ELECTRICAL POWER THEFT CONTROL

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ABSTRACT

 Electrical power theft control system is used to detect an illegal tapping on the main lines spread from the distribution house. The necessary working area of this system is a distribution network of power supply system. This system is able to detect the appropriate location of illegal tapping. Actually this system helps to detect the illegal tapping is takes place on which transmission line. In this system wireless transmission and receiving techniques are used. But in this system it provides one extra technique known as wireless meter reading . This will protect distribution network from power theft done by tapping, meter tampering etc

Keyword : - *Tampering, illegal tapping,Transmission Line.*

1. INTRODUCTION

Electrical power theft detection system is used to detect an unauthorized tapping on distribution lines. Implementation area of this system is a distribution network of electrical power supply system. Existing system is not able to identify the exact location of tapping. This system actually finds out on which electrical line there is a tapping. This is a real time system. Wireless data transmission and receiving technique is used. This will provide an additional facility of wireless meter reading with the same technique and in same cost. This will protect distribution network from power theft done by tapping, meter tampering etc.

This system presents a detection of power theft in every houses and in industry for different methods of theft. Electrical energy is very important for everyday life and spine for the industry. Electricity is indiscipline to our daily life with increasing need of electricity the power theft is also increasing, power theft is a problem that continues to plague power sector across whole country the objective of this project is to design such a system which will try to reduce the illegal use of electricity and also reduce the chances of theft. This project will automatically collect the reading and also detect the theft. This model reduces manual manipulation work and try to achieves theft control. Electricity theft is a very common problem in country, were population is very high and the use of electricity are ultimately tremendous. In India, every year there is very increasing number of electricity thefts across domestic electricity connection as well as industrial electricity supply, which results in loss of electricity companies energy and because of which we are facing the frequent problems of load shading in urban as well as rural areas so as to overcome the need of electricity for whole state. Also the ways using which theft can be done are innumerable so we can never keep track of how a theft has occurred, and this issue is needed to be solved as early as possible.

Here we propose an electricity theft detection system to detect the theft which is a made by the most common way of doing the theft and that is bypassing the meter using the a piece of wire, people simply bypasses electricity meter which is counting the current unit by placing a wire before and after the meter reading unit. The proposed system will be hidden in such meter and as soon as an attempt is made for the theft, it will send SMS to control unit of electricity board. In this system current transformer are used, here one current transformer is placed in input side of the post line. Other current transformer are placed at the distribution points of the house lines. The output of CT values is given as input to PIC microcontroller convert analog inputs to digital. Then PIC compares the input current and the same of output current. If compared result has any negative values then this particular post is detected as theft point. This compared value is transmitted to electricity board, this value display in LCD display. The information will then be quickly processed by the microcontroller and a SMS will be send through the GSM technology.

2. OVERVIEW OF SYSTEM

Suppose there is tapping done by any unauthorized person on the line to connect his appliance as shown in figure1. Over a certain period there will be difference between meter reading (M1) and pole based reading. In this proposed system GSM technology used to transmit the meter reading to the customer and government with the required cost. This process will be happen when needed that means if SMS is received from authorized server mobile transmission between customer and government. Then the energy theft controlled by IR sensor, Bypass detection. Also cut the power supply automatically as per request of authorized server mobile.

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. When importance of electricity is on the increasing side, then how much should theft of this energy or illegal consumption of power from the transmission lines be averted? Power theft has become a great challenge to the electricity board.

