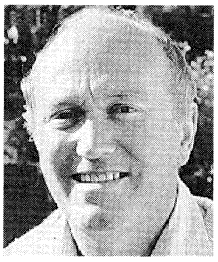
VINTAGE RADIO



By JOHN HILL

Revamping an old Radiola

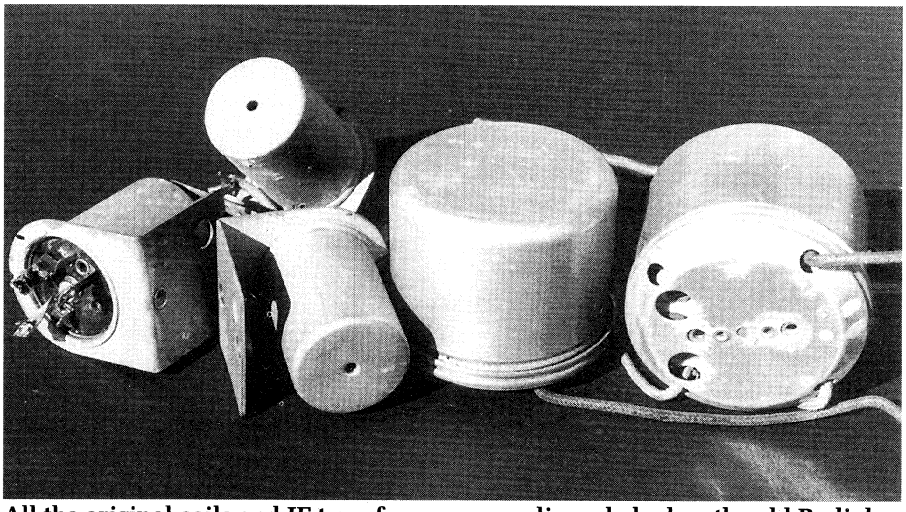
Take one Radiola cabinet, add an Airzone circuit, make a few other alterations and what have you got? A real "bitzer", that's what! This Radiola that has been completely reworked but, despite that, it still looks the part.

In the November 1992 issue, I described how an old 1935 battery-powered Radiola was converted to 240V operation. It was a big job as far as I was concerned, for the simple reason that I had never tackled such a project before. What's more, I didn't know how successful the conversion would be until the job was completed.

The set was originally built from parts salvaged from two wrecked receivers, both of which were battery models. Some time later, a better cabinet was found and so the old Radiola ended up being rebuilt from three separate receivers.

The conversion to AC required the almost complete stripping of the chassis – not even the valve sockets could be used in the rebuild! The only original components that were retained were the dial, the tuning capacitor and its associated coils, the two 175kHz IF transformers, and the permanent magnet loudspeaker.

Retaining the permag speaker may seem an odd approach to an AC conversion since mains-powered receivers used electrodynamic types in those days. However, there were good reasons for keeping it. The cabinet could use only a particular type and size of speaker. Because the heads of the speaker mounting bolts are exposed at the front of the cabinet, moving the bolts to accommodate another speaker was out of the question.



All the original coils and IF transformers were discarded when the old Radiola was rebuilt. They were replaced with more modern components.

As it turned out, the 60-year-old permag speaker worked amazingly well and kept up with anything the single type 42 output valve could throw at it. While there was some apprehension about using the speaker during the construction stage, it soon proved itself once the set was operational. As an added bonus, the speaker actually looks like an electrodynamic type and it requires a close examination to see the difference.

Dial drive problems

Restoring any vintage radio receiver to working order is often fraught with problems. One particular headache with the Radiola was the friction drive dial mechanism, a common fault with many old receivers. Having two to choose from didn't help much as each one was as worn and useless as the other.

The only practical solution was to completely modify the tuning mechanism and the friction drive was replaced with a more conventional cord drive setup. This amounted to adding a drum and a suitable control spindle, specially made to do the job.

Converting a battery receiver to AC operation and altering a useless friction drive to a cord type seemed to be a logical approach to the problems at hand. But not everyone agreed with my line of thought.

