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Electricity Theft Tracking and Reading System Using Micro Controller and GSM

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***Abstract*- This paper deals with automatic meter reading and theft control system. In the proposed work, the total power consumption at the load end will be calculated by using a GSM system. The micro controller AT89S52 is used to detect any theft between energy meter and service line.**

***Keywords*- Theft tracking system, micro controller, GSM, electricity theft, overloading**

I. INTRODUCTION

Electricity is the modern man's most convenient and useful form of energy without which the present social infrastructure would not be feasible. The increase in per capita production is the reflection of the increase in the living standard of people [1]. Power theft is the biggest problem now days, which cause huge loss to electricity boards. And to cover these losses ultimately, price are increased. So if we can prevent these thefts, we can save lot of power. By keeping track of electricity used, you determine where the greatest opportunity for energy saving lies. Becoming aware of overall energy use involves keeping track of the reading on the electric meter. Different modes of theft are [2]:

1. Direct tapping from line.
2. By keeping a strong magnet in front of the disc in the energy meter.
3. Connecting the load directly to the power line bypassing the energy meter.

The theft in energy meter is the major drawback in our country because of theft more than thousand of money loss per state in our country [1]. This project deals about the theft control in energy meter by using embedded systems. The proposed project identifies the Power theft and indicates it to the Electricity board through Power line.

II. PROPOSED METHOD

Electricity Board suffers a total loss of 8 % in revenue due to power theft every year [3]. Our project identifies the Power theft and indicates it to the Electricity board through Power line. An embedded system is a combination of software, hardware and additional mechanical parts that together forms a component of a larger system, to perform a specific function. It's a technology, characterized by high reliability, restricted memory footprint and real time operation associated with a narrowly defined group of functions.

In this system, a micro controller is interfaced with an energy metering circuit, current sensing circuit, GSM communication link, & a contactor to make or break power line. At the substation end, a pc is connected with a GSM link to communicate with all energy meter & a buzzer.

The device consist of a micro controller which is interfaced with the input and output modules, the controller act as an intermediate medium between both

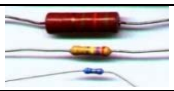
of them. So the controller can be termed as a control unit. We can control the electrical devices through wireless interface. By using the control buttons the data related to the electrical devices is given to the microcontroller. The microcontroller continuously records the reading and the live meter reading can be sent to the electricity department on request. And micro controller also reads energy pulses & current signals. If current is drawing & energy pulses are normal, then no power theft is being done &the output is connected. If current is drawing & energy pulses are not coming, then it indicates that power theft. So microcontroller trips the output using relay and at receiving end data is received and is given to the microcontroller. The micro controller automatically takes the responsibility of controlling the electrical devices [3]. The objectives of the project include real time power monitoring at house and sensing the power theft.

III. IMPLIMANTATION OF PROPOSED PROJECT

Before implimantation, meter read only normal readings and the system is not automated . Theft cannot be realised in real time. After implimantation of proposed method, the system will automatically reads the meter values and sends it to grid sub-station. Then authorities will check the system and consumers reading and generate a sms regading the billing. If no theft occur then system read normal reading and working normally. Incase if any theft occur then the buzzer will activate and alerts the autorities . The list of components used in is shown in table I. Table II shows the block diagram of the proposed work.

