# LOCAL POSITIONING SYSTEM

By

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**Submitted in partial fulfillment of the Degree of Bachelor of Technology**

# DEPARTMENT OF ELECTRONICS AND COMMUNICATION AND ENGGINERING.

# JAYPEE UNIVERSITY OF INFORMATION AND TECHNOLOGY.

## MAY -2007

## CERTIFICATE

This is to certify that the work entitled, "**LOCAL POSTIONING SYSTEM**" submitted by **VAIBHAV SHRIVASTAVA AND KUSHAL SAINI** in partial fulfillment for the award of degree of Bachelor of Technology in ELECTRONICS AND COMMUNICATION ENGGINERING. of Jaypee University of Information Technology has been carried out under my supervision. This work has not been submitted partially or wholly to any other University or Institute for the award of this or any other degree or diploma.

**Mr. D. S. SAINI**

# ACKNOLEDGEMENT

In Accordance with our final project submission of 8th Semester( B.tech Electronics and communication engg. ), we were assigned to study and research on local positioning system.

We would like to express our extreme gratitude to

**Mr. D. S. SAINI**

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For guiding us, being extremely helpful, patient and always being there whenever we were in doubt. Without his help, support and constant supervision, we would have never been able to complete our final project assignment successfully.

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CONTENT

# LIST OFABBREVIATION

- LPS – local positioning system
- Pf – Pico farad
- Tx – ultrasonic transducer
- Rx – ultrasonic receiving transducer

# ABSTRACT

Local positioning system is a very general name given to any functioning circuit which will help us to find the location of any object.

We had used this technology to locate the position of a mobile when it is lost. Our aim is to find that lost mobile location with in a range. In this paper we had presented idea and implemented the circuit for demonstration.

As result we had been able to find and locate the position of lost mobile.

# Chapter 1

# STUDY AND RESEARCH

## 1.1 INTRODUCTION

### 1.11 AIM

Main of the project is to stop the mobile theft in the university campus and if the mobile is being stolen or lost, to find the location of mobile after being lost. This project of our will work under the range constraint. It will only able to find out the location of the mobile if mobile is under our range. But the range can be increase under some circumstances and if some necessary conditions are full filled. In our idea we have a transmitter which will be inserted in a mobile circuit which will start working as soon as our mobile's sim is taken out. At the same time our receiver will start receiving and will display the distance of transmitter and receiver with the help of this data and by simulating it, we will be able to find out the location of mobile. Here in our project we had given an idea how our project will work and had a research over it. We had demonstrated working model of whole system and with this hardware we had some software which will help us in finding the location. Here we had just demonstrated it for one mobile, but by doing some simple changes in the circuit and software we can make it more useful, more generalize and more user friendly.

## 1.2 *BASIC CONCEPT OF LPS*

LPS stands for local positioning system .Basically we had used this name because we had used this technology in our project to find out the location of lost mobile. We had used ultrasonic transmitter to be inserted in the mobile. Our ultrasonic transmitter will work on battery we had provided. It will start transmitting as soon as sim is taken out and we had positioned our 3 receiver in a triangle form and will cover an area of specific region. Our receiver's will show the distance show the distance between the transmitter and receiver if transmitter comes in our range. With the help of that distance we will be able to find

out the location or coordinates of our mobile in which our transmitter is in. Basically we had a different idea over LPS, that idea is the improved version of our demonstrated project, it's the improved version more generalized and with more range. Since we had an ultrasonic transmitter, it will transmit it in unidirectional and our receiver is also an ultrasonic receiver it will receive the signal with in some range of distance only. From the distance we get from 3 receivers and with the help of our software we could find out the location of the point from where our transmitter is transmitting. Working of each transmitter and receiver is explained thoroughly in the upcoming topic. Working and testing of software (program) that we had developed is also thoroughly is explained later.

## 1.3 *ULTRASONIC TRANSMITTER WITH IR TRANSMITTER*

As what name suggest this transmitter must be inserted in a mobile to find out the location when it is lost. Now let us discuss the properties of our transmitter and the functions also that must ensure us that our transmitter working fully and properly.

Let us see the properties that transmitter must posses:-

- Ultrasonic transducer is that converts the electrical energy in the form of ultrasonic frequency.
- In our ultrasonic transducer we had used a crystal oscillator to generate the ultrasonic frequency.
- Our ultrasonic transmitter must transmit this frequency and should transmit continuously.
- It should start transmitting as soon as external voltage is applied.
- For the accuracy and stability we had used crystal oscillator.
- Our transmitter first ensures the receiver when to start receiving the signal.
- For this purpose our transmitter must have an IR transmitter because IR frequency had more speed then the ultrasonic frequency and it will ensure the receiver to start receiving the ultrasonic frequency.
- We must supply the necessary power needed for transmitter to transmit.

## 1.4 *ULTRASONIC RECEIVER WITH IR RECEIVER*

Since we have designed an ultrasonic transmitter, we must have receiver that can receive this frequency and can show the relevant data. Now let us discuss the properties that our ultrasonic receiver must posses so that it can help us in finding the location of our lost mobile.

Let us see the properties of receiver:-

- Since we need to find the location of our mobile, we must have arithmetical logic for the receiver.
- Our receiver must receive frequency accurately and must have connected with peripherals which must show the data required.
- We must have 3 receivers with identical receiving frequency and converting logic.
- Need of 3 receiver is necessary to determine the location of transmitter accurately.
- Receivers must be placed according to our arithmetic logic and at confined position.
- Receiver must start working as soon as it receives the IR signal from the transmitter.
- Receiver to receive the IR signal must have IR detector which must detect the IR signal.
- IR detector must send the signal to peripheral so that it can start receiving the ultrasonic frequency.
- Receiver must be connected to some device that will amplify the output so that it can be given to the peripherals to show the needed data.
- Receiver must have a circuit which will also generate the same frequency as transmitter has generated so that we can determine the distance between transmitter and the receivers.
- Receiver must have a constant power supply which will be supplied to all the peripheral and amplifying devices.

# CHAPTER 2

# DESIGN OF APPLICATION

## 2.1 *STATEMENT OF PURPOSE*

We had already discussed about the project and main logic of the project. Now we are going discuss about each and every minor detail of the project. We are going to discuss about the power supply means regulated power supply and the whole circuit diagram of regulated power supply. We are also going to discuss about the basic function of IC 7805, IC89C2051, IC LM358 and 393, BC557B. Also going to discuss about the circuit diagram of ultrasonic receiver and ultrasonic transmitter and the use of IR transmitter and IR receiver in the circuit. The use of program we made and use of it in finding the location of the transmitter.

## 2.2 *CONTEXT*

User's work: Who so ever need to use our hardware need to insert our transmitter in his mobile and just need to inform us when his mobile is used.

