

ROBOTIC SYSTEM CONTROLLED THROUGH PC USING ZIGBEE TRANSCEIVER

R.Madhuri¹, M.Shobha², M.Kalpana³

^{1,2,3}*Asst.Professor ECE Department SIETK, Puttur (India)*

ABSTRACT

This paper represents the design, development and validation of metal based autonomous robotic system for military application. Security is the first priority in today's unsecured life. In existing system used to design a robotic system for military applications using Bluetooth technology, but in this paper to control, monitoring and detecting objects by using zigbee technology. Here in this paper robot is controlled through PC. The purpose of the paper is to implement a system in military areas and also to monitor the locations by using cam which is connected to robot. In this paper consists of two sections one is transmitter section and other one is receiver section. The instructions are such as left, right, front, back are processed and that any instruction once person giving then automatically robotic controlling by own if when any obstacles, metals can be detected.

Keywords: *ARM controller, Personal computer, sensor interface devices, zigbee module.*

I. INTRODUCTION

Embedded systems are designed to do some specific task rather than be a general-purpose computer for multiple tasks. Some also has real time performance constraints that must be met, for reason such as safety and usability; others may have low or no performance requirements, allowing the system hardware to be simplified to reduce costs. An embedded system is not always a separate block - very often it is physically built-in to the device it is controlling. The software written for embedded systems is often called firmware, and is stored in read-only memory or flash convector chips rather than a disk drive. It often runs with limited computer hardware resources: small or no keyboard, screen, and little memory.

1.1 Communication

Communication refers to the sending, receiving and processing of information by electric means. As such, it started with wire telegraphy in the early 80's, developing with telephony and radio some decades later. Radio communication became the most widely used and refined through the invention of and use of transistor, integrated circuit, and other semi-conductor devices. Most recently, the use of satellites and fiber optics has made communication even more wide spread, with an increasing emphasis on computer and other data communications.

1.2. Project Overview

A modern communications system is first concerned with the sorting, processing and storing of information before its transmission. The actual transmission then follows, with further processing and the filtering of noise. Finally we have reception, which may include processing steps such as decoding, storage and interpretation. In this context, forms of communications include radio, telephony and telegraphy, broadcast, point to point and mobile communications (commercial and military), computer communications, radar, radio telemetry and radio aids to navigation. It is also important to consider the human factors influencing a particular system, since they can always affect its design, planning and use.

In this paper “Robot is controlled through system using Zigbee technology”, like the title indicates the controlling action of Robot is done through the PC. The robot is kept some other place and we can operate the robot by sitting in front of the PC through the 2.4 GHz RF communication i.e. Zigbee.

ZIGBEE is a new wireless technology guided by the IEEE 802.15.4 Personal Area Networks standard. It is primarily designed for the wide ranging automation applications and to replace the existing non-standard technologies. It currently operates in the 868MHz band at a data rate of 20Kbps in Europe, 914MHz band at 40Kbps in the USA, and the 2.4GHz ISM bands Worldwide at a maximum data-rate of 250Kbps.

The ZIGBEE specification is a combination of Home RF Lite and the 802.15.4 specification. The specification operates in the 2.4GHz (ISM) radio band – the same band as 802.11b, Bluetooth microwaves and some other devices. It is capable of connecting 255 devices per network. The specification supports data transmission rates of up to 250 Kbps at a range of up to 30 meters. ZIGBEE's technology is slower than 802.11b (11 Mbps) and Bluetooth (1 Mbps) but it consumes significantly less power.

1.2 Objectives of Project

The project consists of mainly 2 parts:

- Buggy Unit
- Army Base Unit

1. 3.1. Buggy Unit:

This section consists of dc motor based vehicle carrying a metal detector for detecting mines and sensors. This vehicle will scan a per-determined area under consideration. As soon as any mine is detected the buggy stops and sounds an alarm indicating the presence of buggy. Then the buggy logs the longitude and the latitude of that place from GPS to get the exact location of mine and then it transmits these co-ordinates wirelessly through GSM.

1.3.2. Army Base Unit:

This section receives the co-ordinates and sends it to pc. On pc we have visual basic software which is a graphical user interface. The s/w then displays these co-ordinates on the map.

