

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Touch Screen Controlled Multi-Purpose Spy Robot Using Zigbee Environment.

I Mary Sajin Sanju, I Rexiline Sheeba*, FV Jayasudha, and S Thomas Niba.

Department of ECE, Sathyabama University, Chennai, Tamil Nadu, India

ABSTRACT

In Environmental Engineering the design and implementation of wireless controlled robotic vehicle which can be operated through a range of 100 meters transmitter and receiver. The robot is controlled by the touch screen with ZigBee communication. Commands in the touch screen will drive the robot in any desired direction. Microcontroller gets command from touch screen and transmits the information to the robot. Receiver microcontroller receives the necessary movement of the robot using DC motor. Where Wi-Fi requires high frequency and covers only limited area to overcome this drawback ZigBee is used which requires low power consumption. The control system consist of touch screen and ZigBee modules. The small spy robot which has camera attached to it and the robot system has two wheels and the geared motor attached on it .Using ZigBee enabled touch screen environment, the user can control the spy robot from anywhere area.

Keywords: Zig bee, touch screen, DC motors, PIC micro controller, capacitors, voltage regulators.

**Corresponding author*

INTRODUCTION

This project is based on providing solution for controlling spy robot with touch screen. The robot was controlled using touch screen controls which was sent through ZigBee via transmitter and was received using receiver. Hence providing various application of this technology in military. This type of spy robots plays a predominant role in providing service at high risk areas where soldiers cannot operate. The major purpose for using ZigBee was due to low power consumption and long range signal transmission and receiving. And also the usage of Infrared remotes with multiple keys makes the operation more complicated hence in order to overcome this issue touch screen controls has been used. The military robots were designed for various purposes providing intelligent robots using ZigBee saving human life. Robotic application can reduce the human interaction in military operations where loss of life may occur. The development in modern technologies can be applied in robotic control for various military applications like bomb diffusing, spying operations etc. Hence the application of these technologies not only reducing the human power but also provides ease of access to these robotic control. Therefore numerous applications can be implemented they must be affordable for Military applications where they can be damaged or the technology can be theft by enemies. The improvement in technology created more efficient robots using advanced control devices and coding required for it. An embedded system is used to perform a task on both software and hardware.

ZIGBEE IEEE802.15.4

The ZigBee communication is to provide communication between wireless nodes at certain range of distance with higher stability and low power consumption. According to IEEE802.15.4 ZigBee connects nodes with low power consumption consuming only battery. This low cost wireless sensor network provides transmission up to 30m and 1mW for transmitting data. Comparing Wi-Fi with ZigBee, ZigBee can be accessed over larger distance. ZigBee has low frequency level hence consuming low power. ZigBee also provides easy method of communication and reception with advanced features. This method can communicate point to point, or from one point to pc or also in a mesh network.

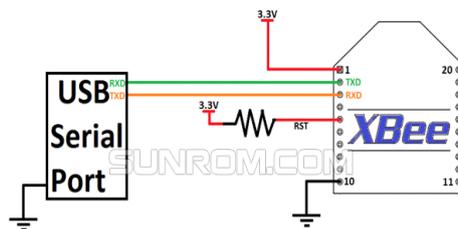
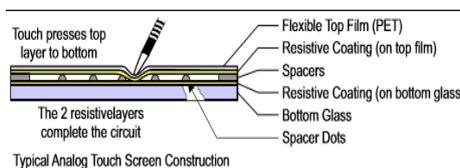


Fig 2.1: zigbee module

The three basic operation commonly used in ZigBee modules are remote industrial control and monitoring, long range remote control and wireless data acquisition. ZigBee modules follows three modes. Command mode, where the command is given, AT node, which can identify the source address of each packet, and the last mode called receiver that receives the status of the transmission. The success and the failure of the process is known through the last mode.

TOUCH SCREEN

Touch screen comprises of several metallic conductive layer with thin gaps. When the gap between these metallic conductive panels gets connected with each other at certain point provides a pair of voltage dividers with connected outputs. Which causes changes in which it is registered as a touch event and provides control for processing. These air gap will be separated using resistive material.



