THIR EYE FOR BLIND

MINI PROJECT REPORT

Submitted for the partial fulfilment of the requirements for the award of the degree of bachelor of science in electronics by the university of Kerala.

By

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K V V S COLLEGE OF SCIENCE AND TECHNOLOGY

(Affiliated to University of Kerala)

Kaithaparambu, Adoor

2018-2021

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CERTIFICATE

Certified that this is the bonafide report of the mini project entitled **'THIRD EYE FOR BLIND'** *done by* **AMITH A G** *of fifth semester, in partial fulfillment of the requirements for the award of the Degree of Bachelor of Science in Electronics by the University of Kerala during the year 2018-2021*

REG NO: 34018805005

Lecturer in Charge **Head of the Department**

Internal Examiner **External Examiner**

Acknowledgement

First and for most we should like thank GOD the almighty for this divine grace and blessing in making all this possible may be continued to lead us in years to come.

I'm thankful to our respected principal Mr SAMUEL for his support and great mind to provide us this opportunity.

I express our gratitude towards Mr ROBIN CHACKO Head of the department of Electronics for his encouragement and cooperation our project.

I'm extremely thankful to our guides Mr SUDEV R, Mr MANISH, Mrs AKHILA S PILLAI, Mrs DEVIKA KURUP, Mr BAIJU lectures of Electronics Department for their valuable guidance and timely encouragement in the preparation of our project.

I express my great thanks to all staff of my department for their kind cooperation. My mission would be incomplete without the encouragement and help from parents and friends those who had been always with us full support, care and love. We always remember them with gratitude.

Yours sincerely

Amith A G

ABSTRACT

From the survey of WHO, 39 million people are blind all over the world. It is a quite miserable statement. The peoples who are all suffered from these visual difficulties can use this project to overcome their situations. In the third eye project, an ultrasonic sensor used in this project plays a vital role. It detects the object in front of this with a certain range. When object is detected a buzzer sound is given to the user as an indication. While they hear this sound they can know an obstacle in front of them.

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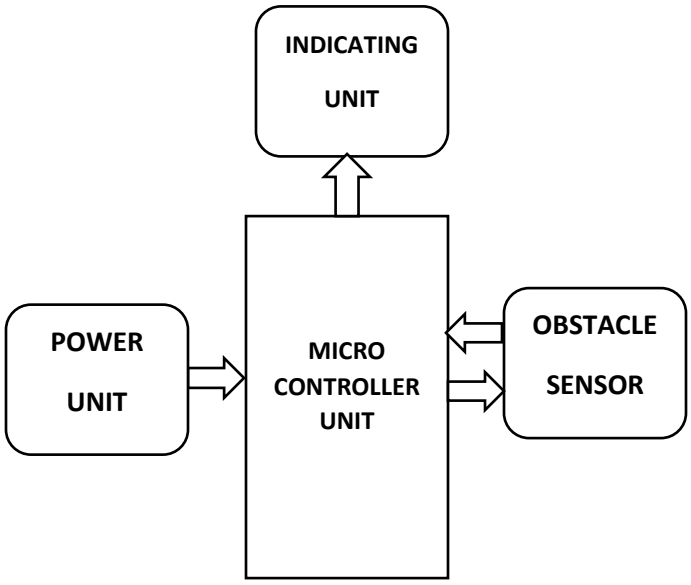
INTRODUCTION

Since the running of daily life of blind people is very difficult. This project helps them to run their life as usual. They can make this project as a gadget or a device in their hands which detects the obstacle. This project is more efficient than the existing system with cheaper and accurate one. Here we are using PIC16F877A to perform this operation. To make the life to be as a normal one for the blind peoples this may be very helpful project for them. By making this as a gadget or a device in their hand they can easily judge an object by their own by knowing the buzzer sound. The system uses ultrasonic sensor as a wide range of field to detect an object with its higher detection range.

This is the first wearable technology for blind people which resolves all the problems of existing technologies. Now a days there are so many instruments and smart devices for visually impaired peoples for navigation but most of them have certain problems for carrying and the major drawbacks is those need a lot of training to use. The one of the main peculiarity of this innovation is, it is affordable for everyone, the total cost being less than $25 (~1500INR). There are no such devices available in the market that can be worn like a cloth and having such a low cost and simplicity. When used on a large scale, with improvements in the prototype, it will drastically benefit the community..

According to WHO 39 million peoples are estimated as blind worldwide. They are suffering a lot of hardship in their daily life. The affected ones have been using the traditional white cane for many years which although being effective, still has a lot of disadvantages. Another way is, having a pet animal such as a dog, but it is really expensive. So the aim of the project is to develop a cheap and more efficient way to help visually impaired to navigate with greater comfort, speed and confidence.

BLOCK DIAGRAM



BLOCK DIAGRAM DESCRIPTION

The third eye for blind project consist of four block units. The block units are microcontroller unit, power unit, obstacle sensing unit, and indicating unit.

MICRO CONTROLLER UNIT: Helps in sensing and controlling the objects in the real-time situations and environment.PIC16F877A is used in the this project, The PIC16F877A features 256 bytes of EEPROM data memory, self-programming, an ICD, 2 Comparators, 8 channels of 10-bit Analog-to-Digital (A/D) converter, 2 capture/compare/PWM functions, the synchronous serial port can be configured as either 3-wire Serial Peripheral Interface (SPI) and a Universal Asynchronous Receiver Transmitter (USART). PIC16F877a is a 40-pin PIC Microcontroller and is used mostly in Embedded Projects and Applications. Few of its features are as follows:

