International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 07 Issue: 06 | June - 2023 SJIF Rating: 8.176 ISSN: 2582-3930

GMM BASED PREPARED ENERGY METER

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INTRODUCTION

The prepaid electricity meter concept is a driving energy to the enhancement of electricity meter. In the past year's many efforts had been made to the energy meter with improved billing method but till now the invented energy meters are not up to the mark. The number of energy consumers is increasing at an alarming rate. It has become typical to provide such a huge amount of energy. Maintenance of the power is an important task as the human operator goes to consumer's house and produces the bill as per the meter reading. The energy meter billing process is time-consuming if the user is not in the house while taking readings on energy consumption. It requires a lot of time and more labor to analyze energy consumption and generating the bill. If the consumer is unable to pay the bill then the foreman has to approach to the consumer's house. This consumes time and difficult to handle. The manual operator cannot find the Un-authorized connections or malpractices carried out by the consumer to reduce or stop the meter reading/power supply [5]. The energy meters which were invented in the past required smartcard for its proper functionality. The demerit of that method is that it needs internet and the computer interface. IN this project, we propose a method which uses the GSM Network which eliminates the need for internet. "A Prepaid Energy Meter" system consists of Energy Meter and the GSM network. GSM modem utilizes the GSM network to deliver equivalent unit for the recharged amount to the Arduino and alerts consumer about the low balance. In the energy provider side, this system is used to update the consumer account and the database. Prepaid electrical meter facilitates the user to use the energy if the balance is more than the threshold value. The system first gets recharged by a certain amount and allows to use only limited units of energy as per recharge and then cut off the supply when the balance goes below the specified particular value. The Prepaid electricity meter is widely used to provide a neoteric more modified electrically billing system where the users revitalize when they intend to use the facility. It also consists of GSM module that allow the operator to revitalize the meter with the help of an SMS message. This puts forward an innovative electricity billing and eliminates the need for manual electricity mete

ABSTRACT

The antiquated approach for depositing of bills for consuming of electricity results in undesirable faults and wastage of time. So this project represents the prepaid electricity meter using GSM Module to facilitate power utility and minimize the labor work. Prepaid electricity meter can be used for monitoring of undeveloped and control household energy meter. This technique gives the data about their charge amount of the consumer and stops the energy supply when the amount of balance goes below than the threshold value. The data gets delivered and received by concerned energy Provider Company by the GSM network. The body which gives the supply receives the reading within few seconds without visiting consumer. Prepaid electricity meter reduces the number of regular visits. Prepaid electricity meter not only decreases labor cost but also increase meter reading efficiency and save a huge amount of

time. In traditional method, faults are inevitable at every stage of depositing bill. Some faults are human errors at the time of noting the meter reading and while processing the paid bill. The research project elaborates and describes the utility of prepaid electricity meter which is advantageous for the consumer to manage energy usage, to minimize faults and bill processing.

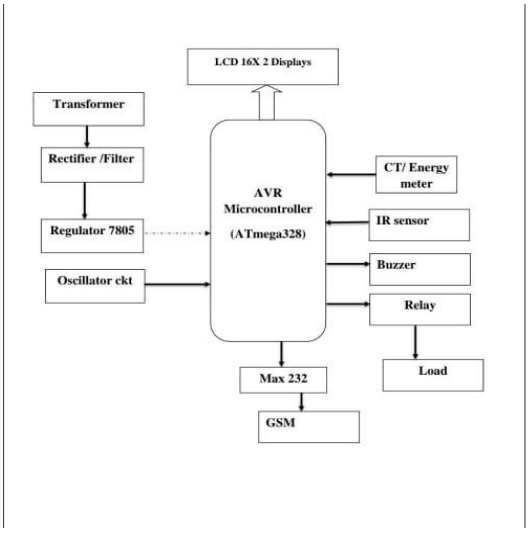
LITERATURE SURVEY

Automatic Power Meter Reading and Distribution Control Using GSM Networks, mainly focused on measurement of power from the consumer side that has been consumed by them. It is an integration of single phase class T, IEC61036 Standard Compliance Digital KWh Power Meter, Power to Communication (P2C) interface board and a GSM modem which utilize the GSM network to send the power usage reading back to energy provider wirelessly. The system mainly focuses on taking to an account of power consumed by the user .The digital power meter is used to measure the power consumption drawn from the energy provider substation to the consumer in KWh unit. A single phase digital Watt Hour Meter ATEC12and ATEC was chosen for GSM Power meter implement the system consists of optocoupler instead of Electromagnetic Relay which may require a step down transformer to transfer the amount of power consume and will also, result in complexity in circuit. The Power to Communication (P2C) is used to interface the impulse and synchronisation count from the power meter optocoupler circuit and to store the power meter reading into the internal non EEPROM memory at single impulse count interval. In the case of power failure the last meter reading will be stored in EEPROM.During the time of power restoration the microcontroller circuitry used here retrieves back last meter reading and to continuous synchronous with the digital power meter. At the time of normal operation the Power to Communication interface board used to retrieve the last meter reading from the EEPROM memory. Here the GSM Power Meter and SMS Gateway uses normal SIM card phone number. The billing notification to customer send by SMS, E-mail and hardcopy printing for postal. The complete demonstration of GPMDC from meter reading, notification, payment, distribution control of power cut-off and power restoration are being done.