Service provider: As soon as we got the information is lost we start our receiver to receive the frequency and with the help of that data and simulating it in our program we can find the location of mobile.

## 2.3 *PIN DIAGRAM AND DESCRIPTION OF ICATMEL89C2051*

### 2.3.1 *Features*

Let see some important features of this IC:-

- Compatible with MCS-51™ Products.
- 2K Bytes of Reprogrammable Flash Memory
  - Endurance: 1,000 Write/Erase Cycles.
- Fully Static Operation: 0 Hz to 24 MHz.
- Two-level Program Memory Lock.
- 128 x 8-bit Internal RAM.

- 15 Programmable I/O Lines.
- Two 16-bit Timer/Counters.
- 2.7 to 6V operating range.
- Six Interrupt Sources.
- Programmable Serial UART Channel.
- Direct LED Drive Outputs.
- On-chip Analog Comparator.
- Low-power Idle and Power-down Modes.

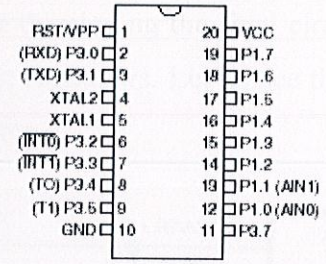
## 2.31 *Description*

The AT89C2051 is a low-voltage, high-performance CMOS 8-bit microcomputer with 2K bytes of Flash programmable and erasable read only memory (PEROM). The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard MCS-51 instruction set. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89C2051 is a powerful microcomputer which provides a highly-flexible and cost-effective solution to many embedded control applications.

The AT89C2051 provides the following standard features: 2K bytes of Flash, 128 bytes of RAM, 15 I/O lines, two 16-bit timer/counters, a five vector two-level interrupt architecture, a full duplex serial port, a precision analog comparator, on-chip oscillator and clock circuitry. In addition, the AT89C2051 is designed with static logic for operation down to zero frequency and supports two software selectable power saving

## Pin Configuration

PDIP/SOIC




modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port and interrupt system to continue functioning. The power-down mode saves the RAM contents but freezes the oscillator disabling all other chip functions until the next hardware reset.

## 2.4 *PIN DIAGRAM AND DESCRIPTION OF IC 7805*

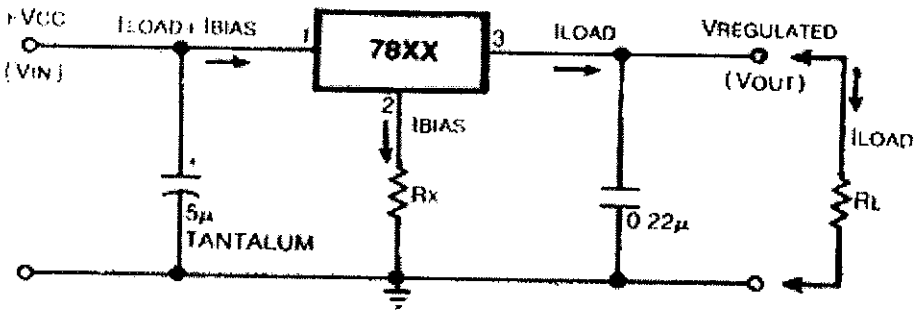
### *THE ADAPTING 3-TERMINAL VOLTAGE REGULATORS FOR CONSTANT HIGH VOLTAGE POWER SUPPLIES*

One can get a constant low-voltage power supply using inexpensive 3-terminal voltage regulators through some simple techniques described below. Depending upon the current

requirement, a reasonable load regulation can be achieved. Line regulation in all cases is equal to that of the voltage regulator used.

Though low voltage can be obtained with suitable voltage boost circuitry using ICs like LM 723, some advantages of the circuits presented below are: simplicity, low cost, and practically reasonable regulation characteristics. For currents of the order of 1A or less, only one zener and some resistors and capacitors are needed. For higher currents, one pass transistor such as ECP055 is needed.

Before developing the final circuits, let us first understand the 3-terminal type constant voltage regulators. Let us see the schematic in Fig. where 78XX is a 3-terminal voltage regulator.




Schematic for obtaining low-voltage regulated output using 3-terminal voltage regulators.

Rectified and filtered unregulated voltage is applied at VIN and a constant voltage appears between pins 2 and 2 of the voltage regulator. *The distribution of two currents in the circuit (IBIAS and ILOAD) is as shown.

*It is highly recommended to use the two capacitors as shown. Electrically regulator will be at a distance from the rectifier supply. Thus, a tantalum grade capacitor of 5mf and rated voltage is good. Electrolytic capacitor is not suitable for it is poor in response to load transients, which have high frequency components. At the output side a 0.22mf disc ceramic capacitor is useful to eliminate spurious oscillations, which the regulator might break into because of its internal high gain circuitry.

## 2.5 *PIN DIAGRAM AND DESCRIPTION OF LM 358*

### Low Power Dual Operational Amplifiers

***General Description***

The LM358 consists of two independent, high gain, internally frequency compensated operational amplifiers which were designed specifically to operate from a single power supply over a wide range of voltages. Operation from splitpower supplies is also possible and the low power supply current drain is independent of the magnitude of the power supply voltage.

Application areas include transducer amplifiers, dc gain blocks and all the conventional op amp circuits which now can be more easily implemented in single power supply systems. For example, the LM158 series can be directly operated off of the standard +5V power supply voltage which is used in digital systems and will easily provide the required interface electronics without requiring the additional ±15V power supplies.

### 2.5.1 Unique Characteristics

- In the linear mode the input common-mode voltage range includes ground and the output voltage can also swing to ground, even though operated from only a single power supply voltage.

- The unity gain cross frequency is temperature compensated. he input bias current is also temperature compensated.

### 2.5.2 Advantages

- Two internally compensated op amps in a single package.
- Eliminates need for dual supplies.
- Allows directly sensing near GND and VOUT also goes to GND.
- Compatible with all forms of logic.
- Power drain suitable for battery operation.

### 2.5.3 Features

- Internally frequency compensated for unity gain.
- Large dc voltage gain: 100 dB.
- Wide bandwidth (unity gain): 1 MHz (temperature compensated).
- Wide power supply range:— Single supply: 3V to 32V — or dual
- Supplies: ±1.5V to ±16V.
- Very low supply current drain (500 μA)—essentially independent of Supply voltage.
- Low input offset voltage: 2 mV.
- Input common-mode voltage range includes ground.
- Differential input voltage range equal to the power supply voltage.
- Large output voltage swing: 0V to V+- 1.5V.

### 2.5.3 *Use of LM*

We had used 2 IC of LM series in our circuit namely LM 393 and LM 358. They both act as dual low power amplifier. They will provide the necessary frequency required by the circuit to calculate the distance between the transmitter and receiver with the necessary power. Both the IC will work as dual amplifier.

