ISSN: 2277-9655
(I2OR), Publication Impact Factor: 3.785

IJESRT

INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES & RESEARCH TECHNOLOGY

IMPLEMENTATION OF ZIGBEE(802.15.4) FOR DATA LOGGER

Mohammad Rafakath*, Sachin Tyagi
Scholar Master of Technology, Dept. of Electronics and Communication Engineering, Roorkee College of Engineering, Roorkee, UK, India
Assistant Professor, Dept. of Electronics and Communication Engineering, Roorkee College of Engineering, Roorkee, UK, India

ABSTRACT

The aim of this dissertation is to provide data logger for remote system. It consists of a temperature sensor for constantly monitoring temperature and Zigbee module for wireless data transfer. The measured temperature parameter will be sent to microcontroller. And with the help of Zigbee module temperature is sent to computer from remote area.

Present time is sent with the help of inbuilt RTC which ARM7 (LPC2148) microcontroller has got. There will also provision for setting of RTC time if user required in any case and it is done with the help of remote computer. When microcontroller circuit power up then user is ask to set RTC time and if user does set RTC time then RTC will be set to previous value which is being running continuous with the help of 3.3V lithium cell and after this data transfer take place continuously which appears on computer via Zigbee module connected to computer .

KEYWORDS: Embedded, data logger, Zigbee, ARM Microcontroller,LM35, LPC2148, temperature sensor

INTRODUCTION

A data logger is a device which collect and provide data mostly in real time. The system gets the data by build in instrument or sensor. Unfortunately, most of the wireless data logger products in markets are expensive, complicated and unfriendly with user.

The original model for this system consists of stand alone data logger. As the requests from users are getting higher, the application of wireless communication as medium transmission rather than the use of wires. Other than that, extra features or some kind of bonus will be add to this system which is capable to access to wireless communication for alarming some events. Moreover, these systems which apply low power consumption are easy to manage and install. It is based on wireless sensor networks.

Wireless Sensor Network consists of large numbers of sensor nodes. The nodes are equipped with sensor devices that are used for a certain applications. For example, the sensor device is camera and it is used to retrieve the environment data visually, microphone is used to detect the sound, thermometer and thermocouple are used to detect the changes in temperature. Every sensor nodes are also equipped with wireless module in order to communicate with each other. The communication between the nodes are performed by establishing the routing topology in the system before the data can be transmit from the certain sensor node to the collection point or host

Wireless sensor network (WSN) is an emerging technology and has great potential to be employed in critical situations. Wireless sensor networks have been deployed in various monitoring applications such as industrial, health, environmental, and security The Wireless Sensor Networks comprise of relatively inexpensive sensor nodes capable of collecting, processing, storing and transferring information from one node to another. These nodes are able to autonomously form a network through which sensor readings can be propagated. Therefore, a standard is required that is capable of establishing the network between these nodes as well as provide low cost and less power consumption. Fortunately, there is a standard called ZigBee that is capable of accomplishing all these requirements.

ISSN: 2277-9655
(I2OR), Publication Impact Factor: 3.785

MATERIALS AND METHODS

Implementation of data logger consists of three main component shown in block diagram.

1. LM35 temperature sensor
2. ARM microcolroller (LPC2148)
3. Zigbee (802.15.4)

1. LM35 temperature sensor: Sensor provide output in analog form. Its provide 10mV/C, it means that for 30 *C sensor will provide 300mV output. And sensor is interface to microcontroller.
2. ARM microcontroller (LPC2148):For programming microcontroller Keil compiler is used and language used is Embedded C. LPC2148 has 10-bit ADC, microcontroller accept the analog output from sensor and convert it using it inbuilt ADC. Temperature as a data is provided with respect to time, clock timing is maintained with the help of inbuilt RTC, which stores the value even in power off mode using 3V lithium cell. Temperature and time value is transmitted through Zigbee to receiver Zigbee connected to computer. Zigbee is interface to microcontroller through UART.
3. Zigbee: For configuration of Zigbee XCTU software is used which is provided from DIGI international company. The XBee and XBee-PRO RF Modules were engineered to meet IEEE 802.15.4 standards and support the unique needs of low-cost, low-power wireless sensor networks. The modules require minimal power and provide reliable delivery of data between devices. The modules operate within the ISM 2.4 GHz frequency band and are pin-for-pin compatible with each other. 802.15.4 defines the physical and MAC layers, and ZigBee defines the network and application layers. For sensor network applications, key design requirements revolve around long battery life, low cost, small footprint, and mesh networking to support communication between large numbers of devices in an interoperable and multi-application environment.

