Vintage Radio

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The impressive AWA Radiola B32 transistor portable

Australian manufacturers produced several high-performance transistor radio receivers during the 1960s – an era that was to herald the end of local domestic radio manufacturing. One such set was the AWA Radiola B32 transistor portable.

Although broadcast-band sets dominated, some of the transistor receivers produced by Australian manufacturers during the 1960s were multiband sets, which meant that the ABC's shortwave inland services could be heard almost anywhere in Australia. Of course, those original inland services, located at Lyndhurst (Melbourne) and also near other capital cities, have long since closed down. In fact, the old Lyndhurst site is now a housing estate!

However, there are now three stations that have taken over this role and they are located near Alice Springs, Tennant Creek and Katherine. They transmit at night on 2310kHz, 2325kHz and 2485kHz and during the day on 4835kHz, 4910kHz and 5025kHz. The daytime transmissions are not usually heard in populous areas but some of the night-time transmissions can be heard quite clearly in these areas.

The AWA B32 transistor portable was a relatively large unit with a leather case and a metal front panel. This view shows the set after restoration.

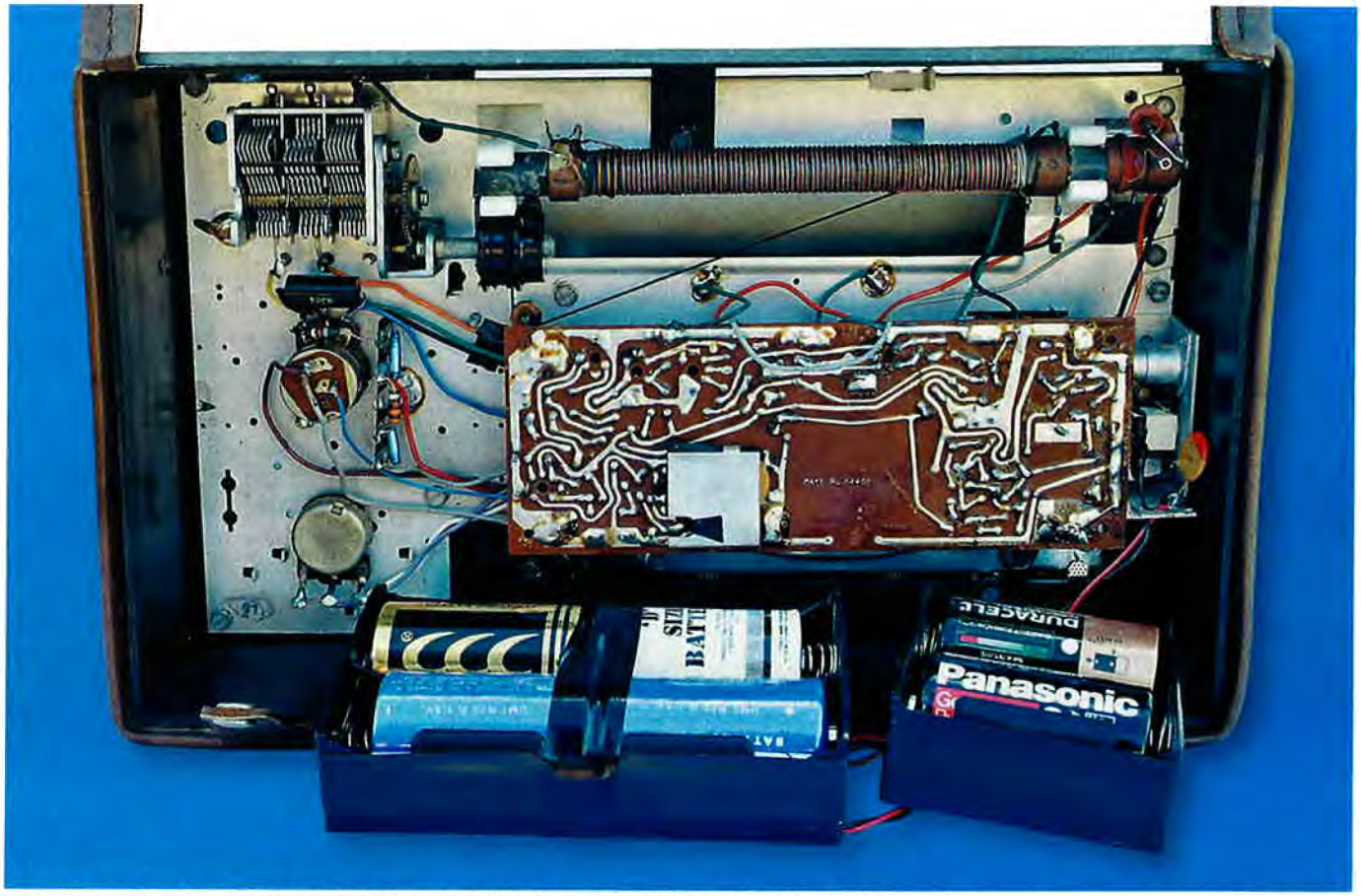
The B32 receiver

One interesting high-performance receiver from the era is the AWA Radiola B32 transistor portable. Produced around 1965, it has a large 195 x 12mm loopstick antenna, followed by a sensitive low-noise radio frequency (RF) stage which feeds an autodyne converter. A 2-stage 455kHz intermediate frequency (IF) amplifier then feeds a diode detector and three stages of audio amplification. The transformer-coupled output stage is wired in push-pull configuration and drives an oval loudspeaker measuring 150 x 100mm.

The case is quite substantial for a transistor receiver and measures 320 x 200 (not including the handle) x 110mm (including the knobs). The main part of the case is made of leather, while the front of the set is metal and this is attached to a plastic inner frame.