## 2.6 *CIRCUIT DIAGRAM OF POWERSUPPLY*

### 2.6.1 *NEED OF POWER SUPPLY*

Perhaps all of you are aware that a 'power supply' is a primary requirement for the 'Test Bench' of a home experimenter's mini lab. A battery eliminator can eliminate or replace the batteries of solid-state electronic equipment and the equipment thus can be operated by 230v A.C. mains instead of the batteries or dry cells. Nowadays, the use of commercial battery eliminator or power supply unit has become increasingly popular as power source for household appliances like transreceivers, record player, cassette players, digital clock etc.

### 2.6.2 CIRCUIT DIAGRAM AND DISCRIPTION OF TRANSMITTER POWER SUPPLY

Since we know that our transmitter circuit will work on external voltage to transmit the ultrasonic frequency. We required a regulated power supply for transmitter circuit. Our transmitter circuit consists of a microprocessor which required the voltage supply of +5v and to provide this circuit we have a +9v external battery. So we need to regulate it by providing a power supply circuit.

So in order to provide +5v we had used and IC 7805 which will regulate it +9v to +5v.
As we had already discussed the functioning of IC 7805. Our IC is 3 pin IC. Pin no 1 is at what we applied the unregulated voltage. At pin no2 we applied the ground voltage and at

pin no3 we get the regulated voltage. Family of IC78XX last 2 digit of chip specified the amount of voltage at the output. So in IC7805 we get +5v as output on supplying +9v input.

To improve the regulation we use diode IN4007 in our circuit diagram.

### 2.6.3 *CIRCUIT DIGRAM AND DISCRIPTION OF RECEIVER POWER SUPPLY*

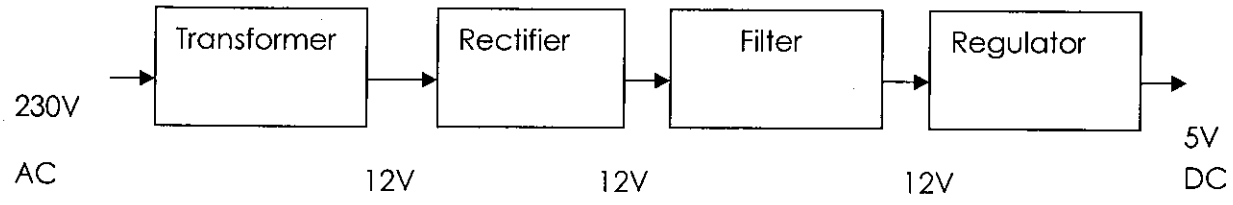
Since all the electronics circuits works on the low DC voltage we need a power supply unit. For this we need a transformer, rectifier, filter and regulator. The input to the transformer is typically 230v rms.

TRANSFORMER : Converts 230v Ac into 15v Ac.

RECTIFIER : Converts 15v Ac into 12v Dc.

FILTER : Converts 12v pulsating Dc into pure Dc.

REGULATOR : Converts 12v Dc into 5v Dc and 9v Dc.




#### 2.6.3.1 *TRANSFORMER:*

A transformer converts AC from one voltage to another with little loss of power. Transformers works only with AC. Step-up transformers increase voltage, step-down transformers reduce voltage. Most power supplies use a step-down transformer to reduce the dangerously high mains voltage (230V) to a safer low voltage (15V).

The input coil is called the primary and the output coil is called the secondary. There is no electrical connection between the two coils instead they are linked by an alternating magnetic field created in the soft-iron core of the transformer. The two lines in the middle of the circuit symbol represent the core.

Transformers waste very little power so the power out is (almost) equal to the power in. As voltage is stepped down current is stepped up.

The ratio of the number of turns on each coil is called as the turns ratio. A step-down transformer has a large number of turns on its primary (input) coil which is connected to the high voltage mains supply, and a small number of turns on its secondary (output) coil to give a low output voltage.

Turns ratio = $Vp = Np$ and

Power out = Power in

$Vs * Ns * Is = Vp * Ip * Np$

Where,

Vp = primary (input) voltage

Np = number of turns on primary coil

Ip = primary (input) current

$V_S$ = secondary (output) voltage

$N_S$ = number of turns on secondary coil

$I_S$ = secondary (output) current

### 2.6.3.2 *RECTIFIER:*

There are several ways of connecting diodes to make a rectifier to convert AC to DC. The bridge rectifier is the most important and it produces full-wave varying DC. A bridge rectifier can be made using four individual diodes, but it is also available in special packages containing the four diodes required. It is also called as full-wave rectifier because it uses all AC wave (both positive and negative sections). 1.4V is used up in the bridge rectifier because each diode uses 0.7V when conducting and there are always two diodes connected across the DC supply to act as a reservoir, supplying current conducting. Bridge rectifiers are rated by the maximum current they can pass and the maximum reverse voltage they can withstand (this must be at least three times the supply RMS voltage so the rectifier can withstand the peak voltages).

### 2.6.3.3 *FILTER:*

Smoothing is performed by a large value electrolytic capacitor to the output when the varying DC voltage from the rectifier is falling. The capacitor charges quickly near the peak of the varying DC, and then discharges as it supplies current to the output.

Smoothing significantly increases the average DC voltage to almost the peak value (1.4 × RMS value). Smoothing is not perfect due to the capacitor voltage falling a little as it discharges, giving a small ripple voltage. For many circuits a ripple which is 10% of the supply voltage is satisfactory and the equation below gives the required value for the smoothing capacitor. A larger capacitor will give lesser ripple. The capacitor value must be doubled when smoothing half-wave DC.

Smoothing capacitor for 10% ripple, C = 5 * Io * Vs * f

Where,

C = smoothing capacitance in farads (F)

Io = output current from the supply in amps (A)

