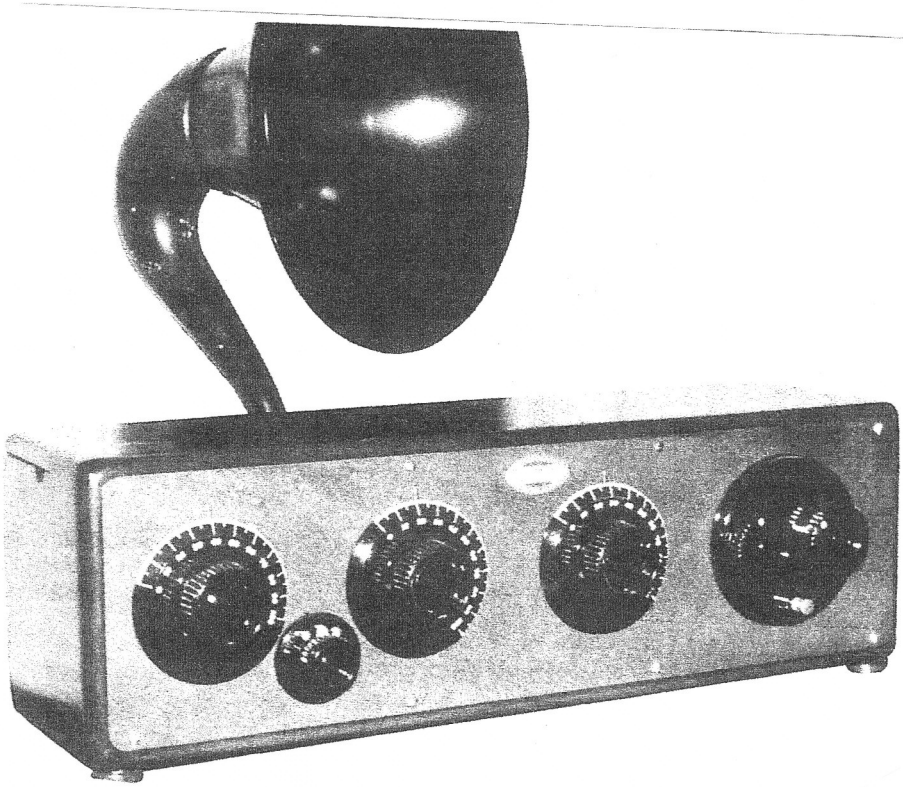
HOW TO RESTORE A

VINTAGE RADIO

By John Mowatt

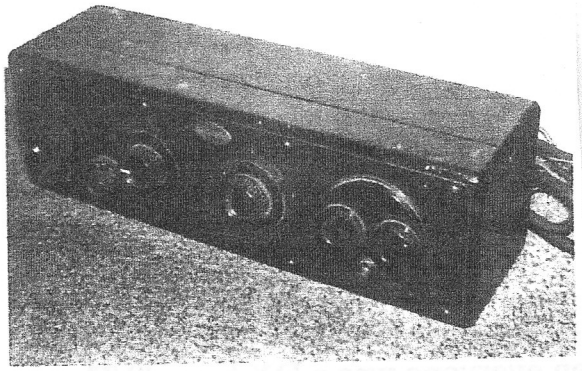


With nostalgia being the in thing these days,how would you like to rekindle some of the adventure of the 1920s when everyone was a DX hound? Those were the early days of radio when the big thing was to twiddle those many dials (the more the better) and edge a little closer to the horn speaker trying to catch some of those faint call letters of a distant station.

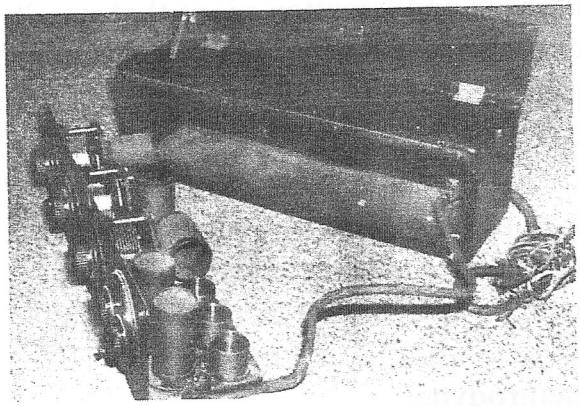
Restore an antique radio and you will have a conversation piece that won't quit.Don't think for a moment that restoration is difficult; vintage radios were the gheight of simplicity. Take a quick look at the typical circuit diagram and you will agree,for it is an ordinary TRF (tuned radio frequency) with inductively coupled RF amplifiers,a demodulator or detector,followed by transformer coupled audio frequency amplifiers. This type of circuit was calloed a NEUTRODYNE and was representative of most early broadcast band receivers. The super heterodyne made its appearance in 1923 but was too expensive,and too difficult to tune (at that time),for the average homeowner so he was content with his neutrodyne.

