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INTERACTIVE E – STICK FOR BLIND

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ABSTRACT:
Approximately 1.1billion people in the world are visually disabled, which drives us to think of an electronic solution with cost effective. The proposed project is one of such attempt for blind people which detects the nearby big moving or static objects and communicate in-voice about the direction they are in. The design consists of simple logic circuit interfaced with proximity IR sensor, which detects the presence of object. The design also interfaces a 8-bit voice recorder(APR9600) that can be mounted on a stick to assist the person.
Keywords : 8-bit Voice recorder(APR9600), Logic Circuit, Microphone, Loud Speaker, 7427 IC, 7404 IC, IR sensor

INTRODUCTION :

An Interactive e-stick for the blind is a device which is used for blind people to walk in a safest possible way and avoids obstacles which are in the path of the user. This device consists of a speaker which is used to give instructions to the user through voice. These instructions are primarily stored by the programmer, in the voice recorder. These instructions are stored in such a way that when the obstacle is detected by the sensors a pulse is given to the logic circuit which in turn activates the voice recorder. This device can be used for the old people also. This may be useful for the blind warning them before any accident could happen; this concept can substitute the normal canes which the blind persons use presently

AIM OF THE PROJECT :

The aim of our project is to inform blind person in voice about surroundings. By this interactive e-stick, blind person can acknowledge obstacles in front of him.

METHODOLOGY :

Basic working of "Interactive e-stick for the blind "depends on the logic circuit, which takes inputs from the sensors and according to that it activates corresponding input of voice recorder. Here APR9600 serves as voice recorder. In this voice recorder we can store maximum 8 voice signals which are of 5sec duration. The sensors we use in our project are IR sensors whose range can be varied from 10cm-25cm.

SIGNIFICANCE OF PROJECT :

According to recent study some 1.1 billion people in the world are blind. Blindness is increasing by 1 to 2 million per year. 90% of blind are in the poorer areas of the world.Some of the previously used models were the C-5 laser cane, the Nottingham obstacle detector (NOD), the binaural sonic aid (sonic guide) and the white cane. Out of these the most successful aid is the white cane. Three fundamental shortcomings can be identified in all ETAs are:

1. The user must actively scan the environment to detect obstacles (no scanning is needed with the Sonic guide, but that device doesn't detect obstacles at floor level). This procedure is time-consuming and requires the traveler's constant activity and conscious effort.
2. The traveler must perform additional measurements when an obstacle is detected, in order to determine the dimensions of the object. The user must plan a path around the obstacle) Again. a time-consuming, conscious effort that reduces the walking speed.

3. One problem with all ETAs based on acoustic feedback is their interference (called masking) with the blind person's ability to pick up environmental cues through hearing.
Also all these ETAs require proper training before the usage. Whereas the e-stick can be used by all the individuals without any training and all these shortcomings are eliminated.

BLOCK DIAGRAM

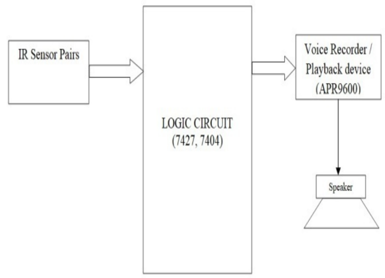

Fig. block diagram

EXISTING SYSTEM:

The existing systems are made using different techniques like using Microcontrollers; Arduino; IoT. This needs more components, which results in more cost.

PROPOSED SYSTEM :

In proposed system, we are getting the same output function as like existing system, but using simple logic circuit, which is made of two 7427 IC's and two 7404 IC's.