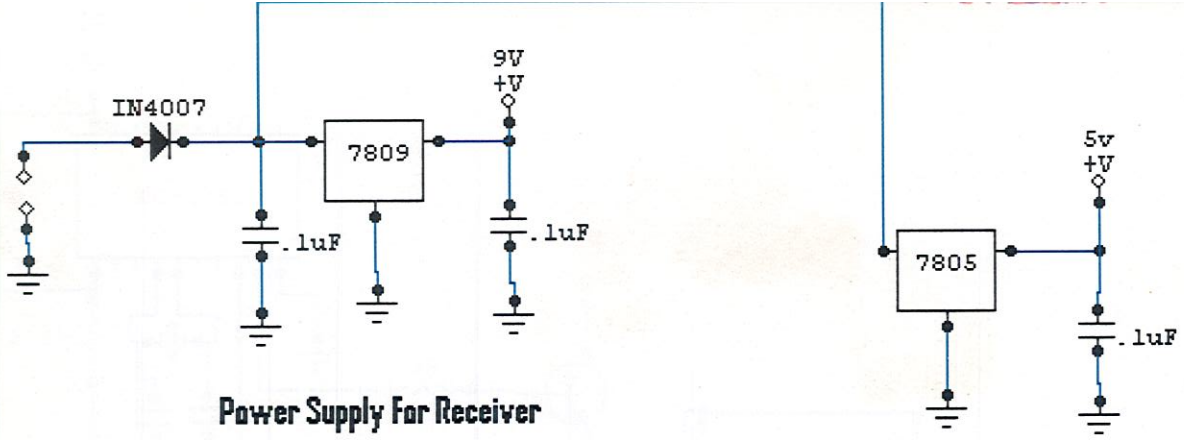
Vs = supply voltage in volts (V)

f = frequency of the AC supply in hertz (Hz)

### 2.6.3.4 ***REGULATOR:***

Voltage regulator ICs are available with fixed (typically 5, 12 and 15V) or variable output voltages. They are also rated by the maximum current they can pass. Negative voltage regulators are available, mainly for use in dual supplies. Most regulators include some automatic protection from excessive current ('overload protection') and overheating ('thermal protection').

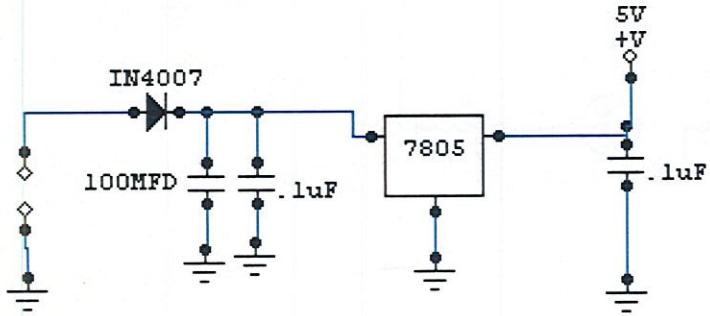
Many of the fixed voltage regulators ICs have 3 leads and look like power transistors, such as the 7805 +5V 1A regulator. They include a hole for attaching a heat sink if necessary. Since we need +9v also we had connected IC7809 also to get the required voltage.



