

Hi-Tech Mseb Power Meter Using Rf Transceiver

Snehal Ithape^{#1}, Pallavi Godse^{#2}, Sangita Shinde^{#3}

[#]Students, Department Of Computer Engineering, MMIT, Lohgaon, Affiliated To University Of Pune
Pune, Maharashtra, India

*Assistant Professor, Department Of Computer Engineering, MMIT, Lohgaon, Affiliated To University Of Pune
Pune, Maharashtra, India

Abstract—

This paper presents the system that collects the consuming energy for residential and corporate zones and sends it directly to the central Server. The entire project overcomes the drawback's of the existing system that uses Zigbee and construction of the new system using RF transceiver for remote readout of residential electric meters. The readings are taken from a consumption meter will be transmitted wirelessly to the local server along with unique meter number. This data will be processed by the server and automatically generates the bill. After, the bill is generated an SMS alert will be sent to the owner's registered mobile number and it will also be mailed on the owner's registered email ID. Online payments as well as payment through scratch card facilities are also provided.

Keyword—MSEB, SMS, UART, RF, TCP/IP, AMR

I. INTRODUCTION

The rapidly advancing mobile communication technology and the decrease in costs make it possible to incorporate mobile technology into MSEB automation systems. We propose a system that collects the consuming energy from residential and corporate zones and send it directly to the central Server.

The traditional approach for collection of energy consumption data is that the representatives of MSEB monthly comes and visit every residential and corporate and manually reads the consumption data from the meter. The data is recorded on a piece of paper along with a snap shot of the meter and submitted to the local MSEB office. There after the officers reads the snap shot and readings of the meter and then feet it to the local software for bill calculations. Finally the bills are dispatched. We as a consumer then make the payment for the received bill. Such a hectic process is this. Man made mistakes can be countless. Human resources wasted and many other problems do occur.

We finally thought of building a system that will do the above process automatically. Each & every Energy meter will be attached to a microcontroller unit that will scan the meter reading after every one month.

The meter reading will transmit wirelessly to the local server along with the meter number. This data will be processed by the server and generates the bill automatically. Once the bill is generated an SMS alert will be send to the owner's mobile number and it will be also mailed on the owners registered email ID.

The rest of the paper is arranged in different sections as:

Section II includes the Existing Methods which describes the current status of the system.

Section III includes the Proposed Work where we are doing the expansion of the existing system.

Section IV includes the Software and Hardware Requirements which are needed for the execution of the system.

Section V includes Applications and Limitations of the system.

Finally in Section VI we have concluded our methodology of implementation of system.

II. EXISTING METHODS

Previously Automatic Meter Reading (AMR) in indoor environments, implementing a WSN (Wireless Sensor Network) based on Zigbee technology was being used. AMR was used for remote collection of the water, fuel, gas, electricity consumption data or any other. Previously the concentration was on Electricity power monitoring system which could monitor power quality, could remotely control power service which would enable prepaid billing. But due to its low range of frequency which caused distraction in local range our RF transmitter overcomes its disadvantages and it is being implemented by us.

ZigBee is high level communication protocols using small, low-power digital radios based on an IEEE 802 standard for personal area networks. These devices are often used in mesh network, which form to transmit data over longer distances, passing data through intermediate devices to reach more distant ones. This allows ZigBee networks to be formed ad-hoc, with no centralized control or high-power transmitter/receiver able to reach all of the devices. This device can be tasked with running the network. ZigBee is used in the applications that require a long battery life, low data rate and networking. [6]

ZigBee has a 250kbit/s datarate. This rate best suited for intermittent data or periodic or a single signal

transmission from an input device or sensor. Applications include electrical meters with in-home-displays, wireless light switches and traffic management systems and industrial equipment that requires short-range wireless transfer of data at relatively low rates. The technology defined by the ZigBee specification is intended to be simpler and less expensive than other WPANs & wireless technology such as Bluetooth.

III. PROPOSED WORK

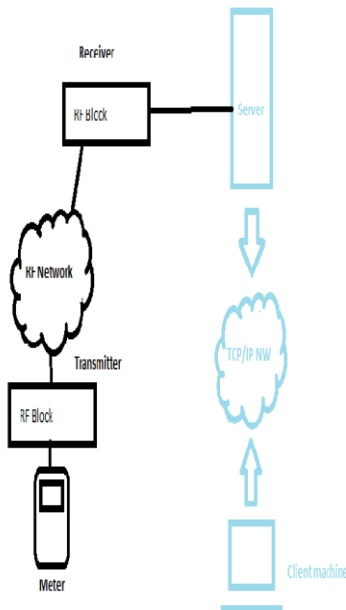


Fig.1: Architecture of system

Every energy meter is attached to a microcontroller unit that will scan the meter reading. Microcontroller sends data to RF transmitter in ASCII format, which is attached to the meter. The data is sent in the form of packet. This packet format as follows:

16 Bytes	2 Bytes	6 Bytes	16 Bytes
DATE TIME	NU	UNITS	MID

Fig2:RF Packet Format

The packet is of 40 bytes. It has 4 fields.

- i. **DATE / TIME:** It contains the reading date or time.
- ii. **NU:** Not Used. May be in future, this field can be used for other purpose.
- iii. **UNITS:** It contains total units consumed.

- iv. **MID:** It contains the meter ID from which reading is taken.

RF receiver receives data in ASCII format and converts it into hexadecimal format. This converted data is stored in the server database. Then, the server automatically generates the bill. After generating the bill, server will send SMS which contains the billed amount with consumed unit's on consumer's mobile number. E-mail will sent on consumer's registered mail id.

