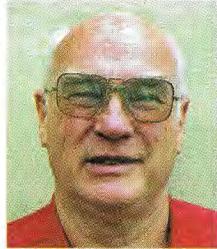


# VINTAGE RADIO

By RODNEY CHAMPNESS, VK3UG



## The AWA R154 Battery Console

**Intended for use in country areas without mains power, the AWA R154 battery console was first sold in 1935. It operated from three different battery types and there were no less than 11 battery leads to hook up to the chassis.**

Back in April 2001, I wrote about Keith Lang, an enthusiastic vintage radio collector in Western Australia. Recently, I had a chance to renew our association during a trip to the west in late 2002.

Keith has many fine examples from the bygone era of Australian-made radios. I asked him which set was his favourite, to which he replied: "I have no particular favourite but my favourites are the Australian made sets".

### The AWA R154

One of Keith's favourites is an the

AWA R154 console that takes pride of place in the lounge room. This set (and the re-badged Bandmaster 365B version) appeared on the market in 1935. It had an RF stage and as such, was intended to operate in remote country areas.

The R154 and sets like it used a 2V lead acid accumulator (A supply), three 45V batteries (B supply), a 9V tapped bias battery and a 4.5V bias battery (C supply). It was a bit of a nightmare connecting all the batteries into circuit, as in this case there were 11 leads. Thankfully, they were all

labelled (see photo).

For the unwary owner, there was the ever likely chance of connecting the leads incorrectly, with the possibility of burning the valve filaments out. The 2V cell (battery) was charged as necessary by the mechanic at the local garage, while the B and C batteries were simply replaced when they went flat. In practice, the 2V cell had to be recharged several times before it became necessary to replace the B and C batteries.

In fact, the C batteries often lasted their shelf life, as negligible current was drawn from them in most receivers.

### No mains power

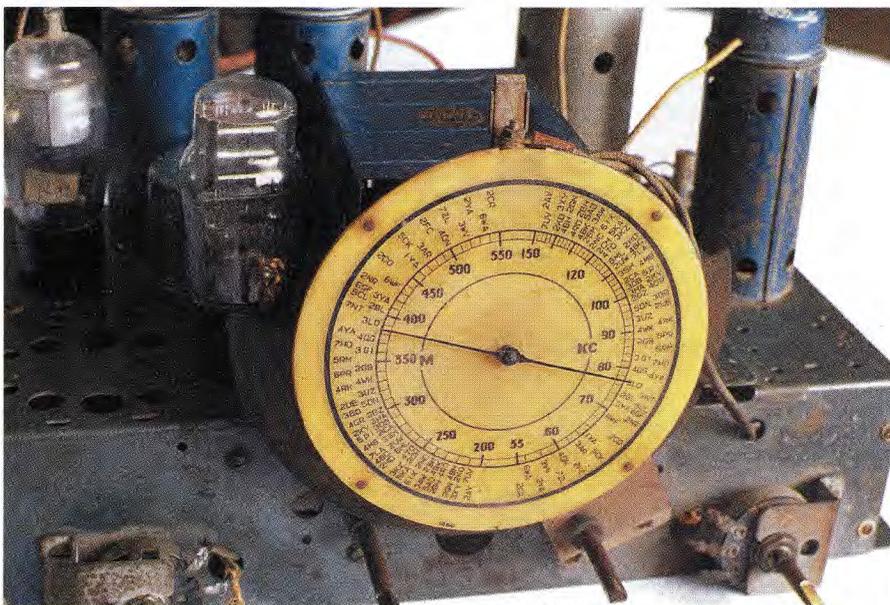
Not many farming communities had access to the 240V AC mains supply back in 1935. This meant that, once outside the perimeter of the townships, you were very much on your own when it came to providing electrical power. The "well to do" often had their own power supplies which usually took the form of a 32V lighting plant. However, most farmers couldn't afford that luxury, hence the use of battery receivers.

