ISSN (Online) 2395-2717

International Journal of Engineering Research in Electrical and Electronic Engineering (IJEREEE)
Vol 3, Issue 4, April 2017

Smart Automatic Energy Billing and Power Unplug System

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***Abstract*— Electrical power has become indispensable to human survival and progress. Apart from efforts to meet growing demand, automation in the energy distribution is also necessary to enhance people's life standard. So there is augmented demand for Automatic Meter Reading (AMR) systems which collect meter reading automatically, and its appliance is expanding over manufacturing, viable and service environment. Design of an Electric Energy Meter for long-distance data information regarding Electricity consumption, which is based upon IoT method is proposed in . In this work, 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. Some broadcast protocols in wired/wireless approach were introduced so far to examine digital meters distantly at dissimilar area of India. In this scenario the utilization of existing IOT network for metering in India will be a cost effective method for all class of people. The Digital watt hour meters are IOT based meters which replaced conventional electromechanical meters. A IoT based meter is used in this to evaluate the electricity expenditure of multiple user in a suburban area. A master PC at the control centre was used to propel commands to a remote meter, which in revolve transmitted data back, using the IOT. The programming language used for developing the software is Embedded C /Assembly.**

Keywords: **IoT, AMR, digital Wattmeter, Embedded C.**

I. INTRODUCTION

Electronic service meters are an important pace towards automating the utility metering course. So there is increased order for automatic metering reading(AMR)systems which collects meter readings automatically, and its application is intensifying over industrial, commercial and utility surroundings. As a result of the analogue and mechanical scenery of the components in these meters. Collection of meter readings is also ineffective, because a meter reader has to essentially be onsite to take the reading. This scheme of collecting of meter readings becomes more complex and costly when reading have to be collected from vast, and often speckled rural areas. Meter readers are disinclination to make the effort to journey to such areas and will often submit incorrect estimations of the quantity of electricity consumed. For household at the top of tall buildings and luxury housing plots traditional analysis is highly ineffective. There exists chance for missing bills, absence of consumer etc. Even though these conventional meters were replaced with additional efficient electronic energy meters these troubles still persists. So a system which will provide the bill in users mobile will be more suitable in the current scenario. Here a new procedure of post-paid electronic power metering is introduced in this paper which will routinely sense the used energy, records these reading constantly, then sends it to the billing point through the presented IoT network. Finally after processing, the collected data bill is generated using a web based method software and is send back to the consumer as SMS (short messaging system). As it is web learning once the information is updated, the registered users and ability can monitor and examine the generated bill of any month by sitting anyplace in the world. An different approach for monitoring the Electrical parameters in real time for an individual level was proposed using the cloud enabled system with 2G/3G modules are even monitored at regular intervals with a mobile application.

II. EXISTING SYSTEM

The skill of E-metering (Electronic Metering) has moved out through hasty hi-tech advancements and there is improved demand for a dependable and proficient Automatic Meter Reading (AMR) method. This paper presents the set up of a uncomplicated low expenditure wireless IOT based energy meter and its associated web interface, for automating billing and control the collected

ISSN (Online) 2395-2717

International Journal of Engineering Research in Electrical and Electronic Engineering (IJEREEE)
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information globally [4]. The projected scheme replaces conventional meter reading methods and allows distant access of dynamic energy meter by the energy provider. Also they can observe the meter readings frequently without the individual visiting every residence. A IoT based wireless communication section is integrated with electronic energy meter of each unit to have distant admittance over the custom usage of power. A PC with a correspondent at the other end, which contains the record acts as the billing point. Live meter analysis from the IOT enabled energy meter is sent back to this billing point periodically and these details are updated in a central database. Following are the disadvantages of the present energy meter reading:

- The billing process of electricity utilization which is in practice is very long procedure and requires enormous man power.
- The energy billing system in India is fault prone and also time and labour overwhelming.
- Errors get introduced at each phase of energy billing, like errors with electro-mechanical meters, individual errors while marking down the meter evaluation and error while dispensation of the paid bills and the unpaid bills.
- There are numerous cases where the bill is paid and then is shown as a unpaid amount in the upcoming bill.

