RESEARCH ARTICLE OPEN ACCESS

Wireless MSEB Meter Reading Vehicle

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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 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 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.

II. SYSTEM OVERVIEW

Now a day, electricity is very important in every aspect of life. For measuring the amount of electricity consumed, there is providence of energy meters. At every month, the meter counts the consumption of electricity for particular consumer. In this paper a new technology of MSEB billing system in which wireless vehicle is used to collect the meter reading has introduced.

2.1 HISTORY OF MSEB BILLING

In earlier system, MSEB employee come at consumers place to note down the meter reading and then submit it to MSEB office, and then electricity bills are generated. That time meters used was old analogue type. After that new version of analogue meters was developed having disc structure. With this meter the reading was generated depending upon the number of rotation of the disc. But after some period it was found that there is theft of energy. So there was increase in loss of energy consumer.

Afterwards to overcome problems of the analogue meters the digital electronic meters are

generated. This meter works on the principle of light emitting diode. For billing, MSEB employee come and takes down the photocopy of the meter reading and submits it to the MSEB office. But again there was occurrence of manual mistakes.

In the past meter reading system, every area decided for the MSEB employee to take the meter reading. Employee goes every house and takes the photo of meters due to which time required is increase for snapshot of each house meter reading. All these photos have to submit at MSEB office and the meter readings are saved by other employees of MESB to generate electricity bill. During this whole process manual mistakes may be takes place.

At past billing system, MSEB made more mistakes for bills. Most of time, the last months meter reading had copied on the current bill paper, so the consumer faces problem of correcting that bills from MSEB office.

2.2 PROPSED BILLING SYSTEM USING NEW TECHNOLOGY

The earlier billing system has many mistakes because of manual calculation problems and errors so it is inconvenient for the consumer to pay the bills. Many times last month unit consumption is just copied on next month bill paper, which create problem for the consumer. This project overcomes this problem, reduces manual mistakes and requires less man power.

This proposed Automated MSEB model includes an office module which has a PC with its back end connected to a database. It consists of AVR microcontroller having high speed and comparatively low cost. It also consists of RS232 which is used for transmitting and receiving radio frequency signals. The other module is the customer home module which is present at the home this module is used to make note of the amount of power consumed by the customer. With the help of this module consumer can get information about billing of electricity in hand.
Then another is vehicle unit, in that AVR micro-controller, LCD display, RS232 is fitted. RS232 is communicating device. With the help of this device the data from consumer unit is collected.

This technology is more accurate as there is one MSEB vehicle which goes in particular area or colony and receives the meter readings of every house of that colony. Radio frequency range is fixed for every area and meter data is collected and saved. All bills are uploaded on the webpage and available for the consumers. In this new technology, vehicle is used for collection of meter readings. By using this method, it is possible to get the accurate meter reading in minimum time without manual errors [2].

III. SYSTEM DESIGN

This system mainly consists of two circuits
1. Slave side (House unit)
2. Master side (MSEB vehicle)

3.1 SLAVE SIDE (House Unit)

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 salve side is shown in Fig1.

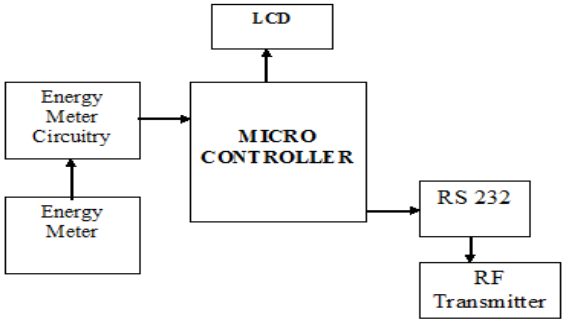

Fig 1: Slave Side (House Unit)

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.

3.2 MASTER SIDE (MSEB Vehicle)

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.