For example, my parents lived about 4km from the nearest town with 240V AC power. This meant that, in 1948, when they replaced their "Wimmera" console (similar in power requirements to the AWA R154), they chose a 6V HMV vibrator receiver.

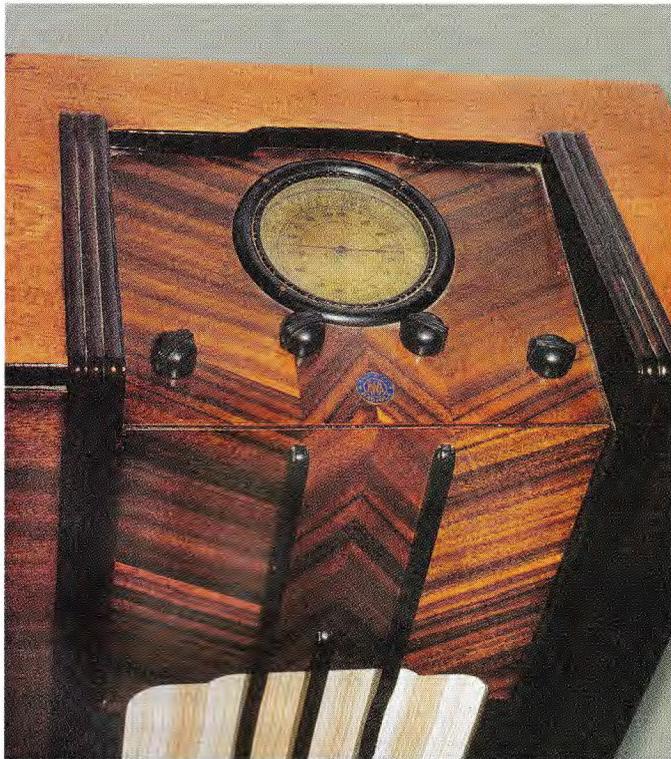
In fact, my parents relied on kerosene lights until they installed a 32V lighting plant in 1949. But even at that stage, not many 32V sets were available and most people either relied on battery sets such as the R154 or the later vibrator powered sets.

