# Automatic Energy Meter Reading System

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**Abstract – Traditional metering method for retrieving the energy data is not convenient and the cost of the data logging systems is high. So this paper presents of design and development of Automatic meter reading (AMR) system. AMR system is a boom for remote monitoring and control domestic energy meter. AMR system give the information of meter reading, power cut, total load used, power disconnect and tempering on request or regularly in particular interval through SMS. This information is being sent and received by concerned energy Provider Company with the help of Global system for mobile communication (GSM) network. Energy provider receives the meter reading within a second without visiting person. AMR minimize the number of traditional visits required by employs of energy Provider Company. This system not only reduces the labor cost but also increase meter reading accuracy and save hugs amount of time.**

**Index Terms – Short Message Service (SMS), Automatic Meter Reading (AMR), Energy meter, Energy provider company, GSM.**

## 1. INTRODUCTION

Electricity is one of the vital requirements for sustainment of comforts of life. It should be used very judiciously for its proper utilization but in our country we have lots of localities where we have surplus supply for the electricity while many areas do not have access to it. Our policies of its distribution are also partially responsible for this because we are still not able to correctly estimate our exact requirements and still power theft is prevailing.On the other hand consumers are also not satisfied with the services of the power companies. Most of the time they have complaints regarding statistical errors in their monthly bills. Thus we are trying to present an idea towards the minimization of technical errors and to reduce human dependency at the same time. With the help of this project we are aiming to receive the monthly energy consumption from a remote location directly to a centralized office. In this way we can reduce human efforts needed to record the meter readings which are till now recorded by visiting every home individually.

This results in considerable loss of human hours and also provides considerable details regarding the average consumption of a locality so that power supply can be made according LO these data. This will help the officials in deciding the specifications of transformers and other instruments required in power transmission

Automatic Meter Reading System (AMR) is the remote collection of consumption data from customers utility like Electric meters using radio frequency, telephony, power-line or satellite communications technologies and process the data to generate the bill. Now a day, AMR is heavily used in the abroad for collecting reading and billing purpose. The electric meters are situated in the houses, offices and factories etc .Meter readers go to the place which are generally situated inside the house and take the meter reading. Most of the time the owner gives some extra money to the meter reader person to have less meter reading. As a result corruptions occur and actual payment is not received by the service provider. So the provider faces a huge amount of loss in every year. Millions of Analog meters are already used in our houses, offices, industries. So we are not proposed any new meter. We want to develop a miniature module which will take reading from analog meter and then convert this data into digital data. And this module also responsible for transmission of data to the provider end. At the provider end there will be another module which is responsible for data receiving. And this module makes an interface with computer which is responsible for data processing. Automatic meter reading, or AMR, is the technology of automatically collecting data from energy meter or water metering devices (water, gas, and electric) and transferring that data to a central database for billing and/or analyzing. This 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.

## 2. BLOCK DIAGRAM

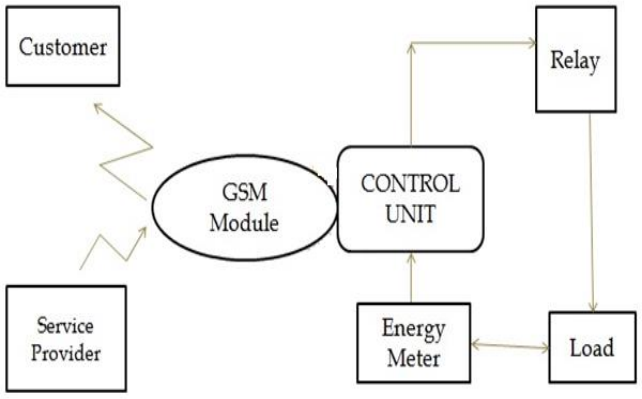


Figure 1. Block Diagram

## 3. PROPOSED WORK

To implement this system, an 8051 processor based board is used. It uses a 8-bit processor with on-chip, timer/counter module and UART module to interface a GSM modem and energy meter. The energy meter which generates the pulses as well as count the energy consumed is used. The digital energy meter is having a LED which blinks for a specific number of times to indicate the energy consumed (e .g. 1 Unit = 1600 pulses). These pulses are fed to 8051 based system which is programmed to count these pulses. The system reads these pulses and after counting specific number of pulses it increments the internal counter by one which indicates the number of units consumed.

When specific numbers of pulses are counted by control unit (e.g.5), GSM modem, which is connected through UART interface, interrupts controller. This causes 8051 to read the number of units burnt and sends the data to the UART. Further, the UART sends the data to GSM modem which sends this meter reading data to customer.

If, now, the service provider detects that the previous bills are pending for a specific user, the missed call will be sent by the service provider, which results in disconnection of energy supply for that user. For this purpose, the supply goes further to home/office through a relay circuit, which is again controlled by control unit.