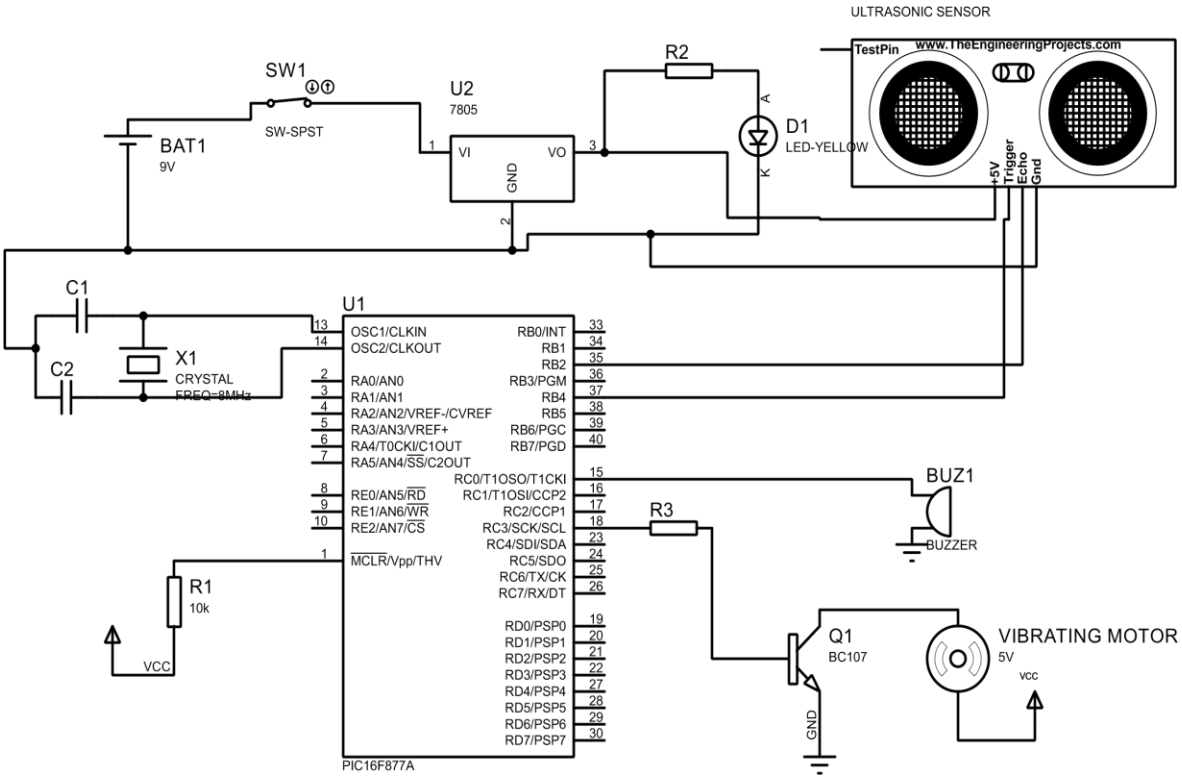
- It has five Ports on it starting from **Port A to Port E**.

- It has **three Timers** in it, two of which are 8 bit Timers while 1 is 16 Bit.
- It supports many communication protocols like: Serial Protocol, Parallel Protocol andI2C Protocol.

- It supports both hardware pin interrupts and timer interrupts.

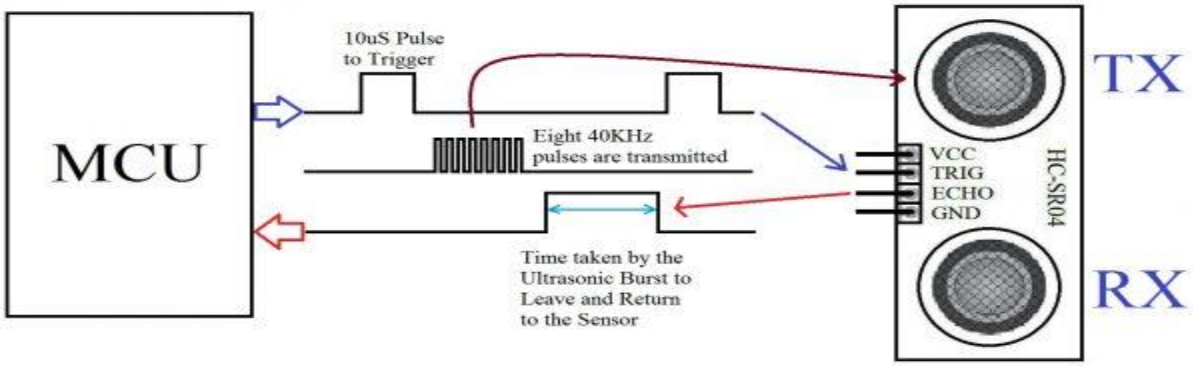
- POWER UNIT: Provide 5v input voltage to processing unit and other units. This unit consist of 9v battery and 7805 IC voltage regulator.7805 IC voltage regulator provide stable 5v to microcontroller unit and other component.
- OBSTACLE SENSING UNIT: consists of transmitter, receiver and transceiver. The transmitter convert electrical signal into soundwaves. The receiver converts the soundwaves into electrical signal again. The transceiver performs both the receiver and transmitter operations. It also has crystal oscillators in it. It will perform the stabilization operation in the ultrasonic sensor.
  INDICATING UNITS: indicates or signals the user if obstacle is ahead. This unit consist of LED, Buzzer and vibration motor.

CIRCUIT DIAGRAM



CIRCUIT DIAGRAM EXPLANATION

In the circuit diagram of third eye for blind project, crystal oscillator is connected to the pin 13 and 14 of PIC16F877A microcontroller which provides stable and accurate frequency to the microcontroller (the capacitor are there to resonate with the crystal inductance and cause the crystal to oscillate on its fundamental parallel resonant mode).the voltage regulator 7805 regulates 5 v power supply to the pin 1 of the microcontroller and vcc pin of ultrasonic sensor. The trigger and echo pin of the ultrasonic sensor is connected to the pin 33 and 34 of microcontroller respectively. The buzzer, vibrating motor, and led is connected to the pin 35, 36, and37 of the pic16f877a respectively.



