ELECTRONIC BLIND AID PROJECT

Submitted in partial fulfilment of the Degree of

Bachelor of Technology in

Electronics and Communication Engineering

Under the supervision of

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Certificate

This is to certify that project report entitled "**ELECTRONIC BLIND AID PROJECT",** submitted by **Twinkle Bansal(111023), Sumit Baweja(111105), Adarsh Kapil(111121)** in partial fulfilment for the award of degree of Bachelor of Technology in Electronics and Communication Engineering to Jaypee University of Information Technology, Waknaghat, Solan has been carried out under my supervision. This work has not been submitted partially or fully to any other University or Institute for the award of this or any other degree or diploma.

Supervisor's Name: Dr. PRADEEP KUMAR

Designation: Associate Professor

Signature:

Date:

Acknowledgement

We would like to give our cordial thanks to our project guide **Dr. Pradeep Kumar** associate professor ECE Department, for his regular encouragement, invaluable advice and support without this project would have never been completed so smoothly. It is because his regular guidance and effort, that the whole process has become a success.

We would like to express our heartfelt gratitude to our supervisors for guiding this work with utmost interest, patience, cares and scientific rigor. We are grateful to them for setting high standards and giving us the freedom to explore many things. Thank you for the time and experiences shared as well as additional knowledge gained as we believe that we would not get this kind of opportunity elsewhere.

We are thankful to our family for bearing with us during this venture and providing the strength to persist. Finally, a special mention for our project partners whose support and suggestions went along way in making this work a reality.

 Thank you.

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ABSTRACT

Blind people consist of a large group of people in our society. Losing their eyesight has caused them inconvenience in performing daily tasks.

Mobility aids like walking sticks are commonly used by blind people these are called as electronic travel aid. Hence, smart cane had been developed in order to increase the life quality of a blind person.

The purpose of this project is to design a smart cane with ultrasonic sensor for the blind. Ultrasonic sensor will send the trigger pulse to detect obstacles.

The present electronic travel aid device consist usually available ultrasonic sensor to detect obstacles on the way within a distance of one meters. It transmits ultrasound beams at a regular time interval. If any object is present on the way, the emitted ultrasound will be reflected back to the sensor. The discrete distance of the object is then measured and sensed by tactile vibrators.

In addition to this, device is to give information about water pits in the traveling path.

In 7th semester we made water pits detector circuit and in 8th semester we worked on Ultrasonic sensor circuit.

OBJECTIVE

The main objective of this project is to design a smart cane to increase the mobility of a blind person and to implement a navigation system.

Technology has advanced so much in the last decade or two that it has made life more efficient and comfortable. The comfort of being able to detect any obstacle from one particular location has become imperative as it helps the blind. Therefore there arises a need to do so in a systematic manner which we have tried to implement with our system. The application of our system comes in handy for blind people who face difficulties in their daily life.

To increase the mobility ability, ultrasonic sensor is used to sense obstacles and alert the blind people through vibration and also waterpits circuit used to alert waterpits ahead**.**

1 INTRODUCTION

1.1 INTRODUCTION

Vision is the most important part of human physiology as 83% of information   human being gets from the environment is via sight. The 2011 statistics by the World Health Organization (WHO) estimates that there are 285 billion people in world with visual impairment,39 billion of which are blind and 246 with low vision . The traditional and oldest mobility aids for persons with visual impairments are the walking cane (also called white cane or stick) and guide dogs. With the rapid advances of modern technology, both in hardware and software front has brought potential to provide intelligent navigation capabilities. Recently there has been a lot of Electronic Travel Aids (ETA) designed and devised to help the blind navigate independently and safely. Also high-end technological solutions have been introduced recently to help blind persons navigate independently .Many blind guidance systems use ultrasound because of its immunity to the environmental noise. Another reason why ultrasonic is popular is that the technology is relatively inexpensive, and also ultrasound emitters and detectors are small enough to be carried without the need for complex circuit.

The project scope consists of two parts:

- Hardware
- Software design.

For hardware part, it mainly consists of ultrasonic sensor, microcontroller, vibrating motor. For software part, C programming language is used to control the hardware input and output.
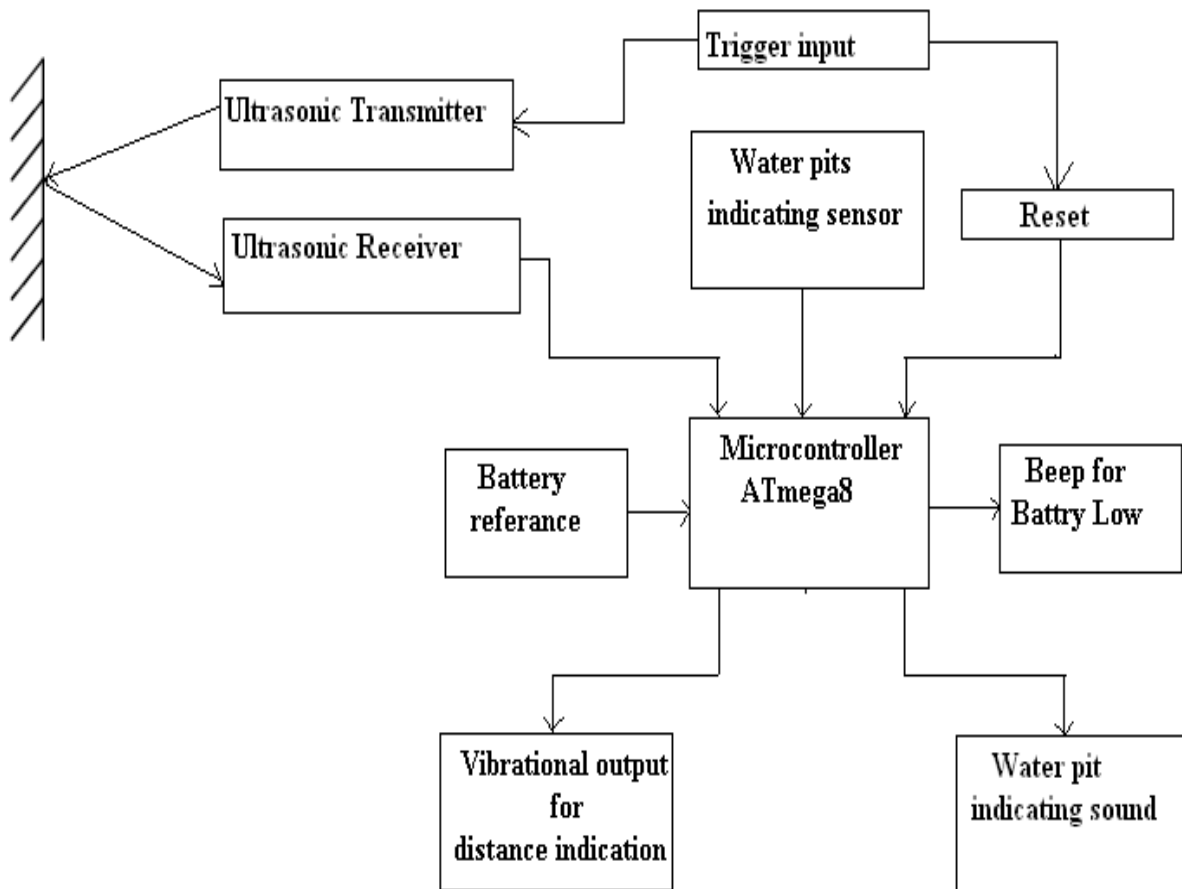
1.2   BLOCK DIAGRAM

Figure 1: Shows the complete block diagram of the suggested device

Once triggered the sensor will generate and transmit ultrasound in the forward direction. This ultrasound will be reflected back to the sensor if any object is present within 3 meter range. The time taken by the ultrasound to travel to and back from the obstacle is measured by a counter using specific clock frequency. Again for continuous distance measurement the ultrasonic sensor should be triggered at a regular time Interval and the counter inside microcontroller should also be reset accordingly. The counter output of microcontroller is then decoded and interfaced appropriately with output devices. This produces one of the two audio signal either for water pit and to activate tactile vibrator to indicate discrete distance of 1 meter.

1.3 METHODOLOGY

In order to achieve the goal of this project the work has been categorised as follows:

- Study of microcontroller
- Study of ultrasonic sensors.
- Power supply
- Circuit diagram
- Keil software
- Source code.

1.4 SIGNIFICANCE OF WORK

The significance of this project is to help the visually impaired people with the indications of any object or water pits through the sensors and alert them.

