

A New Prepaid Energy Meter Using AT89S52 Microcontroller

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ABSTRACT

A plan of Electricity charging system called *PREPAID ENERGY METER WITH TARIFF INDICATOR* can encourage in enhanced trade stream administration out energy utilities and can diminishes issue connected with charging buyer living in confined range and decreases organization of labor for taking meter readings. Each shopper can purchase a memory card (is only an EEPROM IC) with a secret word put away inside it utilizing a MC program. The memory card is accessible at different reaches (i.e. Rs 50, Rs 100, Rs 200 etc). In our venture we have given the name for memory card as savvy card. At the point when the purchaser embed a brilliant card into the card reader which is associated in prepaid energy meter with levy pointer unit. The card reader will read the put away data and erase the data from the EEPROM IC (smart card) utilizing the MC program. So that the brilliant card cannot be reused by others. Assume if a buyer purchases a card for Rs.50/- so on. He/she can embed this sum through the card reader so that prepaid vitality meter with duty pointer unit will be actuated. As indicated by the power utilization the sum will be lessened. At the point when the sum is over, the transfers will naturally close down the entire system. In this paper, we additionally have an arrangement to give a caution sound to buyer before the entire sum is decreased.

Keywords: card reader, EEPROM, IC, prepaid energy meter, smart card

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INTRODUCTION

Prepaid Energy Meter using Smart Cards is an efficient scheme of electricity billing. It is more advantageous to consumers and industrial power plant in terms of revenue and power sector reforms.^[1] Electricity is a main source of energy in the world and used in every civilized country for domestic, commercial and industrial purpose. Currently owing to raise in number of new housing, commercial and industrial developments in India, the number of users of electricity have been increased in the network distribution. The monthly power bill for the consumers is evaluated from post-paid meter reading based on the electricity consumption. But

the disadvantage of this system is that meter checkers are needed to visit every house to read the meter for billing purposes. This is a tedious and error prone process. Moreover, there is a chance for electricity consumers as well as meter checkers to do the corruption. In post-paid system,^[2] the monthly bill sent to the consumer by mail in the beginning of the month and all the consumers often need to gather in a long queue to pay the bills. This method is tedious and time consuming. In this paper, a prepaid energy meter (PPM) system^[3] has been designed. Each consumer has to install digitally designed prepaid energy meter along with smart card in their home, office, etc.

LITERATURE SURVEY

More than 40 nations have executed prepaid meters in their business sectors. In United Kingdom the system, has been being used for well more than 70 years with around 3.5 million purchasers. The prepaid program in South Africa was begun in 1992; from that point forward they have introduced more than 6 million meters. Other African provinces, for example, Sudan, Madagascar are taking after the South African achievement. The idea has discovered ground in Argentina and New Zealand with couple of a huge number of establishments. The Sabah Electricity SdnBhd (SESB), Malaysia, has granted an agreement to a nearby maker to supply 1080 prepaid meters. Nations, for example, Thailand, Bangladesh, Singapore, and Iran have been demonstrating expanded enthusiasm for embracing prepaid system. In India, the State of West Bengal has chosen to present the smart card worked prepaid energy meters in remote islands of Sunderbans. In Mumbai, prepaid power is given by the Brihanmumbai Electricity Supply and Transport (BEST) Undertaking. Tata Power arrangements to present prepaid power in Delhi. Tata Steel is probably going to introduce prepaid power meters at its representative township in Jamshedpur.

STUDY AND ANALYSIS

In the course of the most recent couple of years, Prepaid Energy Meter has been proposed as an imaginative arrangement went for encouraging reasonableness and decreasing the cost of utilities. This system, basically, requires the clients to pay for the power before its utilization. Along these lines, customers hold credit and afterward utilize the power until the credit is depleted. In the event that the accessible credit is depleted then the supply of power is cut off by a relay.

In any case, their utilization is still questionable. From one perspective, those that bolster the dissemination of prepaid meters guarantee that they advantage both buyers and utilities since they help clients to devour all the more proficiently and to enhance the administration of their financial plan, while permitting firms to lessen money related expenses, and additionally the expenses of operation and awful obligations. Then again, those that are against prepaid meters contend that their appropriation is costly for firms and dangerous for low wage buyers, as the weakness and unpredictability of their salary may constrain them to make little utilization of the administration, or eventually, realize automatic self-detachment.

