



## INTELLIGENT WIRELESS TALKING BUS STOP

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### Abstract:-

This paper is about a bus system that uses Wireless Sensor Networks (WSNs). A ZigBee unit is provided to the blind people in the bus station. This is recognized by the ZigBee in the bus and the presence of blind people in the bus station is indicated in the bus. This will help the bus to stop in that particular station. The bus that has to be taken by the blind is notified to him with the help of speech recognition system HM2007. The input about the place that has to be reached is given by the blind using microphones and the voice recognition system recognizes it. The microcontroller analyzes the input and the corresponding bus numbers are generated in accordance to the location provided by the blind. A voice synthesizer APR 9600 is used to convert the bus number into audio output. The bus number is sent from the zigbee transceiver in the bus to the transceiver in the blind's zigbee and it is announced to the blind by means of headphones. This helps blind to take the right bus parked in front of him and a GPS-634R that is connected with the controller and voice synthesizer which produces the audio output announces them when the destination is reached. Zigbee also identifies the blind in bus station and the number of bus parked in the bus station. When both the numbers matches then the buzzer in the bus unit sends the alarm.

**Keywords:** - Wireless Sensor Networks (WSNs), ZigBee, APR 9600.

### 1. INTRODUCTION

Different challenges are faced by the visually impaired persons based on their specific level of vision. Though living in the knowledge pool in the area of technology there is a great difficulty faced by the visually impaired in terms of navigation. This paper takes up the discussion on Wireless sensor network system with ZigBee for identification of the blind by the bus and providing the bus number using the embedded system and destination is indicated by the GPS. The environmental conditions are continuously monitored by the sensors in Wireless sensor network (WSNs) and data is send to the main network. WSN use embedded device which is tiny in size called the ZigBee. These nodes consist of an RF transceiver, memory, on board sensors/actuators and a power source which have processing and computational capability. CC2420 is a true single-chip 2.4 GHz IEEE 802.15.4 compliant RF (Radio Frequency) transceiver designed for low-power and low-voltage wireless applications present in zigbee that is used to send or receive useful information. The ZigBee in the blind system receives the number of bus parked in front of the blind. ZigBee also functions for the identification of blind in the bus station. When both the

numbers matches then the buzzer in the bus unit sends the alarm.

## 2. BUILDING BLOCKS OF THE SYSTEM

### Micro controller:

This part is the control unit of the entire system. This part contains a Microcontroller which is connected to circuitry such as Crystal with capacitors, Reset circuitry, Pull up resistors (optional) and so on. It controls the devices being interfaced and communicates with the devices in accordance with the coding hence microcontroller is the heart of the system.

### 3. ARM7TDMI

Advanced RISC Machines is abbreviated as ARM it is a class of processors. The RISC instruction set is much simpler in decoding mechanisms in comparison with Complex Instruction Set Computer (CISC) design.

### Liquid-crystal display

LCD is a flat panel electronic visual display which uses the property of light modulation of liquid crystals. They do not emit light directly. LCDs are used to display arbitrary or fixed images which can be either displayed or hidden. They use the same basic technology as in digital clock, but differ in terms of display that has large elements whereas arbitrary images are made up of a large number of small pixels.

### GPS modem

A GPS modem is used to receive the signals from the satellites and those signals that are given to the microcontroller. The signals may take the form of coordinates that are represented in form of the latitudes, longitudes and altitudes.

### APR 9600:

This device is true single-chip voice recording, non-volatile storage, and is

capable of playback for almost 40 to 60 seconds. Both random and sequential access of multiple messages is supported by the device. User can select their sample rates, this allows the designers to modify their design to attain unique quality and storage time needs. System design is simplified by using integrated output amplifier, microphone amplifier, and AGC circuits.