III. PROPOSED SYSTEM

The disadvantages of the existing system are overcome by an automated system as presented in this section. In the proposed system customer end is user friendly and can be operated effortlessly by swapping [6]. The billing procedure is prepaid power billing, i.e. pay first and then consume it. The system proposed here is to endow with a real time investigation of the consumed power and its billings, which is sent to electricity board and is monitored by the officials constantly irrespective to the position they are located. Thus, this system requires a network of remote servers instead of a local server to store, transmit the processed information and there is also a possibility for a mobile application which is created and intimated to the authorities to indicate the changes in environment immediately and also displayed in a dedicated web page.

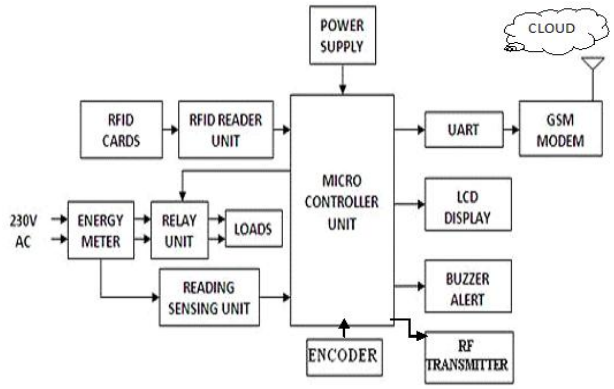

Fig: 1 Proposed block diagram of Transmitter

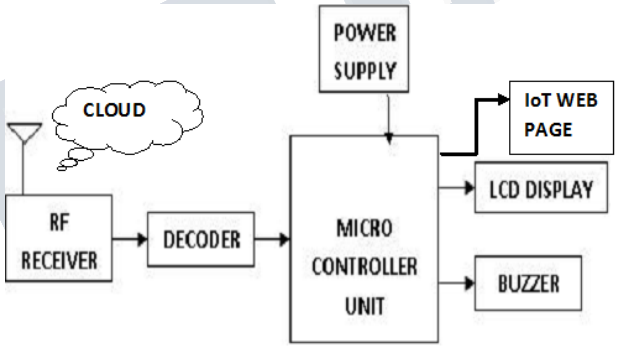

Fig: 2 Receiver end

The Atmel AT89S52 is a powerful microcontroller which provide a highly-flexible and cost-effective resolution to many embedded control application. Port 0 also receive the code bytes during Flash programming and output the code bytes during program confirmation. Port1 also receive the low-order address bytes during Flash programming and confirmation. In this application, Port 2 use strong interior pull-ups when emit 1s. Port 2 also receive the high-order address bits and some control signal through Flash programming and confirmation. The UART take bytes of information and transmits the entity bits in a sequential trend. At the destination, a second UART re-assembles the bit into entire bytes. The MAX232 is an incorporated circuit that convert signals from an RS232 serial port to signals appropriate for use in TTL attuned digital logic circuit

A signal on the DIN pin activate the oscillator which in turn decodes the received address and information. The decoders will then ensure the received address three times incessantly. Several RFID tags can be examine from numerous meters. The application of bulk reading enables

ISSN (Online) 2395-2717

International Journal of Engineering Research in Electrical and Electronic Engineering (IJEREEE)
Vol 3, Issue 3, March 2017

an almost-parallel reading of tags. The tag's information is stored electronically [3]. An RFID reader transmit an encoded radio signal to interview the tag. The tag receives the message and responds with its identification information. tag uses the radio energy transmitted by the reader as its energy source. Most RFID tags control at least two parts: One is an integrated circuit for storing and processing information, modulating and demodulating a radio frequency (RF) signal, other specialized functions, the other is an antenna for receiving and transmitting the signal.

A relay consists of an electromagnet and coil plus one or more switches. The switch changes over when the current in the electromagnet is switched off and on. The stream of current that source the buzzer to resonance. So microcontroller will confer high or low to switch on/off buzzer. In this scheme it is used to identify the emergence of the SMS in the type of sound [1].

