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MSEB Smart Meter Reading

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ABSTRACT The electricity is very essential in day to day life. Most of industries are running with electricity. In commercial areas also electricity plays very vital role and hence electricity is backbone of any developing nation. To measure the consumed electricity and generate Electricity bill, the energy meters are provided to each and every consumer. This project is use to take meter reading wirelessly by using transceiver which provides accuracy and speed in MSEB meter reading. In this work, Micro controller plays the main role. This circuit contains the LCD, RF transmitter, RF receiver, Energy meter, switch, RS 232 etc. This project uses one Microcontroller, LCD, RF transceiver module, energy meter and relay for connecting load. Meter reading is the technology of automatically collecting data from energy meter and transferring that data to a central database for billing and/or analysing. This saves employee trips and means that billing can be based on actual consumption rather than on an estimate based on previous consumption, giving customers better control of their use of electric energy. The Transmitter is connected to the meter and it counts the pulses from it and displays it over the LCD. It transmits the data over radio frequency. This network technology overcome all the difficulties of earlier billing system and become more advantageous and accurate.

KEYWORDS: Maharashtra State Electricity Board (MSEB), Liquid Crystal Display (LCD), Radio Frequency (RF).

I.INTRODUCTION

Traditional meter reading for electricity consumption and billing is done by human operator from houses to houses and building to building. This requires huge number of labor operators and long working hour to achieve complete area data reading and billing. Human operator billing are prone to reading error as sometime the houses electric power meter is place in a location where it is not easily accessible. Labor billing job is sometime also restricted and slowed down by bad weather condition. The increase development of residential housing and commercial building in the developing country require more human operators and longer working hours to complete the meter reading task. This increases the energy provider operation costs for meter reading. In order to achieve efficient meter reading, reduce billing error and operation costs, Wireless automatic meter reading system play an important role. Wireless automatic meter reading is an effective mean of data collection that allow substantial saving through the reduction of meter re-read, greater data accuracy, allow frequent reading, improved billing and customer service, more timely energy profiles and consumption trends updates and better employment of human resource. With the rapid development of Global System Mobile

(GSM) infrastructure and Information Communication Technology (ICT) in the past few decades has made wireless automatic meter reading system. In an environmental aspect there is a focus on how to reduce energy consumption. Especially in the hydro-based system in Norway, it is needed to lower energy consumption in dry years; two white papers have recently discussed two way communication (TWC), RLC and price incentives to the customers as possible solutions to both peak power problems as well as to dry-year problems. Environmental aspects are important driver also in Finland, but due to the different production mix, the main driver is the reduction of CO₂-releases resulting in the energy saving. Frequently information (i.e. by use of web) to the customer about energy consumption, may lead to reduction in the consumption.

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LITERATURE SURVEY

The rapid development of ICT technology,[1] power metering technology and power monitoring knowledge base has had a very significant impact on AMR and power monitoring in the past few years. Historically power monitoring systems have been either automated meter reading (AMR) or power quality or power usage (PQ) monitoring systems. As the network technology, communication protocols and computing power technology increased the costs have decreased and we are observing a merger of the system capabilities. The problem of [2] efficiently collecting data from a large number of distributed embedded Web-servers in the energy meters is still a challenging problem. Mobile agents are executing programs that migrate during execution and present methods for maintaining and using distributed systems. In this paper, they develop a new abstract approach using mobile agents to solve the problem of efficiently collecting meters readings.

Two pilots are described[3] in the paper. In the Norwegian pilot two-way communication is established to more than 10000 customers, mainly households. Load management is established to approximately 50% of those customers. In the Finnish pilot automatic meter reading is established to 31 real estates. Meter reading is the[4]technology of automatically collecting data from energy meter and transferring that data to a central database for billing and/or analyzing. This saves employee trips and means that billing can be based on actual consumption rather than on an estimate based on previous consumption, giving customers better control of their use of electric energy. The Transmitter is connected [5] to the meter and it counts the pulses from it and displays it over the LCD. The power and billing information is continuously transmitted by the use of Internet of Things and monitored by the Electricity Board section. Whenever there is power theft identified can be sent from the Electricity Board section to cut the supply to the customer.

METHODOLOGY

1. Slave Side

The slave side consists of energy meter which is fixed in each house to counts the number of unit consumed and sends it to microcontroller. The block diagram of slave side is shown in Fig1. The microcontroller takes continuous reading from energy meter with the help of signal conducting circuit in the form of pulses. Microcontroller displays this reading on the 16*2 alphanumeric LCD and transmits meter reading and meter ID continuously with the help of RF transmitter and RS232. There is one optimization, the transceiver module is in sleep mode it will be in active mode only when the switch in the MSEB vehicle is ON [3]. Then it transmits the meter reading. The circuit diagram of Slave side is as shown in Fig. 2.

