



INTERNATIONAL JOURNAL FOR ENGINEERING APPLICATIONS AND TECHNOLOGY

Smart Electricity Meter Billing Via SMS

Mr. Ankush Ukirde¹, Ashwini Biradar², Suraj Upade³, Nikhilesh Wani⁴

¹Mr. Ankush Ukirde, E&TC Department, SKN Sinhgad college, Maharashtra, India, ukirdeas.sknsits@sinhgad.edu

²Suraj Upade, E&TC Department, SKN Sinhgad college, Maharashtra, India, surajupade@gmail.com

³Nikhilesh Wani, E&TC Department, SKN Sinhgad college, Maharashtra, India, nikhileshwani@gmail.com

⁴Ashwini Biradar, E&TC Department, SKN Sinhgad college, Maharashtra, India, ashwinbiradara@gmail.com

Abstract

In every system, it is automated in order to face new challenges in the present day situation. Everyone wants to be as much secure as possible. As considering security which is one the prime concern in our daily life. Hence every field prefers automated security systems. Every month we can see a person standing in front of our house from Electricity board whose duty is to read the energy meter handover the bills to the owner of that house. This is nothing but meter reading. According to that reading we have to pay the bills. The main drawback of this system is that person has to go area by area and he has to read the meter of every house and handover the bills. The electricity board has to give privileges for these people to do their duty monthly. The thing is, Government will not appoint any particular person for this duty. The people working in this board will go on a particular day and do their duty leaving all their pending works. Due to this, their work will be delayed and this is great loss for government. To overcome this drawback we have come up with an idea and this idea will help the government and it will save the time of the employees working in these boards. Another advantage of the prepaid system is that the human errors made reading meter and processing bills can be reduced to a large extent. We can also avoid the electricity thefting.

1. INTRODUCTION:

In this paper, the idea of pre-paid energy meter using ARM controller have been introduced. In this method 8051 have been replaced by ARM controller because, it is energy efficient i.e. it consume less power, it is fastest among all the microcontroller families, it has inbuilt ADC and have advanced RISC architecture. In this paper, energy meter have not been replaced which is already installed at our house., but a small modification on the already installed meters can change the existing meters into prepaid meters, so this meters are very cheaper.

The amount left for usage will be continuously displayed on the LCD and if the amount decreases then by the use of GSM modem one can recharge the energy meter with the help of mobile. Also this paper is to remote monitoring and control of the domestic energy meter. This system enables the electricity department to read the meter readings regularly without the person

visiting each house. This can be achieve by the use of microcontroller unit that continuously below certain minimum value then it can be indicated with the help of buzzer. The purpose of amount left for usage will be continuously displayed on the LCD and if the amount decreases then by the use of GSM modem one can recharge the energy meter with the help of mobile.

Also this paper is to remote monitoring and control of the domestic energy meter. This system enables the electricity department to read the meter readings regularly without the person visiting each house. This can be achieved by the use of microcontroller unit that continuously below certain minimum value then it can be indicated with the help of buzzer. The purpose is monitors and records the energy meter readings in its permanent memory location. This system also makes use of GSM modem for remote monitoring and control of energy meter.

The microcontroller based system continuously records the reading and the live meter reading can be

send to the electricity department on request. This system also can be used to disconnect the power supply to house in case of non-payment of electricity bills. A dedicated GSM modem with SIM card is required for each energy meter.

1.1 PROJECT ANALYSIS:

In this paper we use ARM7 LPC2148 controller which is connected to GSM modem through MAX232 connector. GSM is used for sending and receiving message from MSEB office to controller and vice versa. The MSEB office sends a message to the ARM7 through GSM modem when MSEB want to count the reading. ARM7 takes the reading from counter of energy meter. Then ARM7 calculate the bills as per readings and then send bill through GSM modem to the MSEB and owner of the meter and it also display on LCD and Buzzer is on. If the user not paid the bill before a due date that time MSEB disconnect the power supply by sending a message to the GSM module to the ARM7 then ARM7 gives the instruction to the relay for disconnect the electricity. This meter is also used as prepaid energy meter like dish recharge and our phone recharges. That means firstly user has to pay the bill for electricity and then MSEB office give the electricity to the particular user. When his limit is over of electricity MSEB send a notification that user to recharge.

