

## Digitized Meter and Invoice Generation

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**Abstract** - The representative of electricity board monthly come and visits every residential and corporate zone and manually collects the readings from electricity meter. The data is recorded on a piece of paper along with a snap shot of the meter.

There after the officials reads the snap shot and readings of the meter and then feed it to the local software for bill calculations. Finally the bills are sent. We as a consumer then make the payment for the received bill. Such a tedious process is this. Man made mistakes can be in huge numbers.

Human resources are wasted and many other problems do occur. We finally thought of building a system that will do the above process automatically.

The advancing mobile communication technology and the decrease in costs make it possible to combine mobile technology into electricity board 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 electricity board 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 finally submitted to the local electricity board office. There after the officials reads the snap shot and readings of the meter and then feed it to the local software for Invoice.

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. Every Energy consumption meter will be attached to a microcontroller unit that will scan the meter reading after every one month. The meter reading will transmitted 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.

According to the market need of Electric Meter. Now the system will use wireless controller. It is used since application

don't need high speed data rate, need to be low powered as well as low cost.

**Keywords:** Energy Meter, Microcontroller LPC 2148 , Mobile, Server, Buzzer, crystal oscillator.

### 1. INTRODUCTION

The usual metering systems has many disadvantages as manual reading has faults such as errors in taking reading mistake, external conditions affecting readings ,delayed work. These ways of doing things also needs huge manpower. Smart meter reading system is one way to avoid these faults. Due to this system, incorrect bills were delivered and huge economic loss of consumers.

There are three key elements in an smart meter reading (SMR) system: consumption measurement, meter reading, transmission of measured data, and data processing and billing. An SMR system has to be Cost-effective while providing robust and reliable performance. Smart meter reading enables utility companies to communicate remotely with residential utility meters using communications. electricity board can now set up two-way data communications between the utility's data center and the meters. More detailed customer information can serve to offer enhanced services such as time-of-use pricing, management of demand, and load profiles. Every Energy consumption meter will be attached to a microcontroller unit that will scan the meter reading after every one month. The meter reading will transmitted 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.

### 2. LITERATURE SURVEY

#### Reference Paper Study-

#### 2.1. A Novel approach for energy meter billing system using RFID:

Our study on paper: RFID is not suitable to cover large area as we know that RFID is used for short range application.

## 2.2 . Wireless Prepaid Energy Metering using RF and Arduino Technology :

Our study on paper: In this paper RF was used but the drawback is RF has very short range and the arduino is used for media interfacing.

## 2.3. Implementation of Automatic Meter Reading System Using Wireless Sensor Network:

Our study on paper : Traditional meter reading such as errors in reading, inaccuracy, external conditions affecting readings, delayed work we have implemented meter reading system based on latest technology.

## 2.4. ZigBee Based Electric Meter Reading System:

Our study on paper: As a need of market requirements of Electric Meter. The ZigBee is used as the application don't need high speed data rate, need to be low powered and low cost.

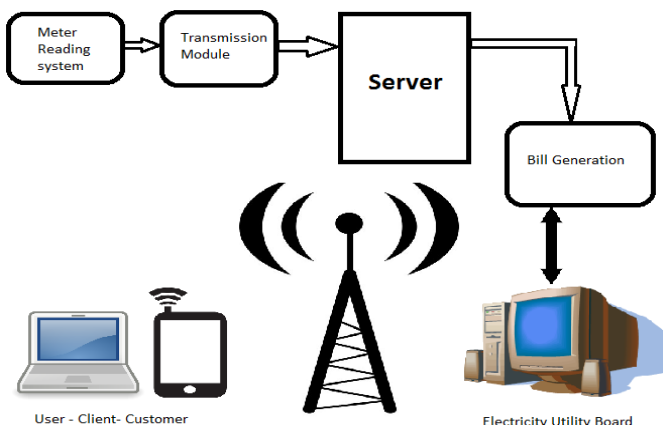
## 3. DRAWBACKS OF EXISTING SYSTEM

In traditional billing systems the heavy power and economic losses that occur due to power theft by the consumers. Also there was no real time analysis of the power consumed so the consumer was unable to know his power consumption.

