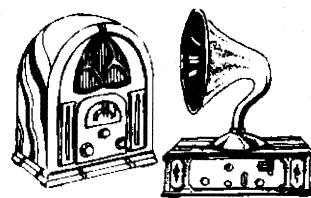


# Vintage Radio

by ROGER JOHNSON



## The Fisk Radiola 257: 'Big is beautiful'

AWA's Fisk Radiola model 257 for 1937 had the latest in everything. It was big and expensive, but a brilliant performer — delivering reception and audio quality about as good as it was possible to get from a traditional open-backed console cabinet.

Whilst the four-valve-plus-rectifier set was the predominant receiver for 1937, some manufacturers ventured into the exotic designs using up to the minute techniques. Such was Fisk Radiola's model 257. Thumbing through the *Australian Official Radio Service Manual* for 1937

shows that only four manufacturers were game enough to try the new metallic valves. Only Healing used them for all of their electric models. The other manufacturers used them sparingly, but AWA Radiola did incorporate them into the model 257.

Although the advertising

brochures claimed the model 257 contained 10 valves, when pared down to basics it was a three-band superhet with a tuned RF stage. That is where the similarity to any other receiver ends!

Of all the 1937 models that were available, only a couple had push-pull 2A3's in the output. Healing marketed a very powerful set, their model 777E (seven valves plus rectifier), using push-pull 6L6's in what must have been a powerful audio stage indeed. The AWA model 262, the larger brother of the 257, also had push-pull 6L6's in the output, but the front end and other features remained the same.

### Stylish cabinet

For a start, the 257 was housed in a very stylish cabinet. As one leaflet says, 'The magnificent console cabinet embodies the latest tendencies in modern furniture design and features rich walnut and zebirano veneers with full polished hand rubbed finish'. True enough. As the photo in Fig.1 shows, it has a concave speaker baffle decorated with curtained grille cloth to give the appearance of a proscenium of a theatre. The well-proportioned cabinet features black pinstripe piping and black knobs and escutcheon, to highlight the beautifully grained timber.

There is a magic-eye tuning indicator, which together with the dial scale is positioned for ease of viewing

whether sitting or standing. The shape of the tuning gang plates are such that the dial markings are as linearly spaced as it is possible to get, and the dial contains more than 100 station call signs.

### Mechanical features

The dial is an interesting affair. Above the broadcast band station markings, which are on a flat dial, is a rotating cylinder calibrated in frequency and corresponding to the station markings below. The axis of the cylinder is parallel to the length of the dial beneath. When either of the shortwave bands are selected, the cylinder rotates, and shows the shortwave calibrations in wavelength, together with the mandatory legends 'Rome', 'Paris', 'London', 'Moscow' and so on. Why they bothered with his Lord only knows, for those markings are quite irrelevant to tuning those particular stations.

As the shortwave bands are selected, the main dial lamps are extinguished and the cylinder dial is separately illuminated. Nothing, it seems, was left to chance.

The mechanics of providing for this visual extravagance are quite complex and would have required a considerable amount of tooling and engineering during the manufacturing process.

Another feature common to the better class of Radiolas was, for want of a better description, the 'sec-