HARDWARE SCHEMATIC OF PROPOSED SYSTEM :

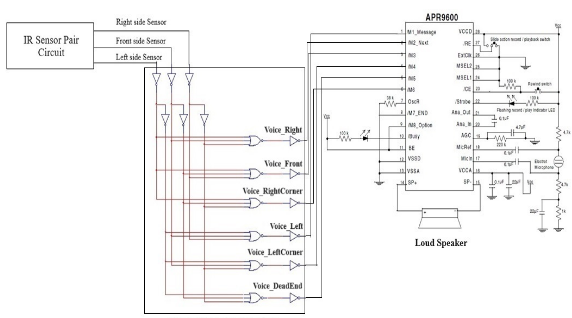

Fig. hardware schematic of proposed system

HARDWARE SCHEMATIC DESCRIPTION :

Initially, when there s no obstacle, all the outputs of sensors (i.e. LEFT, FRONT, RIGHT) are HIGH (i.e. +5v). For this condition, all the outputs of logic circuit are HIGH. At this time, no voice will come from voice recorder since voice recorder responds to only LOW (i.e. 0V) inputs.Suppose when the obstacle is detected by any one of the sensor then the output of that sensor goes to LOW. The outputs of remaining sensors whichever not found obstacles are HIGH. In this condition one of the outputs of logic circuit goes to LOW and which activates the corresponding input of voice recorder, then whatever voice preloaded in that input will come from the loud speaker.Suppose if the two

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obstacles are detected by any of two sensors (i.e. (LEFT, FRONT). (FRONT. RIGHT), (LEFT, and RIGHT)) at a time then the outputs of those sensors go to LOW. Similarly, in this condition also one of the outputs of logic circuit goes to LOW. And which activates the corresponding input of voice recorder, then whatever voice preloaded in that input will come from the loud speaker.Suppose, when three obstacles are detected by all three sensors at a time then all outputs of sensors go to LOW. Similarly whatever we said in the above conditions that process will be continued.

COMPONENT DESCRIPTION :

5.1 IR SENSORS

This is the IR Transmitter and Receiver pair, matched pair used in our IR proximity. White Line or Micro mouse sensor. It consists of 5mm 940 nanometer wave length high power IR LED and photodiode having peak sensitivity at 940 nanometer wavelength.

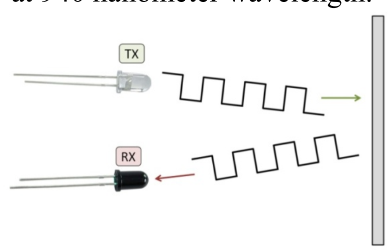

Fig. Top view of IR sensors

An infrared emitter is an LED made from gallium arsenide, which emits near-infrared energy at about 880nm. The infrared phototransistor acts as a transistor with the base voltage determined by the amount of light hitting the transistor. Hence it acts as a variable current source. Greater amount of IR light cause greater currents to flow through the collector-emitter leads.

IR Sensor Circuit Diagram :

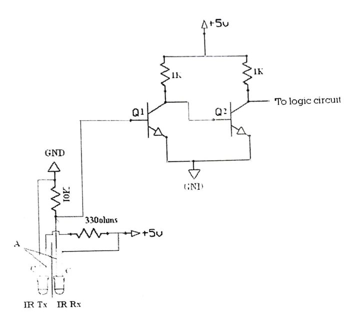

Fig. circuit diagram of IR sensors

CIRCUIT DESCRIPTION :

IR transmitter (TIL31) and IR receiver (TIL81) are 2 pin devices. The larger pin is Anode and the smaller pin is Cathode. Cathode pin of IR transmitter is directly connected to ground and Anode pin is connected to supply through 330ohms. Thus IR transmitter LED is FORWARD BIASED. Anode pin of IR receiver is connected to ground through 10Kohms and Cathode pin is directly connected to supply (+5V). Thus IR receiver is REVERSE BIASED.Anode pin of IR receiver is directly connected to base of transistor1 (Q1), and output of this amplifier is connected to another transistor2 (Q2). Output of this amplifier circuit is connected to logic circuit. When +5V is supplied to IR circuit then voltage appeared across Anode pin is around 0.8V when there is no obstacle is detected.Whenever obstacle is detected then voltage across Anode pin drops to voltage around 0.5V

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Transistors Q1 & Q2 act as amplifiers and produces output voltage 1.9V when there is no obstacle is detected. Whenever obstacle is detected then output goes LOW indicating detection of obstacle. Emitter pins of both transistors are grounded. Collector pins are connected to Vcc through resistors 1Kohms.IR receiver LED is placed before transmitter LED by small distance in order to avoid direct reception of IR rays which are emitted by IR Transmitter. Opaque partition is placed between transmitter and receiver.

