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AUTOMATION AND SURVEILLANCE IN TELEPHONE EXCHANGE USING SCADA AND EMBEDDED SYSTEM

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ABSTRACT

The project is designed to form bridge between rural exchanges and district telecom and to state wide telecom. By implementing this idea in a telephone exchange will improve the quality of work. We have considered many factors in this project starting from coaxial cable to optical fiber cable along with security and safe operation of the exchange, without any human interference. By implementing our idea, the user can identify the cable failure, Optical Fiber Cable failure, fire accidents, manmade failures, bomb detection, overheating problem, generator and UPS monitoring. All the above plays a vital role in almost all the exchanges irrespective of the size. We would like to provide embedded solution for the above. A perfectly crafted 16F877A controller will be used to make further perfection of processing. All the above mentioned events will be demonstrated lively. This could be the real application model. Status of the one exchange will be connected to the main exchange using SCADA software. This software allows to propagating the exchange related parameters to web. If in case of any communication failure, can be identified automatically.

INTRODUCTION

This academic project has been developed to place a record on the integration of the electronic components with the controller and the users. This project will meet the industrial requirements on the security front from Fire, Metal and Human Intruders. Also this project will address the needs of electronic attendance registration with high end of authentication. The project kit will support the integration of fire detection, PC based alert system using RS-232 link and human intruder system using infrared. The staff attendance can be logged into the Ms-Access database for the historical reporting and MIS (Management Information System) usages using USART (Universal Synchronous Asynchronous Receiver and Transmitter) interface.

The recent trend in manufacturing places is emphasis on automation. Automation is emerging in more and more of applications in industrial systems. Most of the manufacturing industries are using automation and monitoring control to fine the faults in the manufacturing products and to filter the damaged products from the good one. These security systems are not only used in industries, but also life saving like during mine cleaning and bomb detecting. Parameters and Events taken into consideration

- Optical Fibre Cable failure
- Bomb detection
- Intruder sensing
- Flame detection
- Staff attendance
- Room temperature Maintenance

This project consists of self sufficient sensors and transducers supported with embedded controllers.

SYSTEM ARCHITECTURE

Description: This is a simple block diagram of our project showing the various functions involved in Supervisory Control and Data Acquisition (SCADA). SCADA is operating systems with the addressed network over communication channels to have the control remote devices. SCADA is subdivided into five modules. They are:

- Data acquiring
- Data processing
- Data conversion
- Data manipulation
- Data communication

Data acquiring: Data acquiring occurs through sensors, detectors and IR code readers. Data acquiring includes flame detection, staff attendance maintenance, intruder sensing.

Data processing and conversion: Data Processing and Conversion are done by signal conditioning and conversion block, which includes filters, amplifiers, protection circuits, analog to digital converters, Schmitt triggers, relays.

Data manipulation: Data Manipulation is done by Programmable Interrupt Controller. In this case we use PIC 16F877A to process and control the data outputs from the sensors are retrieved, processed and manipulated in stored required format.

Data communication: Data transmission or communication links the slave (embedded) system, subsystem (Remote logic unit) and the master system (decision maker). Communication link is provided by Visual basic.

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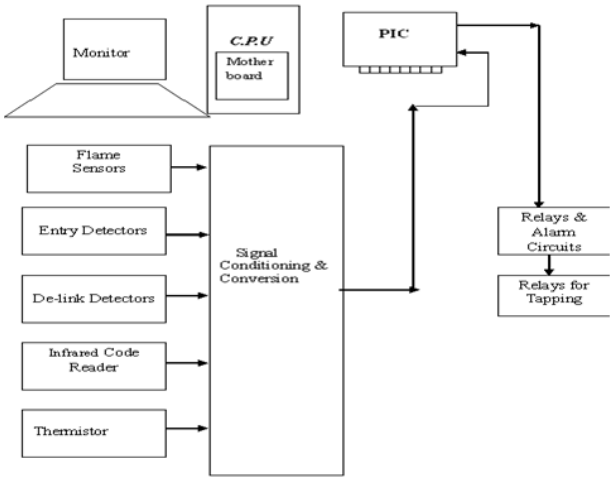

Figure 1: Proposed system architecture

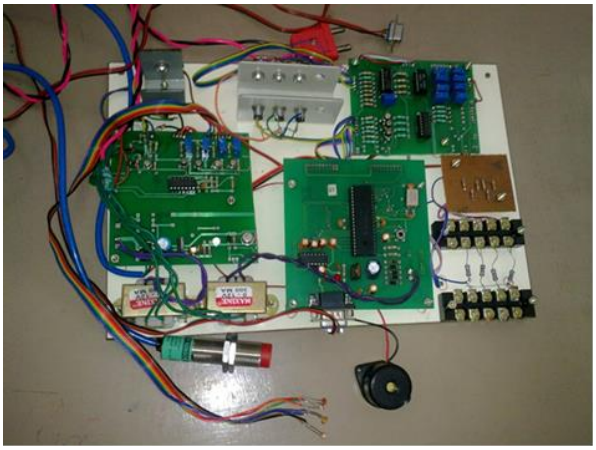

Fig 2. Embedded Control board

RESULTS

Supervisory control for telephone exchange – simulated output:

CONCLUSIONS AND FUTURE WORK

The automation using embedded system has been done with prime objective of automation of security system and monitoring the same to make flaw free security zone. The application of this electronic kit has been extended from security system to attendance tracking system as well. At present our project can be used for small areas such as rural exchange but it can be expanded to be implemented in large industry with the help of CCTV based security and remote monitoring. Further it can be expanded with the use of multiple mobile sensors in order to have large area coverage.

REFERENCES

Chawla. V and Ha. D. S, "An overview of passive RFID," Communications Magazine, IEEE, 2007, vol. 45, pp. 11-17.

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Domdouzis.M, Kumar's, and Anumba.C, "Radio- Frequency Identification (RFID) applications: A brief introduction," Advanced Engineering Informatics, 2009, vol. 21, pp. 350-355.

Hunt. V. D., Puglia. A, and Puglia. M, RFID: A Guide to Radio Frequency Identification: Wiley- Inter science, 2007.

Weis.S.A,Sarma.S.E,, Rivest.R.L, and Engels.D.W, "Security and Privacy Aspects of Low-Cost Radio Frequency Identification Systems," Security in Pervasive Computing,2003, pp. 201–212.

Wu N. C, Nostrums M. A, Lin T. R, and Yu H. C, "Challenges to global RFID adoption," Technovation, 2006, vol. 26, pp. 1317-1323.

Henrico .D and Muller, "Providing Security and Privacy in RFID Systems Using Triggered Hash Chains," in Sixth Annual IEEE International Conference on Pervasive Computing and Communications Los Alamitos, CA, USA: IEEE Computer Society, 2012, pp. 50-59.

D.Vijendra Babu, P.Subramanian, N.Ravikannan, "Micro Blaze and UCLINUX Based Data Acquisition on SPARTAN 3E", Proceedings of International Conference on VLSI & Embedded Systems '08(IC VLSI '08),February, 2008.pp:1-4: ISBN: 81-8424-300-6

Sunder Pandean. J, Boppana R.V, Chalasani.S, and Madny.A.M, "Models for Cost-Benefit Analysis of RFID Implementations in Retail Stores," Systems Journal, IEEE, 2007, vol. 1, pp. 105-114.

ZK Software, "Welcome to ZK Software: Advanced Biometric Solutions," 2008. 38959.