Vintage Radio

By RODNEY CHAMPNESS, VK3UG

The AWA B79 transistor mantel

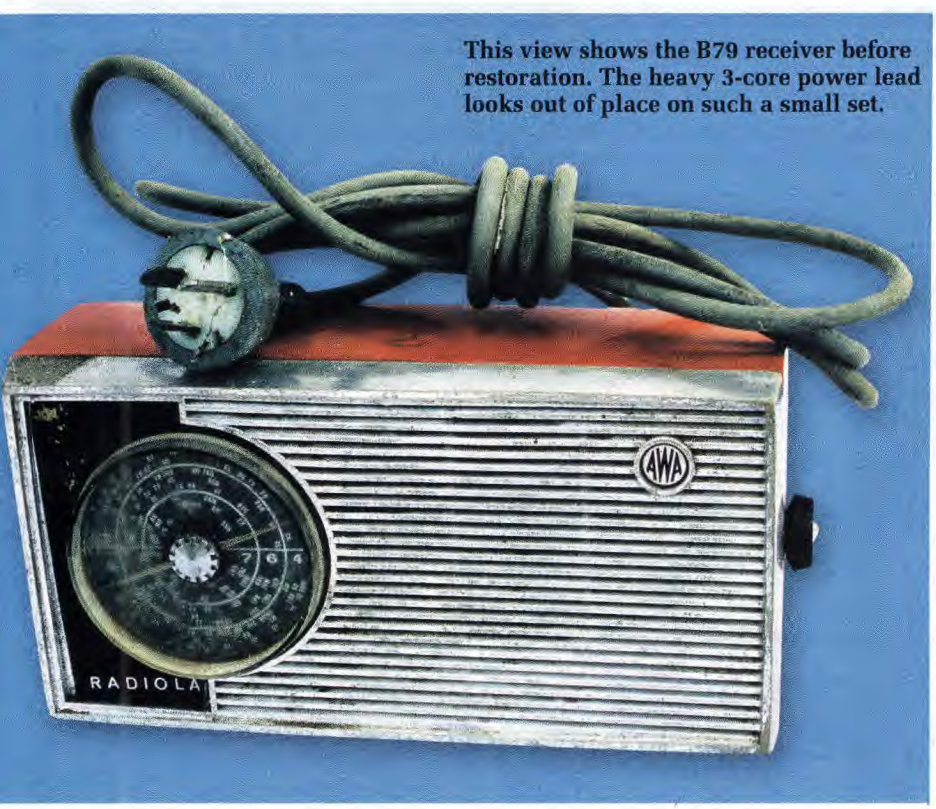
Most Australian-made transistor radios from the 1960s and 1970s ran on batteries. Not so the AWA B79 – it ran on mains power so that it could operate for long periods as a mantel receiver. It's an interesting unit that was let down by manufacturing compromises.

During the 1960s and 70s, valve mantel radio receivers gradually gave way to transistorised portables. Unfortunately, many of these new receivers were quite hard on batteries and so were relatively expensive to operate in the house as a kitchen mantel receiver.

As a result, manufacturers such as AWA decided to adapt some of their transistor portables and produce models that were mains-operated. So which model AWA portable was the B79 AC mantel set's twin? I'm not sure.

The AWA B79

The B79 is a small 7-transistor unit with a compact power supply and a relatively heavy 2.6-metre 3-core power lead. I've owned this unit for some time but as with many other pieces of equipment, I had to grab it when I could and put it aside until I could find time to restore it.



This view shows the B79 receiver before restoration. The heavy 3-core power lead looks out of place on such a small set.

The set isn't particularly eye-catching in appearance, its importance being its place as part of our radio heritage. In fact, a relatively small portable (for that is what it is) sporting a 3-core mains power lead seems rather incongruous.

The cabinet in this example is made from red plastic and a quick examination soon reveals where the battery would have fitted in the portable version. There would have been enough space for a 2362 9V battery but its life would have been quite limited, since this battery is quite small. As a result, the portable version would have been expensive to run if used as a mantel receiver.

