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# Gprs Based Automatic Energy Meter Reading System with Gps Tracking

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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. It enables remote access of existing energy meter by the energy provider. A GPRS based wireless communication module is integrated with electronic energy meter of each entity to have remote access over the usage of electricity. A PC with a GPRS receiver at the other end, which contains the database acts as the billing point. Live meter reading from the GPRS enabled energy meter is sent back to this billing point periodically and these details are updated in a central database. Authentically, users can access the developed web page details from anywhere in the world. The complete monthly usage and due bill is messaged back to the customer after processing this data. So GPRS based wireless AMR system is more effective approach for convention of billing system. This system also provide authority to electricity companies to take actions against lenient customers who have outstanding dues, otherwise company has right to disconnect the power supply and also it can reconnect power supply after deposition of dues.*

***Keywords***: *Optocoupler, energy meter, GPRS(General Packet Radio Service),RTC(Real Time Clock).*

## I. INTRODUCTION

**S**mart Energy has been an important conceptual paradigm for future energy use. Because of limited nonrenewable energy resources available on Earth and also high costs of acquiring renewable energies (REs), how to make energy use more efficient and effective is critical for future social and economic developments [1]. Smart grids (SGs) have been

a key enabler for smart energy, which refers to power networks that can intelligently integrate the behaviors and actions of all stakeholders connected to it, e.g., generators, customers, and those that do both—in order to efficiently deliver sustainable, economic, and secure electricity supplies. While there are many definitions for SGs, one commonly used conceptual framework is that of the National Institute of Standards and Technology (NIST) which defines seven important domains: bulk generation, transmission, distribution, customers, service providers, operations, and markets. Key technological challenges facing SGs include intermittency of RE generation that affects electricity quality; large scale networks of small distributed generation mechanisms

## II. LITERATURE SURVEY

Energy saving solutions has been becoming increasingly essential in recent years because of environmental issues such as climate change and global warming. Environmental problems are very important issue and these problems are largely caused by the excessive use of energy. Since the existing systems are designed without considering user satisfaction ,it is not appropriate to the places such as house and office where the user satisfaction is more crucial factor than cost benefit due to energy saving. All things considered, design goals of the new intelligent lightning control system are as follows; the new intelligent lightning control system should be designed to maximize the utilization of LED lighting. The new intelligent lightning control system should be designed to have the communication capability. The system should be designed to both energy efficiency and user satisfaction.

## III. PROPOSED SCHEME

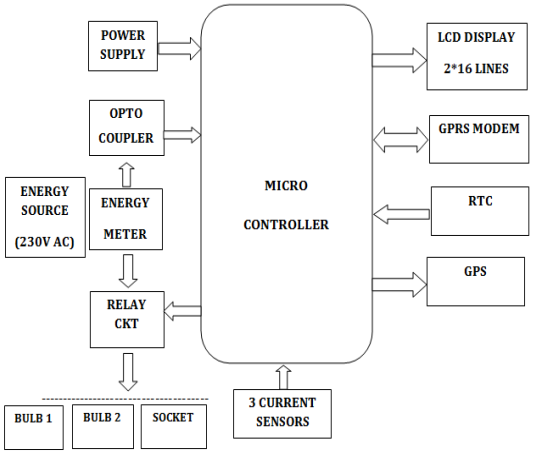


Fig.1.Block diagram

## IV. METHODOLOGY

**Micro controller:** This section forms the control unit of the whole project. This section basically consists of a Microcontroller with its associated circuitry like Crystal with capacitors, Reset circuitry, Pull up resistors (if needed) and so on. The Microcontroller forms the heart of the project because it controls the devices being

interfaced and communicates with the devices according to the program being written.

**ARM7TDMI:** ARM is the abbreviation of Advanced RISC Machines, it is the name of a class of processors, and is the name of a kind technology too. The RISC instruction set, and related decode mechanism are much simpler than those of Complex Instruction Set Computer (CISC) designs.

**Liquid-crystal display** (**LCD**) is a flat panel display, electronic visual display that uses the light modulation properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images or fixed images which can be displayed or hidden, such as preset words, digits, and 7-segment displays as in a digital clock.

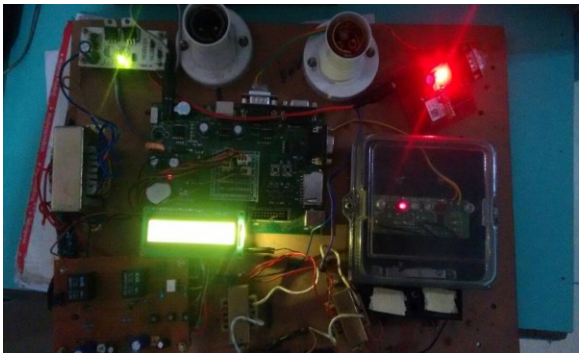

Fig. 1.1.Project Hardware kit arrangement

**Opto Couplers:**

There are many situations where signals and data need to be transferred from one system to another within a piece of electronics equipment, or from one piece of equipment to another, without making a direct electrical connection. Often this is because the source and destination are (or may be at times) at very different voltage levels, like a microcontroller which is operating from 5V DC but being used to control a triac which is switching 230V AC. In such situations the link between the two must be an isolated one, to protect the microprocessor from over voltage damage. Relays can of course provide this kind of isolation, but even small relays tend to be fairly bulky compared with ICs and many of today's other miniature circuit components. Because they are electro-mechanical, relays are also not as reliable ó and only capable of relatively low speed operation. Where small size, higher speed and greater reliability are important, a much better alternative is to use an Optocoupler. These use a beam of light to transmit the signals or data across an electrical barrier, and achieve excellent isolation.