As can be seen in the photographs, there is quite a bit of room in the back of the set (to the left). This is used for the extra features included in the 4-band version of this set, the B33. Overall, the cabinet is of somewhat higher quality than some of the downmarket AWA transistor receivers.

Due to its size, the set is quite heavy, weighing in at 3.3kg without the battery and around 4kg with the battery in place. It uses the now unobtainable 2761 battery but two D-cell battery



This is the view inside the back of the set, with the modified battery packs in the foreground. The modified battery packs are necessary because the original 2761 type battery is no longer available.

holders – one for four cells and the other for two cells – will fit into the space that the 2761 occupied.

In my case, I removed the battery plug and wired the battery leads to the two holders in series to obtain the required 9V. This arrangement works well and is the only "non-standard" work I needed to do in order to get the set working.

The performance of the receiver can be enhanced by connecting an antenna and earth to the bayonet socket at one end of the receiver. In addition, there is a socket for an external 9V power pack and this can be used to extend the already long battery life of this set. However, there's one important thing to note here: like most transistor receivers using PNP transistors, this set has a positive chassis. This means that the sleeve of the socket is also positive.

Restoring the B32

For some time now, I have been keen to obtain the 4-band B33 version of this set and I still am. Even so, I jumped at the chance when a B32 model was offered to me.

The set had quite bad distortion but I thought that this would be easy to fix. Well, the fault was easy to find – a bit of careful probing with the signal tracer revealed that the audio was fine up to the loudspeaker. A quick check with a multimeter then revealed that one half of the speaker voice-coil was open circuit.

