

Design and Implementation of Talking Energy Meter

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Abstract— In recent years, the demand for electricity has increased in households with the use of different appliances. This raises a concern to many developed and developing nations with the demand in immediate increase of electricity. People are unaware of energy consumed by various appliances. An electricity meter is a device that measures the amount of electric energy consumed by various electrical appliances. The main drawback of previously used traditional meters is that they do not provide information to the consumers, which accomplished with the help of Talking Energy Meter. As power consumption is increasing day by day there should be more focus on understanding consumption patterns. Traditional electromechanical energy meters are now replaced by electronic meters in domestic as well as commercial applications. This paper aims to design a circuit which helps the consumer in taking care of the electrical energy consumption. This system helps the users by alerting them about the billing status and unit consumption. The “Design and Implementation of Talking Energy Meter” using ARM Microcontroller is an exclusive system which is used to help the deaf and dumb people to announce their requirements using voice module aPR33A3.

Keywords: Talking Energy Meter

I. INTRODUCTION

In the early phase of household technology, delivery of electricity is completely depended on traditional energy meters. These meters play a key role in measuring the consumption of electrical energy in individual households. The major problem arises when habitants are unaware of their daily behavior. Monthly feedback given to the consumers is not sufficient as the consumers will not have knowledge on how much energy does the individual appliances consume. To overcome the problems of traditional electricity meters, electronic meter or static energy meter comes in picture.

The Microcontroller based “Talking Energy Meter” mainly aims at them middle class and the lower class family to bring their electricity bill down with the help of the power consumption alert system. It benefits the government in reducing the power consumption and succeeding can reduce the unusual power usage. Energy meters being deployed at homes are used for reading the power that is being consumed. Each consumer may fix a customized threshold value(unit). If the value reaches above the threshold, it will alert other consumer by voice module. This system may install at any place where the energy consumption should be regularly monitored and controlled. The consumers can fix their own threshold bud get values and can be easily customized based on their requirements. This is used to continuously monitor the meter reading and give monthly information about the number of units consumed along with its cost to the consumer. It also alerts the user if someone tries to steal the electricity from meter by using IR sensor and cut the line form the Electricity Board by mobile application.

II. BLOCK DIAGRAM

The purpose behind this system is to design a circuit which aware the consumer about their energy usage by giving the voice alert when consumed energy get exceeds the threshold limit which is set by the user according to their requirement. It also helps to monitor the electrical energy usage and protect the meter if someone tries to theft the electricity by cutting the line of meter with prior SMS to the electricity board.

The block diagram of Talking Energy Meter based on ARM controller. An AC source is given to the electric energy meter and from this, the load is connected to the meter via a relay switch. The LED of the energy meter is given to one of the digital pins of ARM controller. The microcontroller is connected to the voice module and the GSM module. The GSM module is used to send and receive messages via a mobile network to give daily alerts. The energy values once taken from the energy meter are digitized and processed with the help of a controller. The billing of the corresponding energy usage is determined and per unit rate of consumption is set at the time of programming. The threshold unit value is set for which the consumption level increase is notified to the user. And the user can change that threshold limit according to the requirement by using switch. A relay switch is connected with the microcontroller and the load which is used to cut the supply if someone tries to steal the electricity.

It is used as protection purpose. Voice Module is used to give the alert when consumption of units exceeds the set limit by user. As soon as the limit exceeds, the voice alert occur and SMS get send on registered mobile number.

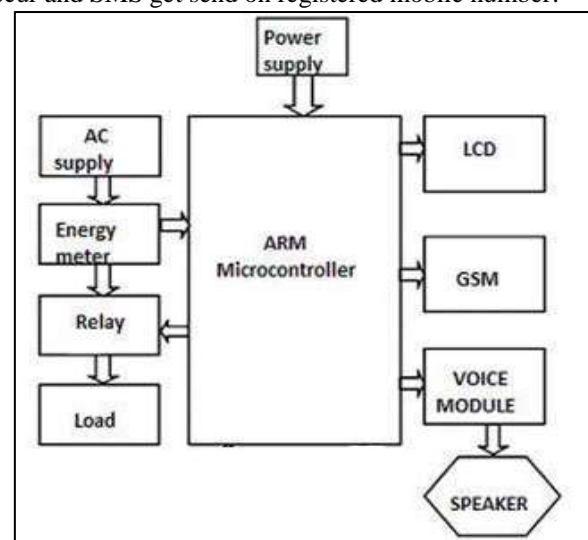


Fig. 1: Block Diagram

III. ADVANTAGES

- This energy meter alerts the user incase of over usage of electricity.

- Announces the power supply status. This is very useful for blind people too.
- Announces about the bill payments.
- This can be customized to any language. As we need to store the voice message before using this.
- Very helpful for illiterate people. They can know the bill and meter reading using announcement without taking help from literates.
- Electricity usage is monitored there is knowledge of electricity usage in project as in existing system only monthly bill comes so consumers not get aware about their daily usage.

IV. DISADVANTAGES

- Interfacing energy meter to microcontroller is very sensitive.
- Provision for energy stealing in previous meter, if energy gets theft by the other people, owner not gets information about the stealing of their energy meter. And owner get suffer from this.

V. APPLICATIONS

- This system can be practically implemented in real time where there is a limitation on energy utilization.
- We can use this energy meter in houses, industries for measuring energy.

VI. CONCUSSION

The Talking Energy Meter based on Microcontroller is used to alert the user whenever the usage of energy exceeds the threshold value which can be set by user by using dome switch; it announces a voice message which is already predefined in the voice module. This helps in saving electricity and also keeping the electricity bills under limits.

It not only benefits the consumer, but also benefits the government as it is capable of reducing the power consumption and subsequently can reduce the unusual power usage. By using this meter, customer can manage their energy consumption.

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