Apparently, some vintage radio collectors were horrified at such desecration and I received a few critical letters as a result. The debate about the set's originality continued off and on for about two years before the matter was finally laid to rest. Apparently, vintage radios should be restored exactly as they were originally made, without alterations to circuits or devi-

ous modifications. Well, so I'm told!

Unfortunately, that's not always possible. Beside, I like to restore an old receiver in a manner that suits me and I base my decisions on such things as cost, the availability of parts and other practical aspects of getting a derelict old radio working again.

It is interesting to note that during the war years thousands of 1930s vintage battery receivers were converted to AC operation. As new receivers were unavailable at the time, converting battery sets to AC operation became a booming business. It's strange that such a conversion was OK then but not the done thing today.

Major rework

Since then, the Radiola AC conversion has undergone a major rework. No doubt it will please my critics to know that I haven't chosen another set to convert, so hopefully I won't draw any further flak from those opposed to such things. It's just an extension of the previous modification.

The incentive for the rework came about because the old Radiola developed an odd intermittent fault. Sometimes it would work normally, while at other times it would not. And when it played up, part of the broadcast band would move off the low-frequency end of the dial.

While the fault was obviously caused by a considerable shift in oscillator frequency, the problem could not be corrected by tapping components or waggling connections. Whether or not it worked properly was a decision that only the receiver made, depending on its mood.

After several unsuccessful attempts at locating the elusive intermittent fault, a big decision was made. The whole chassis was stripped with the exception of the tuning capacitor, dial mechanism, and power transformer. It was then rebuilt using fresh components.

The last time this was done, an Airzone 517 circuit was used to build the detector and audio stages. This time the whole circuit was used. The Airzone 517 is nothing special; just a fairly standard late 1930s broadcast band 5-valver with simple AGC and octal valves. My version, however, used pre-octal valves with similar characteristics.

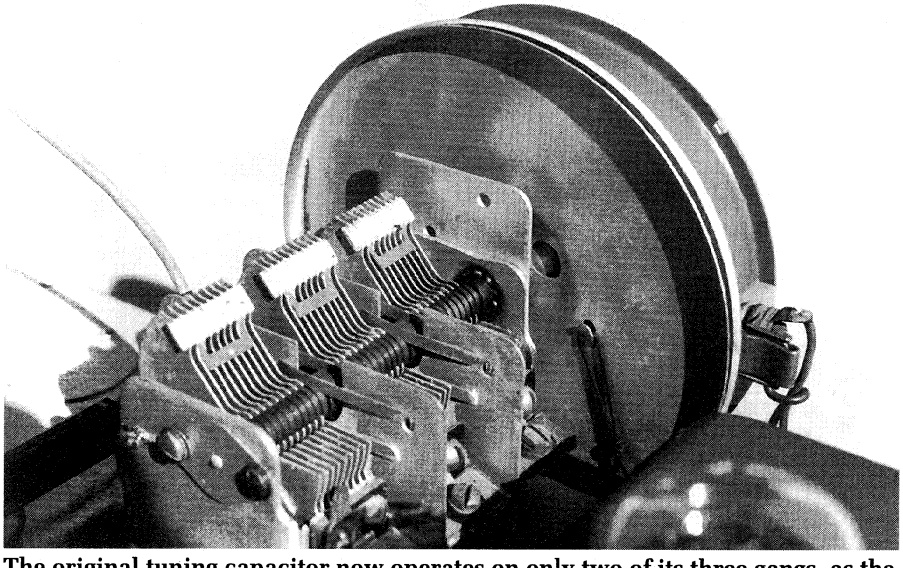
There were also a few alterations to the circuit. For starters, the local/distance and tone switches were eliminated, with a potentiometer being substituted for the latter. A high-tension choke was also incorporated to substitute for the nonexistent field coil. Previously, a 20W resistor had been used in the HT line but this resulted in a low-level hum in the speaker. While this hum was not intrusive, it has been virtually eliminated by the addition of the choke.

