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Energy Meter with Tampering Detection and Power Saving Using IOT

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Abstract: In today's world tampering detection and problems related to power savings are in huge amount. To avoid this many function energy meters for automatic meter reading using arduino kit are IOT based. It has facility of connecting with central database maintained by some energy provider using computing devices which can prevent theft detection from unauthorized users thus by leading to power saving losses. Remarkable feature of this meter is IOT based implementation which makes it faster, reliable and cost effective. Now a days, for high speed data rates the wireless system is used for communication protocol. The combine characteristics of the wireless technology and with micro controller ATMega16 can resolve the shortcoming of the technology. For Arduino Meter the hardware implementation was designed and analyzed .The chances of manual errors and delay in processing and misusage of the electricity by other sources. It requires many sets workers such as; one set of workers to write the reading and other set to cut down the power if payment is not paid at the right time.

Keywords: Arduino, Micro controller, Internet of Things, etc.

I. INTRODUCTION

In the IOT's, many of the living & non-living things that surrounds us will be on the internet in many forms .Gadgets empowered by wireless technological innovation such as wireless Bluetooth, radio frequency, wireless-fidelity, embedded sensor. From its beginning stage IOT has moved out and it is actually on the edge of changing the present fixed internet world into a well featured upcoming internet. Currently almost we are having 9 billion inter connected gadgets & it is estimated that in 2020 it will nearly touch to almost 50 billion gadgets, if this happens then it will be a big success for the technology . Today the world is facing such an environment that offers challenges for every now and then. The condition of instability regarding energy resources are the main problem faced by our society. A demand of high performance low budget relevant system to control and also to monitor the power usage for this problem. Condition of instability regarding energy can be addressed by diminishing the usage of power in household purposes. The consumers are increasing rapidly and also burden on electricity offering divisions is sharply increasing on daily basis .Several technologies like embedded systems and Real Time Operating Systems (RTOS) play a major role in making these concepts possible and to provide customers a big relief. A large number of people are already depending on operating systems for real time applications, these "eyes in the sky" are now going to make an impact on our day to day life in a more significant manner. Embedded systems are designed without connection and operate as per the required task. But in operating systems instruction is design-oriented. These systems are basically platform-less systems. Embedded systems are the unsung heroes of much of the technology we use today the video game we play, or the CD player or the washing machines we use employ them. Without an embedded system we would not even be able to go online using modem. Rather than designing various devices for particular tasks, embedded systems are designed to do various tasks and the tasks can be controlled very effectively. We also have to met the real time performance constraints for reasons such as safety and cost ; others may have low or no performance requirements, allowing the system hardware to be simplified to reduce costs.

II. LITERATURE SURVEY

This paper is described to calculate the energy consumption in the residences & other electrically powered devices and thus to generate its bill automatically using . This can help in reducing energy consumption in house as the owner is continuously being notified about the number of units that are consumed. Its objective is to generate bill automatically by checking the electricity units consumption in house & thus by reducing the manual labour. Design & Implementation of paper is only based on ARM controller using Internet Of Things. Energy meters which is already installed at our houses are not replaced but a small modification is made on the already installed meters which can change them from existing meter into smart meters. We can also provide feature of notification through SMS by using GSM module. Working through web page one can access the meter. The propagated model is used to calculate the energy consumption of the household & even make energy unit reading to be handy. Automatic, portable and remote

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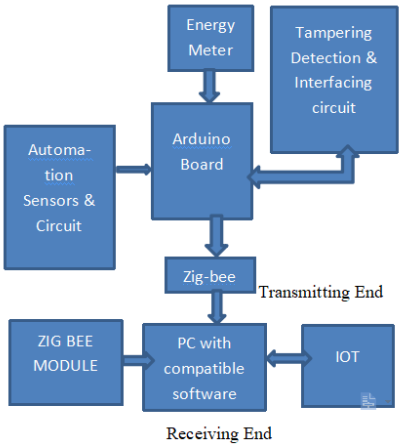
control all these features which every management system is trying to make. Above work for novel smart energy meter for an automatic and superior metering and billing system represents a efficient system for power saving and tampering. For the meter reading system with some automatic functions will be provided by the combination of Arduino and GSM along with the "SHORT MESSAGE SERVICE" system. Firstly, we have simulated the project in PROTEUS 8.0 then successfully implemented on the circuit board in laboratory and obtained the result . GSM modem and embedded controller which are incorporate with the proposed energy meter are used to transmit the data in the form of consumed energy in kWh, generated bill, security services (line Cut/On) over GSM mobile network such as data can be then fed and integrated into existing energy management systems located at power companies or organizations to provide the services among the customers without man-power.

