

# CONTROL AND MONITORING OF DISTRIBUTION TRANSFORMER USING EMBEDDED SYSTEM

Mrs. S. Indu  
Lecturer, E&C Deptt.  
DCE, Delhi-42

Mrs. Rachana Garg  
Lecturer, EE Deptt  
DCE, Delhi-42

## INTRODUCTION

Distribution Transformer is a vital link in distribution system as it functions as an interface in reducing the voltage of power supply to utilization voltage of consumer's equipment. The maintenance of distribution transformer in rural areas has become a difficult task due to inaccessibility of locations. The continuity of the supply to the customers basically depends on the performance of Distribution Transformer, Feeder etc. It is therefore necessary to monitor Distribution Transformer, Feeder, and associated Switchgears etc. on real time basis. An Embedded System is one of the alternative solution for continuous monitoring and control of Distribution Transformer, Feeder, and associated Switchgears etc. An Embedded System is a micro controller based , software driven, reliable real time control system, autonomous, human or network interactive operating on diverse physical variables and in diverse environment and soled into a competitive cost conscious market. The authors have presented Embedded System to monitor and control of Distribution Transformer, Feeder, and associated Switchgears etc. in this paper. This Embedded System monitors voltage, current on line and do necessary actions for the control of Distribution Transformer, Feeder, and associated Switchgears etc.

## FEATURES OF EMBEDDED SYSTEMS

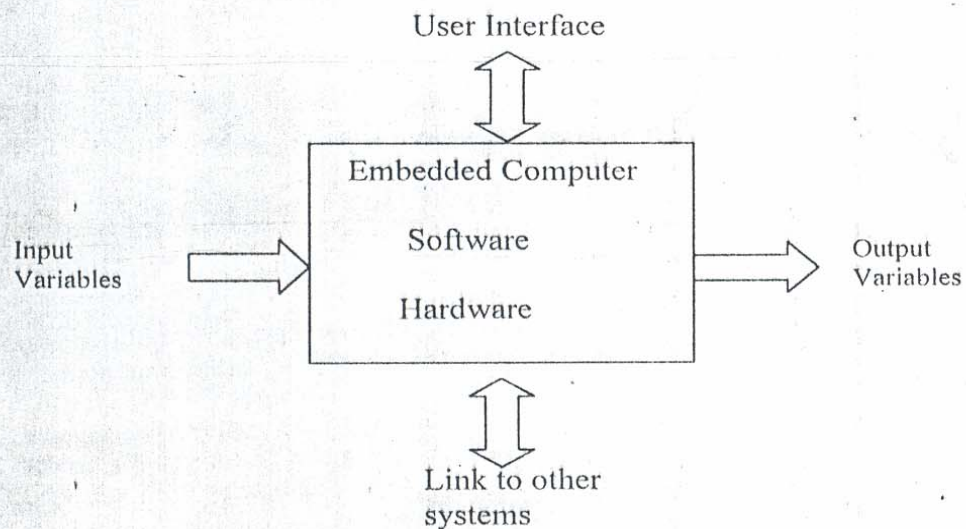


Fig 1: Schematic Representation of Embedded Systems

### a) Constituents of Embedded Computer

The Embedded system is made up of hardware and software as shown in figure 1. hardware design of the computing core of the embedded system is now in many cases viewed as a comparatively straightforward affair. The design attention has shifted to some extent towards software development with advanced languages and tools available to develop sophisticated programs.

### b) Timeliness

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The embedded system must be able to respond fast enough to keep its operations within a safe region. This is a characteristic of operating in "real time". The system must be able to respond to inputs as they happen and make responses within time frame set by the controlled system.

c) **System Interconnection**

Figure 1 shows possibility of interaction with other systems. A network of low cost microcontrollers is often cheaper and simpler to develop than a single complex computer undertaking many tasks.

d) **Reliability**

The embedded system should be designed fault proof as they work on real time. Hence the embedded system designer must develop a good grasp of reliability issues and how a reliable system can be achieved.

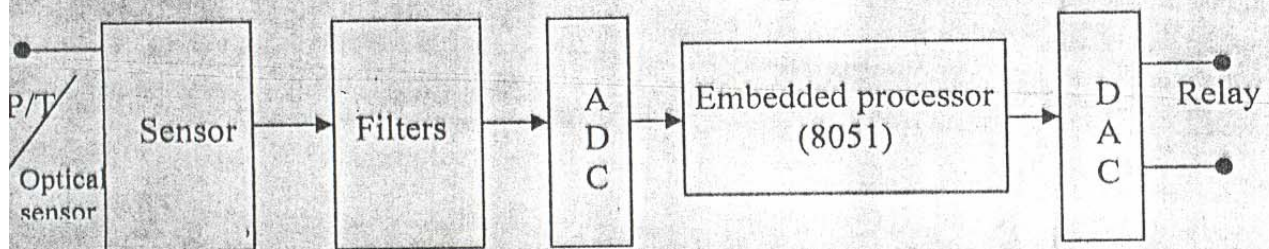


Fig 2. Block Diagram for control and monitoring of Distribution Transformer.

### Hardware circuit

The Embedded processor will do the following task

- Monitor input voltage of Distribution Transformer and the Feeder voltage
- Control switching sequence
- Acquisition of voltage during ground fault
- Alarm/ tripping during emergency
- Capacitor bank switching.

### The Aims of Software development

- To develop a program that fully meets the target specification
- To develop the program as quickly as possible
- To enable subsequent maintenance and upgrading to take place
- To make the most efficient use of the system hardware resources
- To make the most efficient use of time during execution

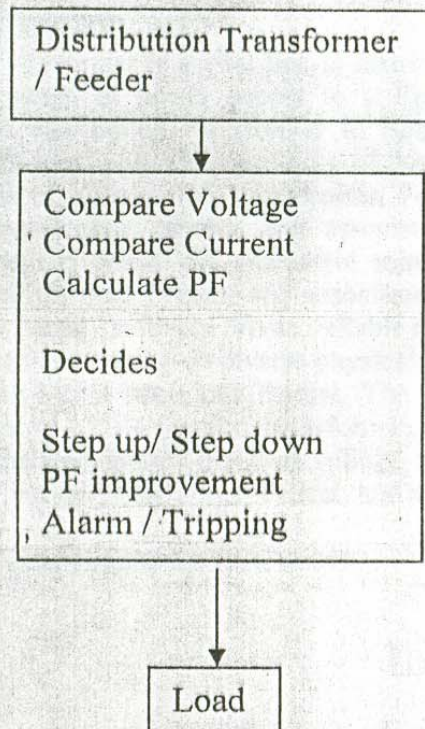


Fig. 3 The Modular flow diagram.

**Conclusion:**

The control circuit for making an intelligent transformer is discussed, which improves the quality of power supply and life of the distribution equipment. This intelligent transformer enhances the efficiency of distribution system. Considering all the discussed aspects, use of intelligent transformer is inevitable.

**Reference:**

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2. An introduction to the design of small scale embedded systems by Tim Wilmshurst.
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