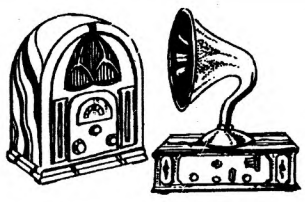
Vintage Radio

by PETER LANKSHEAR



The Vintage Serviceman...

Always a very popular feature of *Electronics Australia* and its precursors, the monthly Serviceman column has been published for more years than I care to remember. Today it concentrates mainly on TV and VCR topics, but in pre-television times there was just as keen an interest in radio servicing experiences. Recently, I was taken back in time with a series of diverse repair jobs that could well have been the subjects of a 'Serviceman Tells' column of a generation ago, and which I am sure will be of interest to vintage radio enthusiasts.

We had decided to take a holiday, in an overdue visit to my old home town, two or three days' travel away. Soon after we had given warning of our plans, we were informed that lined up were several favourite old radios, in need of some 'tender loving care' — so would I please come prepared. There are still plenty of valve radios in active service...

It looked as if I would not be short of something to do; but with a minimum of facilities and equipment, I was a bit dubious as to the chances of success. For one thing, replacement components could well be a problem. These days it is not always a matter of visiting the nearest electronics store for valve radio spares!

However, I packed up some tools, a digital multimeter, a range of capacitors and resistors and a selection of valve types that were, as best as I could recall, likely to be encountered. To aid my vintage eyesight as well, a jeweller's loupe was included!

Atwater Kent 246

First to be dealt with was a really classic receiver, my daughter's 1933 Atwater Kent model 246. The complaint was that it would go sometimes, but at other times it was completely dead.

Fortunately, I had come during one of its dormant spells, and a close look at the rear of the cabinet soon revealed the trouble. The filament of the 47 output pentode was not glowing, but gentle pressure on one side of the valve immediately brought it to life.

There were three likely causes of the problem. The socket could be faulty, there could be faulty soldering to a filament contact on the socket, or there could be a dry joint in a base pin of the 47. From previous experience and because it was easiest, I decided to try the valve first.

After the solder was melted out of the filament pins, a close inspection with my magnifying glass showed that the tip of one of the wires had never been tinned. In fact, it was black — a classic fault. Fortunately, it was possible to reach sufficient of the wire to scrape it clean enough to resolder. Had this not been successful, the base would have had to be completely removed and the leads all extended with fuse wire, and then the base glued back on before resoldering.

Internal fireworks

The second patient was a Columbus 90, a popular Radio Corporation of New Zealand model of the 1940's. With bandspread shortwave tuning, a negative feedback switched tone control, and generally a first class performer, it was RCNZ's 'top of the line' receiver for several years. The description of the symptoms was a bit vague, but within a few seconds of the receiver's being switched on, a loud rasping roar came from the 10" loudspeaker.

A quick look at the rear of the cabinet and the culprit was obvious. The 5Y3GT rectifier was filled with fireworks, and a bright lilac and blue glow. As someone once said, some of the vacuum in the valve must have leaked out! Fortunately, I had packed a replacement 5Y3GT, and within moments, the model 90 was performing with its intended vigour.

Familiar problem

Two down, and I had not even needed to take a chassis out of a cabinet!

