

# HOME AUTOMATION BY VOICE RECOGNITION USING ZIGBEE

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## ABSTRACT

*This paper details the overall design of a voice controlled home automation system using ZigBee. The project is basically for the usage of elderly and the disabled person or especially those who live alone in the house and cannot move frequently. This automation system works on the voice command given by the user and it uses very low power RF ZigBee wireless communication module which is relatively cheap. This home automation system is designed to control electrical appliances like light, fan, TV, motor etc by just giving the voice commands. The signal is received by the ZigBee module and further transmitted to the PIC microcontroller and then the controller firstly, converts the voice signal into desired format and then again sends the signal through the ZigBee module to another ZigBee module and to the microcontroller as well from where the appliances are connected. Based on the command given by user, this automation system will ON/OFF the appliances.*

**KEYWORDS-**Home Automation, ZigBee Transreceiver, Low Power, Voice Controlled

## I. INTRODUCTION

The demography of the world shows that the population is rising rapidly which in turn results in the increment of the average life expectancy of people. In today's era, one of the major growing industry is home automation because we have lack of time as well as we are always looking forward to change the way, we live, This home automation system is not a new phenomenon but it is an old one. While the only difference is that, the older ones deals with the luxury, sophisticated and expensive home automation platforms. The aim of this project is to provide the service to those who are elder or disable. So that by giving the command through voice, they can control the appliance such as light, fan, heater, television, etc. in the home. The other goal of this project is to made a system which is reasonably cheap, easy to operate or configure and easy to run. There are various commercial and research projects available in the market on smart homes and voice recognition system. These systems were developed by using various technologies like GSM/GPRS networks, Bluetooth, power and the ZigBee.

## II. RELATED WORKS

Home automation system has been there for more than a decade .The main concept in this project is to connect the electrical and electronic appliance in the house. Home automation is a rapid growing technology, which has completely changed the way of living the people. According to the data published by the market research and market intelligence firm ABI about 4 million home automation systems were globally sold in 2013. The same organization also estimated that about 90 million home will be employed by the home automation system by the end of 2017. There have been several commercial and research version of smart home system introduced and developed. Many companies starts developing the home automation system including Google too.

Andriod@Home for smart home platform is named by Google, as its home automation system. But, despite of all these yet no company has become successful in launching home automation as a popular technology. There are various failure for this and some of them are as follows:

- (a) Cost of the system:  
The already existing systems costs very high and even can be owned by rich families only.
- (b) Difficulties in usage:  
The controlling mechanism is not of good quality and not user friendly.
- (c) Difficulties in installation:  
There is always a need of expert professionals to install and configure the system.
- (d) Dependency on vendors increases because separate companies vendors are needed to control different appliances.
- (e) Less functionality:  
Most of the home automation system can do only 1 task i.e. either they can monitor or they can control.
- (f) Not customized:  
Most of the systems need to be customized with the user`s requirement.

Some other reason are also there for the failure of old automation system such as security related issues and multiuser issues as well

