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POWER METER BILLING AND LOAD CONTROL USING GSM

P.Malleswara Reddy, Assistant Professor, Department of Electrical and Electronics Engineering, Gates institute of Technology, Gooty.

K.Praveen Kumar[1], N.Mallikarjuna[2], S.Bharathkalyan[3], G.Rohith[4], K. Md.Wahid[5] UG Scholars, Department of Electrical and Electronics Engineering. Gates institute of Technology, Gooty[123456]

ABSTRACT:

Automatic Energy Meter Reading system (AEMR) regularly read the energy meter and calculate total amount of bill at the set dead line and sends the message to service provider. From energy meter received data i.e. user name, meter ID, total units with paying amount this message maintained at database server which located at service provider department. By using this system save the time required for conventional billing system and minimized human work load. User and service provider both are get correct reading and bill amount. AEMR System can provide message at hourly, daily and monthly by the request. This technology reduced the man power, reading collection time avoids late bill payment. By apply this system data security improves. And improve customer and service provider services. Due to this system service provider quickly find out illegal and late bill paying customer by accessing database. So, GSM based AEMR system is more efficient that conventional billing system.

KEY WORDS: Energy Meter, Power Supply, Global System for mobile Communication (GSM), Light Dependent Resistor (LDR), Arduino,Relay, LCD .

1. INTRODUCTION:

Now a days the traditional manual Meter Reading was not suitable for longer operating purposes as it spends much human and material resource. It brings additional problems in calculation of readings and billing manually. The number of electricity consumers is increasing in great extent. It became a hard task in handling and maintaining the power as per the growing requirements. Presently maintenance of the power is also an important task as the human operator goes to the consumer's house and produces the bill as per the meter reading. If the consumer is not available, the billing process will be pending and human operator again needs to revisit. Going to each and every consumer's house and generating the

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bill is a laborious task and requires lot of time. It becomes very difficult especially in rainy season. If any consumer did not pay the bill, the operator needs to go to their houses to disconnect the power supply. These processes are time consuming and difficult to handle. The proposed work is implemented for the purpose of getting a real power consumption and accurate reading. Current system Consumes more time and labour. Also, it is slow, costly, and lack in flexibility as well as reliability. Today accuracy in electricity billing is highly recommended. 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. The smart energy meter is less time consuming and cost effective. It provides real time monitoring of electricity uses. The purpose of this project to get automatic electricity reading system. Even though accurate and fast reading are obtained by using GSM system. The design and implementation of a digital GSM based Smart Energy Meter based on microcontroller. Sending details to consumer or utility company through SMS using GSM network by the microcontroller is a distinct feature of this project

2. RESEARCH METHOD

This section will be focusing on the methods used to develop horizontal single axis solar tracker using Arduino approach. It is divided into three sub-section which include the specification of components, software design and hardware design.

2.1. Specification of Components

This section discusses the components that used on this research.

2.2 Block Diagram

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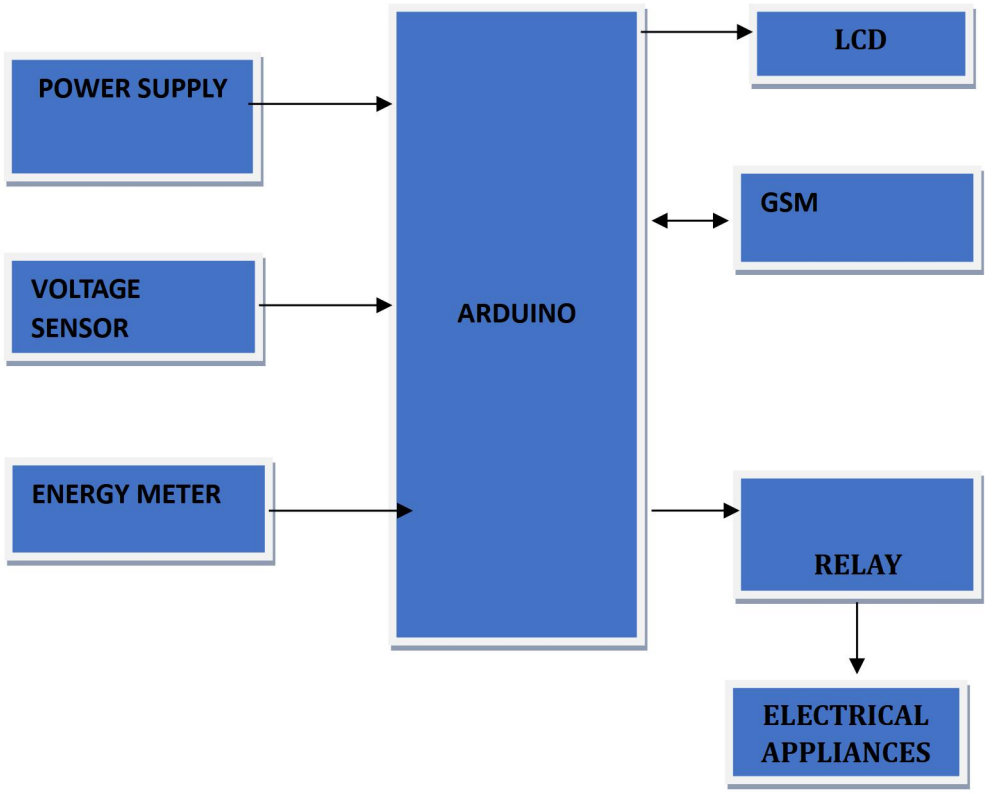


