ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

Data Transfer with in the Future Microgrids by Using Zigbee & IOT

E.Aparna
M.Tech Student,
Dept of ECE,
MRIET, Maisammaguda,
Dhulapally Village, Hakimpet,
Medchal Mandal, Ranga Reddy
District, Telangana, India.

Dr.M.Narsing Yadav, MS, Ph.D
Professor & HOD,
Dept of ECE,
MRIET, Maisammaguda,
Dhulapally Village, Hakimpet,
Medchal Mandal, Ranga Reddy
District, Telangana, India.

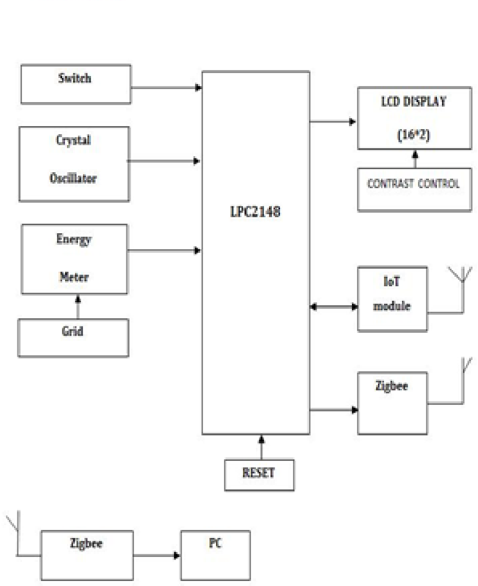
M.Naresh
Assistant Professor,
Dept of ECE,
MRIET, Maisammaguda,
Dhulapally Village, Hakimpet,
Medchal Mandal, Ranga Reddy
District, Telangana, India.

ABSTRACT:
By embedding computational capabilities in all kinds of objects and living beings, it will be possible to provide a qualitative and quantitative leap in several sectors: healthcare, logistics, domestics, entertainment, and so on. Due to the drastic changes in technology in the last decade, so many advancements were introduced in electricity departments. The electricity bill can be paid now through E-Seva centers, Net-banking and even through mobile phones.In this project electricity consumption by the user i.e. Units consumed in that meter will be sent to PC using zigbee module and also 16X2 LCD is provided to read units available. Whenever there is a change in count of units in the meter, then these values are displayed on LCD and also updated in the PC. Here we are using zigbee for the purpose of communication. An IoT module is included to update the information.

Keywords:
Arm7 Processor, Zigbee, IOT, Energy meter, Grid.

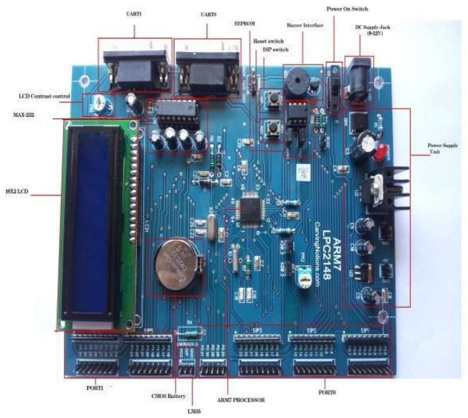
I. INTRODUCTION:
A smart meter is usually an electrical meter that records consumption of electric energy in intervals of hour or less and communicates that information at least daily back to the utility for monitoring and billing purposes (Smart grid, 2013). Smart meters enable two-way communication between the meter and the central system. Unlike home energy monitors, smart meters can gather data for remote reporting (Botha, 2008; Transportation demand management, 2013).Smart metering system is the first step toward moving the electric grid into the digital age. Our smart meters have two-way communication capabilities using ZigBee enabled wireless communication to allow consumers to view their electricity usage in unit interval increments and on demand, which can encourage them to save energy and money.

