

Review on Advance Prepayment Energy Meter using GSM Technology with Alert System

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Abstract— In this project, the whole idea about recharge card prepayment energy meter using G.S.M. technology AT mega 328 microcontroller introduced, The present day system of energy meter require a person to read & record energy consumption & submit bill M.S.E.B department and create billing error i.e. time, labor consuming human error , processing error etc.The aim to design their topic energy meter system that cans system that can efficiently control amount of electricity. Electricity user can buy specific amount of energy to use it only when they needed.

Also create less work i.e. no bill production, distribution, lower overhead, time based, load based. The system fully alert when recharge low, no balance, successful recharge and over load their alert system have alarm with sound based message based and LED induction. The system has one day loan facility. When you have no balance.

Keywords- Smart Energy meter, GSM, Arduino, Microcontroller ATmega 328.

I. INTRODUCTION

The current meter reading system require a person to read and record the energy consumption and submit the bill to electricity department(i.e. M.S.E.B) therefore various disadvantages to suffer from manual readings is the requirement of large so, we are established this project i.e. advance prepayment energy meter using GSM technology with alert system. This is the new concept in world of electricity measurement. This concept is not beneficial for electricity measurement but also has the capabilities to prevent theft and misuses of electricity. The concept of prepaid energy meter is similar to prepaid mobile system, you recharge and spend accordingly. When the purchased units are used up the consumer the meter disconnected the next recharge. The system will automatically notify the consumer to recharge before zero balance; unit recharge will be done by the service provider.

II . RELATED WORK

The prolonged discussion clearly defines the architecture of smart metering system. The architecture proposed in this study is a multifunctional approach to read the energy meters

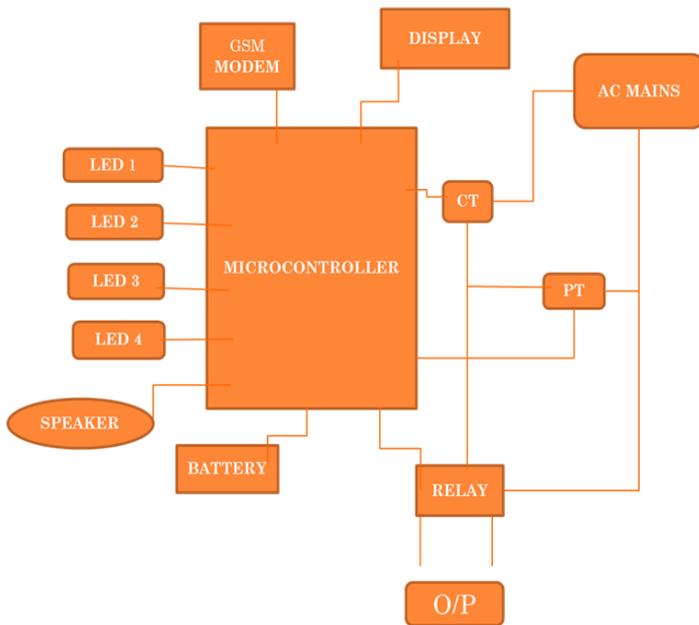
Located at the consumer sites. This report states that out of total energy generated only 55% is billed and only 41% is realized

[1].Each customer equipment provides the energy consumption

to the MCIC that keeps the details of individual users. The meter tampering is easily detected by this approach. But the implementation cost is high. This paper discusses simulations and models based on data from pre-paid meters in order to determine the feasibility and method of Operation for remote check meter. The resolution of illegal consumers detected depends on the deviation of the losses and the connected time of the check meter .This report gives only the simulation result. It would be the better method for minimum amount of users. The further improvements to detect the electricity theft lead to grouping of customers by means of Support Vector Machine (SVM) [3].This methodology insists data processing and data mining methods to detect the customers with abnormal consumption of electricity.It involves many complicated mathematical calculations that may provide erroneous results and can detect only 60% fraudulent customers. The previous methodologies are apt for the traditional power systems. Sudarshan K. Vallurup[4] proposed the Design and Assemble of Low Cost Prepaid Smart Card Energy meter.

III . HARDWARE DETAIL DESIGN

A) Block Diagram



other multisegment LEDs. A 16*2 LED means it can display 16 character per line and other are two each line.

IV. Why Prepayment System is used?

- Keep customers on supply.
- Recovered money owed.
- Lower overhead.
- No bill production.
- No need to chase payments.
- 80% mobile phones used in India are prepaid.
- Flexible payment solution.
- Pay to suit your income solution.
- Reduce waste- conserve energy.
- No billing errors.

V. Software Development for Energy Meter

Arduino - The Arduino Uno is a microcontroller board based on the ATmega328 . It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver Chip. Instead, it features the Atmega8U2 programmed as a USB-to-serial converter. "Uno" means one in Italian and is named to mark the upcoming release of Arduino 1.0. The Uno and version 1.0 will be the reference versions of Arduino, moving forward.

Technical Specification

Microcontroller	ATmega328
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limits)	6-20V
Digital I/O Pins	14 (of which 6 provide PWM output)
Analog Input Pins	6
DC Current per I/O Pin	40 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	32 KB of which 0.5 KB used by boot loader
SRAM	2 KB
EEPROM	1 KB
Clock Speed	16 MHz

B) Power supply- The microcontroller and associated circuitry requires 5V supply and relay 12V supply. A single 12V adapter connected to the mains produce DC 12V output usable for relay and this voltage former passed through regulator IC 7105 output get 5v DC. This output use and require microcontroller and other logic circuitry.

C) Microcontroller- The at mega 328 is very popular microcontroller chip produce by atmel. It is 8 bit microcontroller that has 32K of flash memory 1K of EPROM and 2K internal SRAM. The at mega 328 is one of the microcontroller chip that are use to popular acquired duemilanove board. At mega 328 has 28 pins. It is 14 digital I/O pins, of which 6 can we use as a PWM output and 6 analog input pins. Microcontroller is programmable device which contain microprocessor, memory, input output port etc. which can be compare microcomputer. Microcontroller is a single chip controller. It is a also low cost.

D) GSM modem- The SIM900 is complete quad-band GSM/GPRS solution in a SMT module which can be embedded in controller application the SIM900 delivered GSM/GPRS 850/900/1800/1900MHz. performance voice, sms, data and fax is small form factor low power consumption, with tiny configuration 24mm *24mm*3mm SIM900 can fit almost all the space requirements in yours M2M application, specialty for SIM and compact demand of design, requirement are in application such as smart phone , PDA phone and other mobile device

E) Display- LCD (liquid crystal display) screen is an electronic display module and find wide range of application. A 16*2 LCD display is a very basic module and commonly use in various device and circuit the module are prepare over 7 segment and

VI. RESULTS

Designed meter is able to send the usage value at a predefined

time and the status is displayed in LCD for the next 5 minutes after sending,

VII. CONCLUSION

Integrating features of all the hardware components used have been developed in it. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. Secondly, using highly advanced IC's with the help of growing technology, the project has been successfully implemented. Thus the paper has been successfully designed and tested.

VIII. REFERENCES

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