Pic microcontroller Provide trigger signal, atleast 10µS High Level (5V) pulse. The ultrasonic sensor will automatically transmit eight 40 KHz ultrasonic burst. If there is an obstacle in-front of the module, it will reflect the ultrasonic burst. If the signal is back, ECHO output of the sensor will be in HIGH state (5V) for a duration of time taken for sending and receiving ultrasonic burst. Pulse width ranges from about 150µS to 25mS and if no obstacle is detected, the echo pulse width will be about 38ms. which is fed as input to pic microcontroller and it provides high level (5v) to led, buzzer and vibration motor.

COMPONENTS REQUIRED

- PIC16F877A Microcontroller
- Crystal oscillator
- Capacitor
- Resistor
- Led
- Piezo buzzer
- Vibrating motor
- Ultra-sonic sensor(HC SR04)
- Voltage regulator(7805IC)

PIC16F877A

The PIC microcontroller PIC16f877a is one of the most renowned microcontrollers in the industry. This microcontroller is very convenient to use, the coding or programming of this controller is also easier. One of the main advantages is that it can be write-erase as many times as possible because it uses FLASH memory technology. It has a total number of 40 pins and there are 33 pins for input and output. PIC16F877A is used in many pic microcontroller projects. PIC16F877A also have much application in digital electronics circuits.PIC16f877a finds its applications in a huge number of devices. It is used in remote sensors, security and safety devices, home automation and many industrial instruments. An EEPROM is also featured in it which makes it possible to store some of the information permanently like transmitter codes and receiver frequencies and some other related data. The cost of this controller is low and its handling is also easy. It is flexible and can be used in areas where microcontrollers have never been used before as in microprocessor applications and timer functions etc.

- It has a smaller 35 instructions set.
- It can operate up to 20MHz frequency.
- The operating voltage is between 4.2 volts to 5.5 volts. If you provide it voltage more than 5.5 volts, it may get damaged permanently.
- It does not have an internal oscillator like other PIC18F46K22, PIC18F4550.
- The maximum current each PORT can sink or source is around 100mA. Therefore, the current limit for each GPIO pin of PIC16F877A is 10 mili ampere.
- It is available in four IC packaging such as 40-pin PDIP 44-pin PLCC, 44-pin TQFP, 44-pin QFN

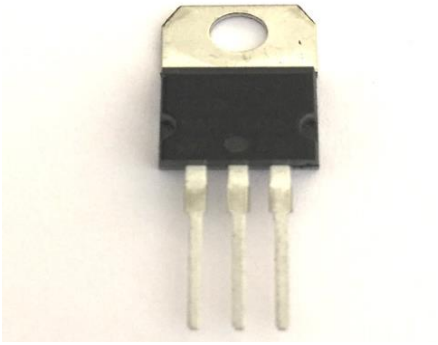
VOLTAGE REGULATOR (7805)

Voltage regulators are very common in electronic circuits. They provide a constant output voltage for a varied input voltage. In our case the 7805 IC is an iconic regulator IC that finds its application in most of the projects. The name 7805 signifies two meaning, “78” means that it is a positive voltage regulator and “05” means that it provides 5V as output. So our 7805 will provide a +5V output voltage.

The output current of this IC can go up to 1.5A. But, the IC suffers from heavy heat loss hence a Heat sink is recommended for projects that consume more current. For example if the input voltage is 12V and you are consuming 1A, then (12-5) * 1 = 7W. This 7 Watts will be dissipated as heat.

7805 Regulator Features

- 5V Positive Voltage Regulator
- Minimum Input Voltage is 7V
- Maximum Input Voltage is 25V
- Operating current(I_Q) is 5mA
- Internal Thermal Overload and Short circuit current limiting protection is available.
- Junction Temperature maximum 125 degree Celsius
- Available in TO-220 and KTE package



ULTRASONIC SENSOR

L293d IC is known as a motor driver. It is a low voltage operating device like other ICs. The other ICs could have the same functions like L293d but they cannot provide the high voltage to the motor. L293d provides the continuous bidirectional Direct Current to the Motor. The Polarity of current can change at any time without affecting the whole IC or any other device in the circuit. L293d has an internal H-bridge installed for two motors.

H-Bridge is an electrical circuit that enables the load in a bidirectional way. L293d Bridge is controlled by external low voltage signals. It may be small in size, but its power output capacity is higher than our expectation. It could control any DC motor speed and direction with a voltage range of 4.5 – 36 Volts. Its diodes also save the controlling device and IC from back EMF. To control the max 600mA amount of current an internal "Darlington transistor sink" installed in it, which could be used to control a large amount of current by providing a small amount of current. It has also internal "pseudo-Darlington source" which amplifies the input signal to control the high voltage DC motor without any interception.

Pin configuration of IC is shown below-

HC-SR04 Ultrasonic Distance Sensor is a popular and low cost solution for non-contact distance measurement function. It is able to measure distances from 2cm to 400cm with an accuracy of about 3mm. This module includes ultrasonic transmitter, ultrasonic receiver and its control circuit.

HC-SR04 module has 4 pins:

- VCC – 5V, +ive of the power supply

- TRIG – Trigger Pin
- ECHO – Echo Pin
- GND – -ive of the power supply

CRYSTAL OSCILLATOR

A crystal oscillator is an electronic oscillator circuit that uses the mechanical resonance of a vibrating crystal of piezoelectric material to create an electrical signal with a constant frequency. This frequency is often used to keep track of time, as in quartz wristwatches, to provide a stable clock signal for digital integrated circuits, and to stabilize frequencies for radio transmitters and receivers. The most common type of piezoelectric resonator used is the quartz crystal, so oscillator circuits incorporating them became known as crystal oscillators, but other piezoelectric materials including polycrystalline ceramics are used in similar circuits.

A crystal oscillator relies on the slight change in shape of a quartz crystal under an electric field, a property known as electrostriction or inverse piezoelectricity. A voltage applied to an electrode on the crystal causes it to change shape; when the voltage is removed, the crystal generates a small voltage as it elastically returns to its original shape. The quartz oscillates at a stable resonant frequency, behaving like an RLC circuit, but with a much higher Q factor (less energy loss on each cycle of oscillation). Once a quartz crystal is adjusted to a particular frequency (which is affected by the mass of electrodes attached to the crystal, the orientation of the crystal, temperature and other factors), it maintains that frequency with high stability.