The next call involved a complaint that

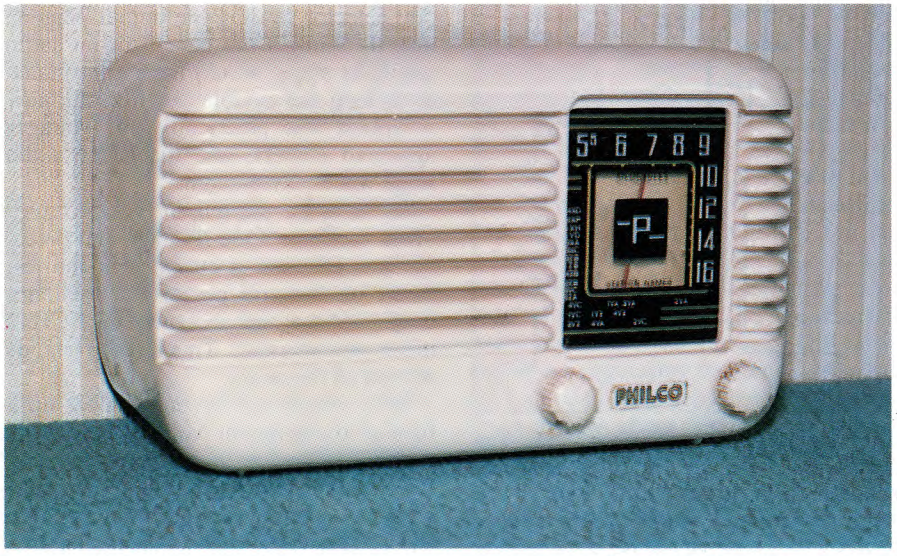


Fig.1: With only three Philips Noval valves plus rectifier, this little New Zealand made Philco receiver has a very basic circuit not unlike the 'Little General'. After 40 years of trouble-free service it developed a classic fault...

a medium sized Bakelite cased radio from Dominion Radio was locked on to one station and could not be shifted. This is a common enough problem and is usually the result of a broken dial cord, which can sometimes be a patience-testing exercise and usually entails installing a new cord.

A remarkable variety of 'do-it-yourself' efforts can be encountered in cord replacement, with string and monofilament fishing line being popular, and often with the wrong threading sequence. In fact, *real* dial cord is woven, rather than twisted or solid, and has become hard to find. However, modern *braided* fishing line of suitable diameter (available from large sports stores) is an effective replacement.

In this case, the word 'locked' meant just that. Nothing moved in the tuning department, and rather than spinning freely, the knob was very hard to turn. This time the chassis *had* to come out...

Once the chassis was out of the cabinet, the problem was apparent. The cord which towed the pointer along a metal rod was intact, but clearances were fairly tight and the original grease lubricating the rod and pulley wheels had mixed with the dust that inevitably gathers inside radios and had dried into a hard deposit — effectively blocking the pointer's travel. So the buildup was cleaned off, some sewing machine oil was run along the rod and on to the pulley spindles, restoring normal operation.

Too easy, so far!

The first three problems had been simple and straightforward, with owners suitably impressed by the rapid repairs; but Nemesis was about to strike...

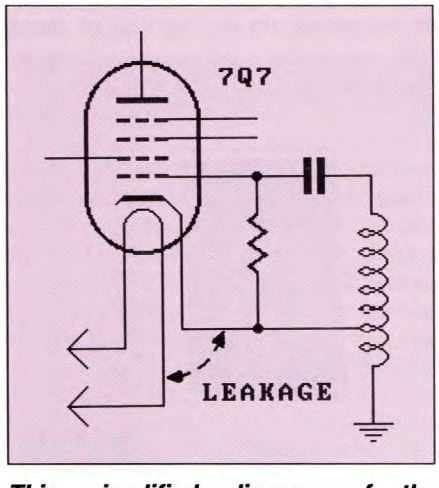
The next job, a large mantel Courier made by Radio (1936) Ltd, one of New Zealand's major manufacturers, proved to have a puzzling fault. A multiband model dating from the early 1950's, it has a mixture of eight-pin octal and loctal based valves.

The complaint was that sometimes when the receiver was first switched on it made a lot of noise, much as if it were tuned off a station. Sometimes this noise would persist, but often it would disappear after a short time. Needless to say, when *I* switched on the set, it behaved perfectly. There was nothing for it but to take it back to my son-in-law's workshop and set it up for some serious work.

Eventually, I managed to catch the elusive fault for about 10 seconds. The effect was a noisy background between stations, but the strange thing was that when a carrier was tuned in, there was a 50Hz modulation hum, sufficient to drown out the programme. As the volume control action was normal, the fault had to be in the RF/Mixer/IF sections.