This project aims at the design and development of a detachable unit which is robust, low cost and user   friendly, thus, trying to aggrandize the functionality of the existing white cane, to concede above-knee obstacle detection as well as below-knee detection. The designed mobility stick which is low cost, sturdy, and robust can be easily operated uses ultrasound sensors for detecting the obstructions before direct contact. It offers haptic feedback to the user in accordance with the position of the obstacle.

1.5 CONCLUSION

The paper proposed the design and architecture of a new concept of Smart Electronic Guiding Stick for blind people. The advantage of the system lies in the fact that it can prove to be very low cost solution to millions of blind person worldwide. The proposed combination of various working units makes a real-time system that monitors position of the user and provides dual feedback making navigation more safe and secure.

2 MICROCONTROLLER

2.1   MICROCONTROLLER 89s52

The 89s52 has 4 different ports, each one having 8 Input/output lines providing a total of 32 I/O lines. Those ports can be used to output DATA and orders do other devices, or to read the state of a sensor, or a switch. Most of the ports of the 89S52 have 'dual function' meaning that they can be used for two different functions.
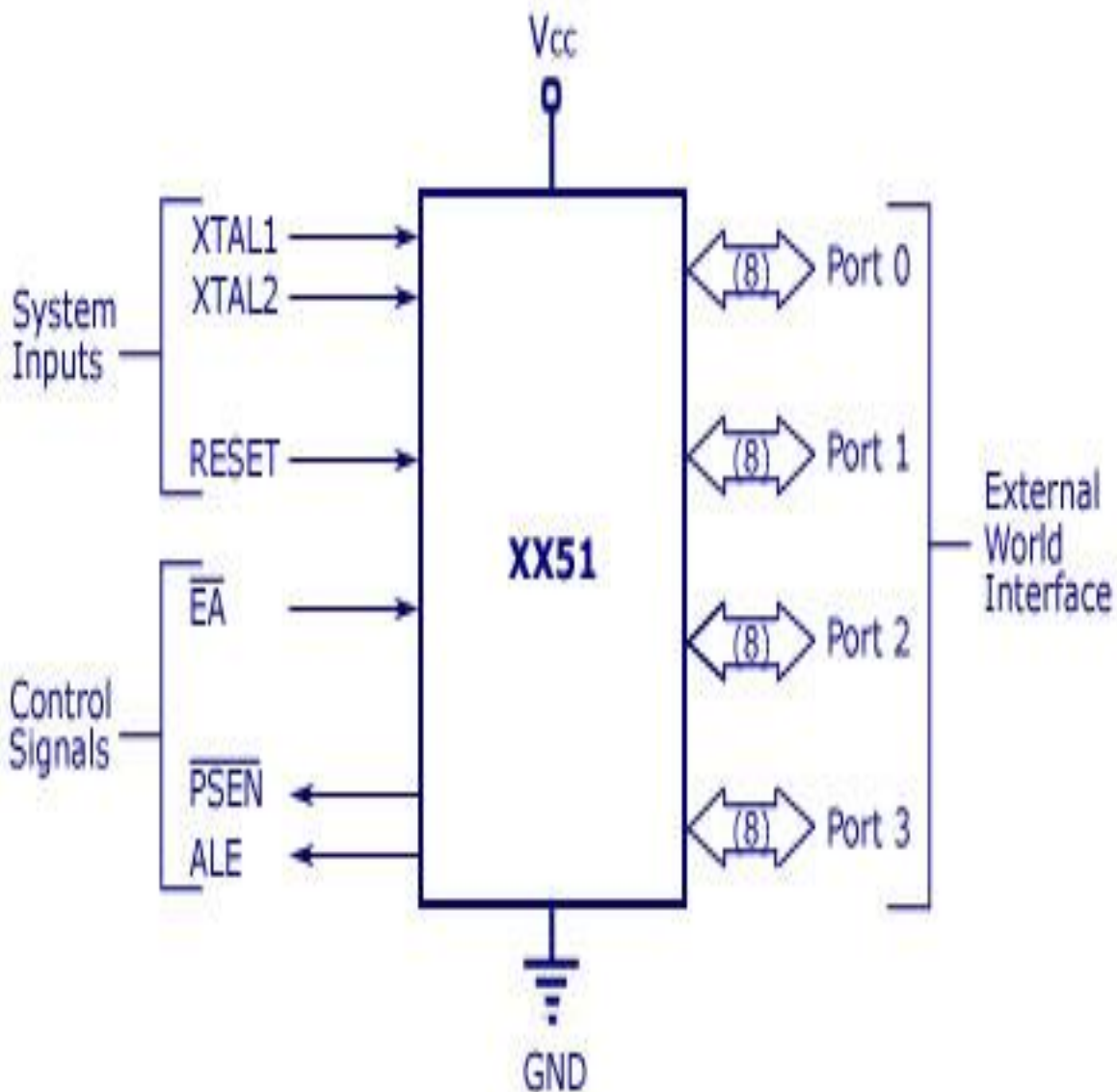

Figure 2: Shows Schematic Inputs and Outputs

The first one is to perform input/output operations and the second one is used to implement special features of the microcontroller like counting external pulses, interrupting the execution of the program according to external events, performing serial data transfer or connecting the chip to a computer to update the software. Each port has 8 pins, and will be treated from the software point of view as an 8-bit variable called 'register', each bit being connected to a different Input/output pin. The on-chip Flash allows the program memory to be reprogrammed in system or by a conventional non volatile memory programmer. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89s52 is a powerful microcomputer which provides a highly- flexible and cost effective solution to many embedded Control applications
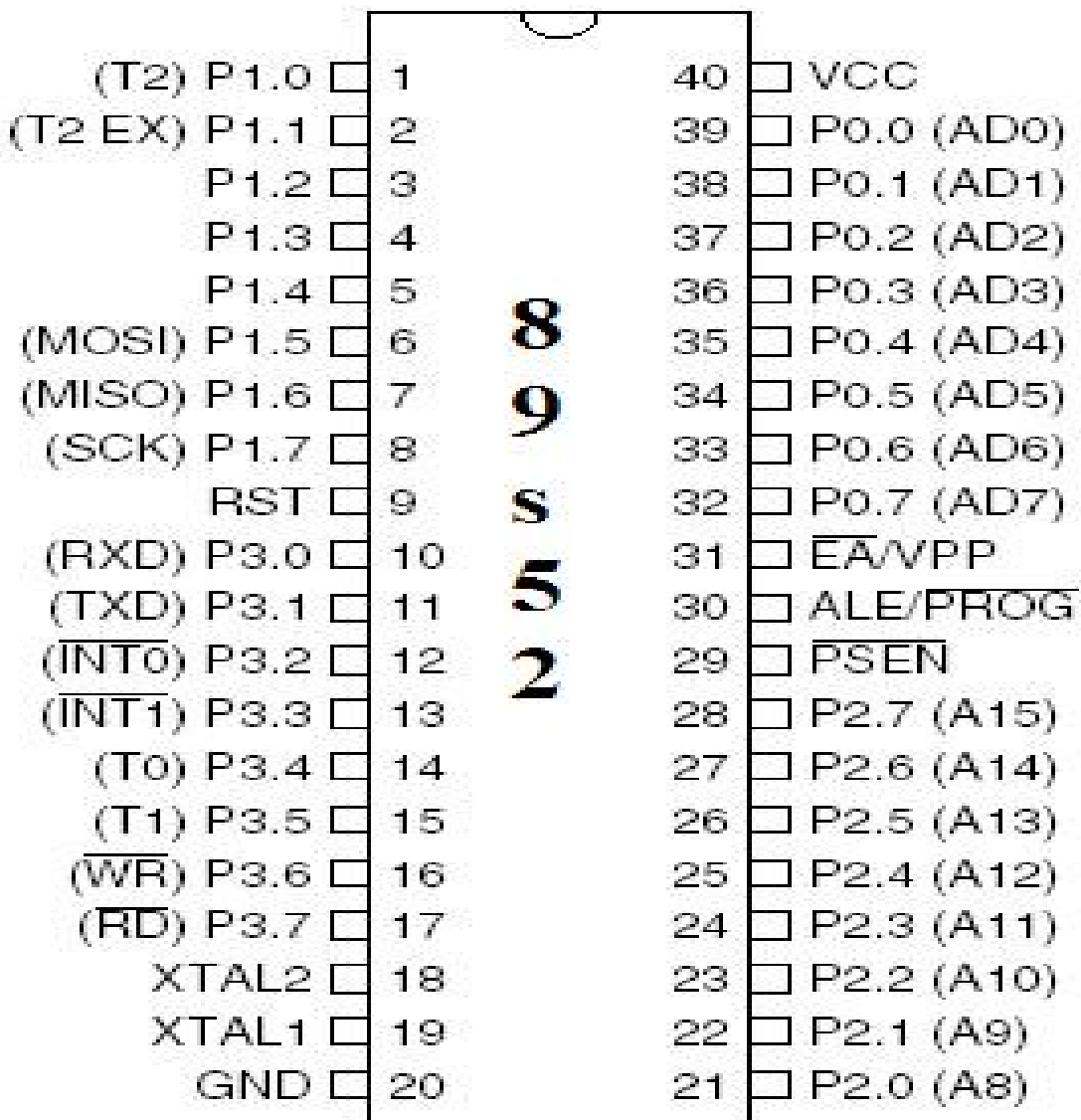