We use encryption-decryption technique to make the data transmission secure.

II. LITERATURE SURVEY

Anti-personnel mines are designed to kill or injure enemy combatants. They are usually buried 10mm to 40mm beneath the soil and it requires about 9 kg minimum pressures to detonate them. The face diameter of most the anti-personal mines ranges from 5.6cm to 13.3cm.

An anti-tank mine is a type of land mine designed to damage or destroy vehicles including tank and armored fighting vehicles. An applied pressure of 158 kg minimum is required to detonate it; hence the footstep of a 4 Landmine detection and marking robot

“The landmine is eternally prepared to take victims.” It is true that the forgotten landmines are taking the lives of civilians every now and then. Thus, different countries use different methods to deal with buried landmines which possess potential danger to the lives of its own civilians. The most commonly used methods are as followed.

Metal Detectors: The detectors try to discover a buried mine by sensing the metal components inside the mines.

III. PROPOSED METHOD

3.1. Transmitter Section

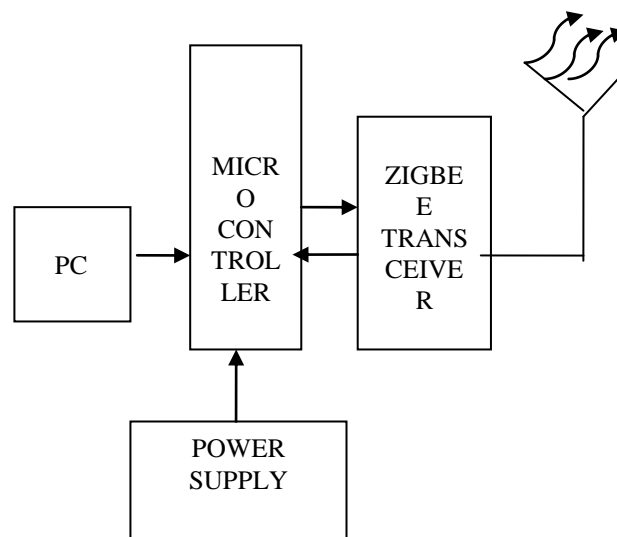


Fig 1. Block Diagram of Transmitter Section

3.2. Receiver Section

This Paper mainly consists of Power Supply section, Microcontroller section, Zigbee transceiver, H-bridge, dc motor, PC. In this paper work the micro-controller is plays major role. Micro-controllers were originally used as components in complicated process-control systems. However, because of their small size and low price, Micro-controllers are now also being used in regulators for individual control loops. In several areas Micro-controllers are now outperforming their analog counterparts and are cheaper as well to allow compatibility among data communication equipment made by various manufactures, an interfacing standard called RS232 was set by the Electronic Industries Association (EIA). This RS-232 standard is used in PCs and numerous types of

equipment. However, since the standard was set long before the advent of the TTL logic family, its input and output voltage levels are not TTL compatible. In RS-232, a 1 is represented by -3 to -25V, while a 0 bit is +3 to +25V, making -3 to +3 undefined. For this reason, to connect any RS-232 to a microcontroller system we must use voltage converters such as MAX232 to convert the TTL logic levels to the RS-232 voltage levels and vice versa. So here we are using this MAX-232 to have compatibility between the GSM MODEM and microcontroller.

