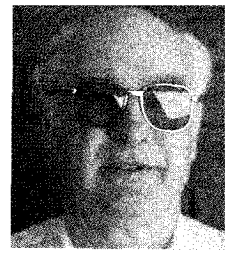
VINTAGE RADIO

By RODNEY CHAMPNESS, VK3UG



The magnificent 7-banders from AWA

If ever there was a particular range that stood out in the AWA stable it was the 7-band radios of the 1940s and early 1950s. There were quite a few different models produced and they came in three cabinet formats – table, console and radiogram. They were powered by batteries (2V, 135V and sometimes a bias battery) or via a vibrator (6V) or from 240VAC.

Prior to WWII, people were becoming quite keen on shortwave radio listening. People loved to hear Bradman making a century at Lords and shortwave radio was the only way to hear the tests in England. There was a proliferation of shortwave transmitting stations and the signals were definitely better than in the early 30s. Gone also were the difficult to handle sets of the early 30s, which didn't have very good performance at the best of times, particularly on shortwave.

Radio receiving principles had become mature by the late 1930s. The superheterodyne receiving principle using purpose-designed converter valves, such as the 6A7 and later types, overcame most of the problems experienced with the autodyne converter system.

There were also quite a few good radio frequency (RF) pentodes such as the 6D6 and its successors. These valves in particular made the task of designing a set capable of good RF performance so much easier than it had been in the past. Also, the problems with detectors and audio stages had been solved several years beforehand with the advent of good, indirectly heated valves.

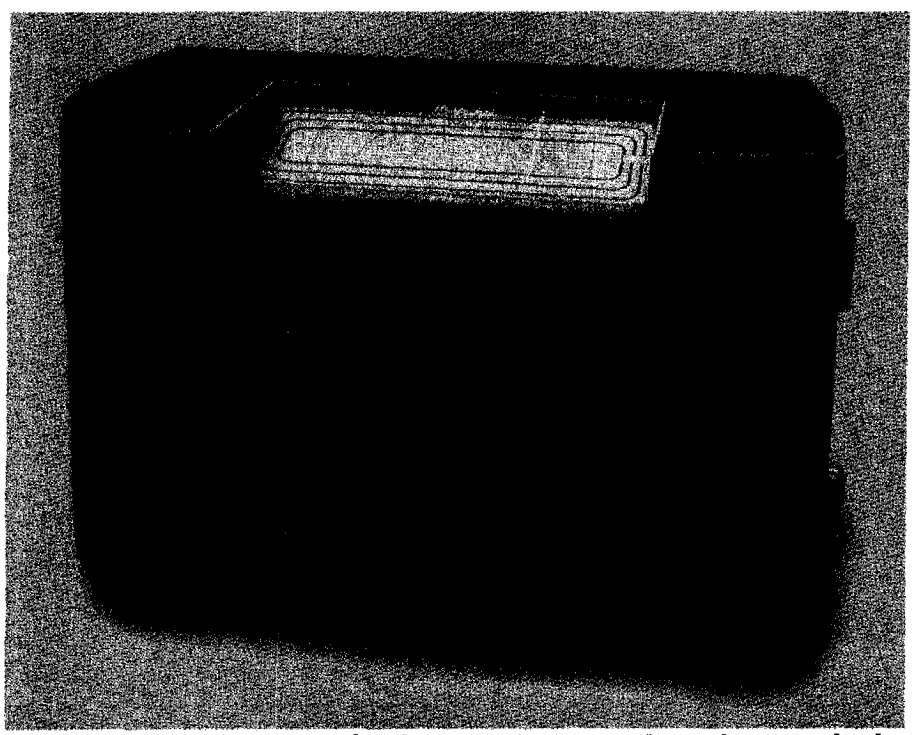
Service information on the first 7-banders appeared in the 1940/41 Australian Official Radio Service (AORS) Manual. It is strange that the first ones appeared during the war when domestic radio production was severely restricted. Probably they had been designed before the war and were already in production when war was declared.

By the time the 7-banders came onto the market octal valves had largely replaced the pre-octal valves, even though many of them were the same valves with a different base.