IV.CIRCUIT DIAGRAM

The step down transformer is used to step down the main supply voltage from 230v AC to lower value .This 230v AC voltage cannot be used directly, thus it is stepped down. The output from the secondary coil is also AC waveform. The rectifier path is used to convert the AC voltage into an equivalent DC voltage. The most important and simple device used in rectifier circuit is the diode. The efficient circuit used is the full wave bridge rectifier circuit. The output voltage of the rectifier is in the rippled form, the ripples from the obtained DC voltage are impassive using others path obtainable. The circuit used for removing the ripples is called filter circuit. Capacitors are used as filter. Regulator regulates the output voltage to be always constant. When the AC voltages changes, the DC voltages also changes. Thus to avoid this regulators are used.

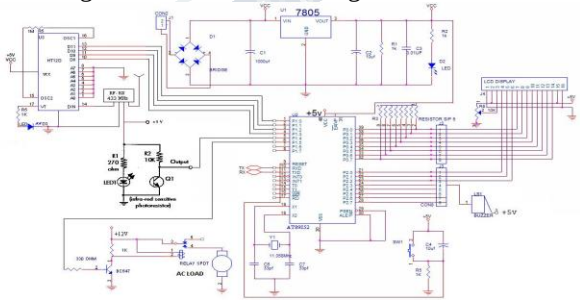

Fig: 3 Circuit diagram of Transmitter

The filter circuit is often fixed after the regulator circuit .Capacitor is the most often used as filter. The principle of the capacitor is to charge and discharge. It charges during the positive half cycle of the AC voltage and discharges during the negative half cycle. So it allow only AC voltages and does not allow the DC voltage. The filter is fixed after the regulator circuit to filter any of the possibly found ripples in the output received finally [5]. Here we used 0.1uf capacitor. The output at this stage is 5v and is given to the microcontroller. A micro controller consists of a influential CPU tightly integrated with memory, various I/O interface such as serial port, parallel port timer or counter, interrupt, controller, data acquisition interfaces analog to digital converter, digital to analog converter, incorporated on a single silicon chip. AT89S52 is 8-bit micro controller, which has 4KB on chip flash memory, which is just sufficient for our application [7]. Moreover ATMEL is the leader in flash technology in today's market place and hence using AT89C52 is the optimal solution. The AT89S52 is a low power, high performance CMOS 8 bit microcontroller with 8k bytes of in-system programmable flash memory. The device is contrived using Atmel's high density non-volatile memory technology and is attuned with the Industry-standard 80C51 instruction set and pinout.The AT89S52 provides the following standard feature:8k bytes of flash ,256 bytes of RAM, 32I/O lines, watchdog timer, two data pointer, three 16-bit timer/counters, a six-vector two level interrupt architecture, a full duplex serial port, on chip oscillator, and clock circuitry. The WDT is intended as a recovery method in circumstances where the CPU may be subjected to software upsets. The WDT is defaulted to hinder from presented reset. MCS-51 devices have a epidemic address gap for program and data memory. Up to 64k bytes each of external program and data memory can be addressed [9].The tag's information is stored electronically .Current flowing throughout the coil of the relay creates a magnetic field which attracts the leveler and changes the switch conducts. The coil current can be on or off so relays have to switch positions and they are double throw switches. For example a low voltage battery circuit can be used relay to switch a 230v ac mains circuit. There is no electric connection inside the relay between two circuits, the link is magnetic and mechanical. The LCD panel's Enable and register select is connected to the Control Port. The Control Port is an open collector/open drain output. While most parallel ports have internal pull up resistors, there are a few which don't. Therefore by incorporating the two 10k external

ISSN (Online) 2395-2717

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pull up resistors, the circuit is more portable for a wider range of computers, some of which may have no internal pull up resistors connected between the supply rail(+v)and the input signal. This acts as load on the driver. When the input signal approaching into the buzzer subsystem is low,a potential difference across the buzzer cause current to stream. Buzzer is connected to Microcontroller port pin, so microcontroller will give high or low to switch on/off buzzer [2]. In this scheme it is worn to identify the advent of the SMS in the form of sound. Nowadays, Buzzer it is more popular to use a ceramic based piezoelectric sounder which makes a high pitched tone. Usually these were keen up to "driver" circuit which assorted the hurl of the sound or pulsed the sound on and off [8]. The KEIL cross compiler is used to edit ,compile and debug this program. Micro Flash programmer is used for burning the developed code on Keil in to the microcontroller Chip.

