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Monthly Electricity Billing Display with Bill SMS Features

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ABSTRACT:The technology of e-metering (Electronic Metering) has gone through rapid technological advancements and there is increased demand for a reliable and efficient Automatic Meter Reading (AMR) system. The proposed system replaces traditional meter reading methods and enables remote access of existing energy meter by the energy provider. They can also monitor the meter readings regularly without the person visiting each house. After processing the data, bill is generated and using web based system software it is sent back to the customer as SMS.

KEYWORDS: DB9 Connector, GSM Modem, Keil compiler, LDR, Max232

I. INTRODUCTION

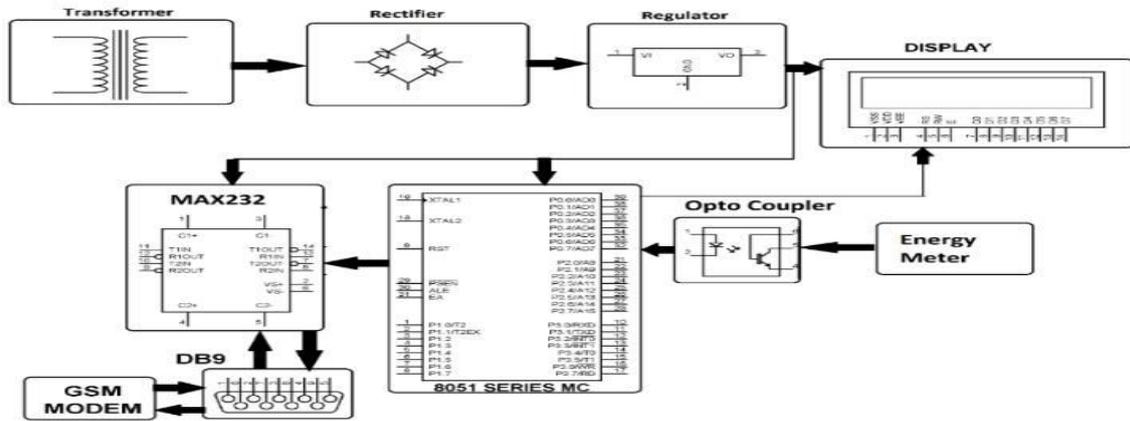
The Electrical metering instrument technology has come a long way from what it was more than 100 years ago. From the original bulky meters with heavy magnets and coils, there have been many innovations that have resulted in size & weight reduction in addition to improvement in features and specifications. Resolution and accuracy of the meter have seen substantial improvements over the years. Introduction of the digital meter in the later part of last century has completely changed the way Electrical parameters are measured. Starting with Voltmeters & Ammeters, the digital meter has conquered the entire spectrum of measuring instruments due to their advantages like ease of reading, better resolution and rugged construction of particular significance is the introduction of the Electronic Energy Meter in the mid-eighties. Now a day, the energy consumption and energy distribution has become a big subject for discussion because of huge difference in energy production and consumption. In this regard, energy consumers are facing so many problems due to the frequent power failures; another important reason for power cuts is due to the un-limited energy consumption of rich people. In this aspect, to minimize the power cuts and to distribute the energy equally to all areas, some restriction should have over the power consumption of each and every energy consumer, and according to that the Government should implement a policy, by introducing Autonomous Energy Meters everywhere in domestic sector. Hence, the need has come to think on this line and a solution has to be emerged out. Today the metering instrument technology grown up significantly, such that the Consumed energy can be calculated mathematically, displayed, data can be stored, data can be transmitted, etc. Presently the microcontrollers are playing major role in metering instrument technology. The present project work is designed to collect the consumed energy data of a particular energy consumer through wireless communication system (without going to consumer house), the system can be called as automatic meter reading (AMR) system [1, 2]. The Automatic Meter reading system is intended to remotely collect the meter readings of a locality using a communication system, without persons physically going and reading the meters visually.