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to a particular frequency (which is affected by the mass of electrodes attached to the crystal, the orientation of the crystal, temperature and other factors), it maintains that frequency with high stability.

PIEZO BUZZER

In simplest terms, a piezo buzzer is a type of electronic device that's used to produce a tone, alarm or sound. It's lightweight with a simple construction, and it's typically a low-cost product. Yet at the same time, depending on the piezo ceramic buzzer specifications, it's also reliable and can be constructed in a wide range of sizes that work across varying frequencies to produce different sound outputs.
For instance, at APC International, Ltd., we offer piezo buzzers without signal generators, self-oscillating buzzers that have signal generators and even multi-tone sound generators — often used in alarms and sirens. Regardless of the model you choose, our piezo buzzers offer high sound outputs. Plus, since they can be mounted on circuit boards, they're highly useful in a wide range of applications and assemblies.

A piezoelectric speaker (also known as a piezo bender due to its mode of operation, and sometimes colloquially called a "piezo", buzzer, and crystal loudspeaker or beep speaker) is a loudspeaker that uses the piezoelectric effect for generating sound. The initial mechanical motion is created by applying a voltage to a piezoelectric material, and this motion is typically converted into audible sound using diaphragms and resonators. Compared to other speaker designs piezoelectric speakers are relatively easy to drive; for example they can be connected directly to TTL outputs, although more complex drivers can give greater sound intensity. Typically they operate well in the range of 1-5 kHz and up to 100 kHz in ultrasound applications.

Piezoelectric speakers are frequently used to generate sound in digital quartz watches and other electronic devices, and are sometimes used as tweeters in less-expensive speaker systems, such as computer speakers and portable radios. They are also used for producing ultrasound in sonar systems. Piezoelectric speakers have several advantages over conventional loudspeakers: they are resistant to overloads that

would normally destroy most high frequency drivers, and they can be used without a crossover due to their electrical properties. There are also disadvantages: some amplifiers can oscillate when driving capacitive loads like most piezo electrics, which results in distortion or damage to the amplifier.

VIBRATION MOTOR

Small vibration motors have been around since the 1960s. Initially, they were developed for massaging products, but their development took a new turn in the 1990s when consumers required vibra-call on their mobile / cell phones. Today, designers and users alike have learned from two decades of mobile phones, that vibration alerting is an excellent way to alert operators to an event. These days miniature vibrating motors are used in a wide range of products, such as tools, scanners, medical instruments, GPS trackers, and control sticks. Vibrator motors are also the main actuators for haptic feedback which is an inexpensive way to increase a product's value and differentiate it from the competition. So, if you landed here because you want to make something vibrate, you're in good company. Precision Microdrives is the leading supplier of sub-Ø60 mm vibrating motors. We carry the widest range of stock and we offer unrivalled application support and on-hand technical expertise.

Vibration motor is a coreless DC motor and the size of this motor is compact. The main purpose of this motor is to alert the user from receiving the call by without sound/vibrating. These motors are applicable for different applications like pagers, handsets, cell phones, etc

PRINTED CIRCUIT BOARD

TOOLS USED: PROTEUS

The Proteus Design Suite is a complete software solution for circuit simulation and PCB design. It comprises several modules for schematic capture, firmware IDE and PCB layout that appear as tabs inside a single, integrated application. This provides a smooth AGILE workflow for the design engineer and helps products get to market faster.

The Proteus PCB Design products include both schematic capture and PCB layout modules and are designed to be both easy to use and powerful. Features such as a world class shaped based AutoRoute, 3D Visualization, automatic net tuning, design snippets and assembly variants save you time during product design. Meanwhile, a powerful design rule system enforces whatever rules and clearances you might need for your PCB. The routing of tracks is fully design rule aware and live clearance checking makes it easy to locate and correct any violations.

The Proteus simulation products all use the schematic capture module as the electronic circuit and our customized mixed-mode SPICE engine to run the simulation. Proteus VSM then allows the microcontroller to also be simulated on the schematic while Proteus IoT Builder enables the design and test of the remote user interface for the circuit.

For embedded engineers, Proteus VSM bridges the gap in the design life cycle between schematic capture and PCB layout. It enables you to write and apply your firmware to a microcontroller component on the schematic (PIC, AVR, ARM, 8051, etc.) and then co-simulate the program within a mixed-mode SPICE circuit simulation.

For academics and the maker market, Proteus Visual Designer allows Arduino programs to be written with simple flowcharting methods and Arduino shields to be placed on the schematic with a mouse click. The entire Arduino system can then be simulated, tested and debugged in software. Proteus IoT builder then adds the ability to create a user interface for your phone or tablet to interact with the Arduino electronics. You can even test this by controlling the running simulation from your mobile device.

The Proteus is a fully function, procedural programming language created in 1998 by Simone Zanella. Proteus incorporates many function derived from several other languages. C, BASIC, Assembly, clipper/dBase; it is especially versatile in dealing with strings, having hundreds of dedicated functions; this make it one of the richest languages for test manipulations. Proteus owes its name to a Greek god of the sea (Proteus), who look care of the Neptune's crowd and gave response; he was renowned for being able to transform himself, assuming different shapes. Transforming data from one form to another is the main usage of this language. Proteus was initially created as a multiplatform (DOS, Windows, UNIX) system utility, to manipulate text and binary file and to create CGI scripts. The language was later focused on Windows, by adding hundreds of specialized functions for: network and serial communication, data base emulation, ISAPI scripting. Most of these additional functions are only available in the Window flavor of the interpreter, even though a Linux version is still available Proteus was designed to be practical, readable, and consistent.

