

**Zigbee based Secured Wireless Data Transmission and Reception**J. Lakshmi Sowmika¹, A. Janardhan Reddy², V. Balraj³, C.Venkata Narasimhulu¹²³⁴Department of ECE, Geethanjali College of Engineering and Technology, Hyderabad, India

Abstract — Everyone in this world wants to be safe and secure. When it comes to the safety many Multinational companies, Military services, Army, the situation becomes more critical. Even a common man struggles a lot to protect his data. One of the popular methods is to protect the data in a more secure way and to encrypt the data while sending and while receiving, decrypt the data to retrieve the original message. Before transmitting the data, a password code is set and will be sent. At the receiving end, the reverse of encryption carries on to get back the original message. Thus, the data will be protected in every way by following the encryption and decryption standard formats. Wireless makes this project more flexible. Standard algorithms require software to be installed into the system before actually using them and hardwired connections. The hardware connections and hacking can be completely eliminated in this project. The most efficient and reliable wireless communication is ZigBee. The data can be entered from the PC keyboard or a keypad. This data is sent to the microcontroller at the transmitter side. The microcontroller encrypts the data by setting a code and then passes the encrypted data to the Zigbee transmitter module and the transmitter transmits the data into air. At the receiver end, the Zigbee receiver module receives the data from air. This microcontroller receives the encrypted data, decrypts the data when the code entered is correct i.e., finally converts the data into a form suitable for the user to read. This decrypted data can be seen on the LCD display. Thus, the data is protected while it is transmitted and received between two different places

Keywords- Personal computer(PC), Liquid Crystal Display(LCD), Light Emitting Diode(LED),Xbee(Zigbee).

I. INTRODUCTION

The purpose of this paper is to generate and transmit the text message through a wireless communication system in a secured manner. This facility is existed in the mobile network for which the user has to pay for it, where as the system designed here can be used as personal communication system and unlimited information can be transmitted at free of cost. And more over the data is secured as it is encrypted at the transmitting end. So to decrypt the data the password or the code is to be entered in the receiving section to read the data. As it is a prototype module, one way communication system is implemented, but for real applications two way communication systems can be developed for exchanging the text information. The advantage of using this device is that the user can generate the message in less time when compared with mobile phone. The microcontroller used in the project work is programmed to decode the PC keyboard, the same controller is also programmed to display the information through LCD interfaced with it. Means the text message generated through PC keyboard that is supposed to be transmitted will be displayed for the confirmation. After confirmation simply by activating the enter key, entire information will be quantized and transmitted as group of pulses. This will be in the form of eight bit data and this digital data will be superimposed over the carrier and transmitted as modulated waves.

The received information at remote end will be decoded through another microcontroller unit & it will be displayed through another LCD panel when the code is entered correctly through the keys interfaced to the controller. As the data receiver is equipped with a small buzzer, it will be activated automatically whenever it receives new message, then the code is to be entered to read the message that will be displayed in the LCD. This feature is added to alert the concern person. In addition to the personal communication, the system designed here can be used for many applications like wireless control of remote notice board, information display system for industries, military, defense, etc. the wireless communication technology used in the project is zigbee technology. Since it is a prototype module, the range is restricted to less than 60 feet. But for real applications, high power transmitter can be used for long distance.

II. LITERATURE SURVEY

After the birth of wireless LAN and Bluetooth, new International short-distance wireless standard technology of ZigBee has applied rapidly in our life and recognized as core technology to bring Ubiquitous life in near future. ZigBee, unlike other wireless communication technology, consumes low electricity power and inexpensive to implement. These advantages allow to be applied diverse Ubiquitous environments including intelligent home networks, automated commercial devices, building automation industry, commercial automation, environment monitoring, toy and industries and telematics.

Zigbee is designed to use in embedded applications requiring low data rates and low power consumption. The benefits of using Zigbee technology is to make the design as simple as possible, cost-effective, Robust (Ensuring a reliable solution in noisy environments), low-power wireless connectivity, etc. One main advantage of using this technology is to cover large areas with routers. As each Zigbee module can send and receive data, the received data received from one point can be transported to the third point as a mediator.

Zigbee is widely used in an industrial control, an embedded sensor, and a building and home automation. XBee is one of the ZigBee modules from Max-Stream. The XBee provides a user friendly interface, minimal power consumption, and reliability of data transferring between the modules. Several topics related to the ZigBee protocol such as a selection of the module, a basic concept of the module operation, and the implantation of the module in this project work will be discussed in the following chapters. The main advantage of using Zigbee is that it is a transceiver (transceiver). So it can act as a transmitter as well as receiver. In this project this is important to maintain communication link between the guard trolley and the train to avoid accidents.