II. LITERATURE SURVEY

For this work existing meter reading techniques in India are analyzed and conducted an extensive study on different energy measuring instruments available now. In existing system either an electronic energy meter or an electro-mechanical meter is fixed in the premise for measuring the usage. The meters currently in use are only capable of recording kWh units. The kWh units used then still have to be recorded by meter readers monthly, on foot. The recorded data need to be processed by a meter reading company. For processing the meter reading, company needs to firstly link each recorded power usage datum to an account holder and then determine the amount owed by means of the specific tariff in use. In this project the front end is User friendly and any employee with minimum knowledge of computers can work on this software. Employees can read the meter by sitting in their office.



BLOCK DIAGRAM



III. METHODOLOGY

Figure 1 shows the prototype model of GSM based energy meter. In this project the pulse and unit (meter reading) count continuously according to load connected. The energy meter counts the pulses, these pulses are received by IR Receiver and from IR Receiver the pulses are passed to Microcontroller. Simultaneously both Microcontroller and EEPROM which is interfaced with the Microcontroller starts to count the pulses coming from IR Receiver.

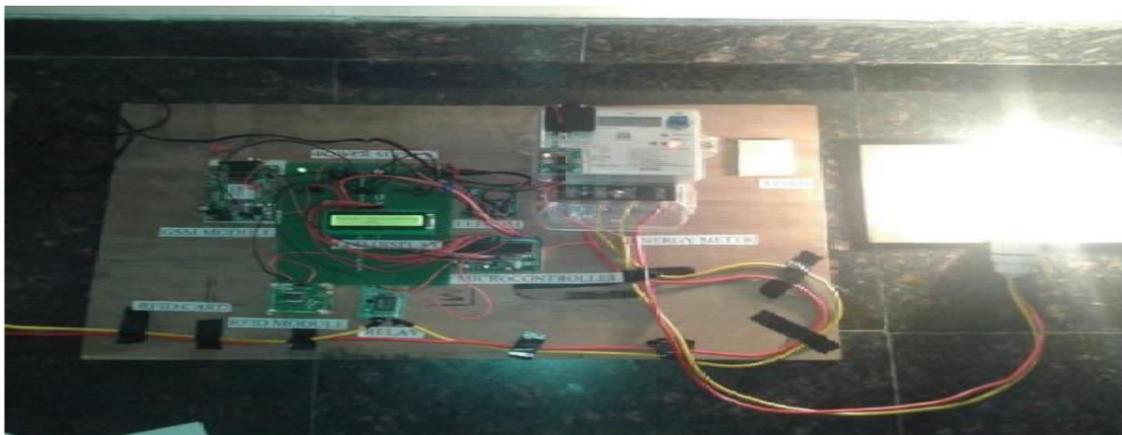


Figure 2 shows the display of pulse count in LCD .The pulses which are counted by Microcontroller is sent to LCD for displaying.



Figure 3 shows the Working of RFID Module along with the RFID cards. When authenticated RFID card is swiped for every 30 days the counted pulses from Microcontroller of 30 days is sent to the user as SMS using GSM technology

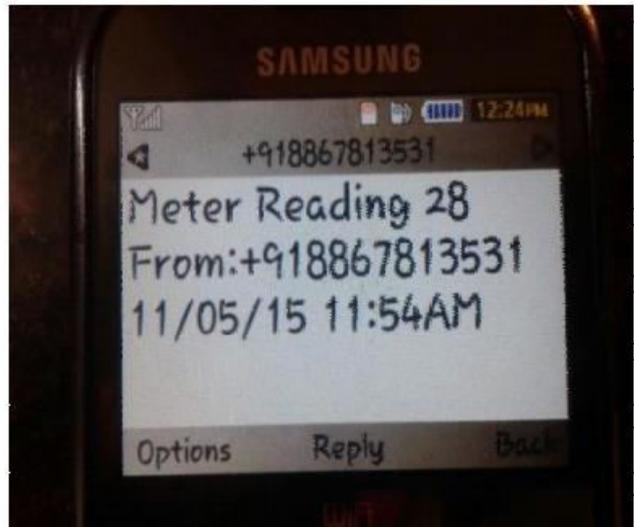
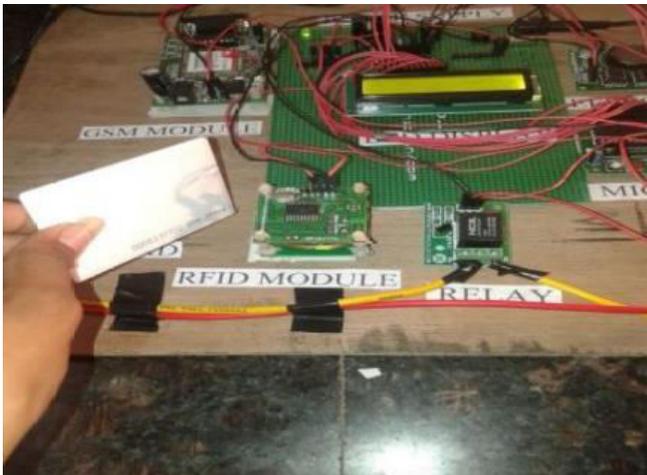