Figure taken from a datasheet provided by ATMEL™

Figure 3: Shows Microcontroller Pins Description

2.2 FEATURES

- Compatible with MCS-51 Products
- 8K Bytes of In-System Programmable (ISP)Flash Memory
- 0V to 5.5V Operating Range
- Fully Static Operation
- 0 Hz to 33 MHz
- Three-level Program Memory
- 8-bit Internal R AM
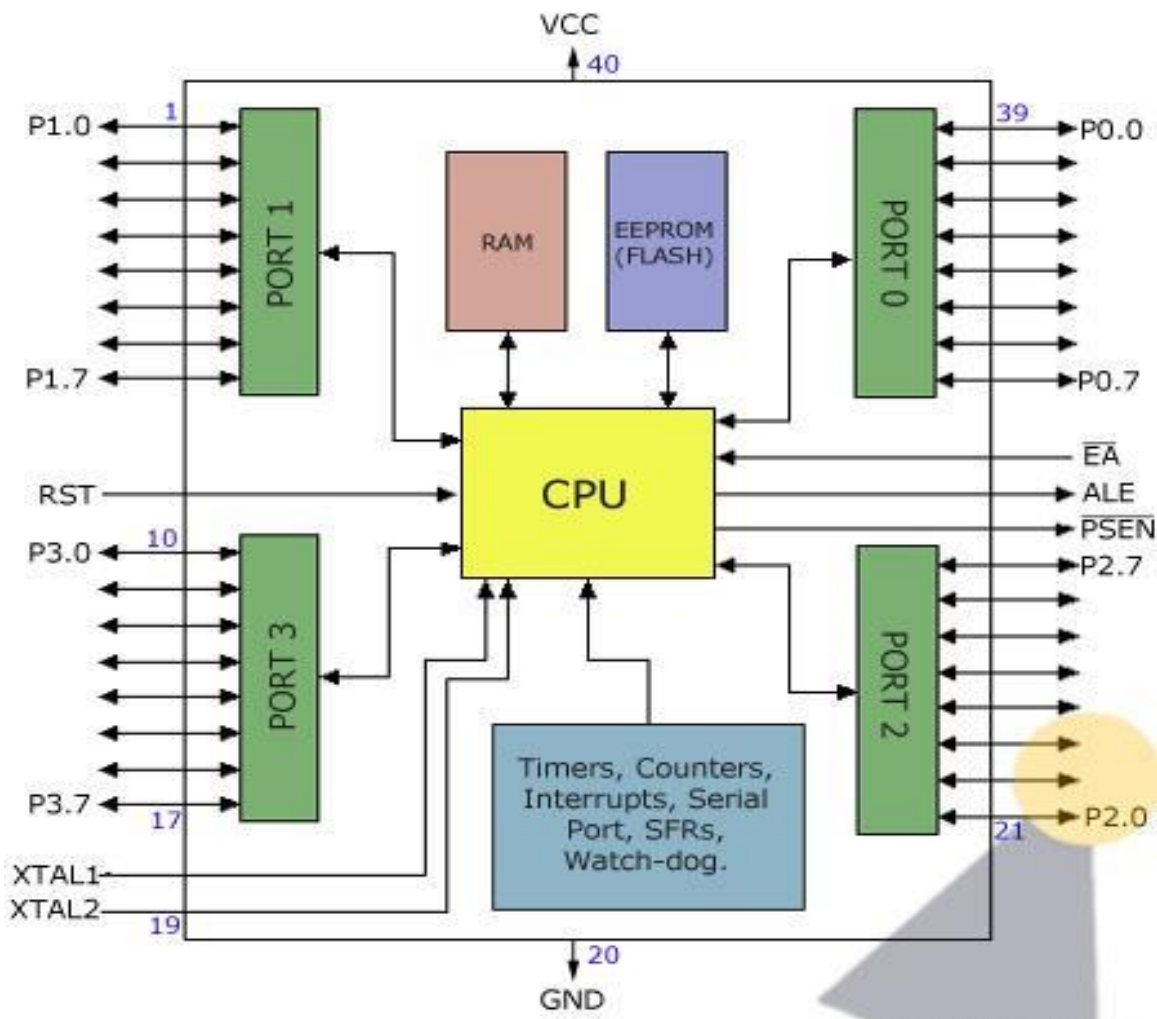- 32 Programmable I/O lines
- Three 16-bit Timer/Counter

Figure 4: Shows all ports arrangement

2.3 PIN DESCRIPTION

VCC

Supply voltage**.**

GND

Ground.

Port 0

Port 0 is an 8-bit open drain bidirectional I/O port. As an output port, each pin can sink eight TTL inputs. When 1s are written to port 0 pins, the pins can be used as high-impedance inputs.

Port 0 can also be configured to be the multiplexed low-order address/data bus during accesses to external program and data memory. In this mode, P0 has internal pull-ups.

Port 0 also receives the code bytes during Flash programming and outputs the code bytes during program verification. External pull-ups are required during program verification.

Port 1

Port 1 is an 8-bit bidirectional I/O port with internal pull-ups. The Port 1 output buffers can Sink /source four TTL inputs. When 1s are written to Port 1 pins, they are pulled high by the internal pull-ups and can be used as inputs. As inputs, Port 1 pins that are externally being pulled low will source current because of the internal pull-ups.

In addition, P1.0 and P1.1 can be configured to be the timer/counter 2 external count input (P1.0/T2) and the timer/counter 2 trigger input (P1.1/T2EX), respectively, as shown in the following table.

Port 1 also receives the low-order address bytes during Flash programming and verification.

Port 2

Port 2 is an 8-bit bidirectional I/O port with internal pull-ups. The Port 2 output buffers can Sink /source four TTL inputs. When 1s are written to Port 2 pins, they are pulled high by the internal pull-ups and can be used as inputs. As inputs, Port 2 pins that are externally being pulled low will source current because of the internal pull-ups.

Port 2 emits the high-order address byte during fetches from external program memory and during accesses to external data memory that use 16-bit addresses (MOVX @ DPTR). In this application, Port 2 uses strong internal pull-ups when emitting 1s. During accesses to external data memory that use 8-bit addresses (MOVX @ RI), Port 2 emits the contents of the P2 Special Function Register.

Port 2 also receives the high-order address bits and some control signals during Flash programming and verification.

Port 3

Port 3 is an 8-bit bidirectional I/O port with internal pull-ups. The Port 3 output buffers can Sink / source four TTL inputs. When 1s are written to Port 3 pins, they are pulled high by the internal pull-ups and can be used as inputs. As inputs, Port 3 pins that are externally being pulled low will source current because of the pull-ups.

Port 3 receives some control signals for Flash programming and verification.

Port 3 also serves the functions of various special features of the AT89S52, as shown in the following table.

RST

Reset input. A high on this pin for two machine cycles while the oscillator is running resets the device. This pin drives high for 98 oscillator periods after the Watchdog times out. The DISRTO bit in SFR AUXR (address 8EH) can be used to disable this feature. In the default state of bit DISRTO, the RESET HIGH out feature is enabled.

ALE/PROG

Address Latch Enable (ALE) is an output pulse for latching the low byte of the address during accesses to external memory. This pin is also the program pulse input (PROG) during Flash programming.

In normal operation, ALE is emitted at a constant rate of 1/6 the oscillator frequency and may be used for external timing or clocking purposes. Note, however, that one ALE pulse is skipped during each access to external data memory.

If desired, ALE operation can be disabled by setting bit 0 of SFR location 8EH. With the bit set, ALE is active only during a MOVX or MOVC instruction. Otherwise, the pin is weakly pulled high.

