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Energy meter billing on load control Using Arduino

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Abstract: Today the energy meter is placed in the domestic or commercial sites and collects the data of the energy consumed and displays it on either a number dial or digital display So the purpose of this project is to develop an energy meter which is used to measure the consumer's power consumption in kWh but also enable and support real consumption and, so meter reader does not need to visit each customer for the consumed data collection and to distributed the bill slip.

Keywords: GSM, Energy Meter, Load Control, Arduino Project, Smart Billing System .

INTRODUCTION:

Smart electrical energy meter technologies have been investigated and developed for approximately 10 years.

For the billing, the users will get thebill from the energy board after they generated and provided using the several methods. With this system users can note down the voltage, power reading unit, current and the time, date of the energy consumption. This system just

PROJECT METHODOLOGY

Fig.1 Block diagram of GSM based energy meter

In this project the microcontroller is powered with 5V supply from voltage regulator which provides constant voltage of5V. The 16*2 LCD display is powered from 5V through VDD pin and VSS is connectedto common ground of circuit. The VEE is connected to common ground through 1K resistor to maintain the proper brightness of LCD display. The R/W is kept low for write operation. The 16*2 LCD display is used here to monitor the parameter like voltage, current, power and unit balance. gives some advantages over the previous meter reading stored in float variable called 'current' and it is continuously displaying on LCD for monitoring purpose also microcontroller uses the value of current stored in variable for power and energy consumption calculation. SMS from energy meter mentioning the turning OFF status..

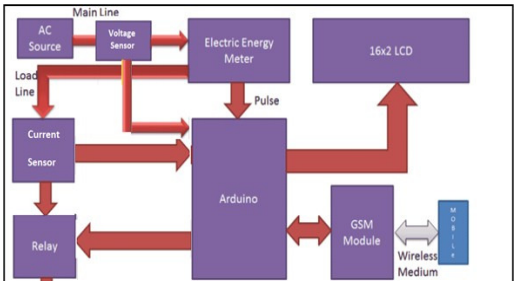
OBJECTIVES

1. To get the status of balance units at any instant of time by the user .
2. If the per day consumption of the user crosses the limit then an alert message will be sent to them .
3. Load control by the user through SMS.

The user can get the per day consumption of units for energy conservation.

WORKING OPERATION

The value of voltage in volts stored in float variable called 'voltage' and it is continuously displaying on LCD for monitoring purpose also microcontroller uses the value of voltage stored in variable for power and energy consumption calculation. The ACS712 current sensor is connected to analog A4 pin of microcontroller and gives output in millivolts corresponds to the current flows through the load. A conversion factor 66 is to be used for getting actual amount of current flows in the circuit. The Atmega328p microcontroller has 10bit inbuilt ADC which converts input 0-5V analog signal to digital in range from 0 to 1024. [4] discussed about a project, in this project an automatic meter reading system is designed using GSM Technology. The embedded



micro controller is interfaced with the GSM Module. This setup is fitted in home. The energy meter is attached to the micro controller. This controller reads the data from the meter output and transfers that data to GSM Module through the serial port. The embedded micro controller has the knowledge of sending message to the system through the GSM module. Another system is placed in EB office, which is the authority office. When they send “unit request” to the microcontroller which is placed in home. Then the unit value is sent to the EB office PC through GSM module. According to the readings, the authority officer will send the information about the bill to the customer. If the customer doesn’t pay bill on-time, the power supply to the corresponding home power unit is cut, by sending the command through to the microcontroller. Once the payment of bill is done the power supply is given to the customer. Power management concept is introduced, in which during the restriction mode only limited amount of power supply can be used by the customer. [6] discussed about E-plane and H-plane patterns which forms the basis of Microwave Engineering principles..[7] presented a book, We know, correspondence implies exchange of data from source to beneficiary. In conventional communication, when source and beneficiary were situated in long separation, this exchange used to occur by interfacing source and beneficiary physically through leading wires, which would convey data as electrical signs. Any exchange of data between focuses that don't have a physical association, similar to wire or link association, would be WIRELESS COMMUNICATION. In 1897 Gugliemo Marconi was the first to show that it was conceivable to build up a ceaseless correspondence stream with the boats that were cruising in the English Channel, by methods for radio waves. From that point forward, the remote advancements that make "moving" correspondence feasible for us have developed strikingly. Today, encouraged by RF circuit manufacture and advanced exchanging systems, reasonable rapid media transmission has been to a great extent sent over the world. Living in an innovation, information driven world powers our requirement for a quick and solid remote association whether we're grinding away, at home, or in a hurry. As indicated by the CTIA – The Wireless Association, association speeds by means of portable systems dramatically increased from 2012 to 2013.The interest for remote network has soar in the most recent decade and considerably more so over the most recent couple of years. We request quick associations that can bolster the greater part of our remote needs and those of others. From home systems to work and the café down the road, we hope to be associated on a nonstop premise. CTIA reports that in 2013 versatile activity became roughly 81%. This is one of numerous pointers that our interest for availability, speed, and support is at an unequaled high and developing. WiMAX is basically a cutting edge remote innovation that improves broadband remote get to. Along these lines, one might say that WiMAX is a progressive remote innovation that, we accept, could change the remote innovation scene impressively. The quick development of remote correspondence and its unavoidable use in all kinds of different backgrounds are changing the way we impart in all major ways. It is a standout amongst the most dynamic regions in the correspondence field today. Genuine Wireless correspondences have picked up a force in the most recent decade of twentieth century with the achievement of second Generation (2G) of advanced cell portable administrations. Overall accomplishments of Global System for Mobile Communications (GSM), Interim Standard 95 (IS-95), Personal computerized Cellular (PDC) and Advanced Mobile Phone System (IS-54/136) have empowered inescapable lifestyles for the new data and correspondence innovation time. Second Generation (2G), 2.5G, and Third Generation (3G) guidelines of portable frameworks are being sent wherever around the world. Overall Interoperability for Microwave Access (WiMAX) is a benchmarks based remote innovation for giving fast, last-mile broadband availability to homes and organizations and for versatile remote systems. WiMAX is like Wi-Fi however offers bigger data transmission, more grounded encryption, and enhanced execution over longer separations by interfacing between accepting stations that are not in the viewable pathway. Universally, WiMAX has been finding a home among developing markets that don't have a not too bad wired infrastructure.

RESULTS & DISCUSSION

The result is obtained , energy billing is obtained on phone through message, load is controlled through SMS , an alert message is received after the set units consumption value is exceeded , display all parameter values (i.e. balance units , power consumption)

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