International Journal for Modern Trends in Science and Technology
Volume: 03, Issue No: 06, June 2017
ISSN: 2455-3778
http://www.ijmtst.com

Automatic Energy Meter Accounting

Ch.Rajyalakshmi[1] | A.Jawahar[2] | Qalidah Ahmed[3] | M.Surya Teja[4] | V.Rajesh[5] | G Bhaskara Rao[6] | A Srinivasa Rao[7]

[1-7]Department of Electrical and Electronics Engineering, Sanketika Institute of Technology and Management., Visakhpatnam, Andhra Pradesh, India.

To Cite this Article
Ch.Rajyalakshmi, A.Jawahar, Qalidah Ahmed, M.Surya Teja, V.Rajesh, G Bhaskara Rao and A Srinivasa Rao, "Automatic Energy Meter Accounting", *International Journal for Modern Trends in Science and Technology*, Vol. 03, Issue 06, June 2017, pp. 156-159.

ABSTRACT

Automatic energy meter accounting technology is a system were the data from the energy meter is collected and transmitted to the central database for analysis and accounting to generate the bill. Here we are going to explain the way how the load consumes power, transmit actual meter readings through SMS by GSM technology, updating the central administrative database of the consumer periodically and generating bill after whole month consumption. Then that generated bill will be sent as a textual message to the user mobile. Then after, when the bill payment is done the supply continues or else by a relay mechanism the connection will be disconnected. Here in this prototype a simple load of four holders and a socket is taken. And model of all parameters like tariff rates and time of due date of payment are considered. The bill is calculated in the microcontroller itself for simplicity, then to explain the updating process periodical units are sent to the user end mobile number. Then after at the end of full load the bill is generated and sent to all three numbers. After confirmation of payment, one of the two buttons - paid (or) not paid is pressed, which decides the continuity of the supply. The design reduces the manual work, increases the accuracy and gives a path for a smarter society; this is actually very useful in remote areas. Based on this many more advancements can be developed.

KEYWORDS: *energy meter, accounting, database, load management, power bill, GSM, DSM*

Copyright © 2017 International Journal for Modern Trends in Science and Technology
All rights reserved.

I. INTRODUCTION

The Automated Energy Meter which has capabilities like remote monitoring and controlling of energy meter. Automatic Meter Reading system (AMR) continuously monitors the energy meter and sends data on request of service provider through SMS. It saves huge human labour. The data received from an energy meter has been stored in database server which was located at electricity Board station through SMS gate way for further processing by energy provider. Energy provider sends electricity bill either by e-mail, SMS or by post.This system allows to the customers to pay bill online either by credit card, debit card or by net banking. This system provides freedom to electricity companies to take action against lenient customers who have outstanding dues, otherwise companies can disconnect the power of customer .Companies can re-connect the power after deposition of dues. This system also gives the power cut information and tempering alert. So GSM based AMR system is more efficient apropos convention billing system.

Types of energy meters
1. Conventional meters (or) traditional meters
A. Electromechanical induction meters
B. Electronic meters
2. Smart meters

S.No	Features	Smart meters	Conventional meters
1.	Labour	×	✓
2.	Control	✓	×
3.	Tampering identification	✓	×
4.	Auto disconnection indication	✓	×
5.	Power cut indication	✓	×
6.	Operation cost	Low	High
7.	Resolution	✓	×
8.	Power management	✓	×

Table 1 Comparison between conventional and smart meters

Company Advantages

1. Data sent to the central database for billing can be used for troubleshooting and analysing process even
2. This system also gives the power cut information and tampering alert.
3. Provide better resolution. Operating cost is low
4. Better network performance and cost efficiency.
5. Demand and distribution management.
6. It saves huge human labour.
7. More intelligence to business planning.

Customers Advantages

1. Clear and accurate billing.
2. Better and faster customer service.
3. Helps in building a smarter society.

So GSM based AMR system is more efficient than convention billing system.

Limitations

1.Loss of privacy

2.Complex design than conventional one.

3.Increased security risks from network or remote access

Technologies used to Transmit the Data

There are many technologies that can be used to transmit the data. For example

1.PLCC

2.Radio frequency

3.Zig Bee

4.Wi-Fi

5.Bluetooth

6. GSM finally

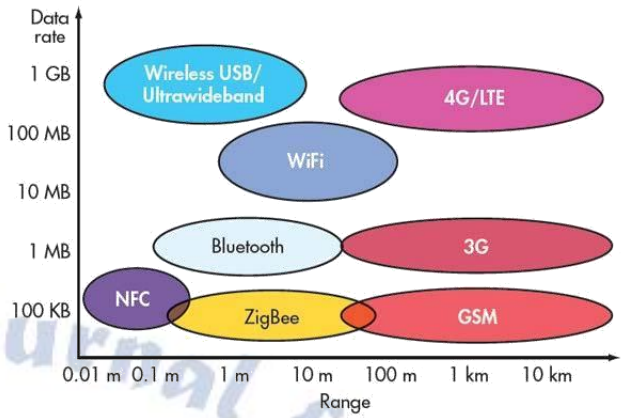

Fig 1 Ranges of wireless connectivity

Apart from these all we used GSM technology to transmit the data is due its frequency range and the availability. As the frequency range of the GSM (Global System for Mobile communication) system is 900MHz to 1800MHz and from 2100MHz for 3rd gen. of network. This system nothing but the mobile network we use in our daily life.

