

Crystal Radio Assembly

After you have completed winding both the tuning coil and the antenna coil for your radio, you are ready to assemble the radio. The first step is to solder connector wires to the tuning coil. Find the bag containing three stranded wires, one red, one green, one black. These wires have a ring terminal on one end. Strip off the insulation from the end opposite the terminal ring on each of the three wires.

The tuning coil is divided into two sections, one with 28 turns of wire and one with 17 turns. Hold the coil so that the 28-turn section is to the right. In that position, the red wire is soldered to the wire on the right side of the coil and the black wire is soldered to the wire on the left side of the coil. The green wire should be soldered to the tap between the coil sections. Before you solder a wire to the coil, slip a piece of heat shrink tubing over the wire and slide it down to the end with the ring terminal. Then solder the wire to the proper place on the coil. When you are finished soldering all three wires, ask an adult to help you use the heat gun to shrink the tubing around the soldered connections.

When you are finished soldering the wires on the tuning coil, mount the coil to the white radio base using the two machine screws, spacers and nuts that are already inserted into the base. The red wire soldered to the coil should be on the right.

I have already assembled some of the radio parts on the radio base and front panel. The variable capacitor, which is used to tune radio stations, is attached to the front panel. It already has a black wire and red wire attached to it. The free ends of these wires contain ring terminals. **IT IS VERY EASY TO DAMAGE THE VARIABLE CAPACITOR. DO NOT TOUCH THE PLATES OF THE CAPACITOR WITH YOUR HANDS OR ANY TOOL. IF YOU BEND THE CAPACITOR PLATES, YOU MAY DAMAGE THE CAPACITOR.**

The radio also has an audio transformer attached to the base on the right side (the component that has many wires). In addition, there is a phone jack attached to the front panel. Just behind the phone jack there are four machine screws in the white radio base. These are secured on the top side of the base with two nuts. You will use these machine screws to make connections between components of the radio rather than soldering components together. The wires you will be using have ring terminals, which slip over the machine screws. To make a connection, first remove the top nut. Then place all of the ring terminals of the wires to be connected over the machine screw. Then replace the top nut and tighten. Also notice that there is a fifth machine screw that you will use to connect some wires. This is the screw on the right side of the transformer (the one that has two nuts). **ALL OF THE BLACK WIRES, EXCEPT THE ONE ON THE DIODE, SHOULD BE CONNECTED TO THE MACHINE SCREW ON THE RIGHT SIDE OF THE AUDIO TRANSFORMER.**

On the next page you will find a schematic for the radio. You should use that schematic to help you wire the radio properly. I will not give you step by step instructions beyond this point for the main module of the radio. This is a test to see if you can wire an electronic project using the schematic for reference.

T1 in Figure 1 is the audio transformer. Look at the transformer attached to the white base. Notice that it has many wires. But only three of the wires have ring terminals soldered on the ends (white, violet and black wires). The different wires of T1 allow impedance matching to various devices that might be connected to the phone jack for listening. If you experiment in the future with different types of ear phones, amplifiers, headsets, etc., you may need to use some of the other wires of T1 for impedance matching. You will learn more about this in a future lesson.

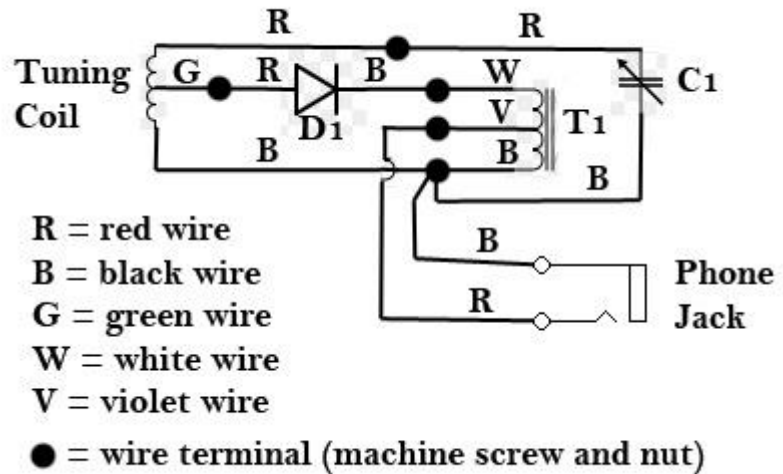


Figure 1 crystal radio schematic – main module

Go ahead now and finish wiring the main module of the radio. The wires from T1 and the variable capacitor C1 are already connected to machine screws, BUT THEY MAY NOT BE IN THE CORRECT PLACE. It is your job to make sure all wiring connections are correct, according to the schematic in Figure 1.

When you are finished wiring your main module, ask an adult to check it. You will test your radio in a future lesson and will have to wait until then to confirm that your radio is working. Now it is time to assemble the antenna coil module.

You probably found that the antenna coil was more difficult to wind than the tuning coil because the antenna coil has so many taps. The taps are used to tune the radio antenna to specific radio stations. In tuning your radio, there are two things to tune: 1) adjust the tuning capacitor C1 to tune a desired station 2) adjust the antenna coil for the loudest signal from the tuned station.

There are four connecting wires for the antenna coil module: 1) a black wire with a ring terminal on one end and an alligator clip on the other 2) a red wire with a ring terminal on one end and an alligator clip on the other 3) another black wire with a ring terminal on one end and an alligator clip on the other. You do not need to do any soldering of these wires. The fourth wire is red, has a ring terminal on one end and nothing on the other end. Strip that end in preparation for soldering it to the antenna coil. Slip a piece of heat shrink tubing over the red wire and slide it down to the ring terminal on the other end. Then solder the wire to the end wire of the coil. You should solder the red wire to the end where you started to wrap the coil. If you are not sure which end that is, then look at the example that will be available as a model.

After you have soldered the red wire to the antenna coil, mount the coil on the small white base that has four machine screws. The two black wires should be connected together at one of the machine

screws and the two red wires should be connected to the other machine screw. Then your radio is complete. The alligator clip of the red wire is used to connect to your antenna. The alligator clip of one of the black wires is used to connect to a ground. The remaining alligator clip of the third wire is used to connect to one of the taps of the coil. By connecting to various taps, you tune your antenna for the strongest signal at a particular frequency. You will learn more about antennas in a future lesson. You will not be able to operate your radio until it is connected to an antenna and ground.