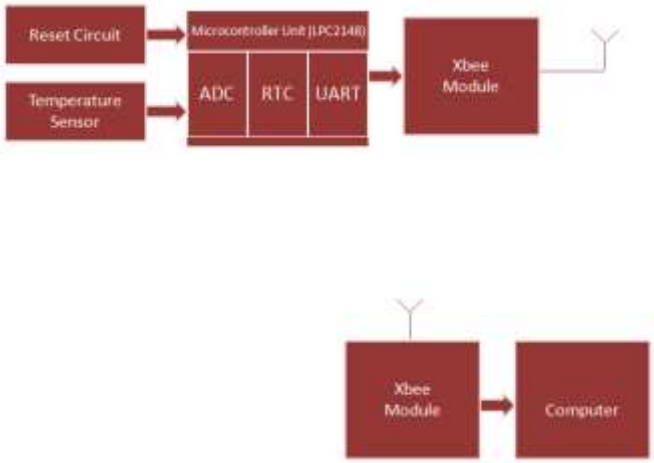

Figure 1.

RESULTS AND DISCUSSION

This project is developed for remote monitoring of system with respect of time. Therefore user does not need go to remote area to know the temperature of device .The device developed can work efficiently up to a 30m distance depending upon surrounding environmental and 100m for open air, which can be used as a modern technique as per requirement .

ISSN: 2277-9655
(I2OR), Publication Impact Factor: 3.785

Result and output

Transmitter Section photo is shown in figure 2.0

Figure 2.0

Receiver Section photo is shown in figure 2.1

Figure 2.1

When transmitter section is switch on then at receiver section on computer screen output will be displayed, so that user can give input for time and if in case user don't provide input for time then previous stored time value in EEPROM memory of microcontroller will be assigned.

ISSN: 2277-9655
(I2OR), Publication Impact Factor: 3.785

Below Figure 2.2 shown for user input for setting of RTC value.