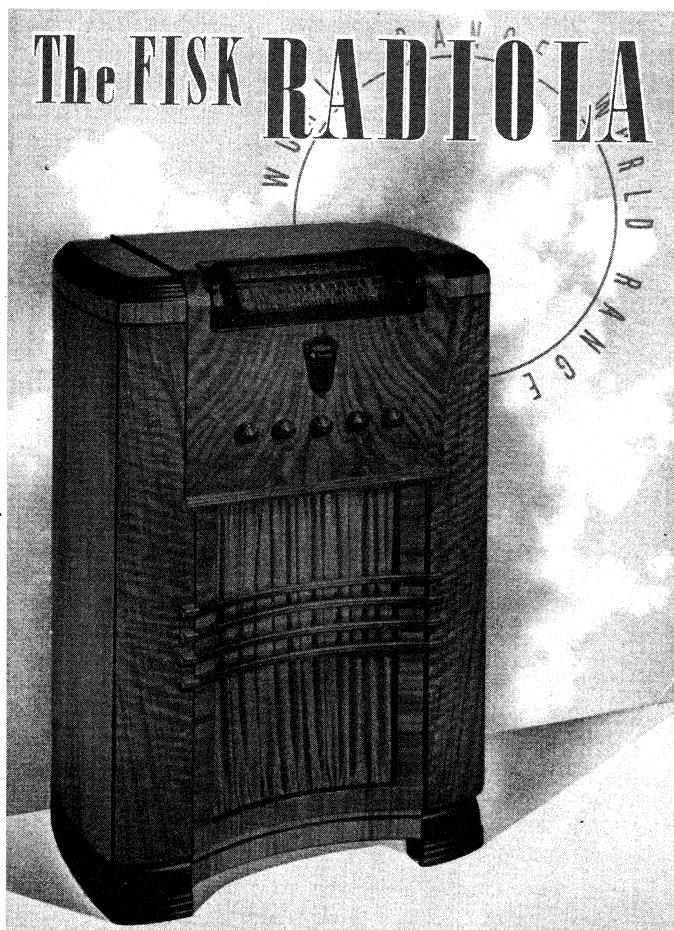
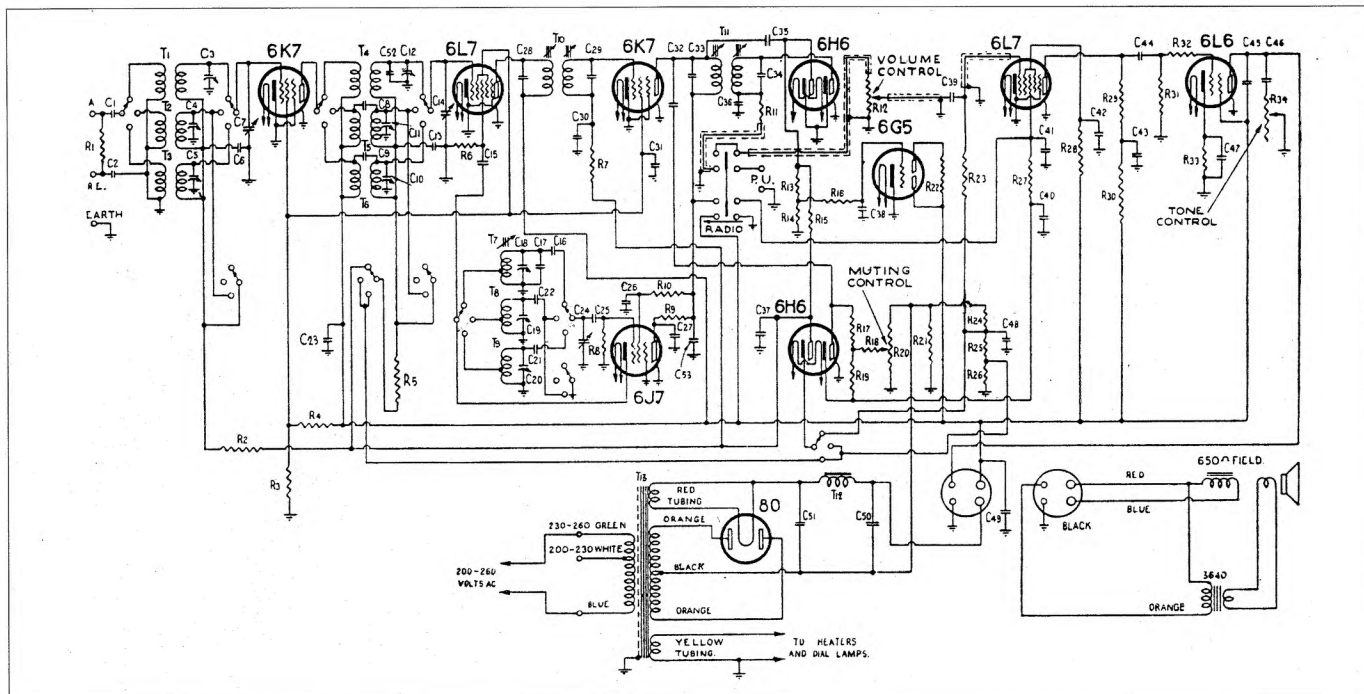


Fig.1: The AWA Radiola model 257 of 1937 looked most imposing in its handsome cabinet, and had 'big' performance to match.