Setting the ALE-disable bit has no effect if the microcontroller is in external execution mode

PSEN

Program Store Enable (PSEN) is the read strobe to external program memory.

When the AT89S52 is executing code from external program memory, PSEN is activated twice each machine cycle, except that two PSEN activations are skipped during each access to external data memory.

EA/VPP

External Access Enable. EA must be strapped to GND in order to enable the device to fetch code from external program memory locations starting at 0000H up to FFFFH. Note, however, that if lock bit 1 is programmed, EA will be internally latched on reset.

EA should be strapped to VCC for internal program executions.

This pin also receives the 12-volt programming enable voltage (VPP) during Flash programming.

XTAL1

Input to the inverting oscillator amplifier and input to the internal clock operating circuit.

XTAL2

Output from the inverting oscillator amplifier.

3 ULTRASONIC SENSORS

3.1 ULTRASONIC SENSORS

- An ultrasonic sensor is a device that works in much same way as RADAR and SONAR. In fact, ultrasonic sensors mimic bats and other animals' natural ability to use ultrasonic frequencies for navigation.

Figure 5: UltraSonic Sensor

- Ultrasonic sensors broadcast a powerful, ultrasonic frequency, then detect the ultrasonic sound waves as they bounce off of objects and return to the sensor. They are almost always used to measure speed or direction and are efficiently at determining position.

- Ultrasonic sensors are commonly used for a wide variety of noncontact presence, proximity, or distance measuring applications. These devices typically transmit a short burst of ultrasonic sound toward a target, which reflects the sound back to the sensor. The system then measures the time for the echo to return to the sensor and computes the distance to the target using the speed of sound in the medium.
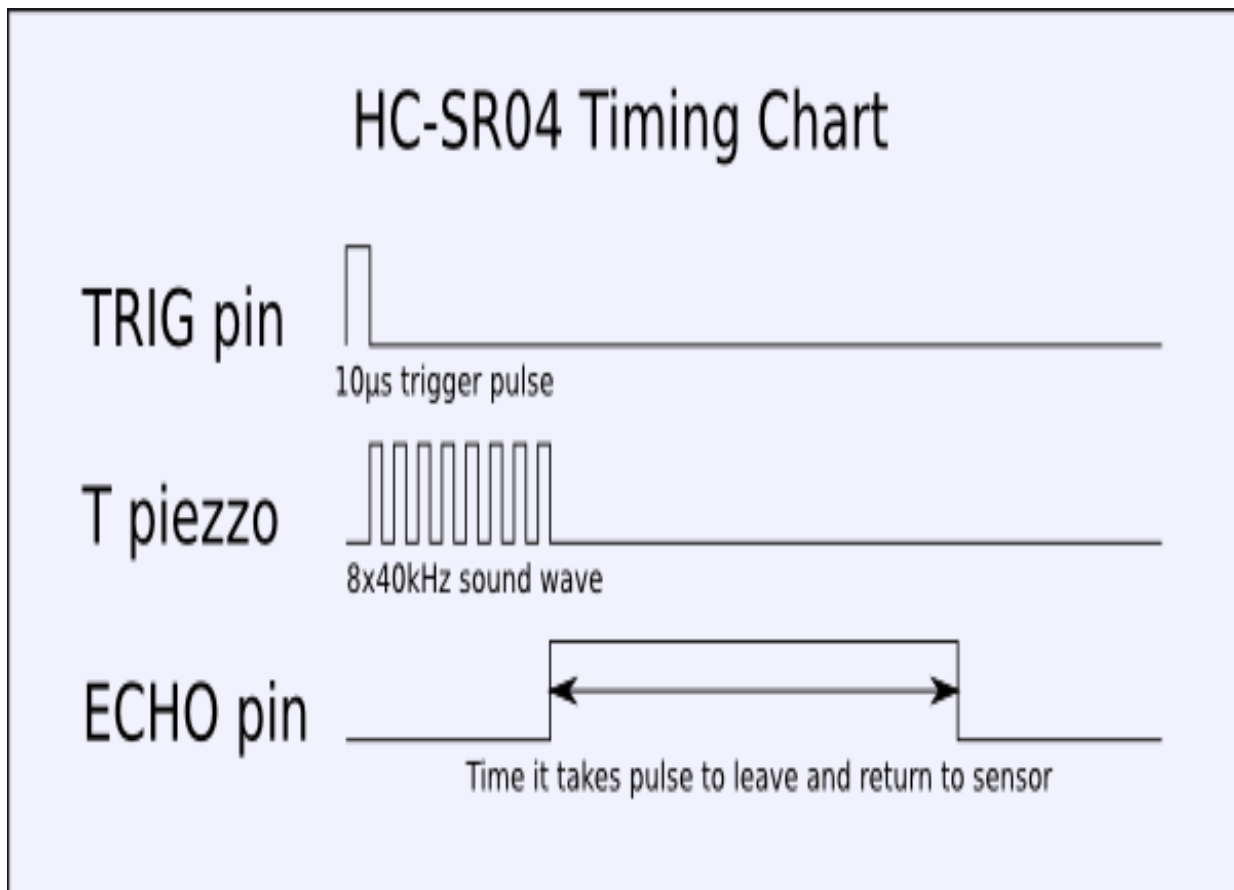

Figure 6: Timing Diagram

3.2 WORKING OF ULTRASONIC SENSORS

- Ultrasonic sensors depend on two separate devices: an ultrasonic transducer and a detector. An ultrasonic transducer is any device that converts energy into an ultrasonic frequency. Though dog whistles and several other devices can convert mechanical energy into an ultrasonic frequency, ultrasonic transducers are usually made from piezoelectric crystals that can change size when a voltage is applied to them. When an alternating current is applied to a piezoelectric crystal, it vibrates extremely fast and produces an ultrasonic sound wave. The detector is also made of a piezoelectric crystal, but produces a voltage when an ultrasonic frequency comes in contact with it, effectively producing the opposite results. A sensor calculates the time that it takes in between broadcasting the ultrasonic frequency and receiving the incoming waves.

- Type SRF04, known as ultrasonic range finder. The SRF04 is a light weight (of 0.4 Oz), small size (4 cm wide, 2 cm height and 1.5 cm depth) sensor and produces ultrasound of 40 KHz frequency and has built-in transmitter and receiver. It operates from 5 V DC and consumes 30 mA to 50 mA current.

- The maximum range of this sensor is 1 meters. This sensor can detect a stick having diameter of 3 cm from a distance of 2 meters or more. This SRF04 uses a microcontroller and requires an input trigger pulse of minimum 10 micro second widths.

- In operation the processor of SRF04 waits for a trigger pulse. After receiving a proper trigger pulse the processor will generate eight cycles of sonic burst of 40 kHz.

- This sonic burst will be reflected back to the sensor by any obstacle that is situated.Accordingly an echo pulse whose width is proportional to obstacle distance will be generated by the microcontroller.

- By measuring the width of an echo pulse we can get the ditance of an obstacle and hence blind person is able to detect how far is the obstacle actually is.

- The width of the echo pulse can be anywhere between 100 microsecond to 18 m sec, if there is any obstacle present within the specified range.

- The minimum pulse width is 100 microseconds corresponds to a distance of 1.67 meter and the maximum pulse width of 18 m sec corresponds to a distance of 3 meters. However if there is no obstacle within the range of 3 meters then width of the echo pulse will be 36 m sec.

3.2 ULTRASONICS:

UltraSonic's is the study and application of high-frequency sound waves, usually in excess of 20KHz(20,000 cycles per second).

Modern ultrasonic generators can produce frequencies of as high as several gigahertz (several billion cycles per second) by transforming alternating electric currents into mechanical oscillations, and scientists have produced ultrasound with frequencies up to about10GHz (ten billion vibrations per second). There may be an upper limitto the frequency of usable ultrasound,but it is not yet known.

Higher frequencies have shorter wavelengths, which allow them to reflect from objects morereadily and to provide better information about those objects. However, extremely high frequencies are difficult to generate and to measure.

Detection and measurement of ultrasonic waves is accomplished mainly through the use of piezoelectric receivers or by optical means. The latter is possible because ultrasonic waves are rendered visible by the diffraction of light.

Ultrasound is far above the range of human hearing, which is only about 20Hz to 20 KHz.However, some mammals can hear well above this. For example, bats and whales use echo location that can reach frequencies in excess of 100 KHz.