BLOCK DIAGRAM

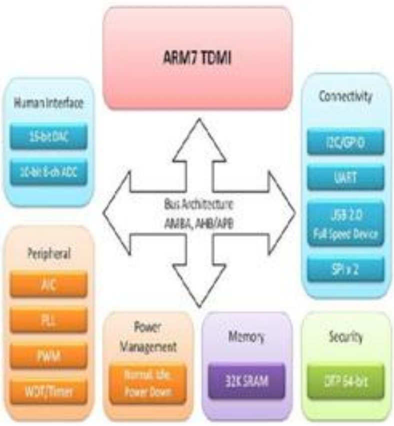


II. HARDWARE MODULES
A. LPC2148 CONTROLLER
The LPC2148 are based on a 16/32 bit ARM7TDMI-S™ CPU with real-time emulation and embedded trace support, together with 128/512 kilobytes of embedded high speed flash memory

ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal



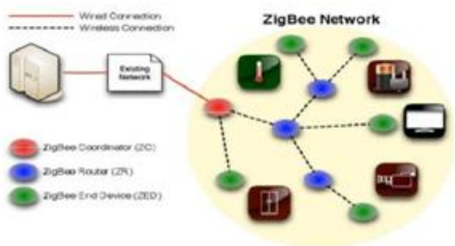
A 128-bit wide memory interface and unique accelerator architecture enable 32-bit code execution at maximum clock rate. For critical code size applications, the alternative 16-bit Thumb Mode reduces code by more than 30% with minimal performance penalty. With their compact 64 pin package, low power consumption, various 32-bit timers, 4- channel 10-bit ADC, USB PORT,PWM channels and 46 GPIO lines with up to 9 external interrupt pins these microcontrollers are particularly suitable for industrial control, medical systems, access control and point-of-sale. With a wide range of serial communications interfaces, they are also very well suited for communication gateways, protocol converters and embedded soft modems as well as many other general-purpose applications.



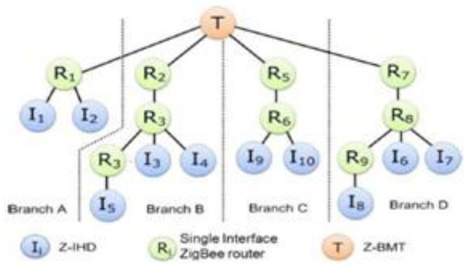
B. ZIGBEE:

The main constituent of this reported idea is ZigBee based smart meter model.

The ZigBee is the product of the ZigBee Alliance, an organization of manufacturers dedicated to developing a new networking technology for small, ISM-bands (Coronet, 2005). ZigBee supported as a low-cost, low-power, low-data rate wireless mesh technology. The ZigBee specification identifies three kinds of devices that incorporate ZigBee radios, with all three found in a typical ZigBee network coordinator, which organizes the network and maintains routing table's routers, which can talk to the coordinator, to other routers and to reduce function end devices, reduced function end devices which can talk to routers and the coordinator (Coronet, 2005).



It is the wireless device for transmitting and receiving purpose or simply it called as Transceiver. Zigbee is based on the IEEE802.15.4 protocol. The range of the Zigbee is covered as 100m. It range is 10 times better than Bluetooth device so it can be more preferable one in wireless device. The data rate is very low for transmission while using this device.



ZigBee floor network tree.

C. GRID:

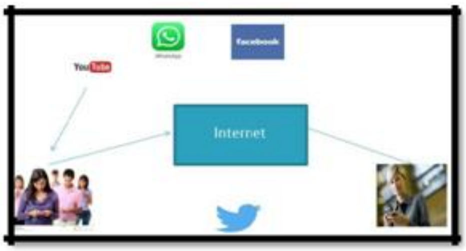
The term grid usually refers to a network, and should not be taken to imply a particular physical layout or breadth. Grid may also be used to refer to an entire electrical network, a regional transmission network or may be used to describe a sub network such as a local

ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

utility's transmission grid or distribution grid.

D. Internet of Things:

Internet is helping people to communicate each other using different applications using IoT module.