**Fig.2: The circuit of the 257. With an RF stage, separate local oscillator, magic-eye indicator and audio muting system in addition to AGC, it delivered a high level of performance.**

tional' vernier tuning. Normally, the tuning shaft is friction coupled to the tuning capacitor to achieve a suitable dial rotation reduction ratio. However, on this and other Radiolas, the 'outer' or main tuning shaft is in turn planetary driven by an inner or 'knob' shaft by means of ball bearings, which together with a mechanical stopper, allows only one rotation of the knob shaft that can be planetary coupled to the main shaft. After the knob shaft has reached the stopper, it then becomes directly coupled to the main shaft. Of course, the knob can be rotated in the other direction, whereupon the planetary drive will come into effect, until the stopper then directly couples it to the main shaft again.

The beauty of this system is that the slow motion effect is there right where it is needed; for searching a station — and without the need to separately engage another form of reduction gearing. The tuning knob can be gently rocked back and forth for very accurate fine tuning, particularly on the shortwave bands.

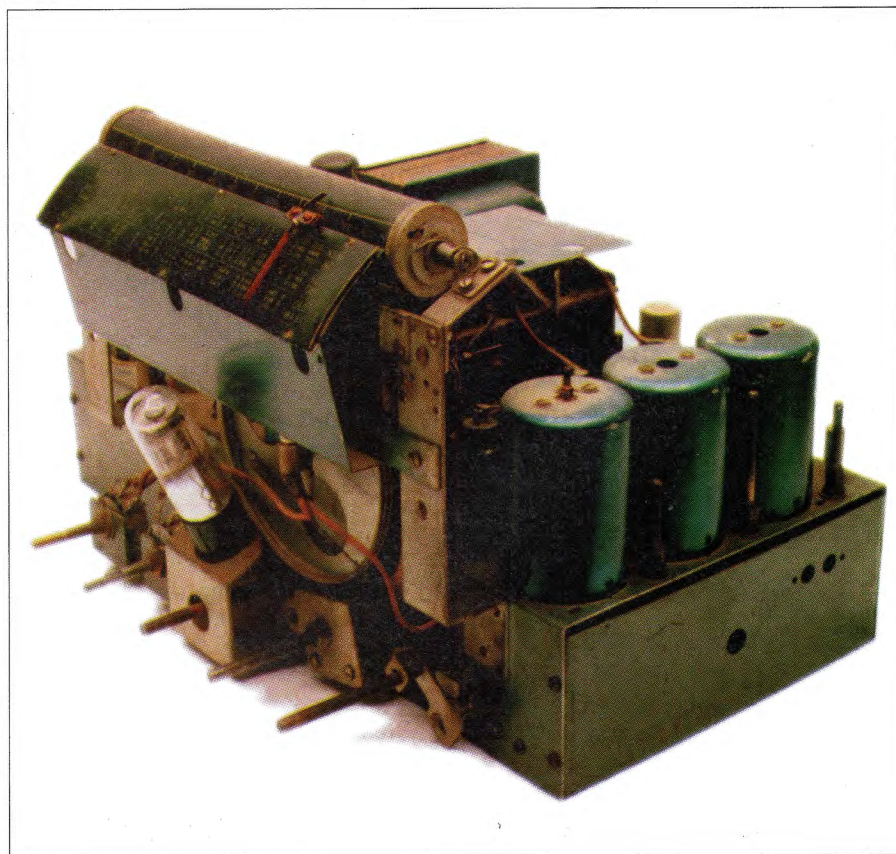
### Electrical features

This is one of the few sets with a 'muting' control, which accounts for the fifth control knob in the set. The muting control is device for eliminating all signals which fall below a certain strength, as predetermined by the setting of the control. It is much like a 'squell'.

Other features are the magic eye tun-

ing indicator, a treble cut tone control (what else?) and a single ended 6L6 output stage driving a very high quality 'Amplion' electrodynamic speaker.