Its strongest points are

- Powerful string manipulation
- Comprehensibility of Proteus scripts
- Availability of advanced data structures: arrays, queues (single or double), stacks, bit maps, sets, AVL tree.

The language can be extended by adding user functions written in Proteus or DLLs created in C/C++.

- At first sight, Proteus may appear similar to basic because of its straight syntax, but similarities are limited to the surface:
- Proteus has a fully functional procedural approach
- Variables are untyped, do not need to be declared, can be local or public and can be passed by value or by reference
- All typical control structures are available (if-then-else; for-next; while-loop; repeat-until; switch-case)
- New functions can be defined and used as native function.

Data types supported by Proteus are only three; integer numbers, floating point numbers and strings. Access to advanced data structures (files, arrays, queues, stacks, AVL trees. Sets and so on) takes place by using handles, i.e. integer numbers returned by item creation functions. Type declaration is unnecessary. Variable type is determined by the function applied Proteus converts on the fly every variable when needed and holds previous data renderings. To avoid performance degradation caused by repeated conversions. There is no need to add parenthesis in expressions to determine the evaluation order, because the language is fully functional (there are no operators).

Proteus includes hundreds of functions for

- Accessing file system

- Sorting data
- Manipulation of data and strings
- Interacting with the user
- Calculating logical and mathematical expressions.

PCB DESIGNING

A printed circuit board , or PCB, is used to mechanically supported electrically connect electronic component using conductive path ways, tracks or traces etched from copper sheets laminated on to a non-conductive substrate. It also referred to us printed wiring board {PWB} or etched wiring board .A PCB populated with electronic component is a printed circuit assembly {PCA}, also non as a printed circuit board assembly {PCBA}.

MATERIALS

Conducting layers are typically made of thin copper foil .insulating layers is typically laminated with epoxy resin prepare. The board is typically coated with a solder mask. There are quite a few different dielectrics that can be chosen to provide different insulating values depending on the requirements of the circuit .some of these dielectrics are polytetrafluoroethylene [Teflon], FR-4, FR-1, CEM-1 or CEM.

LAYOUT

The first rule is to prepare each and every PCB layout as viewed from the component side. Another important rule is not to start the designing of a layout unless an absolutely clear circuit diagram is available, if necessary, with a component lists, among the components the larger one are placed first and the space between is filled with smaller one. Component requiring input/output connections come near the connectors. All components are placed in such a manner that disordering of the component is not necessary if they have to replaced.in the designing of a PCB layout it is very important to divide the circuit in to functional subunit .Each of this subunit should be realized on defined portion of the board. In the designing the inter connection which are usually done by pencil lines actually space requirements in the art work must be considered .in addition the layout can be rather roughly sketched and will still be clear enough on art work designer.

BOARD CLEANING

The cleaning of the copper surface prior to resist application in an essential step for any types of PCB process using etch or plating resist.

Where cleaning has to be done with simplest means or only for a limited quantity of PCBs, manual –cleaning process is mainly used. In the process we require just a sink with running water, pumice power, scrubbing brushes and suitable tanks.

PATTERNING (ETCHING)

The vast majority of printed circuit boards are made by bonding a layer of copper over the entire substrate , sometimes on both sides,(creating a "blank PCB ")then removing unwanted copper after applying a temporary mask (e.g. by etching), leaving only the desired copper traces. A few

PCB are made by adding traces to the bare substrate (or a substrate with a very thin layer of copper) usually by a complex process of multiple electroplating step.

LAMINATION

Some PCBs have trace layers inside the PCB and are called multi –layer PCBs .these are formed by bonding together separately etched thin boards.

DRILLING

Holes through a PCB are typically drilled with tiny drill bits made of solid tungsten carbide. The drilling can be performed manually by using a hand drill.

EXPOSED CONDUCTOR PLATING AND COATING

PCBs are plated with Solder, Tin, or Gold over Nickel as a resist for etching (removal) away the (unneeded after plating) underlying copper. Matte solder is usually fused to provide a better bonding surface or stripped to bare copper. Treatments, such as benzimidazolethoil, prevent surface oxidation of bare copper. The places to which components will be mounted are typically plated, because untreated bare copper oxides quickly, and therefore is not readily solder able. Traditionally, any exposed copper was coated with solder by hot air solder leveling (HASL).This solder was a tin-lead alloy. However new solder compounds are now used to achieve Compliance.

SOLDER RESIST

Areas that should be soldered may be covered with a polymer solder resist (solder mask)

Coating. The solder resist prevent solder from bridging between conductors and creating short

Circuits. Solder resist also provides some protection from the environment. Solder resist is

Typically 20-30 microns thick.

PRINTED CIRCUIT ASSEMBLY

After the printed circuit board (PCB) is completed, components must be attached to Form a functional printed circuit assembly, or PCA (sometimes called a “printed circuit board assembly” PCBA).In through-mount construction, components are placed on pads or lands on the outer surfaces of the PCB. In both kinds of construction, component leads are electrically and mechanically fixed to the board with a molten metal solder.

PROTECTION AND PACKING

PCBs intended for extreme environments often have a conformal coating, which is applied by dipping or spraying after the components have been soldered. The coat prevents corrosion and leakage currents or shorting due to condensation. The earliest conformal coats were wax. Modern conformal coats are usually dips of dilute solutions of silicon rubber, polyurethane, acrylic, or epoxy. Some are engineering plastics spurted onto the PCB in a vacuum chamber.

.PCB SOLDERING

MAKING SOLDERED JOINTS

Hold the soldering iron like a pen near the base of the handle. Touch the soldering iron into the joint to be made. Feed the little solder on the joint, remove the solder, then the iron, while keeping the joint still. Input the joint closely and should have a volcano shape. Some components such as transistors can be damaged by, when soldering. It is wise to use a heart sink dipped to the lead between the joints and components body. Some components require special case when soldering.