Fig.2: The Bell 'Colt', which provided some headaches out of all proportion to its modern size and circuit. Colts surely hold the World's record for longevity as a production model. First produced in 1951, it was made during the following 20 years, and continued as a transistorised set until 1980! Australian readers may recognise the cabinet as having been used for the Airzone 458 of 1946.

I had completely overhauled this receiver a few years ago, so I felt that the fault was unlikely to be a capacitor. By reason of its only occurring during warmup, and the hum being 50Hz, it seemed very likely that the fault was heater-cathode leakage in a valve. In this receiver, RF bias is supplied by the AGC line and the cathodes of the valves are earthed. Usually, in such cases, heater-cathode leakage is often not significant — certainly not the overwhelming roar that this was creating.



This simplified diagram of the oscillator section of the Courier receiver illustrates how heater to cathode leakage could create severe hum by modulating the RF oscillations via the coil tap. Had the cathode been directly earthed the leakage could well have gone unnoticed.

This receiver has a heptode 7Q7 converter valve, an uncommon type that is in fact electrically identical to the more familiar 6SA7 and similar to the miniature 6BE6. As these valves have no oscillator anode, the cathode would not necessarily be directly earthed, but connected to a tap on the oscillator coil. It seemed likely that this was the way the leakage hum could be modulating the oscillator signal.

There was not much more I could do but to identify the 7Q7, so that it could be swapped for a good one that I would send when I returned home. I do not like having to leave 'cures' for intermittent faults unproven. Too often the brilliant 'diagnosis' turns out to be wrong, but it seems from subsequent reports that in this case we were lucky.

Final surprise

The final holiday 'surprise' was the small plastic-cased and New Zealand made Philco receiver shown in Fig.1. This had given 40 years of faithful service and I was assured that previously, it had never been serviced. The complaint was that it was 'very weak'.

I had not been warned of this job and had not brought with me any of the 'Rimlock' valves that it used. Australian readers will be unfamiliar with this series, which Philips introduced in 1950/51. They are similar to the standard Noval series, but with eight pins and a dimple on the side of the base which locks into the skirt of the socket.

This particular receiver is of the 'Little General' type, but with automatic gain control. The simple circuit, with the diode detector feeding the output pentode directly without the benefit of an audio amplifier stage, would have contributed to its long and trouble free life. But now reception was practically nil. Voltages appeared correct, and the EL41 audio stage was lively enough.

As far as I could tell, the EAF42 combined diode/pentode IF stage and detector was OK and a check with the test meter on the grid pin of the oscillator confirmed that *that* section of the ECH42 mixer was working. This left the hexode section of the mixer.

With visions of having to post up a further replacement valve, I was idly probing around with a screwdriver and touched the control grid pin of the mixer socket — creating a loud burst of noise. Clearly, the valve was not dead after all...

This pin is connected to the aerial tuning coil with about 30mm of plastic covered wire, and for no particular reason I

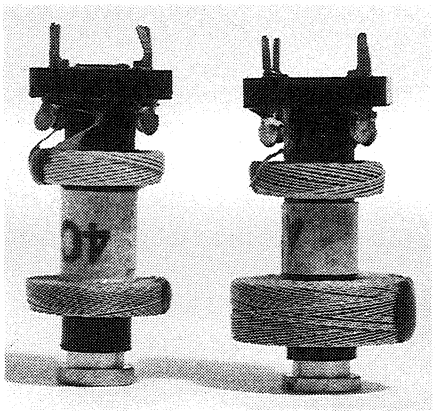


Fig.3: Matched aerial and RF amplifier coils. The upper tuned windings are of course identical, but the relative difference in size between the two lower untuned windings is clearly visible. The aerial coil is on the left. Swapping the two can seriously affect the performance of a receiver.

touched the coil end of this lead. There was no response! Taking care not to disturb anything, a check with test meter confirmed that there was no continuity between the coil and grid whatsoever!

Was the wire broken inside its insulation? A good tug on the lead showed the answer. It came away cleanly from the coil, without a trace of solder! A classic dry joint, it had taken all this time to reveal itself.

In this case I was fortunate in that the symptoms were sufficiently permanent for me to track the cause down. Similar faults — when intermittent — have ruined many a serviceman's reputation!