### R154 circuit details

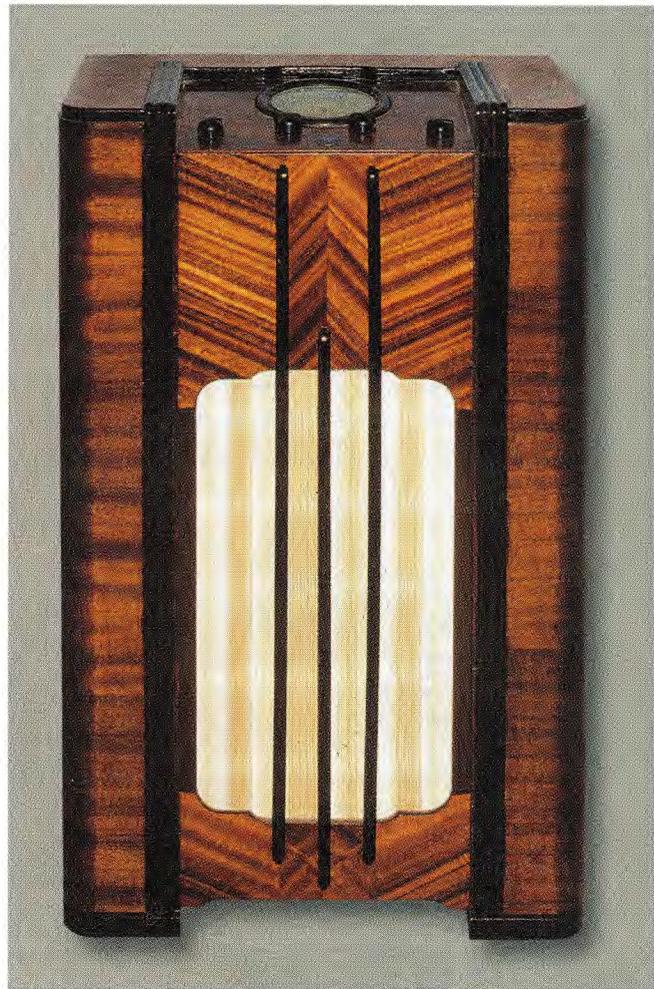
Fig.1 shows the circuit of the R154



The AWA R154 receiver featured a large round dial mechanism. It not only indicated the tuned station but also the tuned frequency (in kilocycles) and the wavelength (in metres).



**Above:** the top of the set carried the controls and dial scale. The set is a good performer and is well worth restoring.



**Right:** this photo shows Keith's fully restored AWA R154 console. This particular unit has been converted to mains operation, to avoid battery hassles (see text).

– it is quite conventional with one or two unusual quirks.

For example, the tuning gang is mounted on rubber insulation which isolates it from the chassis. This is necessary because the gang is nominally at -4.5V with respect to the chassis (this is the bias applied to the two 34 valves). AWA did this with a few of their sets but the reason for this and its advantage, if any, is unknown.

The various stages within the receiver have the appropriate voltages applied to them via taps on the battery supplies. There is very little in the way of decoupling between stages but the receiver is stable in its operation just the same. That so little decoupling was used is an indication of the relatively low gain of individual stages. In addition, the battery supply itself was used as a decoupling medium.

### RF stage

The input stage is a conventional tuned radio frequency (RF) stage using a 34 valve, followed by a 1A6 as a

converter. It covers the tuning range from 550-1500kHz, as can be seen on the dial scale.

The intermediate frequency (IF) stage operates on 175kHz and uses another 34 as the amplifier. The IF output is then fed to a 30 triode which is used as a diode detector. Its output is applied to volume control R4 and from there to a 32 which functions as the first audio amplifier stage. This is then followed by a 33 audio output stage, which gives about 0.5W of output – quite adequate with an 8-inch loudspeaker mounted on a substantial baffle board. A tone control (R9) is included between the 32 and the 33.

The purpose of R2 across the volume control is not clear at first glance. Usually, the C battery positive goes directly to chassis as happens with the bias battery (a). However, this set has two bias batteries and the second one (b) applies -4.5V to the front end of the receiver as a standing bias via R2 and R4.