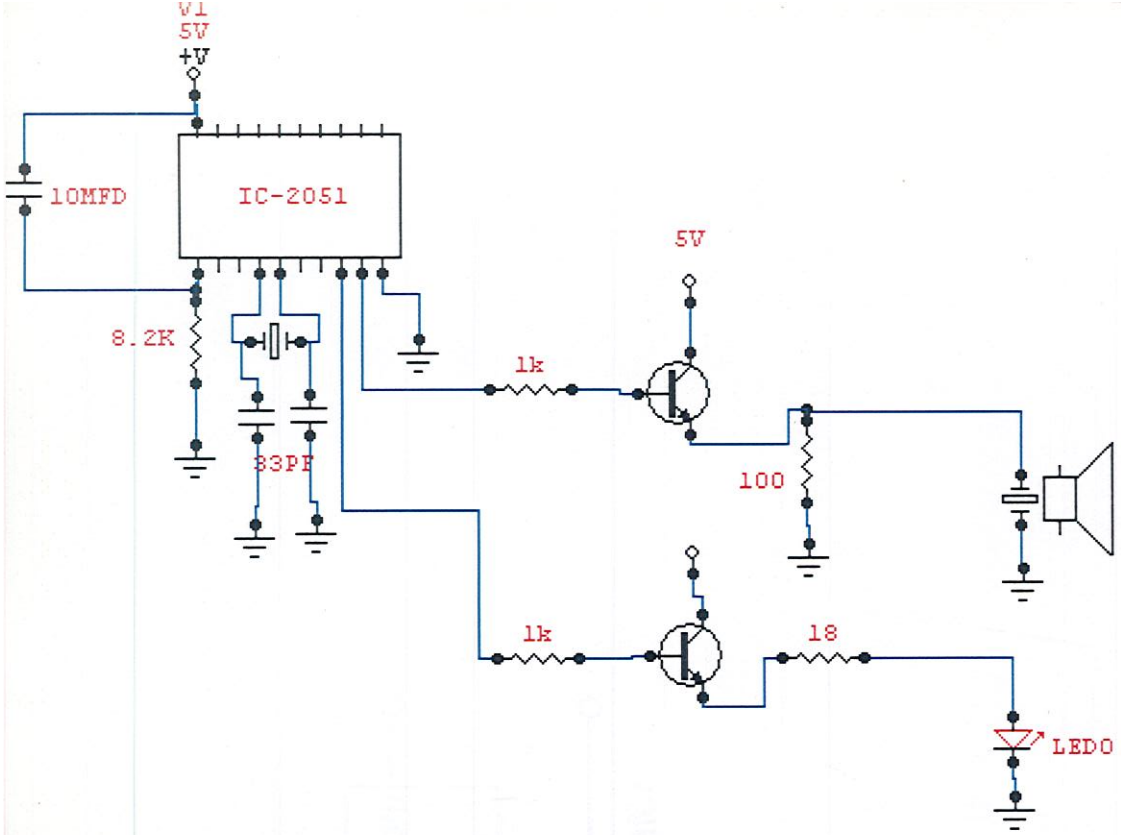




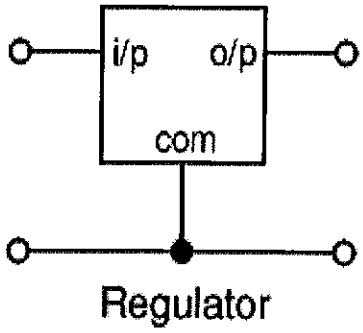
Power Supply For Receiver




Power Supply For Transmitter



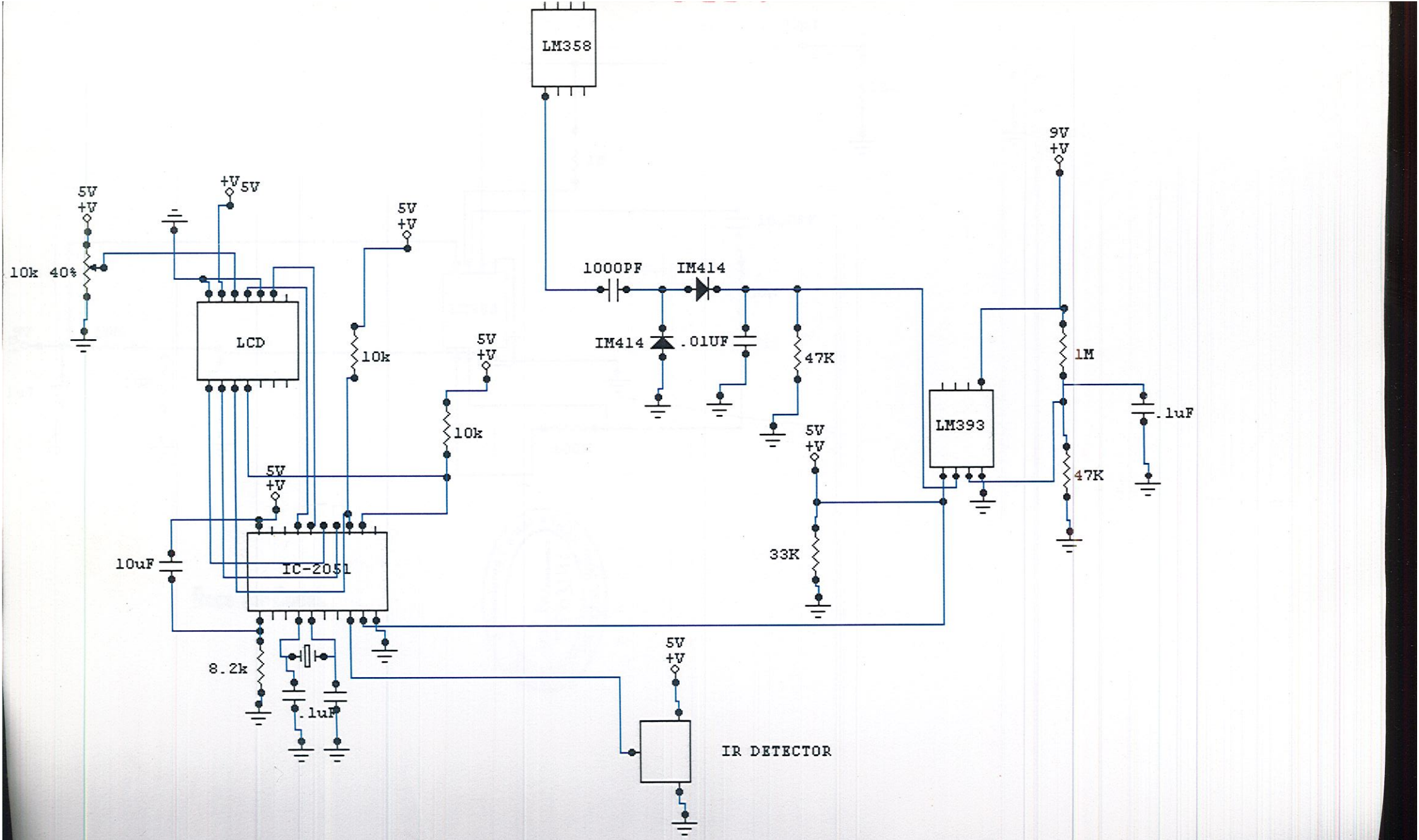

Ultrasonic Transmitter with IR Transmitter

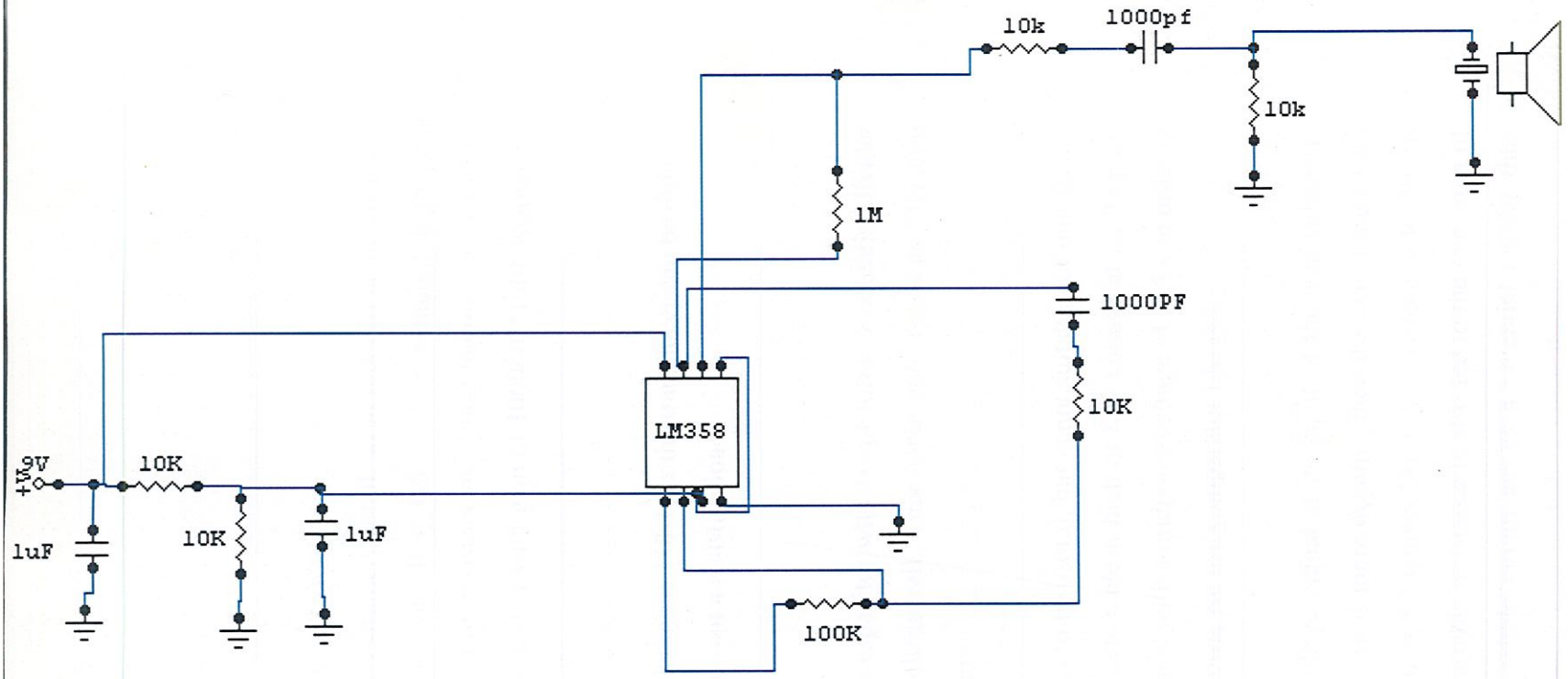



## 2.7 *CIRCUIT DIAGRAM OF ULTRASONIC TRANSMITTER*

### *TRANSMITTER EXPLANATION*

From circuit diagram we can see that for transmitter comprises of an IC 89C2051 which act as an microprocessor. From this microprocessor we had connected a crystal oscillator for generating frequency around 11.052 MHz. Since we need to supply a stable and constant power supply to microprocessor, we had done voltage regulation of +9v external battery to convert it into +5v. This +5v will provide the necessary amount of Vcc required for the 2051. As soon as battery is connected, the IR transmitter and ultrasonic transducer will start transmitting. Both the IR and ultrasonic are connected with diode BC557B, which act as push-pull amplifier and provide the necessary voltage required for transmitter to transmit. Now our transmitter is ready to transmit. IR transmitter will act as an acknowledgement signal for the receiver to tell when receiver to start.