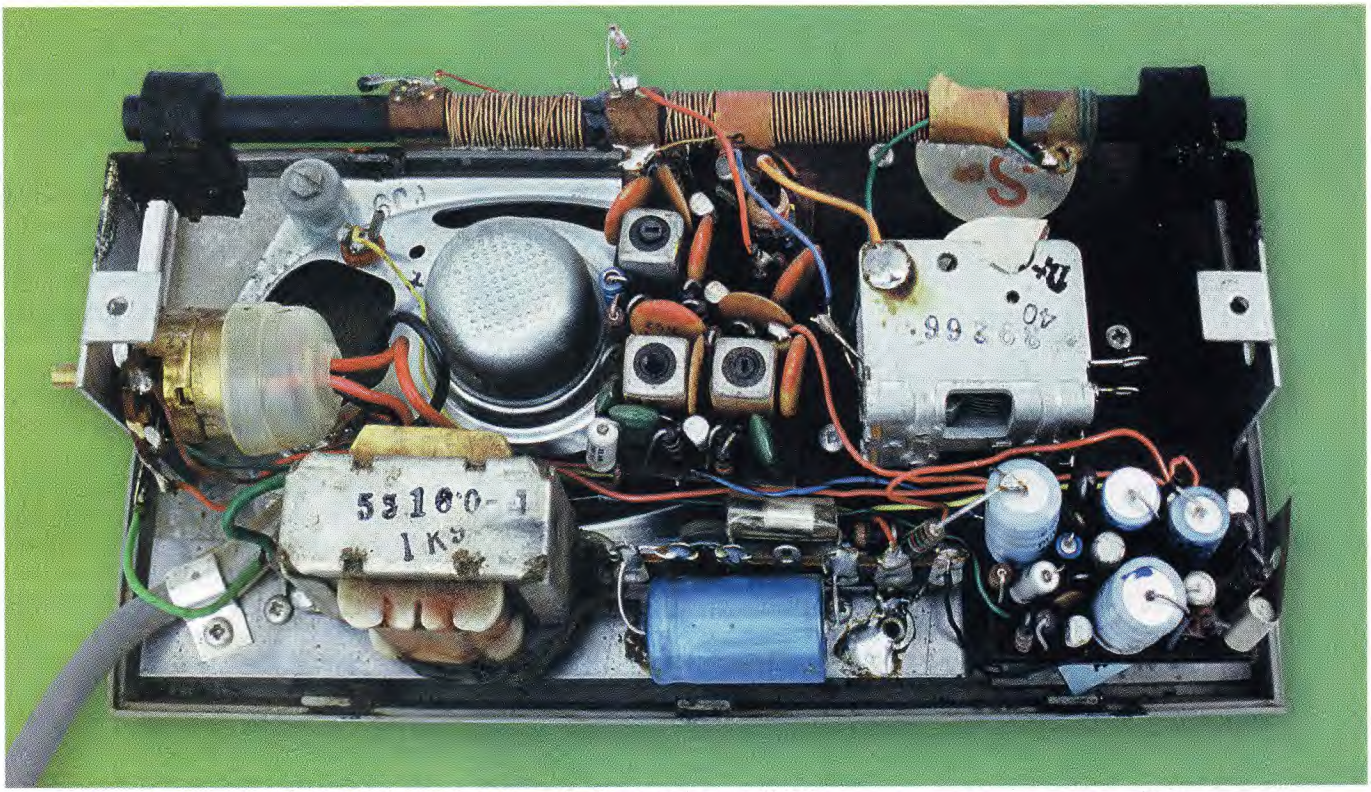
The quality of the cabinet and particularly the "chromed" escutcheon is of only fair quality. Over this set's life, the "chrome" has worn away in a number of places, revealing the yellowish colour of the plastic under the "chrome" finish.

Although the set can be cleaned up and made to look reasonable, "re-chroming" the front just isn't on. As a result, the set still looks a bit "worse for the wear", even after restoration.

Broken loop-stick

The first problem with this set was that the loop-stick antenna had broken in half. Obviously, the set had been dropped at some stage, causing this rather brittle component to break. There was no other damage to any other parts though.

A set won't work at all well with a broken loop-stick and this meant that it had to be repaired, as replacements for many of these units are simply no



Most of the circuitry inside the B79 receiver is packed onto two small PC boards. The ferrite loop-stick had broken in half and was repaired by gluing it back together using Araldite®.

longer available. If it's a clean break, the job it relatively easy – just glue the two sections together using Araldite® and the rod will be nearly as good as new. The only thing required may be a slight adjustment of the antenna coil on the rod.

The next problem was that the brackets supporting the loop-stick antenna had nearly rusted through. As a result, I gave them a spray with Inox® contact cleaner/lubricant to prevent any further deterioration. Unfortunately, that wasn't enough and the brackets quickly fell to pieces as soon I started to work on the receiver.

This problem was easily fixed. I have quite a good collection of plastic cable clamps, so I rummaged through my supply until I found a couple that were the right size. These were then used to hold the loop-stick securely in place.

Don't make the mistake of using metal clamps for this job. If you do, they will act as short circuits as far as the tuned circuit is concerned and the efficiency of the antenna will be severely compromised.