Prepaid meters are normally introduced by power provider, in the event that it feels that the client cannot keep up installments on their energy charge. In any case, they can likewise be asked for by the client themselves - and are regularly observed as a decent technique for planning. As a rule they are utilized by lower wage family units, for example, individuals on welfare benefits, solitary guardians or those with no ledger.

From an innovative perspective, the prepayment framework comprises of three very much separated parts. The first is an administration meter introduced at the unit where vitality will be devoured, for example, a family unit abiding or a store. By and large, these meters are of the "two-group" sort, and comprise of a UI's unit and a present measuring set. The interface unit is a gadget introduced inside the building, which permits the client to "associate" with the meter. The metering unit, then again, is the keen segment that stores credit and utilization data, and makes up the component that either tidies or switches up power supply. The second part of the framework is the alleged credit

administering unit, which is the candy machine where shoppers can buy power credit. All in all, these business outlets are situated at the utility's business workplaces, and also in stores with long opening hours. The third segment is the supporting gadget that connections the different sales out let to the utility's administration system.

COMPONENTS REQUIRED

Microcontroller AT89S52

The AT89S52 is a very low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory.^[4] The device is manufactured by Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard 80C51 instruction set and pin out.^[5]

External EEPROM Memory (2/4/8/32/64 Kbytes)

These memory devices are used to store the data for off line process. The AT24C02A / 04A/ 08A/ 32/64 provides 2048/4096/8192/32,768/65,536 bits of serial electrically erasable and programmable read only memory (EEPROM) organized as 512/1024/4096/8192 words of 8 bits each.^[6] This device is customizing for utilize in many industrial and commercial applications where low power and low voltage operation are essential. The AT24C02A/04A/08A is available in space saving 8-pin PDIP.

LCD (Liquid Crystal Display)

LCDs can add a considerable measure to your application as far as giving a valuable interface to the client, investigating an application or simply giving it an "expert" look. The most widely recognized kind of LCD controller is the Hitachi 44780, which gives a moderately straightforward interface between a processor and a LCD. Unpracticed originators do regularly not

endeavor utilizing this interface and developers since it is hard to discover great documentation on the interface, introducing the interface can be an issue and the showcases themselves are costly. LCD has single line show, Two-line show, four line show. Each line has 16 characters.

WORKING

Each purchaser can buy a memory card (is only an EEPROM IC) with a secret word entered inside it utilizing a MC program. The memory card is accessible at different extents (i.e. Rs 50, Rs 100, Rs 200 etc.). In our venture we have given the name for memory card as smart card

At the point when the shopper embeds a smart card into the card reader which is associated in prepaid energy meter with tariff indicator kit. The card reader will read the put away data and erase the data from the EEPROM IC (smart card) utilizing the MC program. So that the smart card cannot be reused by others. As indicated by the power utilization the sum will be decreased. At the point when the sum is over, the transfers will naturally close down the entire system. Microcontroller AT89S52 goes about as the essential controller. The essential controller gathers data from vitality meter and from the brilliant card which is IC AT24C02 (EEPROM chip). Shrewd card gives data about the restriction of units. The vitality meter perusing is contrasted and the brilliant card data by the essential controller.

Contingent upon the outcome the Primary Controller will enact the bell if the credit is low and the Controller will trigger the Relay if the credit goes low. Once the Relay is set off, the power Supply will be cut. The supply will begin again just when the meter is revived with enough credit. Figure 1 shows the circuit diagram of

prepaid energy meter. Figure 2 shows the

actual designed model of prepaid meter.