The sound reproduction is about as good as is possible from this type of speaker in an open-backed console cabinet, without the recourse to full range



**Fig.3: The chassis is quite tightly packed, explaining why metal valves must be used. Note the metalwork surrounding the dial.**



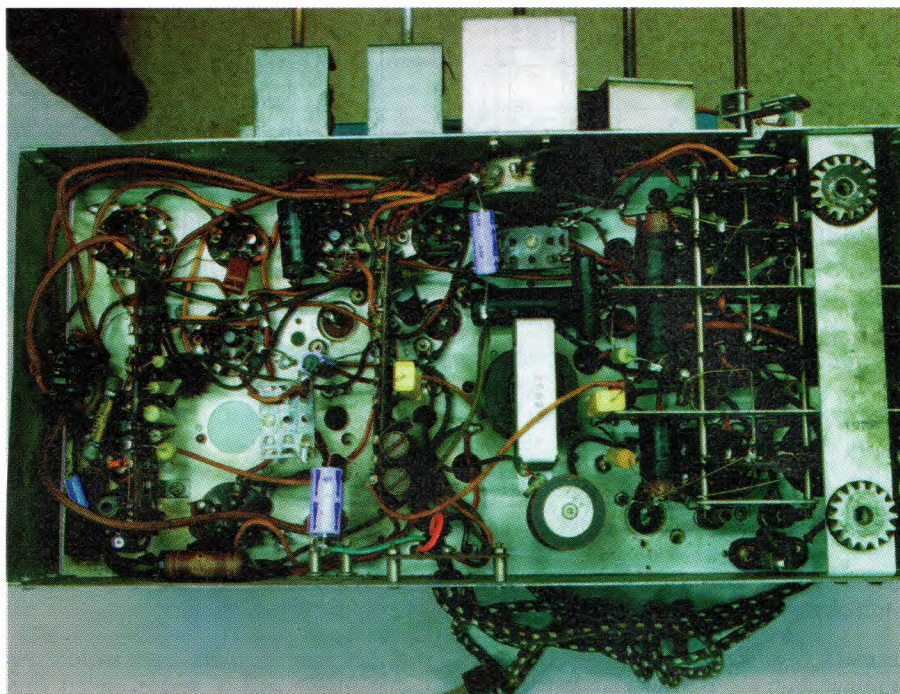
tone compensation.

## The circuit itself

The circuit is shown in Fig.2. Although there are indeed nine valves plus the magic eye, two of these are type 6H6 twin diodes used for various functions and of course one is the rectifier. The valve lineup is (1) 6K7 RF amplifier; (2) 6L7 mixer; (3) 6J7 oscillator; (4) 6K7 IF amplifier; (5) 6H6 detector and AVC (AGC) diode; (6) 6H6 muting control diode and back-bias control diode; (7) 6L7 audio amplifier; (8) 6L6 audio output; (9) 80 rectifier; and (10) 6G5 tuning indicator.

The aerial input is fed to the grid of the 6K7 RF amplifier via the usual input transformer (one per band), and thence transformer coupled to the super-control grid of the 6L7 mixer. The 6J7 local oscillator is an electron-coupled type, which is described as 'resistance stabilised in frequency'; the output is derived from the cathode and injected directly into the 6L7 injector grid via C15. The 6L7 was designed for just this purpose.

The resultant intermediate frequency is fed via the two IFT's (T10, T11) and the 6K7 IF amplifier to the first of the 6H6 diodes. The diode load in this case is provided by the volume control, R12. The second diode unit is to provide the AGC voltage. This diode is fed from the primary of T11 via C35.



**Fig.4:** Although the circuit is fairly complicated, there's generally plenty of room under the chassis. Most of the components are quite accessible, apart from those in the front end (right).

The anode of the bottom 6H6 is also fed from C35. The cathode of the bottom 6H6 is switched to the back-bias network and provides about -5V (R24/R25) on the broadcast band and about -2.5V (R25/R26) on each of the shortwave bands. As can be seen, AGC is not applied to the 6L7 on the shortwave bands.