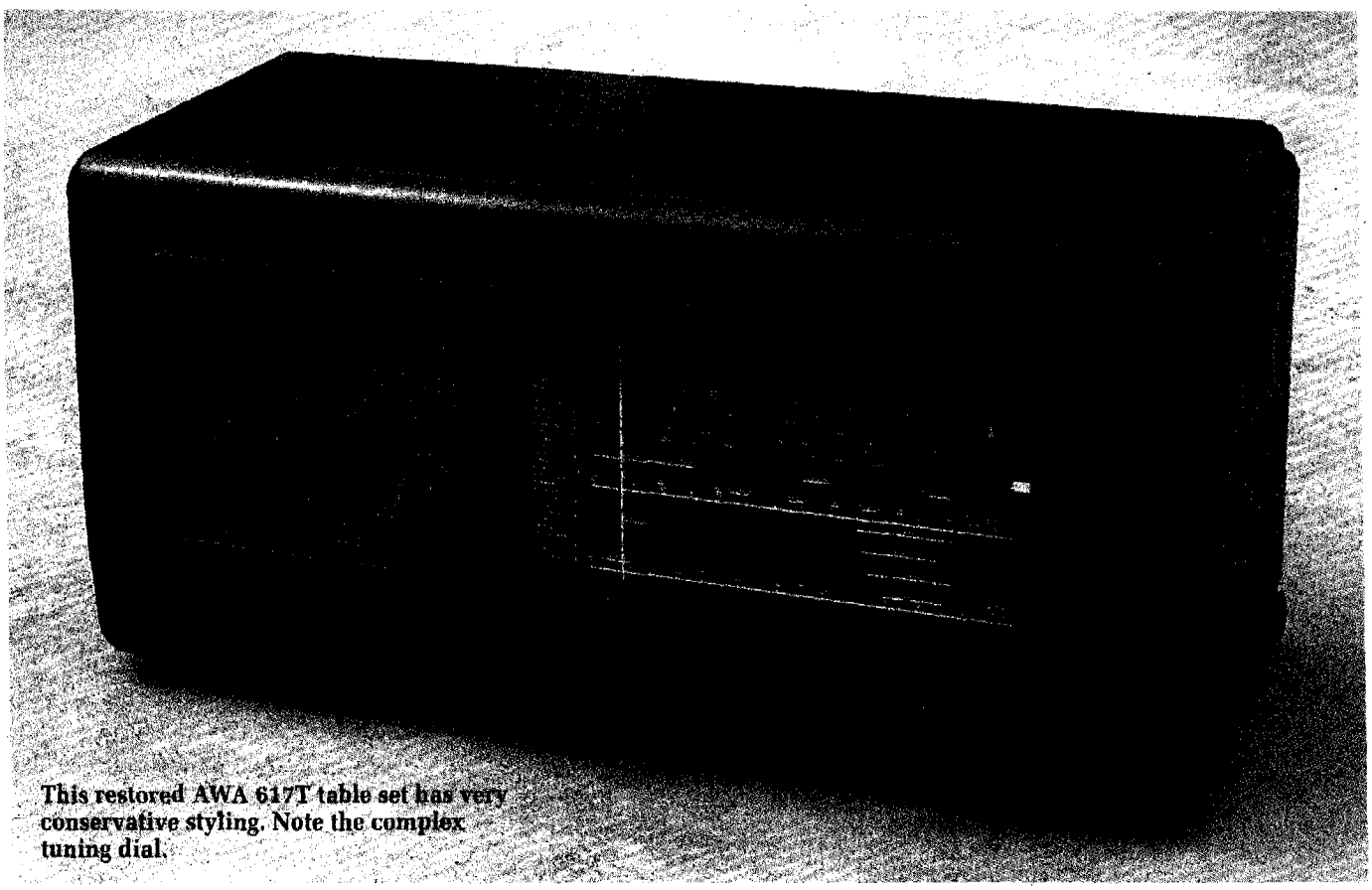
So what was it that caused these sets to really stand out from the crowd?