Figure 4 shows the power cut down process due to nonpayment of the electricity bill. When the user does not pay the electricity bill within the given period by the electricity department, the authorized person comes and swipes the RFID card for the power cut down. The SMS alert is sent to the user to notify that the power is cut down

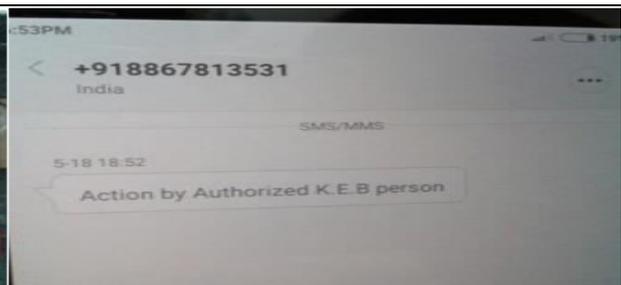
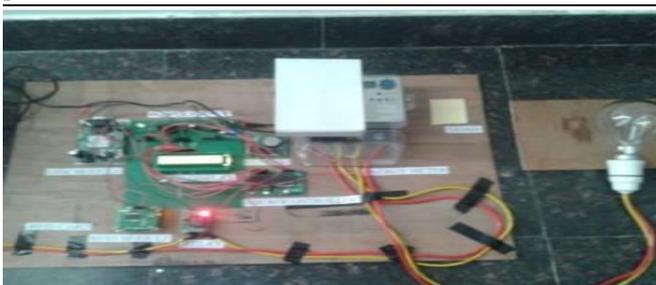


Figure 5 shows Power cut process and SMS alert is sent to the user in case of nonpayment of the electricity bill.



