

Smart Electricity Meter

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ABSTRACT

Today there is a requirement of smart energy meter in market. hence Nowadays the system will use ZigBee system for communication protocol. The ZigBee is used since the application need high speed data rate, need to be low powered and low cost. In this project presenting the remote wireless Energy Meter Reading System. This aims at resolving the shortcomings of the technology of the traditional Energy Meter Reading, by combining the characteristics of the ZigBee technology with AVR Microcontroller ATmega16 The automatic metering system is designed to make the prevailing electricity billing system simpler and efficient. The conventional metering system is done manually. An employee of the Electricity Board will be coming to take the reading and enter in the card. There are more chances of manual error, delay in processing, tampering of the meter and misuse of the Electricity by other sources. It requires so many workers, one set of workers to note down the reading and other set to cut the power if the payment is not paid at the right time and we have very poor servicing.

Keywords: ATmega16 microcontroller, zig bee , piezo sensor.

INTRODUCTION

In Maharashtra, there are more than crore meters for electricity that are read every month, at a cost in salaries, transportation and other expenses that tops Rs. 3848.4 crore (2006-2007) . A meter-reading system would still require someone driving by every meter and getting a reading through a hand-held receiver, but even newer technology - called an Smart Electricity Meter (SEM) - would eliminate even that need. An SEM is a sophisticated communication link directly from the meters to the central office computers that will also speed locating service interruptions, faulty meters and service theft, as well as allowing for expanded services, such as flexible billing dates, time-of-use rates and prepaid accounts. Meters could also be turned on or off directly from the office rather than having to send out an employee to do it manually.

The study shows an SEM system would save almost 2-3 crore per year by eliminating meter-reading, automating disconnects/reconnects, reducing bad debts and improving meter accuracy and reducing theft of service another positive element of the project would be lower costs for services to the consumer as well. Many service providers of electricity, water, and gas are trying to implement this system. For example Northern

Ireland Water Supply Company had specified its requirements and waiting for tenders. Maharashtra state electricity board has also specified its requirements in 2004-2005. Smart Electricity Meter technology can not only save human resources, but more importantly may improve the accuracy and real time of the meter, enabling management sector to access to data messages timely and accurately. No cable wiring can save human and material resources, so investment is considerably economical.

Our aim is to design a low cost system without any recurring expenses so that an ordinary man can purchase and use it.

I. METHODS AND MATERIAL

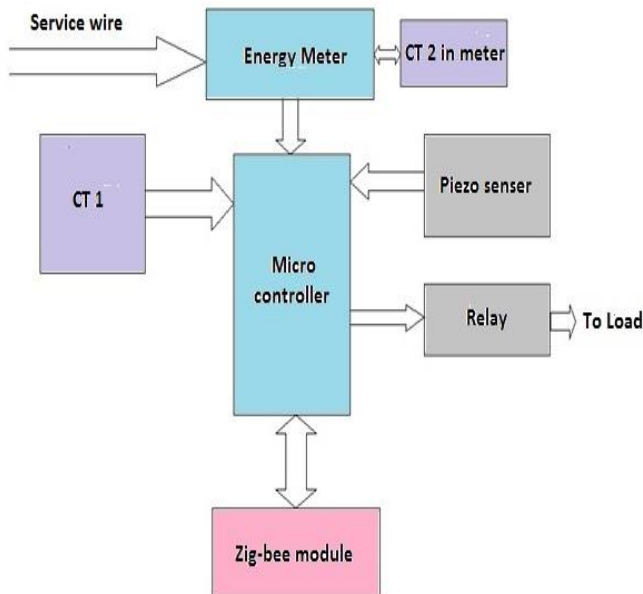
SEM stands for **Smart Electricity Meter**. A device which remotely obtain meter readings and transmits this data to the system's computer via communication media such as phone lines, power lines, Zig Bee, or dedicated cables for processing. SEM devices can detect outages, remotely connect and disconnect services, detects tampering as well as other uses. Economic benefits include increased cash flow, lower labor and equipment cost, increased accuracy and lower costs. Some customer satisfaction benefits include improved service quality, more customer choices and faster response time.

II. RESULTS AND DISCUSSION

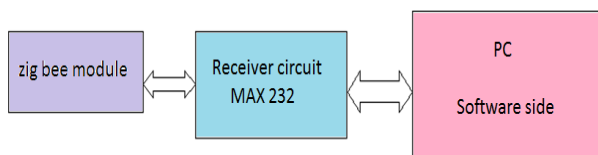
The automatic metering system is designed to make the prevailing electricity billing system simpler and efficient. The conventional metering system is done manually. An employee of the Electricity Board will be coming to take the reading and enter in the card. There are more chances of manual error, delay in processing, tampering of the meter and misuse of the Electricity by other sources. It requires so many workers, one set of workers to note down the reading and other set to cut the power if the payment is not paid at the right time and we have very poor servicing.

Instead of utilizing man power in billing system, we can automate the system and the man power can be utilized to provide quality service. The system is installed at the site of a standard utility meter and is configured for monitoring and operation by a user via keyword command programming on a data terminal or personal computer. In the Automatic System designed, the units consumed are measured at the consumer side in the form of pulses, it is transmitted to the Electricity Board side where the units consumed and amount equivalent is calculated. The monetary values are displayed both at the consumer module and electricity board side.

BLOCK DIAGRAM OF TRANSMITTER



BLOCK DIAGRAM OF RECEIVER



DISCRIPTION

Microcontroller based electricity consumption meter is consists of different blocks. To better understand the working of microcontroller based wireless energy meter, we must the working of each block of electronic energy meter. The major blocks are microcontroller block, zigbee modem block, and relay-loads block.

1. Microcontroller Block: The microcontroller block can be considered as the main block of the entire circuit, as it is programmed to control all the components to perform the desired operation. Here, in this project microcontroller ATMEGA is used and programmed using C#.NET software. The energy meter is interfaced with the microcontroller using an interfacing device or middle wire device namely Opto-coupler. Similarly, ZIG BEE modem is interfaced with a microcontroller using an interfacing device called as MAX232 and DB9 connector.

2. Relay and Load block: Relay are interfaced with microcontroller using relay driver. The loads are connecting between the relays and energy meter, such that loads are given a 230V AC power supply for their operation. This 230V AC power supply is given to operate the loads until the relays are switched.

IV.CONCLUSION

Automatic Meter Reading (AMR) is a unique solution for problems in existing manual system. Automatic Meter Reading is self assured automation system. Implementation of Automatic Meter Reading with the help of standalone system is an innovative idea. There are more chances of manual error, delay in processing, tampering of the meter and misuse of the Electricity by other sources but with the help of Automatic Meter Reading, we can easily overcome this anomalies.

Standalone AMR system is most suitable to implement transfer of unit. Using prepaid services, we can make proper use or storage of electricity. Economic benefits include increased cash flow, lower labour and equipment cost, increased accuracy and lower costs some customer satisfaction benefits include improved service quality, more customer choices and faster response time.

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