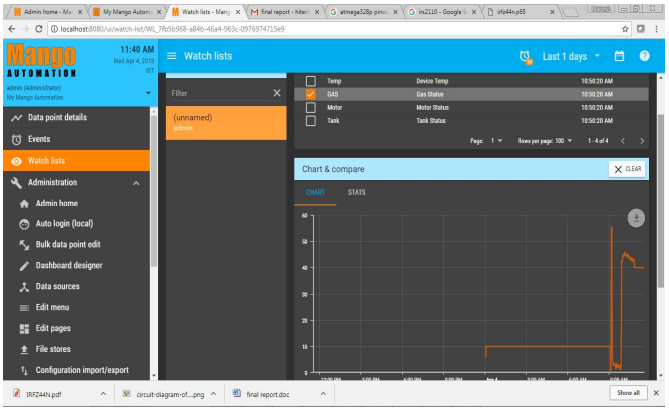

Fig 5.3: Gas Detection

Above figure shows the detection of gas. Set point for gas is 48and if the gas is detected then the relay is turn on and this is graphically display as well as digitally.

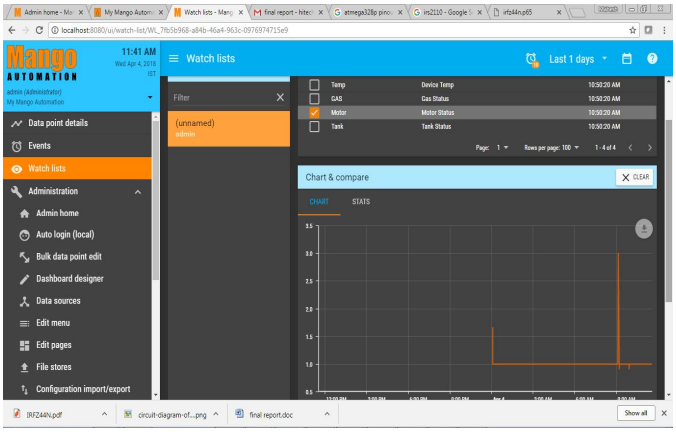

Fig 5.4: Start and stop motor

Above figure shows the start and stop motor. If the motor is

Start then output is 0and if motor is stop then output is 1. This is graphically display as well as digitally.

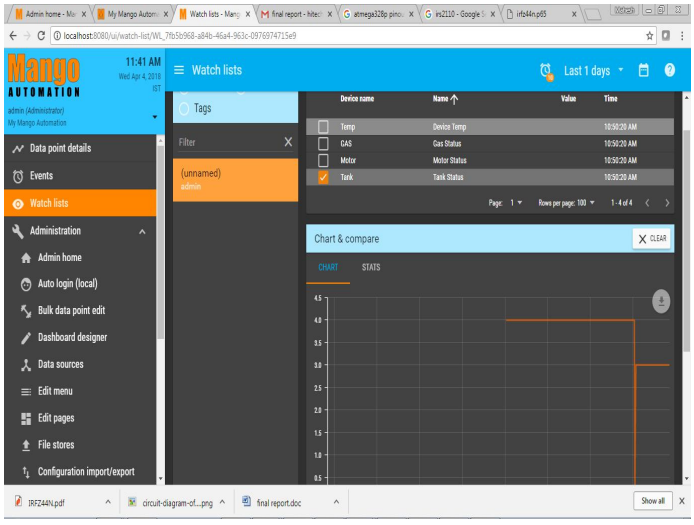

Fig 5.5: Fluid level

Above figure shows the fluid level. The set level for tank is 3. If the tank level is below this point then relay is turn on

And display graphically display as well as digitally

VI. CONCLUSION

In this project, a low cost SCADA System with digital Input and Output and analog Input and Output for industry automation has been developed. The configured SCADA system shows effective representation of the data using SCADA. SCADA used for monitor and control the process parameters for the given application.