WORKING OF IR SENSORS:
As it is mentioned earlier, IR sensors continuously pass the power among themselves. That means. a continuous transfer of current is present between transmitter and receiver.The IR sensors have a voltage divider circuit which is at a constant voltage for the continuous current transmission. Whenever there is an obstruction of current between transmitter and receiver, the current passed to receiver decreases and hence the voltage across voltage divider decreases. It can be compared with threshold voltage and the change can be noticed.The IR sensor pair is used in the project where in for every unit of electricity spent, an obstruction is created between the transmitter and the receiver, the voltage across the receiver drops from logic HIGH to logic LOW and the receiver output is connected to the logic circuit, which is a logic 0 pin and the count of the no. of electricity units spent increases by 1 whenever there is an obstruction between the IR transmitter and the receiver (i.e., for every unit of electricity utilized)

LOGIC CIRCUIT :

Fig. Logic circuit

5.2.1 Functional Table of Logic Circuit

INPUTS			OUTPUTS					
L_S	F_S	R_S	Voice_Right	Voice_Front	Voice_RightCorner	Voice_Left	Voice_LeftCorner	Voice_DeadEnd
5V	5V	5V	5V	5V	5V	5V	5V	5V
5V	5V	0V	0V	5V	5V	5V	5V	5V
5V	0V	5V	5V	0V	5V	5V	5V	5V
5V	0V	0V	5V	5V	0V	5V	5V	5V
0V	5V	5V	5V	5V	5V	0V	5V	5V
0V	5V	0V	5V	5V	5V	5V	0V	5V
0V	0V	0V	5V	5V	5V	5V	5V	0V

Table Functional table of Logic circuit

5.2.2 Pin Diagram of NOT Gate (IC 7404)

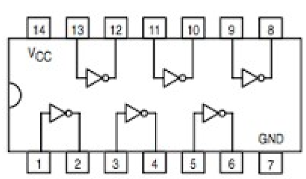

Fig. pin diagram of NOT Gate IC

Functional Table

Input	Output
A	Y = A’

L = Low Logic Level
H = High Logic Level

L	H
H	L

Table. Functional table of NOT Gate

Pin Diagram of 3-input NOR Gate (IC 7427):

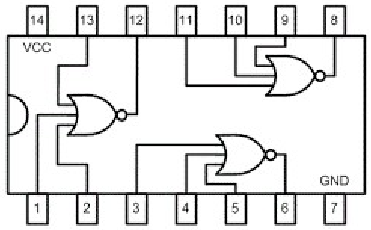

Fig. pin diagram of NOR Gate IC

Functional Table :

Inputs			Output
A	B	C	Y = (A+B+C)'
L	L	L	H
X	X	H	L
X	H	X	L
H	X	X	L

L = Low Logic Level
H = High Logic Level
X = either Low or High Logic Level

Table. Functional table of 3-input NOR gate

SINGLE CHIP VOICE RECORD/PLAYBACK DEVICE (APR9600):

General Description of APR9600

The APR9600 device offers true single-chip voice recording, non-volatile storage, and playback capability for 40 to 60 seconds. The device supports both random and sequential access of multiple messages. Sample rates are user-selectable, allowing designers to customize their design for unique quality and storage time needs. Integrated output amplifier, microphone amplifier, and AGC circuits greatly simplify system design. The device is ideal for use in portable voice recorders, toys, and many other consumer and industrial applications.APLUS integrated achieves these high levels of storage capability by using its proprietary analog/multilevel storage technology implemented in an advanced Flash non-volatile memory process, where each memory cell can store 256 voltage levels. This technology enables the APR9600 device to reproduce voice signals in their natural form. It eliminates the need for encoding and compression, which often introduce distortion.

