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Arm Based Automatic Electricity Meter Reading By Using Gsm System

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***ABSTRACT**-- The Electricity Meter Reading using GSM system consists of GSM Digital Power Meters installed in every consumer unit and a back-end database at the EB office which calculates the amount to be paid according to the number of units consumed. The GSM Digital Power Meter is a single phase digital KWH power meter with embedded GSM modem which utilizes the GSM network to send its power usage reading using Short Messaging Service (SMS) back to the energy provider wirelessly. The user interface also consists of LCD which displays the amount of power consumed. The advantages of the proposed system make the existing system incompetent. It is possible to connect to remote areas as it employs wireless technology. The new system is user friendly, easy to access and far more efficient than the existing system.*

***Keywords :** Automatic Meter Reading System (AMRS), Short Messaging Service (SMS)*

I. INTRODUCTION

Electricity is one of the vital requirement for sustainment of comforts of life. IT should be used very judiciously for its proper utilization. But in our country we have lot of localities where we have surplus supply for the electricity while many areas do not even 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 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 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 monitors and records the Energy Meter readings in its permanent (non-volatile) memory location. This system also makes use of a GSM modem for remote monitoring and control of Energy Meter.The Microcontroller based system continuously records the readings and the live meter reading can be sent to the Electricity department on request. This system also can be used to disconnect the power supply to the house in case of non-payment of electricity bills. A dedicated GSM modem with SIM card is required for each energy meter.The GSM AMR takes the advantage of available GSM infrastructure nationwide coverage and the Short Messaging System (SMS) cell broadcasting feature to request and retrieve individual houses and building power consumption reading back to the energy provider wirelessly.The Store and Forwarding feature of SMS allow reliable meter reading delivery when GSM signal is affected by the poor weather conditions. The stored message is archive in the mobile operator and can be later retrieve for billing purposes.

II. LITERATURE SURVEY

In order to overcome the problems of the existing traditional meter reading system, efforts are underway around the world to automate the meter reading systems and to provide comprehensive information to the consumer for efficient use of utilities. Researchers have proposed different implementation techniques for ARM. One is the SMS-based reconfigurable automatic meter reading system which uses the GSM network for sending the arm data. The other technique is secure and scalable automated reading system which uses the

existing local ISPs instead of requiring its own proprietary set communication infrastructure. The gateway node basically consists of an embedded microprocessor system, based on embedded Linux, and a modem. The remote real time automatic reading system employs distributed structure based on wireless sensor networks which consists of measure units, sensor nodes, data collectors, server and wireless communication network

III. HARDWARE IMPLEMENTATION

It discusses the design and working of the design with the help of block diagram in detail. It explains the features, timer programming, serial communication, interrupts of ARM7 microcontroller. It also explains the various modules used in this project.

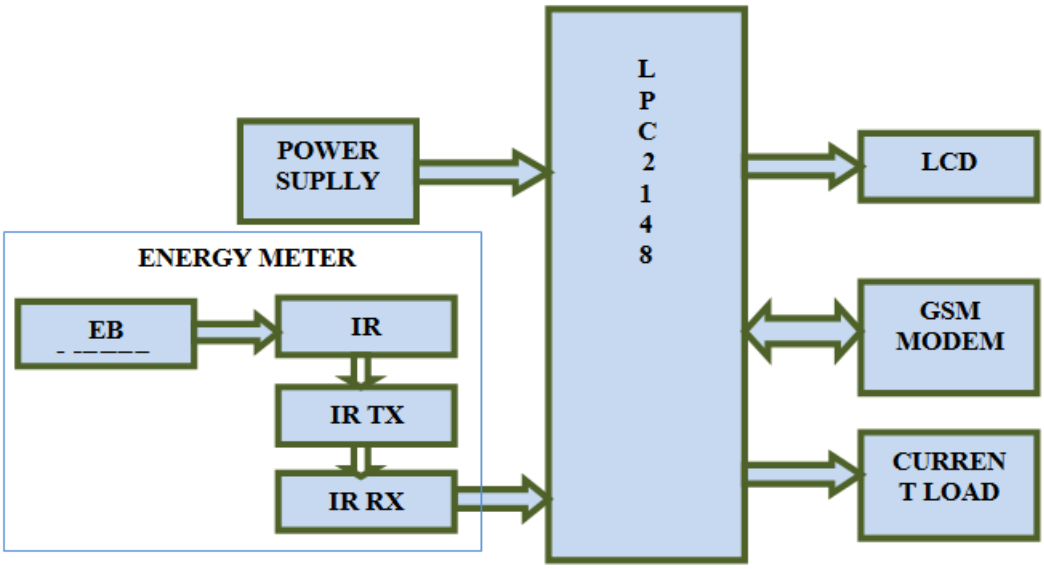


Figure 1: over all implementation

The complete overview of GSM AMR system is shown below and consists of GSM energy meter with installed in every individual unit. On the other hand SMS gateway, application terminal and database server are present at the energy provider side. This AMR system works in conjunction with the GSM network to retrieve the power meter reading using SMS. The GSM energy meter is an integration of an electric meter with a GSM modem. A SIM card with a unique special number is required for meter to receive and reply its energy meter readings to the energy provider using SMS. The SIM number is identical to the one used for mobile phones except it is not used for voice communications. The SIM card is also used to identify and retrieve owner or consumer details from the database server for billing purposes. An automatic power reading takes place automatically on request by the energy provider. SMS gateway performs cell broadcasting of request through SMS to all meters to request for meter reading. The meter will immediately respond in the form of meter readings upon receiving the request from the energy provider.