LM358
9V
+V
5V
+V
10k 40%
LCD
10k
1000PF
IM414
IM414
.01UF
47K
LM393
1M
.1uF
47K
33K
10uF
IC-2051
8.2k
.1uF
IR DETECTOR






**Receiver Contd..**

## 2.8 *CIRCUIT DIAGRAM OF ULTRASONIC RECEIVER*

The signal picked up from the transducers is extremely small, so in order to be in any use it needs quite significant amount of amplification. ICs_358 form a standard high gain preamplifier, with 358 having a gain of 10 set by resistors and 358-2 having a gain 100 set by resistors. So altogether they form a pre-amplifier with gain of 1000(10*100). Remember that both the ICs are in 8 pin package.

There is no need for coupling capacitor for the input 358-1, as the transducer can be thought of a type of capacitor, there for it does not present a resistive load.

The resistor of 10 k and 100k together with capacitor with 100pf forms a potential divider that supplies the op-amps with half the voltage rail. This commonly name as "floating ground" eliminates the need of negative supply.

The output of 358 is sufficiently large enough to be useful, but is not suitable for interfacing directly to a microprocessor. The micro expects a clean high or low voltage at its IO port, but the output of op-amp is amplified AC signal with a midpoint voltage of 2.5 v in order to convert this Ac signal discernable high and lows, we use comparator LM393.

A comparator works by comparing the 2 voltage signal at its input, if the +ve voltage is more +ve then –ve output is high, but if the +ve is more negative then the –ve voltage then the output is low. The output signal of 358 IC is 2.5 voltage thi is directly feed to IC 393 to the +ve input. The same voltage through a variable resistance is also fed to the –ve input of 393. Since one resistor(R8) is ground the whole circuit act as a potential divider thus reducing the voltage. So that voltage at the –ve input is slightly lower then the +ve input, the ouput is high and this is the "no obstacle case". When an echo is received, an amplified version of the signal appears on the output of 353 and is fed to the +ve input of comparator which now goes both higher and lower than before as the Ac signal is super imposed on the dc signal.

# CHAPTER 3

# WORKING PRINCIPAL

## 3.1 *COMPLETE CIRCUIT DIAGRAM*

Let see now whole system works and how can we find the location of the mobile. In the transmitter circuit we have IC Atmel 89C2051 which we had programmed to provide the necessary Vcc required by the Tx to transmit the ultrasonic frequency and IR transmitter to transmit the IR frequency. We are transmitting around 40 kHz which is 3 times more than the human hearing capability. As soon as transmitter start transmitting, since we know that the speed of IR transmitter is more than the ultrasonic waves it will provide the acknowledgement signal for the receiver to start receiving. We have an eye detector which will detect only IR frequencies and will provide the signal to the LCD to start monitoring the ultrasonic frequency. After which our ultrasonic frequency reaches the IC 2051 to which we had connected an LCD display which will display the distance between transmitter and receiver and we had also programmed that IC to convert the frequency in terms of distance it travelled. First our ultrasonic receiver receive it and since amplitude is small we need to amplify it, in order to that we had connected it to 2 IC circuit. First one LM358 act as dual amplifier which amplifies the signal and fed it to LM393 which will provide the necessary output for the IC used in receiver circuit which will calculate the distance between the transmitter and receiver. This IC is connected to 16 * 2 display IC which will display the distance in meters.

## 3.2 *ARITHMETIC AND LOGIC USED*

Now come the basic idea behind the project to find the location of transmitter. For this purpose we had used the triangle law for simulation and to find out the location of our transmitter. We required 3 receivers to be placed in a equilateral triangle formation. Now

we calculate the distance of transmitter from the all the 3 receiver and we know that our coordinates of 3 receiver are fixed and now we get distance on every transmitter from the receiver. Now using simple line equation and basic mathematic we can calculate the coordinates of the transmitter. To make it more user friendly we had simulated it on c++ program. Where we just need to enter the distance from the receiver and get the coordinates of the transmitter.

## 3.3 *CODES AND PROGRAM USED*

### 3.2.1 *PROGRAM USED IN TRANSMITTER IC*

```
$MOD52

ORG 0000H

MOV A , #07FH

MOV 80H,A

ACALL DELAY

MOV A , #0BFH

MOV 80H,A

ACALL DELAY

MOV A , #0DFH

MOV 80H,A

ACALL DELAY

MOV A , #0EFH
```

```
MOV 80H,A
ACALL DELAY
MOV A , #0F7H
MOV 80H,A
ACALL DELAY
MOV  A, #0FBH
MOV 80H,A
ACALL DELAY
MOV A, #0FDH
MOV 80H,A
ACALL DELAY
MOV A, #0FEH
MOV 80H,A
ACALL DELAY
AJMP 0000H

ORG 0040H
DELAY:      MOV R7, #0FFH
LOOP1:      MOV R5, #0FFH
LOOP: DEC R5
MOV A, R5
```

```
JNZ LOOP

DEC R7

MOV A, R7

JNZ LOOP1

RET

END
```

This is the program we had used in the transmitter IC which will help us in generating the ultrasonic frequency. This program must be burnt on IC using IC UPLOADER to get the desired output from the IC used.