The Internet of Things (IoT) is the network of physical objects or "things" embedded with electronics, software, sensors, and network connectivity, which enables these objects to collect and exchange data.In this project ESP8266EX is used

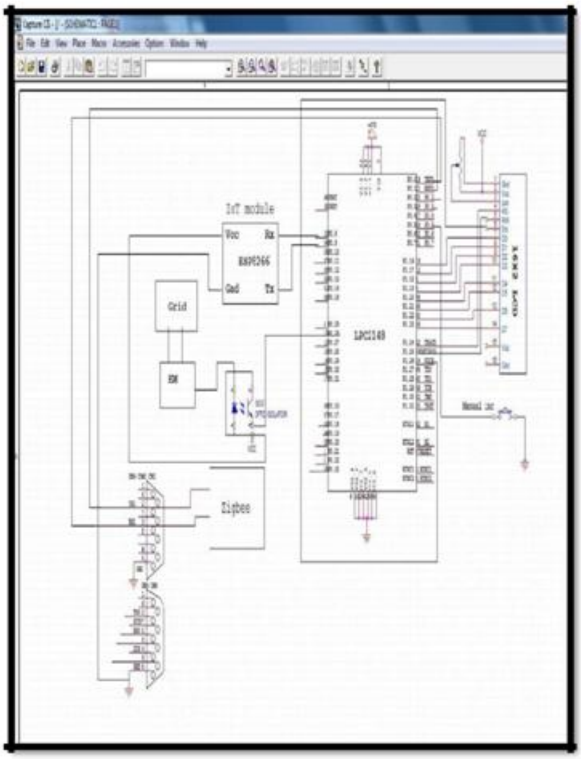
➢ESP8266EX:

ESP8266EX has been designed for mobile, wearable electronics and Internet of Things applications with the aim of achieving the lowest power consumption with a combination of several proprietary techniques.

E. Energy Meter-ADE7757:

The ADE7757 is a high accuracy electrical energy measurement IC. It is a pin reduction version of the ADE7755 with an enhancement of a precise oscillator circuit that serves as a clock source to the chip. The ADE7757 eliminates the cost of an external crystal or resonator, thus reducing the overall cost of a meter built with this IC. The chip directly interfaces with the shunt resistor and operates only with ac input.

Schematic representation of project

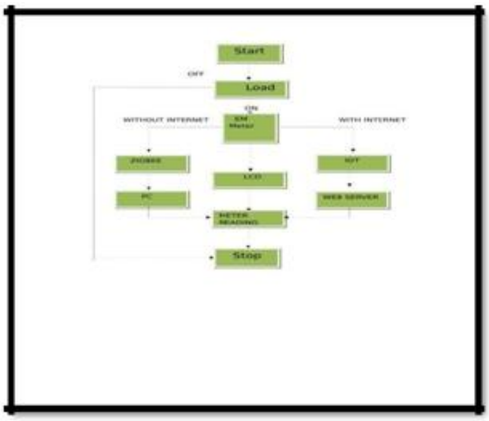


III. SOFTWARE DETAILS

Keil compiler:

Keil compiler is software used where the machine language code is written and compiled. After compilation, the machine source code is converted into hex code which is to be dumped into the microcontroller for further processing. Keil compiler also supports C language code

Flow chart of project:



ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

V. RESULTS:

Fig. Experimental Set-up

Fig. Meter Reading LCD Display

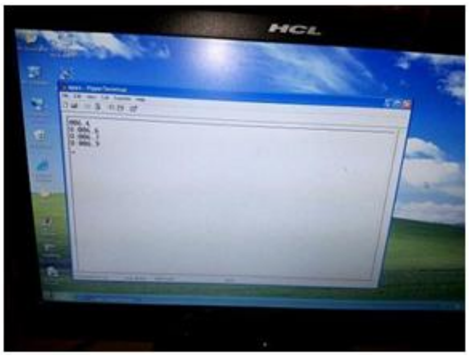


Fig: Meter Reading in PC By Using ZIGBEE

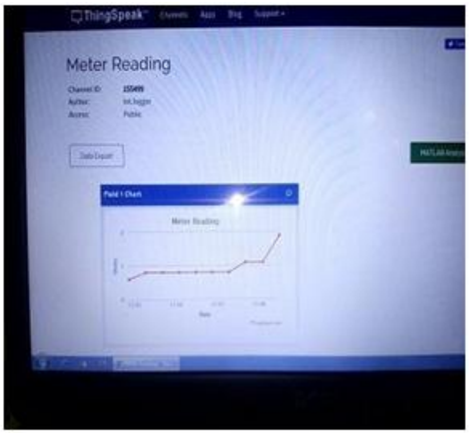


Fig: Meter Reading In Webserver using IOT

ADVANTAGES:

Ease of maintenance

Accessing the data from other place

Less power consumption

Very faster communication

VI. APPLICATIONS:

1. Industrial Automation
2. Weather stations
3. Agricultural

VII .CONCLUSION:

It can reduces problem associated with billing consumer living in isolated area and reduces deployment of manpower for taking meter readings

VIII .REFERENCES:

1.P. Siano, C. Cecati, H. Yu, and J. Kolbusz, "Real time operation of smart grids via FCN networks and optimal power flow," IEEE Trans.Ind. Inf., vol. 8, no. 4, pp. 944–952, Nov. 2012.

2.W. Su,H. Eichi,W. Zeng, andM.Y.Chow, "Asurvey on the electrification of transportation in a smart grid environment," IEEE Trans. Ind.Inf., vol. 8, no. 1, pp. 1– 10, Feb. 2012.

3.F. Benzi, N. Anglani, E. Bassi, and L. Frosini, "Electricity smartmeters interfacing the households," IEEE Trans. Ind. Electron., vol. 58, no. 10,pp. 4487–4494, Oct. 2011.

4.J.Haase, J.M. Molina, andD.Dietrich, "Power-aware system design of wireless sensor networks: Power estimation and power profiling strategies,"IEEE Trans. Ind. Inf., vol. 7, no. 4, pp. 601–613, Nov. 2011.

5.P. Palensky and D. Dietrich, "Demand side management: Demand response, intelligent energy

ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

systems, smart loads," IEEE Trans. Ind. Inf.,vol. 7, no. 3, pp. 381–388, Aug. 2011.

6.Y. H. Jeon, "QoS requirements for the smart grid communications system," Int. J. Comput. Inf. Sci., vol. 11, no. 3, pp. 86–94, 2011.

7.Y. Simmhan, Q. Zhou, and V. K. Prasanna, "Chapter: Semantic information integration for smart grid applications," in Green IT: Technologies and Applications. Berlin, Germany: Springer, 2011.

8.Z. M. Fadlullah, M. M. Fouda, N. Kato, A. Takeuchi, N. Iwasaki, and Nozaki, "Toward intelligent machine-to-machine communications in smart grid," IEEE Commun. Mag., vol. 49, no. 4, pp. 60–65, Apr.2011.

9.P. T. A. Quang and D. S. Kim, "Enhancing real-time delivery of gradient routing for industrial wireless sensor networks," IEEE Trans. Ind. Inf., vol. 8, no. 1, pp. 61– 68, Feb. 2012.

10.U.S. DOE, "Locke, Chu Announce Significant Steps in Smart Grid Development," 2009. [Online]. Available: http://www.energy.gov/news2009/7408.htm.

11. Dept. Energy Commun., "Communications requirements of smart grid technologies," Oct.5,2010.

12.Robert H. Lasseter, Paolo Piagi, "The design space of wireless sensor networks", in Proc. IEEE 35th Annu. Power Electron. Spec. Conf., Aachen, Germany, pp. 4285–4290, 2004.

13.A. Sendin, "Communication and Networking in Smart Grids", in Communication and Networking in Smart Grids, Y. Xiao, Ed. Boca Raton, FL, USA: CRC Press, pp. 241–275, 2012.

14.Department of Energy, US government, "Smart Grid", https://www.smartgrid.gov .

15.Nithin.S and Dr.N.Radhika, "Smart Grid test bed based on GSM", Procedia Eng., vol. 30, no. 2011, pp. 258–265, 2012.

16.N. C. Batista, R. Melício, J. C. O. Matias, and J. P. S. Catalão, "Photovoltaic and wind energy systems monitoring and building/home energy management using ZigBee devices within a smart grid," Energy, vol. 49, pp. 306–315, Jan. 2013.