Flowchart

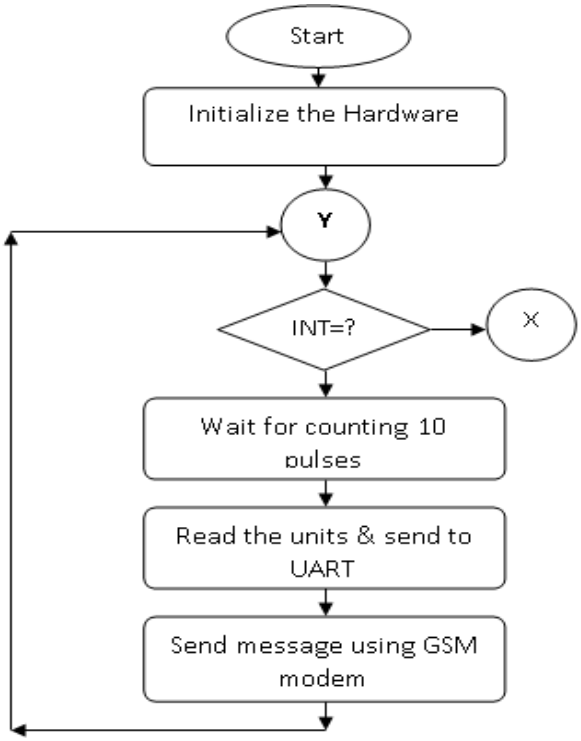


Fig. (a) Energy Consumption

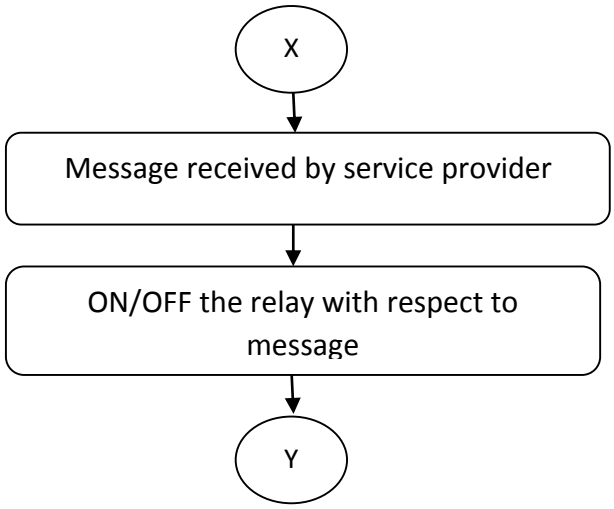


Fig.(b) ISR (power supply on/off)

## 4. RESULTS

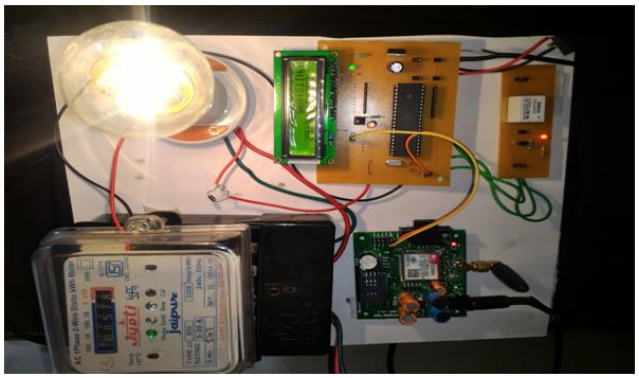

Fig.(a) Experimental setup of automatic meter reading system

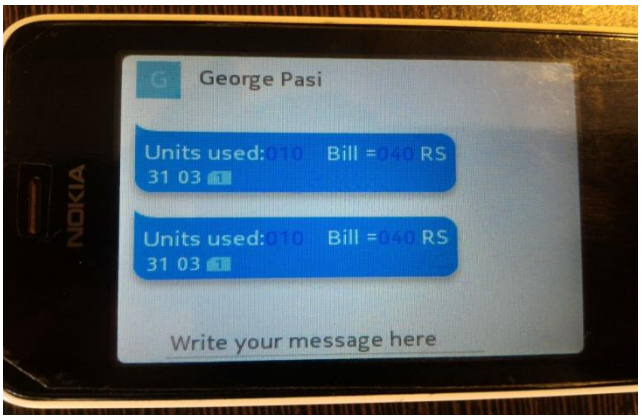


Fig.(b)Result

## 5. FUTURE SCOPE

The system designed reduces the efforts of manual data collection of energy meter. Also, data which is received at

service provider side is easy to manipulate for bill generation and other such tasks. With this system we can collect the reading as well as control the supply to the user. With addition of software at service provider side, the customer can be informed of current meter reading, bill for current cycle, status of the line and other parameters to the customer with either message or a phone call.

## 6. CONCLUSION

With this system the service provider can collect the bill any time with a single message. The data collection and manipulation task becomes fast and easier. Any modification can be made to the code in less time. Changes in rate or unit calculation can be done very effectively.

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