

Automated Meter Reading for Electricity Using PLCC Method

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ABSTRACT: In every aspect of life automation is required to reduce the work. So we have designed Automated Meter Reading for Electricity using power line carrier communication. This AMR will overcome the current old method of electricity billing process. This project eliminates the need for employing Electricity Board meter readers and this set of employees can be used elsewhere. The drawback is reduced by using a prepaid energy meter which is based on the concept "Pay first and then use it". The prepaid energy meter uses a recharge card which is available in various ranges (i.e. Rs. 300, Rs. 200, Rs. 150, Rs.50, etc.). PLCC, Power Line Carrier Communication, is an approach to utilize the existing power lines for the transmission of information. In today's world every house and building has properly installed electricity lines. By using the existing AC power lines as a medium to transfer the information, it becomes easy to connect the houses with a high speed network access point without installing new wiring.

KEYWORDS:AMR, PLCC, PLC modem, RFID reader, Smart card.

I. INTRODUCTION

Traditional electricity billing process is very length and erroneous. Now a day energy meter reader goes to every premise and takes the reading manually then issues the bill. This requires huge number of labours and long working hours for billing. Visiting every consumer's home is something that causes a bit of inconvenience. Sometimes room/ houses is found locked this comes as an embarrassment for the employee on duty also. For manual reading in different houses conditions vary leading to somewhat erratic results, especially when the meter is inside the home or in a hard-to-access place. In the typing stage again there are chances of errors. All these lead to not so accurate billing. Which have some disadvantages like erroneous reading, easy manipulation, manual labour and time consuming. In case of failure in bill settlement by customer, the employee of EB office have to personally visit the customers house and cut off the supply. Thus much of time and labour power is wasted in that. Consumer is not aware of the costs and service consumption until the statement charges are received. This might create problems for the customer at the time of payment. To avoid this difficult task, Automated Meter Reading for Electricity using PLCC system is introduced.

II. EXSISTING SYSTEM

Current smart meters are limited to a brief description of the power consumption for a certain period monthly, weekly, or daily. In this project, we are going to propose advanced metering system. Even though automatic meter reading (AMR) is a low data rate application, it demands both high reliability and low computational complexity. The readings of the meter is done manually that leads to obvious error and wastage of time and resource. It is difficult to make exact load consumption analysis. To overcome this new technology is introduced in this paper.

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A. *DISADVANTAGE OF EXISTING SYSTEM:*

- Data collection and manipulation task is slow
- Unit calculation is not efficient

III. PROPOSED METHOD

In this proposed system we going to implement a PLCC Based Reliable and Efficient Power Metering System for Energy Management and Controlling. Power metering system will monitor the consumed power in particular home and transmitted via PLCC . The bill payment section will be take place in home itself. RFID reader will detect the smart card and amount selection take place via keypad. Controller will check remaining amount continuously. When the balance reaches some point of threshold level the buzzer will be turn on. PLCC, Power Line Carrier Communication, is an approach to utilize the existing power lines for the transmission of information. In today's world every house and building has properly installed electricity lines. By using the existing AC power lines as a medium to transfer the information, it becomes easy to connect the houses with a high speed network access point without installing new wiring.

A. *PROPOSED METHOD ADVANTAGES*

- Low-cost, fast and efficient data collection.
- More accurate and precise measurement of water consumption. Consumers will be billed for what they are actually consuming.
- Reduced meter reading costs.
- Ability to access difficult-to-read meters.
- Improved customer service.
- Reduced percentage of estimated bills.
- Improved meter reader safety.
- Implementation of real-time pricing.
- Reduced read-to-bill time.
- Distribution automation.
- Improved fraud detection.

IV. SYSTEM DESCRIPTION

The electricity consumption and automatic billing through power line consists of main two sections.