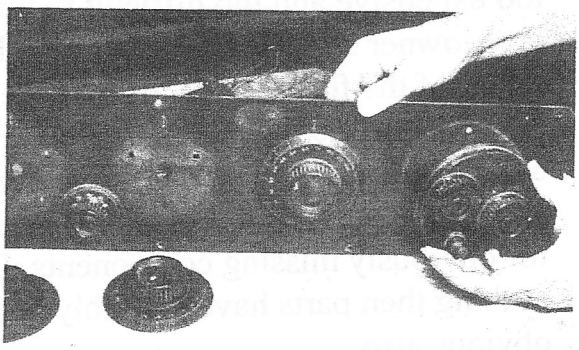
Part of the fun of restoration is the search for a radio set. Nose around antique stores,collectible auctions and even garage sales.Try radio hams and collectors who may have acquired one or two. When you find one don't expect the set to look to great. Remember it is around 80 years old. Lookout for obviously missing components. If there are a lot of wires attached to nothing then parts have probably been removed. Empty tube sockets will be obvious also.

Take a small ohmeter along and check the tubes for filament continuity. You will find trhat they are commonly 201 As,and the two fat prongs are the filament. If you read about 2 to 10 ohms you are in business. Usually with a good filament 201-As will work OK. You can buy 201-A tubes fairly easily on the internet.

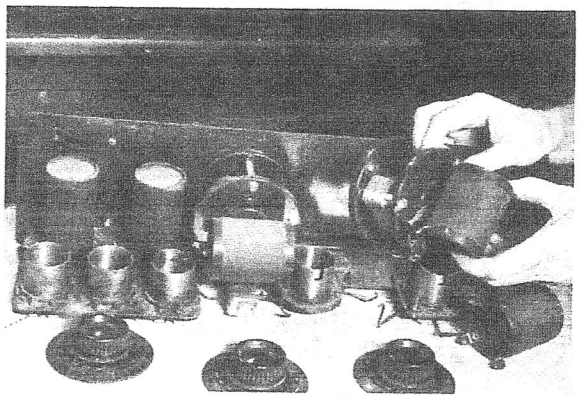


What good is good luck in finding an old, worn-out Atwater Kent receiver (above) if you don't know what to do with it. First, inspect it carefully outside and inside (below) before you buy it. Make sure all the parts are there!





Restoration is easy and a simple process that any amateur can tackle. Begin by removing chassis from cabinet. Next, remove knobs and front panel plates.



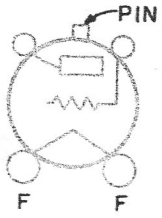
Then, tear down rear assemblies. Be sure to save the screws, as you will need them later when you are ready to reassemble the radio.

Technique is important. Restoring an antique radio is much like restoring a car. It is done very simply by refurbishing all the component parts. The radio described here is an Atwater Kent Model 20,but any other make of radio can be treated in the same manner. This model was very common in the 1920s and had three large tuning dials which was typical of most sets of this period.

Thousands of Atwater Kents were made in this period. How much should you pay? That is a hard question to answer.Typically a radio of this era these days will go for $100 dollars in fairly rough condition. In nice condition the price will rise accordingly. Don,t be in a hurry. These sets are around in numbers and are not uncommon. Shop everywhere till you find what you want at your price. When you find it make a sketch of all the parts and where they go.

If you are lucky you might find a set with shiny bus bar wire all neatly bent to make everything look parrallel. Even in very elaborate sets there are not too many wires and you will find the sketching easy to do. Most sets were hand made and the parts were held in place with 6-32 machine screws. This make it easy to take the whole set apart which is the next step. Mix up a batch of 1 part ammonia and 4 parts water with a little detergent and give all the parts a bath except the dials. Don't leave the coils in too long or the shellac will dissolve and the wire will unwind. Rinse in clear water and dry by playing a heat lamp over them. Be careful-do not overheat. The tube sockets can be disassembled and the brass shell and prongs polished with ordinary brass polish.