A welcome home

Of the five sets I had repaired, three had faulty valves, one had mechanical trouble and one had bad soldering. That there were no faulty capacitors or resistors involved can be ascribed to four of the receivers having had complete overhauls in recent years.

But the world does not stop for holidays, and when I finally arrived home, waiting for me was a Bell 'Colt', a little box of tricks that was to take far longer to fix than it should have and bring me back to earth with a jolt. A laconic note taped to the cabinet simply said 'NO GO'.

The Bell Colt probably holds the record for being the radio with the longest production period of all time, and there are plenty of them around. The circuit is simple and the components of good quality. Normally there is nothing easier to repair than a Colt. "No problem", I thought, "I'll fix this one in short order".

Common faults are an open-circuited speaker transformer, or resistors which have changed value. Sure enough, the 150k anode load resistor for the audio stage measured more than two megohms. This was soon replaced and while I was about it, I tested the valves which all checked out as being quite healthy. With the power turned back on I confidently sat back, waiting for a response.

The audio amplifier was certainly working now, but there was still no reception. So much for my quick repair job! The problem appeared to be in the mixer or IF stage, but the voltages were correct. There were no open circuited windings and the oscillator was working.

It was then I noticed something that I had previously missed. The wax that seals the IF transformer tuning slugs had been disturbed. Each of the four cores had been attacked and damaged, apparently with a steel screwdriver. The correct tool for these particular cores is a hexagonal plastic alignment tool.

Two of the slugs were still serviceable when reversed, but I had to replace one transformer whose former had been cracked. It is not uncommon to find that screwdriver adjusted trimmers have been screwed up tight, but to remove wax seals to get at ferrite slugs requires quite a lot of determination...

As long as there have been radios, there have been people who attack preset adjustments in an attempt to 'fix' faults. They are closely related to car owners who 'tune up' an ailing vehicle without any real knowledge of what they are doing. At best they incur for themselves extra labour costs; sometimes, as in the present case, real damage is done.

With the transformers repaired and replaced, IF realignment was straightforward, and there was some reception; but the stations were in the wrong places. By now I was prepared for anything, and sure enough, I found that the oscillator coil slug had been tweaked. Fortunately, the padder in these sets is fixed, eliminating one variable. Even so, it took quite a while to get the oscillator tracking correctly, especially as the tuning capacitor trimmers had also been 'adjusted'!

It seemed that mercifully, due to access to its slug being obscured by wiring, the aerial coil had escaped attention. However, although by now the set was operating well enough at the top half of the broadcast band, the sensitivity below about 1MHz was below normal. I rechecked the alignment, but the tracking was correct. Was there *still* something amiss?

By now I was getting frustrated with the 'simple' job, and while I sat glowering at the chassis, and the aerial coil in particular, I realised that the primary winding didn't look quite right — it seemed to be too big.

Different primaries

To simplify tracking with random external aerials, and to equalise gain over the tuning range, it has been common practice to fit both aerial and RF amplifier broadcast band coils with primary windings which are resonant at a frequency a little below 500kHz. However, as aerials provide additional capacitance, aerial coil primaries have a lower inductance than their companion RF coils. The difference can be clearly seen in Fig.4. Could it be that this receiver had the wrong type of coil? Surely not — but with this particular set, anything was becoming possible.

That was the problem. A replacement aerial coil restored performance to normal. It would seem that somehow, somewhere, possibly in the factory, the wrong type of coil had been installed. Who knows, maybe the damage to the receiver was the result of attempts to remedy the poor performance. I never did find out.

Simple sets can sometimes have obscure faults!

A mystery set

Finally, this month, I have a request for information. Readers will recall that in the October 1991 Vintage Radio column, we described the Philips 'Tin Trunk' type 2510 receiver. Recently an equivalent battery version has come to light. Called a 1411, it appears to be original, but is a mystery as none of the available catalogs refer to it.

If any reader has one or knows of one, I would be grateful to hear from them care of *EA*. ❖