IV. RESULTS & DISCUSSION

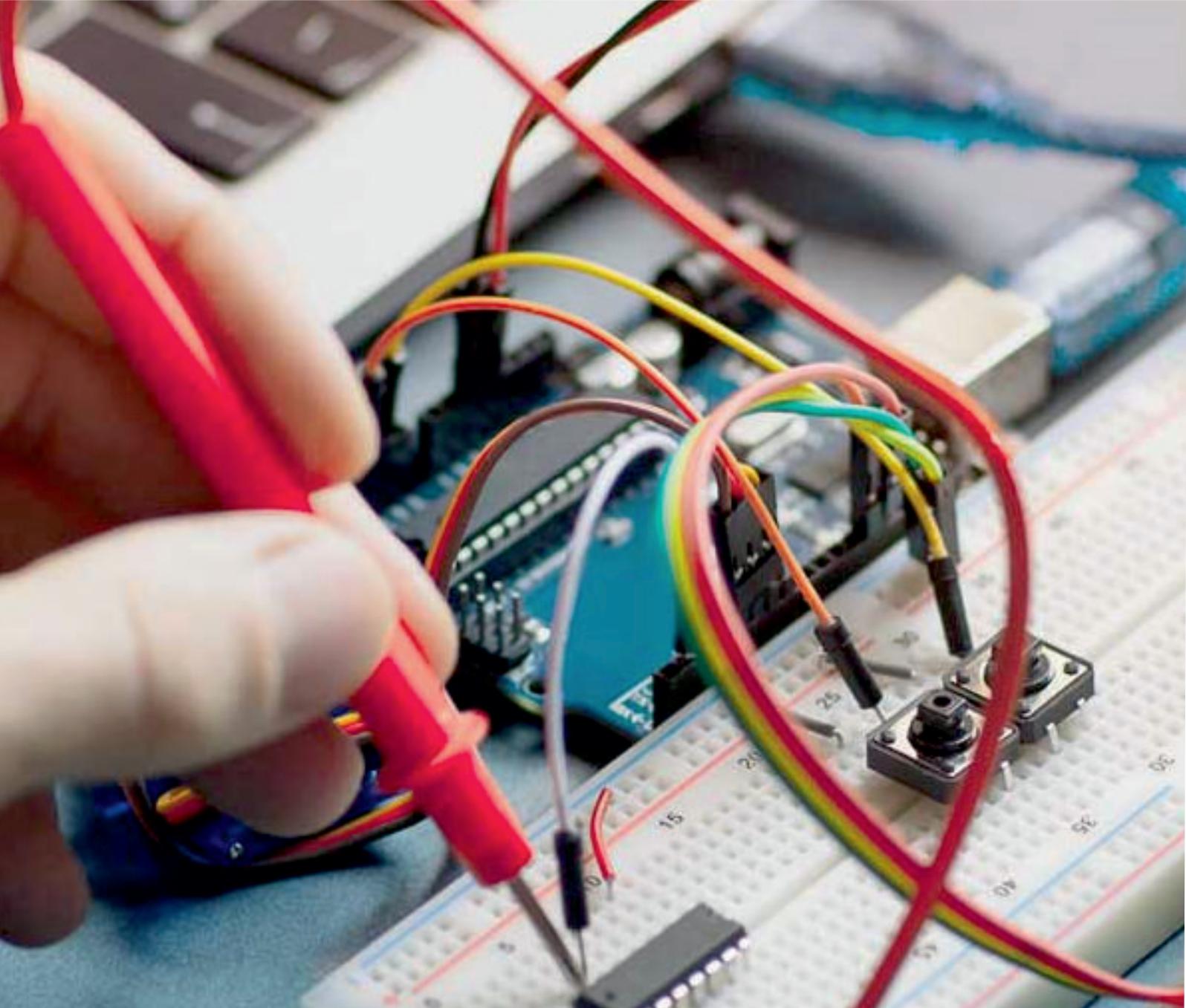
Thus we designed the energy meter is for reading electrical energy consumed in units and in rupees to display on an LCD screen to the user. This data is also provided to the electrical department using GSM technology for billing purposes. Owing to high electricity cost these days it becomes necessary for the consumer to know as to how much electricity is consumed to control electricity bill within his budget. In this proposed system, the consumer will get his energy consumption data on real time basis on a LCD display. The same data is sent through GSM modem to the electricity department via SMS. A microcontroller of 8051 family is interfaced to the energy meter to get the Watt Hour pulses. The microcontroller then processes these pulses according to the program written in it, to calculate the units consumed and cost involved. Further it gives command to the SIM loaded GSM modem for sending the data to the electricity department via SMS. Further this project can be enhanced by to control the electrical appliances remotely via SMS. Also, the electricity department can send the bill amount over SMS to the receiving unit for consumer information.

V. CONCLUSION AND FUTURE WORK

The Design of this system model reduces the manual billing system work also the conventional electricity bill payment procedure in India would be made simple. As witnessed a customer has to spend long hours standing in the queue waiting for his turn to pay the bill. But with this technology the customer has to suffer no such inconvenience. The customer can easily know his bill in his mobile phone at the month's end via an SMS and can pay his bill using his debit card without having to go anywhere, using the card reader embedded energy meter from his household's perimeter. GSM based energy meter is easy to installation and beneficial for both energy provider and consumer. This system is secure and reliable because it can be accessed only by an authorized person. This project is prototype implementation of the system which can be utilized in a real time system which reduces the man power and save the nature by saving the cut down of trees which is used to make paper. Thus this project reduces the man power of paper billing system and also the saves the nature which is ecofriendly. Also, this technology can be further broadened to other bill payments such as water bill, newspaper bill etc.

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