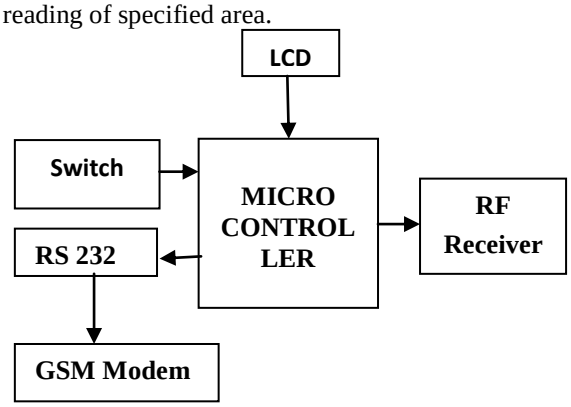

Fig 2: Master Side (Vehicle Unit)

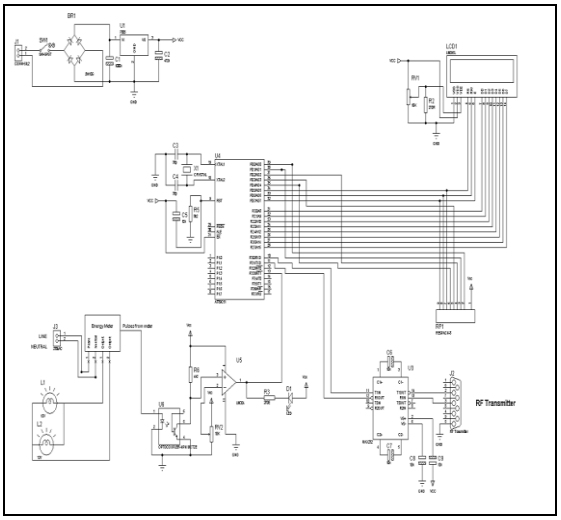

Fig 3: Circuit Diagram of Slave side (Home Unit)

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.

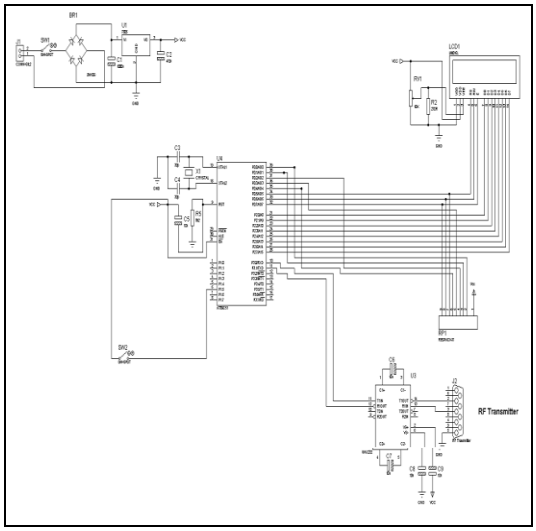

Fig 4: Circuit Diagram of Master Side (Vehicle Unit)

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.

The complete assembly of the slave side and master side of Wireless MSEB meter reading vehicle is as shown in Fig 5.

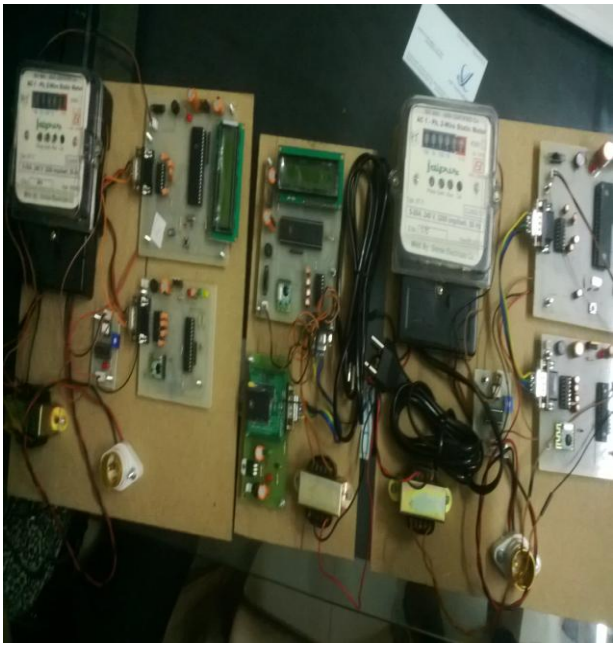

Fig 5: Image of Complete Hardware

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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