



Research Article

WIRE LESS POWER THEFT MONITORING USING GSM

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ABSTRACT

Developing countries faces widespread theft of power from government owned power utilities. So the aim of this project is to display the power theft area of the distribution transformer and raise an alarm. Here for the practical purpose transformers, source energy meter, household load, energy meter are used for measuring real loads along with wired link. The power theft area of the distribution transformer at substation is obtained by calculating the real consuming power by the energy meter and the main power at the distribution transformer. That means the real consumption of all users must be equals to the total power delivered by the transformer. The difference must be analyzed by the controller by calculating both powers. If the difference is within 2 to 3% variation (transmission losses are concerned) the system raises no error otherwise it will generates error with an alarm and sends message along with transformer location information to the authority through GSM modem and displays in the corresponding substation along with alarm.

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INTRODUCTION

Wireless Communication is the process of sending information from one point to another, the communication system which uses the present wide variety of electrical and electronics shows a significant impact on the modern society.

As the technology is growing day-by-day the impact on wireless technology also increasing.

The main motive to take up the project is to reduce human effort in controlling the power theft. The project is basically designed with MS-51 series 89C52 microcontroller and ADC0808 analog to digital converter. Here we are developing a control system by using microcontroller MCS 51 to which the assembling program is written to control the power theft. With the help of this project detection of theft current can be done easily. This can be considered as a better one because in this project we are using a LCD display and buzzer driver at the substation to acknowledge the staff at the substation and a GSM modem to send SMS to the corresponding authority.

Previously power theft was detected by making random checkups that is manual check up is done which consumes lot of manual work and the result is not accurate and it cause lot of loss to economy. So in order to avoid this a automatic detection of power theft is done with our instrument which makes the work more easy.

Paper is organized as introduction of the wireless power theft monitoring using GSM in Section I, Section II deals with the Existing systems, proposed system and its working is given in Section III, Section IV and V is having Results and Conclude with analysis using different parameters.

Existed System

In this existing system wireless communication system of energy meter used with Zigbee, relay control and GPRS. The cryptographic method is used to secure the communication channel and zigbee for the transmission of data in a serial process. Drawback of this system is to collect the readings, going in the particular range of area and manually cut power supply if needed.

Proposed System

In the proposed system GSM technology used to transmit the meter reading to the customer and government. 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. The block diagram consists of microcontroller AT89C52, analog to digital converter ADC 0808, LM555 Astable oscillator, buzzer driver, relay, LCD display and the GSM modem as shown in Fig1.