III. PROPOSED ALGORITHM

A. BLOCK DIAGRAM

The Fig 1 below in the transmission has a LCD panel of 2 line x 16 characters, which displays the data and allows the user to enter the data with the help of keyboard. In fig 1 a keyboard is used to enter the data. To access the keyboard a code must be entered. Once when the code entered is correct the keyboard gets activated. The interfacing of various inputs and outputs is done with the microcontroller ATMEEL 89C51 is observed in the below fig 1 and fig 2

A.1. TRANSMISSION

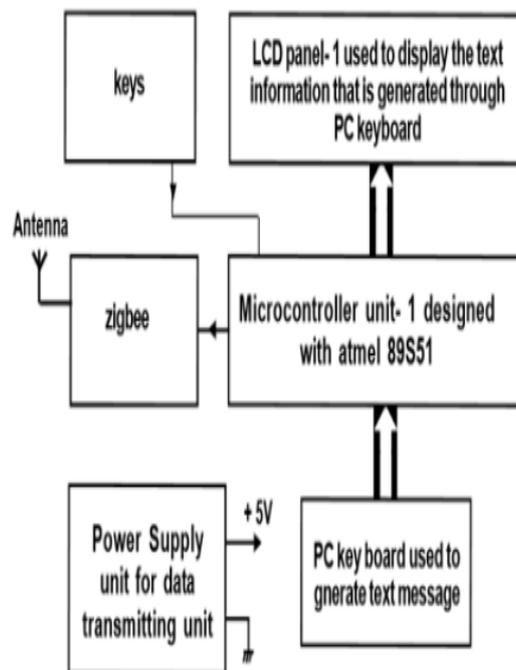


Fig 1: block diagram which represents the transmission of data

A.2. RECEPTION

The fig 2 shows the interfacing of various inputs and outputs. Alarm is used in the fig 2 so that whenever the information is received the alarm turns ON automatically indicating that a message got received.

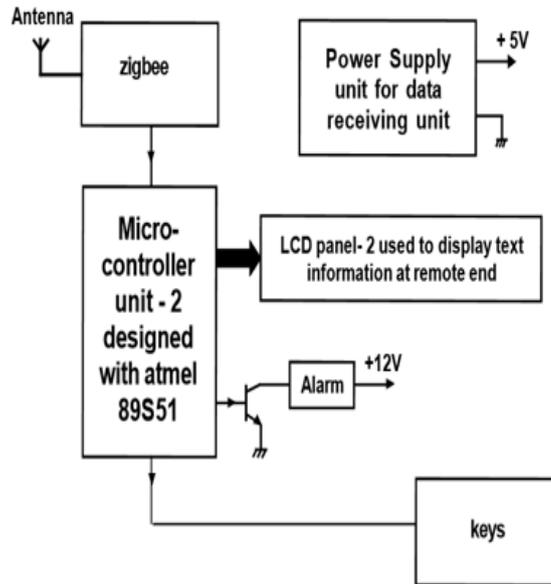


Fig 2: Block diagram which represents the reception of data.

B. FLOW CHART

The below fig 3 and fig 4 show the developed flow chart of the message generated and the received with the help of keil μ vision.

