

Mobile Base Station Safety & Security using SCADA System: Proposed Work

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Abstract— Now a day's nobody can leave without mobile phone. Today's whole world life style is depends on mobile. Therefore the mobile base stations are one of the important units in a mobile communication system. Mobile base stations are usually located on building, terrace, highways & heighted bridges. To monitor this base stations situated at such allocation is very risky job & also the base stations contain cost effective equipment. Hence there safety & security is another important aspect. Also the electronic components at the base stations are sensitive to temperature. Thus it is very important and necessary to monitor the temperature at the base station. In this project we will implement system which is cost effective solution to resolve above problems.

Key words: ITU, SCADA, SPI, UDP, RFID, TCP

I. INTRODUCTION

Base station (base radio station) is according to the International Telecommunication Union's (ITU) ITU Radio Regulations (RR) defined as "A land station in the land mobile service". Base stations can be local controlled or remote controlled. Local controlled base stations are operated by front panel controls on the base station cabinet. For mobile stations the SCADA system is very useful. For Example, if we are going to monitor the motion of any unauthorized person inside the base station by motion sensors. Person is authorized or not is decided by the RFID tag. When authorized person enters the base stations he will first scan the RFID then monitoring of motion is stopped by the system and when technician or the person leaves the base station again scan the RFID, then again monitoring of base station starts. Presence of an individual is tracked by the motion sensor. Along with this door opening and closing of the base station is also gets monitored by the contact sensor. Therefore by using SCADA system we can protect the mobile base stations. "SCADA is an acronym for Supervisory Control and Data Acquisition. SCADA generally refers to an industrial computer system that monitors and controls a process." SCADA (supervisory control and data acquisition) is a system operating with coded signals over communication channels so as to provide control of remote equipment (using typically one communication channel per remote station).

II. OBJECTIVE OF WORK

The objective of the project is to online monitoring of mobile base station parameters using SCADA system.

III. METHODOLOGY:

A. Proposed Block Diagram:

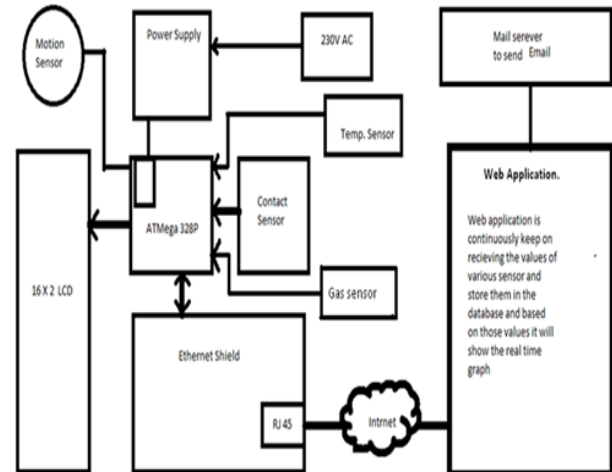


Fig. 1: Block diagram of mobile base station safety & security using SCADA system.

In this project we will implement the system which is cost effective solution to resolve problems. Data acquisition is done by SCADA system and monitoring of acquired data is done with help of Web application.

B. Working:

A 230v ac supply is gives to the power supply .Power supply converts that ac supply into 5V dc supply. This 5V supply gives to all components through the Atmega328p. Analog data in all sensors gives to the Atmega328p in the digital form, because analog to digital converters are in build in this system. All data present in the controller are display on the LCD screen. This digital data gives to the Ethernet shield which is used to connect our system to the web application through the internet. So we can monitor, parameters like temperature, gas,, motion, entry of unauthorized person in the base station.

1) Contact Sensors:

The door opening and closing at the base station is monitored by contact sensor. Contact Sensors are sensors used in flatbed scanners almost in direct contact with the object to be scanned. [5]

2) Motion Sensor & Temperature Sensor:

A motion detector is a device that detects moving objects, particularly people. A motion detector is often integrated as a component of a system that automatically performs a task or alerts a user of motion in an area. Presence of an individual is tracked by the motion sensor. If rise in temperature above critical level at base station may cause damage to components hence we can monitor the temperature continuously.

3) Ethernet Shield:

The Arduino Ethernet Shield connects your Arduino to the internet in mere minutes. Just plug this module onto your

Arduino board, connect it to your network with an RJ45 cable. The Arduino Ethernet Shield allows an Arduino board to connect to the internet. It is based on the Wiznet W5100 Ethernet chip.

The Wiznet W5100 provides a network (IP) stack capable of both TCP and UDP. The Ethernet Shield has a standard RJ-45 connection, with an integrated line transformer and Power over Ethernet enabled.

4) *Atmega328:*

The ATmega328 is a single chip micro-controller created by Atmel and belongs to the mega AVR series. For getting this continuous result of temperature change and it has serial peripheral interface (SPI) port. Hence we are going to use the ATmega 328 microcontroller. The ATmega 328P provides the following features: 4K/8K bytes of In-System Programmable Flash with Read-While-Write capabilities, 256/512/512/1K bytes EEPROM, 512/1K/1K/2K bytes SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible Timer/Counters with compare modes, internal and external interrupts, a serial Programmable USART, a byte-oriented 2-wire Serial Interface, an SPI serial port, a 6-channel 10-bit ADC, a programmable Watchdog Timer with internal Oscillator, and five software selectable power saving modes.

5) *16*2 Lcd:*

A liquid-crystal display (LCD) is a flat panel display, electronic visual display, or video display that uses the light modulating properties of liquid crystals. Liquid crystals do not emit light directly. [1] Liquid Crystal Display is used to display digital data which is received from ATmega 328 microcontroller. The LCD screen is more energy efficient and can be disposed of more safely than a CRT. [5]

6) *Web Application:*

In computing, a web application or web app is a client-server software application in which the client (or user interface) runs in a web browser. [2] Security breaches on these kinds of applications are a major concern because it can involve both enterprise information and private customer data. Protecting these assets is an important part of any web application and there are some key operational areas that must be included in the development process. [3]

7) *Radio-Frequency Identification (RFID):*

Radio-frequency identification (RFID) is the wireless use of electromagnetic fields to transfer data, for the purposes of automatically identifying and tracking tags attached to objects. The tags contain electronically stored information. Some tags are powered by electromagnetic induction from magnetic fields produced near the reader. Some types collect energy from the interrogating radio waves and act as a passive transponder. Other types have a local power source such as a battery and may operate at hundreds of meters from the reader. Unlike a barcode, the tag does not necessarily need to be within line of sight of the reader and may be embedded in the tracked object. RFID is one method for Automatic Identification and Data Capture (AIDC).

8) *Power Supply:*

A power supply is an electronic device that supplies electric energy to an electrical load. The primary function of a power supply is to convert one form of electrical energy to another and, as a result, power supplies are sometimes referred to as electric power converters. Some power supplies are discrete, stand-alone devices, whereas others are built into larger

devices along with their loads. Examples of the latter include power supplies found in desktop computers and consumer electronics devices.

IV. CONCLUSION

We can conclude that by using the Supervisory control and data acquisition technique we can monitor the temperature, motion of any people and presence of gas at the mobile base station by using proposed system. Also future work of this project is to control the same parameters from remote place.

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