A pair of large postwar IF transformers were selected to replace the old 175kHz originals. These were chosen mainly for their size as everything about the old Radiola is big, the chassis being about 125mm high. The IF transformers were mounted on top of the chassis, as opposed to the underchassis mounting arrangement of the originals.

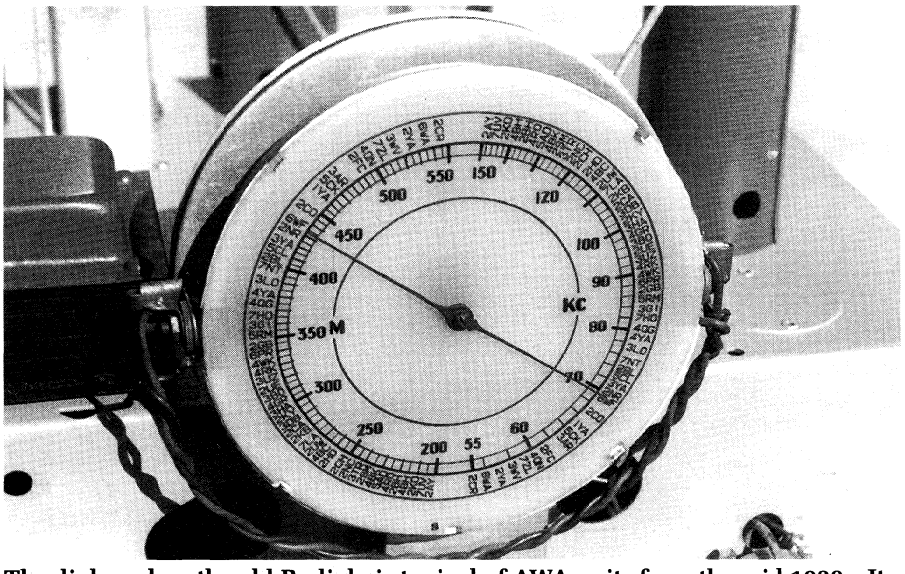
When these transformers were taken from their derelict receiver, the various connections were noted before disconnecting the wiring. They were also marked IF1 and IF2 because they bore different part numbers and so should not to be treated as interchangeable units.

The air-cored aerial and oscillator

The "new" IF transformers are from a late 1940s Radiola and were mounted on the top of the chassis (the originals were mounted below). These transformers were chosen mainly because their large size seemed appropriate to the generous dimensions of the chassis.



The original tuning capacitor now operates on only two of its three gangs, as the preselector bandpass stage has been removed. Note the large diameter cord drum that has been fitted to the tuner spindle so as to incorporate a cord drive.



The dial used on the old Radiola is typical of AWA units from the mid 1930s. It is marked with station call signs around the outside, wavelengths in metres on the left, and frequencies in kHz (KC) on the right. The original battery-operated set had no dial lighting but this was added during the conversion to mains power.

coils were taken from an old Astor chassis. Again, as the coil connections were unmarked, notes were made as to which tag went where.

It would have been nice to have taken all these components from the one chassis but it turned out that they were all compatible when the rebuild was completed.

Another major change to the circuit was the removal of the preselector bandpass filter. A bandpass filter, or an RF stage, was employed on early superhets using 175kHz IFs and was essential to avoid double spotting, a natural characteristic of receivers with low intermediate frequencies. Receivers with higher IFs around 455kHz do not require the bandpass filter.

As a result, the new circuit uses only two of the three sections of the tuning capacitor.

There were no great problems putting all the parts together and the work progressed without incident. Having all the necessary components laid out ready for use prevented any hold-ups.

A few additional tag strips were used to advantage with the under chassis wiring, the end result being a better layout than my previous effort.

Problems

Using odd components from various makes and models can make a project of this nature somewhat difficult. While the IF transformers tuned OK to 455kHz, I encountered difficulties in getting the dial to track when aligning the aerial and oscillator circuits. Most of the broadcast band was there but the frequencies did not line up correctly with the dial.

