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DATA LOGGER SYSTEM

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ABSTRACT

The purpose of this paper is to develop a Data logger system, using Zigbee & Energy IC AD 7751. Basically,. The main purpose of this project is to read the Energy meter reading and transmit the reading to PC through Zigbee based wireless transmission. The final output of this project is going to be the reading of the meter to be displayed on PC wirelessly.

Keywords: ***CT, Energy IC, Microcontroller Atm 16, Xbee.***

I .INTRODUCTION

The device that records data over time or in relation to location either with a built in instrument or sensor or via external instruments and sensors. Increasingly, but not entirely, they are based on a digital processor (or computer). They generally are small, battery powered, portable, and equipped with a microprocessor, internal memory for data storage, and sensors. Some data loggers interface with a personal computer and utilize software to activate the data logger and view and analyse the collected data, while others have a local interface device (keypad, LCD) and can be used as a standalone device.

The purpose of this project is to read the Energy meter reading and transmit the reading to PC through Zigbee based wireless transmission. This system helps to give a quick reference to the users. This can be achieved by the use of control unit that continuously reads the meter into its permanent (non-volatile) memory location. Then the control unit takes the responsibility to transmit the data and the received data is sent to PC. The final output of this project is going to be the reading of the meter to be displayed on PC wirelessly.

Data loggers typically have slower sample rates. A maximum sample rate of 1 Hz may be considered to be very fast for a data logger, yet very slow for a typical data acquisition system. Data loggers are implicitly standalone devices, while typical data acquisition system must remain Tethered to a computer to acquire data.

This standalone aspect of data loggers implies onboard Memory that is used to store acquired data. Sometimes this memory is very large to accommodate many days, or even months, of unattended recording. This memory may be battery backed static random access memory, flash memory or EEPROM. Earlier data loggers used magnetic tape, punched paper tape, or directly viewable records such as "strip chart recorders". Given the extended recording times of data loggers, they typically feature a mechanism to record the date and time in a timestamp to ensure that each recorded data value is associated with a date and time of acquisition in order to produce a sequence of events. As such, data loggers typically employ built-in real-time clocks whose published drift can be an important consideration when choosing between data loggers. Data loggers range from simple single channel input to complex multichannel instruments.

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II. LITERATURE REVIEW

1) ZHANG Weiyong, Feng Lin & Wei Zhenchun, "Research on home networking with Zigbee", Journal of Hefei University of technology, 2005.In this paper, they conclude zigbee is a home area network designed specifically to replace the proliferation of individual remote control. Zigbee was created to satisfied the markets need for a cost effective, standard based wireless network that supports low data rate, low power consumption, security & reliability.[1]

2) Chen Dechuan & Wang Meifang "A Home security Zigbee network for remote monitoring application", 2006 IET. In this system, availability of zigbee based sensor network technology with low power consuming sensors has made their implementation in healthcare possible particularly for remote patient monitoring. This paper introduces an experimental home security monitoring & alarming system based on zigbee technology.[2]

3) H.G.RODNAY TAN "An automatic power meter reading system using GSM network" in (2007).In this system GSM digital power meter installed in every consumer unite and electricity billing system at the energy provider side. Using GSM technology he was developed billing system for energy meter system which can be energy provider side. The development of a GSM automatic power meter reading (GAPMR) system is presented in this paper. This system is consisting of GSM digital power meters installed in every consumer unit & an electricity e-billing system at the energy. [3]

4) SHUBHASHIS MAITRA "Embedded Energy Meter- A new concept to measure the energy consumed by a consumer & to pay the bill" (oct.2008) .In this paper a new concept of energy meter will be discussed, where maximum demand of energy of consumer will be indicated in meter used by the consumer. After exceeding the maximum demand, the meter an hence the connection will automatically we disconnected by an embedded system inserted in meter itself. Also helps to eliminate the drawbacks of billing management system.[4]

III. OBJECTIVE

1. To develop microcontroller based wireless Data Logging System.
2. To interface a zigbee module this will work as wireless device.
3. To record the transmitted data using RS232 communication to Excel sheet on the PC
4. Ability to collect the data on 24 hour basis.

IV. MEHODOLOGY

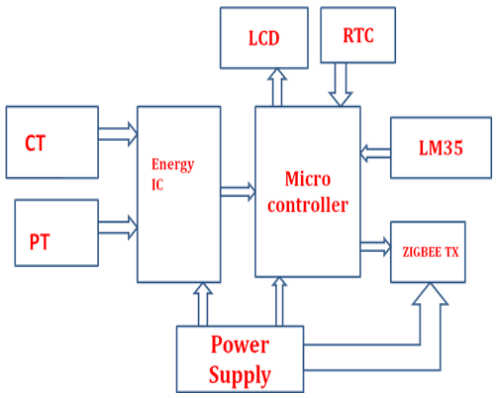

Fig.1: Transmitter side block diagram

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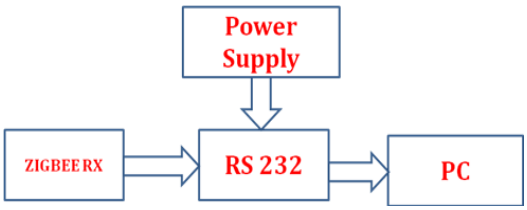