SOLDER

It is an alloy of tin and lead, typically 60% tin and 40% lead. It meet at a temperature of 200 degree Celsius. Coating a surface with solder is called tinning, because of tin content of the solder. Lead is poisonous and one should always wash hand after using solder. Solder for electronics use contain tiny cores of flux like the wires inside the main flux. The flux is

corrosive like an acid and it cleans the metal surface as the solder melts. That is why one must itself melt the solder actually on this joints not on the iron tip without flex must joints would fails because metals quickly oxidize and the metal and the solder itself will not flow properly on to a dirty oxidized metal surface.

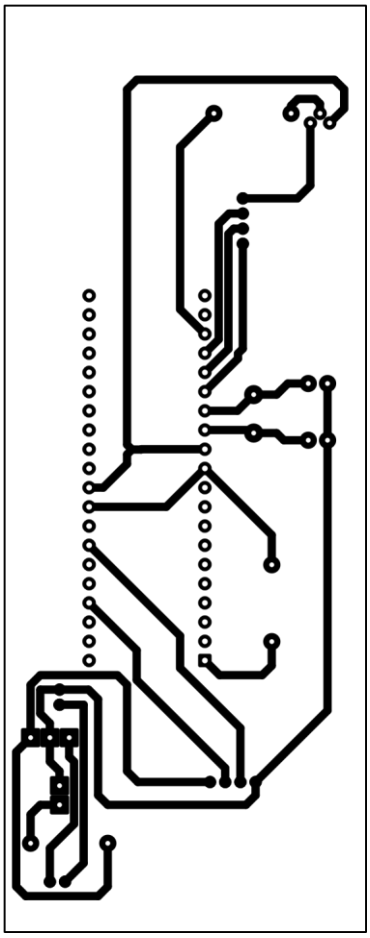
FLUX

Components are basically mounted only one side of the board. The performance and reliability of solder joints give best result covered with solder and here with contributing to actual solder connections. However lead cutting after soldering is still common in particular in smaller industries where hand soldering is used. With the soldered PCB many contaminants can be found which may produce difficulties with the functioning of the circuit. Among the contaminants, we can typically find flux, chip of plastics, metals and other constructional materials, plating sails, oils greases environmental soil and other processing materials.

The following performance are expected from cleaning procedure with the appropriate cleaning medium:

1. Dissolutions or dissolving of organic liquid and solids, e.g., oils, greases, resin flux.
2. Removal of plating salts and silicone oils.
3. Displacing of particulate and other insoluble matter, e.g., chips, dust, and lint.
4. No severe attacks on board and components to be cleaned, no alteration of ink or paints rotations and last but not the least, compatibility with healthy environmental working conditions.

PCB LAYOUT



RESULT

With the improvement of the living standards of the people, we have become so materialistic that we have forgotten how the physically disabled people live a tough life. They undergo rigorous, indifferent behavior towards them for being physically disabled. They become dependent on other people in a way for their day to day routine chores. Blind and impaired persons always depend on other people for their regular activities. Eyes are responsible for observing and listen the outside environment; dysfunction of such prime sense organ severely affects the knowledge perceiving capability of the outside environment. Therefore, going around to places in such an environment is a very big challenge because blind people cannot depend on their own eyes and thus face many difficulties. This project will help them to overcome their obstacles.

ADVANTAGE OF THIRD EYE FOR BLIND

➥easy and less maintains cost

➥It helps many poor blind people lives

➥Operating principle is very easy.

➥It consumes less power for operation.

➥Installation of the third eye for blind are very

Much simple.

➥It costs very less

DISADVANTAGES OF THIRD EYE FOR BLIND

➡ Not designed for underwater use because ultrasonic sensor get spoil when use under water. This means users is not permitted use this device when its raining.

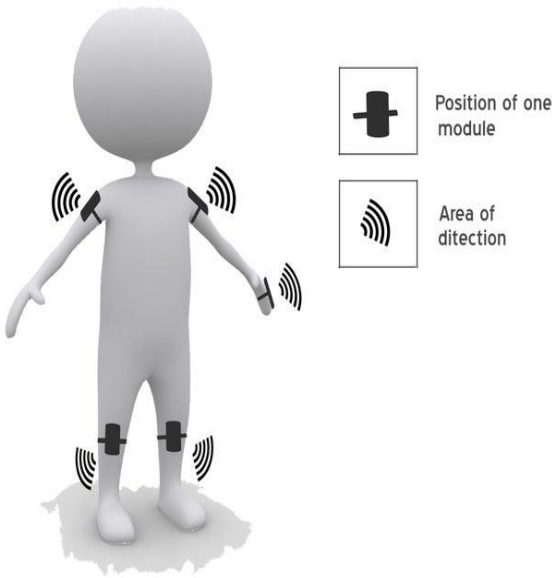
➡sensing accuracy is affected by changes in the temperature of 5 -10 degree

.

➡Have limited detection range

FUTURE SCOPE

By wearing this device they can fully avoid the use of white cane and such other devices. This device will help the blind to navigate without holding a stick which is a bit annoying for them. They can simply wear it as a band or cloth and it can function very accurately and they only need a very little training to use it.I have designed a special wearable device based on the Arduino board which can be worn like a cloth for blinds. This device is equipped with five ultrasonic sensors, consisting of five modules which are connected to the different parts of the body. Among them, two for both shoulder, another two for both knees and one for the hand. Using the five ultrasonic sensors, blind can detect the objects in a five dimensional view around them and can easily travel anywhere. When the ultrasonic sensor detects obstacle the device will notify the user through vibrations and sound beeps. The intensity of vibration and rate of beeping increases with decrease in distance and this is a fully automated device.



CONCLUSION

The objective of this project is Third Eye for the Blind is to design a product which is very much useful to those people who are visually impaired and those who often have to rely on others. The third eye for Blind project is an innovation which helps the blind person to move around and go from one place to another with speed and confidence by knowing the nearby obstacles using the help of the wearable band which produces the ultrasonic waves which notify them with buzz sound or vibrations. It allows the user those who are visually impaired to walk freely by detecting the obstacles. They only need to wear this device as a band or cloth on their body.