In operation, the detector develops a negative voltage across R3 and R4

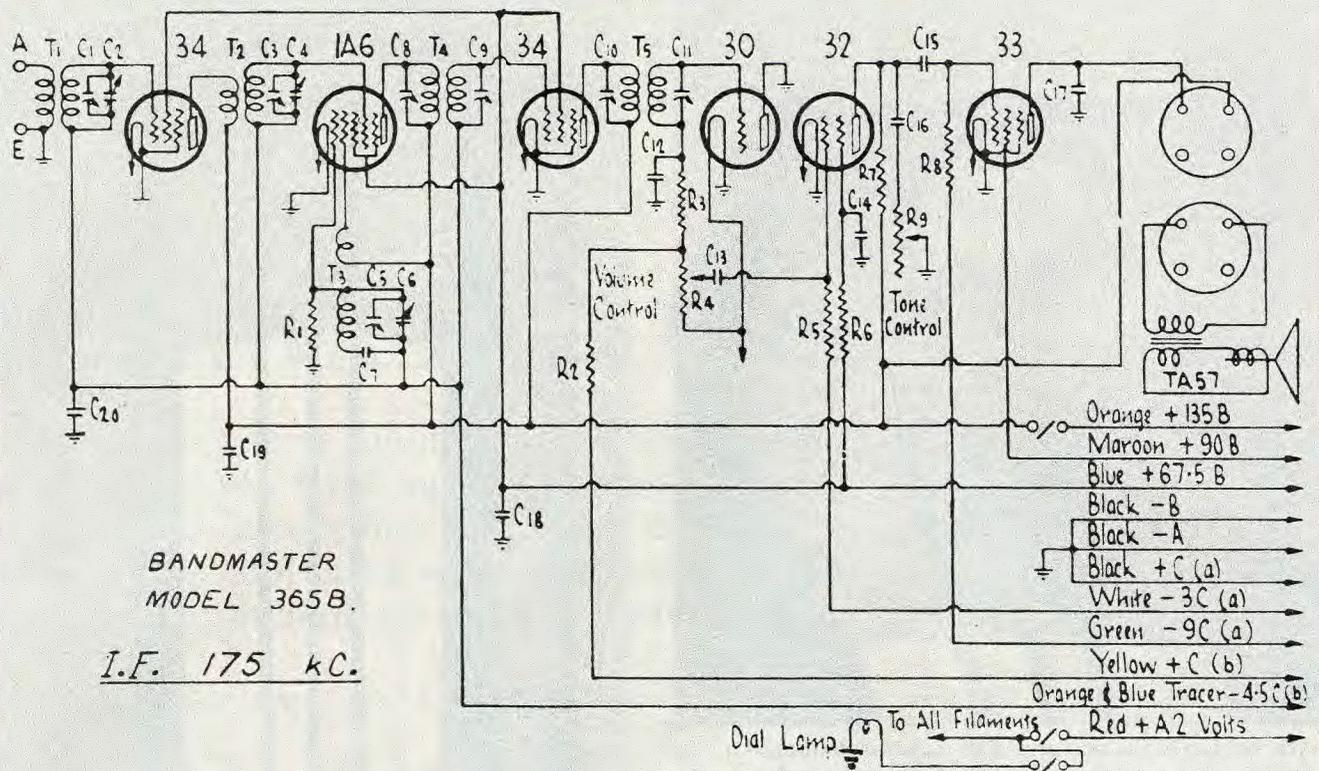
that increases with the signal strength. This voltage is effectively in series with the bias voltage and so the RF and IF valves have their amplification controlled via the automatic gain control (AGC) circuit.

Apparently, designers hadn't solved the problem of minimising the number of batteries and tappings on the batteries at that stage. As mentioned earlier, there are 11 battery leads in this set – a recipe for disaster in the hands of non-technical users.

### Restoring the R154

There's no risk of the chassis falling out of the cabinet in this set – it's secured in place using 6mm-diameter bolts! Before removing the chassis, it's first necessary to remove the knobs, the various battery cables and then the chassis mounting bolts.

Because the chassis is mounted almost vertically, removing the last bolt (or refitting the first bolt) can be rather difficult. The way around this is to lay the set on its front on a blanket. That way, the chassis will remain in place



## "Bandmaster" Battery Operated Broadcast Console Model 365B

Fig.1: the circuit diagram for the Bandmaster 365B is the same as for the AWA R154. The set used six valves: a 34 RF stage, 1A6 converter, 34 IF amplifier, 30 detector, 32 first audio stage and a 33 audio output stage.



This rear view of the chassis shows some of the non-original valve shields that had to be pressed into service to complete the restoration.

when the last bolt is removed and it can then be lifted out.

Keith found that the antenna coil had been destroyed by lightning and so it had to be replaced. The original one was unavailable, so a midget Q-Plus car radio type was fitted inside the original coil can. The set works very well with a short antenna.

The 1A6 converter was also faulty but its replacement wouldn't work either. As a result, Keith decided to replace it with a 1C6, which worked reliably. According to Keith, the 1A6 was always an unreliable valve and the 1C6 was designed to replace it.

Some of the valve shields were also missing and the correct ones were unavailable, so it was necessary to use whatever would fit. These will be replaced further down the track if the correct shields can be obtained.