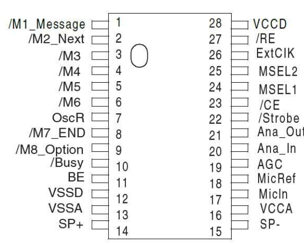

Fig.Pin diagram of APR9600

Block Diagram of APR9600 :

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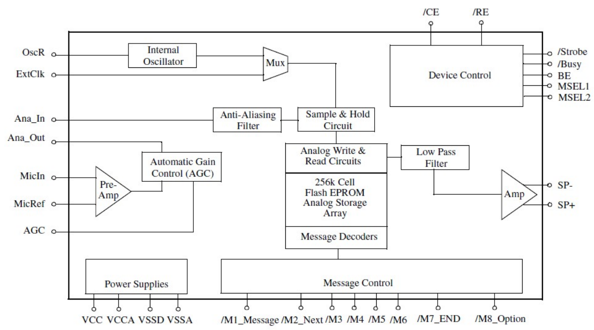

Fig. block diagram of APR9600

Functional Description of APR9600:

APR9600 block diagram is included in order to describe the device's internal architecture. At the left hand side of the diagram are the analog inputs. A differential microphone amplifier, including integrated AGC. is included on-chip for applications requiring use. The amplified microphone signals fed into the device by connecting the ANA_OUT pin to the ANA_IN pin through an external DC blocking capacitor. Recording can be fed directly into the ANA_IN pin through a DC blocking capacitor, however, the connection between ANA_IN and ANA OUT is still required for playback. The next block encountered by the input signal is the internal anti-aliasing filter. The filter automatically adjusts its response According to the sampling frequency selected so Shannon's Sampling Theorem is satisfied. After anti-aliasing filtering is accomplished the signal is ready to be clocked into the memory array. This storage is accomplished through a combination of the Sample and Hold circuit and the Analog Write/Read circuit. Either the Internal Oscillator or an external clock source clocks these circuits. When playback is desired the previously stored recording is retrieved from memory, low pass filtered, and amplified as shown on the right hand side of the diagram.The signal can be heard by connecting a speaker to the SP+ and SP- pins. Chip- wide management is accomplished through the device control block shown in the upper right hand corner. Message management is provided through the message control block represented in the lower center of the block diagram. More detail on actual device application can be found in the Sample Application section. More detail on sampling control can be found in the Sample Rate and Voice Quality section. More detail on Message management and device control can be found in the Message Management section.

Message Management of APR9600 :

Playback and record operations are managed by on chip circuitry. There are several available messaging modes depending upon desired operation. These message modes determine message management style, message length, and external parts count. Therefore, the designer must select the appropriate operating mode before beginning the design. Operating modes do not affect voice quality; for information on factors affecting quality refer to the Sampling Rate & Voice Quality section. The device supports three message management modes (defined by the MSEL1, MSEL2 and /M8_Option pins shown in Figures 1 and 2):

• Tape mode, with multiple variable-duration messages, provides two options:
  - Auto rewind
  - Normal

• Random access mode with 2, 4, or 8 fixed-duration messages

Modes cannot be mixed. Switching of modes after the device has recorded an initial message is not recommended. If modes are switched after an initial recording has been made some unpredictable message fragments from the previous mode may remain present, and be audible on playback, in the new mode. These fragments will disappear after a record operation in the newly selected mode. Table 1 defines the decoding necessary to choose the desired mode. An important feature of the APR9600 message management capabilities is the ability to audibly prompt the user to changes in the device's status through the use of "beeps" superimposed on the device's output. This feature is enabled by asserting a logic high level on the BE pin.

Mode	MSEL1	MSEL2	/M8_Option
Random Access 2 fixed duration messages	0	1	Pull this pin to VCC through 100K resistor
Random Access 4 fixed duration messages	1	0	Pull this pin to VCC through 100K resistor
Random Access 8 fixed duration messages	1	1	Becomes the /M8 message trigger input pin
Tape mode, Normal operation	0	0	0
Tape mode, Auto rewind operation	0	0	1

Table modes of operation

Tape Mode operation :

Tape mode manages messages sequentially much like traditional cassette tape recorders. Within tape mode two options exist. Auto rewind and normal. Auto rewind mode configures the device to automatically rewind to the beginning of the message immediately following recording or playback of the message. In tape mode, using either option, messages must be recorded or played back sequentially, much like a traditional Cassette tape recorder.