Maintenance:After the parts have been cleaned you should check them. Thre whole set is RF coils and audio transformers,so a simple resistance check of windings will usually show if anything is wrong. The circuit diagram here shows the approximate value in DC ohms. If you find an open RF coil it is usually the wire terminations on the soldering lugs which can be easily repaired.

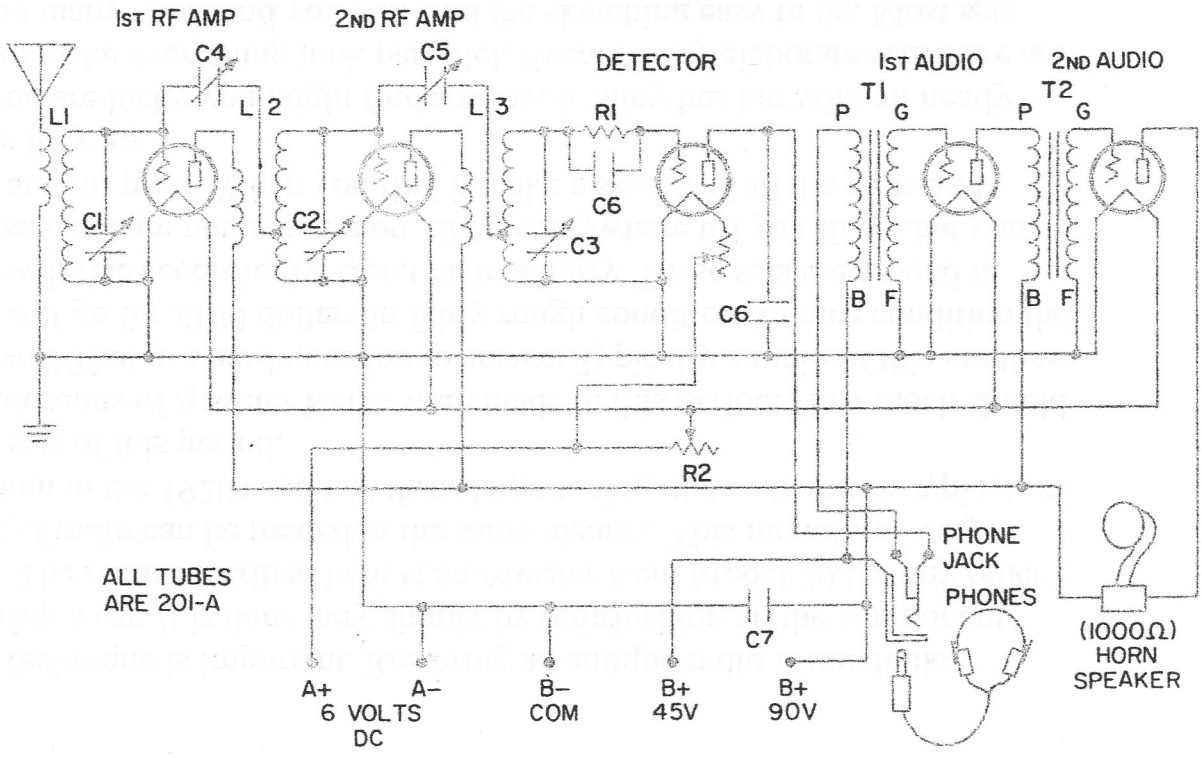


(VIEWED FROM BOTTOM)

FILAMENT VOLTS	5.0 VOLTS DC
FILAMENT CURRENT	0.25A
MAX PLATE VOLTS	135 VOLTS DC
PLATE CURRENT	3.0mA
AMPLIFICATION FACTOR	8.0
PLATE RESISTANCE	10000Ω
POWER OUTPUT	250mW

The 201-A vacuum tube did multiple duty in the Atwater Kent receivers. Replacements may be hard to find so handle yours with care.

The Atwater Kent Model 20 broadcast band receiver uses five vacuum tubes powered by dry and wet cell batteries. Capacitors C1, C2, and C3 tune the front end much in the manner of later day TRF's except that each capacitor was tuned independently.