Internal layout

Most sections of the receiver are built on two small boards – one for the audio and the other for the radio frequency (RF) and intermediate frequency (IF) sections. Apart from AWA, quite a few other manufacturers also tried this modular approach, with Philips probably making more sets along these lines than anyone else.

The idea, apparently, was that a faulty module could be replaced, without having to track down (and fix) individual components. However, the cost of the replacement modules was usually too high to do this and service technicians were used to replacing individual components anyway. That said, replacing individual components would not have been easy, as they were packed tightly together (see photo).

The power supply is installed where the battery would have been fitted. It is a simple little half-wave unit with a nominal output of 9V, depending on the setting of the volume control.

Circuit checks

Once the loop-stick antenna had been fixed, the PC boards were carefully inspected for possible faults but this revealed no further problems. Plugging the set in and switching on soon told a different story, however – there was no audible output.

This problem was quickly solved. Moving the RF/IF board caused the sound to cut in and out intermittently, after which the fault was quickly traced to a broken track in one corner of the board.

This broken track was basically caused by a manufacturing fault. As a cheap way of mounting the RF/IF board, an untrimmed resistor pigtail in one corner was fed through a hole in the underlying phenolic mounting board (not the PC board). This lead was then bent so that it ran along the underside of this board, after which it was secured with contact adhesive.

Fairly obviously, the other corner of the board was meant to be secured in the same way but the pigtail on

Photo Gallery: Keogh TRF Receiver

Manufactured in 1928, this Keogh 3-valve TRF receiver was produced by a small Australian manufacturer. It was fitted with three A609 (or equivalent) valves and was battery powered – 6V filament, -4.5V bias and 90V HT. Unusually, the cabinet was made of wood but was painted to appear like the metal cabinets that were more common during that era. Because of its low power output, the set would have mostly been used with headphones. Photo: Historical Radio Society of Australia, Inc.

that resistor had been bent out of the way. As a result, the job had never been completed and this meant that the board could "flop around", eventually breaking the track around the resistor lead.

The track was easily repaired by soldering a 15mm-length of tinned copper wire along it – see photo. This is a fairly common technique for repairing tracks on PC boards.

Alignment

With the set now running reasonably well, it was time to check the tuning range. This immediately revealed a problem when the tuning gang was fully meshed, the set being tuned to 500kHz instead 525kHz as it should have been. This was fixed by screwing the oscillator coil slug out until 525kHz was tuned in.

I then went to the other end of the tuning range and found that the oscillator was tuning to 1800kHz, so I screwed the oscillator frequency trimmer in to bring it down to 1750kHz. This allows the set to tune all the new services in the range from 1602-1701kHz. (Note: the 1750kHz range allowed the set to tune to University of Adelaide station 5UV, which is marked on the dial. It has long gone from that frequency allocation.)

The next step was to check how successful the loopstick antenna repair had been. The small coil at the end of the loopstick (near the green wire) was glued in position and couldn't be shifted, so I tried adding extra turns of wire to get the inductance right. I went from three turns to eight turns and ended up back at three turns as the optimum number, with the turns spread slightly.

This was done by tuning to a weak station at the low-frequency end and moving the turns along the loop-stick with a small screwdriver to obtain the best performance. Once that had been achieved, they were glued into position using epoxy resin.

The high-frequency end of the dial was optimised by adjusting the antenna trimmer. The performance was now quite good. I also checked the IF alignment but it appeared to be spot on so it was left alone.

Actually, the performance of this little receiver is quite good, even inside a metal garage, and I was able to tune a number of Melbourne stations from my location in northern Victoria. The set has no provision for an external antenna and for suburban use the set performs well without one.

That said, this appears to be one of the few simpler transistor sets (ones without an RF stage) that will work with an external antenna/earth system. As an experiment, I wound a few turns of thin hook-up wire onto the ferrite rod and connected one end to my outdoors antenna and the other to the earth. The performance improved noticeably, with little in the way of "hiss" generated by the receiver on weaker stations.

Connecting an antenna and earth to a transistor receiver in this manner often causes it to pick up all sorts of shortwave stations, as well as the sought-after stations on the broadcast band. This is due to a problem with the local oscillator. What happens is that the oscillator generates numerous harmonics in addition to the intended signal and, due to poor front-end selectivity, short-wave signals are easily fed to the converter.

Wonky dial

Poor quality control is again evident with the dial scale assembly. The paper dial scale is not only glued in the wrong position but is also crinkled. As a result, the handspan plastic tuning wheel has worn away a section of the dial scale where it has been rubbing.

Unfortunately, there's little I can do about this except get another set with a good dial scale and replace the front of the set. In the meantime, I've cleaned the handspan tuning wheel and the dial scale as best I can.

