



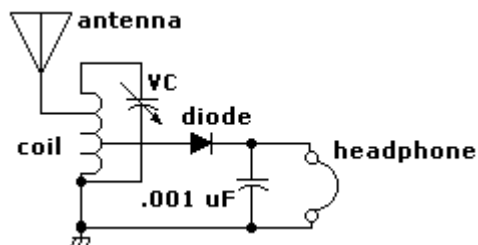
Technical Details & Assembly Note: Crystal Radio with IC Amplifier & Speaker

## Overview:

I have been listening stories from dad of making a radio when he was little younger than me. It was hard to digest that his radio worked without power!! But as you all know, dads are always right!! May be they are right but at that time, I thought of nothing more than old mom's stories that we have been told at bedtime!!

However, Understanding little more about radio waves & basic principles, I realize that dad's story could be true & was worth giving a try. So, I decided to make a crystal radio for myself.

## The Basic Crystal Radio is just this much:

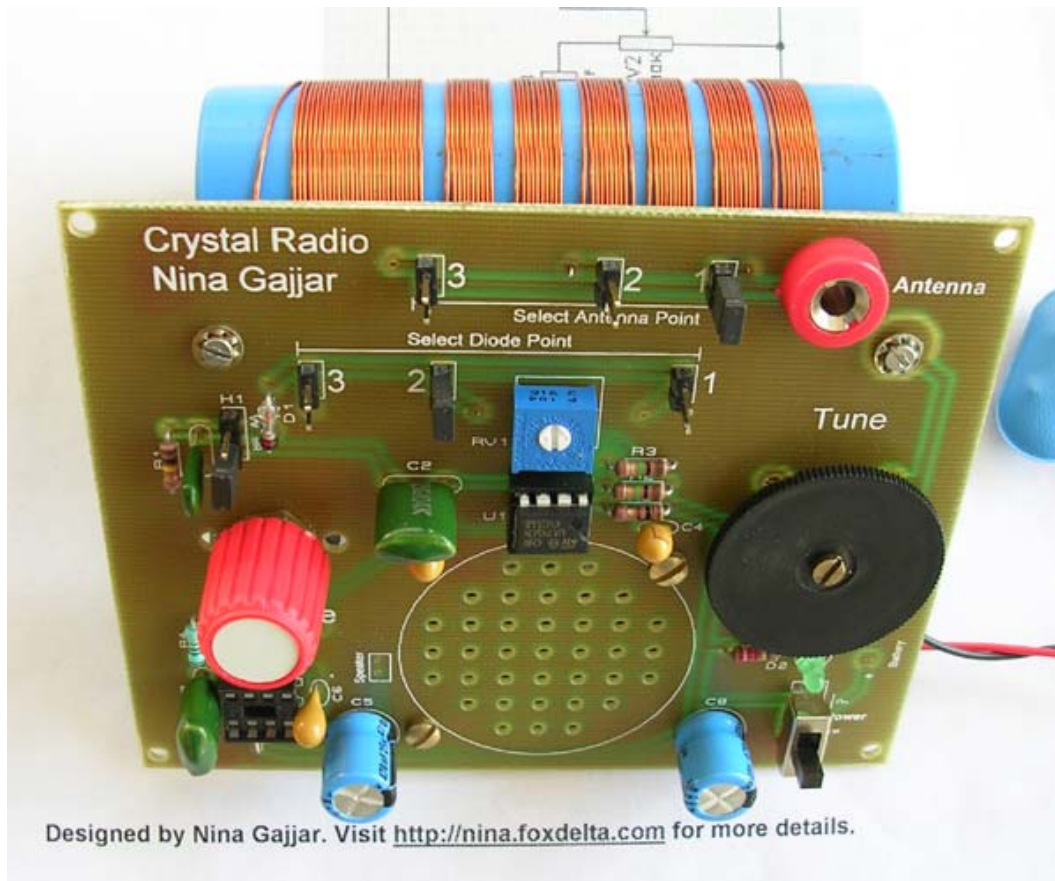


A coil, Variable capacitor to tune frequency, a crystal Diode and a High Impedance headphone, makes a crystal radio. You require a very good antenna and good ground. The .001uf Capacitor is to remove radio frequency from the signal.