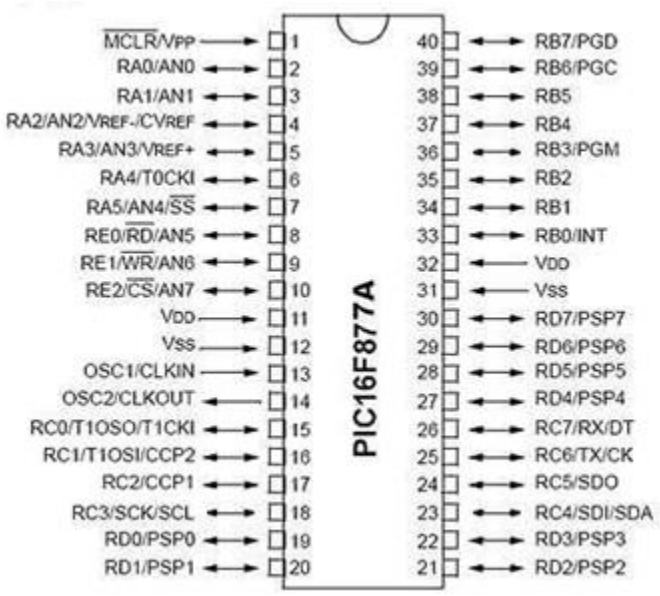
Thus, this project Arduino based obstacle detector for blind people is a new method to resolve their problems. A less complex portable, cost efficient, easy to manage an effective system with many more amazing properties and advantages are proposed to provide support for the blind. The system will be very easy to find the distance between the objects and the sensor. It can detect the objects in every directions th the blind person. Without the help of others the blind person can move from one place to other and lead their regular lives independently.

REFERENCE

- https://circuitdigest.com/electronic-circuits/automatic-rain-sensing-car-wiper
- Electronics for you(magazine)
- www.Electronicshub.com

APPENDIX A

PIC16F877A (PIN CONFIGURATION)



Pin Number	Pin Name	Description
1	MCLR/Vpp	MCLR is used during programming, mostly **connected to programmer** like PicKit
2	RA0/AN0	**Analog pin 0** or 0th pin of PORTA
3	RA1/AN1	**Analog pin 1** or 1st pin of PORTA
4	RA2/AN2/Vref-	**Analog pin 2** or 2nd pin of PORTA
5	RA3/AN3/Vref+	**Analog pin 3** or 3rd pin of PORTA
6	RA4/T0CKI/C1out	4th pin of PORTA
7	RA5/AN4/SS/C2out	**Analog pin 4** or 5th pin of PORTA
8	RE0/RD/AN5	**Analog pin 5** or 0th pin of PORTE

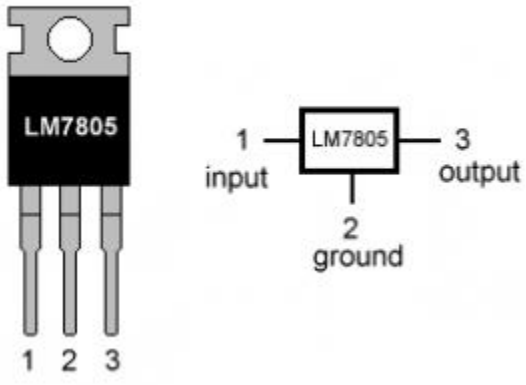
9	RE1/WR/AN6	**Analog pin 6** or 1st pin of PORTE
10	RE2/CS/AN7	7th pin of PORTE
11	Vdd	**Ground pin** of MCU
12	Vss	**Positive pin** of MCU (+5V)
13	OSC1/CLKI	**External Oscillator**/clock input pin
14	OSC2/CLKO	**External Oscillator**/clock output pin
15	RC0/T1OSO/T1CKI	0th pin of PORT C
16	RC1/T1OSI/CCP2	1st pin of POCTC or **Timer/PWM** pin
17	RC2/CCP1	2nd pin of POCTC or **Timer/PWM** pin
18	RC3/SCK/SCL	3rd pin of POCTC
19	RD0/PSP0	0th pin of POCTD
20	RD1/PSPI	1st pin of POCTD
21	RD2/PSP2	2nd pin of POCTD
22	RD3/PSP3	3rd pin of POCTD
23	RC4/SDI/SDA	4th pin of POCTC or Serial Data in pin
24	RC5/SDO	5th pin of POCTC or Serial Data Out pin
25	RC6/Tx/CK	6th pin of POCTC or **Transmitter pin** of Microcontroller
26	RC7/Rx/DT	7th pin of POCTC or **Receiver pin** of Microcontroller
27	RD4/PSP4	4th pin of POCTD
28	RD5/PSP5	5th pin of POCTD
29	RD6/PSP6	6th pin of POCTD
30	RD7/PSP7	7th pin of POCTD
31	Vss	**Positive pin** of MCU (+5V)
32	Vdd	**Ground pin** of MCU
33	RB0/INT	0th pin of POCTB or **External Interrupt** pin
34	RB1	1st pin of POCTB

35	RB2	2nd pin of POCTB
36	RB3/PGM	3rd pin of POCTB or **connected to programmer**
37	RB4	4th pin of POCTB
38	RB5	5th pin of POCTB
39	RB6/PGC	6th pin of POCTB or **connected to programmer**
40	RB7/PGD	7th pin of POCTB or **connected to programmer**

VOLTAGE REGULATOR

Pin No.	Pin	Function	Description
1	INPUT	Input voltage (7V-35V)	In this pin of the IC positive unregulated voltage is given in regulation.
2	GROUND	Ground (0V)	In this pin where the ground is given. This pin is neutral for equally the input and output.
3	OUTPUT	Regulated output; 5V (4.8V-5.2V)	The output of the regulated 5V volt is taken out at this pin of the IC regulator.