Low-level hum problem

By now, I was quite pleased with the set's performance except that its hum

level was greater than I would have liked at full volume and off station. Suspecting a fault, I began by checking the electrolytic capacitors but they all appeared to be in good condition.

In fact, I doubt that I can do much about the hum without a lot of experimentation, as the low-level audio leads run right up against the power transformer windings. I tried lengthening the audio leads and dressing them away from the transformer but there was no noticeable improvement.

The only thing that did make an improvement was to increase the value of the first electrolytic capacitor from 1000µF to 2200µF, so I have left it at that. Even so, a hifi enthusiast would not be impressed with the hum level and neither am I. A bridge rectifier in the power supply in lieu of the single diode that was used would certainly have made the hum less obvious but it looks as though AWA had tried to keep the manufacturing cost as low as possible.

Having said all that, the hum is hardly noticeable when the set is tuned to any reasonable station at "normal" volume.

Transistor functions

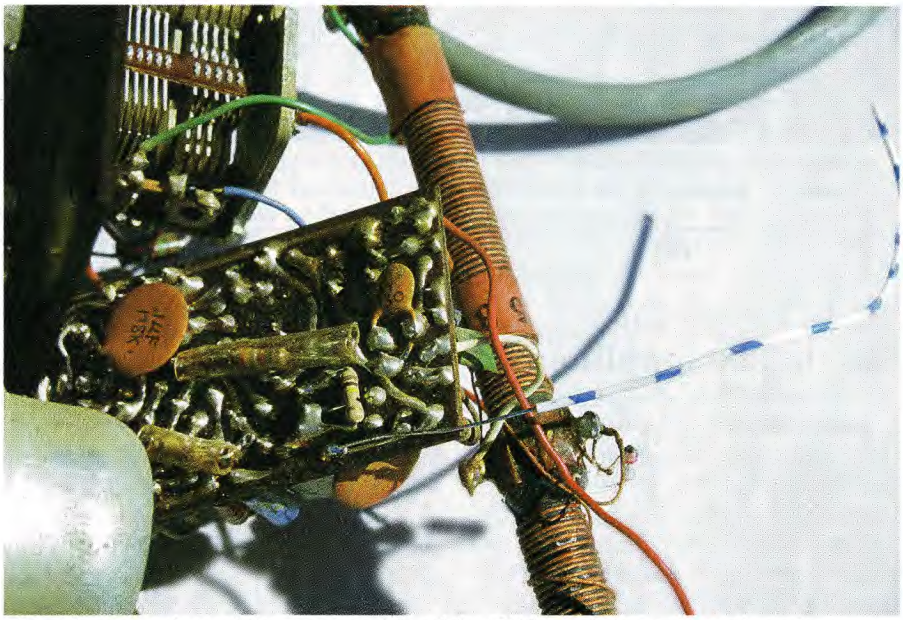
Unfortunately, I haven't been able to find a circuit for this set in my collection. However, it would almost certainly follow the style used in many other AWA sets of the same era.

The receiver comes with a small stick-on label (which had fallen off) inside the cabinet, which shows the physical layout plus the semiconductor complement. The transistors used consist of an AS300 as the autodyne converter, an AS300 as the first intermediate frequency (IF) amplifier and an AS302 as the second IF. An OA91 diode is used as the detector, while the audio amplifier stage consists of a 2N408, an AS311, an AS313 and an AS128.

Finally, in the RF section there are additional OA91 and OA95 diodes which assist with the AGC operation and prevent input overload.

Summary

The B79 is quite a reasonable performer – better, in fact, than many of the same vintage. However, AWA could have improved the power supply by using a full-wave bridge rectifier instead of a half-wave design. This would have given a worthwhile reduction in hum and the extra cost would have been minimal.



This close-up view of the copper side of the RF board shows how tinned copper wire being was used to repair a break in one of the tracks (blue/white wire).

The plastic cabinet back has proved to be of good quality, with virtually no discoloration. By contrast, the plating over the plastic front of the receiver is poor and has either worn away or has become pitted. Another problem area is the dial-scale, which is just a piece of heavy paper with the stations and brand name printed on it. As stated, it wasn't fitted correctly on this particular unit and, as a result, has been damaged by the handspan tuning wheel.

Although many of these carelessly assembled parts and low-quality items have been repaired to some extent, the set still doesn't look as good as it should. Perhaps it was a symptom of the deterioration in quality control as radio receiver manufacturing ceased in this country.

So what was potentially quite a good little set has, in my opinion, been spoilt by lack of quality control. **SC**

The B79 still looks a bit "worse for the wear", even after restoration. Note the poor condition of the metallised plating on the front of the set and the badly fitted dial scale.