

Automatic Power Controlling and Energy Management using ZigBee Network

Madhu Hubballi¹, Manjunath Bevinamatti², Pooja Patil³,
Vinayakareddy Kamatta⁴, Mallikarjuna G.D⁵

¹⁻²⁻³⁻⁴ department Of Electrical And Electronics Engineering, U G Students, Tontadarya College Of Engineering, Gadag Karnataka, India.

⁵ department Of Electrical And Electronics Engineering, Assistant Professor, Tontadarya College Of Engineering, Gadag Karnataka, India.

ABSTRACT: The proposed Automatic power controlling and energy management using ZigBee network. It uses ZigBee-based wireless devices which enable more efficient street lamp-system management and automatic LT line cut-off indication to the electricity boards is helps reduce power losses and automatic street light controlling system will helps to saving the energy without wastage of power. To save energy is more important than generation of energy by this method we can improve the energy problems face by many fields. This project is a study of automatic power controlling and energy management using ZigBee network. Monitoring of street lights and controlling is of utmost importance in developing country like India to reduce the power consumption. The paper presents a remote streetlight monitoring and controlling system based on LED and wireless sensor network. The system can be set to run in automatic mode, which control streetlight.

Keywords: Power System, Control System, Zigbee Network, Power Consumption.

I. INTRODUCTION

The whole area lights are controlling through computer using ZigBee technology. Initially the KEB person has to give the command to PC, this signal will given to the ZigBee module through MAX232 IC. The ZigBee module sends the data to air. And at receiver end another ZigBee will receive the signal and do the action as per receive command and performs the action. After execution of given command the executed data will be sent KEB. And the at the KEB side the ZigBee will receive the data and display it on PC. The task of the presence sensor is to identify the passage of a vehicle or pedestrian, giving an input to turn on a lamp or a group of lamps. This function depends on the pattern of the street; in case of a street without crossroads, 3 sensor is sufficient (or one at each end in case of a two-way street), while for a street requiring more precise control, a solution with multiple presence detectors is necessary. The presence of vehicle is identifying through IR LED. When vehicles enters the street lights will get TURN ON and passage of vehicle some street lights will get OFF automatically. Here IR sensor and op-amp has been used to detect the vehicle. If any of the LT lines gets cut off then the power will be disconnected from the main line. Here that we are using PIC microcontroller to get the signal from the LT lines when the LT line gets cut off then the microcontroller will execute the program at 47MHz speed. The output of microcontroller is fed to input of LT lines so that the line power will be disconnected.

I. The Zigbee Module



Fig1. zigbee module

CC2500 RF Module is a trans receiver module which provides easy to use RF communication at 2.4 Ghz. It can be used to transmit and receive data at 9600 baud rates from any standard CMOS/TTL source. This module is a direct line in replacement for your serial communication it requires no extra hardware and no extra coding toIt works in Half Duplex mode i.e. it provides communication in both directions, but only one direction at same time

Features:

- Supports Multiple Baud rates (9600)
- Works on ISM band (2.4 GHz)
- No complex wireless connection software or intimate knowledge of RF is required to connect our serial devices.
- No external Antenna required.
- Plug and play device.
- Works on 5V DC supply.

Specifications:

- Input Voltage - 5Volts DC
- Baud Rate – 9600.
- RS 232 Interface & TTL Interface.

II. Controlling Circuits



Fig2. controlling circuits for street lights and Lt line cut-off indication

Fig.2 shows the controlling circuits of the street light and LT line cut-off indication. When the supply is given to the circuit red LED will be glow which will be indicated that circuit is ready for operating. For street light controlling we are using BC547 transistors in order to automatic switching on and off of the street lights. For LT line cut-off indication switching relays are used. in normal condition relay in normally closed condition. If line gets cut-off automatically line gets cut off from the supply and data is transferred to the zigbee module.