OBJECTIVE

The main objective and aim of this intended project is to implement and construct a digital power or energy meter for domestic appliances. This energy meter will measure the electrical energy digitally, and send messages to individual user so that user can easily identify how much energy they used at one time.

BLOCKDIAGRAM



SOFTWARE AND HARDWARE REQUIREMENTS

SOFTWARE REQUIREMENTS:

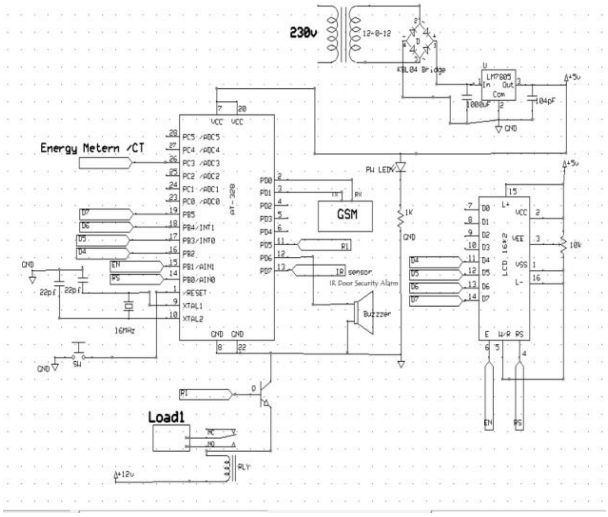
1) Arduino IDE (Programming)

2) Express PCB (Circuit &layout design)

HARDWARE REQUIREMENTS:

- *MICROCONTROLLER- AT mega 328*
- *LCD 16*2*
- *CT sensor*
- *Regulator*
- *Bridge*
- *Crystal*
- *IR sensor*
- *Transformer 12v step down*
- *Gsm Module*
- *BUZZER*

CIRCUIT DIAGRAM



ALGORITHM*S*

1) *Initiate all Ports.*
2) *Set threshold.*
3) *Get sensed data from CT.*
4) *Check balance.*
5) *Display reading on LCD.*
6) *Repeat 4.*
7) *Stop.*

ADVANTAGES

- *By using this interfacing of prepaid energy meter with GSM system we can manage our loads through mobile phone, by checking the load status.*
- *By using this system we can easily reduce the billing of our homes.*
- *By using this system we can reduce the energy losses.*
- *By using this system we can switch on or off the home loads through mobile phone.*
- *By using this system we can save the energy from theft*

FUTURE SCOPE

The concept of "Prepaid electricity meter" gives the smooth and better flowofcapital processing and administrationofenergy utilities. It can reduce the hurdles which are associated with users living in the areas in which the access of billing and electricity is a problem.Itcan reducealargeamount of time and manpower for taking and noting down readings.Every consumer using the "Prepaid electricity meter"can recharge toany amount such as Rs 15,Rs25,Rs30.As itrecharges the account of user all over the Asiaso it also reduce the cost of transportation .Adding a mini printer to the "prepaid electricity meter" produces the printed bill which the user can keep for the record. If a software is added to the "Prepaid electricity meter" by which a balance can be seen on request thena consumer's power cut can be prevented.

CONCLUSION

This design helps us to measure active power/energy, potential, and current flowing in a single-phase environment. The heart of the meter is an processor. All the readings and measurements are taken in the digital domain, so we use pulses, and measurement results are displayed in LCD. Then the data calculated is sent as SMS via GSM module. Energy meters are also sometimes mention to as power meters and vice versa.

REFERENCES

[1] Jubi.K, MareenaJohn, "PrepaidEnergy Meter with GSM Technology", AIJRSTEM, pp. 195-98, June-August, 2013.

[2]"SIM300 Hardware Interface Specification", 2006-04-05,SIM300_HD_V2.02

[3]Dr.Boyina.S.Rao, B. Gnanasekaranathan, M. Raguram, S. Pravinkumar,P. Kamalesh, "Domestic Prepaid Energy Distribution System for saving of Power Consumption",IJAET/Vol.III/ Issue II/April-June, 2012/26-29.

[4]Bhavna Patel, ShrikantMhaskar, "Voucher Based Prepaid Electricity Supplier With Auto Cut Off", IJIIT|Volume-II|Issue-I|2013-2014 July |Project-03.

[5]Dr. K. Sheelasobanarani1, S. Dinesh Raja2, B. Dhanaraj3, K. Manickam4, K. KarthickRaja5. "A Prepaid Energy meter for efficient Power Management", International Journal of Emerging Technology and Advanced Engineering,Volume 4, Issue 3, March 2014

[6]Bharat Indorey, M.Lokhande, "ZigBee Based Advanced Energy Prepaid Meter",International Journal of Innovations in Engineering and Technology (IJIET),Volume 3 Issue3 February 2014