



International Journal of Intellectual Advancements and Research in Engineering Computations

Wireless energy meter reading transmission

Rathnasabapathy.P, Dhanalakshmi.V, Manikandan.M, Nesamani.T, Prashanth.S

1 Assistant Professor, Dept of ECE, Nandha Engineering College, Erode, Tamilnadu, India.

2,3,4,5 Students, Dept of ECE, Nandha Engineering College, Erode, Tamilnadu, India.

dhannuvasanth1@gmail.com

Abstract—Design and implementation of commercial as well as industrial systems based on wireless communication. This paper presents an implementation methodology for a wireless automatic meter reading transmission system incorporating the widely used GSM. In many countries GSM network is widely known. Using GSM as the medium for WAEMRTS provides a cost effective. It is wireless and also always connected. The WAEMRTS sense information of utility usage. In this paper we suggest a method where we utilize telecommunication systems for automated transmission of data to monitor total power usage of a small scale company.

Keywords: Power logic pm TM210, Arduino, GSM, Max232, Real time clock, Mobile phone.

I. INTRODUCTION

Automatic electric meter reading transmission is one method to reading and transmission is one method to reading and transmission data automatically by using mobile phone. It is the need of improving the automatic level of rapid development of the communication. The energy effectiveness requires strong control of the electric consumption. This is of a great importance for all companies and enterprises but especially for big consumers. So, there is a need of control measurement which has to doubles the commercial one in order to ensure information for the energy transfer with the system operator. It not only may relieve reading person's labor intensity, reduce the reading mistake. It has the advantage of high speed and good real time.

With the project of the wireless energy meter reading transmission complete the design of automatic electric meter reading for wireless communication technology. Through researching the characteristics of main wireless communication protocol, GSM (Global System for Mobile communication) is a digital mobile is a digital mobile telephony system that is the world. GSM uses a variation of time division multiple access. Heart of this wireless energy

meter reading transmission is Arduino board that is based on ATmega 328P microcontroller. The voltage and current input is given to the controller separately and this microcontroller is already programmed for transmitting values such as amount of power utilized by the consumer and also the energy. The transmitted values can be viewed through the serial monitor

and these values are then transmitted to the consumers as SMS

via GSM. These meter readings are uploaded in our specific web page too. The MAX232 is an integrated circuit that converts signal from a serial port to signals suitable for use in digital logic circuits. The MAX232 is a dual transmitter /dual receiver that typically is used to convert the RX, TX, CTS, RTS signal.

II. LITERATURE STUDY

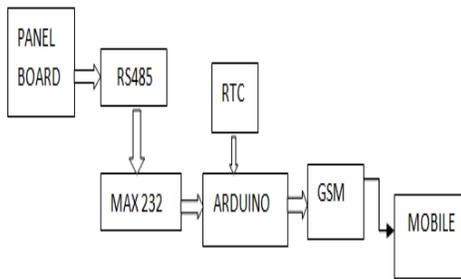
Shraddha Male PallaviVethekar, Kavita More, Prof. V. K. Bhusari are "Smart Wireless Electronic Energy Meter Reading Using Embedded Technology" In this paper he concluded that The metering IC creates the output in the form of pulses which are counted using the default timer of PIC microcontroller unit. These pulses are identified by the transition of high and low voltage of the automatic voltage regulator. A TTL inverter circuit is used to reverse the produced pulse before applying to the counter. For reading the data from the metering IC, microcontroller is programmed using software interfacing. When microcontroller reads the energy usage, this data is stored and updated in software. In this, meter is measured for 1 unit of energy consumption and it creates 3200 pulses in LED.

[1] O. HomaKesav, B. Abdul Rahim are the ideas under the titled of "Automated wireless meter reading system for monitoring and controlling power consumption. The ARM7 LPC2148" microcontroller module takes the data from the energy meter and performs the necessary control operations like breaking the circuit through Relay control unit and the

required information to the mobile phone via the communication module GSM. The MAX-232 which was inbuilt in the ARM7 is used as a serial communication interface for the GSM modem for transmitting the data from the controller to the mobile phone. In the Load bank section a 60W incandescent bulb is used as a load for the purpose of energy consumption of the user.

[2]]The wide proliferation of wireless communication propose and explore new possibilities for the next generation Automatic Meter Reading (AMR) whose goal is to help collect the meter measurement automatically and possibly send commands to the meters. Automation ranges from Connecting to a meter through an RS-232 interface for transmitting the meter measurements all the way from the meter to the utility company via GSM network.

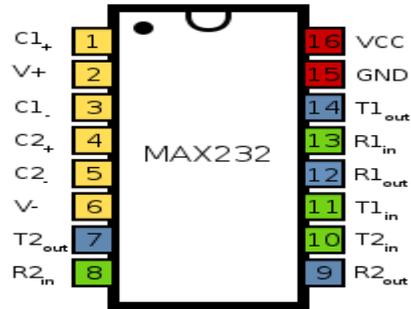
III Block Diagram



IV Explanation of elements

4.1 MAX-232 Basics:

(Recommended standard 232) is a standard for serial binary data signals connecting between a DTE (Data terminal equipment) and a DCE (Data circuit terminating Equipment). The RS-232 standard defines the voltage levels that correspond to logical one and logical zero levels. Valid signals are plus or minus 3 to 25 volts. The range near zero volts is not a valid RS-232 level; logical one is defined as a negative voltage, the signal condition is called marking, and has the functional significance of OFF. Logic zero is positive, the signal condition is spacing, and has the function ON. So a logic zero represented as +3v to +25v and logic one presented as -3V to -25v. Usually all the digital ICs works on TTL or CMOS voltage levels which cannot be used to communicate over RS-232 protocol. So a voltage level converter is needed which can convert TTL TO RS232 and RS232 to TTL voltage. The most commonly used RS-232 LEVEL CONVERTER IS MAX232. This IC includes charge pumps which can generate RS232 voltage levels (-10V and +10V) from 5V power supply. It also includes two receiver and two transmitters and is capable of full duplex UART/USART communication.