LM7805 PINOUT DIAGRAM



APPENDIX B

PROGRAM LOGIC

Basic Steps:

1. Provide TRIGGER to ultrasonic module
2. Listen for Echo
3. Start Timer when ECHO HIGH is received
4. Stop Timer when ECHO goes LOW
5. Read Timer Value
6. Convert it to Distance
7. Turn on the led, buzzer and vibration motor

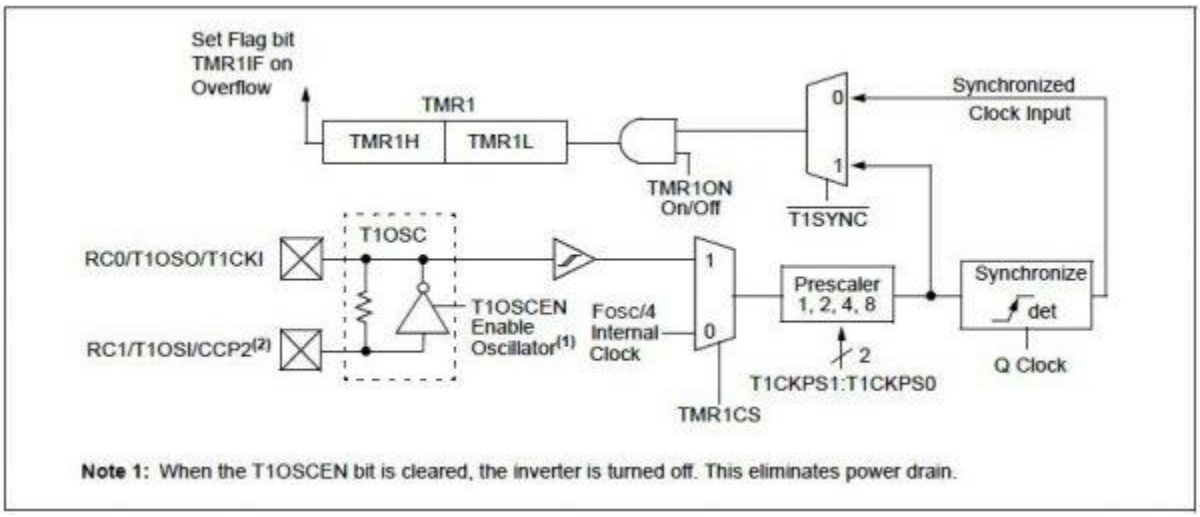
Timer1 Module

Timer1 Module can be used as a 16 bit counter or timer. It consists of two 8 bit registers TMR1H and TMR1L which are readable and writable. The register pair, TMR1H:TMR1L increments from 0000H to FFFFH and rolls over to 0000H. If enabled Timer1 Overflow Interrupt is generated during rolls over to 0000H. Here we will use this module as a 16 bit Timer.

T1CON: TIMER1 CONTROL REGISTER (ADDRESS 10h)

U-0	U-0	R/W-0	R/W-0	R/W-0	R/W-0	R/W-0	R/W-0
—	—	T1CKPS1	T1CKPS0	T1OSCEN	$\overline{\text{T1SYNC}}$	TMR1CS	TMR1ON
bit 7							bit 0

Timer1 Control Register



Timer1 Module Block Diagram

Since we are using Timer1 module as a Timer, we should use internal clock (Fosc/4), ie TMR1CS = 0. Prescaler is used to divide the internal clock (Fosc/4). Here we can set Prescaler as 2, ie T1CKPS1 = 0 & T1CKPS0 = 1. T1SYNC bit is ignored when TMR1CS = 0. As we are using internal clock (Fosc/4) we can disable oscillator, ie T1OSEN = 0. TMR1ON bit can be used to ON or OFF timer as per our requirements.

- Thus we can initialize timer as : T1CON = 0x10
- To TURN ON the Timer : T1CON.F0 = 1 or TMR1ON = 1
- To TURN OFF the Timer : T1CON.F0 = 0 or TMR1ON = 0

Fosc is the oscillator frequency, here we are using 8MHz crystal hence Fosc = 8MHz.

Time = (TMR1H:TMR1L)*(1/Internal Clock)*Prescaler

Internal Clock = Fosc/4 = 8MHz/4 = 2MHz

Therefore, Time = (TMR1H:TMR1L)*2/(2000000) = (TMR1H:TMR1L)/1000000

Distance Calculation

- **Distance = Speed * Time**
- Let **d** be the distance between Ultrasonic Sensor and Target
- Total distance travelled by the ultrasonic burst : **2d** (forward and backward)
- Speed of Sound in Air : **340 m/s = 34000 cm/s**
- Thus, **d = (34000*Time)/2**, where Time = (TMR1H:TMR1L)/(1000000)
- Therefore, **d = (TMR1H:TMR1L)/58.82 cm**
- **TMR1H:TMR1L = TMR1L | (TMR1H<<8)**

MikroC program

```
void main()
{

  int a;
    TRISB = 0b00010000;          //RB4 as Input PIN (ECHO)

  TRISC = 0b00000000;
   PORTC=0x00;
  Delay_ms(3000);

  T1CON = 0x10;                //Initialize Timer Module
```

```
 while(1)
 {
   TMR1H = 0;                //Sets the Initial Value of Timer
   TMR1L = 0;                //Sets the Initial Value of Timer
    PORTC=0x00;
   PORTB.F0 = 1;              //TRIGGER HIGH
   Delay_us(10);             //10uS Delay
   PORTB.F0 = 0;              //TRIGGER LOW

   while(!PORTB.F4);          //Waiting for Echo
   T1CON.F0 = 1;              //Timer Starts
   while(PORTB.F4);           //Waiting for Echo goes LOW
   T1CON.F0 = 0;              //Timer Stops

   a = (TMR1L | (TMR1H<<8));   //Reads Timer Value
   a = a/58.82;                //Converts Time to Distance
   a = a + 1;                 //Distance Calibration
   if(a>=0&&a<=50)
    {
   portc=0xff;
   }
else
{
portc=0x00;
}
delay_ms(500);}}
```