

Interfacing Of SCADA with Mobile GSM for Power Station

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Abstract: - The purpose of this project is to acquire the status of circuit breaker(i.e. open or close)and send this real time status over GSM network using GSM Modem/phone. The ongoing processes in substations are monitored 24/7 in ALDC. This system is designed to send SMS alerts whenever the Circuit Breaker trips .This project makes use of an onboard computer which is commonly termed as microcontroller. This onboard computer can efficiently communicate with the different sensors being used. The controller is provided with some internal memory to hold the code. This memory is used to dump some set of assembly instructions into the controller. And the functioning of the controller is dependent on these assembly instructions. The controller is programmed using Embedded C language.

Key words: GSM Modem, PIC-C compiler for Embedded C programming, PIC kit 2 programmer for dumping code into Micro controller, micro C, SCADA monitoring system, Substation equipment.

I. INTRODUCTION

Monitoring and controlling of substations are essential task for supplying healthy power to the consumers in this automated era. Supervisory control and data acquisition (SCADA) refer to the overall set of process control systems that remotely monitor and measure substation parameters from centralized location. Implementation of wireless SCADA system using microcontroller is the simple and basic way to monitor the substations. A wireless technology like GSM is used to connect the substation. The advantage is real time monitoring, fast response and high sensitivity.

SCADA software provides the necessary details about the process information Continuous monitoring of the process can be done through the SCADA software by interfacing it with mobile modem which could update us continuously about the status of the circuit breaker. Upon interfacing, messages will be sent to the corresponding registered mobile number through short message service Cell phones have been gaining tremendous popularity since the last decade. At present, there are approximately more than two billion users all over the world. In fact, cell phones are shaping themselves as a business tool and an essential segment of daily routine life in most developed countries. They are uprooting the old conventional cable systems in more number of developing countries. The

GSM modem is connected to microcontroller by serial communication. GSM is a wireless communication technology; most popular today for transmitting data anywhere in the world through SMS Whenever an SMS is sent to the GSM modem Advantage of the system is that the person in charge not only can obtain accurate data about the required parameters in substation.

II. METHODOLOGY

Substation parameters such as CT & PT tapping, meter reading from interfacing points, frequency, power factor measurements including the indications which shows the state of the circuit breaker, relays etc including the transformer tap position are obtained through CR panel by interfacing with RTU, These input data from MTU (multi transducer unit) are given to the different input chords in the RTU. IDU transmit these data in required format & quantity to the ODU from where it is transmitted through communication media VSAT to the master control unit & different ALDC's for monitoring & control. As the whole SCADA system is bidirectional the control signal through ALDC's take the reverse procedure for controlling the equipments such as circuit breaker & isolators trip, charging & discharging of the feeders etc. In this system GSM modem is to be operated through the switches like Relay which are interfaced to the microcontroller. The microcontroller is programmed in such a way that if any fault occurs a fixed format of SMS is sent to the mobile from GSM modem.

The sequence of steps carried out in the sending a SMS from the GSM modem to the mobile phone is as shown below w:

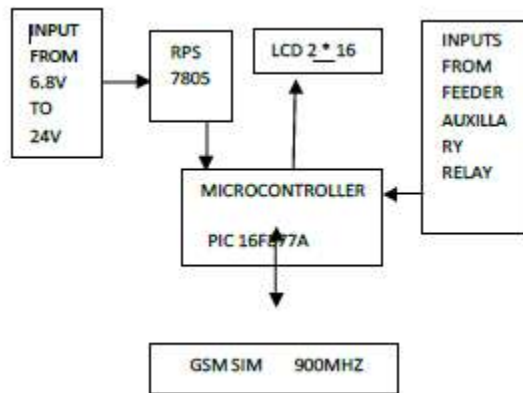


Fig1: Block Diagram

INPUTS:

- ❖ From Auxiliary relay of feeder
- ❖ From RPS7805
- ❖ Programming Of Microcontroller: One for LCD and another for GSM
- ❖ GSM: For serial communication which is Bidirectional
- ❖ LCD: (2*16) for display

Input is given from auxiliary relay with a regulator dc power supply (i.e. RPS7805). This type of regulator gives an output of +5volts is fed to all the blocks. Here LM7805 ends with “05”; thus, it outputs 5 volts. The “78” part is just the convention that the chip makers use to denote the series of regulators that output positive voltage. And it is 3 pin IC, Pin 1 (input Pin): The Input pin is the pin that accepts the incoming DC voltage, which the voltage regulator will eventually regulate down to 5 volts, Pin 2 (Ground): Ground pin establishes the ground for the regulator, Pin 3 (Output Pin): The Output pin is the regulated 5 volts DC. When the voltage level exceeds then the preprogrammed microcontroller (PIC16F877A) communicates with LCD and serially with GSM modem (SIM 900MHz) through transmitter and receiver which communicates using Application Terminal (AT) Commands. Programming language used is Embedded ‘C’. PIC16F877A microcontroller is a self programmable having 256 bytes of EPROM data memory. Here 4 pins for inputs, 2 for serial communication, 4 data bits & 3 control bits for LCD and one for ground are used out of 40 pins of micro controller. This device has 8K words*14 bits of flash program memory. GSM modem is a surface mounted device; it is a regular mobile device

without keypad. GSM SIM900 delivers GSM/GPRS 900/1800MHz performance for voice, SMS, data & fax with low power consumption. Due to its tiny configuration (i.e. 24mm*24mm*3mm) it can fit in almost all space requirements. The Modem is designed with 5volts dc interfacing circuitry which allows user to directly interface with 5volts micro controller (PIC, 8051, AVR etc). It is suitable for SMS as well as data transfer application in mobile phone to mobile phone interface. DB9 connector (serial port) is provided for easy interfacing. LCD (Liquid Crystal Display) is an electronic display module and find wide range of application as it is easily programmable, economical and have no limitation of displaying special and even custom characters, animations and many more. 16*2 LCD means it can display 16 characters per line and there are two such lines. Once Micro Controller sends command to both LCD and GSM modem, LCD displays required data and also GSM (SIM900) sends the SMS to the particular mobile number.

III. RESULT

The project interfacing of SCADA with mobile GSM for power station Monitoring was designed such that the devices can be monitored from anywhere in the world using GSM modem connected to mobile phone. Message is received as soon as circuit breaker trips (i.e. status of a circuit breaker open or close). Fig below shows snapshot of message



IV. CONCLUSION

The use of GSM technology adds quicker solution for clearing faults in power stations by sending message (SMS) immediately to the key person. Integrating features of all the hardware components used have been developed in it. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. Secondly, using advanced ICs with the help of growing technology, the project has been successfully

implemented. Thus the project has been successfully designed and tested.

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