3.1 Pair-based Executing scheme

During registration user submits his password. The minimum length of the password is 8. It can be called as secret password. During the login phase, when the user enters his username and password interface consisting Welcome to MSEB provided facility of a displayed.

a) Web Design:

Registration Module:

New Consumer:

Consumer Number:

Consumer Full Name:

Mobile No:

Address:

Enter Email ID:

Password:

SUBMIT

Fig.3: Registration form

Figure 3 shows the registration form for new user to register. In this phase new user must enter his consumer number which is same as station id on meter. Then enter his full name, mobile no, address. The meter no is same as consumer number. Then user must enter

user name & password to making use of facility which is provided by our system. After filling the registration form completely click on the submit button.

Login Module:

During the login phase, when the user enters his username and password interface consisting of a home page is displayed. His home page contains features of view current & previous bill, pay bill & recharge account. The home page will display every time when you login.

The login interface consists of a rectangular box with a light orange background. At the top left, there is a small red box with the word "Login:" in white. Below this, there are two input fields: "User Name:" followed by a white rectangular box, and "Password:" followed by another white rectangular box. At the bottom center of the box is a grey button with the word "SUBMIT" in white capital letters.

Register New User

Fig.4: Login interface

Figure 4 shows the login interface. In this phase Consumer has to enter the username & password. This password consists of alphanumeric characters.

b)RF Transceiver:

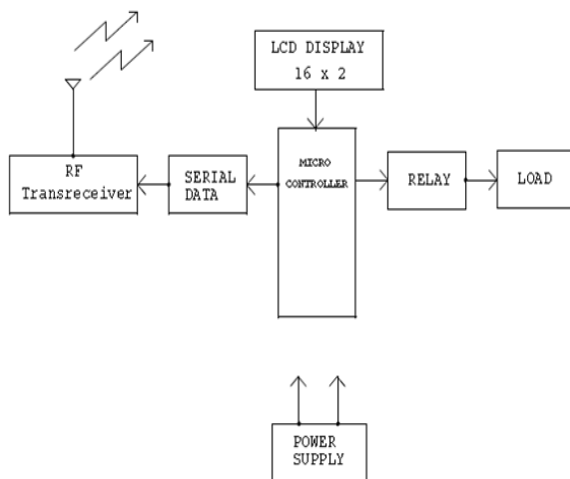


Fig.5:RF Transceiver[5]

Figure 5 shows the RF transceiver. In that RF Transceiver is transmitting & receiving radio frequency from meter.89s52 this microcontroller used in this system. Serial data can transfer bit by bit information through the microcontroller & RF Transceiver. On the LCD it will display the station ID with consumed unit.

Relay is used for switch on & off the light. For running this hardware, power supply is must.

c) Bill Generation:

Bill

Mr/Mrs :- snehal Contact:- 9405273242 Address:- Pune				
Customer No:1			Customer Name:snehal	
Bill Date :08/03/2013				
Meter No	Current	Previous	Total Units	
1	08/03/2013 37	33 312	4	
			Fixed Charges	Rs:50
			Energy Charges	Rs:50
			Electricity Duty	Rs:50
			E.A.C.	Rs:12
			Other Charges	Rs:40
			Total	Rs:242

Pay Bill

Fig.6: Bill Generation

d) SMS & E-Mail Facility:

Our system can provide the SMS & E-Mail facility for each & every user which is registered.

e) Payment through the scratch card:

The recharge interface consists of a rectangular box with a light orange background. At the top left, there is a small red box with the word "Login:" in white. Below this, there are two input fields: "Enter Credit Card No:" followed by a white rectangular box containing the number "10000000000000", and "Enter Recharge Amount:" followed by another white rectangular box containing the number "5000". At the bottom center of the box is a grey button with the word "Recharge" in white capital letters.

Fig.7: Recharge Facility

By using recharge facility, user can recharge his own account for payment of bill.

V. REQUIREMENTS

a. Software Requirements

1. Operating System Platform-Microsoft Windows, Linux
2. Database Used-SQL server

3. Development Platform-Windows XP SP 2, 3
4. Development kit-JAVA SDK7
5. Design Tool-Rational Rose
6. Development Tool-Netbeans 7.0

b. Hardware Requirements

1. Personal Computer
 - (a) Processor- Pentium IV
 - (b) Hard Disk- 80GB (Min.)
 - (c) RAM- 2GB (Min.)
2. Network Specification-Internet connection.
3. IIS Server
4. RD Transmitter and Receiver

VI.APPLICATIONS AND LIMITATIONS

a. Applications

1. It can be used in MSEB office and other electricity related organization.
2. Project can be deployed on any platform as coding is done in java.
3. Automatic supply cut down in the event of defaulters.
4. Monitoring energy loss.

b. Limitations

1. It cannot be used in above 30 meter.
2. Each meter registered to the server

VII. CONCLUSION

The demand of automatic meter reading is increasing in many organizations. The meter reading will be transmitted wirelessly to the local server along with the meter number. This submitted data will be processed by the server and the bill is generated automatically. Total amount of generated bill will be sent to the owner's mobile number through the SMS alert. If any user cannot pay amount of bill then there is a power cut event is generated for consumer meter.

Through this project we were taking consumed meter unit from user's meter automatically. It allows the user or consumer to pay the bill through the scratch card.

This project helps in creation of such a model for MSEB or other organization by generating automatic bill by using the microcontroller based meter and executing it.

VIII.ACKNOWLEDGMENT

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