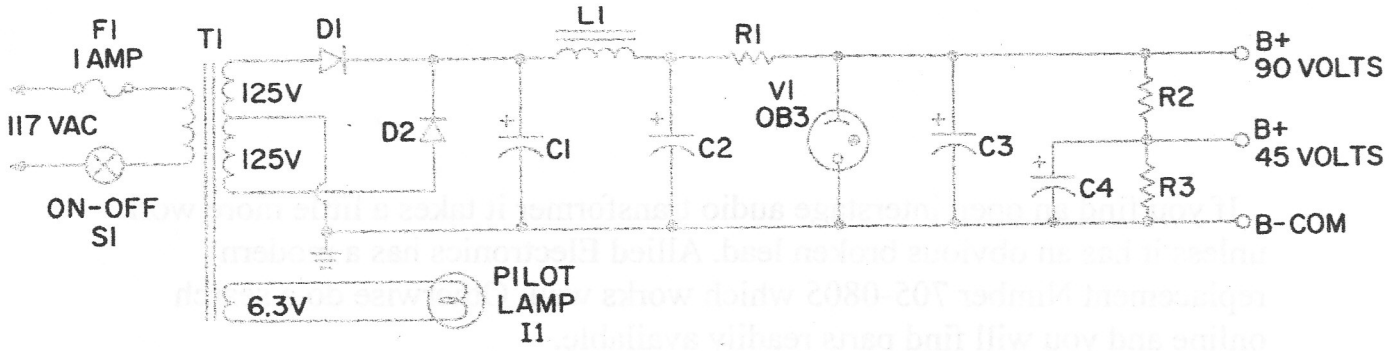


If you find an open interstage audio transformer it takes a little more work unless it has an obvious broken lead. Allied Electronics has a modern replacement Nimber 705-0805 which works well. Otherwise do a search online and you will find parts readily available.

As a last resort you can pop a modern transformer among all the antique parts. Most early audio transformers were enclosed in a metal case and are a thing of beauty with a fancy name p[late,binding posts etc. Remove the lamination assembly from the case. If you have an Atwater Kent this may have the laminations potted which requires gentle heating of the can while pulling on the wires. The whole works will pull out encased in a black compound. Drop the new one in and seal it with paraffin wax.

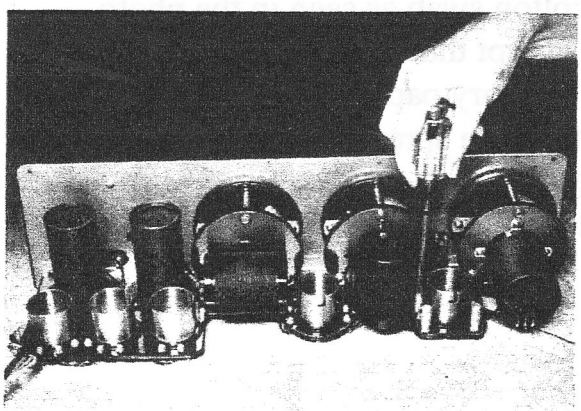
Dials:The biggest impression of a restored antique radio is big bright shiny dials. It is easy to get thewm that way. Test the dials to see if they are made of bakelite. Rub a paper towel moistened with lacquer thinner on the back of the dial. If you get a very black deposit on the towel this means it is so called composition material and is not restorable. This however is rare. Most have bakelite dials and this is what you will probably find.

Next buy a small can of white lacquer. Be sure that it is pure white. Now soak the dials in the ammonia detergent wash for a minute to loosen the old white lacquer in the numbers and graduations. Remove all this lacquer. Paint over the dials indentations with a cotton swab as seen in the photo. When dry remove all the excess lacquer except that in the indentations. The photo shows how and you will find that ordinary paper towels are sufficiently abrasive to polish the bakelite. Then spray with high glass plastic polyurethane varnish from a spray can. You can also spray all bakelite parts such as the tube sockets etc while disassembled. Make everything sparkle.

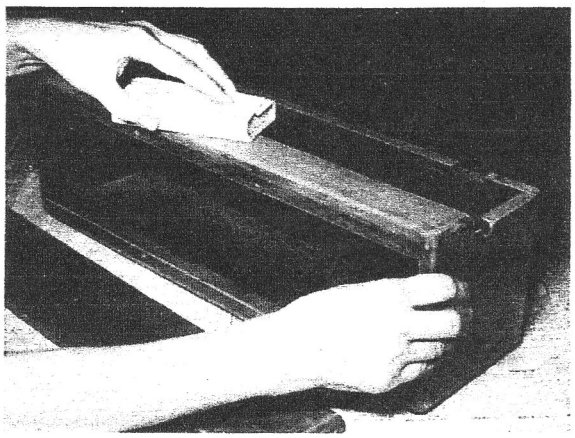


Feel free to use overrated transformer and electrolytic capacitors.