Function Description Recording in Tape Mode using the Normal option :

On power up, the device is ready to record or play back, starting at the first address in the memory array. To record. /CE must be set low to enable the device and RE must be set low to enable recording. A falling edge of the /M1_Message pin initiates voice recording (indicated by one beep). A subsequent rising edge of the /M1_Message pin during recording stops the recording (also indicated by one beep). If the MI Message pin is held low beyond the end of the available memory, recording will stop automatically (indicated by two beeps). The device will then assert a logic low on the /M7_END pin for a duration equal to 1600 cycles of the sample clock, regardless of the state of the /M1_Message pin. The device returns to standby mode when the M1 Message pin goes high again. After recording is finished the device will automatically rewind to the beginning of the most recently recorded message and wait for the next user input. The auto rewind function is convenient because it allows the user to immediately playback and review the message without the need to rewind. However, caution must be practiced because a subsequent record operation will overwrite the last recorded message unless the user remembers to pulse the /M2_Next pin in order to increment the device past the current message. A subsequent falling edge on the M1_Message pin starts a new record operation, overwriting the previously existing message. You can preserve the previously recorded message by using the /M2_Next input to initiate recording in the next available message segment. To perform this function, the /M2 Next pin must be pulled low for at least 400 cycles of the sample clock. The auto rewind mode allows the user to record over the previous message simply by initiating a record sequence without first toggling the /M2_Next pin. To record over any other message however requires a different sequence. You must pulse the /CE pin low once to rewind the device to the beginning of the voice memory. The /M2_Next pin must then be pulsed low for the specified number of times to move to the start of the message you wish to overwrite. Upon arriving at the desired message a record sequence can be initiated to overwrite the previously recorded material. After you overwrite the message it becomes the last available message and all previously recorded messages following this message become inaccessible. If during a record operation all the available memory is used the device will stop recording automatically. (double beep) and set the /M7_END pin low for a duration equal to 1600 cycles of the sample clock. Playback can be initiated on this last message, but pulsing the /M2_Next pin will put the device into an "overflow state". Once the device enters an overflow state any subsequent pulsing of /M1_Message or /M2_Next will only result in a double beep and setting of the /M7_END pin low for a duration equal to 400 cycles of the sample clock. To proceed from this state the user must rewind the device to the beginning of the memory array. This can be accomplished by toggling the /CE pin low or cycling power. All inputs, except the /CE pin, are ignored during recording.

Function Description of Playback in Tape Mode using Normal option :

On power-up. the device is ready to record or play back. starting at the first address in the memory array. Before you can begin playback. the /CF input must be set to low to enable the device and /RE must be set to high to disable recording and enable playback. The first high to low going pulse of the /M1_Message pin initiates playback from the beginning of the current message; on power up the first message is the current message. When the MI Message pin pulses low the second time. playback of the current message stops immediately. When the /M1_Message pin pulses low a third time, playback of the current message starts again from its beginning. If you hold the /M1_Message pin low continuously the same message will play continuously in a looping fashion. A 1.530 ms period of silence is inserted during looping as an indicator to the user of the transition between the beginning and end of the message. Note that in auto rewind mode the device always rewinds to the beginning of the current message. To listen to a subsequent message the device must be fast forwarded past the current message to the next message. This function is accomplished by toggling the /M2_Next pin from high to low The pulse must be low for least 400 cycles of the sampling clock. After the device is incremented to the desired message the user can initiate playback of the message with the playback sequence described above. A special case exists when the /M2_Next pin goes low during playback. Playback of the current message will stop, the device will beep. advance to the next message and initiate playback of the next message. (Note that if M2 Next goes low when not in playback mode, the device will prepare to play the next message, but will not actually initiate playback). If the /CE pin goes low during playback, playback of the current message will stop. The device will beep, reset to the beginning of the first message, and wait for a subsequent playback command.When you reach the end of the memory array, any subsequent pulsing of /M1_Message or /M2_Next will only result in a double beep. To proceed from this state the user must rewind the device to the beginning of the memory array. This can be accomplished by toggling the /CE pin low or cycling power.