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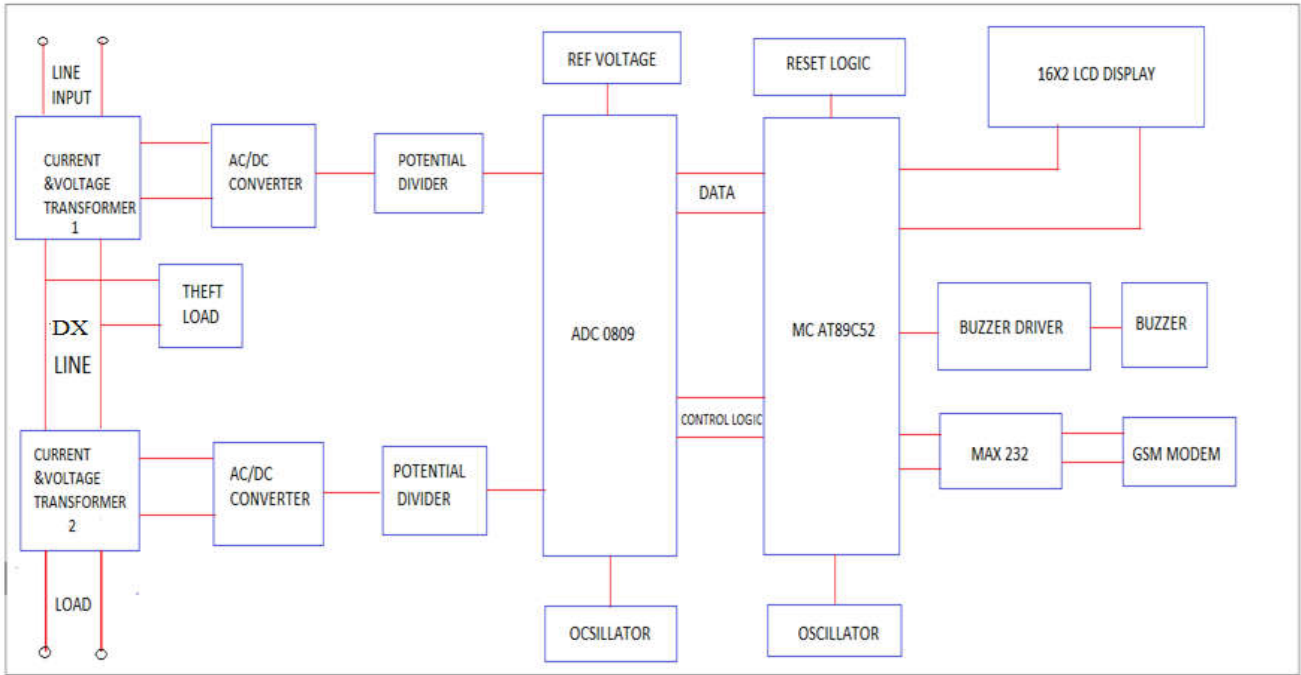


Fig. 1 Block diagram of Wireless power theft monitoring using GSM

GSM Technology

Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication. A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves.

Working of the Project

Operation

T/F & Voltage T/F

The Input AC voltage is converted into DC by using voltage transformer and full wave rectifier that is given to the channel 0 of ADC and the input AC current is converted into DC by using current transformer and bridge rectifier that is given to channel 1 of ADC. The DC voltages are responsible for input AC voltage and AC current. The product of V and I is calculated in the microcontroller program written in AT89C52. The DC voltages are calibrated to input AC parameters by using variable resistors at the output of the rectifiers. The calibrated voltages are given to ADC.

