Sms Enable Digital Prepaid Energy Meter

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Abstract : We can see an employee of the electricity board standing in front of our home, performing their monthly duties of reading the energy meter and delivering the bills to the home's owner. It's just a meter reading, nothing more. That passage states that we must pay our bills. The biggest flaw in this approach is that a person must visit each residence individually to read the meter and hand over the invoices. Errors like an excess bill amount or a notification from the power board despite the fact that the bills have already been paid happen frequently. We have developed a solution to this issue that would do away with any middlemen between the customer and the service provider

IndexTerms -Microcontroller Unit,Liquid crystal, miniature circuit breaker,double pole double threw, relay driver,arduino

I. INTRODUCTION

The distribution businesses are unable to keep up with the shifting maximum demand of consumers under the current invoicing scheme. Even though bills are paid on time, the consumer still has issues with receiving past-due bills for payments that have already been made as well as with the reliability and quality of the electrical supply. The solution to all of these issues is to regularly monitor consumer load in order to ensure proper billing, monitor peak demand, and identify threshold values. All of these elements must be considered when creating an effective energy billing system. The current "Smart prepaid energy meter" project addresses the issues that both customers and distribution firms encounter. The focus of the study is the smart energy meter, which combines hardware and software to provide required functionality using embedded system capabilities. The project compares Arduino and other controllers and uses Wi-Fi modems to explain the concept of "smart." while they are near to surpass the threshold value they have established, the consumer and service provider will both receive readings of the amount of spent energy while using a Wi-Fi modem. The user can also track his read material with the aid of a Wi-Fi modem and can change the threshold value via a website. This program

II. SYSTEM ANALYSIS

For this paper, accessible meter reading methods in India are examined, and a thorough investigation of the various energy measuring tools currently in use was done. The quantity of electric energy utilized by a home, a business, or an electrically powered device is measured by an electricity meter, also known as an electric meter, electrical meter, or energy meter. Electric utilities bill customers using electric meters that are put on their property. The current meters have been calibrated in kWh units The "Magnetic Induction" phenomena serves as the foundation for the traditional mechanical energy meter. It has many toothed wheels in addition to the Ferriwheel, a revolving aluminum wheel. The Ferriwheel rotates in response to the current flow, which causes other wheels to also rotate. This will be translated in the display area into the appropriate measurements. Mechanical breakdowns and faults are frequent because there are several mechanical components. Additionally, there will be a greater likelihood of manipulation and current theft. Digital Micro Technology (DMT) is the foundation of the electronic energy meter, which has no moving parts. the EEM is referred to as a "Static Energy Meter" ASIC (Application Specified Integrated Circuit) is a specially created IC that manages EEM's precise operation. ASIC is only built utilizing Embedded for certain applications.,

III. ACCEPTANCE

Monitoring of energy meters at a cheaper cost is made possible through the internet of things, which is more cost-effective than SMS. Daily consumption reports are generated and can be seen on a web site or an Android app. Additionally, android users can pay their electricity bills using an android app. Online bill monitoring and payment is available for non-Android users. The reading values are gathered via energy meters, making the system more dependable and precise. With the help of an Android

application, you may view the energy meter's real-time readings. The readings can also be seen online. All values are maintained in the central server, eliminating the need for labor-intensive human activity. The communication channel is secure, and it is simple to spot when energy meters are being tampered with. If a mistake happens

IV. UNO ARDUINO

The MCU utilized in Arduino UNO R3 as the primary controller is the ATmega328 microcontroller. The AVR family's ATmega328 MCU is an 8-bit chip, therefore its internal registers and data-bus architecture are built to support 8 parallel data streams.

Atmega328 has three different types of memory:

32KB of nonvolatile flash memory. The reason you don't have to upload your program every time you unplug your Arduino from its power source is because this is used for application storage.

2 KB of volatile SRAM memory. This is used to store variables that the running application needs.

• 1KB of nonvolatile EEPROM memory. Using this, data that has to be accessible even after the board is powered down can be stored.

V. METHODOLOGY

- ➢ Microcontroller
- ➢ Potential Transformer
- ➢ Current Transformer
- ➢ Precision Rectifier
- ➢ Relay Driver
- ➢ SIM800L
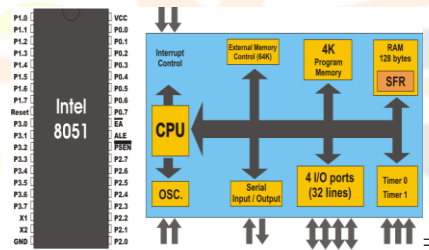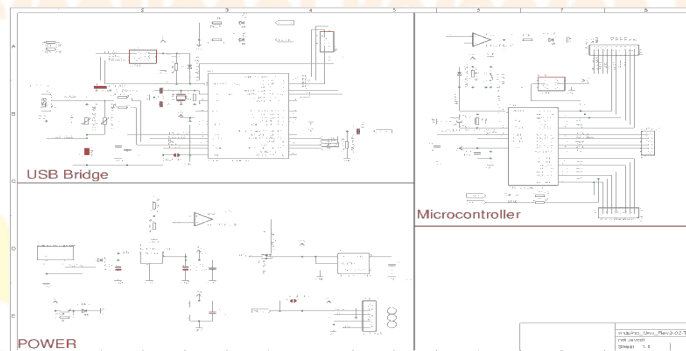- ➢ Alarm
- ➢ LCD Display
- ➢ **Diagram**