The dailies report that Electricity board suffers a total loss of 8 % in revenue due to power theft every year, which has to be controlled. Our paper identifies the Power theft and indicates it to the Electricity board through GSM. The electricity is needed to be protected for efficient power delivery to the consumer because electricity is indispensable to domestic and industrial development activity. In many poor countries economic growth is hampered by inadequate and irregular supplies of electricity. Indian firms ranked electricity problems as the number one issue facing their businesses in the 2006 World Bank Enterprise Survey . Every year the electricity companies fare the line losses at an average 20- 30% according to power ministry WAPDA Companies loss more than RS.125 billion. The scarcity and unpredictable supply of electricity are in part results of widespread theft, as well as lack of adequate generating capacity. Given its high value, the relative ease with which it is diverted, and the difficulty of identifying individual offenders, theft of electrical power is easily accomplished as well as useful to enterprises and individuals. The hardware of the automatic meter reading and theft control system by using GSM module our project at designing such a system which will automatically collect the reading and also detect the theft. Current transformer is used to measure the total power consumption for house or industrial purpose.
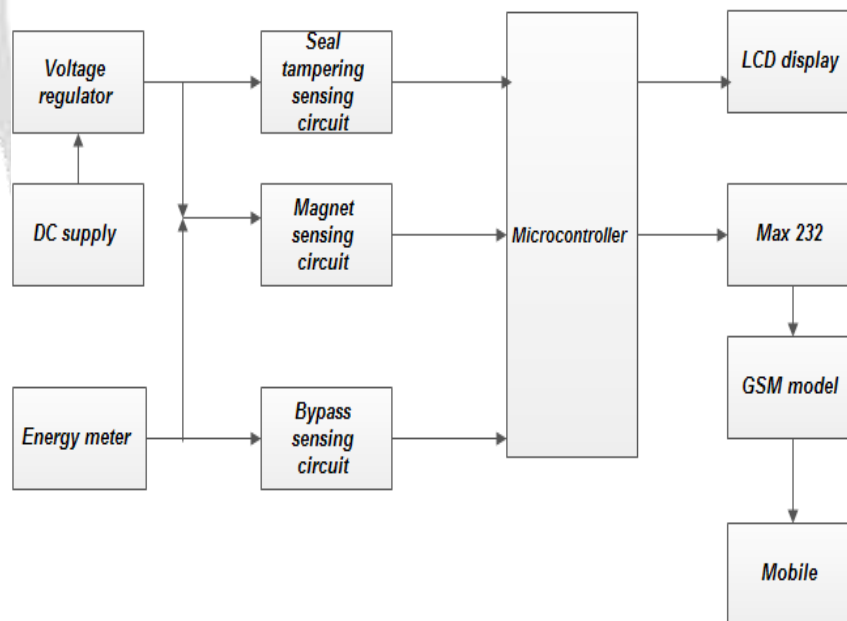

Fig -1: Block Diagram of power theft detection

This recorded reading is transmitted to the electricity board as per his demand for transmitting the reading of energy meter GSM module is used. The energy theft is control by IR sensor, IR is placed in the screw portion of energy meter seal. If the screw is removed from the meter message is send to the electricity board. The measuring of energy

meter and monitoring of IR sensor is done with a PIC microcontroller. Then bypass of meter is detected by using to CT. One is in energy meter another is placed on electricity poles.

3. COMPONENT DETAILS
3.1 Power Supply circuit
Initial stage of every electronic circuit is power supply system which provides required power to drive the whole system. The specification of power supply depends on the power requirement and this requirement is determined by its rating.

3.2 Microcontroller AT89S52
When the AT89S52 is executing code program memory, PSEN is activated twice each machine cycle, except that two PSEN activations are skipped during each access to external data memory. EA/VPP: External Access Enable. EA must be strapped to GND in order to enable the device to fetch code from external program memory locations starting at 0000H up to FFFFH. Note, however, that if lock bit 1 is programmed, EA will be internally latched on reset. EA should be strapped to VCC for internal program executions. This pin also receives the 12-volt programming enable voltage (VPP) during Flash programming. 5.2.10 XTAL1: Input to the inverting oscillator amplifier and input to the internal clock operating circuit. 5.2.11 XTAL2: Output from the inverting oscillator amplifier.
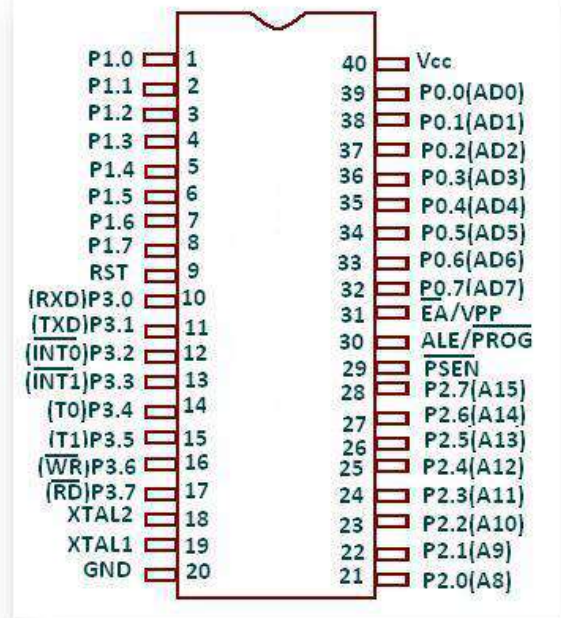