- 1.Home section
- 2.PC section

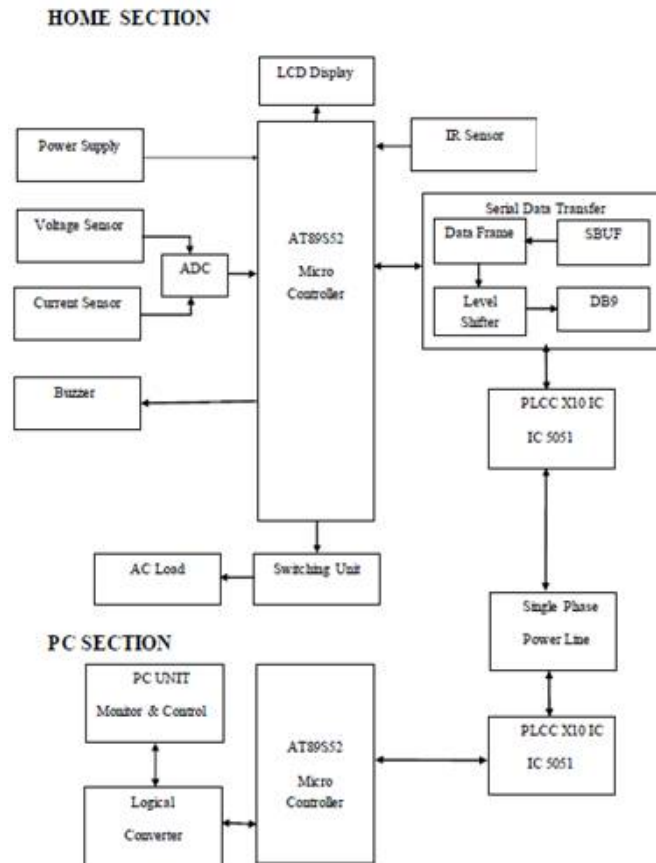


Figure 1: Block diagram of AMR

In this the home section is the transmitter section and PC section is the receiver section. Transformer with power supply section (bridge rectifier and capacitor are used for filtering).5V DC for operating microcontroller section and RFID reader module is used to recharge with RFID tag. Keypad section is used for select the amount for recharge purpose. LCD is used for displaying message. Buzzer is used to generate a alarm when the warning message comes from the LCD display. Voltage and current sensors are used to calculate the voltage and current depend upon the power consumption. Whenever the calibration reading close, the IR sensor is used to count the one unit pulse and it show the amount decrementing in the LCD display. Relay circuit is used whenever the completion of units the relay will disconnect with the load automatically. UART is used for serial communication. Power line carrier communication is an approach to utilize the existing power lines for transmission of information. The PC section consists of the MODEM which is a transceiver i.e. it can receive as well as transmit data. The modem receives the input from the microcontroller and transmits it to the EB side. These are received by the modem placed in the EB side and sent to the PC. Hence the number of units consumed and the amount is displayed in the LCD.

V. EXPERIMENTAL RESULT

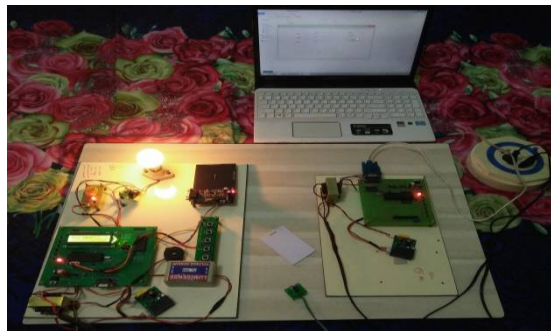


Figure 2: Practical design of system



Figure 3: Displaying show card to place the card in RFID reader



Figure 4: Displaying Enter amount to select the amount in keypad



Figure 5: Displaying amount, current and voltage consumed



Figure 6: Amount is zero and indicating to recharge

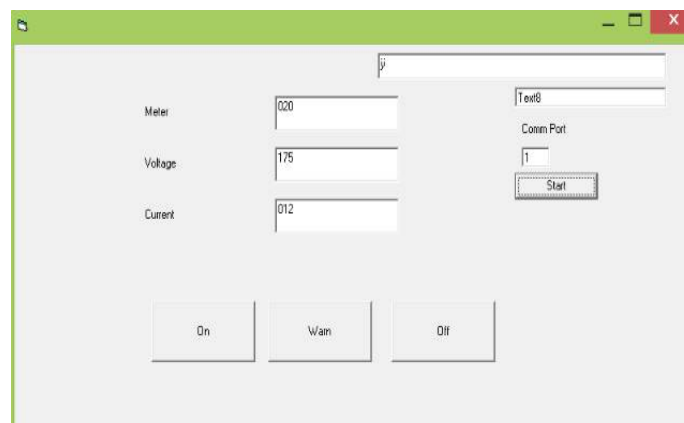


Figure 7: Monitoring of AMR at EB section

VI. CONCLUSION

This paper is intended to present an overview of prepaid energy meter, which can control the usage of electricity on consumer side to avoid wastage of power. Prepaid energy meter is a concept to minimize the Electricity theft with a cost efficient manner. The users are not bound to pay excesses amount of money, users have to pay according to their requirement. It can reduce problems associated with billing consumers living in isolated areas and reduce deployment of manpower for taking meter readings. It avoids the human intervention and provides efficient meter reading avoiding the billing error. Although there are new modern technologies of communication of billing data, the use of existing power line seems to be the most economical one and readily adaptable system, when compared to the other technologies. Hence this system proves to be very advantageous as well as efficient, the one which might become the bench mark in the history of automation. Prepaid energy meter is more reliable and user friendly. From all these we can conclude that if we implement this prepaid energy meter then it can become more beneficial.

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