3.3 ULTRASONIC SENSING/CONTROL BASICS:

Ultrasonic signals are like audible sound waves, except the frequencies are much higher. Our ultrasonic transducers have piezoelectric crystals which resonate to a desired frequency and convert electric energy into acoustic energy and vice versa. The illustration shows how sound waves, transmitted in the shape of a cone, are reflected from a target back to the transducer. An output signal is produced to perform some kind of indicating or control function. A minimum distance from the sensor is required to provide a time delay so that the "echoes" can be interpreted. Variables which can affect the operation of ultrasonic sensing include: target surface angle, reflective surface roughness

or changes in temperature or humidity. The targets can have any kind of reflective form - even round objects.

3.5 FEATURES:

• Minimum range 10 centimeters
• Maximum range 400 centimeters (4 Meters)
• Accuracy of +-1 cm
• Resolution 1 cm
• 5V DC Supply voltage
• Compact sized SMD design
• Modulated at 40 kHz
• Serial data of 9600 bps TTL level output for easy interfacewith any microcontroller

3.6 APPLICATIONS:

Ultrasonic sensors have many uses, but typically involve measuring speed, distance, or volume.They are used in navigation to determine the device and user's location. Ultrasonic sensors detect wind speed and direction, and determine how much liquid is in a container by measuring the distance from the top of the container to the surf ace of the liquid. They are also used in humidifiers, burglar alarms, medical ultrasonography, and some forms of testing.

3.7 ADVANTAGES:

When used for sensing functions, the ultrasonic method has unique advantages over conventional sensors:
• Discrete distances to moving objects can be detected and measured.
• Less affected by target materials and surfaces, and not affected by color. Solidstate units
  have virtually unlimited, maintenance free life. Can detect small objects over
  long operating distances.
• Resistance to external disturbances such as vibration, infrared radiation, ambient
  noise, and EMI radiation.

4 VOLTAGE REGULATOR

4.1 VOLTAGE REGULATOR

- **7805** is a **voltage regulator** integrated circuit. It is a member of 78xx series of fixed linear voltage regulator ICs. The voltage source in a circuit may have fluctuations and would not give the fixed voltage output.

- The **voltage regulator IC** maintains the output voltage at a constant value. The xx in 78xx indicates the fixed output voltage it is designed to provide.

- 7805 provides +5V regulated power supply. Capacitors of suitable values can be connected at input and output pins depending upon the respective voltage levels.
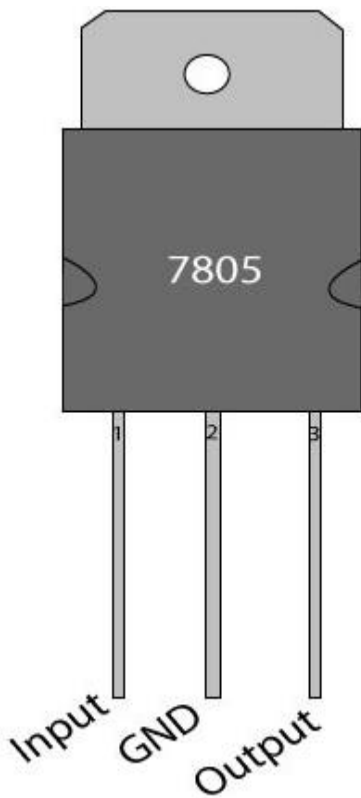
Figure 7: 7805 voltage regulator IC

4.2   CIRCUIT DIAGRAM
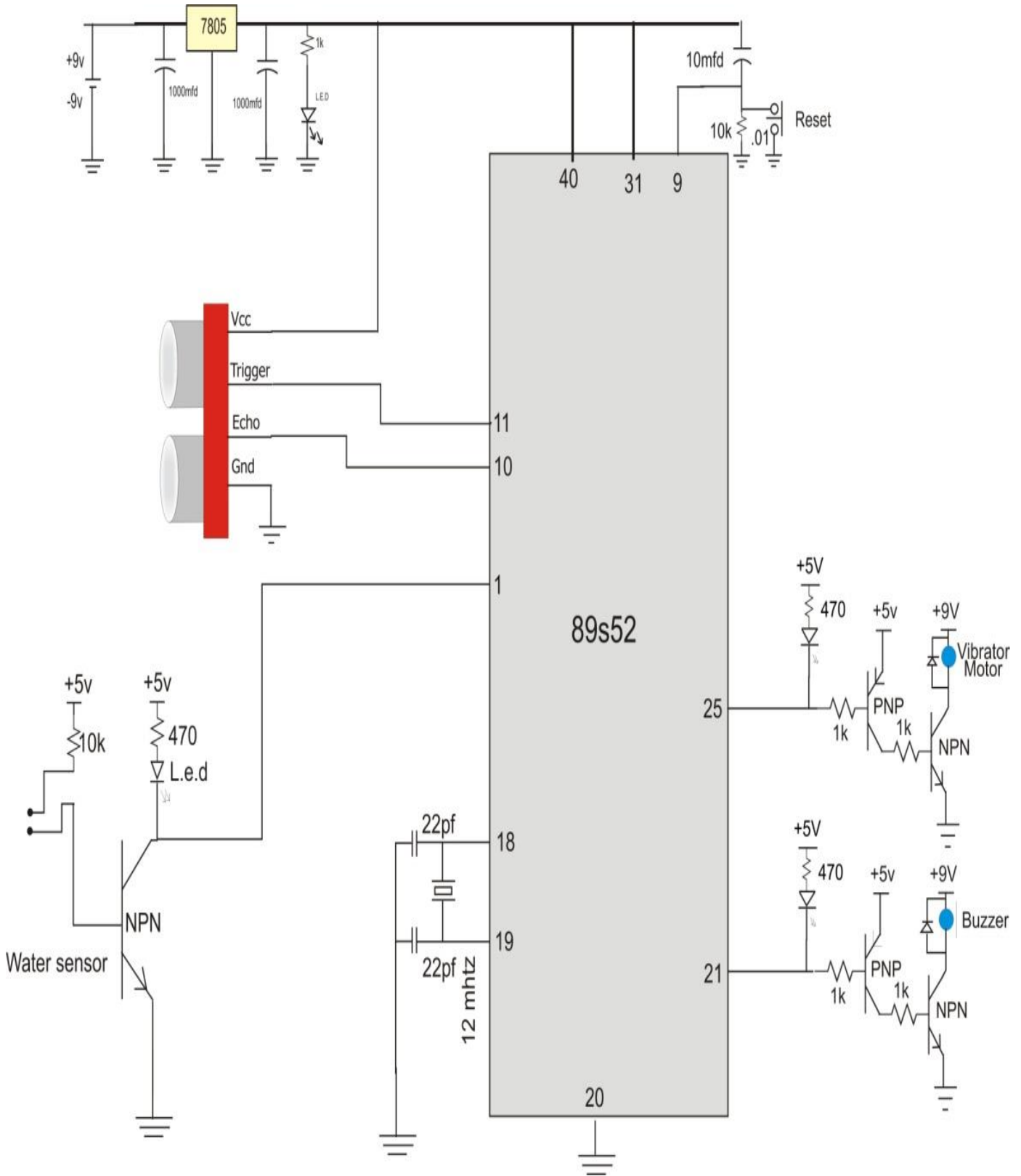
Figure 8: Circuit Diagram shows full structure of Project

4.3   WORKING of WATERPITS DETECTOR CIRCUIT

- In this we have used two metal plates inside of our stick so that it could act as a sensor for water detection.
- We have used n-p-n transistor as a switch, so when it gets the voltage, base current arises and base-emitter junction becomes forward biased.
- It therefore glows the LED, indicating water detection.
- Hence at pin 21 the sound of buzzer indicates water detection.
- On pin 21 we have used two-transistor base driver circuit which acts as an amplifier to provide higher voltage to the buzzer.
- We have also used a diode along with the buzzer to protect the transistor from the back electromotive force.

5 KEIL SOFTWARE

5.1 KEIL SOFTWARE

Free software which solves many of the pain points for an embedded program developer. This software is an integrated development environment (IDE), which integrated a text editor to write programs, a compiler and it will convert your source code to hex files too.

Here is simple guide to start working with Keil uVision which can be used for
- Writing programs in C/C++ or Assembly language
- Compiling and Assembling Programs
- Debugging program
- Creating Hex and Axf file
- Testing your program without Available real Hardware (Simulator Mode)

This is simple guide on Keil uVision 4 though also applicable on previous versions also.

These are the simple steps to get off the mark your inning!