Functional Description of Recording in Tape Mode using Auto Rewind option :

On power-up, the device is ready to record or play back, starting at the first address in the memory array. Before you can begin recording, the /CE input must be set to low to enable the device and /RE must be set to low to enable recording. On a falling edge of the /M1_Message pin the device will beep once and initiate recording. A subsequent rising edge on the /M1_Message pin will stop recording and insert a single heep. If the /M1 Message pin is held tow beyond the end of the available memory recording stops automatically, and two beeps are inserted; regardless of the state

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of the M1_Message pin. The device returns to the standby mode when the /M1_Message pin is returned high. A subsequent falling edge on the /M1_Message pin starts a new record operation in the memory array immediately following the last recorded message, me thus preserving the last recorded message. To record over all previous messages you must pulse the /CE. Pin low once to reset the device to the beginning of the first message. You can then initiate a record sequence, as described above, to record a new message. The most recently recorded message will become the last recorded message and all previously recorded messages following this message will become inaccessible. If you wish to preserve any current messages it is recommend that Auto Rewind option be used instead of Normal option. If Normal option is necessary the following sequence can be used. To preserve current messages you must fast forward past the messages you want to keep before you can record a new message. To fast forward when using the Normal option you must switch to play mode and listen to messages sequentially until you arrive at the beginning of the message you wish to overwrite. At this stage you should switch back to record mode and overwrite the desired message. The most recently recorded message will become the last recorded message and all previously recorded messages following this message will become inaccessible. All inputs, except /CE are ignored during recording.

Functional Description of Playback in Tape Mode using Auto Rewind option :

On power-up. or after a low to high transition on /RE the device is ready to record or play back starting at the first address in the memory array. Before you can begin playback of messages. the /CE input must be set to low to enable the device and /RE must be set to high to enable playback. The first high to low going pulse of the /M1_Message pin initiates playback from the beginning of the current message. When the /M1_Message pin pulses from high to low a second time, playback of the current message stops immediately. When the /M1_Message pin pulses from high to low a third time, playback of the next message starts again from the beginning. If you hold the /M1_Message pin low continuously. The current message and subsequent messages play until the one of the following conditions is met: the end of the memory array is reached. The last message is reached. the /M1_message pin is released. If the last recorded message has already played. Any further transitions on the /M1_Message pin will initiate a double beep for warning and the /M7_END pin will go low. To exit this state you must pulse the /CE pin low once during standby to reset the pointer to the beginning of the first message.

Tape mode, Normal mode Operation circuit diagram :

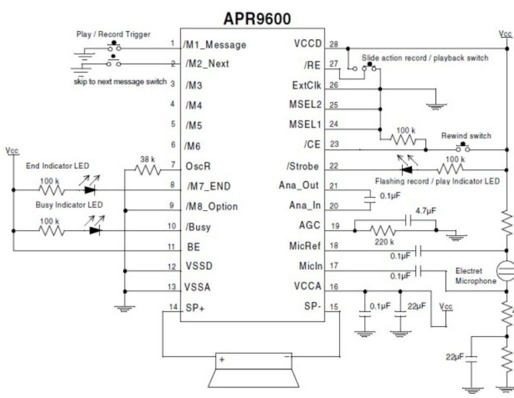

Fig.circuit diagram of Tape mode, normal mode operation circuit

Random Access Mode operation :

In our project we use this Random Access Mode. Random access mode supports 2. 4, or 8 messages segments of fixed duration. As suggested recording or playback can be made randomly in any of the selected messages. The length of each message segment is the total recording length available (as defined by the selected sampling rate) divided by the total number of segments enabled (as decoded in Tablel). Random access mode provides easy indexing to message segments.

Functional Description of Recording in Random Access Mode :

On power up, the device is ready to record or play back, in any of the enabled message segments. To record. /CE must be set low to enable the device and /RE must be set low to enable recording. You initiate recording by applying a low level on the message trigger pin that represents the message segment you intend to use. The message trigger pins are labeled /M1_Message M8 Option on pins 1-9 (excluding pin 7) for message segments 1-8 respectively.