2.3 Arduino UNO

The Arduino UNO is a micro-controller board based on the ATmega328 as shown in Figure 1.It has fourteen digital input/output pins (of which six of it can be used as PWM outputs), six analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the micro-controller; it can simply connect to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

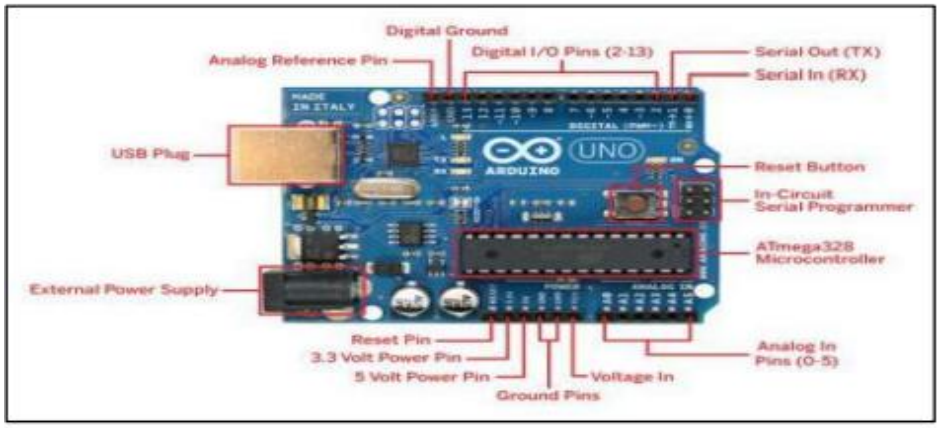


Figure 1. Arduino UNO

2.4 Liquid Crystal Display (LCD)

Liquid Crystal Display (LCD) is an electronic display module or screen and has a wide range of applications. It is very basic and very commonly used in many devices and circuits. LCD

can display sixteen characters per line and a second line on the screen (16x2). The LCD will be displayed in a matrix of 5x7 pixels.

2.5 Energy Meter

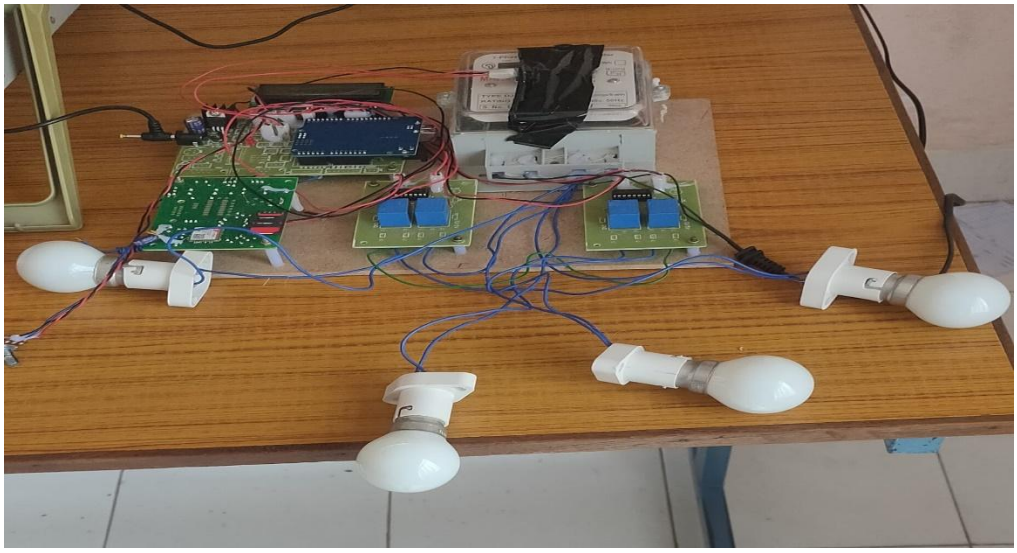
Energy Meter are the basic part to measure the power consumption. It is used everywhere, no matter how big or small consumption it is. It is also known as watt-hour meter. Here we discuss the construction and working principle of induction type energy meter. To understand the structure of watt-hour meter, we must understand the four essential components of the meter