## 4. ZIGBEE

A feature of Universal Asynchronous Receiver/Transmitter (UART) interface is used in Zigbee, which leads to the usage of services from zigbee protocol by any microcontroller or microprocessor. It is important for a Zigbee designer to ensure that the host's serial port logic levels are correspondent with the XBee's 2.8- to 3.4-V logic levels. When there is need for change of the logic level then it can be transfigured by using either a standard RS-232 IC or logic level translators such as the 74LVTH125 this is done when the host is directly connected to the XBee's UART. Data which is in the synchronous format is accepted by the X-Bee module using its DIN pin, which consists of a start bit, 8 data bits, and a stop bit. No bit inversions take place within the asynchronous serial data stream because the input directly reaches the input of UART in the X-Bee modules. X-Bee's automatically takes care of the timing and parity checking. In case of producing data faster than X-Bee can process and transmit it, both X-Bee modules incorporate a clear-to-send (CTS) function to throttle the data being presented to the X-Bee module's DIN pin. This can be overtaken by sending small data packets at slower data rates. RTS (Request to Send) signal is send if the microcontroller wants to send data to transceiver. CTS (Clear to Send) signal if the transceiver is idle. The RTS and CTS signals are active low. When CTS command is received by the microcontroller data is send to the transceiver through DIN pin. DOUT pin is used by the transceiver to send

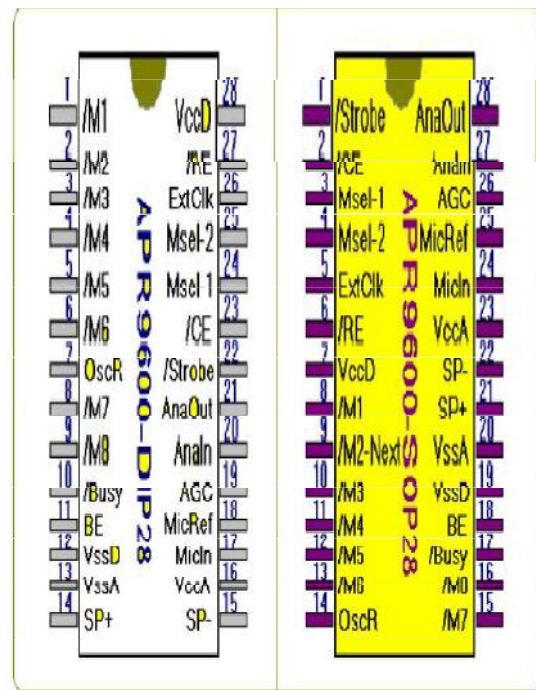
the data to microcontroller. The communication is similar between transceiver and the microcontroller at the transmitter and receiver. RF communication is used between transmitter and receiver.

## 5. GPS

United States Department of Defense developed a Global Navigation Satellite System (GNSS) which is Global Positioning System (GPS). In whole world it is fully functioned. GPS receivers determine their current location, their time, and their velocity by using the constellations between 24 and 32 Medium Earth Orbit satellites that transmit precise microwave signals. Officially it is named as NAVSTAR GPS. United States Air Force 50th Space Wing manages the GPS satellite constellation. The GPS is used as a navigation system. Messages are transmitted from each satellite and they contain the time they was sent. They also include precise orbital information (the ephemeris), and the general system health and rough orbits of all GPS satellites (the almanac). The transit time and the distance to each satellite are computed by the receiver. To combine these distances with the location of the satellites to determine the receiver's location geometric trilateration is used. A moving map display or latitude and longitude is used to display the position. Derived information such as direction and speed, calculated from position changes are also shown by many GPS satellites.

### APR 9600

Using its proprietary of analog/multilevel storage technology implemented in an advanced Flash non-volatile memory APLUS integrated achieves these high levels of storage capability where each memory cell can store 256 voltage levels.



## CONCLUSION

Usually RF communication is used to identify the blind person in the bus station. The microphone is used to inform the needed location; by the blind which is received by the voice recognition system which inturn produces the bus numbers in the voice synthesizer unit as output which can be heard in headset. Then the transceiver in the bus receives the transmitted location. An alarm in the bus unit alerts the presence of blind and a voice is send to the user's headset that the particular bus has arrived, if the name send by the blind matches the names in the transceiver in the bus. The destination chosen by the blind is intimated with the help of GPS tracker connected with audio output when the correct location is reached by the bus.

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