

Wireless Transformer Parameter Measurement And Protection

Utkarsha Milind Meshram¹, Prof. Surjuse²

¹Prof., Dept of Electronics and Telecommunication

²Dept of Electronics and Telecommunication

^{1,2}Government College Of Engineering Chandrapur, India

Abstract- The purpose of this project is to design and implementation of a mobile embedded system to monitor and record remote electrical parameters like voltage, current and frequency and send these actual time values across gsm network using gsm modem/phone along with temperature at power station. This project is additionally designed to guard the electrical circuitry by operating an spdt relay. This relay gets activated whenever the electrical parameters run over the predetermined values. The relay can be used as a circuit breaker to switch of the main electric power supply. User can send commands within the sort of SMS messages to read the remote electrical parameters. This system can also automatically send the important time electrical parameters periodically (based on time settings) within the sort of SMS. This system are often designed to send SMS alerts whenever the relay trips or whenever the voltage or current exceeds the predefined limits. This project makes use of a microcontroller. The controller can efficiently communicate with the different sensors being used. The controller is given some internal memory to carry the code. This memory is employed to dump some set of assembly instructions into the controller. And the functioning of the controller depends on these assembly instructions. The controller is programmed using embedded c language.

Keywords- Microcontroller, Actual time monitoring, Coding done by embedded C, 3 phase supply, voltage sensor, current sensor, oil level sensor, frequency sensor, temperature sensor.

I. INTRODUCTION

The distance between the generators and cargo could also be in terms of many miles hence the quantity of giant power exchange over long distances has clothed as a results of the shortage of quality of the electrical power. During the short time development stages, the problems on quality of power weren't frequently reported. Demanding the standard of power being delivered at the user side has raised the alarm thanks to the rise in demand of electricity within the customer side. an enormous amount of power is lost during the transportation of the overall power which results in the reduction within the quality of power received at substation. to enhance the standard of power with suffer solution it's

necessary to be conversant in what kind of constraint has occurred. Additionally, if there's any inadequacy within the protection, monitoring and control of an influence system. The system might become unstable. Therefore, it necessary a monitoring system that's ready to automatically detect, monitor, and classify the prevailing constraints on electrical lines. A sensor node will decide information or to slightly delay this notification (whether to right away notify the sink about this information.).

- 1) The assessment of sense data: we determine three priority levels {0, 1, and 2}.
- 2) The selection of a communication policy: priority 0-no further action is performed, priority 2-value is sent to the sink because it is considered as urgent and a notification needs to be directly sent, priority 1-we consider that value should be reported because it's going to signal as fault or a drag that's less urgent than priority-2 data.

1.1 OBJECTIVE OF PAPER

The main aim of this project is to monitor and protection of Distribution Transformer Acquisition of different parameters of the transformer by the use of GSM Microcontroller used to monitor and protection of the transformer.

These are the main Objectives of our project.

- Voltage Measurement.
- Frequency Measurements.
- Temperature Measurements.
- Oil Level Measurements.
- Overload Protection.

1.2 BLOCK DIAGRAM

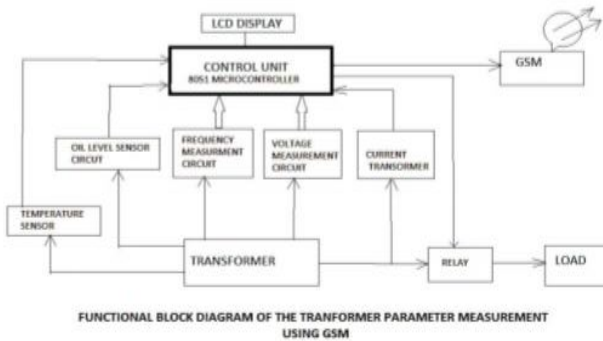


Figure 1-Block Diagram of project

II. RELATED WORK

GSM interfacing with microcontroller:

Features of SIM 900A: dual band 900/1900HZ, low power consumption up to 10mA, operating temp -40°C to 85°C. input voltage is 7.5V. AT commands are used for interfacing.

```

("AT+CMGF=1"); //enable text configuration,
(\r');=enter
("AT+CMGS="); //enable phone number command
("+9197....."); //phone number
(0x1A); //to sends SMS
    
```

