# Repairing Vintage Radios

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**No. 7 in a series**

Occasionally, vintage radio receivers become a nuisance and embarrassment to their owners, either by being as silent as a tomb or by sounding like a 'boiler-factory' at Niagara. Please remember your receiver's age; after all these years many things could go wrong with it.

To locate the trouble source and remedy it, equip yourself with the necessary paraphernalia, the foremost of which is an enduring patience. The trouble is not always easy to locate and the 'hunting' for the source is seldom a pleasure.

You should include the following equipment:

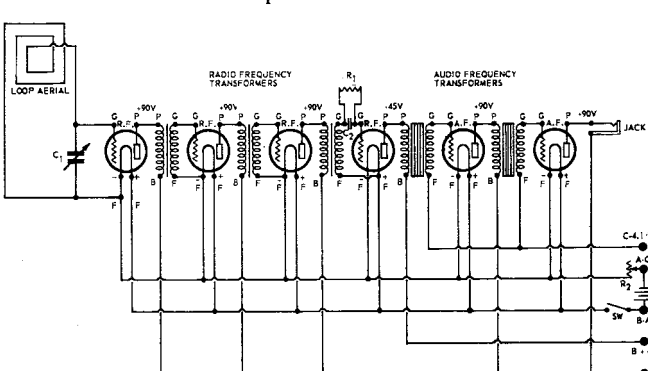
1) Radio receiver's schematic or wiring diagram.
2) DC Voltmeter — two ranges 100V and 10V scale.
3) Continuity tester.
4) Basic tools such as soldering iron, screwdriver, pliers, etc.

The silent receiver usually suffers from such ailments as dead or run-down 'A', 'B', and 'C' batteries, defective battery eliminator (power supply), or an open circuit in the receiver, particularly in power supply cables, tube filaments, filament rheostats, power switch, interstage and output transformers, speaker or earphones, wiring, tube contacts, jacks, etc. to mention but a few.

Let us now refer to the schematic (Figure 1) of a simple vintage receiver. This receiver consists of four separate circuits:

1) the filament circuit
2) the plate circuit
3) the 'C' battery circuit
4) the tuning circuit.

Let's start at the power end of the receiver and test

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the condition of the batteries 'A', 'B' and 'C' or the battery eliminator, with the aid of the voltmeter. It is recommended to test the batteries with a rated load as this will quickly reveal a run-down battery. This particularly applies to the filament storage battery. (*Caution* — never test the power supply of AC receiver, such as the Radiola 17 or 18, without a load, as the open circuit B+ voltage may rise high enough to destroy your filter capacitors.)

If the condition of the battery is O.K., continue at the filament circuit of the receiver. Remove all the tubes and by means of a continuity tester, check all the filaments. At the same time, test also for a possible short circuit between the filaments and the grid, filament and plate, plate and grid. (Unfortunately, modern tube testers are not equipped to test such old tubes as the WD11, R-215, UV201 etc.) Assuming that your tubes are O.K., replace them in their corresponding sockets, connect your 'A' battery to the terminals marked A—, C+ and A+, B—, close the switch 'sw' and with the aid of the voltmeter (low scale 10V) test the filament circuit as follows: from the 'A' battery terminal (A+, B—) to the first R.F. tube filament terminal negative. If no voltage is present at this point, then there is an open circuit in either the switch 'sw', the filament rheostat R2, a broken wire or a poor socket contact. This test procedure should be applied to the remaining tubes, naturally it applies to the parallel tube filament configuration only.

Series filament circuits require a somewhat different test procedure. Connect one lead of your voltmeter to the first R.F. tube negative and last A.F. tube positive filament terminal. An open circuit will indicate full 'A' voltage until you locate the open circuit, then you will have '0' voltage. In between these two points is the open circuit.

The next on the line is the B+ or Plate circuits of the receiver. Again referring to the schematic, it will be clearly seen that the plate circuits consist of the B+ 45V Detector, and the B+ 90V, three R.F. and two A.F. circuits. Again with the aid of the voltmeter (high scale 100V), test the plate voltage on the first R.F. tube. Connect the voltmeter to the 'B—, A+' terminal and to the plate terminal on the tube socket. No voltage at this point would indicate an open primary of the first radio frequency transformer. Test terminal 'B' of this transformer, full B+ voltage here would confirm an open transformer coil. Repeat this test on the remaining R.F. and A.F. plate circuits. On the plate of your last A.F. amplifier, an open circuit would indicate a defective loudspeaker or earphones or a poor jack contact. At the same time, check if the speaker or earphones' plug does not short-circuit the jack terminals. (Good contacts at this point are important.) On a horn-type speaker equipped with a diaphragm, check that this diaphragm is not resting dead against the magnet poles. A similar check should be performed on earphones.

Also look to see, if there is any obstacle in the narrow or throat portion of the horn. (I have seen old horn speakers jammed with so much foreign matter close to the diaphragm, that the air passage was completely blocked off.) On cone-type speakers equipped with a horseshoe magnet, check if the armature is freely moving between the pole pieces, also if the connecting rod to cone or diaphragm is tightly secured.

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Now test the secondary windings of the R.F. and A.F. transformers. This test is best accomplished with the aid of the continuity tester. It is important to test the detector tube grid resistor R1 and capacitor C2. Disconnect the resistor and test for open circuit; at the same time test the capacitor for a possible short-circuit.

The next step is the 'C' battery circuit. Again with your voltmeter, test between terminal 'A–, C+' and the grid terminal on both audio frequency amplifier tube socket terminals. No voltage present between these two points would indicate an open A.F. transformer secondary winding. Another trouble spot here would be a defective filament rheostat, as the negative 'A' battery terminal also serves as the 'C+' battery terminal.

Finally, we have the Loop Aerial and tuning Condenser C1 circuit to test. Disconnect the condenser C1 (one terminal is sufficient), and with the aid of the continuity tester, check for a possible short-circuit, rotating the plates of the condenser from fully closed to fully open position. No deflection on the continuity tester, of course, indicates a good condenser. Also test the loop aerial for open circuit.

If the receiver still refuses to give any sounds, then the finger of suspicion points to the vacuum tubes. Tubes with a good filament and no internal shorts are not necessarily "good tubes". One idea is to try some spare tubes — they can't be all bad. If you do not have spare tubes, check with other collectors, they may loan you tubes which are known to be working, or try to locate someone with an early model tube tester.