GSM CONTROLLED PRE-PAID ENERGY METER

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ABSTRACT:

The aim of the project is to decrease the queue at the electricity billing counters and to restrict the usage of electricity automatically, if the bill is not paid. The project also aims at proposing a system that will decrease the loss of power and proceeds due to power thefts and other illegal activities. The work system adopts a totally new concept of "Prepaid Electricity". The GSM technology is used so that the user would receive messages about the utilization of power and if it reaches the minimum amount, it would automatically alert the user to recharge. This technology holds good for all electricity deliverance companies, private communities, IT parks and self-containing housing projects. The implementation of this project will help in better energy management, preservation of energy and also in doing away with the unnecessary hassles over wrong billing. The automated billing system will remain track of the real time consumption and will depart slight scope for deviation on consumption and billing.

KEYWORDS:

Energy meter, GSM technology, Micro controller ATMEL 89S52.

INTRODUCTION:

The project aims in manipulative a system which makes electric bill payment easier and also controlling of digital meter for electricity department becomes more easily using GSM technology. The GSM modem provides the communication mechanism between the consumer and the energy meter by means of short message service messages. GSM based prepaid electricity is a exclusive and latest concept which saves lot of time and power for electricity department. consumer can recharge the card whenever the power is required. Electricity department authorities send specially decoded SMS message to the Modem connected to the energy meter.

If the sufficient amount is recharged, then the author can send the message through GSM with unique identification number. So the power is delivered to user. Depending upon the user usage of power, money will be decreased depending up on the power consumption. And a LCD is placed to display the current readings. Microcontroller is interfaced with GSM modem. "Pre-paid energy meter" is a modern era automation system where we can save the power. Here the devices to be controlled are interfaced with a GSM modem unit, which is capable of receiving instructions in the form of Short message service and performs the necessary tasks. A dedicated GSM modem with SIM card is required for each energy meter. The bill amount is also displayed on the LCD screen. The authorities can switch OFF the

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power to user if he doesn't pay the bill, through simple SMS. An EEPROM is provided on the board to store the updated recharge units and energy meter pulse count. At every instant the count value and units values are stored in EEPROM so that the data will not be lost even in power failure cases. When the recharged units become zero on power consumption, the system shutdown all the loads connected to it. And the load will be disconnected from the supply with the help of relay. Again user has to recharge.

II. PROBLEM FORMULATION

1.Errors are inevitable at every stage of billing, some are human errors while noting down the meter readings, errors while processing the paid bills and the due bills.[1] 2. human errors in taking meter readings

III. BLOCK DIAGRAM AND EXPLANATION

Pre-paid Energy meter using GSM
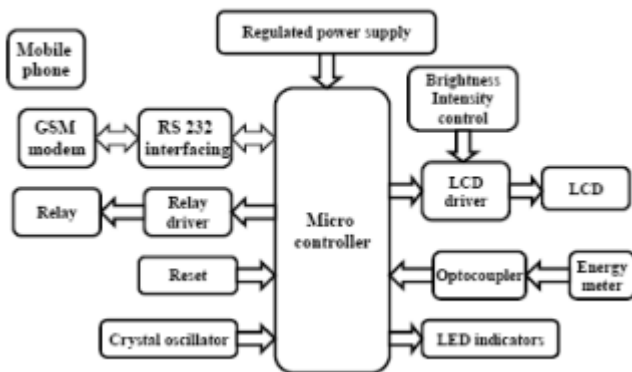
Microcontroller

The AT89S52 is a high-performance CMOS 8-bit microcontroller, low-power, with 8K bytes of EPROM. These are features of AT89S52 microcontroller: 256 bytes of RAM, 8K bytes of Flash,32 input/output pines, three 16-bit timer/counters, Watchdog timer, two data pointers,

six interrupt of two level architecture, serial port, oscillator . the AT 89C52 is very powerful MC which provides a flexible and inexpensive result to many embedded system applications.

An electric meter or energy meter is a device

that measures the amount of electrical energy consumed by a residence, business, or an electrically-powered device.