Note: Message trigger pins /MI_Message. /M2_Next, /M7_END, and /M8_Option. have expanded names to represent the different functionality that these pins assume in the other modes. In random access mode these pins should be considered purely message trigger pins with the same functionality as M3. /M4, /M5, and /M6. For a more thorough explanation of the functionality of device pins in different modes please refer to the pin description table that appears later in this document.When actual recording begins the device responds with a single beep (if the BE pin high to enable the beep tone) at the speaker outputs to indicate that it has started recording. Recording continues as long as the message pin stays low. The rising edge of the same message trigger pin during record stops the recording operation (indicated with a single beep).If the message trigger pin is held low beyond the end of the maximum allocated duration. recording stops automatically (indicated with two beeps), regardless of the state of the message trigger pin. The chip then enters low-power mode until the message trigger pin returns high. After the message trigger pin returns to high, the chip enters standby mode. Any subsequent high to low transition on the same message trigger pin will initiate recording from the beginning of the same message segment. The entire previous message is then overwritten by the new message, regardless of the duration of the new message. Transitions on any other message trigger pin or the /RE pin during the record operation are ignored until after the device enters standby mode.

Functional Description of Playback in Random Access Mode :

On power up, the device is ready to record or playback, in any of the enabled message segments. To playback, /CE must be set low to enable the device and /RE must be set high to disable recording & enable playback. You initiate playback by applying a high to low edge on the message trigger pin that representing the message segment you intend to playback. Playback will continue until the end of the message is reached. If a high to low edge occurs on the same message trigger pin during playback, playback of the current message stops immediately. If a different message trigger pin pulses during playback, playback of the current message stops immediately (indicated by one beep) and playback of the new message segment begins. A delay equal to 8,400 cycles of the sample clock will be encountered before the device starts playing the new message.If a message trigger pin is held low, the selected message is played back repeatedly as long as the trigger pin stays low. A period of silence, of a duration equal to 8,400 cycles of the sampling clock, will be inserted during looping as an indicator to the user of the transition between the end and the beginning of the message.

Random Access Mode circuit diagram

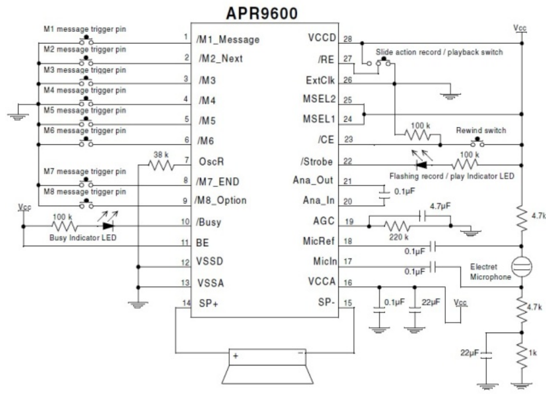

Fig. circuit diagram of random access mode operation circuit

CONDENSER MICROPHONE:

Condenser means capacitor, an electronic component which stores energy in the form of an electrostatic field the term condenser is actually obsolete but has stuck as the for this type of microphone, which uses a capacitor to convert acoustical energy in to electrical energy.

Condenser microphones require power from a battery or external source. The resulting audio signal is stronger signal than that from a dynamics, making them well- suited to capturing subtle nuances in a sound. They are not ideal for high-volume work, as their sensitivity makes them prone to distort.

How condenser microphones work

A capacitor has two plates with a voltage between. In the condenser mic. one of these plates is made of very light material and acts as the diaphragm. The diaphragm vibrates when struck by sound waves, changing the distance between the two plates and therefore changing the capacitance. Specifically, when the plates are closer together. capacitance increases and a charge current occurs. When the plates are further apart. Capacitance decreases and a discharge current occurs

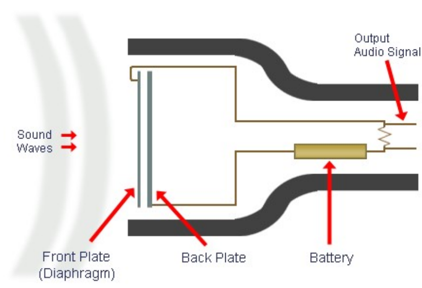

Fig.Cross section of typical condenser microphone

A voltage is required across the capacitor for this work. This voltage is supplied either by a battery in mic or by external phantom power.