A GSM modem is specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone. When a GSM modem is connected to a computer, this allowed the computer to use the GSM modem to communicate over the mobile network. While these GSM modems are most frequently used to provide mobile internet connectivity, many of them can also be used for sending and receiving SMS and MMS messages.



Fig-1: GSM modem

1.3 ARM 7:

LPC2148 is the widely used IC from Arm 7 family. It manufactured by Philips and it is pre-loaded with many inbuilt peripherals making it more efficient and a reliable option for the beginners as well as high end application developer. The ARM 7 LPC2148 primer board is specifically designed to help student to master the required skills in the area of embedded systems. The kit is designed in such way that all the possible feature of the microcontroller will be easily used by the student. The kit supports in system programming which is done through serial port.

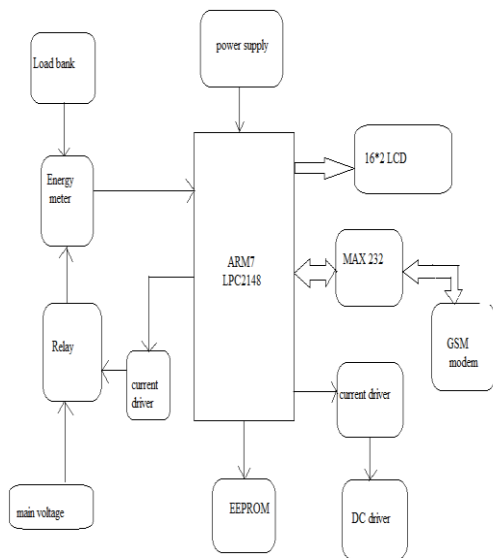


Fig-1: Block Diagram

1.2 GSM MODEM:



Fig-2: ARM 7

LPC2148 works on 3.3V power supply. LM117 can be used for generating 3.3V supply. However, basic peripherals like LCD, ULN2003 etc. works on 5V. So AC mains supply is converted into 5V. After that LM117 is used to convert 5V into 3.3V.

1.4 RELAY:

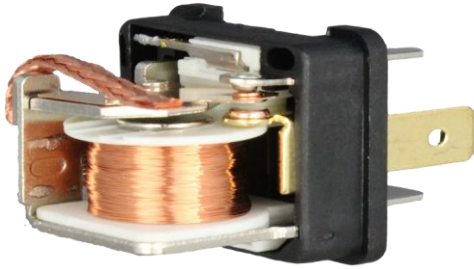
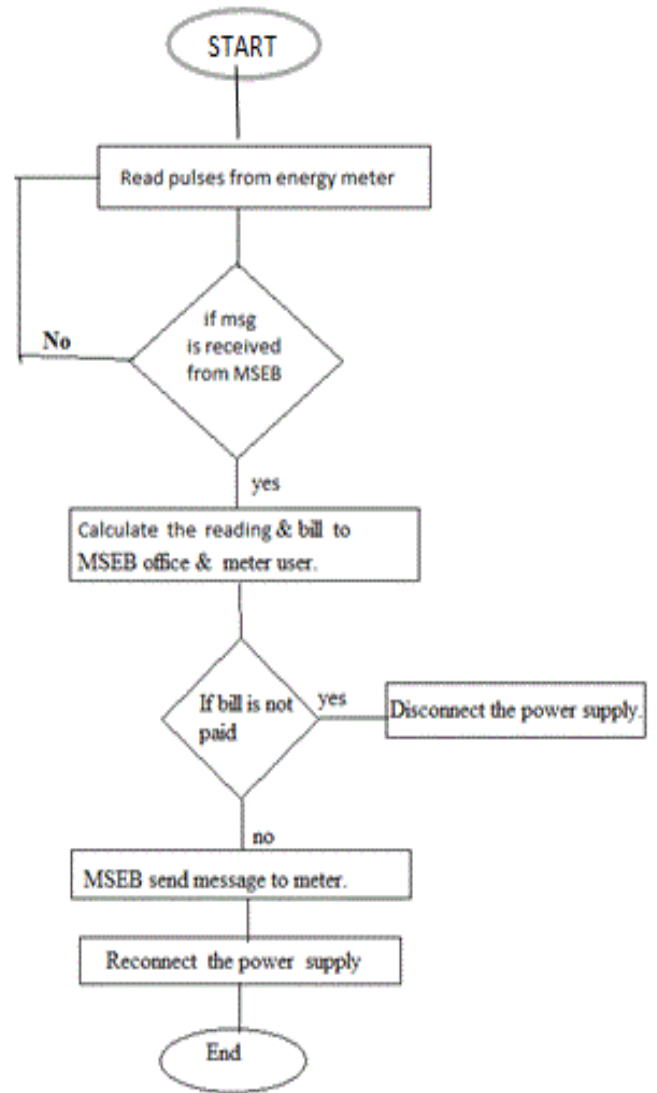