II. BLOCK DIAGRAM AND HARDWARE

The block diagram explains the complete physical setup of the project. This shows the flow of the power and procedure. Now every block of the diagram will be explained clearly with their respective picture of the kit.

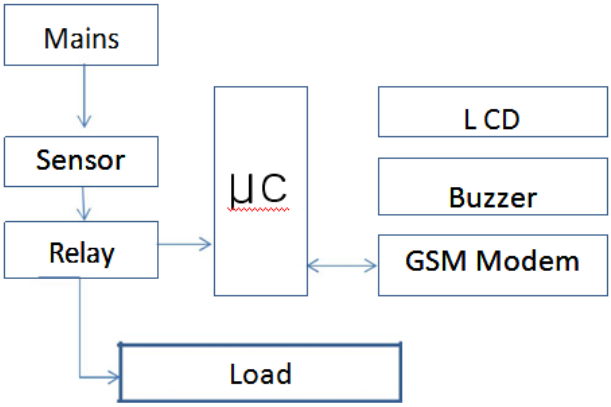

Fig 2.1 Block diagram

III. WORKING THEORY

The working theory of our project is that when load is turned on the current sensor calculates the number of units consumed. This information is sent to the microcontroller, their calculation of the bill takes place and a message is sent to the user end mobile as a text message. After a delay of few seconds (as it is a prototype only) a message is displayed on the LCD of the kit with a question displayed on it to know the payment status. If the

bill is not paid we need to press the not paid button on the kit then the load will be disconnected automatically.This is the flow chart that explains the complete setup of the project.

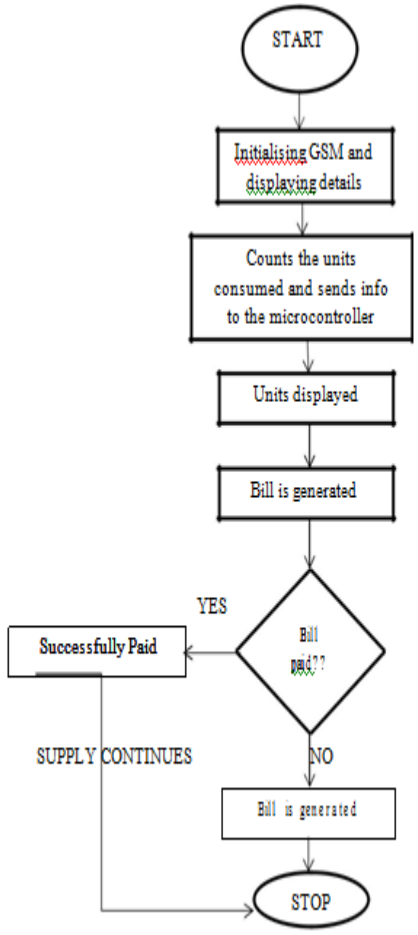

Fig 3. Flowchart of the Project

The figure below shows us the circuit diagram of our project. It gives us the interconnection of the elementary circuits used in our kit and clarity for the elaborated illustration.