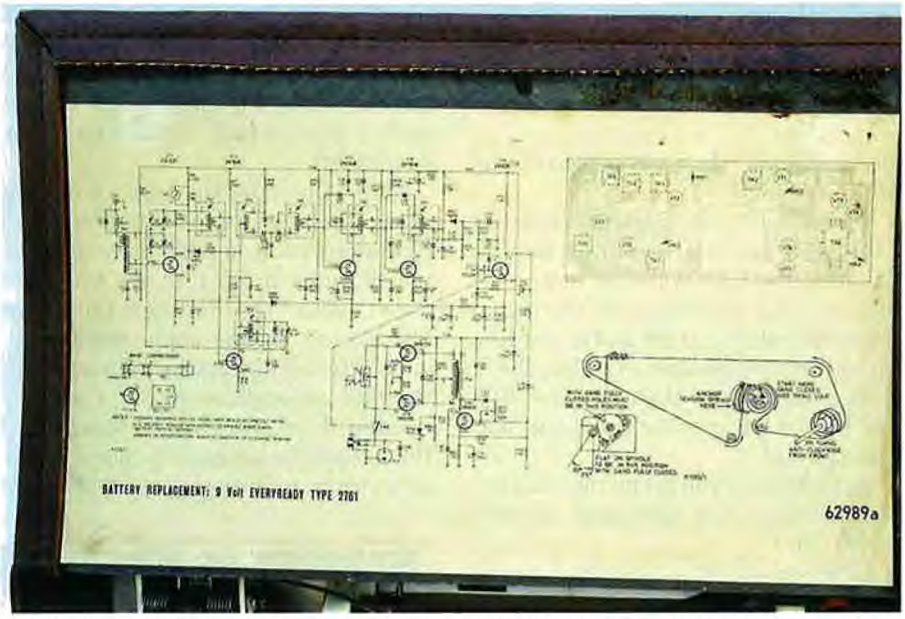
But where do you get 80-ohm centre-tapped voice coil speakers? Answer – you can't.

I needed to get a close look at the speaker, which meant that the "works" had to come out of the cabinet. This initially involves removing three knobs and the six screws holding the chassis plate in position. That done, the small escutcheon around the external power inlet and the antenna/earth socket are removed, after which the chassis can be withdrawn from the cabinet.

Finally, the four nuts holding the speaker were undone and the speaker removed. But could I repair it? I could see the break in one of the voice-coil leads, so I decided to attempt a repair using a small soldering iron, some thin solder and a short length of fine wire. I was in luck – the repair was successful.

With the speaker now working again, the next step was to check the IF alignment. It needed only a minor tweak to get it right on the button. I then checked the front-end alignment but started getting some strange results. The oscillator was tracking with the dial calibrations so no work was needed there. However, I found that the loopstick antenna needed some extra turns to peak its performance at

This view shows the unit with the chassis out of the cabinet, as far as the loudspeaker leads will permit. The loudspeaker is a large oval-shaped unit, which contributed to the good sound.



A full circuit diagram is pasted onto the inside back cover of the receiver, along with a diagram showing the dial stringing arrangement and a third diagram showing the locations of the major components (IF transformers & transistors).

the low-frequency end of the dial.

The antenna coil is wound almost right along the full length of the loopstick, so it's not practical to move it to peak the performance. After adding the extra turns, the set worked very well at the low-frequency end of the dial but I couldn't reduce the trimmer capacitor far enough to peak the performance at the high-frequency end.

So was the distributed capacitance across the coil too high? I doubted this would be the case and decided to probe further. The components involved were TR1 and C6. The same problem occurred with the RF circuit (TR2 & C5) adjustments. However, I couldn't find anything wrong in the circuit and all the adjustments had been done correctly.

Not long after, I had another reputable brand transistor set to restore. It too had an RF stage and it had exactly the same problem, only worse. Why?

I have come to the conclusion that the MSP (Manufacturers Special Products) 3-gang padderless tuning capacitors have not been cut accurately and so the circuits do not track correctly. Assuming that the oscillator gang plates are cut correctly, then it appears that the RF and antenna capacitors have insufficient capacitance when the plates are fully in mesh.

By contrast, the Kriesler 11-99 receiver uses a padderless twin tuning gang and the cut on these is near enough to be perfect. Its tuned circuits track very accurately and the set is extremely sensitive. It's also worth noting that the B33 doesn't suffer from this problem, as the three gang sections are identical.

That said, the B32 is still a good performer. It's just that it could have been even better.