B.1. TRANSMISSION

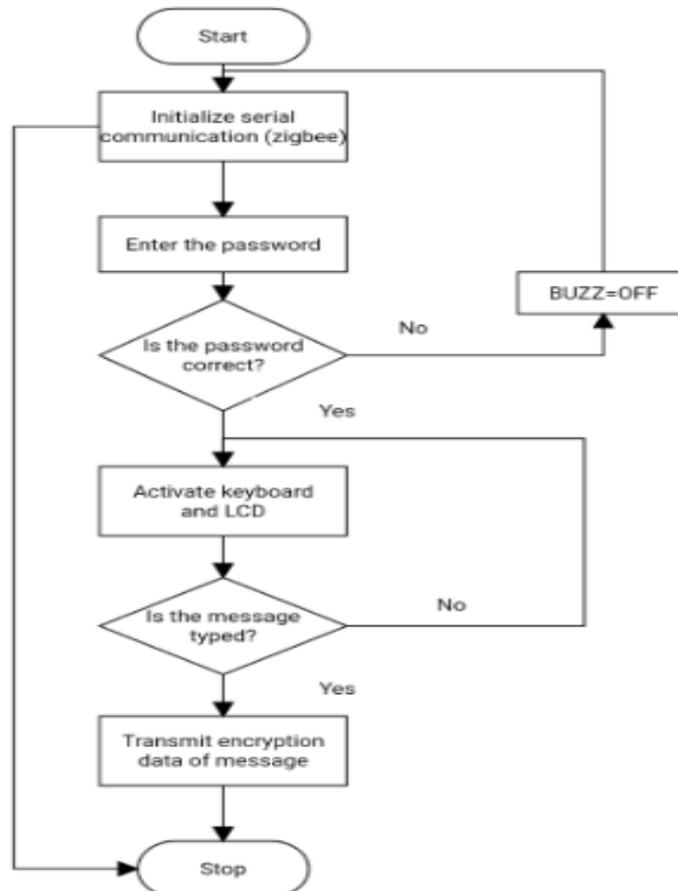


Fig 3: The Flow chart show the transmission process of how the data is transmitted.

B.2. RECEPTION

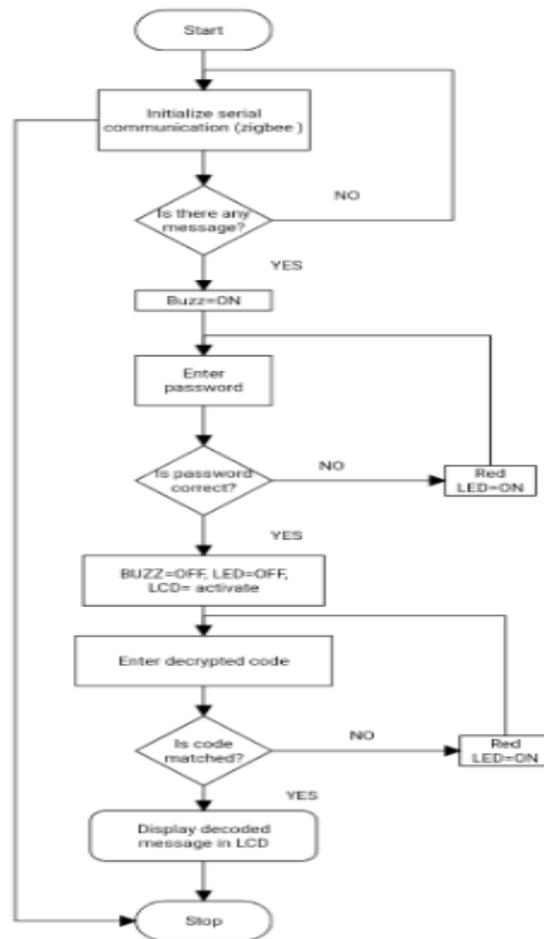


Fig 4: The Flow chart show the reception process of how the data is received.

IV. ANALYSIS

A. HARDWARE

The below figures show the hardware results of how the Zigbee based secured communication takes place.

A.1. TRANSMISSION



Fig 5: initial setup of the kit.

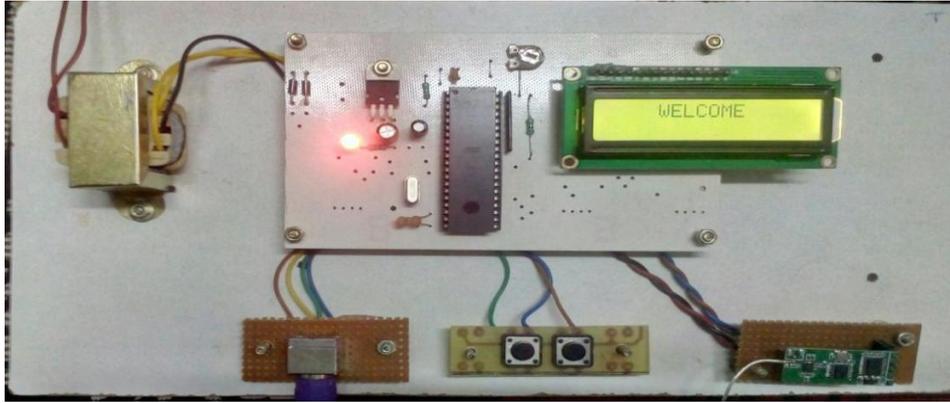


Fig 6: initialisation of transmitter kit.