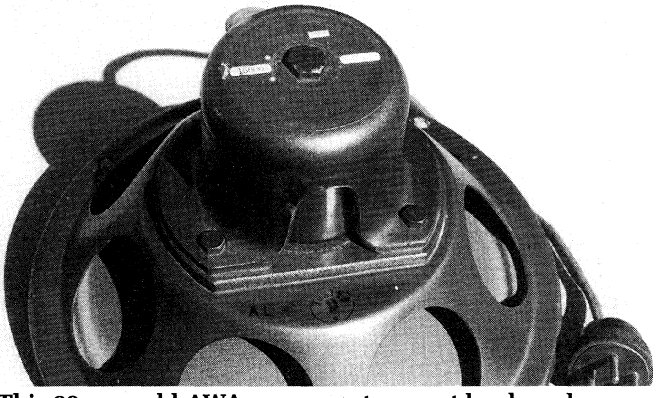
This problem was eventually solved by adding more capacitance to the padder capacitor and attaching a 7pF capacitor to the oscillator tuning gang. After some juggling with the padder adjustment and the oscillator trimmer, the dial tracked quite well, being less than 10kHz out at its worst point of error. In the circumstances, that was better than anticipated.

A good performer

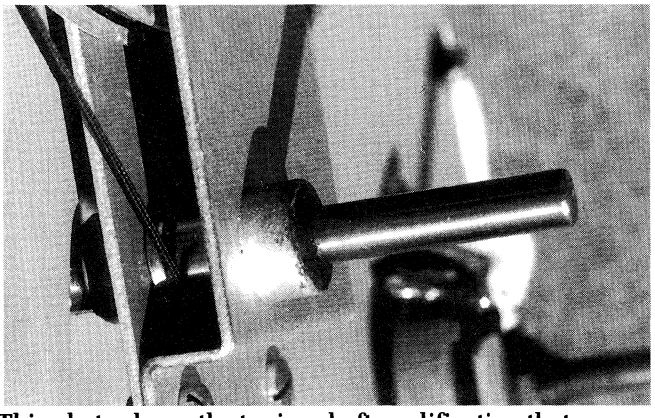
It was only after the alignment had been completed and the chassis fitted into its cabinet that I realised that this was a really good receiver. Its ability to pull in distant stations was excellent and a number of Tasmanian stations came in loud and clear. The rebuilt Radiola-cum-Airzone receiver performed very well indeed.

It is probable that the original aerial, oscillator and preselector bandpass coils, plus the 175kHz IF transformers, left something to be desired with the initial conversion. Using early 1930s coils and IF transformers is not the best way to go about building a radio receiver. The components from that era are nowhere near as efficient as those from the late 1930s and 1940s.

By replacing these parts, the general performance has been greatly improved, particularly at the high frequency end of the dial.



This 60-year old AWA permanent magnet loudspeaker looks identical to the electrodynamic version. It is not the one from the receiver but is kept as a spare. It is also handy for on-the-bench testing when the chassis is out of the cabinet.



This photo shows the tuning shaft modification that was used to convert the slipping friction drive mechanism to a less troublesome cord drive. Why such a modification should be criticised by some collectors is beyond the author's comprehension.

While far from original inside, the old Radiola receiver still retains its vintage appearance. Its current performance is far in excess of that delivered by the original design, thanks to a complete circuit revamp. The three controls (from left to right) are: volume, tuning and tone.

So once again the old Radiola has gone through a major transformation and the IF transformers on top of the chassis betray the extent of the modifications. But that's not a problem as far as I'm concerned because the alterations have been for the better. Upgrading to more modern coils and IF transformers has made a really big difference to the set's performance.

Little cost

In money terms, the initial outlay of $20 for the two battered receivers was not great and they have provided me with many hours of constructional pleasure. The cost of converting junk to an operational radio has been almost zero because all the necessary components were on hand.

Despite the various modifications and the replacement Airzone circuit, the reworked Radiola still looks an acceptable valve radio. Only vintage radio collectors familiar with that particular make and model would notice that the chassis is not what it really should be. **SC**