Step 1: After opening Keil uV4, Go to **Project** tab and

Create new uVision project

Now Select new folder and give name to Project.
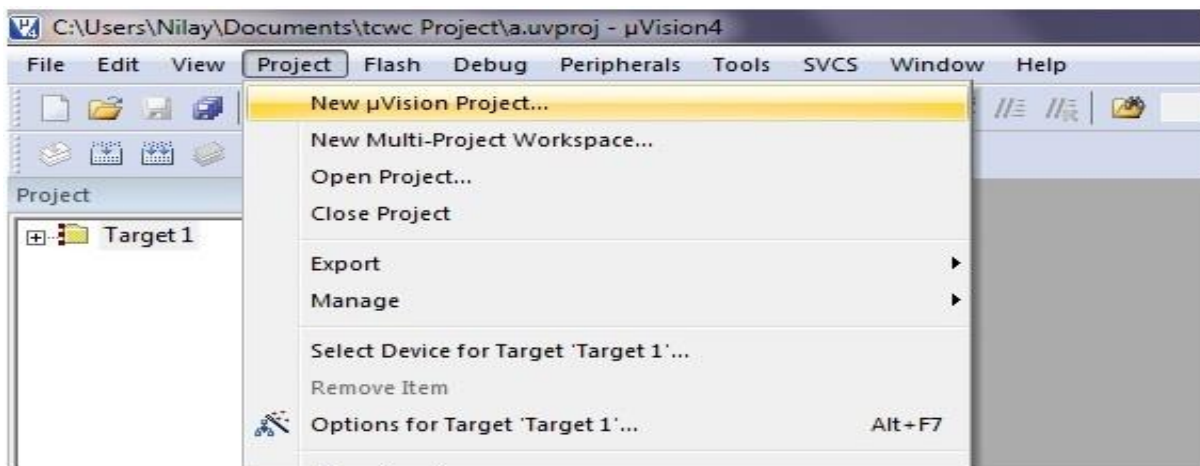
Step 2: After Creating project now **Select your device model**. Example.NXP-LPC2148

      [You can change it later from project window.]

      You can change it later from project window.]

Step 3: So now your project is created and **Message** window will appear to add startup file of your

   Device click on **Yes** so it will be added to your project folder
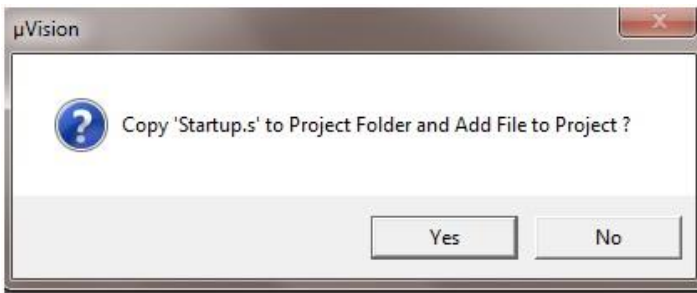
Step 4: Now go to File and create new file and save it with **.C** extension if you will write program in C language or save with **.asm** for **assembly** language.

i.e., **Led.c**
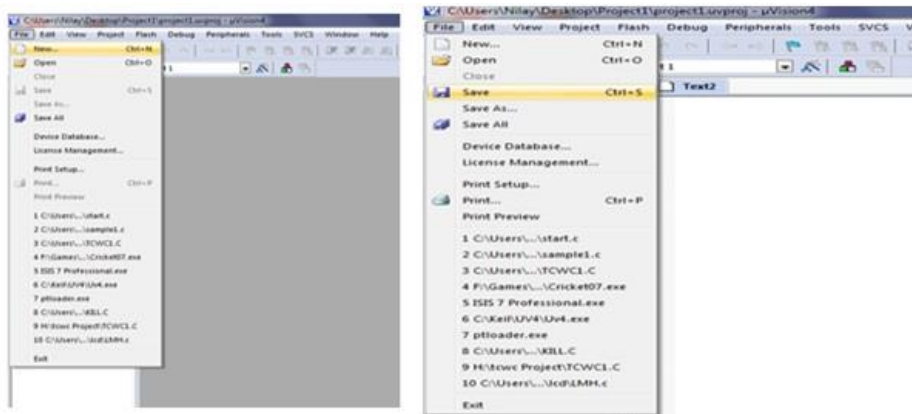
Step 5: Now write your program and save it again. You can try example given at end of this tutorial.

Step 6: After that on left you see project window [if it's not there….go to View tab and click on project window]
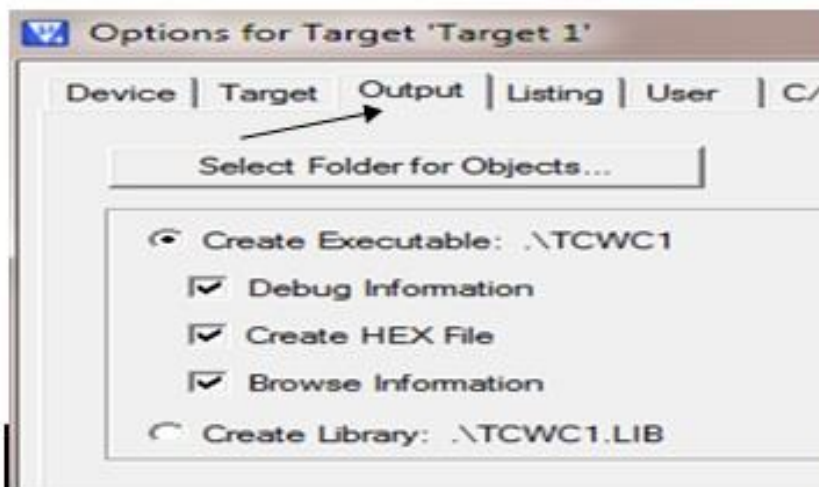
Now come on Project window.
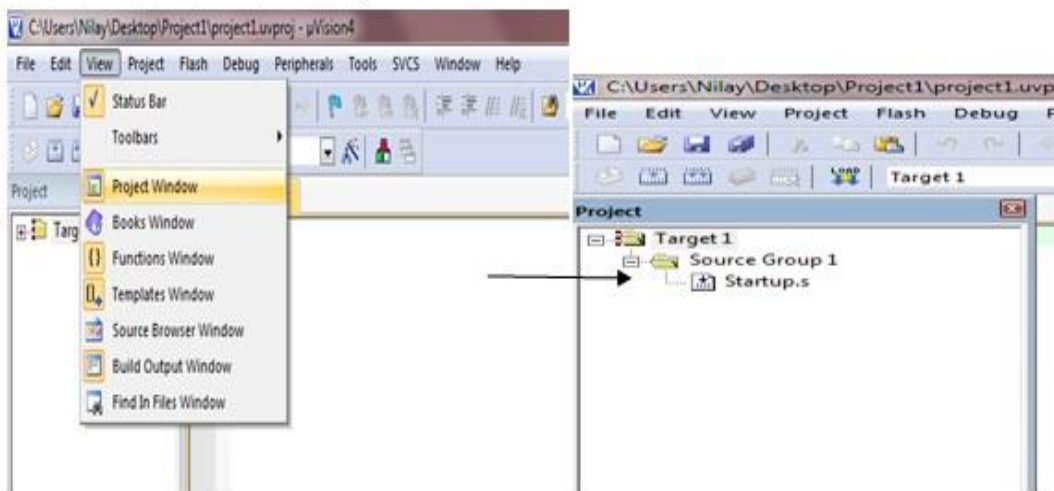
Right click on target and click on **options for target**

Here you can change your device also.

Click **output** tab here & check **create Hex file** if you want to generate hex file

Now click on ok so it will save changes.