Electric meters are typically calibrated in billing units, the most common one being the kilowatt hour. Periodic readings of electric meters establish billing cycles and energy used during a cycle. In settings when energy savings during certain periods are desired, meters may measure demand, the maximum use of power in some interval. In some areas, the electric rates are higher during certain times of day, to encourage reduction in use. Also, in some areas meters have relays to turn off nonessential equipment

Optocoupler:

An optocoupler-isolated power supply is often the safest and most practical way to go when it comes to performance and protection. The use of an optocoupler also acts to break ground loops, and this functionality is valuable in eliminating common-mode noise, especially for systems working at the higher operating voltages. When different power supplies in a system are tied together, ground loop currents tend to be induced due to slight differences in ground potential

Relay:

A relay is an electrically operated switch. Many relays use an electromagnet to operate a switching mechanism, but other operating principles are also used. Relays find applications where it is necessary to control a circuit by a low-power signal,

or where several circuits must be controlled by one signal.

GSM (Global System for Mobile)-

GSM is an additional group cellular common advanced to provide opinion facilities and records transfer by arithmetical inflection.
GSM Specifications-1RF Spectrum
GSM 900
Mobile to BTS (uplink): 890-915 MHZ
BTS to Mobile (downlink):935-960 MHZ
Bandwidth : 2* 25 MHZ

LCD (Liquid Crystal Display) –

LCD which is normally known as Liquid Crystal Display &Alphanumeric Presentation it means that it can show Letters, Amounts as well as different codes thus LCD is a user kindly Show method which can be used for showing many communications different seven section show which can show only quantities and some of the letters.

RS232 CABLE:

To allow compatibility among data communication equipment, an interfacing standard called RS232 is used. Since the standard was set long before the advent of the TTL logic family, its input and output voltage levels are not TTL compatible.

For this reason, to connect any RS232 to a microcontroller system, voltage converters such as MAX232 are used to convert the TTL logic levels to the RS232 voltage levels and vice versa.
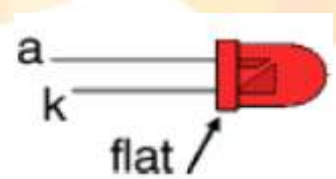
Crystal Circuit

This crystal circuit gives the required clock pulses to the microcontroller to give it the sense of the reference time
.

Reset Circuit

This circuit gives the microcontroller the starting pulse required to start the operation from the start. Unless this pulse is given, the microcontroller doesn't start functioning.

LED Indicators

LED Indicators gives visual indication of system status. In this project we a making use of LED indicators to check the health of the Microcontroller.

It also used to indicates the continuous communication between the microcontroller and GSM Modem.

It also indicates the status of Relay.

Power supply

The A.C. 230 input is given to rectifier circuit and Output obtain from the rectifier is a pulsating D.C voltage. The output from the rectifier is given to a filter circuit to filter A.C components present constant later than rectification. Now, this voltage fed to voltage regulator to pure constant D.C voltage get.

IV. SOFTWARE DESCRIPTION

This project is implemented using following software's:
1. Express PCB – for designing circuit
2. PIC C compiler - for compilation part
3. Proteus 7 (Embedded C) – for simulation part.

V. ADVANTAGES:

1. Energy conservation can be monitored on LCD display.
2. The system alerts through SMS
3. Efficient and low cost design.
4. Low power consumption.
5. Fast and accurate result.

VI. RESULT
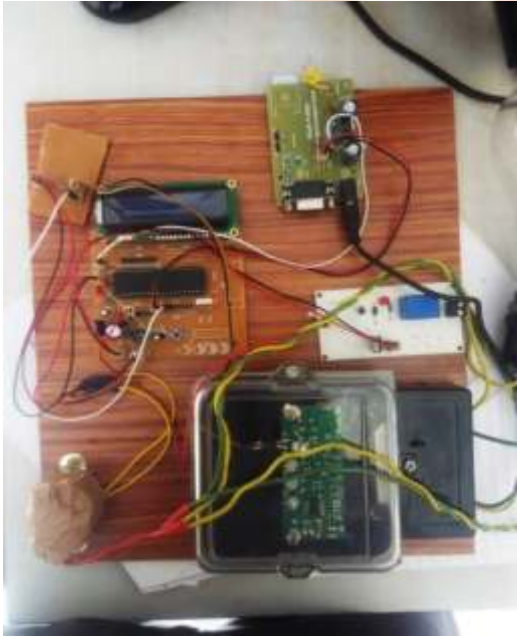
VII. CONCLUSION:

Integrating features of all the hardware components used have been developed in it. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. Secondly, using highly advanced IC's with the help of growing technology, the project has been successfully implemented. Thus the project has been successfully designed and tested.

I. REFERENCES

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