The electrodes present in the edge provides as mean for controlling. The resistive film provides sensing method which in term is based on pressure-sensitive or analog-resistive film touch panels. Using this the contact made on the screen by finger or any other objects can be sensed by using the variation in pressure. Capacitive touch panels is another method for sensing. In this method the contact made on the touch screen surface is sensed using sensors.

METHODOLOGY

The major frame work for implementing this ZigBee controlled spy robot two various sections been involved they are Hardware and Software. The hardware section consists of organizing Touch screen sensor, ZigBee and LCD. Software section comprises of Embedded C fed into Microcontroller using proteus.

HARDWARE

Microcontroller is a programmable device consisting of fixed amount of memory, I/O and O/P ports embedded into a single chip. Here the microcontroller PIC18f458 for transmitting and receiving of control using ZigBee is implemented. The special features of this microcontroller were Power-on Reset (POR), Power-up Timer (PWRT) ,and Oscillator Start-up Timer (OST).There are various high level languages and compilers are available for programming microcontroller. Whereas in this project Embedded C language has been used for programming and proteus been used for feeding microcontroller. The various input and output port plays a major role in operating microcontroller. This microcontroller contains different ports like PORT A, PORT B, and PORT C etc. TRIS register determines the functioning of input and output pin. The camera installed in the robot provides video output at another end providing easy movement of robot in rough surfaces. Two sets of motor been used to control the robot movement where they are used to rotate the wheels of the robot. 12V supply been used to control the motor in order to move the robot. 5 volt supply been provided for microcontroller and touch screen.

LM7805

LM7805 is a voltage regulator integrated circuit. The fixed output voltage can be obtained using this voltage regulator. It is an three terminal positive regulator. It is capable of providing 1 A output current. It provides thermal overload protection and short circuit protection.

GLCD font creator

GLCD Font Creator is the ultimate solution to create personalized fonts, symbols and icons for Graphic LCD (GLCD). It creates fonts for Liquid Crystal Displays (LCD) and Graphic LCD. It provides a very nice and intuitive user interface. GLCD Font Creator also creates fonts and symbols from scratch, or by importing existing fonts on your system. It lets you modify and adjust them for your needs, apply effects to them, and finally export them as source code for use in your favourite language compiler.

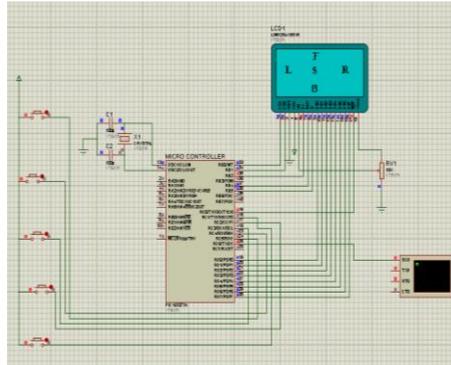
SOFTWARE

Embedded C

Embedded C is the most popular software language. These are the basis for operation of microcontrollers the control program written in embedded c gets compiled into the microcontroller using embedded c compilers. Embedded C is less complex than any other programming languages. And it is also easy to debug. The various compilers are Kiel C compiler, MPLAB compiler etc. The compiler used here was MPLAB compiler.

CCS Compiler

It is easy to use and quick to learn. They can be migrated between all microchip PIC MCU devices. And it minimizes development time.



RECEIVER SECTION

Motor drivers are used to control both the movement of the robot as well as the camera movement in the robot. Camera receives the video signal from the video recorder. A 12V battery supply is used for the power transmission. The power is supplied to the camera and also to the motors for moving the robot.

SCOPE AND APPLICATIONS

ZIGBEE enables the user long distance control range and low power consumption. Touch screen enables user-friendly interface control environment. The user can operate the system easily with minimal user training Simple and low cost hardware mechanism Can be used for hazardous rescue and spy applications.

- Military reconnaissance mission
- Wireless security and surveillance in hot spots.
- Search and rescue operation.
- Manoeuvring in hazardous environment.
- Land mine detection.

CONCLUSION

This proposed system gives an exposure to design a spy robot that can be used to do multifunction in defence environment. This is used to control the robot using touch screen from certain range of distance of about 100 meters.

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