The Elect ret condenser microphone :

The electrets condenser mic uses a special type of capacitor which has a permanent voltage built in during manufacture. This is somewhat like a permanent magnet, in that it doesn't require any external power for operation. However good electret condenser mics usually include a pre-amplifier which does still require power.

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Other than this difference, you can think of an electrets condenser microphone as being the same as a normal condenser

.

Technical notes:

- Condenser microphones have a flatter frequency response than dynamics.
- A condenser microphone works in much the same way as an electrostatic tweeter(although obviously in reverse)

LOUD SPEAKER:

Operating Voltage Single Supply 3V to 7V 2½" High-Fidelity speaker

Features:

- SRC Speakers are engineered to eliminate distortion and interference.
- Special shape
- Wire-mesh snap-on grille result in a full rich sound

Specifications:

- Ohms: 8
- Magnet: 36x8
- Size: 2
- Model: round
- Power: 50 watts

RESULTS

TOP VIEW OF OVERALL HARDWARE CIRCUIT MODULE

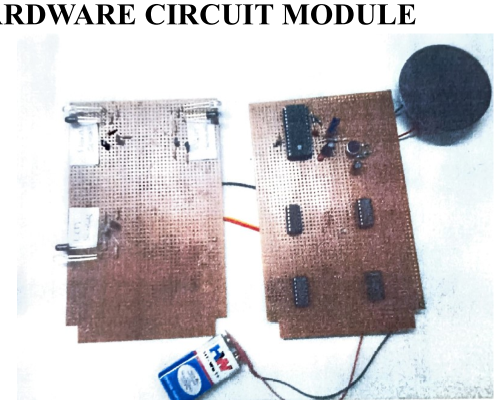

Fig.top view of overall hardware circuit module

LOGIC CIRCUIT AND VOICE RECORDER MODULE

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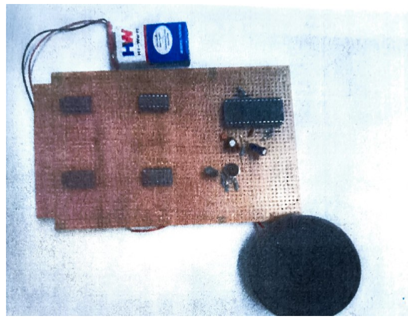

Fig top view logic circuit and voice recorder module

IR SENSOR PAIR MODULE:

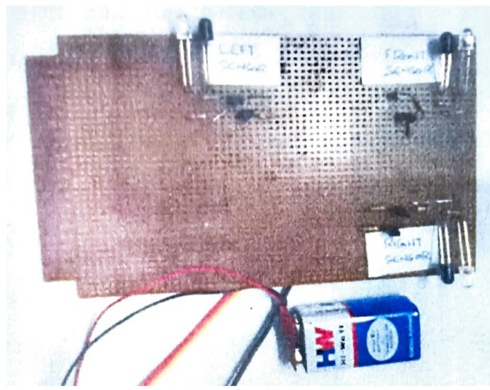

Fig.top view of IR sensor pair module

CONCLUSION :

Thus the approach paves way for better achieving the goals of e-sticks for blind. This project is helpful in ensuring the safest possible movement of the blind user. This helps the blind people to be more aware of the surrounding environment and this is helpful in avoiding the obstacles and eliminates the possibility of occurrence of accidents. This makes the blind independent and free to move from one place to the other.

FUTURE SCOPE :

This project is also helpful to other people who suffer from visual ailments and can be used even by illiterate people without any difficulties as any training isn't necessary because the voice will be stored in the users recommended language. This can be extended to burglar alarms, also we can include RFID reader and use them for bus identification and in super markets and other places for identifying the things and knowing the details, GPS can also be included and positioning, tracking and path finding can be done.

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