### III. CIRCUITS

#### 3.1 Transmitter & Receiver

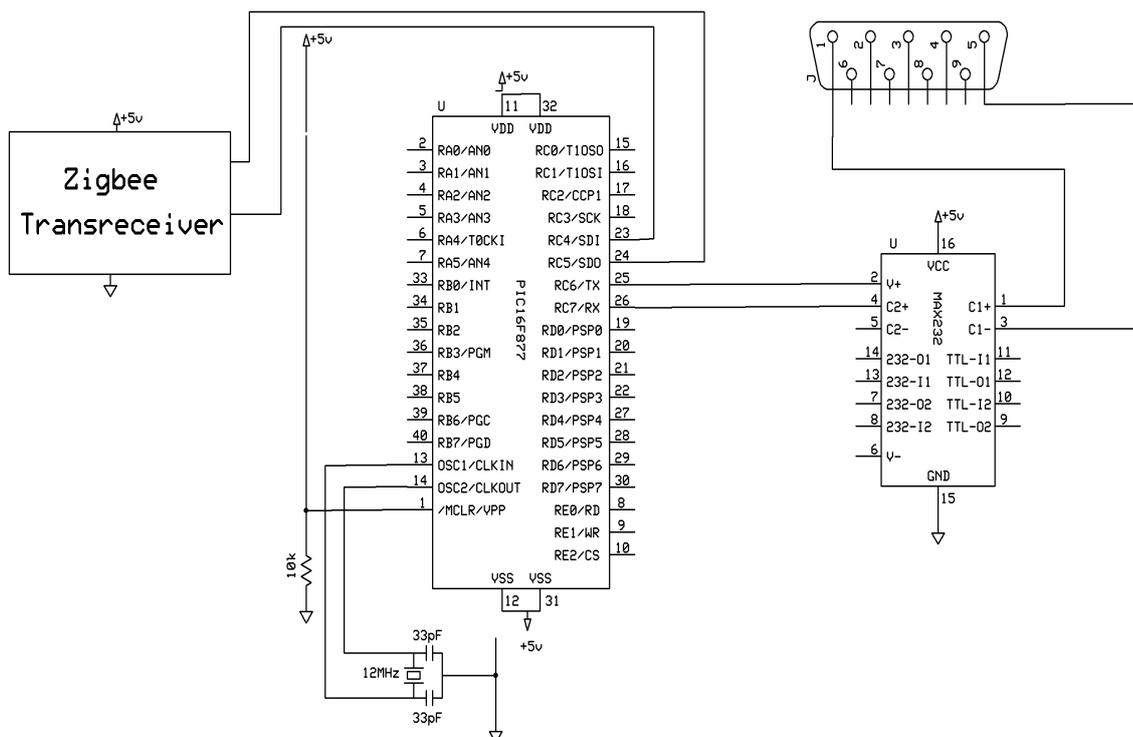


Figure 1: Circuit diagram of transmitter

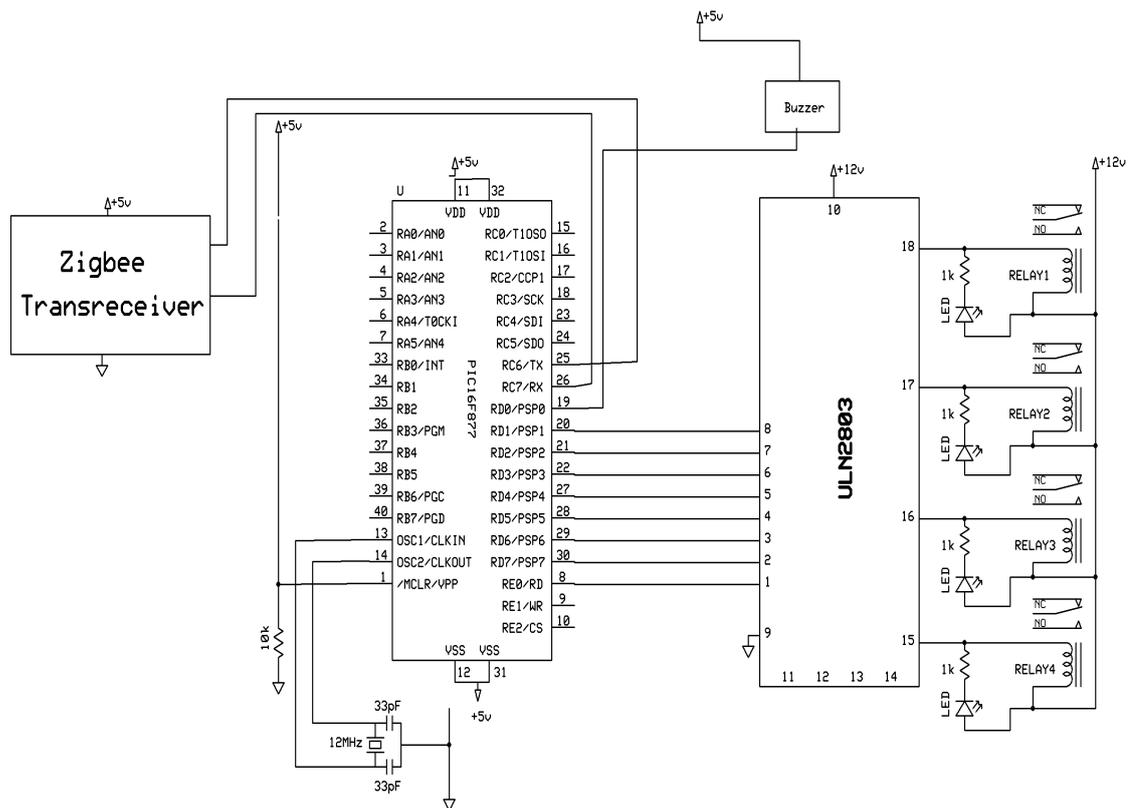


Figure 2: Circuit diagram of receiver

**Working of Circuit:**

In this home automation system firstly we give a command by voice to the operating system through headphone. In our project we are using a laptop as a window operating system. Laptop has its own dictionary and the command provides by the use will be matched to the commands which are already stored in microcontroller in a computer language C#. When the appropriate command is matched with the stored command then a signal will be generated, this signal will operate a particular relay to on off a particular device. Relays are operated with a relay driver ic 2803. So with the help of this project we can control several home appliances form one place through voice command.

**IV. HARDWARE**

The various components used in hardware are serial port, MAX232 voltage level converter controller. ULN 2803 IC has been used to drive the relays which contains array of 8 Darlington pair of transistor. Darlington pair of transistors are generally used to provide larger amount of current to drive the relay.

**V. SOFTWARE**

The entire software section has been done by completely using VC++ language. In our project, VC++ language is used for voice recognition purpose. It can also be in 3 different modes i.e. voice command recognition, text to speech and as speech to text. We have used VC++ for voice command recognition in which we can add some predefined commands in our programming.