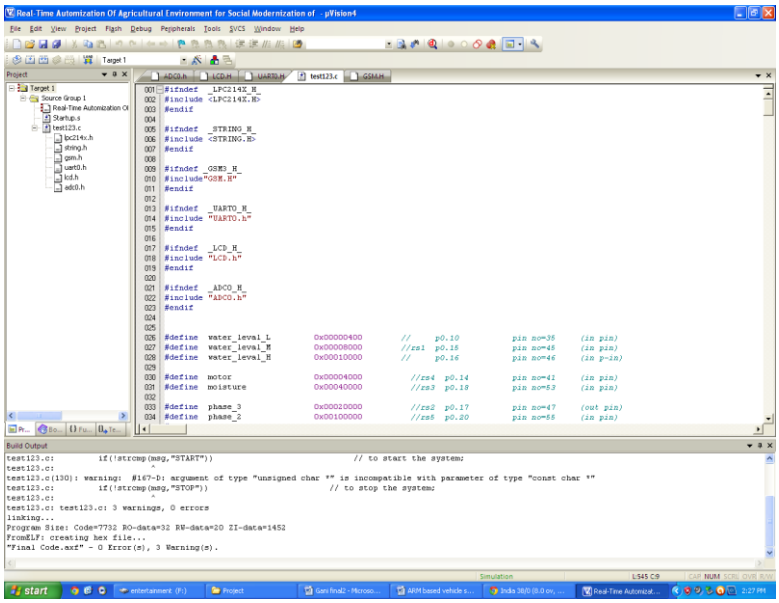
IV. SOFTWARE IMPLEMENTATION

Firmware implementation deals in programming the microcontroller so that it can control the operation of the IC's used in the implementation. In the present work, we have used the Orcad design software for PCB circuit design, the Keil µv4 software development tool to write and compile the source code, which has been written in the C language. The Flash magic programmer has been used to write this compile code into the microcontroller.

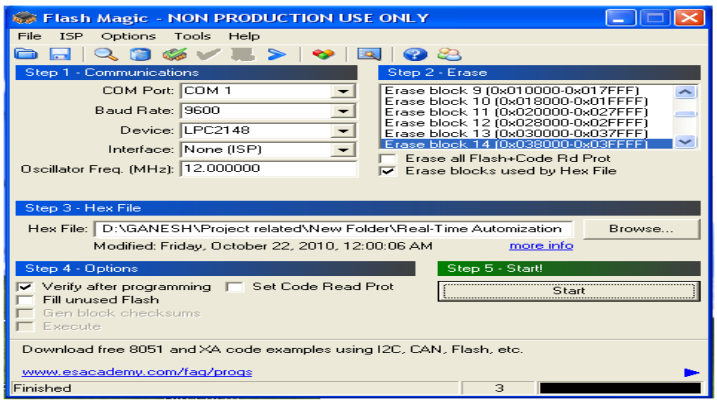
Software Tools Required

- Orcad
- Keil µVision4
- Flash Magic

Orcad is used for drawing the schematic diagram, it is mentioned above. Keilµv4, Flash magic are the two software tools used to program microcontroller. The working of each software tool is explained below in detail.

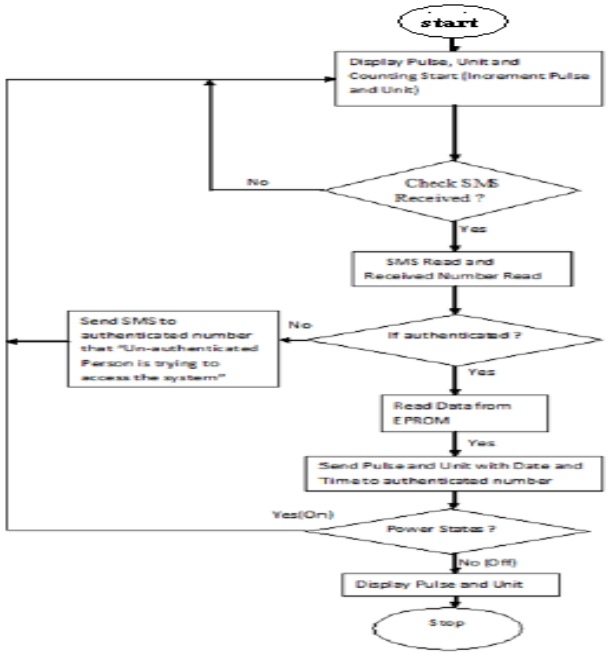


Compilation of source Code



Dump process finished

V. FLOW CHART



VI. EXPERIMENTAL RESULTS

The implementation of Realization of GSM BASED AUTOMATIC ENERGY METER READING SYSTEM WITH INSTANT BILLING is done successfully. The communication is properly done without any interference between different modules in the design. Design is done to meet all the specifications and requirements It can be concluded that the design implemented in the present work provide portability, flexibility and the data transmission is also done with low power consumption.

VII. CONCLUSION

Various electronic meters have been developed and are still being developed. However the use of GSM in this particular system provides numerous advantages over methods that have been previously used. Data transmission is charged at standard SMS rates, thus the charges are not based on the duration of data transmission and instant payment by the consumer from anywhere in the world is also possible.

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