

# Bus Announcement System for Amaurotics

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**ABSTRACT:** This paper present design and implement bus alert system for visually impaired people based on microcontroller unit Arduino NANO with ZigBee and speed sensor. The blind people in the bus stop provide with the ZigBee unit which is recognized by ZigBee in bus and the indication is made in bus that the blind people is present in the bus stop. The blind people give the input about the place they want to travel through keypad. Then input is analyzed by Arduino and it send the signal to ZigBee in blind unit. The corresponding bus receive the signal by ZigBee in bus unit and send the bus number to transceiver in blind. These bus number is converted to audio by voice IC APR 9600 and the bus number is announced through headphone and also displayed in LCD for normal people. Then the speed sensor continuously measures speed of wheel if the bus stopped at the bus stop, it send the signal to blind unit and converted to audio. This intimate bus stopped at stop. Then blind people take correct bus parked in front of them.

**KEYWORDS:** Arduino, Zigbee, voice IC, speed sensor

## I. INTRODUCTION

The World Health Organization calculated that there are 285 million visually impaired people worldwide. Visually impaired persons can be blind or partially sighted people. They are facing lot of problems in day to day life. Especially to identifying correct bus to travel is the biggest problem in their life. There are many technologies used to solve this problem like GPS, RF module etc. But these are not more effective. This project is solution for this problem. This system give intimation for bus arrival as well as the bus stopped at the bus stop. So using this proposed system VIP can easily travel in public transport.

## II. PROPOSED WORK

The system consist of two modules one is VIP module and another one is bus module. Figure 1 and 2 shown the block diagram of modules.

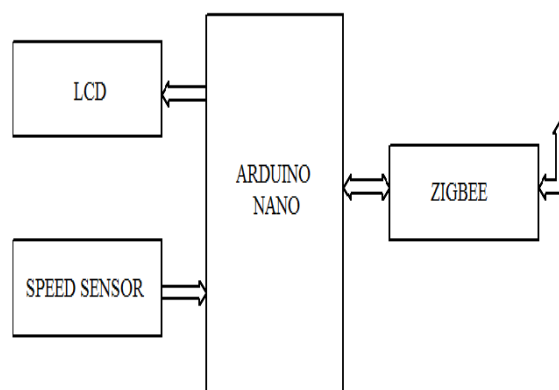


Figure 1. Block Diagram of Bus Unit

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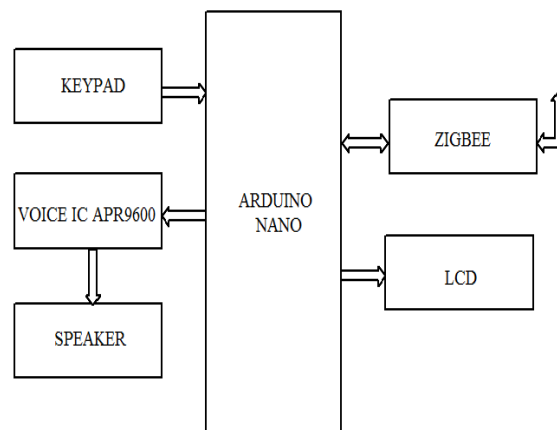


Figure 2. Block Diagram of VIP Unit

### III. WORKING OF MODULE

#### VIP MODULE

In this module, blind people press the bus number in keypad. It is connected to Arduino which sends signal corresponding to key pressing. Afterwards the converted signal is passed to Zigbee transmitter. It transmits the relevant signal to Zigbee receiver through transmitting antenna.

#### BUS MODULE

In this module, the transmitted signal is given to corresponding Zigbee. Then it feed to Arduino. When the bus enter into the region it give intimation through buzzer and also which display the stopping and announce the stops name in LCD display for driver according to the receiver value. Then the bus stopped at the particular stop it pass the signal through Zigbee to intimating the blind people through head phone. Figure 3 shown the working of proposed system.