First, they had attractive but conservative timber cabinets, not tizzy like some other manufacturers' products. The cabinets were well made and strong. And there was a choice of table sets, consoles and, ultimately, radiograms, all of which looked the part.

Second, they were quite sensitive, having a tuned RF stage. Although RF stages had always been desirable in receivers intended for long-range reception, they were not always included due to the extra cost. Where



This is an early example of a 7-band AWA mains-powered set. The tuning knob is on the side of the cabinet.



This restored AWA 617T table set has very conservative styling. Note the complex tuning dial.

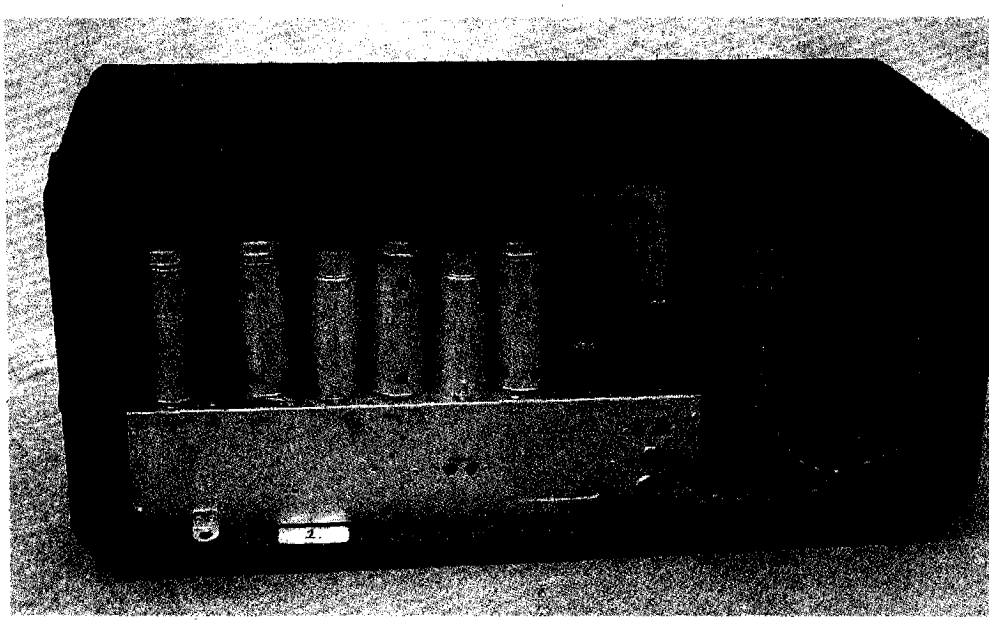
multi-band operation was required, the extra cost was considerable. These sets would certainly not have been cheap.

Third, they covered all frequencies from 540 kilohertz (kHz) to 22.3 megahertz (MHz). This feature was uncommon on other brands. This meant that these sets were in demand as monitoring receivers for the HF communications were used by rural fire brigades. A variety of frequencies were used – eg, during the 1960s, frequencies ranging from 2160kHz to 3158kHz were employed by the Emergency Fire Services of South Australia.

Other states may have used slightly different frequencies, with Victoria using a frequency as high as 3848kHz for fire front use. A few years earlier higher frequencies were used – around the six megahertz area. People in the outback could also listen to various Flying Doctor radio stations which used frequencies from 1600kHz to around 8830kHz. In addition, they could eavesdrop on other HF radio networks.

European migrants bought these sets too, so that they could hear broadcasts from home in their own language. I am led to believe that the remote opal mining town of Coober Pedy in outback South Australia had a large number of these sets. They really needed a receiver much better than the norm. The nearest AM broadcast stations (540kHz to 1600kHz) were many hundreds of kilometres away and the shortwave radio stations that migrants listened to were thousands of kilometres away.

Sets such as these also caused many people (like me) to become interested in amateur radio, as I could hear amateurs on the various radio bands. Amateurs in the 40s, 50s and 60s operated on AM or Morse code, and the voice transmissions were easily picked up on these radios. In fact, some of these



This is the rear view of the restored model 617T table set shown at the top of the page. It features extensive shielding of the valves and IF stages.