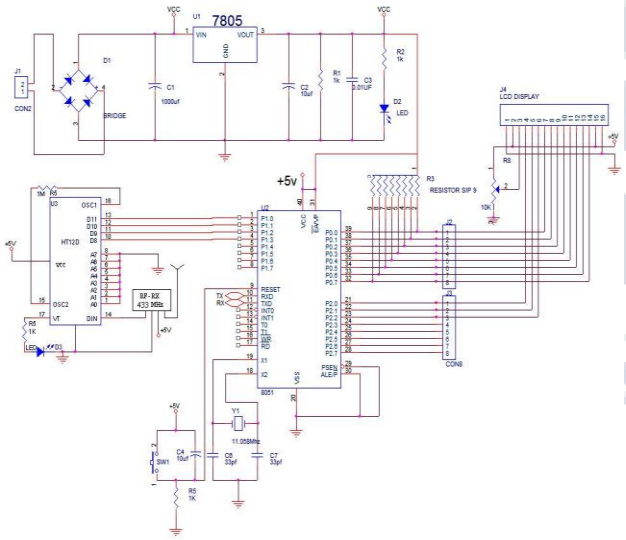

Fig: 4 Circuit diagram of Receiver

V.RESULTS AND DISCUSSION

Internet of things (IoT) is the most important method of contact between the energy meter and the web server. IoT, being a 2.5G mobile tool, is accessible all over the globe. It is also preferably appropriate for data transmit over for all time on-line link between a central locality and mobile devices. The cost is per kilobyte of information transferred, in contrast to SMS where the cost is per message. The reading data from the energy meter in real time is uploaded to a vital database via IoT as shown in fig.6. The same data is also displayed in LCD display connected at the receiver end as shown in fig.5.

Fig 5.LCD display of Energy meter consumed units with bill

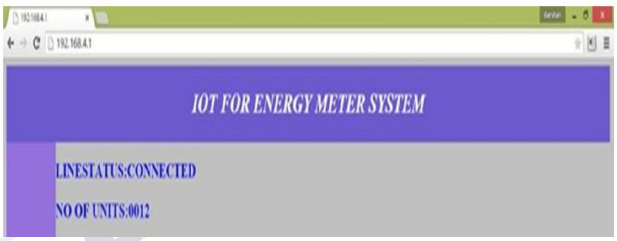

Fig 6.IoT Web page

Fig 7 shows the graph of line status either connected or disconnected at the receiver end with respect to the energy consumed and bill status.

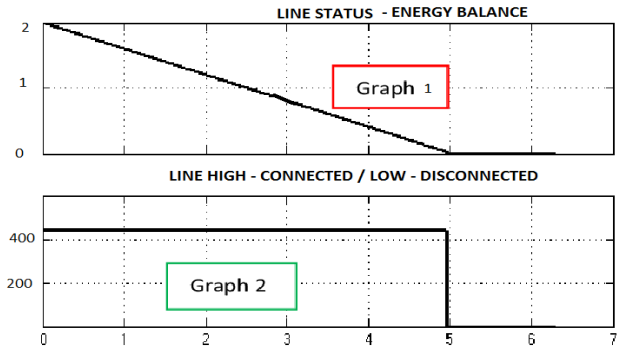

Fig 7 Line Status

ISSN (Online) 2395-2717

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VI. CONCLUSION

This project concludes that, if any where power problem occurs the power identification circuit finds it and using wireless communication this information will be transmitted to electricity board. The communication used between the power cutoff section and electricity board is radio frequency wireless communication medium. By implementing idea, the power cut off information will be transmitted to the electricity board automatically without any delay in time. An alert system will be produced while receiving the information. Along with the buzzer alert, the power cutoff area, nature and some other details will be transmitted to the electricity board using IoT.

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