Cabinet restoration

Fortunately, the cabinet was in very good condition and only required wiping over with a soapy cloth. In addition, a stiff brush was used to get dust out of the crevices in the front panel, while the knobs were scrubbed in soapy water with a nail brush.

The cabinet is in such good order that it's apparent that the set hasn't been used much. Perhaps the fault in the speaker occurred quite early in its life, after which the set was safely stowed away on a shelf or in a wardrobe.

Circuit details

Fig.1 shows the circuit details of the B32. It uses eight transistors, all PNP germanium types, so all voltages are negative with respect to the chassis (ie, positive chassis).

The RF stage uses a 2N1637 transistor (VT1) which has automatic gain control (AGC) applied to it. A milliamp meter in the collector circuit displays the signal strength.

VT2 (2N1639) and TR3 function as an autodyne mixer. Its output signal is at the intermediate frequency (IF, 455kHz) and this is fed to a top-cou-

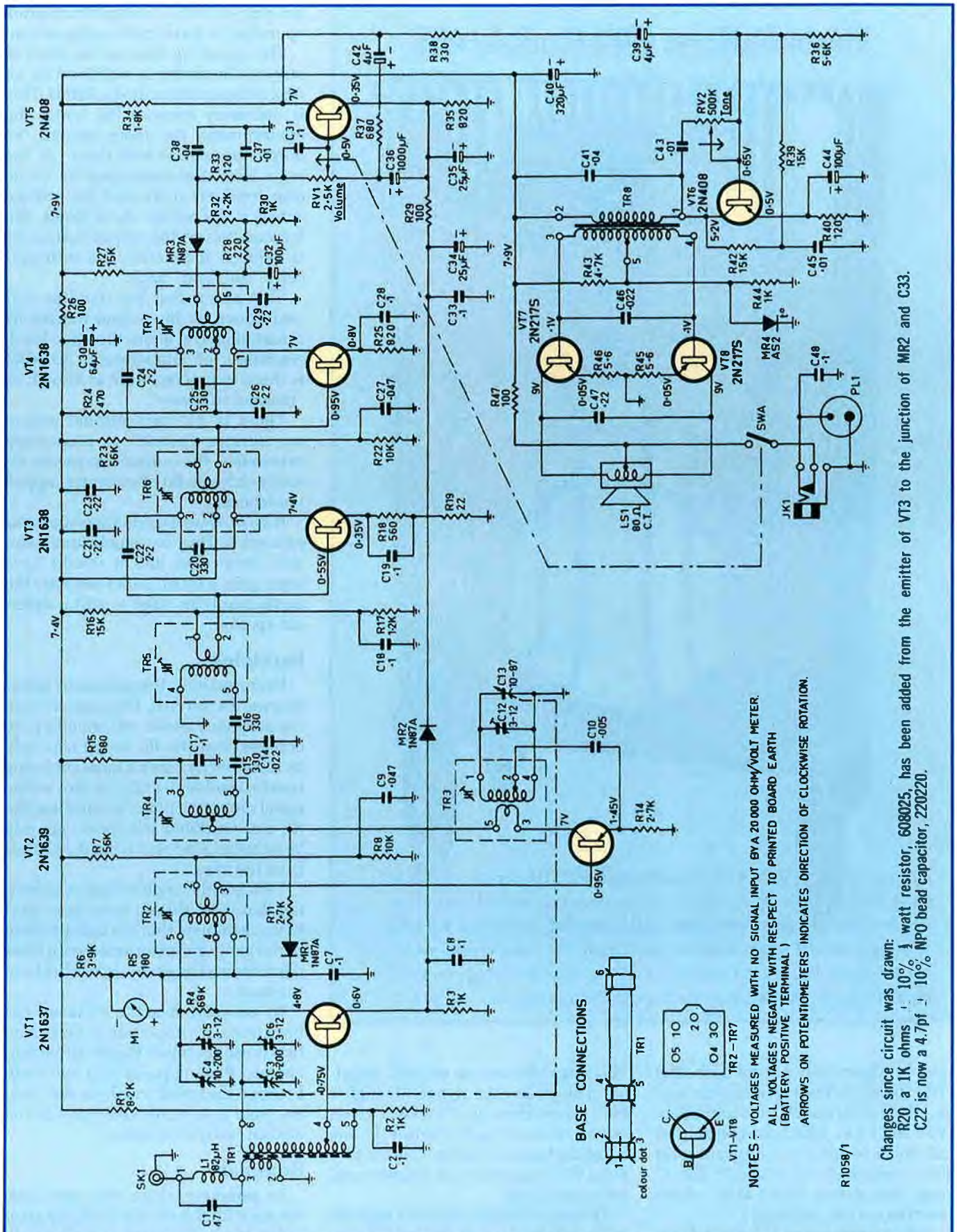


Fig.1: the circuit uses eight PNP germanium transistors in a conventional superhet configuration. Transistor VT1 functions as an RF stage, while the push-pull output stage (VT7 & VT8) drives an 80-ohm centre-tapped loudspeaker.

Photo Gallery: AWA Radiola 46E

Manufactured by AWA in 1932, the Radiola 46E TRF console was a 5-valve "little brother" to the larger 55E console featured last month. In fact, its external appearance was almost identical to the 55E but it featured one less RF stage (and one less knob). The valve line-up was two 235 RF amplifiers, a 224A detector, a 247 audio output stage and a 280 rectifier. Photo: Historical Radio Society of Australia, Inc.

pled bandpass pair of tuned circuits (TR4 and TR5). The first and second IF amplifiers both use 2N1638 transistors (VT3 and VT4), which are neutralised C22 and C24 (after all, these are solid state equivalents of triodes)! The IF stage then drives diode MR3 which functions as the detector.

The detector output is fed to volume control RV1 and then to the base of the first audio stage (VT5, 2N408). This stage also acts as an AGC amplifier. The greater the signal, the higher the current through VT5 for a given setting of the volume control (ie, the transistor turns on harder). This in turn pulls VT1's emitter more negative and reduces its gain.