The action of the left-hand diode in the bottom 6H6 is interesting. When the carrier signal, after rectification via the left-hand diode of the *top* 6H6, becomes less negative than the standing bias, the anode is positive with respect to the cathode and the valve conducts, thereby applying the standing bias upon the grids to which it is switched. When in the case of a stronger signal the AGC voltage is more negative than the standing bias, the valve has no effect and the full AGC is applied to the grids.

Presumably, this circuit was included so that the standing bias would not be applied to the junction of R13/R14 and thence to the grid of the tuning indicator.

## The muting diode

R20 is the muting control, and ulti-

mately controls the voltage applied to the injector grid of the 6L7 audio amplifier stage. The voltage of this injector grid has a marked bearing on the gain of that particular valve. It gives it a variable-mu effect without the need to involve the control grid, such as in the case of an ordinary variable-mu RF pentode.

When R20, which is only a 3000Ω pot, is at the earth end, R18/R19 form a cathode load for the right-hand diode of the bottom 6H6. Depending upon the signal strength, a slightly positive voltage will appear at the cathode, and once filtered via C40/R27/C41, appears at the injector grid of the 6L7 — allowing maximum gain. In this position, the injector grid measures up to +1.0V on a strong signal, and about -0.3V on a weak signal.

When R20 is rotated fully in the other direction, the full back bias (as derived across R21) is applied to the cathode and more importantly to the injector grid of the 6L7, thereby reducing considerably the gain of that stage. The incoming rectified signal must exceed this bias before the diode can conduct and apply the positive

voltage to the 6L7. R17 functions to provide the diode load, together with R18, and together with R19 provides a 2M $\Omega$  bleed across the diode.

The voltages I measured at the injector grid of the 6L7 when the full muting was applied were -0.25V with a full signal and -10.6V with no or weak signal. This amount of bias (injector grid voltage) is sufficient to almost turn the stage off!

The muting control is very effective on short waves — so effective that nothing gets through! On the broadcast band it does ensure that only the stronger signals are passed. Just why it was incorporated is open to debate; it is quite an enigma. The scheme was dropped the following year.

In all probability it was seldom, if ever, used by the listener — but it made a great sales pitch. In an era when the ability to ‘pull in’ weak stations from hither and yon was a major attribute of any receiver, and such abilities were energetically extolled by salesmen, why did AWA put in a control that cuts them out?

## Performance

The performance of this set is nothing short of outstanding in every

respect. This model marked the introduction of the new slug-tuned intermediate frequency transformers, the high impedance Litz-wound primary winding on the broadcast band aerial and RF coils, rigid ‘air trimmers’ for all stages on all bands, and quite solid mechanical assembly of the whole chassis. AWA in particular made exceedingly good coils, and RF and IF transformers which were sealed against moisture.

AWA’s are arguably the best Australian made receivers, in fact.

Selectivity is very sharp, and although I had no access to a laboratory standard signal generator in order to undertake definitive testing, seasoned and experienced ears will realise that this set is about as good as it is possible to get. The next step up from this design would be a communications receiver.

## Repairs & restoration

Access to factory literature is a definite advantage if you want to repair and/or restore this type of set, but is possible to work from just the circuit diagram. Short of trying to repair a simple fault, a circuit diagram is a must. It is published in the *AORSM* for 1937.

Whilst AWA made very good coils, unfortunately the same cannot be said for their black paper capacitors! (They earned a reputation for leakage and capacitance loss early in their working life).

Providing no one has ‘mucked around’ with the coils or the switches, or attempted to doctor the muting control, most components on the mounting panels can be located even though it might take a little time. In this regard, the factory literature is a definite bonus.

Unfortunately, although some may disagree, the metal valves as specified are a must. As well as there being insufficient space for the glass counterparts, the socket assembly is such that the larger bases of the glass equivalents will not seat properly in the sockets designed for the metal types. Also, glass 6H6-GT’s provide no shielding against stray pick-up and the result is a burst of audio instability.

If, after repairs, the voltages match up to those stated and a standard alignment procedure is followed, this receiver can take pride of place in both appearance and performance and enhance the best of collections. ❖