Step 7: Now Expand target and you will see source group

Right click on group and click on **Add files to source group**

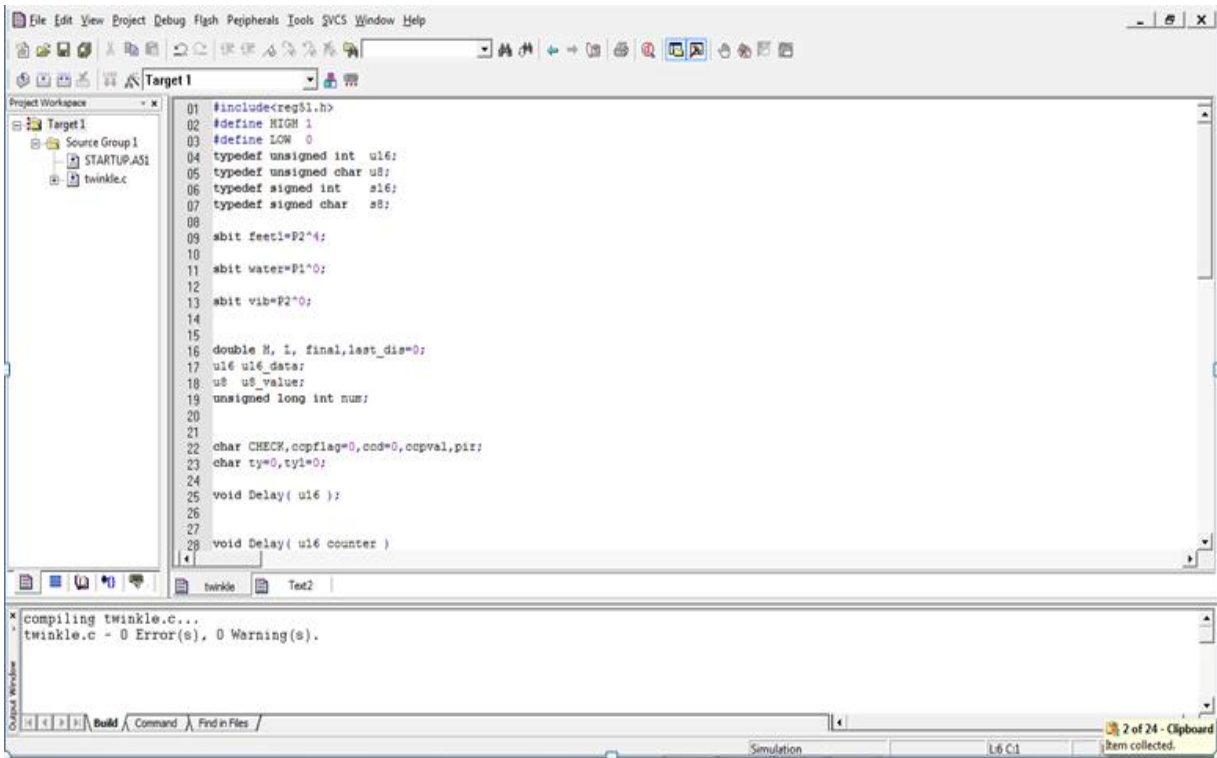Now add your program file which you have written in C/assembly.

You can see program file added under source group.

Step 8: Now Click on **Build target**. You can find it under Project tab or in toolbar. It can also be done by pressing **F7** key.

Step 9: you can see Status of your program in **Build output** window

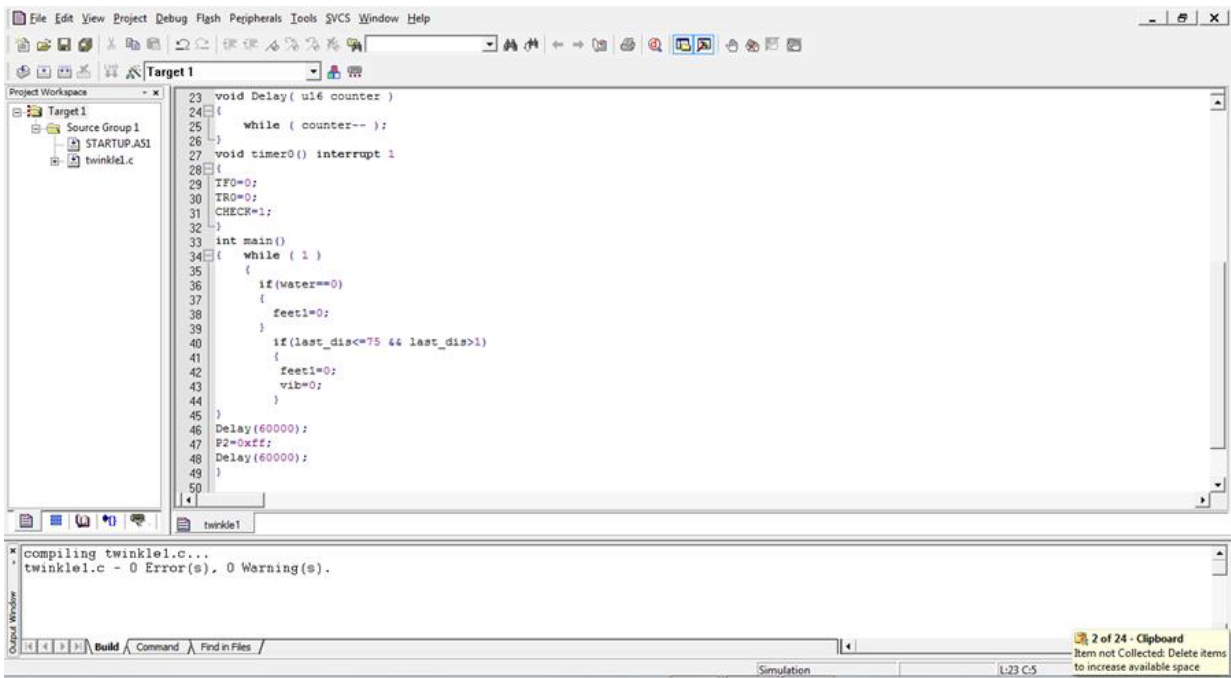[If it's not there go to view and click on Build output window]

5.1 SOURCE CODE ON KIEL SOFTWARE

5.2   SOURCE CODE

```c
#include<reg51.h>

#define HIGH 1

#define LOW  0

typedef unsigned int  u16;
typedef unsigned char u8;

typedef signed int    s16;
typedef signed char   s8;

sbit TRIGGER=P3^1;
sbit ECHO=P3^0;

sbit feet1=P2^4;

sbit water=P1^0;
sbit irsensor=P1^1;

sbit temp=P1^2;
sbit vib=P2^0;



double H, L, final,last_dis=0;
u16 u16_data;
u8  u8_value;
unsigned long int num;



// ====================================================================
//               Function's Declaration
// ====================================================================

char CHECK,ccpflag=0,ccd=0,ccpval,pir;

char ty=0,ty1=0;

void Delay( u16 );


// ====================================================================
//               LCD Code
// ====================================================================

void Delay( u16 counter )
{
      while ( counter-- );
}
```

```c
void timer0() interrupt 1

{
TF0=0;
TR0=0;
CHECK=1;
}


int main()

{

        TMOD=0x21;
        TH0=0x00;
        IE=0X82;
        TR0=1;

        TRIGGER = 0;

        Delay ( 10000 );

        while ( 1 )

        {

        if(water==0)

        {
        feet1=0;
        }

        else if (irsensor==0)

        {
        P2=0xbf;
        }

        else if (temp==0)

        {
        P2=0x7f;
        }

        else

        {
                TRIGGER = 1;
                Delay(1);
                TRIGGER = 0;
                while ( !ECHO );//echo=0 intially
```

```
            CHECK=0;

            TR0 = 1;

            while ( ECHO&&CHECK==0);//when light is recived back

TR0 = 0;

            Delay(10000);

            H = TH0;
            L = TL0;

            final = ( H * 256 ) + L;
            final = ( 0.017 ) * final;

            last_dis = final;
            TH0 = TL0 = 0;
            H = L = 0;


            if(last_dis<=75 && last_dis>1)

            {
            feet1=0;
            vib=0;
            }


}

Delay(60000);
P2=0xff;
Delay(60000);

}

}
```

6 ADVANTAGES / DISADVANTAGES OF PROJECT

6.1   ADVANTAGES

Several advantages were identified during interaction with this product.

- **Light Weight Design**

  Since the cane is small and light; it is easily portable and can be taken anywhere.
  This product is a light weight rechargeable battery provides power.
  The unit should be light in weight without adding extra weight to the existing cane and at the same time without compromising in terms of strength, particularly impact strength and the user should be able to use the unit at length without getting fatigued.