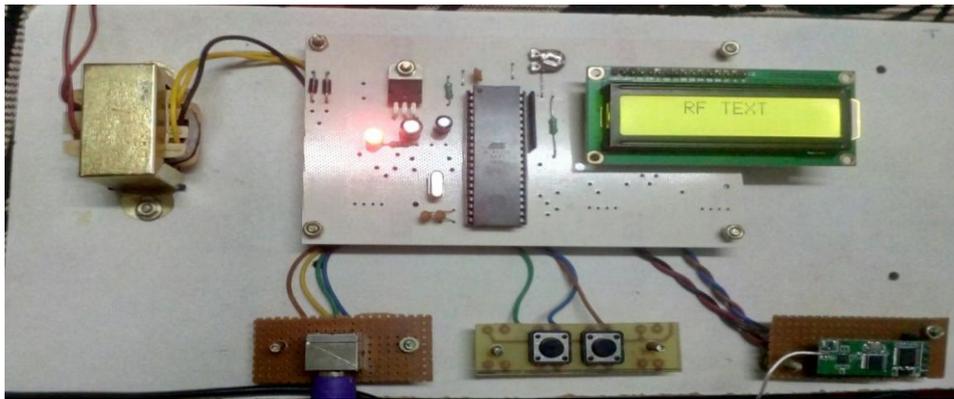


Fig 7: enter the code to activate the keyboard.

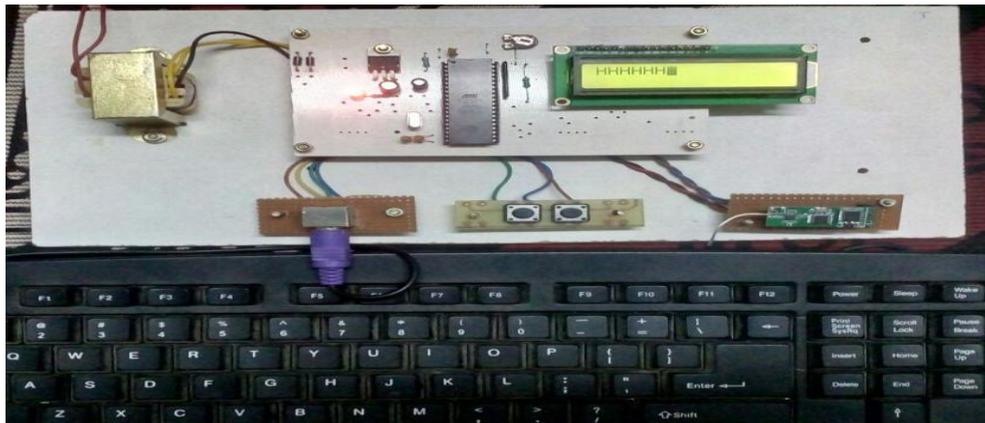


Fig 8: Enter the encrypted data to be sent.

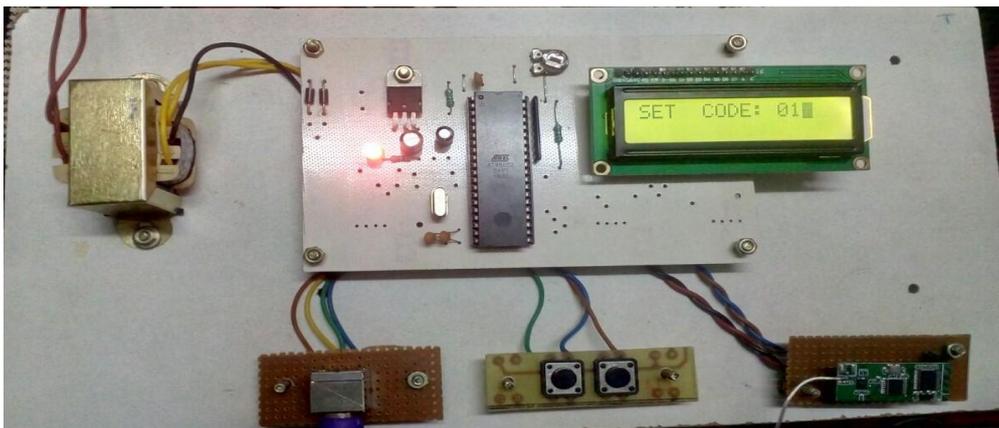


Fig 9: Enter the set code.

Initially from the fig 5 transmitter and receiver kit is made ON. The keyboard is activated by entering the code this is shown in fig 6. Once the code is entered the keyboard is activated and this can be observed in fig 7. This code is entered by using matrix keyboard. In fig 8 ,the message to be transmitted is entered from the keyboard.In fig 9 Along with the message the set code is also sent so that the receiver can access the data.