Fig -2: Pin Diagram Of AT89S52 microcontroller

3.3 GSM Module
GSM/GPRS module is used to establish communication between a computer and a GSM-GPRS system.Global System for Mobile communication (GSM) is an architecture used for mobile communication in most of the countries. Global Packet Radio Service (GPRS) is an extension of GSM that enables higher data transmission rate. GSM/GPRS module consists of a GSM/GPRS modem assembled together with power supply circuit and communication interfaces (like RS-232, USB, etc) for computer. The MODEM is the soul of such modules This GSM module play an important role in this system.
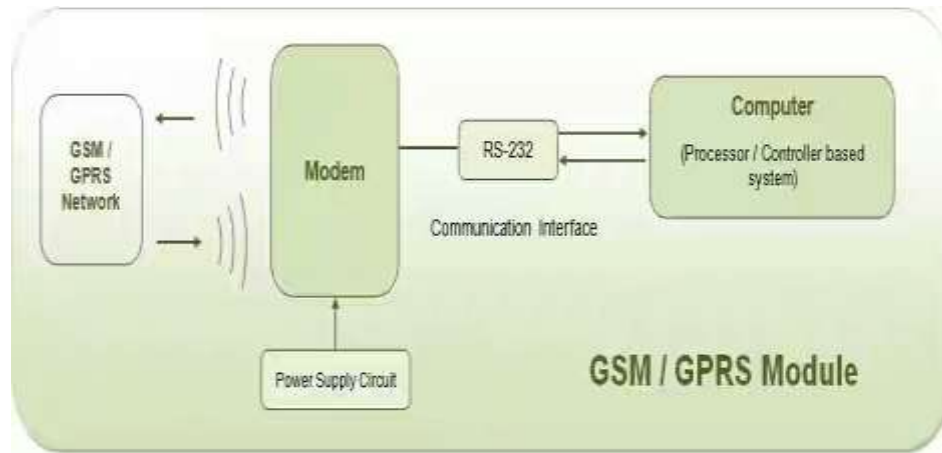
Fig -3:GSM Module

3.4 MAX 232 IC

The MAX232 IC is used to convert the TTL/CMOS logic levels to RS232 logic levels during serial communication of microcontrollers with PC. The controller operates at TTL logic level (0-5V) whereas the serial communication in PC works on RS232 standards (-25 to +25V).
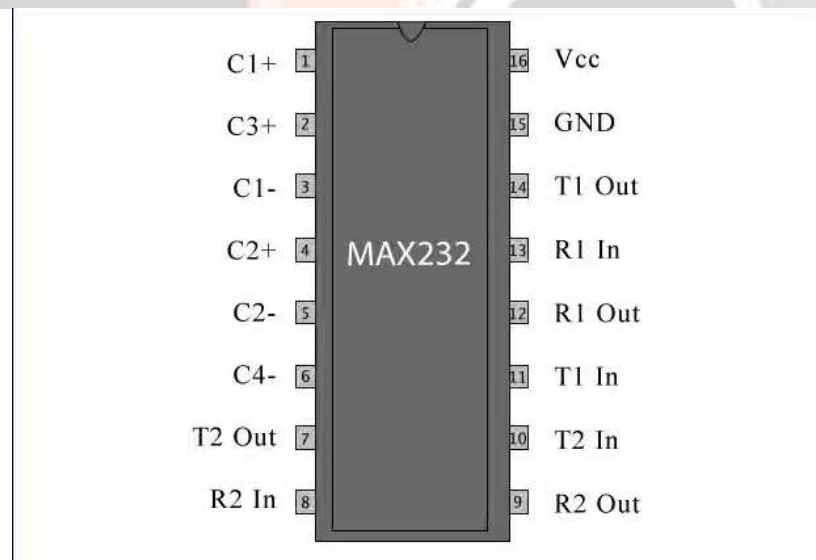