### 3.2.2 ***PROGRAM USED FOR RECEIVER IC***

```
    Frequency Meter Program using AT89c2051 micro controller
'       written using bascom-51

Connect the timer0 input P3.4 to a frequency generator
' freq meter
' 24  mhz xtal ok upto 300khz

' define crystal speed and include file
$regfile = "89C2051.dat"
$crystal = 24000000

' define variables used
Dim A As Byte
Dim C As Long , D As Long
Dim Count As Word
Dim Onceasec As Bit
```

```
Dim T0ic As Long
Dim Green As Byte
Dim Delayword As Word


' Initialize variables
Onceasec = 0
Count = 0
T0ic = 0
D = 0
Green = 0

' initialize ports
P1 = 0
P3 = 255

' configure lcd display
Config Lcd = 16 * 2
Config Lcdpin = Pin , Db4 = P1.4 , Db5 = P1.5 , Db6 = P1.6 , Db7 = P1.7 , E = P1.3 , Rs
= P1.2
Cls
 'clear the LCD display
Lcd "Frequency Meter"

' define timer0
Config Timer0 = Counter , Gate = Internal , Mode = 1
'Timer0 = counter : timer0 operates as a counter
'Gate = Internal  : no external gate control
' exte/internal makes no difference
'Mode = 1        : 16-bit counter
' set t0 internal interrupt
```

```
On Timer0 Timer_0_overflow_int
' interrupt will be generated on every 65536 count
Priority Set Timer0
Enable Interrupts
Enable Timer0



Counter0 = 0
'clear counter
Start Counter0
'enable the counter to count

Do
'set up a 1 sec accurate DO NOTHING loop
Enable Interrupts
'wait 1 as per BASCOM-51 is not accurate

For Delayword = 1 To 45440
Next Delayword

Disable Interrupts
C = Counter0
'get counter value
D = T0ic * 65536

Lowerline
C = C + D
T0ic = 0
Lcd "                "
```

```
Lowerline
' show the frequency
Lcd "f=" ; C ; " Hz"
Waitms 255
Waitms 255

C = 0

Counter0 = 0
Start Counter0
're-start it because it was stopped by accessing the COUNTER
Loop



' timer0 int subroutine
Timer_0_overflow_int:
Rem timer0 overflow ( 65535 ) interrupt comes here
' increment the variable
Incr T0ic
Return
End

' end of program
' uses 1114 bytes of program memory
```

### 3.2.3 PROGRAM USED FOR ARITHMETIC

Logic can be expressed using this program of c and with the help of this program we can locate the coordinates of our transmitter in a map.

```
#include <graphics.h>
#include        <math.h>
#include <stdlib.h>
#include <stdio.h>
#include <conio.h>
#define ROUND(a) ((int)(a+0.5))
#define COLOR YELLOW
#define MAX 3
#define OFF_X 200
#define OFF_Y 200
#define MULT 50

void main(){
 int gdriver = DETECT, gmode, errorcode;
 initgraph(&gdriver, &gmode,"");
 errorcode = graphresult();
 if (errorcode != grOk)  /* an error occurred */{
        printf("Graphics error: %s\n", grapherrormsg(errorcode));
        printf("Press any key to halt:");
        getch();
        exit(1);            /* return with error code */
 }

 float l1,l2;
```

```
float d,x1,y1,x2,y2;
float fin_x,fin_y;

printf("Enter L1");
scanf("%f",&l1);
printf("Enter L2");
scanf("%f",&l2);

d=((l1*l1-l2*l2)/3.0 - 6)*((l1*l1-l2*l2)/3.0 - 6) - 8*((l1*l1-l2*l2)/6-l1*l1+9);

x1=(6-(l1*l1-l2*l2)/3.0+pow(d,0.5))/4.0;
x2=(6-(l1*l1-l2*l2)/3.0-pow(d,0.5))/4.0;
y1=x1+(l1*l1-l2*l2)/6.0;
y2=x2+(l1*l1-l2*l2)/6.0;

if(x1+y1-3<=0 && y1-x1-3<=0 && y1>=0){
        fin_x=x1;
        fin_y=y1;
        //printf("here");
}
else if(x2+y2-3<=0 && y2-x2-3<=0 && y2>=0){
        fin_x=x2;
        fin_y=y2;
        //printf("there");
}

printf("%f,%f\n",fin_x,fin_y);
printf("%f,%f\n",x1,y1);
printf("%f,%f\n",x2,y2);
setcolor(4);
```

```
    line((0*MULT+OFF_X),(3*MULT+OFF_Y),(-
   3*MULT+OFF_X),(0*MULT+OFF_Y));
    line((0*MULT+OFF_X),(3*MULT+OFF_Y),(3*MULT+OFF_X),(0*MULT+OFF_Y));
    line((-3*MULT+OFF_X),(0*MULT+OFF_Y),(3*MULT+OFF_X),
(0*MULT+OFF_Y));
    setcolor(1);
    int a=fin_x*MULT+OFF_X+5;
    int b=fin_y*MULT+OFF_Y+5;


    circle(fin_x*MULT+OFF_X,fin_y*MULT+OFF_Y,1);
    setcolor(15);
    //char *s=a;
     //      char str[50];
     //      sprintf(str,"(%f,%f)",fin_x,fin_y );
     //      printf(str);
    outtextxy(a,b,"the point");
    getch();

}
```

# CHAPTER 4

# FUTURE PROSPECT

## 4.1 *IMPROVED VERSION OF OUR PROJECT*

We can improve our transmitter and receiver and user interface to make our project more generalize. We had changed our transmitter and receiver completely. Now our Transmitter will work on RF frequency and instead of having ultrasonic receiver we will have antennas which will receive the RF frequency. Also our user interface will be more effective and more accurate

### 4.1.2 *RF TRANSMITTER*

In our RF transmitter we have a microcontroller chip which will work on applied Vcc. We have 8bit data written on our chip. This will act as an id for the user. Now we can accommodate maximum 255 users in one chip. When ever our transmitter start working this 8bit data will be transmitted. This 8 bit data will then be converted in to parallel data since the data of microcontroller send data serially. This data will then be provided to a PIN diode which will convert this data to wave form. Our PIN diode will work on 900 MHz frequency which will be provided by crystal oscillator. Our transmitter will need an acknowledge ment signal from the receiver. As soon transmitter receive the signal. We have an synchronous detector which will connected to the comparator and finally to IC4046 which will provide the necessary Vcc required by the microcontroller. This how our circuit will work

### 4.1.2 *RF RECEIVER*

Now we have to design our receiver. Our receiver will be antennas which will be isotropic type. So with the help of our receiver we get the power received and with using the FRIS transmission formula we can determine the distance between antenna and transmitter.

For this we need to have 3 antennas. This will be arranged at the edges of equilateral triangle.

Now let see how we can determine the distance with the help of FRIS transmitting formula.