A.2. RECEPTION

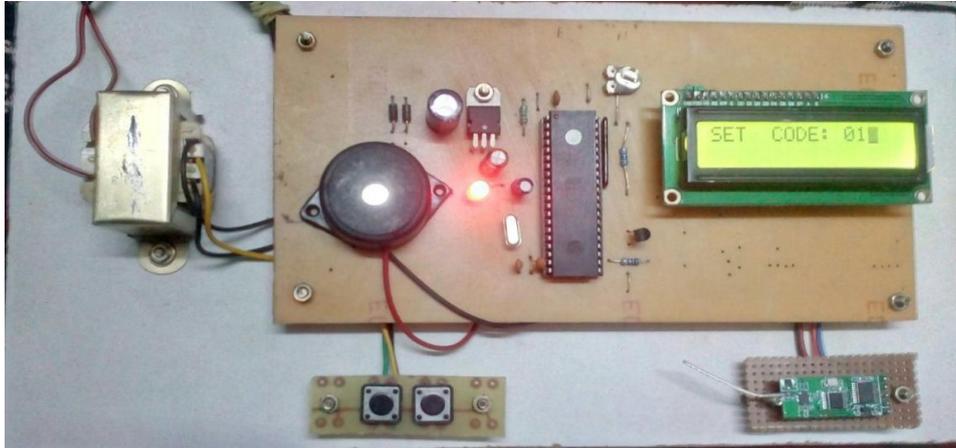


Fig 10: enter the set code to view the message.

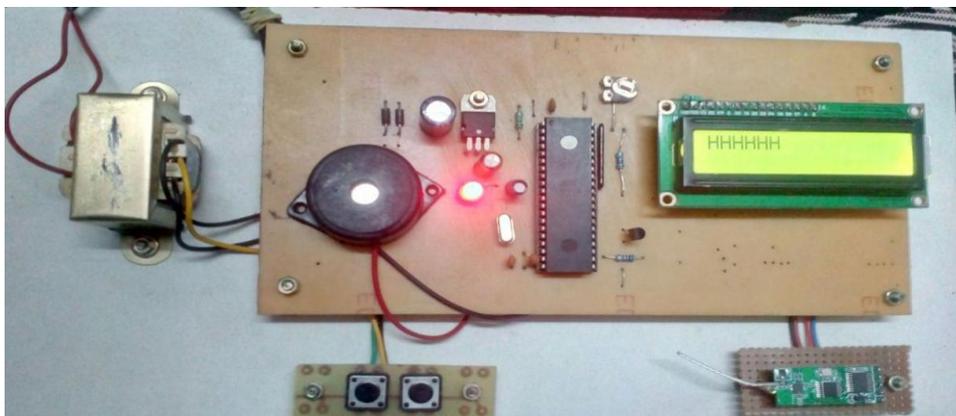


Fig 11: decrypted message.

At the receiver, when the message is received by the receiver a buzzer turns ON automatically. A set code is displayed, where the user must enter the code that is already displayed on the LCD this is shown in the fig 6. If the code matches, the message sent by the transmitter is displayed on the LCD this is shown in fig 11.

V. CONCLUSION

The present project work can be utilized for many applications, depending up on the application exposed in this project report it is said that it can be used for personal communication. In addition, the same system can be used as remote-controlled notice board, which can be used in the colleges where principal wants to display some message to their students. In this regard, the display used here may not be sufficient to display the matter, because it can display only 32 characters, moreover text size is also less. Hence for real applications, big size LCD with more characters must be used such that students can read the display board from certain distance.

The system is designed as user friendly and its operation is quite simple. The data generating cum transmitting module can be installed in the principal's room for the convenience. As the system contains PC keyboard, required message can be produced in less time. Every time new message can be generated by deleting the old message. When planning for a duplex communication system, the designer's task is one of deciding on a particular type of communication system for a given application. The system he proposes should meet a specified set of performance requirements. For analog message signals, the system performance is specified in terms of the ratio of the average message signal power to noise power at the destination point. For discrete message signals the probability of incorrectly decoding a message symbol at the receiver is used as a performance measure. While designing a communication system the engineer faces several constraints.

VI. FUTURE SCOPE

Additional features can easily be incorporated into this module if required. The length of message can be easily increased modifying the microcontroller program and by using a bigger LCD. The system can be provided with battery backup. The received information can be stored; printouts can be taken if required. The communication link can be made through Zigbee modules such that single package will act as transceiver. The overall prototype module is completely tested and trial run results found satisfactory.

VII. REFERENCES

The following are the references made during the development of this project work.

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