This captioned 617C set will be an impressive set when the cabinet is refinished.

Rear view of the unrestored 617C chassis. Note the 12-inch electrodynamic speaker and its associated transformer.

receivers were still being used in this way into the late 1980s.

Band-spread tuning

Finally, the four highest frequency bands had the deluxe feature of band-spread tuning which made picking up remote stations so much easier. Conventional dual-wave receivers tuned from 6MHz to 18MHz in one go, a total of 12MHz, whereas the biggest frequency sweep with the seven banders is 6.1MHz on the third band which tunes from 3.6MHz to 9.7MHz. On the highest frequency band, the tuning range is 17.7MHz to 22.3MHz, a sweep of just 4.7MHz.

The dial tuning mechanism has a reasonable reduction drive and a large tuning knob. So it is a good receiver to tune, even on the highest frequency band. All in all, they were (and are) a pleasing set to use.

Common characteristics

AWA had a real winner and cashed in on the desires of listeners in the 1940s and 1950s. While the AC models were probably much more popular than the battery and vibrator models, the latter would have been keenly sought in remote locations. And while the battery and vibrator models may have been a little less sensitive, the opportunity to put up a larger antenna in remote areas would have more than compensated.

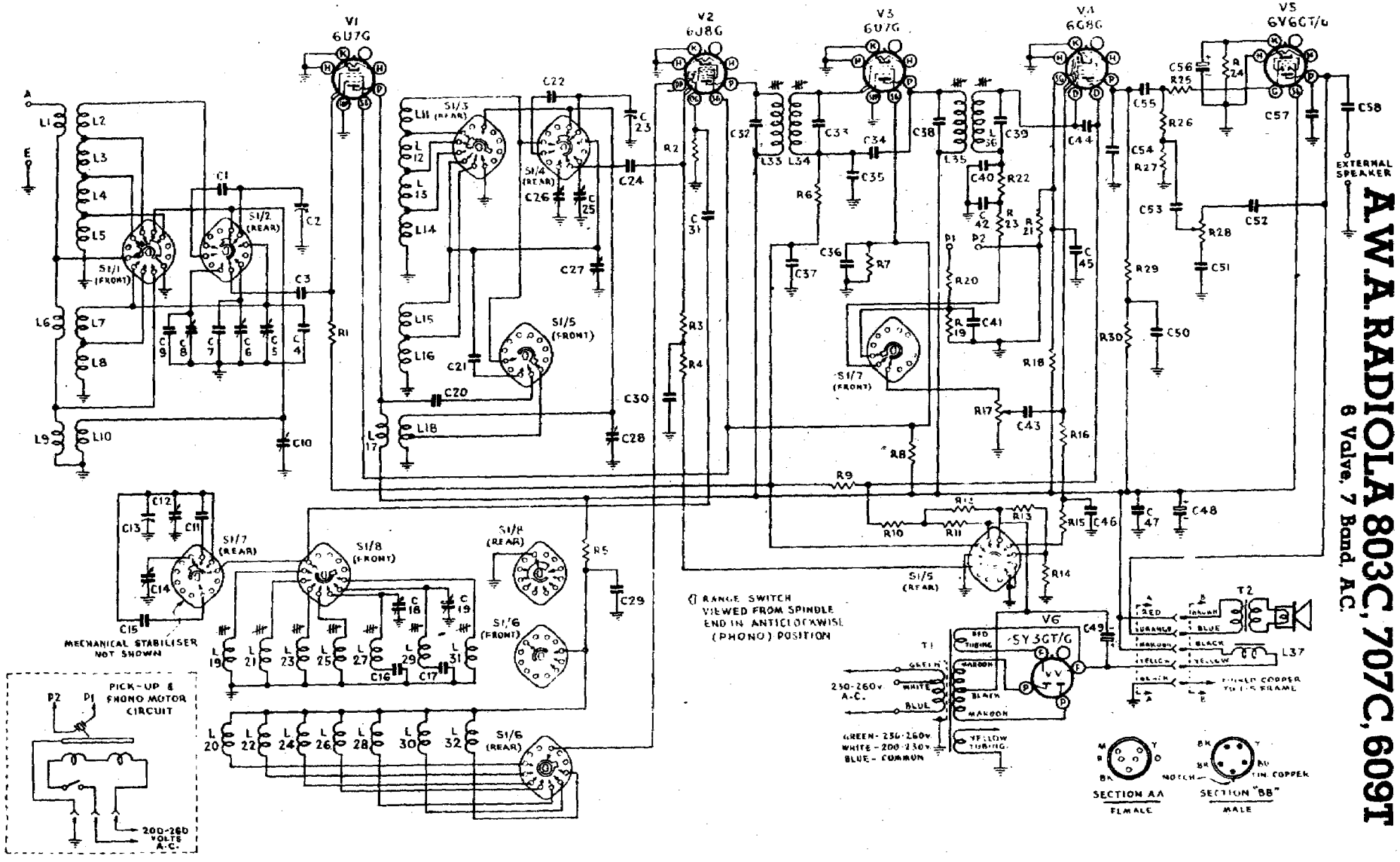
All models had about the same tuning range, although the exact coverage on each band did vary a little.