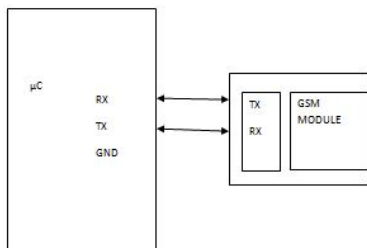


Figure 2: GSM interfacing with microcontroller

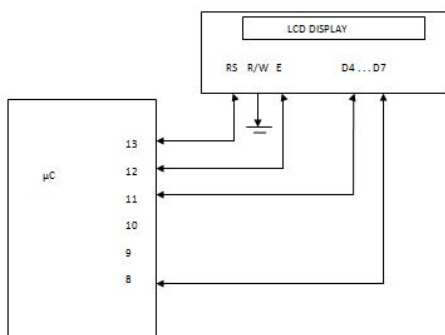


Figure 3: LCD interfacing with microcontroller

Design Procedures-

The planning procedures for the proposed microcontroller-based system is described as follows:

1. Define the interfacing parameters for LCD and Data Registers.
2. Assign a worth for the circuit elements like Relay, LED, LCD, and Analog Inputs.
3. Initialized the input and the output ports of the microcontroller.
4. The parameter values are reveal.

III. HARDWARE IMPLEMENTATION

➤ CIRCUIT DIAGRAM

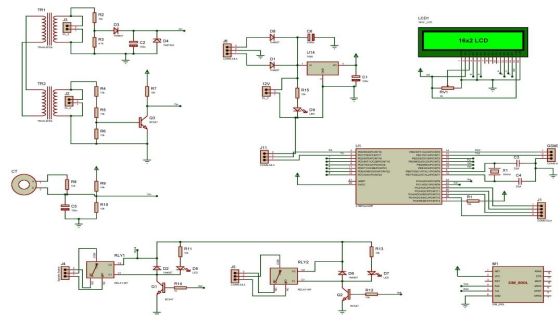
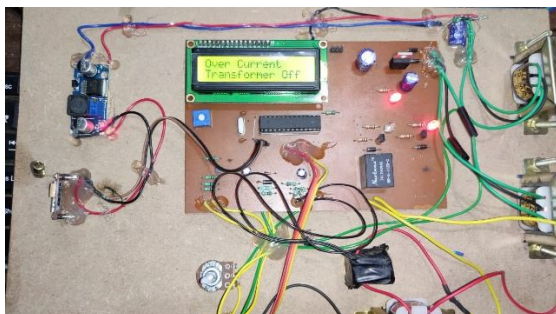
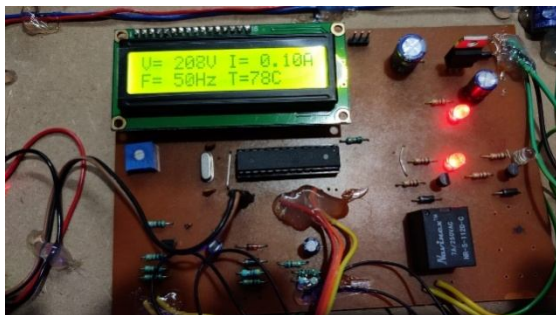
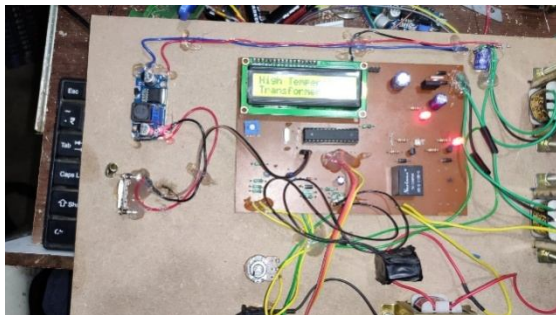
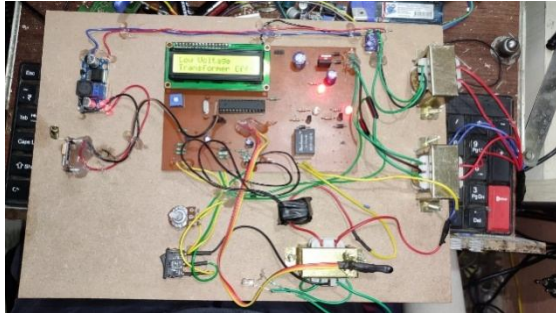
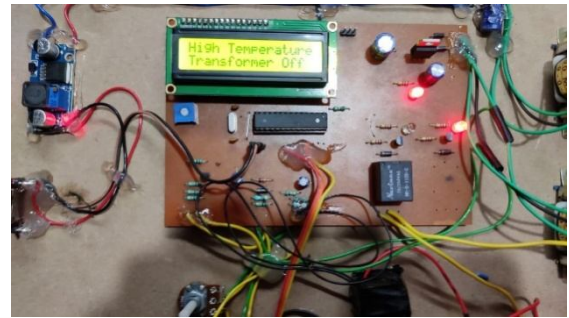
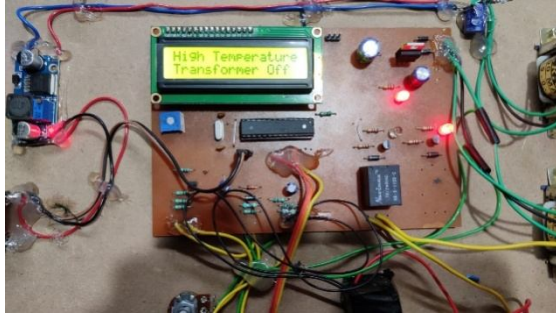


