

# Prepaid Energy Meter with GSM Module and Theft Detection

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**Abstract:** The GSM innovation is utilized with the goal that the shopper would get messages about the utilization of energy (in watts) and in the event that it achieves the base sum, it would consequently caution the purchaser to energize. This innovation holds useful for all power dispersion organizations, private groups, IT parks and self-containing lodging ventures. The execution of this paper will help in better vitality administration, protection of vitality and furthermore in getting rid of the superfluous problems over wrong charging. The computerized charging framework will monitor the constant utilization and will leave little extension for contradiction on utilization and billing. A plan of power charging framework called "prepaid vitality meter with duty pointer" can encourage in enhanced trade stream administration out vitality utilities and can diminishes issue related with charging customer living in detached territory and lessens sending of labor for taking meter readings.

**Keywords:** ULN2003, relay, LDR, energy meter, ARM 7, GSM.

## I. INTRODUCTION

As of late numerous endeavors have been made to plan the vitality meter with moment charging strategy however till now the composed vitality meters are not productive and don't give substitution. Presently a-days the quantities of Electricity purchasers are expanding in extraordinary degree. It is difficult to deal with and keep up the power because of developing prerequisites. Support of the power is a critical errand as the human administrator goes to customer's home and creates the bill according to the meter perusing. The charging procedure takes much time if the customers isn't in the house while taking readings on vitality utilization. It requires a considerable measure of time and more work to dissect vitality utilization and producing the bill. On the off chance that the purchaser did not pay the bill, the Foreman needs to go to their homes to separate the power supply. These expends time and hard to deal with. The manual administrator can't discover the Un-approved associations or misbehaviors did by the purchaser to decrease or stop the meter perusing/control supply. A portion of the vitality meters which had been executed are paid ahead of time yet it needs web to revive it. The significant hindrance of that technique is that it needs web and the PC interface. In this paper we propose a strategy which utilizes GSM Network which dispenses with the need of web.

## II. PROPOSED WORK

The prepaid vitality meter is propelled innovation with the goal that it is usable to spare shopper and in addition Electricity board timing additionally burglary identification can be utilized to distinguish robbery and wastage of power.

System consists of following main modules.

### A. *Arm 7*

The ARM7TDMI-S is a universally useful 32-bit microchip, which offers superior and low power utilization. The ARM engineering depends on Reduced Instruction Set Computer (RISC) standards, and the guideline set and related disentangle component are substantially more straightforward than those of smaller scale modified Complex Instruction Set Computers (CISC). This straightforwardness brings about a high guideline throughput and amazing ongoing interfere with reaction from a little and financially savvy processor center.

### B. *RFID Reader*

A radio recurrence distinguishing proof peruser (RFID peruser) is a gadget used to accumulate data from a RFID tag, which is utilized to track singular items. Radio waves are utilized to exchange information from the tag to a peruser. A radio recurrence recognizable proof peruser (RFID peruser) is a gadget used to accumulate data from a RFID tag, which is utilized to track singular articles.

### C. *Gsm Modem*

This GSM modem is a profoundly adaptable attachment and play quad band GSM modem for immediate and simple combination to RS232. Backings highlights like Voice, Data/Fax, SMS,GPRS and incorporated TCP/IP stack.