This project uses in any industry for automation, as this communicating over standard MOD bus protocol, this hardware can be integrated in to any standard MOD bus enables SCADA system. So data from different analog loads has been acquisitively and digitally displayed on Personal Computer. Several loads have been monitored on Personal Computer as well as mobile phones in real time.

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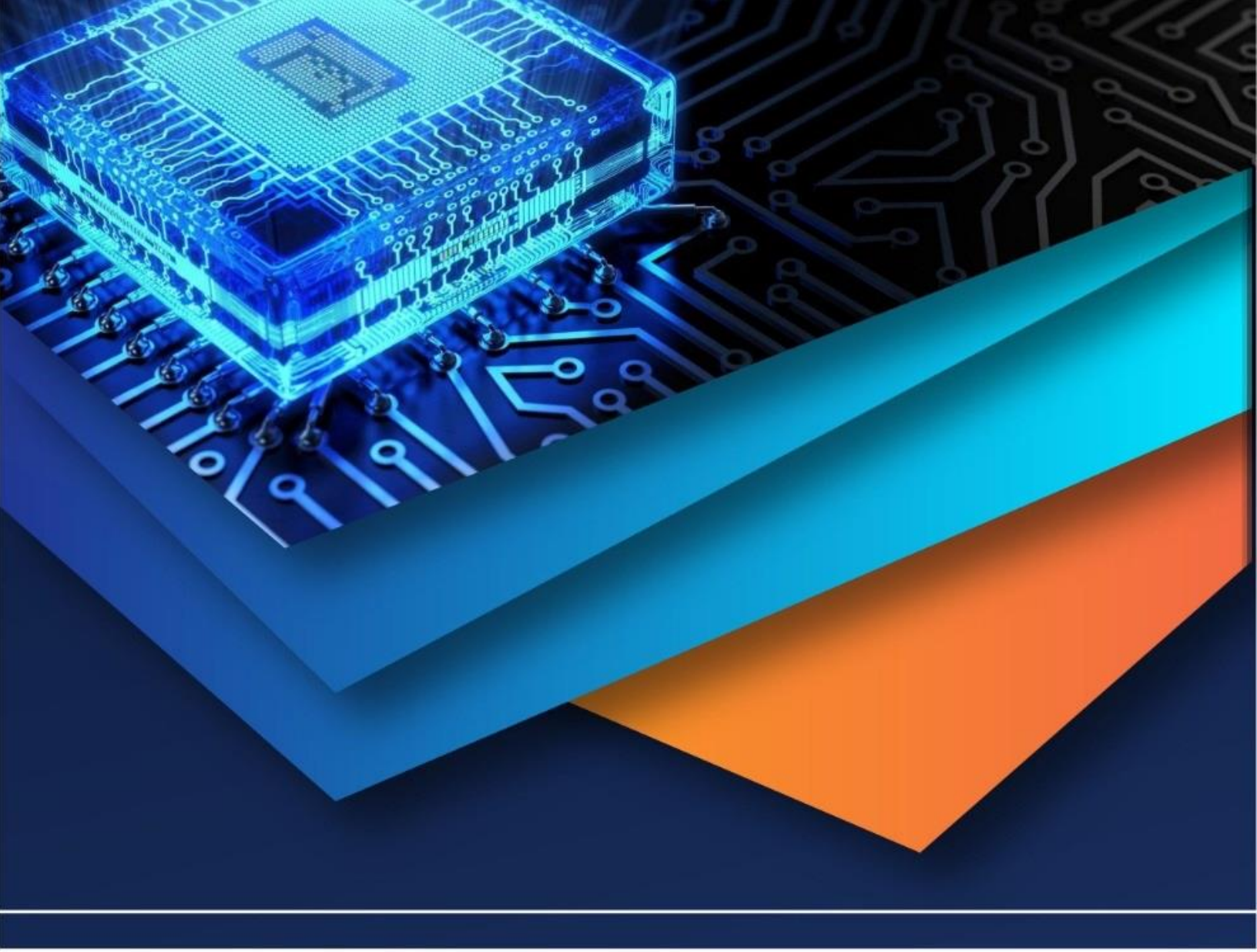

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