The software listens the command given by user and matches it from the list of command, it has. If the command matches then it will operate an event corresponding to the command given by user. By this, user can control the device by giving the voice command as input to the controller to control the appliances. Output is control of appliance and finally controlling the system.

### Simulation

Simulation is done with the help of Proteus software. In this simulation we are providing commands with the help of a switch. The output of the simulate circuit is shown on the lcd. The simulation circuit is given below-

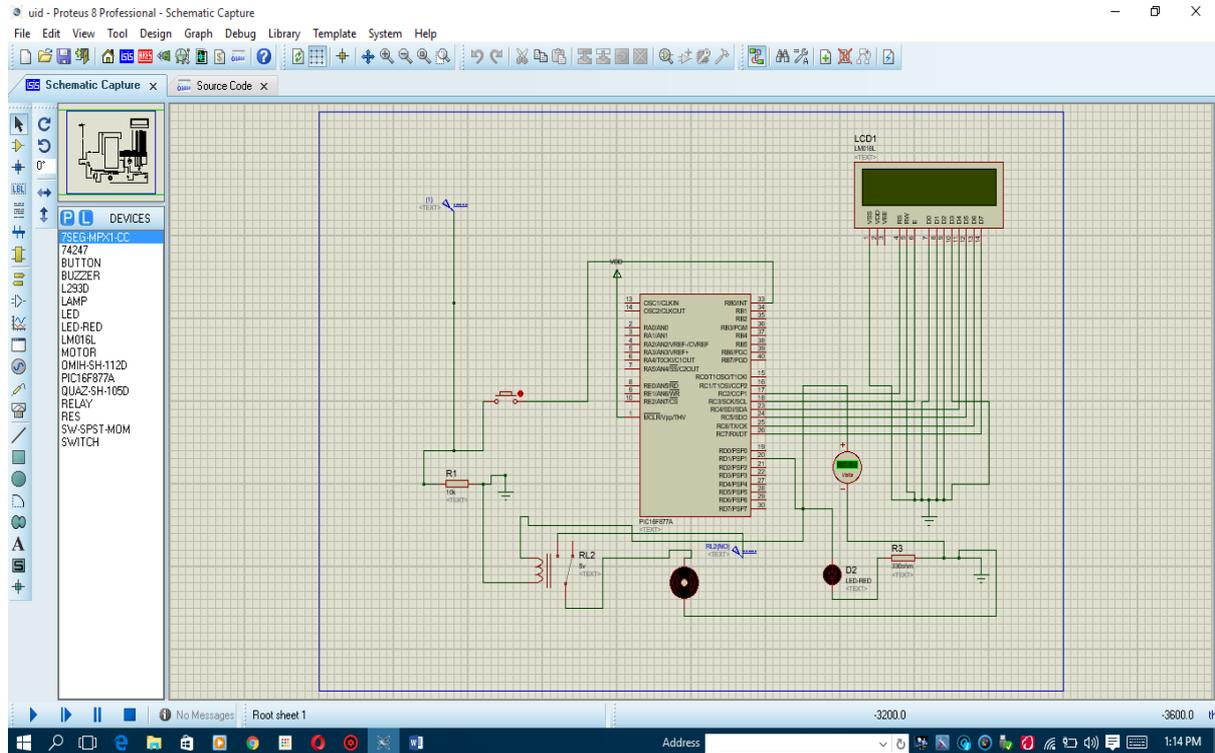


Figure 3: Simulation Circuit Diagram

### Key component:

- Computer system
- Microphone
- DB 9 connector
- MAX232
- Pic16F877A controller
- Relay driver ( ULN 2803)
- Resistors, LED, PCB, RELAYS etc.
- Software
- Window OS
- Zigbee

### VI. LIMITATION

Cost of this system slightly decreases than the older one but still cannot affordable by lower class people. The main reason for the high cost is usage of the Windows Operating System. The other limitation is that sometimes when the noise in the surrounding is high then the system will not be able to take the command properly and thus cannot be able to work or control the appliances properly.

### VII. RESULT

In this voice controlled home automation system, the person do not have to move here and there, he can just sit at one place and can give the commands from there only. The input is given as the voice

command. Whenever the voice command is given as the input then the system takes the input and process the command. After processing, the appliance can be controlled through the voice command. Many appliances can be connected and thus controlled by this home automation system.

## VIII. CONCLUSION

In this paper, we proposed a voice controlled home automation system using ZigBee. In our outwork, SI-ASR(Speak-Independent Automation Speech Recognition ) has been used in the system which makes it possible, that there is no requirement of pre-recording of voice commands or any type of training. This system uses human-computer interaction which provides facility of multifunction. A voice controlled home automation system using ZigBee has been built and implemented. This system basically targets the elders and disabled persons. The prototype which has been developed can control the various electrical of a home or office. Wireless network has been implemented by using ZigBee RF modules as they have high efficiency and low power consumption.

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