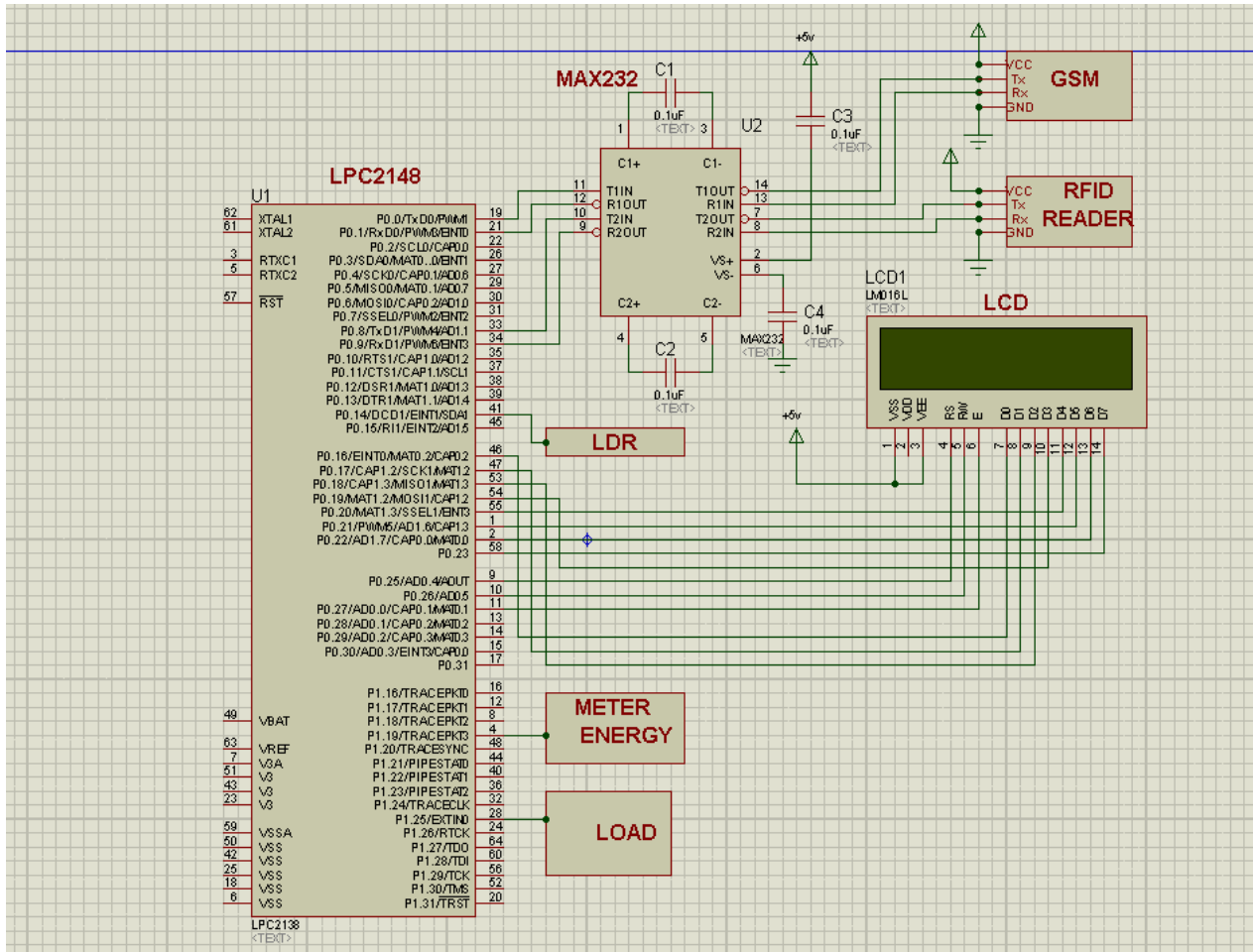


Figure.1 system architecture

The above Figure.1 shows the system architecture of the Prepaid Energy Meter With Gsm Module And Theft Detection.

### III. SOFTWARE REQUIREMENT

- Keil IDE
- Flash Magic
- Proteus
- Expre PCB

### IV. ALGORITHM

**STEP 1 :** Start.

**STEP 2:** RFID card is used as prepaid card and charged with some amount of money like Rs.100 and Rs.500 etc.

**STEP 3:** Actually power theft circuit is placed inside the Energy Meter box in which light from LED is blocked by obstacle due to which no light will fall on the LDR.

**STEP 4 :** When anybody is trying to open that Energy Meter box, light from the LED will falls on the LDR which causes LDR to be activated.

**STEP 5:** Power theft is Detected” will be displayed on the LCD.

**STEP 6 :** microcontroller disconnects power to the loads to avoid power theft. Through GSM, message will be send on registered mobile number.

## V. TECHNOLOGIES USED

Here we are utilizing ARM 7, GSM innovation, RFID peruser.