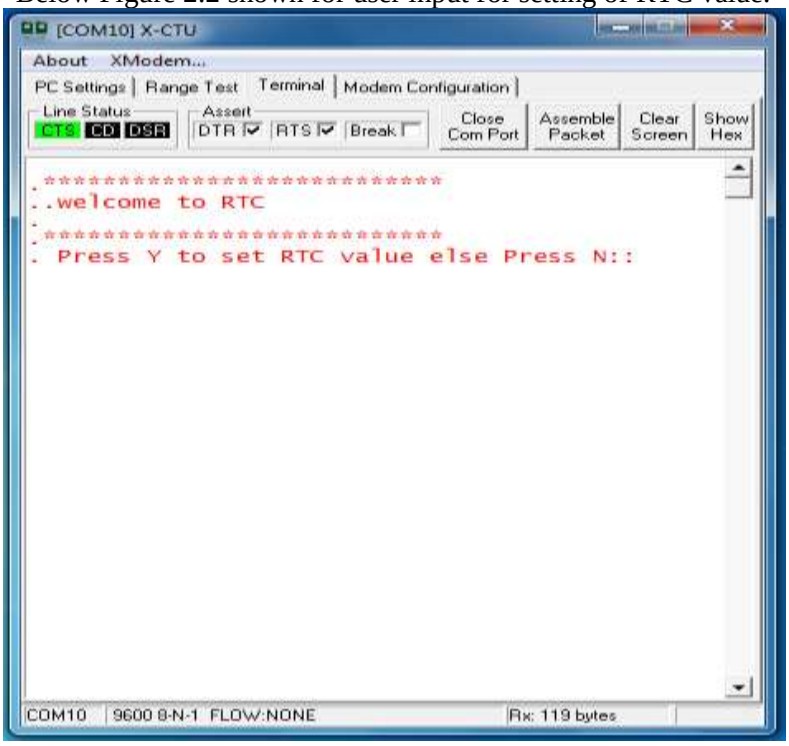

Figure 2.2

Output is shown in figure 2.3 which is being displayed on computer screen

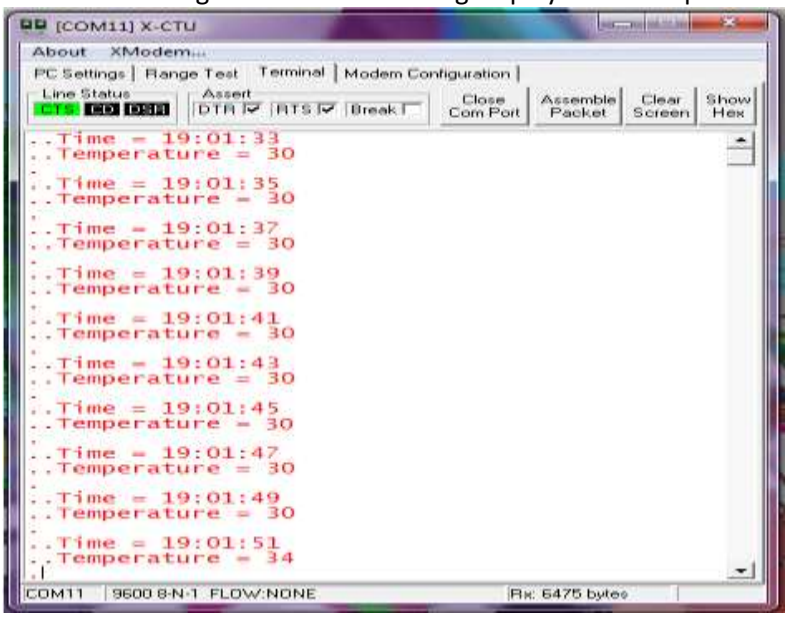

Figure 2.3

REFERENCES

[1] Mahesh G and Mrs. Y. Syamala, "Weather Data Logger Using ARM Processor", International Journal of Advanced Research in Computer Science and Software Engineering,Vol 3, pp. 2277 128X, JNTU, INDIA, 2013

[2] Md. Moyeed Abrar and Rajendra R. Patil, "Multipoint Temperature Data Logger and Display on PC through Zigbee using PSoC", International Journal of Advanced Research in Computer and Communication Engineering, Vol. 2, pp. 2278-1021, AIET, Gulbarga, India, 2013

[3] H.Vijaya Laxmi and M.Narender, "Communication b/w Mobile-Robots'and PC controller Based On ZigBee Network", International Journal of Engineering Research and Applications,Vol. 1, pp. 2248-9622, SREC Warangal, AP, India

[4] Arun Kumar, "A Zigbee Based Wireless Datalogging System" International Journal of Scientific & Engineering Research Vol. 3, pp. 2229-5518, India, 2012

[5] P.V. Mane-Deshmukh, B.P. Ladgaonkar, S.C. Pathan and S. S. Shaikh, " Microcontroller Pic 18f4550 Based Wireless Sensor Node to Monitor Industrial Environmental Parameters", International Journal of Advanced Research in Computer Science and Software Engineering, Vol. 3, pp. 2277 128X, Akluj, India, 2013

[6] Nashtara Islam, Robert Watson and Philip Moore,"Z8 Encore Microcontroller Based Data Logging System",AUJT, Loughborough University Leicestershire, United Kingdom, 2006

[7] Howitt I and Gutierrez J.A, "IEEE 802.15.4 Low Rate –Wireless Personal Area Network Coexistence Issues", IEEE Conference of Wireless Communications and Networking, Vol. 3, pp. 1481-1486, New Orleans, LA, USA, 2003.

[8] Li J and Liu Q, "Application and Research of ZigBee Tehnology in the Miner's Lamp Monitoring", IEEE International Conference on Future Information Technology and Management Engineering, Vol. 1, pp. 317-320, Changzhou, 2010.