

Smart Electricity Management System

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Abstract— The main aim of this paper is to develop a system that will measure, control and minimize power loss so that electricity will be available for 24 hrs to the consumer's. This is the advanced system. It reduces the drawback of the present system adopted by different electricity boards & Distribution Company. This paper concentrates how to calculate the bill at consumer side and display the same units & their respective bill on LCD. This display will be available to customer side as well as at supplier side. By adopting this system we are able to manage electricity distribution effectively and maintain the reliability of the supply.

Keywords- LCD (Liquid Crystal Display), Reliability

I. INTRODUCTION

We know that the entire world is rapidly a switch to advanced technology. Advanced technology like Automation. Now question arises what is automation? Automation is a process in which all the process is done by using different instruments i.e. less man power is involved. So human errors are reduced in this process. Due to this, system is accurate enough. All the lengthy processes included in the conventional processes are eliminated in automation process. So time required for getting result is decreased in automation process. Automation gives effective & correct work with less time and less man power. Now a day, automation rapidly spreads all over sector for e.g. Agricultural, Industrial, Educational, Robotics etc. This gives increase in profit of that sector. So we are interested in doing automation in different electricity boards and distribution companies.

II. EXISTING SYSTEM & ERRORS

Now a day's load shading is done on greater rate. Load shading means zero supply. Load shedding has been a very huge topic for people. Even though people are trying to cope with this situation with the help of alternate energy resources there are lots of drawbacks and disadvantages. Although the use of alternate energy has replaced a lot of households with the old electrical system, it hasn't had much progress towards the industrial sector. The other disadvantage is that the students are going to have a hard time studying without light.

Other disadvantages can be people and hospitals having problems with their day to day activities. The system adopted today by electricity boards & Distribution Company

is quite lengthy. In this process corporation sends electricity bill for every month. Before sending the bill the person from electricity board & corporation comes to home & note downs the meter reading in terms of units or take a photograph of meter. Then they calculate the actual units consumed by customer with the help of previous reading & the current reading. With the help of this respective bill is calculated. This process is time consuming & if customers are more, more man power is required. Also while taking readings the customer should present at home. This is main problem in existing system. Also the some meters used for taking reading are of analog type. So they have drawbacks.

III. SYSTEM COMPOSITION

It consists of two sections:

1. Power Management:

This is done by controlling the supply and demand. Distribution system is divided into following terms: No load, Low load, Medium load, Full load. Due to this electricity will be available 24 hour.

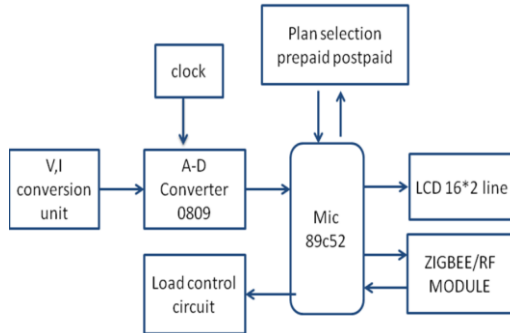
2. Plan Selection of Energy Meter:

Now the energy meters are available only a prepaid or postpaid, but in our system we combine both of these so that user can easily switch to any plan. Smart energy meter with Zigbee model for prepaid and postpaid system is proposed. Due to this system the user has ability to select prepaid or postpaid mode as per customer requirement. In prepaid mode balance is reduced as per energy is consumed. When the balance is low user gets a "Balance is low" message. If balance reaches to zero then with the help of relay power automatically gets cut off. If the account is recharged then the user gets uninterrupted power supply. In postpaid system with the help of Zigbee module electricity board gets the message of how much units a particular user is used and according to that data, electricity board sends bill which is

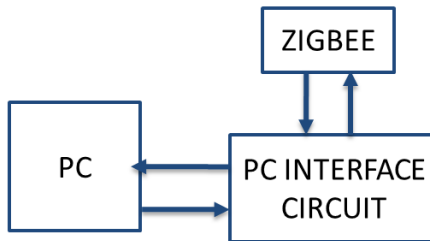
display on LCD situated at consumers home.

IV. BLOCK DIAGRAM

1. Consumer Section:



2. Supplier Section:



Power supply requirement:

Circuit will operate on 5V dc 1A current, so total power required is 5W. Power supply contains step down transformer, bridge rectifier with capacitor filter, lm7805 to get constant supply.

Sensors:

- ◆ Voltage-voltage convertor
- ◆ Current sensing- To calculate power used

ADC 0809:

Output of sensor is analog in nature but micro needs digital data to process so ADC 0809 is used to convert analog data to digital. It is 8 bit ADC.

CLOCK:

ADC requires clock to process the data. 900 kHz clock is given to ADC using RC combination with HEX inverter IC 74hc14. Clock is generated by the help of Crystal.

LCD Display:

20*4 line LCD is used to display the data.

PC:

Data will also be send to pc for analysis or record. So MAX 232 IC & RS 232 CABLE is used to interface PC with microcontroller.

Microcontroller:

AT 89c52 microcontroller is used. It is heart of the project. All the process will carry out by this IC. Main program for process will be in this chip.

ZIGBEE MODULE:

For transmitting & receiving data to & from central unit.n Plan selection: Through server on request user can configure the meter plan in postpaid mode or prepaid mode.

V. ZIGBEE MODULE

For transmitting and receiving data to and from central units. The distance of transmitting and receiving data up to 50 meter. The technology defined by the zigbee specification is intended to be simpler and less expensive than other wireless personal area networks, such as Bluetooth or Wi-Fi. Applications include wireless light switches, electrical meters with in-home-displays, traffic management systems, and other consumer and industrial equipment that requires short range low-rate wireless data transfer.

Its low power consumptions limits transmission distances to 10-100 meters line-of-sight, depending on power output and environmental characteristics. Zigbee devices can transmit data over long distances by passing data through a mesh network of intermediate devices to reach more distant ones. Zigbee is typically used in low data rate applications that require long battery life and secure networking. Zigbee has a defined rate of 250kilobits/sec, best suited for intermittent data transmissions from a sensors or input device.

VI. ADVANTAGES

- ◆ Electricity will be available 24 hours.
- ◆ Supply can be controlled.
- ◆ Power demand can also be controlled.
- ◆ Wastage of electricity can be controlled.
- ◆ As system is automation single person can handle.
- ◆ Saving of the electricity so saving of money.
- ◆ Hard copies can be eliminated completely.
- ◆ Time required for entire billing system gets reduced.
- ◆ If any default in meter then we get idea directly on PC of central office.

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VII. APPLICATION:

- ◆ In this system Customer can directly get idea about the bill on his meter system.
- ◆ Decreases the human errors.
- ◆ Time required for entire billing system gets reduced.
- ◆ If any default in meter then we get idea directly on PC of central office.

VIII. CONCLUSION

The main aim of this paper is we made distribution system automatic. Due to this electricity will available 24 hr. The consumer can easily switch to any of the plan that is prepaid or postpaid. Through this thesis we can control the load on generators automatically. If load increases it will switch the generator so as it will also protect the generators from damage, overheating, and saves the power, money, loss of MSEB.

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