TABLE I

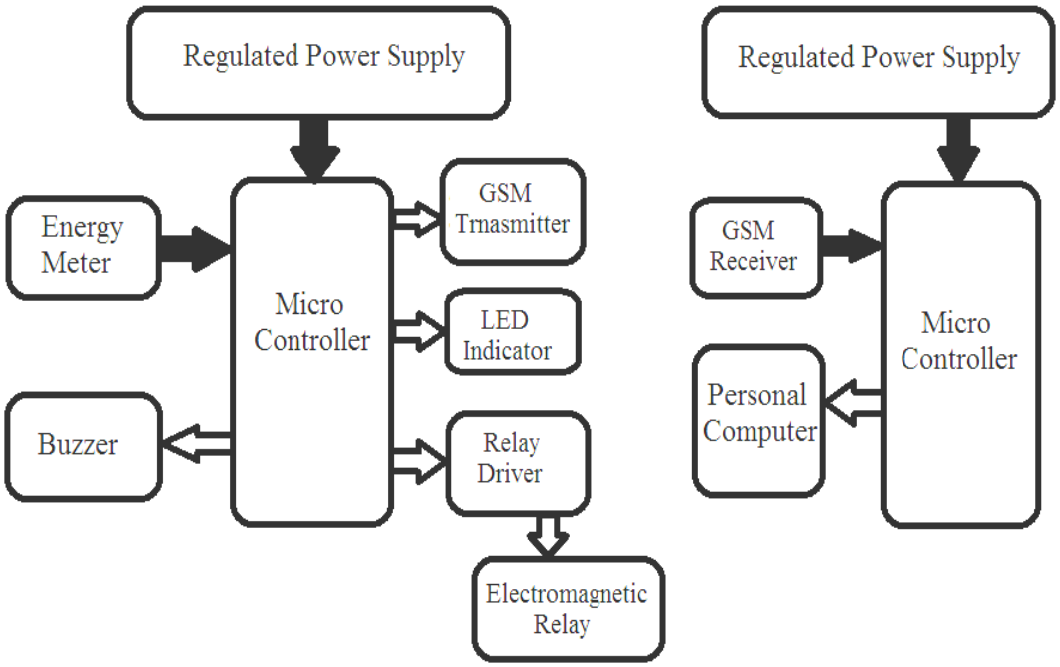
COMPONENT DETAILS

S.No.	Component	Rating	Application	Quantity	Image	References No.
1.	Energy Meter	3KWH	Read the input power	2		5
2.	GSM 900		For Communication Purpose	2		6
3.	Diode	1N4007	Single side current flow	4		7
4.	Micro Controller	AT89S52	Programming & Controlling	2		8
5.	Computer			1		
6.	Relay	6V	For break the connection	1		9
7.	Resistance	1K,10K,470K	Voltage drop	20		10

8.	Capacitor	22PF,10UF ,100UF 1000UF	Charge storage	15		11
9.	Voltage Regulator	7805,7812	Voltage Stabilization	2		12
10.	LED		Indication	10		13
11.	Variable Resistor	20 K	Control	2		14
12.	Crystal Oscillator	11.0529 MHz	Frequency Generate	1		15

TABLE II

BLOCK DIAGRAM OF COMPLETE PROJECT



IV. WORKING OF PROPSED SYSTEM

Our project deal with automatic reading and theft control. In this system, a micro controller is interfaced with an energy metering circuit, GSM communication link, & a contactor to make or break power line. At the substation end, a pc is connected with a GSM link to communicate with all energy meter & a buzzer. In this system different component used for different purpose. Resistance are use for voltage drop, capacitor is used for charge storage, crystal oscillator use forgenerate frequency 11.0523MHz, diode use for current flow in singal direction, voltage regulator is used for voltage stabilization, relay is used for break the circuit, microcontroller is for programming and control, GSM is used for communication purpose.Consists of a single PCB, which converts CF pulses of Electronic Energy Meters to Electrical pulses, accumulate them and generate a meter reading with help of Microprocessor.

- Microprocessor converts this data into Power Line Modulation.
- Existing Meter Reading, Meter Constant and Meter ID is stored in NV RAM of Micro controller.
- One unit is incremented when Retrofit senses the pulses equal to Meter constant.

The proposed model has 8052 microcontroller as central processing unit. The GSM modem is serially connected with the controller which is the major communication module between user and provider. The GSM uses it own network for the transfer of information. Special coding in embedded c is used for programming 8052 microcontroller using programmer hardware along with MP lab IDE software. The programming makes use of massaging features of GSM command. The power circuitry converts 230 volt AC to 12 volt DC with the use of step down transformer and bridge rectifier. The LCD is interfaced to microcontroller using parallel port connection. In this project the microcontroller based system continually records the readings and live meter.

Reading can be sent to the electricity department on request. This system also can be used to disconnect to power supply to the house in case of non-payment of electricity bills. A dedicated GSM modem with SIM card is required for each energy meter. The microcontroller pulls the SMS received by phone, decodes it, recognizes the mobile no. and then switches on the relay attached to its port to control the appliances. After successful operation, controller sends back the acknowledgment to the user's mobile through SMS. The coding emphasis reduces human labor & increases the efficiency in calculation of bills for used electricity. The users will have a universal number and they can recharge outlets of electricity board. The acknowledgment of recharged coupon details will come to notice of the consumer and also will get displayed in LCD module [4]. In case of any theft between the service line and the energy meter, the micro controller will ON the buzzer for necessary action.

So, this process bring a solution of creating awaerness on unnessesary wastage of power and will tend to reduce wastage of power. This module will reduced the burden of energy providing by estabilishing the connection easily and no theft of power will takes place. The LCD display will displays the used amount and balance amount the can be used.

Fig.1 Project Embeded System

Fig.2 Transmission Side of Project

V. CONCLUSION

In the proposed method GSM technology is used to transmit the meter reading to the consumers and with the required cost. Then the energy theft controlled by GSM sensor, magnetic reed switch and some other technique with high security

The project model reduces the manual manipulation work and theft .Use of GSM in our system provides then numerous advantages of wireless network systems. The government saves money by the control of theft in energy meter and also more beneficial for customer side and the government side. The metering IC ensures the accurate and reliable measurement of power consumed. Cost wise low when compared to other energy meter without automatic meter reading and theft control.

The system has the following features:

1. Simply constructed integrated & logical circuit
2. Easy to assemble
3. Useful in preventing electricity theft
4. Make easy bulky process of the detection of electricity theft.
5. Errors due to the resistance is minimum may be equal to zero, hence provide a better result based on light emitting from led of electricity meter & reference meter.

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