Fig3: relay

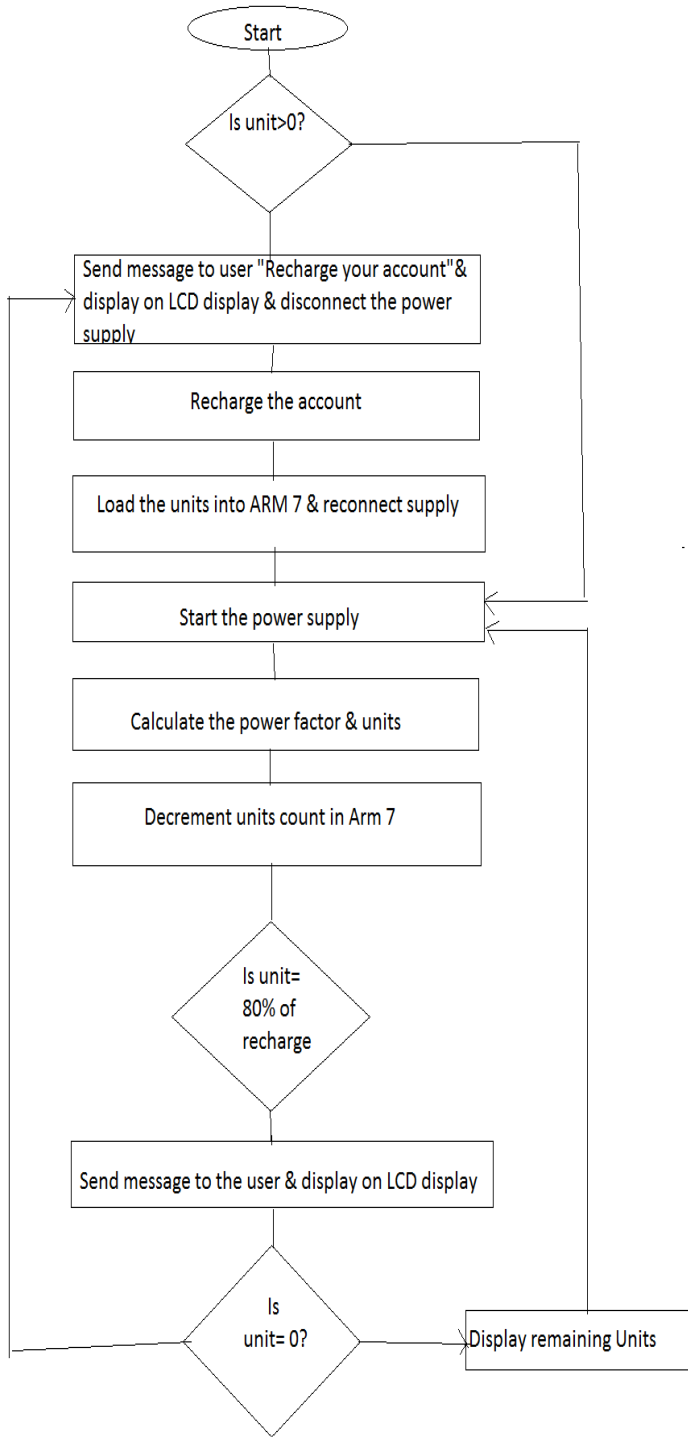
Relay is auto switching device. Relays are components which allow a low power circuit to switch a relatively high current ON and OFF, or to control signals that must be electrically isolated from the controlling circuit itself. To make a relay operate, we have to pass a suitable pull-in and holding current through its energizing coil. And generally relay coils are designed to operate from a particular supply voltage, often 12V, in case of many small relays. A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state relays. Relays are used where it is necessary to control a circuit by a low-power signal, or where several circuits must be controlled. Relays with calibrated operating characteristics and sometimes multiple operating coils are used to protect electrical circuits from overload or faults by one signal.

