

ZIGBEE LIVE ELECTRICITY METER MONITORING WITH TEMPERING PROOF

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ABSTRACT: *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 and transmitted back to the consumer module. The monetary values are displayed both at the consumer module and electricity board side.

Keyword : *Electricity Board, Automatic Meter, billing system, manually, data terminal, tampering, transmitted.*

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 automatic meter reading system (AMR) - would eliminate even that need.

An AMR 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 AMR 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.

CURRENT MANUAL SYSTEM

Let's try to expand the problems in manual meter reading on the following resources:

1. Meter reading resource: Time

1. Time to access the site.
2. Time to read the meter manually.

2. Meter reading resource: Accuracy/re work/Manpower cost.

1. Accuracy of noting the readings.
2. Chances of errors while reading.
3. Errors while recording what was read.
4. Errors during data entry.

3. Meter reading resource: Hard to access meters: (any meter which takes more than 15 minutes to access)

1. Rural accounts
2. Indoor meters
3. Obstacles

4. Manual Meter reading: Commercial Implications

1. Conveying tamper recording remains on the meter reader's loyalty.
2. No clue on demand/ over draws by the consumer.
3. Delay in meter readings, delay bills, delayed revenue, delay in cash-flow
- 4.

5. Cost associated with meter reading

The cost associated with meter reading can have the following headings:

WORKING PRINCIPLE

ZigBee is a new global standard for wireless communications with the characteristics of low-cost, low power consumption, and low data rate. It has a good market in wireless meter reading. The design and implementation of a ZigBee-based wireless automatic meter reading system are proposed in this paper. The experimental results show that the design can meet the basic needs of automatic meter reading with flexibility and expansibility. It can act as a platform of wireless monitor system and supplies a new hardware design approach for wireless ZigBee networks.

PROPOSED SYSTEM

AMR stands for **A**utomatic **M**eter **R**eadings. 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, GSM, or dedicated cables for processing. AMR 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.

A typical Automatic Meter Reading (AMR) set up can be conceptualized using the following block diagram.

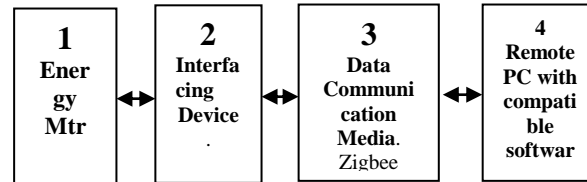


FIG 1: BLOCK DIAGRAM OF AMR SYSTEM

From block diagram we can see that the AMR system consist of following components

1. Energy Meter
2. Interfacing Device
3. Data Communication Media
4. Remote PC with compatible software

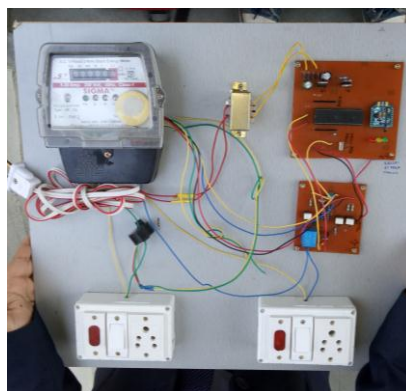


FIG 2: MODEL AMR SYSTEM

1. Energy Meter:

Energy meter is a device which is used to measure the energy consumed by the customer. Basically energy meter is of two types Electro-Mechanical meter and Digital meter. Now a days digital meter are used because they are having high accuracy, with limited control and theft detection capability at nodes.

2. Interfacing Device:

It is a device which takes out readings from meter and passes those readings to the remote pc through communication media. It also consists of a circuit which can switch ON/OFF power supply of customer.

3.Data Communication Media:

For transporting the data from the energy meter to the Host PC a communication media is necessary. Communication can be done by two ways,

- a. Wired Communication: power lines, phone lines, dedicated lines.
- b. Wireless Communication: RF. Service provider can use any communication media depending upon the services available to the service provider.

4. Remote PC with compatible software:

The heart of the meter reading station is the Meter Reading Software which resides in the PC at the Meter Reading Station. It is a standalone system which is responsible for collecting meter reading, storing them to the data base, calculation of bills, switching ON/OFF of power supply, and providing analysis facility.



FIG 3:Output Screen

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 labor 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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