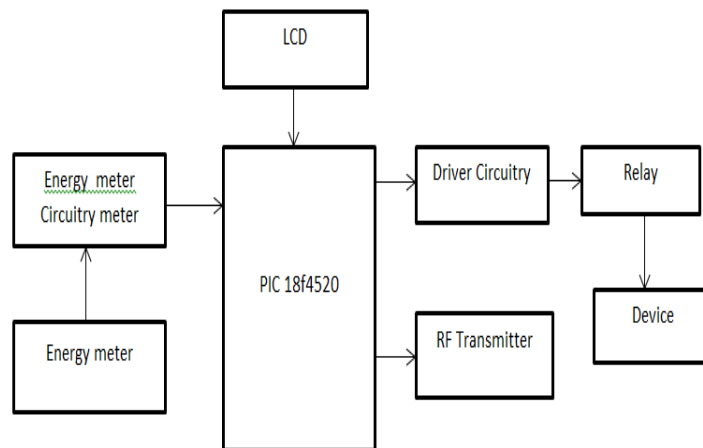


Fig 1: Slave Side (House Unit)

2. Master side

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The circuitry fitted in MSEB vehicle is known Master Side. Vehicle moves in particular areas which decided by MSEB office depending upon radio frequency range and collect all the meter reading of specified area. When switch is in ON mode the RF transceiver module receives meter reading with the help of RS232. This reading sends to microcontroller and display on LCD. With the help of save option, all these meter readings are saved with corresponding meter ID [3]. After this, the meter reading and Meter ID are sends to MSEB office for further billing process. The saved meter reading will send to the MSEB office using GSM module. By using GPRS this readings will upload on website of MSEB. And bills are generated for every consumer with particular meter ID which provided to it. So the bill is available for all the consumer on the website and consumer can cross check the bill.

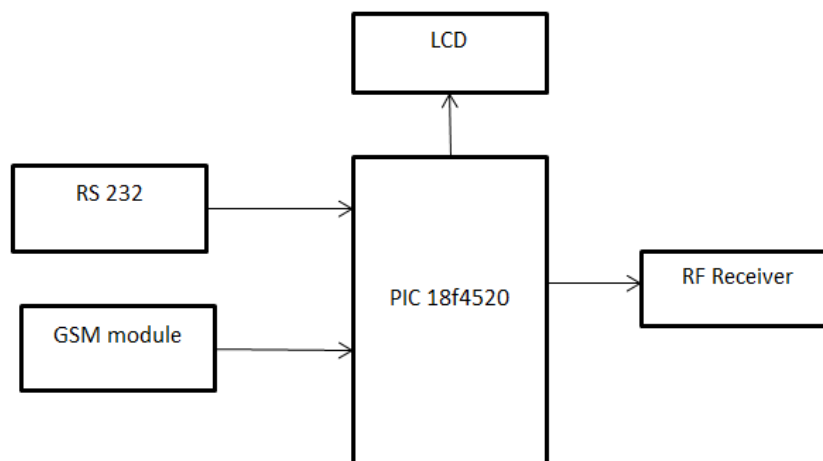


Fig 2: Master Side (Vehicle Unit)

3. Energy Meter

A single phase energy meter is electrical meter used to measure the amount of electrical energy consumed by electrical devices, residences and business.

The basic working of Single phase induction type Energy Meter is only focused on two mechanisms:

- Mechanism of rotation of an aluminium disc which is made to rotate at a speed proportional to the power.
- Mechanism of counting and displaying the amount of energy transferred.

Energy meters are the basic part to measure the power consumption. It is used everywhere, no matter how big or small consumption it is. It is also known as watt-hour meter. Here we discuss the construction and working principle of induction type energy meter. To understand the structure of watt-hour meter, we must understand the four essential components of the meter. These components are as follows:

- Driving system
- Moving system
- Braking system
- Registering system

4. GSM and GPRS

GSM (Global System for Mobile Communications, originally GroupeSpécial Mobile), is a standard developed by the European Telecommunications Standards Institute (ETSI). It was created to describe the protocols for second-generation (2G) digital cellular networks used by mobile phones and is now the default global standard for mobile communications – with over 90% market share, operating in over 219 countries and territories. General Packet Radio Service (GPRS) is a packet oriented mobile data service on the 2G and 3G cellular communication system's global



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system for mobile communications (GSM). GSM/GPRS module is used to establish communication between a computer and a GSM-GPRS system.

Global System for Mobile communication (GSM) is an architecture used for mobile communication in most of the countries. Global Packet Radio Service (GPRS) is an extension of GSM that enables higher data transmission rate. GSM/GPRS module consists of a GSM/GPRS modem assembled together with power supply circuit and communication interfaces (like RS-232, USB, etc) for computer. GSM/GPRS MODEM is a class of wireless MODEM devices that are designed for communication of a computer with the GSM and GPRS network. It requires a SIM (Subscriber Identity Module) card just like mobile phones to activate communication with the network. Also they have IMEI (International Mobile Equipment Identity) number similar to mobile phones for their identification. A GSM/GPRS MODEM can perform the following operations:

- Receive, send or delete SMS messages in a SIM.
- Read, add, search phonebook entries of the SIM.
- Make, Receive, or reject a voice call.

IV. CONCLUSION

The main purpose of implementing this idea is to reduce man power, reduce the cost for taking meter reading and also increase accuracy of the electricity billing system. The idea of this technology overcomes the difficulties arises with earlier billing system such as lengthy process, inaccurate meter reading, requirement of man power and labor cost, and time consuming. So this new technology of Wireless MSEB Meter Reading Vehicle is advantageous in our life

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