2.6 Light Dependent Resistor (LDR)

A light dependent resistor is made from semiconductor materials which enable them to have their light sensitive properties. Light dependent resistor is very sensitive towards light. The resistance of light dependent resistor may change over many order when light shine on it. Significance value of the resistance falling as the level of light shine on the light dependent resistor increases.

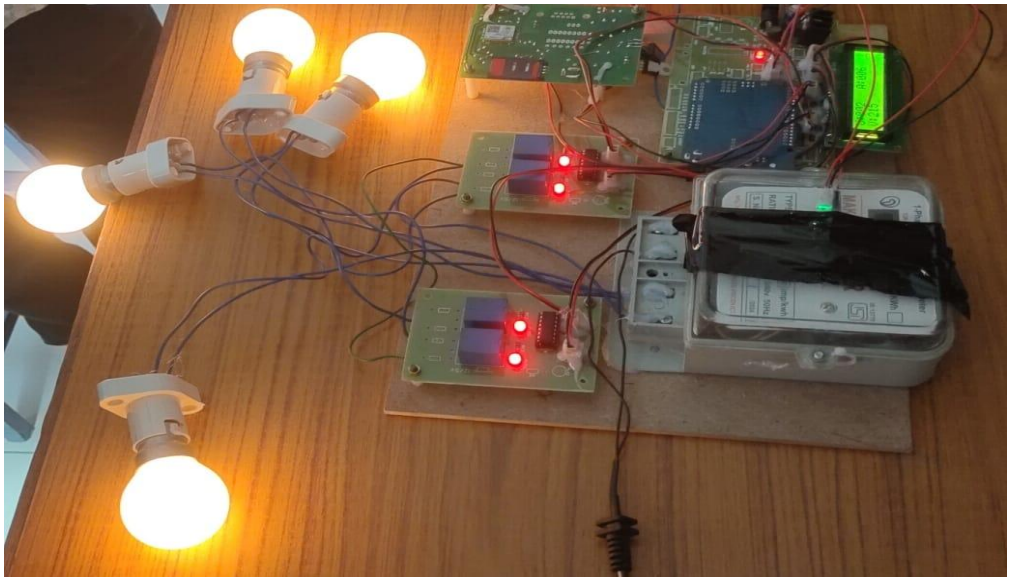
3. Results and Output

The energy meter was tested by using an electric light bulb of 100 watts that draws current up to A. The supply voltage was 230 V. First of all, a wattmeter was used to measure the power consumed by the load. Then energy consumption was measured after every 10 seconds. Total 4 pulses occurred at every 10 seconds in energy meter. The computed energy consumption is read from the LCD.



Total 4 pulses occurred at every 10 seconds in energy meter. The computed energy

consumption is read from the LCD. The test was done over a 2-minute period and measurements were taken every 10 seconds.



4. CONCLUSION

The proposed system for energy meter billing is automatic without human intervention and consumer can directly know the amount has to pay. The electricity board can disconnect or reconnect the connection from remote place through the GSM modem. If the units consumed by the user crosses certain utilization of the power automatically switch off the load connected to it. so that we can reduce the wastage of power in the households etc.

5. FUTURE WORK

Replacing this prepaid billing system with conventional system used currently will overcome the limitation of human error interventions, less accuracy, etc…The proposed system is" Smart" as it indulges less man power and is capable of providing only required amount of energy. We can also buy our own domain for cloud hosting and design completely meter-based website. This will reduce the server problems while recharging and monitoring, making the process faster. We can replace single channel relay by more channel relays for the meter to be used at commercial level.

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