Cabinet styles varied over the time that this marque was produced, as can be seen from the photos. I even saw one table model in an antique shop with a leather covering over the timber.

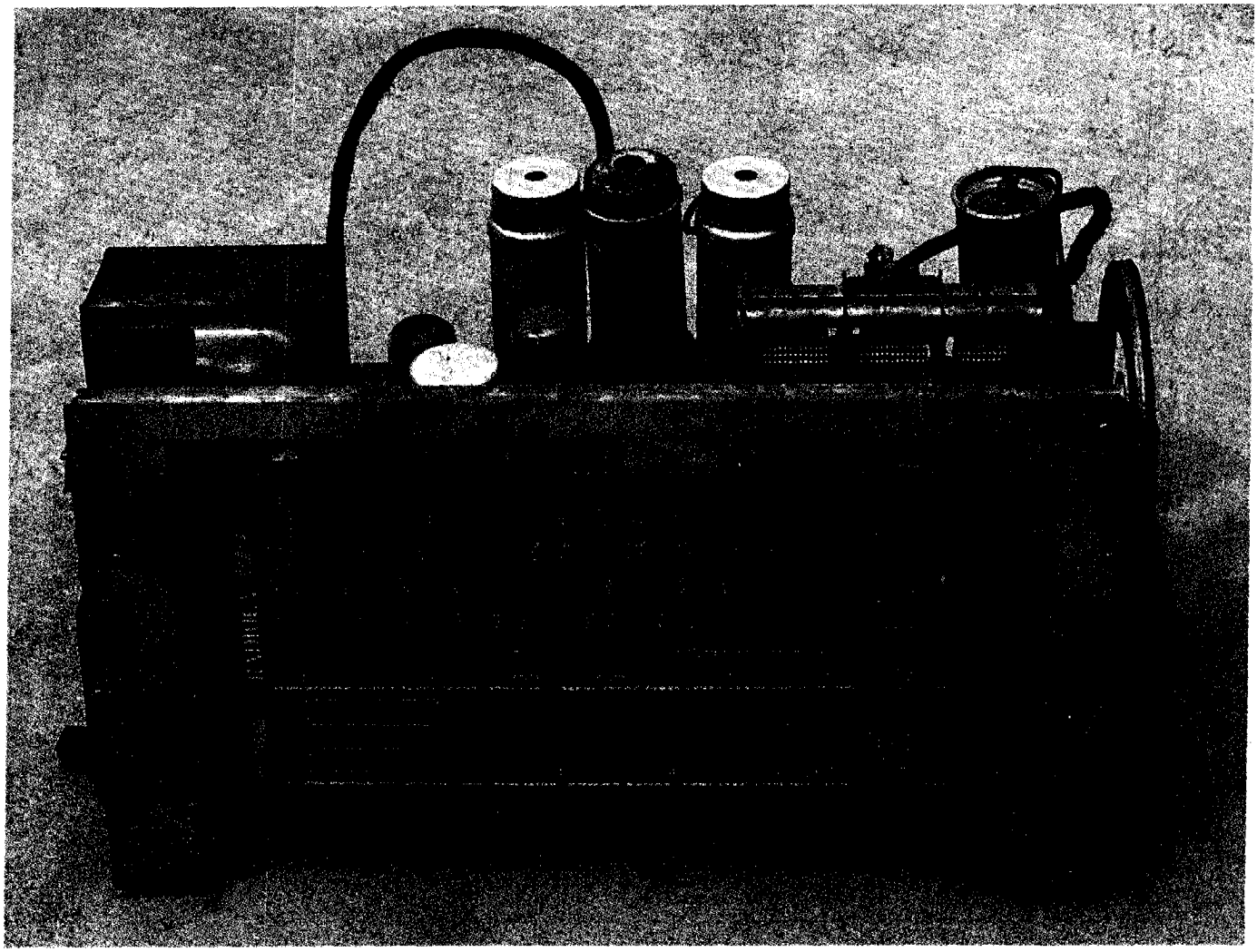
Alignment difficulties

The dial mechanism is a bit of a monster, with the dial being attached to the cabinet. The band-change mechanism is connected directly to the switch but the band indicator is on the dial scale and is connected via a cord and spring mechanism to the band-switch.

AWA recognised the difficulty of aligning the tuned circuits in the sets with the dial scale floating around and devised a method of aligning them with the dial scale removed. A pointer is positioned over the edge of the dial drum which has a scale from 0-180°



The AWA 7-banders were deluxe sets with band-spread tuning and an RF stage. Some models even had push-pull 6V6GTs in the audio output stage.



This is the front view of an unrestored 805GZ radiogram chassis. Note the rather elaborate tuning dial.

around one half of the periphery. The alignment details describe how to set the dial drum at a particular degree mark and then adjust a designated coil, etc.

The alignment details are not in the AORS manuals, with the exception of volume six (1947) which has sufficient data so that the job can be done on all models. There are 19 adjustments in the aerial, RF and oscillator circuits. This is not an alignment task to be undertaken lightly unless you have the instruments and knowledge to do it all. It is a laborious task too.

The intermediate frequency (IF) is 455kHz. Because of the RF stage, image problems are not severe, even on the higher frequencies.

Battery and vibrator models