Arm 7 this is the core of the framework that control all task. At the info side RFID peruser is utilized. This module specifically interfaces with any microcontroller UART or through a RS232 converter to PC. It gives UART/Wiegand26 yield. This RFID Reader Module works with any 125 KHz RFID labels. In this task RFID card is utilized as prepaid card and accused of some measure of cash like Rs.100 and Rs.500 and so forth. LDR used to identify wheather its day or night. Which is put inside the Energy Meter enclose which light from LED is obstructed by snag because of which no light will fall on the LDR. When anyone is endeavoring to open that Energy Meter box, light from the LED will falls on the LDR which makes LDR be actuated. The relating signal is then exchange to microcontroller and " Power burglary is Detected" will be shown on the LCD. At that point microcontroller separates energy to the heaps to maintain a strategic distance from control robbery. Trough GSM, message will be send on enlisted portable number. GSM is another innovation utilized here SIM900 GSM Module – This implies the module bolsters correspondence in 900MHz band. We are from India and a large portion of the versatile system suppliers in this nation work in the 900Mhz band. On the off chance that you are from another nation, you need to check the portable system band in your general vicinity. A greater part of United States versatile systems work in 850Mhz band (the band is either 850Mhz or 1900Mhz). Canada works principally on 1900 Mhz band.

## VI. FUTURE WORK AND CONCLUSION

The paper is expected to exhibit a review of prepaid vitality meter, which can control the utilization of power on purchaser side to maintain a strategic distance from wastage of energy. Prepaid vitality meter is an idea to limit the Electricity robbery with a cost effective way. The clients are will undoubtedly pay abundances measure of cash, clients need to pay as indicated by their necessity. It can lessen issues related with charging purchasers living in disengaged territories and diminish sending of labor fortaking meter readings. Prepaid vitality meter is more solid and easy to understand. From all these we can presume that in the event that we execute this prepaid vitality meter then it can turn out to be more valuable. Vitality robbery discovery is extremely required, as populace and vitality prerequisite is expanding step by step with the goal that we can execute more propel innovation to distinguish vitality burglary on lattice lines moreover.

## REFERENCES

- [1] A.Vijayarajet al "Automated EB Billing system using Ad-Hoc wireless routing" published at International Journal of Engineering and Technology Vol.2 (5), 2010, 343-347
- [2] Muhammad Ali Mazidi; Janice GillispieMazidi; RolinD.Mckinlay; edition 2007, "The 8051 Microcontroller And Embedded System"
- [3] K. J. Ayala, "The 8051 Microcontroller".
- [4] B.P. Singh &RenuSingh;"Advanced Microprocessors and Microcontrollers".
- [5] IrfanQuaziet al "Prepaid Energy meter based on AVR Microcontroller" published at International Journal of Engineering Research and Applications (IJERA) ISSN: 2248-9622, Vol.1, Issue 4,pp.1879-1884.
- [6] Md. MejbaulHaquelet al" Microcontroller Based Single Phase Digital Prepaid Energy meter for Improved Metering and Billing system" Published at International Journal of Power Electronics and Drive System (IJPEDS) Vol.1, No.2, December 2011,pp.139-147 ISSN: 2088-8694.
- [7] I. H. Cavdar, "Performance analysis of FSK power line communications systems over the time-varying channels: Measurements and modeling," IEEE Trans. Power Delivery, vol. 19, pp. 111–117, Jan. 2004.
- [8] Liang Zhao, "Development of an energy monitoring system for large public buildings" Elsevier journal, Energy and Buildings 66 (2013) 41–48.
- [9] M. Trejo-Perea "A real time energy monitoring platform user-friendly for buildings" Elsevier journalProcedia Technology 7 (2013) 238 – 247
- [10] AmitSachan"GSM based SCADA monitoring and control system substation equipment" International Journal of Engineering Research & Technology (IJERT)Vol. 1 Issue 5, July - 2012 ISSN: 2278-0181.
- [11] AbhinandanJain"Smart and Intelligent GSM based Automatic Meter Reading System" International Journal of Engineering Research & Technology (IJERT)Vol. 1 Issue 3, May - 2012 ISSN: 2278-0181
- [12] Abhinandan Jain " Design and Development of GSM based Energy Meter" International Journal of Computer Applications (0975 – 888) Volume 47– No.12, June 2012. [10] S.H. Shete "GSM Enabled Embedded System for Energy Measurement & Billing" International Journal of Scientific & Engineering Research Volume 4, Issue 1, January-2013 1 ISSN 2229-5518.