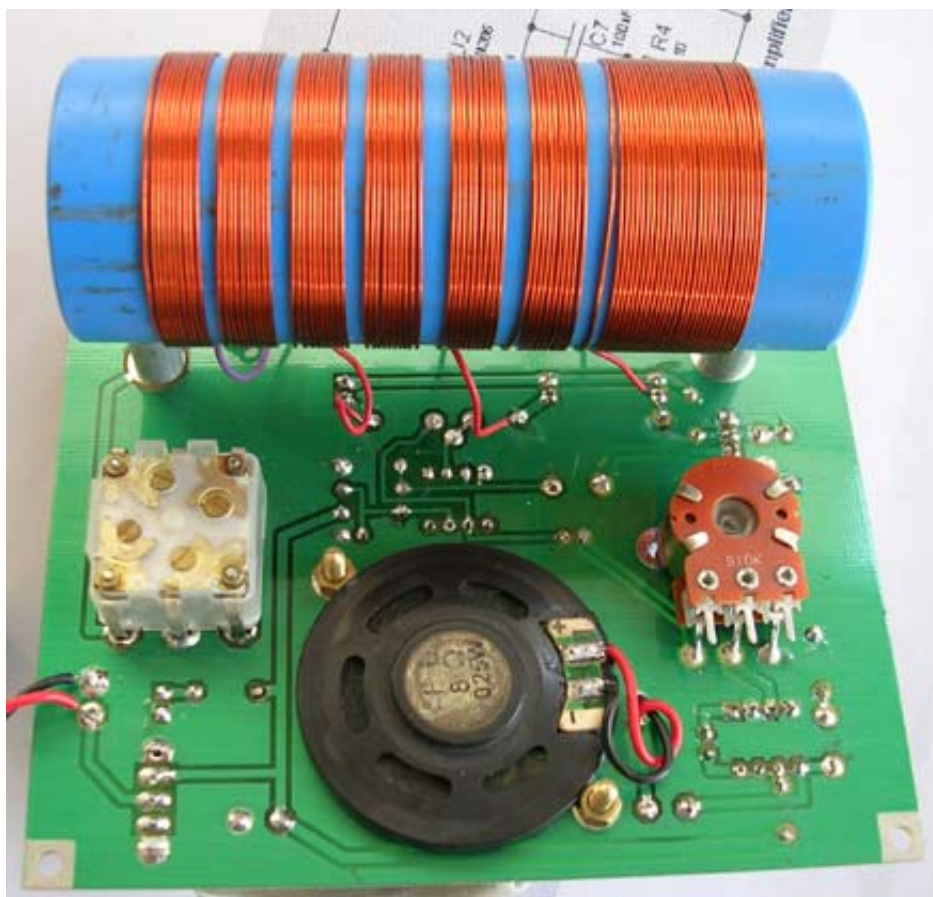
In my project detailed here, I have above circuit already included for those who wants only real crystal radio. However, I decided to add some amplification for the very basic reasons that, it was hard to find a High Impedance earphone, second, it was more pleasant to listen to radio thru a speaker.

An Op.Amp was added to increase level of crystal so a low impedance earphones may be used and an audio IC was added to drive a small speaker.

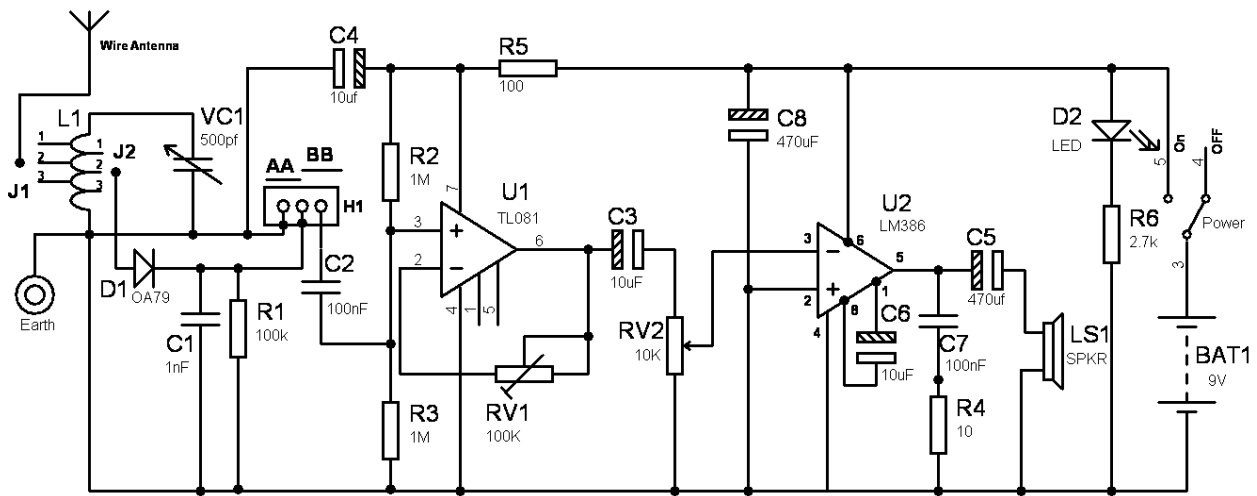
## Completed Crystal Radio with IC amplifier:



## Back Side of the Receiver:



## The Schematic:



H1 = Connect HiZ Earphone at AA or Insert Shorting pin at BB  
J1 = Select Antenna point J2 = Select Crystal Position

Crystal Radio with IC Amplifier by Nina Gajjar  
Visit <http://nina.foxdelta.com>

## Circuit Details:

As explained above, this is a basic Crystal Radio with ICs. The U1 is a JFET op. amp to get good amount of amplification. The Gain of this stage may be adjusted by preset RV1. U2 is a simple audio IC driving a speaker.

The battery is 9V with an On/Off switch on the PCB.

If you prefer to listen to radio without power, insert your high impedance earphone at AA. For amplified use, place a shorting header at BB.

You may try Best Antenna point by changing headers at "Antenna Points" 1,2, or 3. Similarly, to get best match for crystal, suitable point at "Crystal Point Selection" may be selected.

## **Assembly Note:**

**PCB is a single sided board. Most components mounts on topside with exception of coil, tuning capacitor and volume pot because they are large and I do not like to see them on front side.**

**Coil: coil is a 9cm long and 34mm diameter PVC tube. The winding area length is restricted to 8cm only where there are two holes to mount this coil to the PCB. Thru these two hole/bolts, Ground & top of winding is transferred to PCB. Two aluminum posts of 11mm length are used to hold this coil to the PCB by means of 2mm Dia. & 5mm long screws.**

**There are 6 taps on coil. 3 for diode selection & 3 are for antenna selection. There are soldered to their respective places as indicated on PCB. **This coil is to be wound by the constructor even if assembled unit is ordered.****

**The tuning capacitor is a 2J PVC type. Both sections are paralleled to get maximum capacitance. (To get wide tuning range)**

**Volume control is a 10K log type with shaft & a knob.**

**Both ICs have 8DIP sockets, which should be soldered first.**

**On/Off switch is tiny slide type, which is used to switch on the radio when pushed towards the direction of tuning control.**

**A complete Schematic & Parts list is provided on separate document. There are no evident errors on PCB silk from that of schematic representation.**

**I hope you will enjoy building this kit & off course, listen to your nearby radio station too.**

## Parts List:

- |   |   |
|---|---|
| 1 | PCB   |
| 1 | "Tune" Variable Capacitor = VC1                               |
| 1 | Antenna pin with male pin                                     |
| 1 | Coil Drum with 2 pieces alum posts, bolts & Lugs              |
| 1 | Header set (2pin x 6 for Ant & Diode points, 3pin x 1 for H1) |
| 3 | Header shorting pins  |
| 2 | 8pin IC sockets   |
| 1 | LM386   |
| 1 | LM741   |
| 1 | Speaker   |
| 2 | Brass bolts with 4 nuts (Speaker tie-up)                      |
| 1 | "Volume" RV2 10K Pot with Knob                                |
| 1 | RV1 Bourns Preset 100K  |
| 1 | Battery clip  |
| 1 | LED   |
| 1 | "Power" Switch  |
| 1 | D1 = Diode OA79   |
| 1 | Resistor R1 = 100k (all resistors : Philips 1/4 Watt )        |
| 2 | Resistor R2, R3 = 1M  |
| 1 | Resistor R4 = 10 ohms   |
| 1 | Resistor R5 = 100 ohms  |
| 1 | Resistor R6 = 2.7k  |
| 2 | Electro Capacitor 470uf (C8, C5)                              |
| 3 | Electro Capacitors 10uf (C3, C4, C6)                          |
| 2 | Poly 100nf (C7, C2)   |
| 1 | Poly 1nf (C1)   |
| 1 | Length of Copper Wire to wind approx 120 turns                |

**Regards / Nina Gajjar**

Visit for more projects: <http://nina.foxdelta.com>