The battery and vibrator models were basically the same. In a number of instances, the only difference was whether a vibrator power supply or a battery cable was plugged into the set.

The first models had a valve lineup as follows: 1D5G RF; 1C7G converter; 1D5G IF; 1K7G detector and first audio; 1H4G audio driver and 1J6G class-B push-pull audio output. The 1J6G is capable of giving 2W of audio out so even as a battery set it was capable of impressive performance.

In the table models, a 7-inch speaker was used which would have been quite effective. However, the 12-inch speaker in the console models, which had a decent baffle, would have been even more impressive.

On batteries, the receivers used a 2V wet cell for the valve filaments and three series-connected 45V batteries which gave 135V. Bias was obtained for individual stages by tapping a 9V bias battery in the earliest sets. Some later units only required a 4.5V bias battery.

One or two models were vibrator only and due to the way that the filaments were arranged in series across the 6V battery, it was possible to do away with the bias battery altogether. Most battery/vibrator models were 6-valve sets and used the 1J6G as the audio output.

A few sets used the more conventional 1940s arrangement and had a 1M5G RF, 1C7G converter, 1M5G IF and 1K7G detector and first audio, followed by a 1L5G audio output. Certainly, this would not have had as much audio sting as the 1J6G but the current drain would have been less and the audio would have still been quite adequate.

The AC models

The RF sections of the AC models are virtually identical, with only small variations. The audio stages are different, depending on whether the particular set was a table, console or radiogram model. The table units were 6-valve sets using a 6U7G RF, 6J8GA converter, 6U7G IF, 6G8G detector and first audio and 6V6G audio output.