- **Low power consumption**

  8-bit microcontroller it uses the low power, high speed technology and the characteristic is <2mA typical @5V, 4 MHz and 15 µA typical @ 2V, 32 kHz

- **Other Design Features**

  The unit should be such that it has flexibility to be used by users having different styles of holding and gripping.
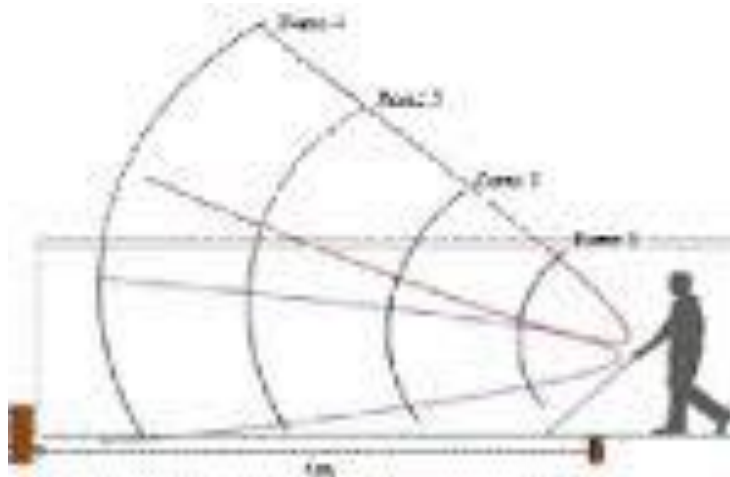

Figure 9: Shows virtual use of stick

6.2 DISADVANTAGES

For aided orientation and mobility, majority of the blind people use a long cane, which provide an extended spatial sensing within and are about 0.5 meters ahead of the user. However, the long cane does not provide protection to their body.

The long cane has several limitations such as:

- A range limited to the length of the cane.
- Typically one pace ahead of the user.
- Difficulties detecting overhanging obstacles

 Due to its inherent limitations, the long cane does not provide protection for the body above the waist elevation.

Consequently, there is no guarantee that the presence of obstacles such as low slung signposts, utility boxes, tree branches, overhanging wires, can be detected by the blind person in time to avoid a collision.

An Electronic Blind Aid is a form of assistive technology having the purpose of enhancing mobility for the blind pedestrian. The blind people find traveling difficult and hazardous because they cannot easily determine where things are, a process otherwise known as spatial sensing.

7 CONCLUSION

7.1 CONCLUSION AND FUTURE WORK OF THE   PROJECT

- Currently we have been successful in implementing the water detection and conveying the indications to the blind persons.

- For water sensor we use one n-p-n transistor with base is connected to the water sensor.

- When water touch two probes, which is connected to the bottom of the stick then npn transistor gets a voltage and this signal is connected to the pin no 1 of the controller. We have designed the code for this and using keil software we were able to run it on it and implement it without any errors.

- We have also been successful in implementing ultrasonic sensor which will detect any obstacle in the path of blind person and at the same time buzzer will produce sound, detecting the obstacle.

This project is made with best of capabilities and dedication. Details were taken care of in preparing it.

The problems encountered in various steps were taken into account and eliminated to much extent so that they may not harm the project functioning.

Also certain areas were thought of before hand and worked upon, so as to prevent them from becoming a limitation for the project.

But, as it is that every system is not perfect in all the aspects. They have some associated limitations.

Currently we have been successful for our work and contribution in the project.

In future we would like to enhance the capability of our project to even detect the obstacle at the distance of 3 meters and also we can implement the difference in sound of buzzers according to the distance of an obstacle i.e. if the obstacle is far it will produce low sound and high sound if its near.
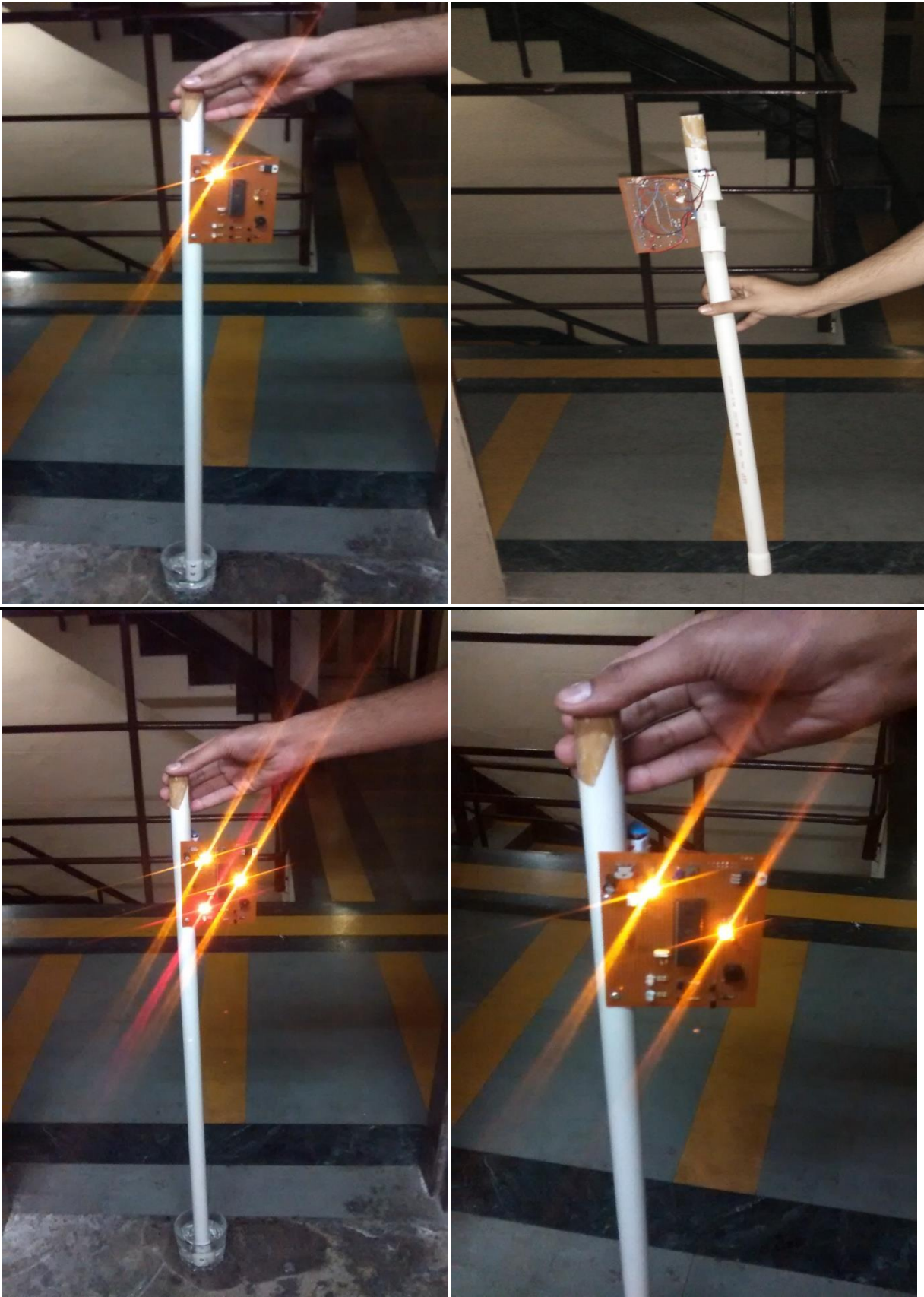
7.2   FINAL RUNNING

Figure 10: Shows Final running of Project

7.3 REFERENCES

[1] Jacob Millman, Christos C. Halkias , "Electronic Devices and Circuits",
     ISBN: 9780070700215, 2013.

[2]   Boylstad and Nashelsky PHI , "Electronic Devices and Circuits", 2001

[3]   http://www.robot-electronics.com

[4] Datasheet of 89s52

[5] Gulati Rishabh, GPS Based Voice Alert System for the Blind, International Journal of
     Scientific & Engineering Research, 2(1), (2011)

[6] Hub Andreas, Diepstraten Joachim. and Ertl Thomas, Design and Development of an
     Indoor Navigation and Object Identification System for the Blind, ASSETS'04, Atlanta,
     Georgia, USA, October 18-20, (2004)

[7] McKerrow Phillip J. and Antoun Sherine M. ,Research Into Navigation with CTFM
     Ultrasonic Sensors, ION 63rd annual meeting, Cambridge, Massachusetts,
     April 23- 25(2007)

[8] Dunai, L.; Fajarnes, G.P.; Praderas, V.S.; Garcia, B.D.; Lengua,I.L.; Real-time Assistance
     prototype- a new Navigation Aid for Blind people,IECON 2010 - 36th Annual Conference
     on IEEE Industrial Electronics Society

[9] Shang Wenqin; Jiang Wei; Chu Jian; A machine vision based navigation system for the
     blind China Computer Science and Automation Engineering (CSAE), 2011 IEEE International
     Conference on 10-12 June 2011

[10] Vision 2020: The Right to Sight. 2010. Blindness and Visual Impairment: Global Facts.
     [Internet] Available at: http://www.vision2020.org/main.cfm?type=FACTS [Accessed January
      2010].