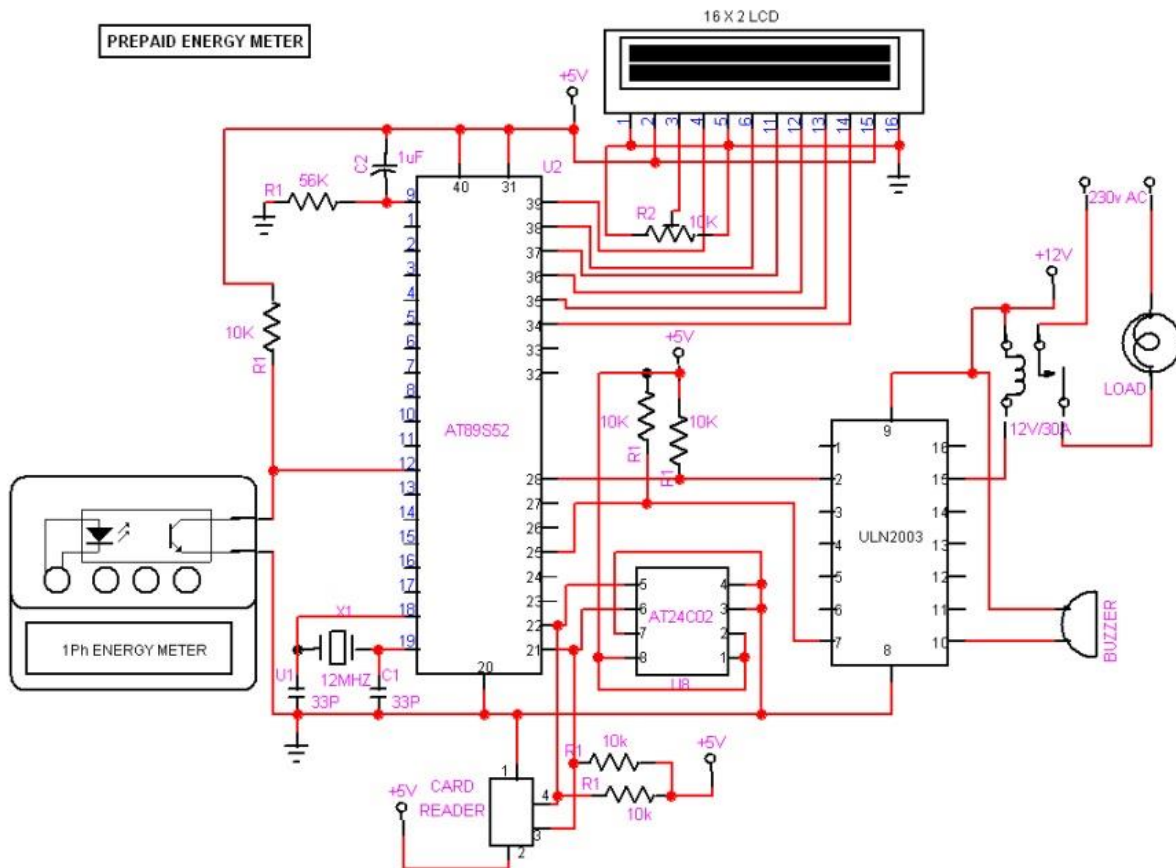


Fig. 1. Prepaid energy meter.



Fig. 2. Actual designed model of prepaid energy meter.

ADVANTAGES

- (1) By this we can pay before use of electricity
- (2) Recover money owed (debt)
- (3) Lower overheads problem
- (4) No bill production

- (5) No need to suffer for payments
- (6) No further actions such as disconnections

CONCLUSION

Prepayment system has been proposed as an imaginative answer for the issue of moderateness in utilities administrations. Notwithstanding being a mainstream system in European and African nations, the utilization of such systems stays questionable. Among the main arguments for its scattering are the focal points concerning lower expenses of overdue debts, running expenses and back charges for the administration supplier and the better assignment of assets it suggests for clients. The contentions against prepaid meters depend on the higher cost of the innovation and the likelihood of self-separation of low-wage users. The

monopolistic power dissemination showcase in Asia is bit by bit changing into a competitive commercial center. Separation in administration will be the key competitive factor to enhance piece of the overall industry in the deregulated control markets. Prepaid meters with their preferences over traditional ones are probably going to power merchants to differentiate and offer esteem added administrations to customers. Urging purchasers to opt for prepaid meters on a willful premise and offering levy or non-tax motivators to those consumers who prepay their energy charges, would help the utilities to actualize this system.

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