Let's analysis the formula

T1- First antenna

T2- second antenna

T3-third antenna

Pr1 - power received by T1

Pr2- power received by T2

Pr3- power received by T3

Aet- effective aperture of transmitter

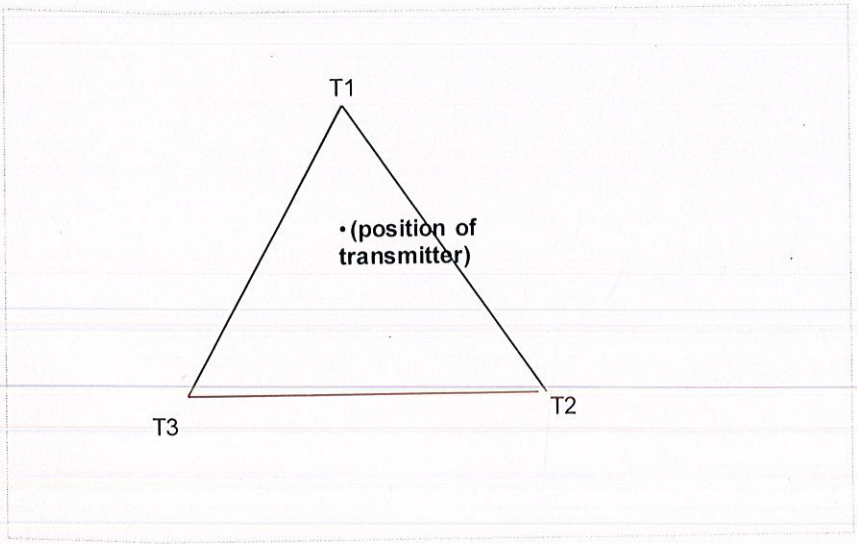
Aer- effective aperture of antenna

$\lambda$ working wavelength

R1 distance between T1 and transmitter

R2 distance between T2 and transmitter

R3 distance between T3 and transmitter



Now by fris transmission formula:-

Power received by T1 is given by

$$P_{r1} = P_t \frac{A_{et} / A_{er}}{\lambda^2 |r|^2}$$

$$r = \sqrt{\frac{P_t A_{et} A_{er}}{P_r \lambda^2}}$$

So we see that we get the distance and by this distance we draw the cir

Cle of radius r1 and r2 and r3. Where the 3 circle will intersect is our location of our mobile. Since the circle intersection will give us the range, we have the specific area in which our mobile is located. With the help of hand receiver we can find out the exact location of our mobile

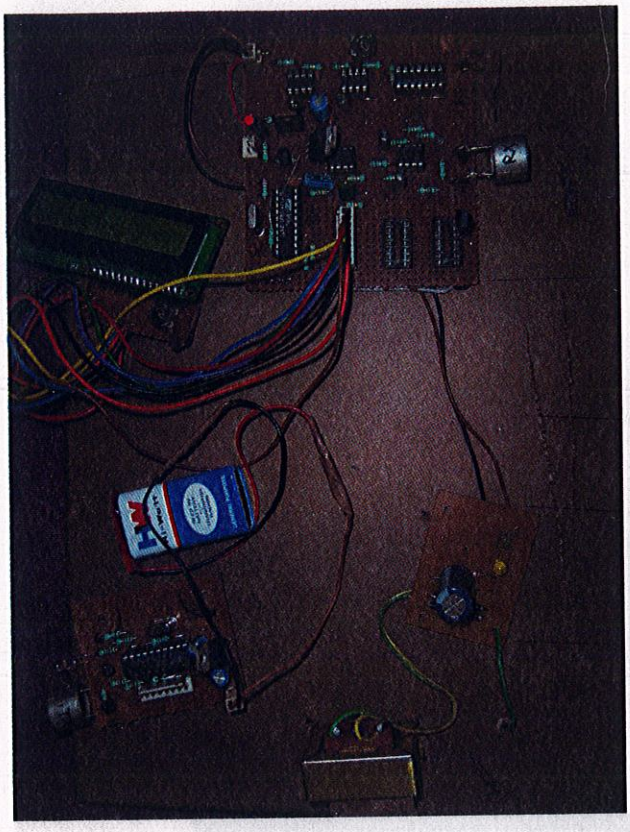
## ***CONCLUSION***

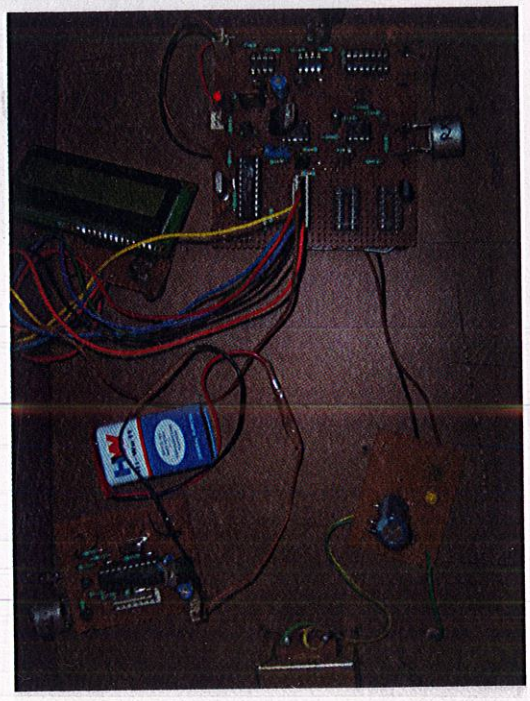
The LPS circuit is currently a prototype level "proof-of-concept" application with primitive optimizations and only basic functionality. The scope and scale of this application can be extended by future developers. The potential areas of extension are listed below:

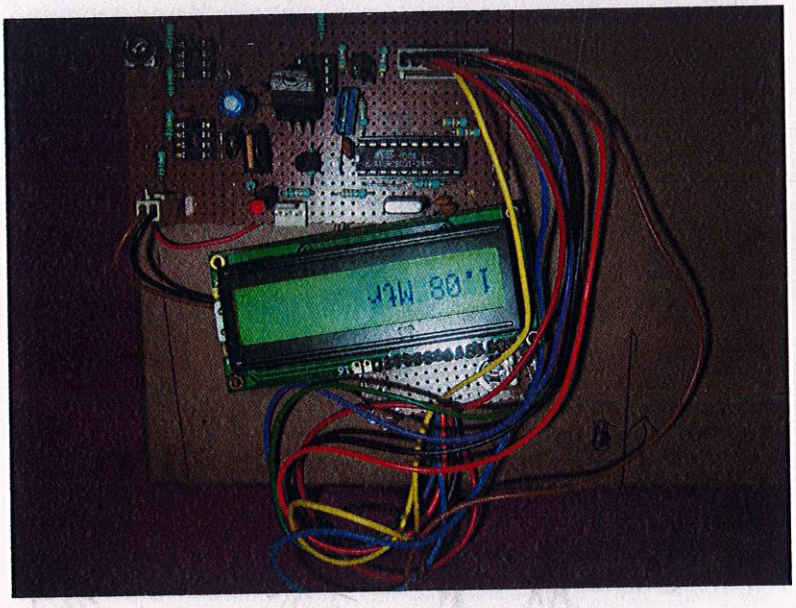
1 It can be extended to RF transmitters and receivers in mobile hand sets as discussed in future aspects

2 The application can be modified to run automatic car systems.where we have to determine objects in vicinity and the distance between them as well as position
of objects

3. The application can be suitably changed in finding primary objects in current Vicinity



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