

Simple Radio Circuit using Op Amp

Simple Radio Circuit

Op-amp is the short form for Operation Amplifier. It is a device used to amplify voltage, and is very popular due to its high gain amplification. It can often amplify voltage to hundred times of what is input.

This project is aimed at making a simple radio circuit using an opamp.

Description

This is a low-cost simple radio circuit based on opamp which can be used to listen to nearby stations.

A simple op-amp radio basically consists of a crystal radio along with a fairly sensitive audio amplifier. The [audio amplifier](#) is able to receive strong stations around Los Angeles with a minimal 15-foot antenna. Stronger signals are always provided by longer antennas. But the main disadvantage is that in the case of long antennas the stronger signals provided may produce a noise as it could be heard in the background of the weaker signals.

In the case of longer antennas, the selectivity will also become bad. A remedy can be obtained to the problem of low sensitivity by connecting the long antenna to one of the taps of the coil. For this, the connection of the antenna to the junction of the capacitor and coil must be changed. For listening to the local radio news we just have to stand outside and let the long headphone leads to lay on the floor. As a result of this setup, a ground is also established. The inductance coil has 200 turns and is made of #28 enamelled copper wire. The inductance coil can produce 220 microhenry inductance with the wire kept on a 7/8 diameter, a 4-inch length of PVC pipe. The inductance coil was set up in such a way that there were wounds with taps every 20 turns. This mechanism is provided so as to select a perfect diode and antenna connection. For a little weaker signals, a germanium diode such as 1N34A type would be more appropriate.

In the case of stronger signals, a silicon diode can be used. A rectified output signal is produced at the cathode of the diode. But the carrier frequency of the rectified signal is removed with the help of a 300pF capacitor. Thus an audio frequency is obtained which is passed onto the non-inverting input of the op-amp through a 0.1uF capacitor. The op-amp acts as a high impedance stage. The output from the first op-amp is given to another op-amp which increases the voltage level about 50 times and is DC coupled to the first through the 10K resistor. In order to keep the DC voltage at the transistor emitter between 3 and 6 volts, we may have to adjust the values of 100K and 1 megaohm resistance, as they may not be close in value.

Adjustment can be made by either using closely matched values of resistance or have to add a capacitor in series with a 10K resistance. Another approach would be to reduce the overall gain with a smaller feedback resistor (470K). High impedance headphones will probably work best you can also try with Walkman headphones.

Parts List

R1.....100K
R2.....1M
R3.....1M
R4.....10K
R5.....100K
R6.....100K
R7.....470K
R8.....470Ohm
c1.....30-360 Pf Variable
C2.....0.1 uF ceramic
C3.....300 pF ceramic
C4.....100uF 15 V Electrolytic
IC1.....LM 324 quad opamp
T1.....SI 100 NPN Transistor
Z1.....Headphone
A1.....See notes
D1.....1N34 Germanium Diode

Note:

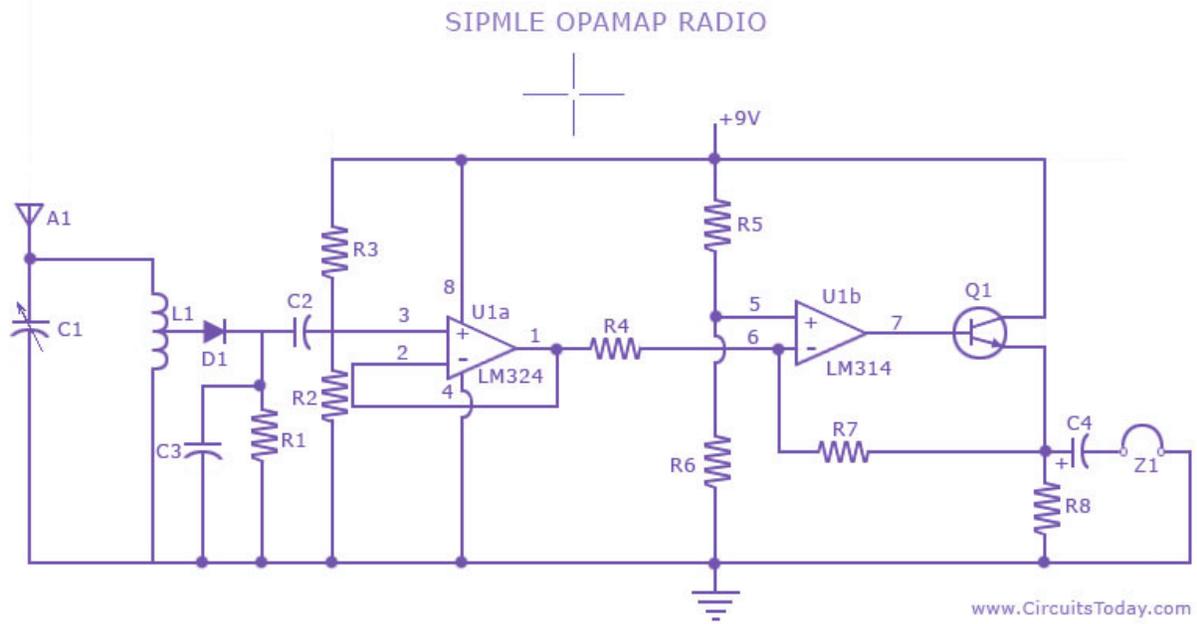
LM 324 is quad op-amp. Out of which only IC1 a & IC1 b are used. Power supply pins are common so they (pin 8 & 4) are shown connected once.

For antenna use a 50 cm long copper wire.

For inductor make 210 turns of no:28 enamelled copper wire on a 1 cm dia and 10 cm long plastic pipe.

Use a 9V battery as a power source for reducing noise.

Simple Radio Circuit Diagram



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<https://www.circuitstoday.com/simple-opamp-radio>