Another job involved the loud-speaker which had quite a few holes in its cone - presumably due to silverfish. These were repaired by sticking medical paper tape over each hole or tear, then gluing from the back with

## Photo Gallery: Goblin Model CR Mantel Radio



Introduced in 1947 as the "Time Spot", this unusual 5-valve 3-band radio featured an 8-inch Plessey speaker and a clock-timer unit (lefthand dial). The set is actually a Goblin Model CR and was made by the British Vacuum Cleaner Company (England). It was obviously intended for export to Australia, as the dial scale is embossed with Australian stations.

The clock setting was activated by a shaft at the rear and by a large-diameter thumb-wheel on the front (between the two round dials). A similar wheel was used for the volume control, a peephole in the dial scale showing the setting.

This particular unit has been fully restored by its owner, Maxwell Johnson, Kingston, Tasmania. (Photo: Ross Johnson).

water-based craft glue.

Unfortunately, the silverfish had also attacked the outer rim of the cone. This damage was fixed using pieces of tissue paper which was covered with glue and rolled into shape around the outer rim of the cone.

The speaker baffle was also replaced but had not been finished at the time of writing. The baffle should be matt black in colour and a variety of finishes can be used here – either matt black paint in a pressure pack, or black boot polish or even good old-fashioned stove polish (eg, Busy Bee and other brands).

### Cabinet restoration

The cabinet needed some attention too. Keith has not had good results with paint stripper and prefers to re-

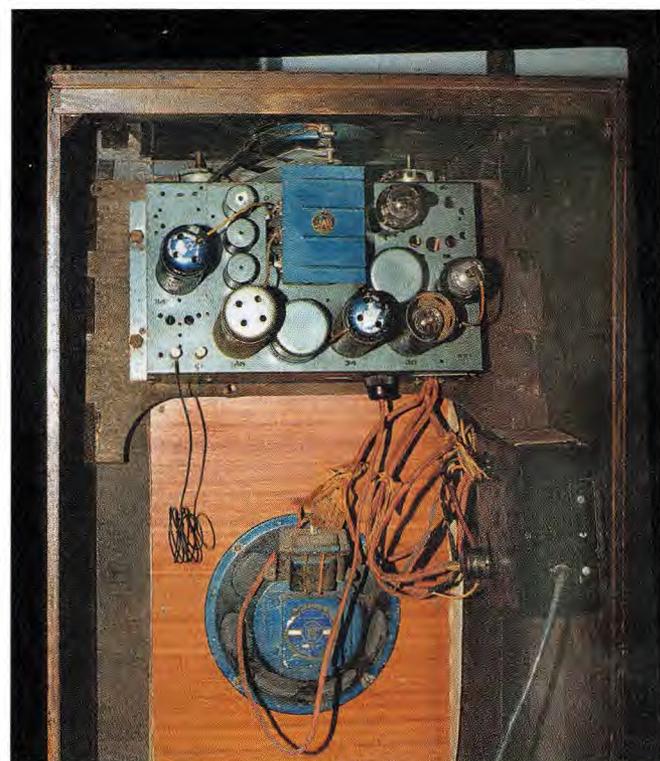
move the old finish mechanically using a sharp paint scraper and a sander. You have to be careful when doing this though, otherwise the thin veneer will be sanded through.

Once the sanding had been completed, black Watty Craftsman traditional interior wood stain was used to highlight the edges (as had originally been done). The cabinet was then sprayed with clear lacquer to get the fine finish apparent in the photographs.

Unfortunately, the set came without knobs so Keith fitted some general-purpose AWA knobs which should be similar to the originals.

### Alignment

The alignment of the receiver was accomplished without any problems.



The chassis was mounted vertically in the cabinet, above the baffle (not the original) and the loudspeaker. Note the bunched battery leads and the added AC power supply (in the black box on the righthand side).

The plate tuning trimmer in each IF transformer is at 135V with respect to the chassis, so care was needed to make sure that no short circuits occurred during the alignment procedure.

By the way, this set is generally easy to restore, particularly underneath the chassis. Everything is well spread out and there isn't a lot underneath the chassis anyway. If only this was true of other vintage radio receivers – some of them can be quite difficult when it comes to gaining access to various parts.