Console models used the above valve line-up but I am not sure if in some instances they had a push-pull pair of 6V6G valves in the audio output. The radiograms certainly did use a more elaborate audio circuit. A typical valve complement was a 6SQ7GT as the detector and first audio, followed by 6SJ7G phase splitter and push-pull 6V6G valves in the audio output.

Some models had a tuning-eye indicator (6U5/6G5) which was mounted behind a hole in the dial back-plate.

The table and console models have the chassis mounted horizontally, in the conventional manner. The dial scale (pointer) moves horizontally across the dial, with station and frequency markings at right angles to the scale, as is also conventional.

Mechanically, the radiogram chassis dial mechanism is mounted in the same way as the table and console models. However, because the chassis is mounted so that one end of it is towards the user (as if mounted vertically), the scale "appears" to move vertically. Because of the way the chassis is mounted, the dial markings are printed in the same plane as the scale so that they can be read.

Technical details

While there is an oscillator coil and suitable adjustments for each frequency range, the same does not happen with the aerial and RF coils. If every range had a core and a trimmer for each coil, there would be six adjustments. For seven bands that would be 42 adjustments.

As there are only 19 adjustments, you can assume that some compromises have been made. The complexity of the receiver in this area can be seen in the circuit accompanying this article.

There were compromises in the design and some tuned circuits are not tuned for optimum performance. However, any tuning inadequacy is compensated for by brute force amplification, with six valves instead of the normal five. It's not a method I particularly like but it works.

As mentioned earlier, it is a complex job aligning the tuned circuits so I'd suggest leaving them alone unless you really know what you are doing. Someone that you know may be able to assist by aligning the set for you if you feel it is necessary. On the other hand, the IF stage is quite conventional and can easily be aligned.

In my 617T, I found that the audio output had noticeable distortion. To overcome this, I modified the audio output stage slightly. On the speaker, I earthed the bare wire from the voice coil to the frame. The negative lead of C56 was lifted off earth and a wire connected to it and run to the insulated wire on the voice coil. A small connector was placed near the speaker plug.

This improved the audio quality noticeably. It can always be put back to standard if need be.

It seems to me to have been a mistake that some form of negative feedback had not been incorporated in such a quality receiver.

Technical restoration

The components in these receivers appear to remain in good order after many years of use. Although the AWA black "moulded mud" paper capacitors are considered unreliable, I've found them to be fairly reliable if there are no cracks in the moulding. I still replace any critical ones such as AGC bypasses, the audio interstage coupling capacitor, the output valve plate capacitor to earth and RF bypasses on the HT line.