Fig 5.1 Basic block of Microcontroller

5.2.Atmega 328 functional block

VI. ARDUINO UNO

Fig 6.1Arduino design (PCB)

Under the terms of the GNU General Public License, version 2, the IDE's source code is made available. Using specific code structuring guidelines, the Arduino IDE supports the languages C and C++. A software library from the Wiring project is made available by the Arduino IDE and includes numerous standard input and output operations. The GNU toolchain, which is also distributed with the IDE, is used to compile and link user-written code into an executable cyclic executive program, which only needs two fundamental functions to start the sketch and the main program loop. The Arduino IDE uses the program avrdude to transform the executable code into a text file in hexadecimal encoding that is loaded into the board's Arduino software by a loader program.

It will take a few seconds for the microcontroller unit to turn on, and then the controller will initialize the liquid crystal display module and print the project title on the display, with the data viewable for a few seconds after that.

VII. RESULTS

7.1 picture of system Power on

When power on it'll take few seconds to power up microcontroller unit and then controller initialize the liquid crystal display module and then print the project title on the display the data visible for few seconds after that controller initialize ESP Module

7.1 GSM Initialization

After clearing the display data's controller initialize ESP module by using respective AT commands. The command consists with module found or not, echo cleared, GPRS connection and server connection the result will printed on the display. After particular time interval controller clear the display and execute next command.


7.2 picture of system Routine Execution

After initializing all sensor modules, controller will update fetched voltage and current on the display. User can power on/off loads by using locally installed keypad or else through webpage. Whenever load state changes, corresponding updates will be

result on both hardware and cloud end. The display does not contain all information we proposed in this system. Some of parameters hide from hardware unit and that will visible on cloud such as energy, unit and price. Controller will calculate energy with interval of one second by using this method we can calculate the energy, unit and price as well.

VIII. FUTURE SCOPE

Primary goal is to provide the entire infrastructure for the energy meter that is currently employed for the notion of smart cities. Readings from energy meters, tampering detection methods, connection and disconnection, as well as the provision of pre-information to users, will all take place on wireless internet in the future. In each region, we will build a few wi-fi hotspots so that all the energy meters can connect and we can configure up to five parameters that will also be tracked. Additionally TANGEDCO's energy meter will receive general improvement information, making it simple for them to manage the situation
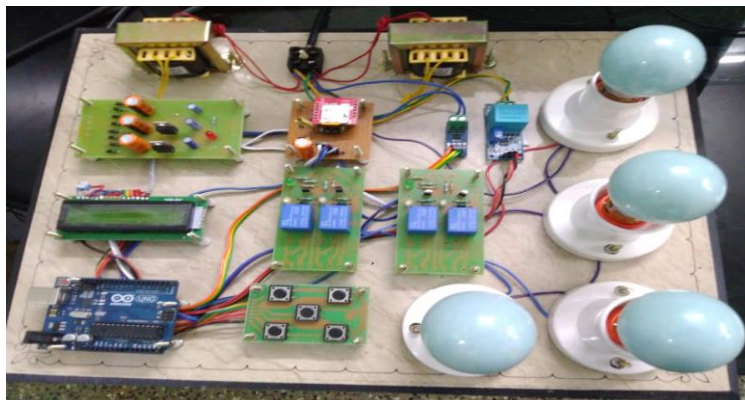
8.1TheAssembled view of proposed system

IX. CONCLUSIONS

This project is primarily concerned with a GSM and Arduino-based smart prepaid energy meter. When we talk about certain issues, people should be informed. The first is that we are switching over to digital meters from conventional electromagnetic ones. For automatic readings and meter connection and disengagement, we employ a GSM module. The meter reading is quicker after that.Customers and TANGEDCO can both access it publicly. They are free to check the bill when connecting and removing the meter before the deadline and can now invoice through the Internet. Both parties will utilize this information in accordance with their demands. A smart app will be used to display all of the information. Our effort came to a successful conclusion after checking the meter bills.

X.REFERENCE

[1] Control application for an internet of things energy meter-a key part of an integrated building energy management system", 2015 IEEE, by Andrzejozadowicz and Jakub Grela.

[2]. "Smart Energy Meter Billing Using GSM with Warning System", IEEE 2017 by P. Loganthurai, M. Veeralakshmi, and A. Vanmathi, Professor, Department of EEE, K.L.N College of Engineering

[3] "Arduino Mega and IOT based Intelligent Energy Meter (IEM) to Increase Efficiency and Accuracy in Current Billing Methodology" ICE-CDS-2017 by OsmiJaiswal and Dilip Chaubisa, undergraduate engineering students at ECEL.D College of Engineering.

[4] Md. Masudur Rahman, Ohidul Islam, and Md. Serazus Salak, "Advanced Metering and Billing System Using Arduino and GSM Based Smart Energy Meter," Pabna University of Science and Technology, Pabna, Bangladesh 2015 IEEE.

[5]["Arduino Board uno," https:// www.arduino.cc/en/Main Arduino Board Uno"

[6] "electricity sector in india",https://en.wikipedia.org/wiki/electricity _sector _in india

[7] "Energy efficiency in the agriculture sector" http://www.theindubusinessline.com.