2. FLOWCHART OF THE SYSTEM

2.1 Pre-paid Energy Meter



2.2 Post-paid Energy Meter



Advantage:

- Providing maximum billing automation.
- Low maintenance.
- Revenue collection efficiency.
- Accurate meter reading. No more estimate
- Improved billing
- Zero man made mistake.

Application:

- Electricity Department.
- Organization staff quarters.

3. RESULT:

When user wants his current status it send the message as '#STATUS' to the GSM modem then, controller display the current status of the meter on the LCD and send the message to the user, which is shown in following fig.



Fig-4

When the thefting occurs then controller send the notification to the MSEB office to stop the power supply. After thefting avoiding then again MSEB start the power supply.

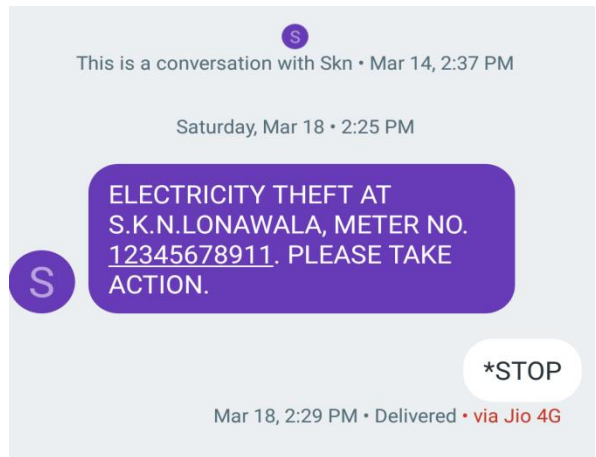


Fig-5

4. CONCLUSION:

Using this we can reduce the manual Efforts to take the readings from the energy meter which is cost effective solution and avoid thefting of electricity and Reduces man power. It is user friendly and we can enhance this project, in which an electricity department can send message to the consumer about the billing information.

5. ACKNOWLEDGEMENT:

I take this opportunity to record my profound gratitude and Indebtedness to Mr. Ankush Ukirde Assistant professor, Electronics and Telecommunication department for their inspiring guidance, valuable advices, constant encouragement and untiring supervision throughout my research work.

I express my deep sense of gratitude to Mrs. R. M. Thadi, Assistance professor and Head, Department of Electronics Engineering, for his continuous inspiration and encouragement. Finally, I would like to Acknowledge and express my special thanks to my family, friends and classmates for their patience, encouragement, supporting have made during the period of the work.

REFERENCES:

1. <http://electronicshub.org>
2. www.ijarcsse.com
3. Power meter store. Measure power at plug.web.30 Nov 2010.
4. H .G. Rodneytan, C. H. Lee, V. H. Mok, Automatic power meter reading system using GSM network, The 8 conference (IPEC2007). International Power Engineering
5. Subhashis Maitra, Embedded Energy Meter- A new concept to measure the energy consumed by a consumer and to pay the bills, power system Technology and IEEE power India Conference, 2008.