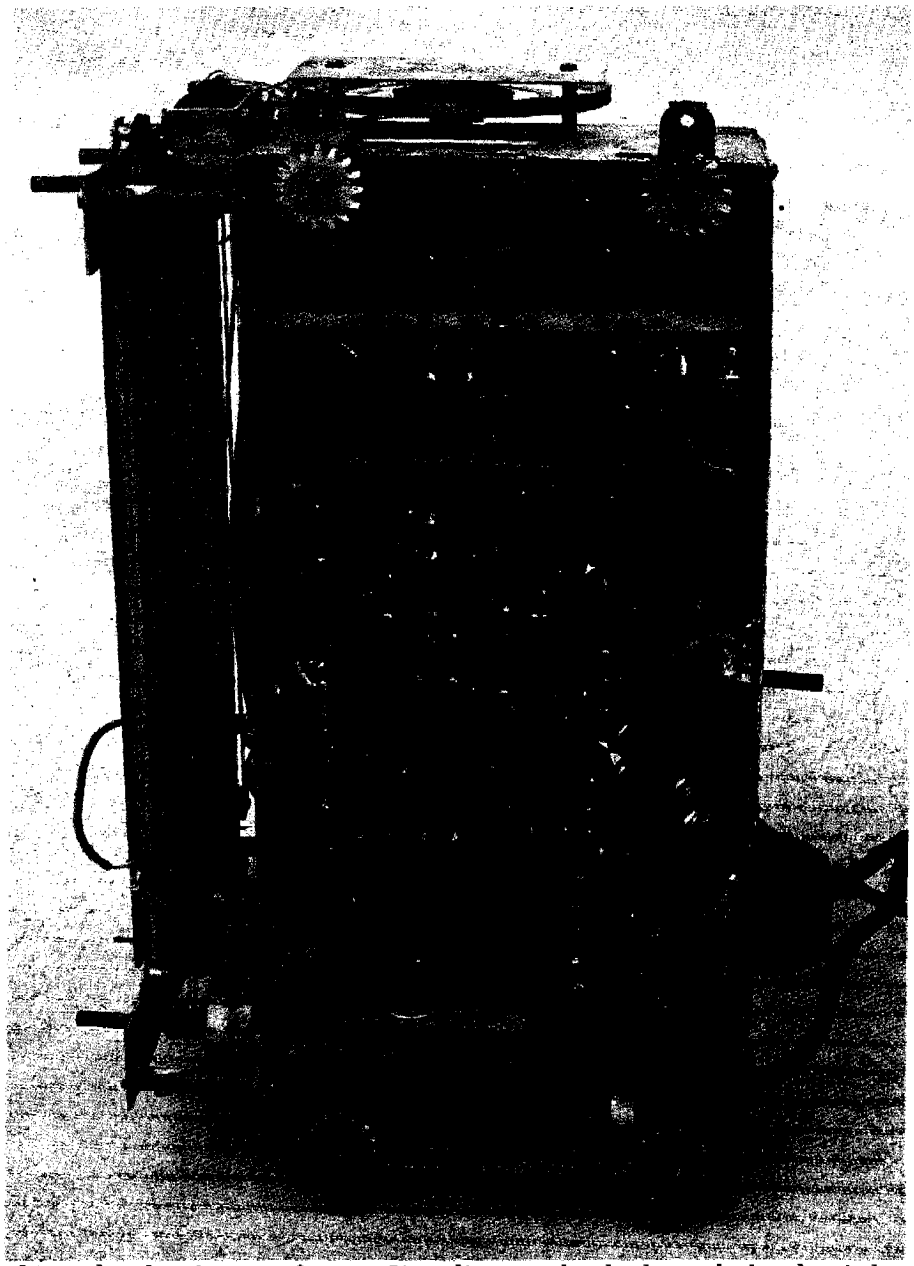
The main area where you hope to avoid replacing components is around the coil and band-switch assembly. If you do, fine needle-nose pliers will be essential. The electrolytics should also be checked, although a surprising number of these are still in good order in my experience.

The valves should be checked by replacement if possible. Only rarely do I need to replace valves, averaging around one valve per radio restored.

Summary

The AWA 7-banders were a significant series of battery, vibrator and AC receivers. They were designed to give the best performance possible over a wide tuning range. They looked good, performed well and were easy to operate. They filled an important niche in the market and some of these sets are in use even today rather than just on display as ornaments.

They are not particularly common as not everyone could afford one, as they would have been at the top end of the market. However, because of the calibre of the sets, it is likely that a



This under chassis view of an 805GZ radiogram clearly shows the band-switch details. Note the modification with the old speaker field coil (bottom of chassis).

greater percentage of the production run has survived compared to more common receivers.

They are not an easy set to service or to align. A complete service would have been quite expensive. The audio quality could have been improved with a slight modification to provide negative feedback. And although I am critical of the lack of tuned circuit adjustments, this does not seem to compromise the operation.

AWA deemed that these sets had their day and didn't produce any new models after 1950. However, the 617T appears to have been produced up until at least 1952.

In 1953, AWA produced a scaled down version in the 1548MA. This is a 5-band 6-valve (including tuning eye) receiver. It has the same tuning range as the earlier receivers but has no RF stage. Also, it has the noisy 6BE6 converter so I believe it would not be anywhere near as good as the earlier sets.

Hotpoint-Bandmaster also sold these sets, rebadged with their name. Overall, there were around 45 separate models with either AWA or Hotpoint-Bandmaster name badges.

These are a very collectible series of receivers. My 617T is permanently on display. It is also used as our entertainment receiver on broadcast and shortwave bands. **SC**