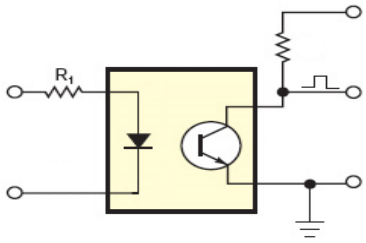


Fig.2.Optocoupler structure

**Energy Meter:**

An electricity meter or energy meter is a device that measures the amount of electric energy consumed by a residence, business, or an electrically powered device.Electricity meters are typically calibrated in billing units, the most common one being the kilowatt hour. Periodic readings of electric meters establishes 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, reflecting the higher cost of power resources during peak demand time periods. Also, in some areas meters have relays to turn off nonessential equipment.

**GPRS:**

GPRS (general packet radio service) is a packet-based data bearer service for wireless communication services that is delivered as a network overlay for GSM, CDMA and TDMA (ANSI-I36) networks. GPRS applies a packet radio principle to transfer user data packets in an efficient way between GSM mobile stations and external packet data networks. Packet switching is where data is split into packets that are transmitted separately and then reassembled at the receiving end. GPRS supports the world's leading packet-based Internet communication protocols, Internet protocol (IP) and X.25, a protocol that is used mainly in Europe. GPRS enables any existing IP or X.25 application to operate over a GSM cellular connection. Cellular networks with GPRS capabilities are wireless extensions of the Internet and X.25 networks.

Fig.3.GPRS module

**GPS:**

Global Positioning System (GPS) technology is changing the way we work and play. You can use GPS technology when you are driving, flying, fishing, sailing, hiking, running, biking, working, or exploring. With a GPS receiver, you have an amazing amount of information at your fingertips. Here are just a few examples of how you can use GPS technology.

GPS technology requires the following three segments.

- Space segment.
- Control segment.
- User segment

**Space Segment**

At least 24 GPS satellites orbit the earth twice a day in a specific pattern. They travel at approximately 7,000 miles per hour about 12,000 miles above the earth's surface. These satellites are spaced so that a GPS receiver anywhere in the world can receive signals from at least four of them.

**Control Segment**

The control segment is responsible for constantly monitoring satellite health, signal integrity, and orbital configuration from the ground control segment includes the following sections: Master control station, Monitor stations, and Ground antennas.

**User Segment**

The GPS user segment consists of your GPS receiver. Your receiver collects and processes signals from the GPS satellites that are in view and then uses that information to determine and display your location, speed, time, and so forth. Your GPS receiver does not transmit any information back to the satellites.

The following points provide a summary of the technology at work:

- The control segment constantly monitors the GPS constellation and uploads information to satellites to provide maximum user accuracy
- Your GPS receiver collects information from the GPS satellites that are in view.
- Your GPS receiver accounts for errors. For more information, refer to the Sources of Errors.
- Your GPS receiver determines your current location, velocity, and time.
- Your GPS receiver can calculate other information, such as bearing, track, trip distance, and distance to destination, sunrise and sunset time so forth.
- Your GPS receiver displays the applicable information on the screen.

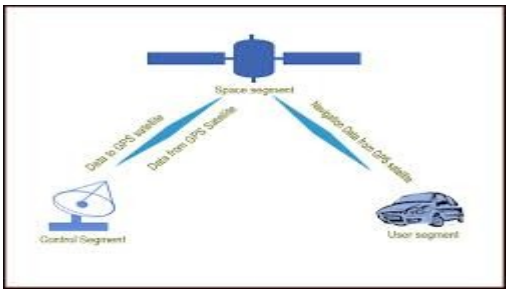


Fig. 4. GPS Working

## V. RESULT AND ANALYSIS

The following figure shows the kit arrangement of System module. Initially the LPC2148 board is powered. After the RTC gets initialized (set hours, minutes, seconds, date, month, year of present day) then GPRS communication starts

connecting after inserting the sim in GPRS module and network led starts glowing.


Fig.5. GPRS connecting


Fig.6. GPS connecting

After entering the url number in web page then Internet of things (IOT) window opens. In home page window displays the last meter IOT system


Fig.7. Data sending

After sending the data then click on project in IOT window. Online service window is opened. In online service it displays the usage status, meter number, units consumped, current consumped by loads(dev1, dev2) in amp and the amount for the usage .

Fig.8.Online service

## VI. CONCLUSION

We propose an intelligent household LED lighting system considering energy efficiency and user satisfaction. We have successfully control the brightness of the system autonomously according to the brightness of the surrounding. The proposed system employees multi sensors and wireless technology to enhance energy efficiency and user satisfaction by turning ON/OFF LEDs, fans and PCs as per user movement. We have also concluded that this system can be used in the applications mentioned above with more or less changes in the system.

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