Like many sets of the era, a large terminal board was used in this receiver. The components are mounted in bulk on this board which is then mounted and wired into the receiver. Unfortunately, some of the components are mounted under the board, which is fine until service work is required.

The leads running under these boards usually have to be carefully traced, as they don't always go where expected. Unfortunately, the wiring in older sets was often run using just one colour, which made lead tracing more difficult.

That said, only a few components

had been replaced over the life of the set and none in recent times. It says a lot for the reliability of most of the components.

### 240V AC operation

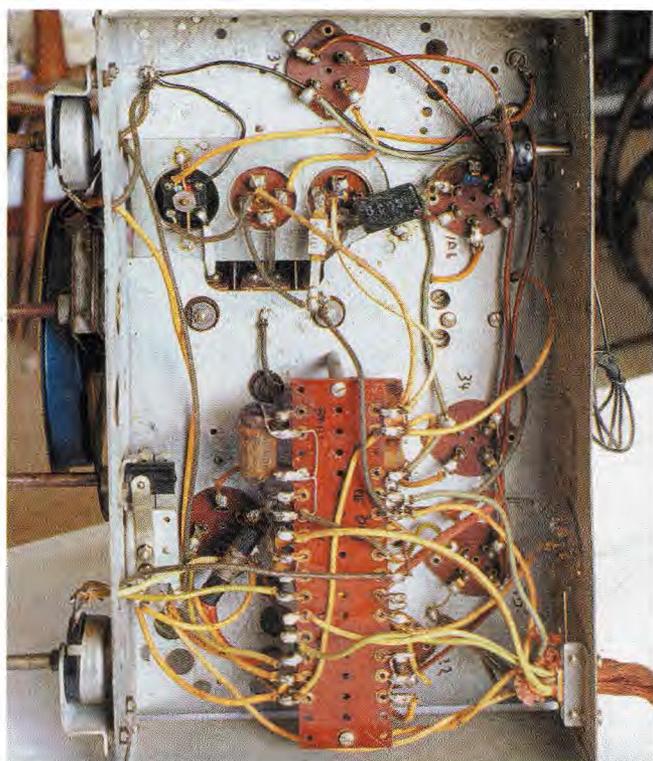
Although originally designed as a battery set, this particular set has been converted to operate on 240V AC. Keith says that even battery sets should be able to be used – even if the batteries to operate them are no longer available.

As can be seen in the photograph of the back of the set, a black box has been attached to the side of the cabinet. This box contains a power supply that provides all the DC voltages necessary to operate the receiver from the AC mains.

This particular supply was made from a kit but Keith has also made a number of supplies to his own design and all work well. The 11 power leads are wired to two plugs, so that they can be easily plugged into the power supply with no confusion as to where each lead should be connected.

### Summary

The R154 (and the Bandmaster 365B clone) are sensitive receivers and the



This under-chassis view of the R154 show the paucity of components and the ready access to the circuit. The only drawback is that some components are mounted on the underside of the terminal board.

audio quality from them is quite good. They would certainly have looked the part in a 1930s or 1940s lounge room and there is much to like about them.

There are also a few features I dislike. First on the list is the great tangle of power supply leads from the batteries.

The second feature I dislike is the "floating" gang. It appears to serve no useful purpose and makes for more complexity in manufacture. And third, I'm not too keen on the way some of the components have been mounted on the underside of the terminal board.

Some of the valves may now be unobtainable for a set of this age, so substitutes may have to be used. For example, the 33 could be quite easily replaced with a 1D4 with minor alterations to the voltages applied to it.

A 1L5G could also be used if the valve socket was changed to an octal socket.

Substitutes for other valves could be found as well. It is just a matter of checking which valves have similar characteristics to those requiring replacement.

Overall, these are good receivers which are well worth restoring and having in a collection. **SC**