Fig.2: Receiver side block diagram

V. WORKING

The current transformer & potential transformer with the turn ratio is used in order to step down the voltage & further the voltage divider network is connected so as to get the required voltage for the energy IC.CT is connected in series with single phase commercial line. Current transformer reduce high voltage currents to a much lower value & provide a convenient way of safely monitoring actual electrical current flowing in an ac transmission line using a standard ammeter. (fig.1)

At receiver side, another zigbee is acts as a receiver zigbee through its serial port the module can communicate with any logic & voltage compatible UART or through a level translator to any serial device .Zigbee is a wireless technology developed as an open global standard to address the unique needs of low-cost, low-power, wireless sensor networks. Zigbee is the set of specs built around the IEEE 802.15.4 wireless protocol. (fig.2)

At the end of work all data like temperature voltage current & power consumption is displayed on excel sheet of PC. The XBee® /XBee-PRO® RF Module was designed to mount into a receptacle (socket) and there-fore does not require any soldering when mounting it to a board. The XBee Development Kits con-train RS-232 and USB interface boards which use two 20-pin receptacles to receive modules. By default, XBee®/XBee-PRO® RF Modules operate in Transparent Mode. When operating in this mode, the modules act as a serial line replacement - all UART data received through the DI pin is queued up for RF transmission. When RF data is received, the data is sent out the DO pin.

The MAX232 device is a dual driver/receiver that Meets or Exceeds TIA/EIA-232-F and ITU Recommendation V.28 includes a capacitive voltage generator to supply TIA/EIA-232-F voltage levels from a single 5-V Operates From a Single 5-V Power Supply With supply. Each receiver converts TIA/EIA-232-F inputs 1.0-µF Charge-Pump Capacitors to 5-V TTL/CMOS levels. The MAX232 device is a dual driver/receiver that meets or Exceeds TIA/EIA-232-F and ITU Recommendation V.28 includes a capacitive voltage generator to supply TIA/EIA-232-F voltage levels from a single 5-V TTL/CMOS input levels into TIA/EIA-232-F levels. Virtual wires can be set up between XBee®/XBee-PRO® Modules.

When an RF data packet is received that contains I/O data, the receiving module can be setup to update any enabled outputs (PWM and DIO) based on the data it receives. Note that I/O lines are mapped in pairs. For example: AD0 can only update PWM0 and DI5 can only update DO5. The default setup is for outputs not to be updated, which results in the I/O data being sent out the UART (refer to the IU (Enable I/O Output) command). To enable the outputs to be updated, the IA (I/O Input Address) parameter must be setup with the address of the module that has the appropriate inputs enabled. This effectively binds the outputs to a particular module's input. This does not affect the ability of the module to receive I/O line data from other modules - only its ability to update enabled outputs. The IA parameter can also be setup to accept I/O data. Then this data can be transfer to PC which is displayed on the excel sheet.Figure 3 shows actual flow of system.

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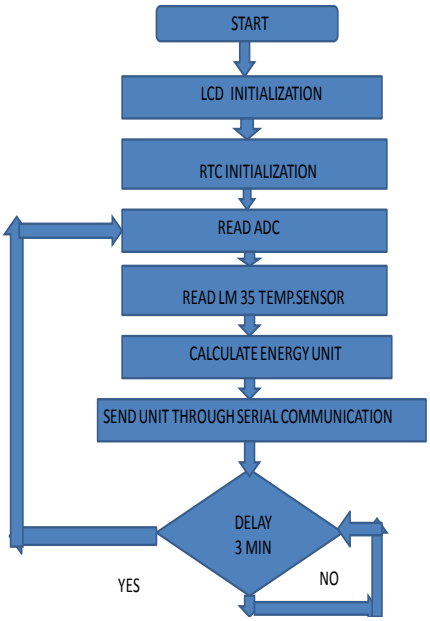

Fig 3.Flow chart of Transmitter & Receiver side

VI. CONCLUSION

In this project, we have concluded the design implementation & evaluation of a data logger system. The system detects user side energy consumption with temperature in real time system. This method is very suitable for data logging in experimental and plant monitoring. The PC is always located at a place with electric supply.

The data logger system that allows users to read unit & with the use of wireless technology it can be sent to the receiver side. The ZigBee protocol is a wireless technology developed as an open global standard to address the unique needs of low-cost, low power, wireless sensors network.

This wireless data logger senses and monitors the variations in the local temperature thereby transmits the data within the range to an assigned received temperature is displayed on a local liquid crystal display (LCD) on assigned server and simultaneously on a computer. By using the current & potential transformer the corresponding energy consumption was displayed on Microsoft excel sheet.

VII. ACKNOWLEDGMENT

First and foremost we want to thank our Guide Assistant Professor S.S.Patil for constant encouragement & Nobel guidance. With great pleasure & gratefulness, we extend our deep sense of gratitude to Prof.J.K.Ravan, H.O.D, Electronics & Telecommunication Engg.Dept.For giving us an opportunity to accomplish our paper & to increase our knowledge. Lastly we wish each & every person involved in making our dissertation successfully. Thank you.

VIII. FUTURE SCOPE

Future work will build upon the EEPROM (Electrically erasable program read only memory).When the power supply is off then all data will be save in EEPROM chip, rather power supply is on it will displayed on LCD.

The project will also work upon GSM technology, where the consumption of unit will be send to user via SMS.

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