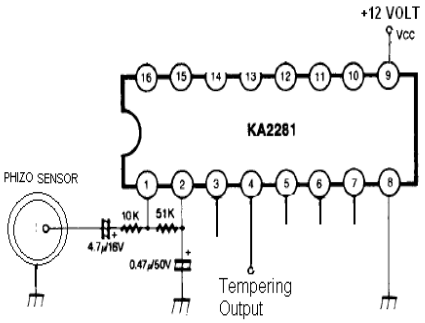
III. BLOCK DIAGRAM



IV. METHODOLOGY

1. Energy Meter: Energy meter is a device which is used to measure the energy consumed by the customer. Basically energy meter is of two types Electro Mechanical meter and Digital meter. Now a days digital meter are used because they are having high accuracy, with limited control and theft detection capability at nodes.

2. Interfacing Circuit & Tampering Detection: It is a device which takes out readings from meter and passes those readings to the computer through communication media. It also consists of a circuit which can switch ON/OFF power supply of customer. Basically it is a IOT based system which is operated according to program which is stored in a micro controller of arduino board. Piezo sensor is used for tampering detection. Piezo sensor have a property to sense vibration and according to that provide output voltage. This output voltage is very low approximately 3to 4 MV. We are giving this signal to the Dot bar IC KA2281.



3. Data Communication Media: From Energy meter to the Host PC a communication media is necessary to transport the data. Communication can be done by two ways: (a) Wired Communication: power lines, phone lines, dedicated lines.(b) Wireless Communication: RF, GSM, GPRS. Service provider can use any communication media depending upon the services available to the service provider. Physical devices, vehicles (also referred to as "connected devices" and "smart devices"), buildings, and other items embedded with electronics, software, sensors, boards and network connectivity that enable these objects to collect and exchange data very easily can be done by inter connecting to the The Internet of things (IOT). Advanced connectivity of devices is expected from IOT systems and

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services which goes beyond machine to machine communications and covers a variety of protocols, domains, and applications.Embedded devices (including smart objects) the interconnection is expected to user in automation and also enabling advanced applications like a smart grid, and expanding to areas such as smart cities.

4. PC with compatible software: The Meter Reading Software is a heart of meter reading station which resides in the PC at the Meter Reading Station. It is a standalone system which is responsible for many things like collecting meter reading, storing them to the data base, calculation of bills, switching ON/OFF of power supply, and providing analysis facility.

V. COMPONENT USED

A. HARDWARE USED

- Arduino kit
- Energy Meter
- Zig-Bee
- LCD`s

B. SOFTWARE USED

- C#

VI. CONCLUSION

This paper is mainly concentrated on IOT network. . We are doing automatic reading and also connecting and disconnecting of meters using wireless module then the meter reading comes faster and it is available for the customers.The people will use the information as per their requirements and they will have freedom to check the bill, tampering, when the meter has been connected and disconnected before the due date. We successfully monitored the tampering seal with power saving and read the meter bills which also be uploaded on the website using IOT . Metering Meter Reading is a unique solution for the problems in existing manual system. Metering Meter Reading is self assured automation system. Implementation of metering Meter Reading with the help of standalone system is an innovative idea. Our implemented project is able to provide all required services remotely for metering and billing with high fidelity with less consumption of power and provide accurate reading.

REFRENCES

[1] Dong Chen, Student Member, IEEE, Sandeep Kalra, Student Member, IEEE, David Irwin, Member, IEEE Prashant Shenoy, Fellow, IEEE, and Jeannie Albrecht, Member, IEEE "Preventing Occupancy Detection From Smart Meters" IEEE Transactions on Smart Grid 2015.

[2] Pooja D Talwar, Prof.S.B Kulkarni "IoT Based Energy Meter Reading" International Journal of Recent Trends in Engineering & Research (IJRTER) Volume 02, Issue 06; June - 2016 [ISSN: 2455-1457].

[3] Darshan Iyer N, Dr. K A Radhakrishna Rao "IoT Based Electricity Energy Meter Reading, Theft Detection and Disconnection using PLC modem and Power optimization" DOI: 10.15662/ijareeie.2015.0407113.

[4] Md Masdur Rahman, Noor-E-Jannat,Mohd. Obidl Islam, Md.Serazas Salak in "Arduino And GSM Based Smart Energy Meter For Advanced Metering And Billing System" IEEE 2015 Ref 8-1-463-666-2/15 & 2nd Int'l Conf. on Electrical Engineering and Information and Communication Technology (ICEEICT) 2015.

[5] Tanmoy Maity, Partha Sarathi Das, "Intelligent Online Measurement & Management of Energy Meter Data Through Advanced Wireless Network" Ref 978-1-4244-9190-2/11 ©2011 IEEE.

[6] Satyanarayan D. Dhakate1 & Prof. Nilesh Bodne, "Enchantment an Arduino for Multi Utility Meter, Load Profiling and a Novel Waveform Logger Application"Imperial Journal of Interdisciplinary Research (IJIR) Vol-3, Issue-5, 2017 ISSN: 2454-1362.

[7] Darshan Iyer N1 , Dr. K A Radhakrishna Rao2,"IOT Based Electricity Energy Meter Reading, Theft Detection and Disconnection using PLC modem and Power optimization"Vol. 4, Issue 7, July 2015 ISSN (Print) : 2320 – 3765 ISSN (Online): 2278 – 8875