PARTS LIST	
C1, C2, C3	30 μF electrolytic capacitor, 250 VDC
C4	1.0 μF electrolytic capacitor, 150 VDC
D1, D2	Silicon rectifier, 100 mA, 500 PIV or better
I1	Pilot lamp. 6.3 V unit (G.E. #47, etc.)
L1	Filter choke, 1 Henry, 30 mA, 100-ohms DC approximately (use secondary filament winding of inexpensive 117/6.3 V transformer)
R1	2,700-ohm, 7 W wire-wound resistor
R2, R3	10,000-ohm, 7W wire-wound resistor
T1	Power transformer: 117 V pri.; 250 V CT at 25 mA, 6.3 V at 1.0 A sec. (Stancor PS8416 or equivalent)
V1	OB3 voltage regulator tube



Reassemble the radio carefully. Don't worry about lost screws—only 6-32 brass jobs were used in those days.



Refinish the cabinet following advice of your paint dealer. Sand first for smooth finish.

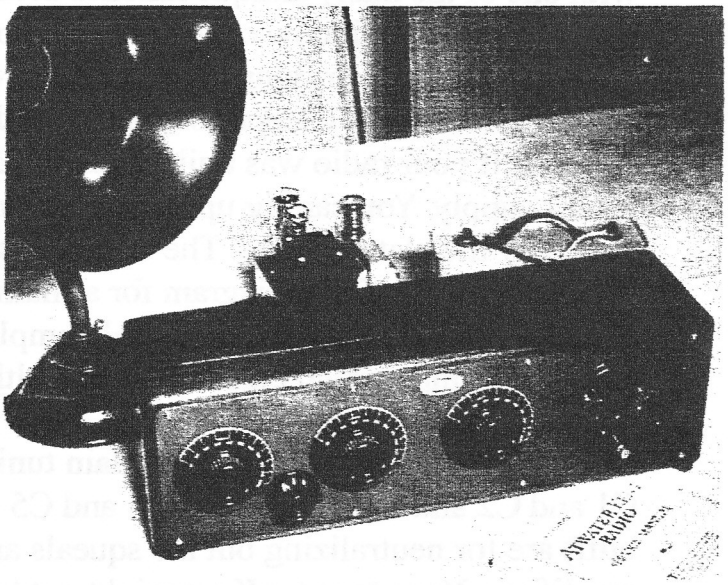
Front:The front panel needs attention next. If it is metal you can repaint it with one of the many antique finishes available. If it is bakelite clean it first using a spray of window cleaner. Then rub it down with a paper towel moistened in lacquer thinner. If it is engraved restore the markings the same way as for the dials except don,t spray with the varnish.

Power;If your radio was built before 1928,it does not have a built in power supply. You can rig up a replacement for the big B batteries that used to supply the plate voltage. The circuit is shown.

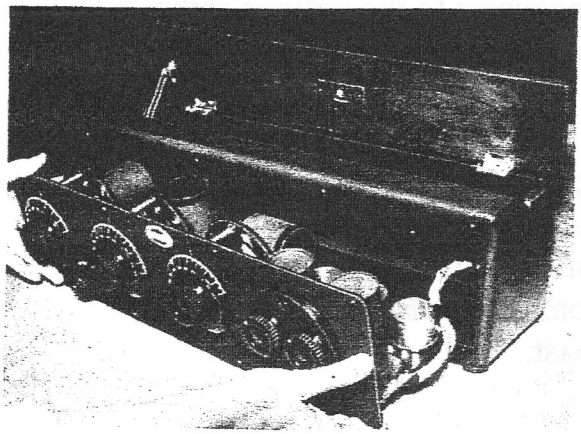
We did not provide a diagram for a filament supply which was a 6 volt car battery back in the 1920s. A normal complement of five 301-A tubes would draw 1.25 amps which takes a pretty healthy transistor regulator. A six volt lantern battery will suffice.

Your radio is now ready to go. Main tuning is accomplished by tracking C1 and C2 and C3. Capacitors C4 and C5 (condensers to the antique radio buff) are for neutralizing out the squeals and squacks prevalent in RF amplifiers. Your Atwater Kent might not have these. They are adjusted by tuning in to a strong station,then killing the filament voltage to the preceding tube and adjusting for minimum signal.

So have fun with your restored antique radio. You will need some kind of an antenna (preferably a long wire) and a ground connection. If you did a good job on the restoration you can recreate some of the high adventure of the 1920s and tune in stations from coast to coast.



▲ *The completed Atwater Kent in restored condition and ready to play. Note B+ power supply and filament battery behind unit.*



◀ *Carefully install the receiver chassis and front panel into the cabinet.*

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