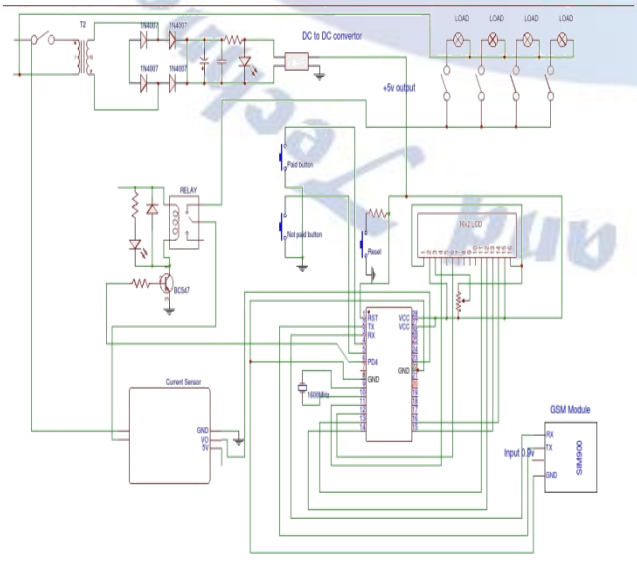

Fig 4 Circuit Diagram

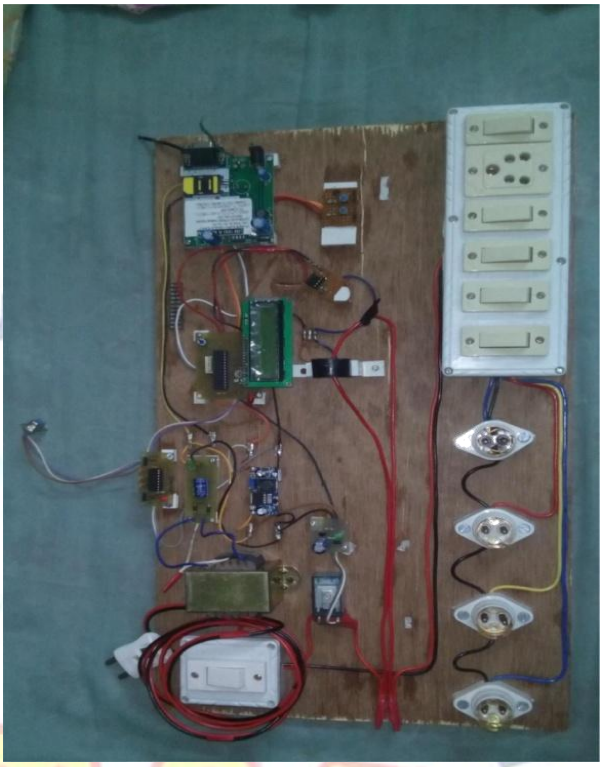

Fig 5 Hardware of the project

IV. RESULT

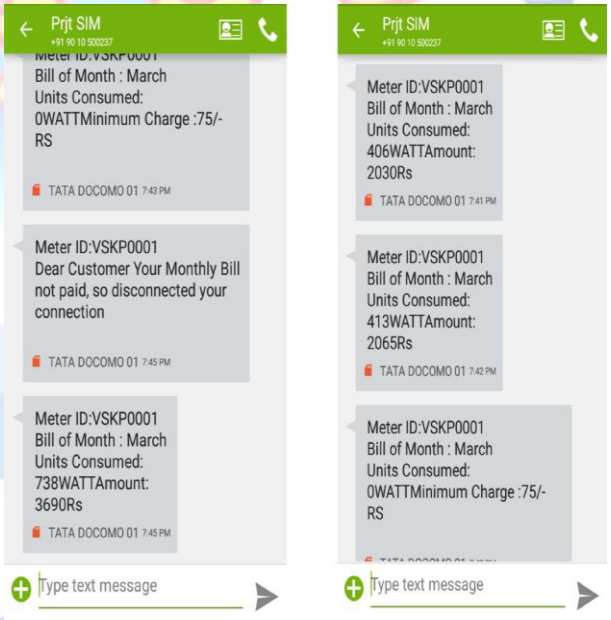

Fig 5 Message to the customer

V. CONCLUSION

Our project **"Automatic Energy Meter Accounting"** is finally completed with a desired output. This project report has an elaborated illustration of the project which can further utilised for advancements and enhance the present system of bill and accounting. This reduces the man power

and increases the scope of employability for educated people.

Future Scope

The future scope of the "**Automatic Energy Meter Accounting**" system has a wide future scope. As this system can be synchronised with the AP EASTERN POWER DISTRIBUTION COMPANY of our state, it can also be synchronised with its APPLICATION to enhance its features. As this APP gives all the information required to a consumer likewise: bill payment, consumption, payment history, supply position, my usage, bill reminder, customer care with the following options like loge complaint and its status. So if that APP is synchronised with this system then system will be full-fledged.

REFERENCES

[1] H.G.Rodney, Tan IEEE, C.H.Lee and V.H.Mok, IEEE "Automatic Power meter Reading system using GSM Network" Proceeding of the 8th international Power Engineering Conference (IPEC-07) 2007, pp:465-469.

[2] Dr. Mohd Yunus B Nayan1, Aryo Handoko Primicanta "Hybrid System Automatic Meter Reading" Proceeding of the International Conference on computer technology and Development,(ICCTD - 09),2009.pp:264-267.

[3] Subhashis Maitra, "Embedded Energy Meter- A new concept to measure the energy consumed by consumer and to pay the bill",Power System echnology and IEEE Power India Conference, 2008.

[4] Li Kaicheng, Jianfeng, Yue Congyuan, Zhang Ming. "Remote power management and meter-reading system on ARM microprocessor", Precision electromagnetic Measurements Digest,2008. CPEM 2008. Conference on Digital Object Identifier.

[5] Ashna.k PG Scholar, Electronics and Communication Dept. "GSM Based Automatic Energy Meter Reading"IEEE 2013.

[6] A. Abdollahi, M. Dehghani, and N. Zamanzadeh, "SMS-based reconfigurable automatic meter reading system," in IEEE International Conf. Control Appl., Oct. 2007.

[7] P. RakeshMalhotra, Dr.R.Seethalakshmi "Automatic Meter Reading and Theft Control System by Using GSM P".RakeshMalhotra et al. / International Journal of Engineering and Technology (IJET).

[8] Vivek Kumar Sehgal,Nitesh Panda, Nipun Rai Handa, "Electronic Energy Meter with instant billin, UKSim Fourth European Modelling Symposium on Computer Modelling and Simulation

[9] P.K. Lee and L.L. Lai, Fieee, "A practical approach to wireless GPRS on-line power quality monitoring system", Power Engineering Society General Meeting, 2007.