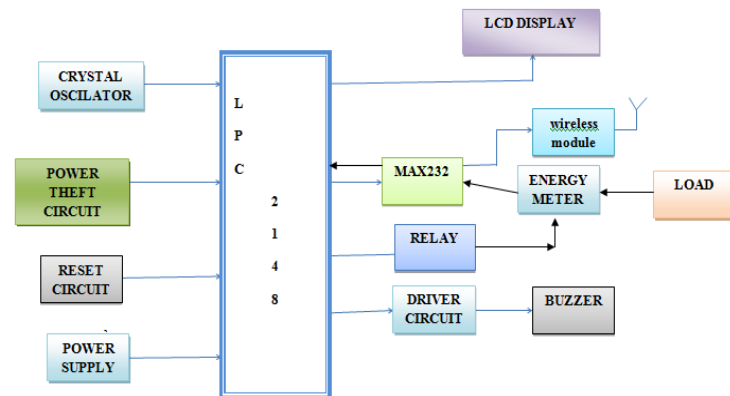
The major disadvantage with the traditional system is that if one electronic energy meter fails down, the electricity department will not come to know until liability of the person going to take the readings of the meter; it can take two or more month to repair or replace the damaged meter.

In traditional billing system each time the representative of electricity board visits home and capture image each time the electricity board needs to pay certain amount to representative so the above process is very costly. And energy board is facing heavy economic loss due to such traditional system.

## 4. SYSTEM FLOW



## 5. BLOCK DIAGRAM



## 6. METHODOLOGY

The whole system can be divided into three sections. First is a energy meter with micro controllers that measures real-time power consumption. Second part is the data transmission, where the meter reading can be sent through a wireless Module based network to a server. The third part is the improved data management system based on user friendly software with two separate access support – one for consumer and another for the electricity authority.

We are using ,

**LPC 2148:** ARM is a family of instruction set architectures for computer processors based on a reduced instruction set computing (RISC) architecture developed by British company ARM Holdings.

LPC-P2148 is prototype board for LPC2148 ARM7TDMI-S microcontroller with USB 2.0 Full-speed device, multiple UARTs, SPI, SSP to I2C-bus and on-chip SRAM up to 40 kB, produced by NXP Semiconductors. With LPC-P2148 you can explore the features of LPC21XX family on budget, the board has everything necessary to build simple applications.

**Crystal Oscillator:** A crystal oscillator is an electronic oscillator circuit that uses the mechanical resonance of a vibrating crystal of piezoelectric material to create an electrical signal with a precise frequency. This frequency is commonly used to keep track of time, as in quartz wristwatches to provide a stable clock signal for digital integrated circuits, and to stabilize frequencies for radio transmitters and receivers. The most common type of piezoelectric resonator used is the quartz crystal, so oscillator circuits incorporating them became known as crystal oscillators, but other piezoelectric materials including polycrystalline ceramics are used in similar circuits.

**Buzzer:** It is an audio signalling device If electricity theft is detected or any misuse of meter is detected, then buzzer rangs.

**Invoice Generation:** Here the calculation is done of meter readings and the bill amount is sent to customer via SMS. Along with SMS we will also send link for bill payment and here we have two payment methods. First method is tradition online payment method and another one is auto deduction from bank account.

This project explores the development of wireless controller Based electricity bill. The purpose of this project is to build a digital electricity bill, which could be controlled using wireless controller.

### 5.1. Meter Reading System:

In this module the readings of the electricity meter are read with the help of microcontroller.

### 5.2. Transmission Module:

In this module the meter readings are sent to the server.

### 5.3. Bill Generation Module:

In this module the generated bills are sent to the customers.

## 6. CONCLUSIONS

This proposed system gives an efficient knowledge about security, Communication System of Meter Reading and payment problems. Since all the vulnerabilities are closed to avoid any possible fraud, lose of electricity problem would be solved. The expense for meter reading and human efforts will be reduced, when the Digitized Energy Meter is introduced. The secure transmission will stop the fraud and theft of energy. The security of this system can further be modified and according to improve the efficiency of the system.

## 7. REFERENCES

- [1] Pradip W Kulkarni, Manisha V Shinde, Automation of Electricity Billing Process, IEEE 2014
- [2] Automatic Electric Meter Reading Monitoring System Using GSM International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056 Volume: 03 Issue: 05 — May-2016
- [3] International Journal of Emerging Technology and Advanced Engineering Website: www.ijetae.com (ISSN 2250-2459, ISO 9001:2008 Certified Journal, Volume 3, Issue 4, April 2013)
- [4] Satellite Conference ICSTSD 2016 International Conference on Science and Technology for Sustainable Development, Kuala Lumpur, MALAYSIA, May 24-26, 2016 ISSN: 2348

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