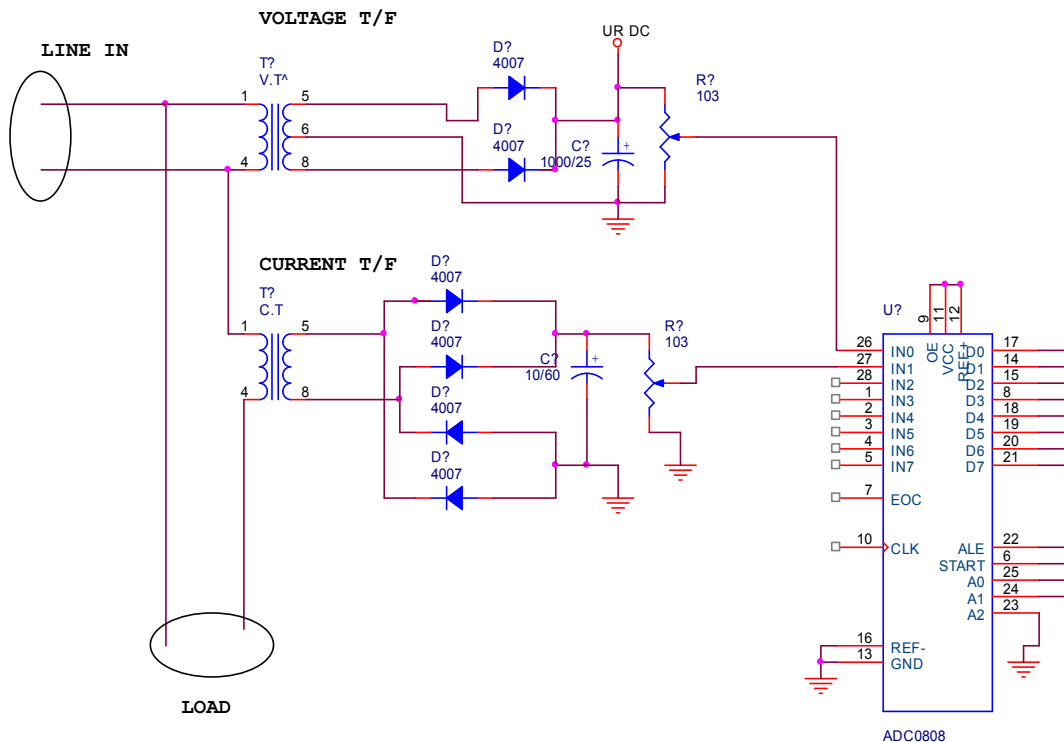


Fig 2 AC Power Measurement with Current

Software Used

1. Assembly language for 8052
2. 8052 Cross compiler

Software Dumping Procedure

1. The assembly language Instructions typed in dos editor or notepad with an extension of .ASM.
2. Compile the above .asm file with 8052 cross assembler.
3. The assembler converts the .ASM file into .HEX file (Contains all op codes).
4. Copy the converted Hex file into internal flash Rom of Micro Controller with the help of Universal Programmer or Micro Controller Programmer.

Programming Procedure

The programming procedure is to check the errors in the program and to convert. ASM file into .HEX file is shown in the Fig.3.

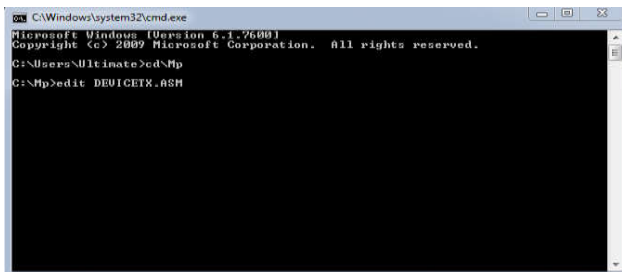


Fig 3 Compiling program in command prompt

Hardware View

Here the hardware view consists PCB which comprises of voltage regulator, programmed AT89C52 microcontroller, crystal oscillator, LCD display to display the load and source values, distribution lines and voltage and current transformers as shown in Fig.4.

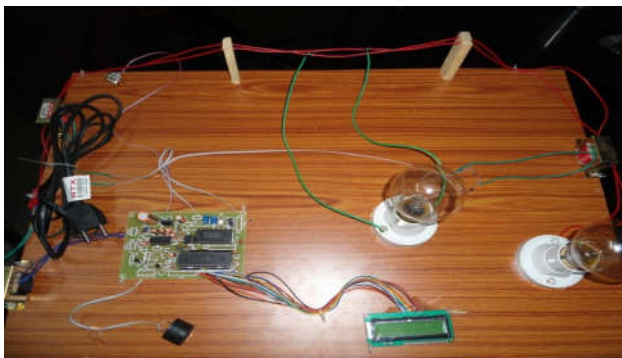


Fig 4 Hardware View of Wireless power theft monitoring using GSM

RESULTS

At the output, LCD display shows the current values of source and load, before and after the theft as shown in Fig. 5 and Fig. 6 .The current value of source and load increases after power is thieved and information is sent to mobile through GSM Module to the authorities besides LCD display shows as power is thieved at transformer on the Hardware view as shown in Fig. 7.



Fig 5 Before theft, current at source and load



Fig 6 After Power theft, current at source and load



Fig 7 Display in LCD at the substation when theft is done along with alarm



Fig 8 Message is sent to authorities when power is thieved

CONCLUSION

The Wireless Power Theft Monitoring using microcontroller and GSM modem can have continuous monitor on the amount of power being used and also it keeps track of the fault current that is being used and if any fault usage of current takes places

it immediately generates alarm in the substation and indicates to the authority in the form of SMS.

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