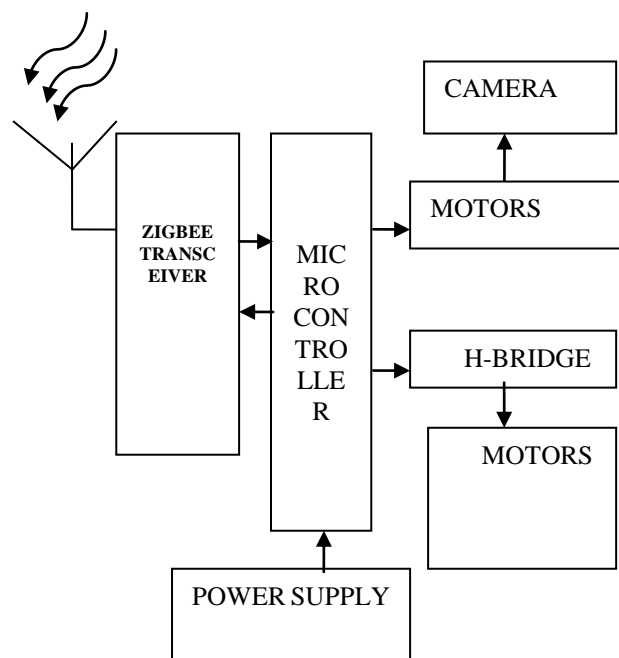


Fig 2: Block Diagram of Receiver Section

ZIGBEE MODULE: ZIGBEE is the only wireless standards-based technology that addresses the unique needs of remote monitoring and control, sensory network applications. Sensors and controls don't need high bandwidth but they do need low latency and very low energy consumption for long battery lives and for large device arrays.

There are a multitude of standards that address mid to high data rates for voice, PC LANs, video, etc. However, up till now there hasn't been a wireless network standard that meets the unique needs of sensors and control devices. There are a multitude of proprietary wireless systems manufactured today to solve a multitude of problems that also don't require high data rates but do require low cost and very low current drain.

This network has large number of nodes when compared to other technologies. It is easy to deploy and configure i.e., if any new node enters into the network it automatically senses and configure it. The Zigbee device is interoperable.

3.3. Application

1. Military applications
2. Industrial applications
3. Mines
4. Fire detection

3.4. Advantages

1. High secure
2. Fast response
3. Save human life's in wars

IV. RESULT



Monitoring System



Robotic System

- If there is no any obstacles in front of moving robot then it is sensing information to PC



- If any obstacles occurred in front of the moving vehicle then it is send information to PC and display on LCD.



IV. CONCLUSION

The paper "ROBOTIC SYSTEM CONTROLLED THROUGH PC USING ZIGBEE TECHNOLOGY" Successfully designed.

It has been developed by integrating features of all the hardware components used. Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit. Here using highly advanced IC's and with the help of growing technology the paper has been successfully designed.

V. FUTURE SCOPE

The paper "Robotic System Controlled Through PC using Zigbee Technology" By connecting a wireless camera to the Vehicle, then we can know the status of the Vehicle in our personal computers and also android mobile phones using Wi-Fi, GPRS technologies.

We can use this Vehicle at so many fields and we can use to handle so many situations in real time.

REFERENCES

- [1] "ARM7DMI Data Sheet"; Document Number ARM DDI 0027D; Issued: Dec 1994.
- [2] Sakr, Sharif. "ARM co-founders John Biggs". *Engadget*. Retrieved December 23, 2011. "[...] the ARM7-TDMI was licensed by Texas Instruments and designed into the Nokia 6110, which was the first ARM-powered GSM phone."
- [3] Andrew (bunnies') Huang. "On MicroSD Problems". Bunnie Studios. "This is comparable to the raw die cost of the controller IC, according to my models; and by making the controllers very smart (the Samsung controller is a 32-bit ARM7TDMI with 128k of code), get to omit this expensive test step while delivering extra value to customers"
- [4] ARM7TDMI Microcontroller Development Resources - header files, schematics, CAD files, etc..
- [5] Source and binaries for running uClinux on the ARM7TDMI
- [6] ARM Microcontroller Development HOWTO - Document describing development environment for ARM7 Microcontrollers on Linux.
- [7] ARM Assembly Intro A starter's tutorial on ARM Assembly
- [8] http://yurichev.com/writings/RE_for_beginners-en.pdf
- [9] Xiuhua Chen, "Based on the of SPCE061A voice control robot", China Water Transport, vol. 07, Aug.2007, pp. 163 -164.
- [10] AijingChe, "The Sunplus SPEC061A microcontroller-based voice control system", Computer development and application, vol. 19, Aug.2006, pp. 49-51.
- [11] Jian Li, "microcontroller Of SPCE061A and its voice recognition and synthesis system", Journal of Chongqing University of Posts and Telecommunications, vol. 126, Apr.2004, pp. 134-135.