Fig -4: Pin Diagram of MAX 232

The MAX232 is an integrated circuit first created in 1987 by Maxim Integrated Products that converts signals from a TIA-232 (RS-232) serial port to signals suitable for use in TTL-compatible digital logic circuits. The MAX232 is a dual transmitter / dual receiver that typically is used to convert the RX, TX, CTS, RTS signals. The drivers provide TIA-232 voltage level outputs (about ±7.5 volts) from a single 5-volt supply by on-chip charge pumps and external capacitors. This makes it useful for implementing TIA-232 in devices that otherwise do not need any other voltages. The receivers reduce TIA-232 inputs, which may be as high as ±25 volts, to standard 5 volt TTL levels. These receivers have a typical threshold of 1.3 volts and a typical hysteresis of 0.5 volts which is as shown in fig.4.
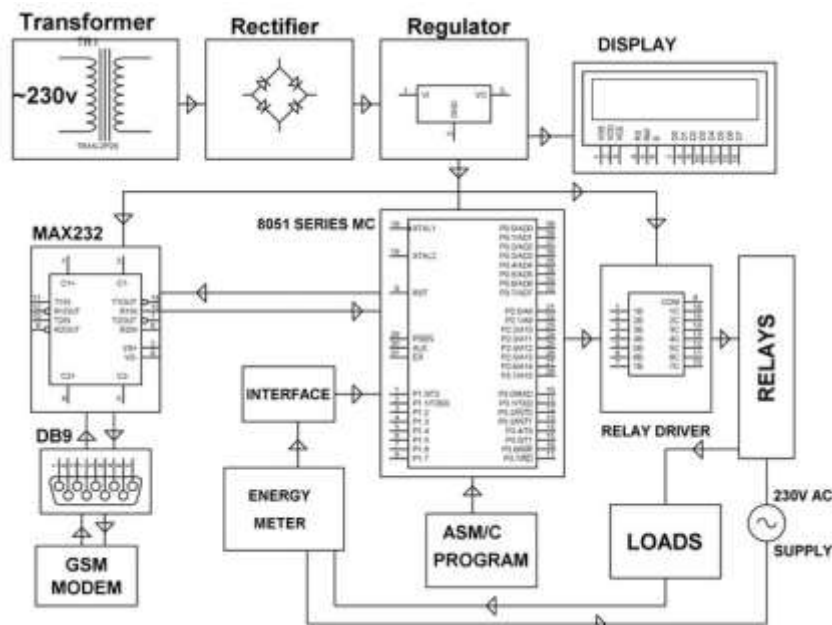
4 CIRCUIT DISCRIPTION

Fig -5:Circuit Diagram Of Power Theft Detector

The block diagram of s based electricity consumption meter is shown in the fig. 5 which consists of different blocks as mentioned above. To better understand the working of microcontroller based wireless energy meter, we must the working of each block of electronic energy meter. As mentioned above, there are different blocks in the wireless electricity consumption meter. The major blocks are power supply block, microcontroller block, GSM modem block, and relay-loads block. This is basic block in every electrical and electronics projects circuit, which is used for providing the required power to the microcontroller and other components in the circuit. Generally, this power supply block consists of step-down transformer, bridge rectifier, and IC 05 voltage regulator. Thus, the required 5V DC power supply is given to the microcontroller. The microcontroller block can be considered as the main block of the entire circuit, as it is programmed to control all the components to perform the desired operation. Here, in this project microcontroller of 8051 family is used and programmed using Keil software. The energy meter is interfaced with the microcontroller using an interfacing device or middle wire device namely Opto-isolator. Similarly, GMS modem is interfaced with a microcontroller using an interfacing device called as MAX232 and DB9 connector which is shown in fig. 5.

Relays are interfaced with microcontroller using relay driver. The loads are connected between the relays and energy meter, such that loads are given a 230V AC power supply for their operation. This 230V AC power supply is given to operate the loads until the relays are switched by the user by sending SMS from the registered mobile number to the GSM modem to turn off the loads. Primarily, we need to register the authorized person mobile number with the wireless electricity consumption meter. This registered mobile number can only have access or authority to regulate the loads and monitor the wireless energy meter system. The microcontroller is programmed to give control commands to the relay driver such that to switch on or off the relays. By using registered mobile number, we can send appropriate commands to the GSM modem as per requirement, which are further used to switch on or off the loads using relays through relay driver. Thus, same information regarding the status of the GSM modem communication with energy meter, the status of the load whether it is on or off, the energy consumed by the loads, SMS sent to the GSM modem, the mobile number registered with the GSM modem will be displayed on the LCD display connected in the circuit which is as shown in the fig.5.

5. CONCLUSION

In developing countries electricity theft is a common practice especially in remote areas, as they do not pay utility bills to a government company in case of electricity and gas as well. To solve these problem governments must think of an idea to provide help in terms of subsidy to manage this issue. And this project may help to identify the power theft in house and in industrial also. And this is the easy way to identify theft in house compare to other

technique like Power line communication and wireless. Because in power line communication there must be match with both impedances and frequency, and in wireless there is limit distance to send the signal to the controller. This system will reduce operations cost required for maintenance and troubleshooting as it eliminates the need of labor and operations team. It will give more and accurate results as in case of any difference between the powers calculated the authorities will be notified through SMS. It enables complaints regarding key performance indicators to be resolved instantly thus attracting more and more subscribers to the network operator.

6. ACKNOWLEDGEMENT

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