The audio output from VT5 appears at its collector and is fed to VT6 (another 2N408) via a 4µF capacitor (C39). It's output is then transformer-coupled to a pair of 2N217S output transistors operating in push-pull configuration.

The operating bias on the 2N217S output transistors is stabilised by an AS2 compensation diode (MR4). This is necessary because the hotter the environment, the more current the output transistors will draw. At the same time, the compensation diode also conducts more and the voltage across it decreases. As a result, the forward bias on the output transistors is reduced and so they are automatically "throttled" back.

This means that the standing current drawn by the output transistors is maintained at about the same level, regardless of temperature. So MR4 is there to prevent what is known as "thermal runaway".

There is no conventional output transformer. Instead, as mentioned previously, the output transistors directly-drive an 80-ohm centre-tapped loudspeaker.

It's just as well the loudspeaker was repairable. They're virtually unobtainable these days and it would have been quite a lot of work to modify the audio amplifier stage to suit a different speaker.

Servicing

Unfortunately, this set can be rather awkward to service. The controls, tuning gang and ferrite rod are all easily accessed but the PC board can only be removed by using a large soldering iron to unsolder it at four points on the metal mounting plate. In addition, the RF and oscillator trimmers can only be adjusted after removing the chassis from the case.

This is rather a poor idea, considering that it would not have been hard to use trimmers that are independent of the gang and positioned with their adjustment slots easily accessible from the back.

By the way, once the PC board has been freed, it's important to make sure that it cannot touch the (positive rail) chassis. Placing paper or a soft cloth between the board and the metal chassis plate is a worthwhile precaution against possible damage.

Summary

In summary, there was very little wrong with the set, the faulty speaker being the main problem. All in all, it is a very good set that's somewhat spoiled by its tuning gang. **SC**