Figure 2: Circuit Diagram of Project

The +9v power supply is provided for the microcontroller to perform its operation. four different types of the load will be connected to sub-station to analyse the voltage, current, frequency, temperature monitoring. if preset value exceed the relay will trip the circuit and provide intimation through GSM. GSM module is employed to send SMS to the specified GSM mobile. This module is programmed using AT commands through USART. Monitoring of Transformers data related to various parameters, predict and stop the non-success of transformer by observing divergence of the transformer parameters expected values. Transformers are the foremost critical assets of electrical transmission and distribution system. Transformer non success could cause power blackout, personal and environmental risk and expensive rerouting or purchase of power from other suppliers. Transformer in working order interference and non-success usually result from dielectric malfunction, winding wrap caused by short-circuit resist, winding and the magnetic circuit hot spot, electrical disturbances, collapse of insulation, lightning, insufficient maintenance, loose connections, overloading, negligence of accessories like OLTCs, stuffing, etc.

IV. RESULT



V. ADVANTAGES

- The immediate attention can take place if a variation happens in the sub-station parameters.
- IOT based control is easy to identify the fault in any variant.
- The various parameters can be modified and analysed continuously through a network.

VI. APPLICATION

- Sub-station
- Power generation
- Distribution area

VII. CONCLUSION

On completion of our project "Substation Monitoring and Control using Microcontroller and IOT," we will improve the standard of power transferred and supply uninterrupted power supply. Also, real time monitoring of different parameters is done which can ensure safety to the substation and its equipment. Besides, utilizing very propelled IC's with the assistance of developing innovation, the undertaking has been effectively executed. In this manner, the undertaking has been effectively composed and tried. To designed system provides easy control of remote substation. It enables two-way interchanges. The substation can speak with the service organization to show, with what sort of fault, a substation has been related. The exact location of the substation can also be determined by sending location coordinates of the substation. finally, the experimental output verified.

REFERENCES

- [1] Amit Sachan, "Microcontroller based substation monitoring and control system with GSM modem" ISSN: 2278-1676 Volume 1, Issue 6 (July-Aug. 2012), PP 13-21.
- [2] Natalie Matta, Rana Rahim-Amoud, Leila MerghemBoulahia, Akil Jrad, "A wireless sensor network

- for substation monitoring and control in the smart grid” (IEEE).
- [3] M. Kezunovic, Y. Guan, M.Ghavami, “New concept and solution for monitoring and control system for the 21st century substation” (IEEE).
- [4] Abdul-Rahman AI-Ali, Abdul Khaliq & Muhammad Arshad,” GSM-Based Distribution Transformer Monitoring System”, IEEE MELECON 2004, May 12-15,2004, Vol 3 Pages999-1002, Croatia.
- [5] Muhammad Ali Mazidi, Janice Gillispie Mazidi, Rolin D. Mckinlay, The 8051 Microcontroller And Embedded Systems Using Assembly And C, Second Edition, Pearson Education, 2008, India.
- [6] T. D. Poyser, "An On-Line Microprocessor Based Transformer Analysis System to Improve the Availability and Utilization of Power Transformers". IEEE Trans. On Power Apparatus and Systems, Volume PAS-102, April 1983, pp.957-962.