4.2 GSM MODULE

The main goals of GSM is to improve spectrum efficiency, international roaming, low-cost mobile sets and base stations, high-quality speech and QoS. The power level of a transmitter within a single cell must be limited to reduce the interference with the neighboring cells. There are several types of cells classified based on their area.

4.3 GSM MODULE

The main goals of GSM is to improve spectrum efficiency, international roaming, low-cost mobile sets and base stations, high-quality speech and QoS. The power level of a transmitter within a single cell must be limited to reduce the interference with the neighboring cells. There are several types of cells classified based on their area coverage Macro cells (3 to 35 km), Microcells(0,1 to 1 km), Pico cells (0,01 to 1km), Nanocells (1m to 10m). Here 2 readily made GSM modules are bought and kept as transmitter and receiver. The GSM module at the user end is connected to the computer with the help of the USB to serial cable converter.



4.3 Real Time Clock

A real time clock is a computer clock that keeps the track of the current time. The purpose of the RTC is low power consumption, frees the main system for time critical tasks, sometimes more accurate than other methods.

4.5 ARDUINO UNO

Arduino Uno board is based on ATmega328P Microcontroller. It has 14 digital pins, 6 analog inputs, 16MHz ceramic resonator, a USB connection, a power jack, an ICSP header and a reset button. The size of the flash memory is 32KB which is used for storing code. The voltage and current input is given to the controller separately and this

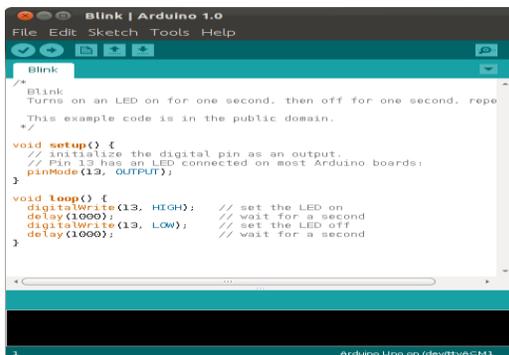
microcontroller is already programmed for calculating values such as amount of power utilized by the consumer and also the energy. The calculated values can be viewed through the serial monitor and these values are then transmitted to the consumers as SMS via GSM. These meter readings are uploaded in our specific web page too.



SOFTWARE

Arduino IDE:

Arduino IDE is an Integrated Development Environment used for Arduino family. It supports both C and C++ programming languages. Arduino supplies the software library, which provides some common input and output procedure. This is an open source board which allows easy coding and upload.



Following are the steps involved in programming an Arduino UNO:

- Open the Arduino IDE
- Go to Tools>Board menu and choose Arduino UNO.
- Make sure that the Arduino UNO is connected to the USB of the computer that you are working in.
- Type the program which you want to dump in to the controller.
- Save the file and verify by clicking the top left button.
- Upload the code into the board by clicking the REFERENCE upload button near the verify button.
- In case of trouble, by pressing the RESET button on the board, the code will start to execute from the first line.

ADVANTAGES

- System helps to maintain the data properly.

- This system is very accurate, simple and low power consumption.
- Which is used for the real time applications.
- Provider side is easy to manipulate for bill generation and other such task.

APPLICATION

- Electricity departments.
- Industrial Energy remote monitoring.
- Household Energy meter monitoring.
- Railway electrical systems.

V CONCLUSION

In the present work wireless meter reading system is designed to continuously monitor the meter reading and It avoids the human intervention, provides efficient meter reading, avoid the billing error and reduce the maintenance cost. It displays the corresponding information on for user notification. and mainly it maintain the database of meter reading which received by the consumer energy meter.

REFERENCES

- [1] YujunBao and Xiaoyan Jiang, "Design of electric Energy Meter for long-distance data information transfers which based upon GPRS", ISA2009. International Workshop on Intelligent Systems and Applications,2009.
- [2] H.G.RodneyTan,C.H. Lee,V.H.Mok,"Automatic power meter reading system using GSM network", The 8 Conference (IPEC 2007). International Power Engineering
- [3] Vivek Kumar Sehgal,Nitesh Panda, NipunRaiHanda, "Electronic Energy Meter with instant billing",UKSim Fourth European Modelling Symposium on Computer Modelling and Simulation.
- [4] Bharath P, Ananth N, Vijetha S, JyothiPrakash K. V. ,"Wireless automated digital Energy Meter", ICSET 2008.
- [5] P.K. Lee and L.L. Lai, Fieeee, "A practical approach to wireless GPRS on-line power quality monitoring system", Power Engineering Society General Meeting, 2007.
- [6] SubhashisMaitra, "Embedded Energy Meter- A new concept to measure the energy consumed by a consumer and to pay the bill", Power System Technology and IEEE Power India Conference, 2008.
- [7] T El-Djazairy, B J Beggs and I F Stewart, " Investigation of the use of the Global System for Mobile Communications (GSM) network for metering and load management telemetry", Electricity Distribution. Part 1: Contributions. CIRED.14th International Conference and Exhibition on (IEE Conf. Publ. No. 438).
- [8] Li Kaicheng, Liu Jianfeng, YueCongyuan, Zhang Ming. "Remote power management and meter-reading system based on ARM microprocessor" , Precision Electromagnetic Measurements Digest, 2008. CPEM 2008.Conference on Digital Object Identifier.
- [9] M.P Praveen, "KSEB to introduce SMS-based fault maintenance system", The Hindu News on 26/06/2011, <http://www.hindu.com>.