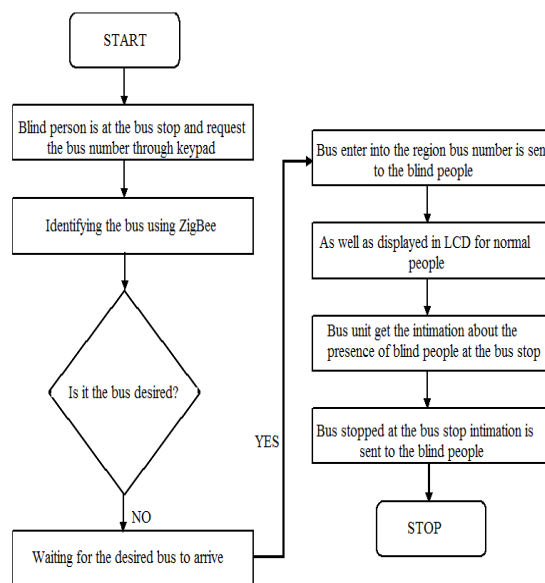


Figure 3. Flow Chart for Working

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## IV. HARDWARE USED

### A. ARDUINO

Arduino is an open-source electronics prototyping platform based on flexible, easy-to-use hardware and software. Arduino can sense the environment by receiving input from a variety of sensors and can affect its surroundings by controlling lights, motors, and other actuators. The microcontroller on the board is programmed using the Arduino programming language (based on Wiring) and the Arduino development environment (based on Processing). Arduino projects can be stand-alone or they can communicate with software running on a computer (e.g. Flash, Processing, Max MSP). The **Arduino NANO** is a microcontroller board based on the ATmega328 (datasheet) and its hardware architecture is shown in figure 4. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. The board can operate on an external supply from 6 to 20 volts. If supplied with less than 6V the board may become unstable.



Figure 4. Hardware Architecture of Arduino NANO

### B. ZIGBEE

The ZigBee specification is 802.15.4. It operates in 2.4GHz (ISM) radio band the same band as 802.11b standard, Bluetooth, microwaves and some other devices. The ZigBee module is shown in figure 5. 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. It consumes less power. It employs either of two modes, beacon or non-beacon to enable the to-and-fro data traffic. Beacon mode is used when the coordinator runs on batteries and thus offers maximum power savings. It transmits the data periodically. While using the beacon mode, all the devices in a mesh network know when to communicate with each other. The non-beacon mode is used when the coordinator is mains-powered. It transmits the data slowly compared to beacon mode.



Figure 5. ZigBee Module

### C. VOICE IC APR 9600

APR9600 is a low cost high performance sound record/reply IC incorporating flash analogue storage technique. Record sound is retained even after power supply is removed from the module. The replayed sound exhibits high quality with low noise level. Total sound recording time can be varied from 32 seconds to 60 seconds by changing the value of a single resistor. The IC can operate in two modes such as serial mode and parallel mode. In serial access mode, sound can be recorded in 256 sections. In parallel access mode, sound can be recorded in 2, 4 and 8 sections. The IC can be controlled simply using push button keys. Figure 6 shows the module of APR voice IC.

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Figure 6. APR voice IC Module

## D. SPEAKER

A speaker is one of the most common output devices. It is a transducer which will convert electrical signal into sound. Figure 7 shown the image of speaker.



Figure 7. Speaker

## E. LCD DISPLAY

A liquid crystal display (LCD) is a thin, flat electronic visual display that uses the light modulating properties of liquid crystals (LCs) and is shown in figure 8. It is more compact, lightweight, portable, less expensive, and more reliable and low electrical power consumption.

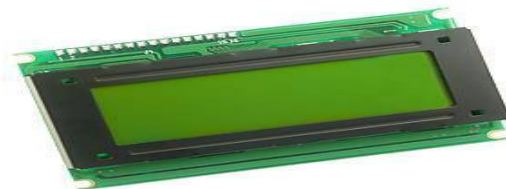


Figure 8. Liquid Crystal Display

## F. SPEED SENSOR

Speed sensor is used to detect the speed of an object, usually a transport vehicle. It is operated at the principle of anti-lock braking system. It has low speed measurement capability. Speed sensor is shown in figure 9.

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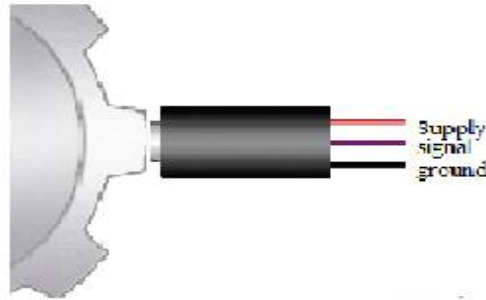


Figure 9. Speed Sensor

## V. SOFTWARE USED

### ARDUINO SOFTWARE (IDE)

The Arduino Integrated Development Environment - or Arduino Software (IDE) contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and Genuino hardware to upload programs and communicate with them. The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. It runs on Windows and Linux. The environment is written in Java and based on Processing and other open-source software. This software can be used with any Arduino board.

## VI. RESULT

The figure 10 shown the prototype output. Depending upon the input bus arrival and bus stopping at bus stop intimation is given to user.



Figure 10. Prototype Output of Bus Alert System for Blind People

## VII. CONCLUSION

This project developed with the welfare of the visually impaired in mind. This new prototype has many advantages which make it a good alternative to the current approaches. With this device, a whole life of those people will change and now they can contribute positively to their society and overcome their weaknesses related to the ability to move freely and without the help of anyone. Also, it is more economical and portable.



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