III. Controlling Software

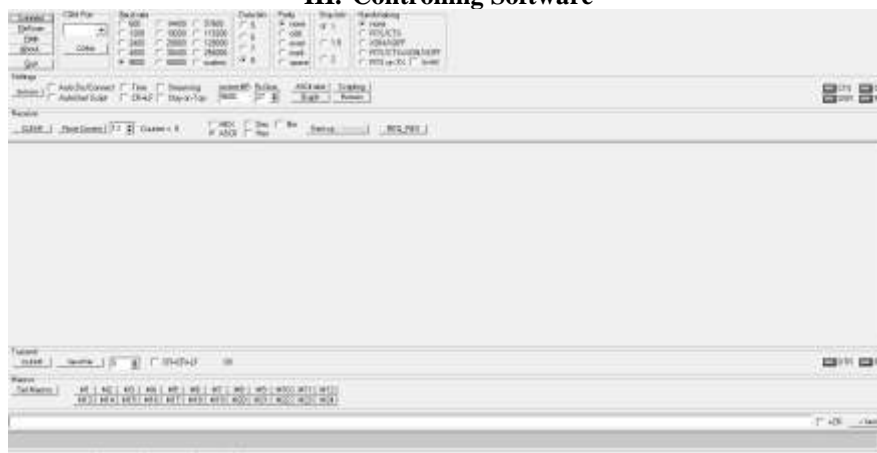


Fig3.Terminal software

Fig3 shows the terminal software window for automation of the street light controlling and LT line cut-off of indication to electricity boards.

II. CONCLUSION

The project work has been studied and implemented a complete working model using a PIC 16F877A microcontroller. This work includes the study of energy saving system in many applications. The main advantage of the present system is power saving. It requires the initial cost only for designing and installation and not for utilization. Hence, such systems are very much useful for the government to reduce the utilization of conventional power. By this project sodium vapour lamps can be replaced by LED using ZigBee technology which will save energy by preventing unnecessary wastage of electricity. the city public utilities can be controlled and monitored using microcontroller and wireless technique is possible.

REFERENCES

- [1]. "Intelligent Street Lighting System Using zigbee" International Journal of Engineering Science Invention ISSN.
- [2]. "Development of Zigbee based Street Light Control System" D.K. Kim Korea Electro technology Research Institute 142440178X /06©2006 IEEE.
- [3]. "Going green with ZigBee smart energy" by Daintree Networks January 2008.
- [4]. "New ZigBee smart energy profile delivers efficiency and savings" by ZigBee Alliance at Tampa, Florida January 22, 2008 at DistribuTECH.
- [5]. Electric Power Management using Zigbee Wireless Sensor Network . ©IJAET ISSN: 2231-1963 492 Vol. 4, Issue 1, pp. 492[3]. Nadu Generation And Distribution Corporation –(Tangedco).
- [6]. Development of an Intelligent Fault Indicator for Smart Grids , 2011 International Conference on Information and Electronics Engineering. IPCSIT vol.6 (2011) © (2011) IACSIT Press, Singapore 23.

BIOGRAPHY

1. MADHU HUBBALLI : U G Student , pursuing Final year Electrical and Electronics Engineering in Tontadarya college of engineering Gadag Karnataka, India.
2. MANJUNATH BEVINAMATTI : U G Student , pursuing Final year Electrical and Electronics Engineering in Tontadarya college of engineering Gadag Karnataka, India.
3. POOJA B PATIL : U G Student, pursuing Final year Electrical and Electronics Engineering in Tontadarya college of engineering Gadag Karnataka, India.
4. VINAYAKAREDDY KAMMATTA: U G Student , pursuing Final year Electrical and Electronics Engineering in Tontadarya college of engineering Gadag Karnataka, India.
5. MALLIKARJUN G.D: working as Assistant Professor, Electrical Department, Tontadarya College of engineering Gadag Karnataka, India. He has published papers in national and international journals. He completed BE and M.Tech under VTU and currently pursuing PhD in power system. His area of interest are power system, FACTS.