





Fig.3: From left to right are shown a National ALP, an Astor GR (without name badge) and a Healing 300E.

This was a most unusual circuit indeed, for it contained two hitherto unheard-of valves in Australian radio production. They were dual purpose types: one was the 32L7GT, which combined a half-wave rectifier and power pentode in the one envelope, while the other was the 12B8(GT), a triode-pentode with separate cathodes (unlike the familiar 6F7 which had one cathode to supply both sections).

These tubes are of American design, and as with types such as 50L7-GT, 25A6 etc., the heaters were designed to be series connected and run direct from the 117V AC mains. Rectification was direct from the mains, so that the tiny superhets were literally transformerless. (This was the original concept of the Astor Mickey, designed by the Hazeltine corporation in 1933.)

### The AR circuit

The circuit for the Astor AR is reproduced in Fig.1, taken from the *AORSM* for 1939 (it was repeated again in 1940). An example, courtesy of HRSA member Mr Les Jolly is pictured in Fig.2.

The set is fairly obviously based on an American design. The heaters are in series, and as the maximum HT is 105 volts after rectification and filtering, HT would have originally been rectified direct from the 117V AC mains. Therefore, a simple transformer, more likely than not an auto transformer to simplify things again, was really all that was required.

For Australian conditions, a special transformer was wound having two secondaries of 44 volts (with a tapping for the dial light!) and a secondary of probably 115 volts, as the maximum rating for the half-wave rectifier in the 32L7 was 125V DC into the filter. This no doubt accounts for resistor R17 (200Ω) prior to the first filter capacitor. The 900Ω choke shown in the circuit is the field coil of the 5" EM speakers, also used on some of the later Astor 'Mickey' sets.

Apart from the low voltages, unfamiliar to Australian servicemen in 'electric' sets, the output stage and the triode audio stage

also differ in that each cathode resistor is unbypassed. This has the effect of negative feedback. Given that the gain of these stages would not be over powerful, negative feedback was a fairly bold move; no doubt an attempt to try and improve the frequency response, by boosting the extreme ends of the audio response curve.

The RF section is worthy of note. The pentode stage of the 12B8 operates as a normal pentode in which gain is controlled by the 10k cathode degeneration pot (shown in the circuit as a 100k, which is most unlikely), which simultaneously shunts the aerial. The RF stage is coupled to the triode detector in the normal fashion, whereupon grid leak detection follows. However a 0.01μF (10nF) grid capacitor followed by a 10 meg grid leak is quite radical. Even for audio frequencies, the usual combination was 1nF/10MΩ, or 10nF with a 1MΩ grid leak. With a strong signal, input overload and distortion would have to be apparent.

Regeneration is used, but it's fixed regeneration around the triode via the 250pF capacitor from its plate, feeding the additional winding on the RF transformer.

Much care would have to have placed in the design of the coils, so that the set would not begin to oscillate at the very top of the band. As one tuned down in frequency, the amount of regenerative feedback decreases (recall the article on aeriels, coils and the whole damned thing?). To compensate for this, the primaries of both coils are of the high impedance type, which increases the coupling at the lower frequency end of the band.

### Post-war TRFs

The same philosophy of a reliable and adequate three-valve budget priced mantel, often referred to as 'miniature' or 'midget' sets, extended into the post-war period. Healing and Radio Corporation were the major players. Radio Corporation by this time controlled the 'Astor', 'Monarch' and 'Peter Pan' brand names, and in Adelaide they also owned the 'National' brand.

However the post war models were of a vastly different design concept. They used

a variable-mu duo diode pentode as a reflex RF amplifier and audio amplifier, followed by an output valve and a conventional full-wave rectifier giving the 165 or so volts, so that the valves were operating at something like more familiar conditions.

### The Healing 300E

This midget was housed in the same cabinet and used the same chassis as the 400E and the 401E, a straight four-valve superhet with a couple of unorthodox design ideas. Released in 1946, the cabinet colours were brown, cream or maroon bakelite, all of which are collectable.

The first stage of the 300E (Fig.4) is an EBF2-G in which the pentode section is firstly an RF amplifier. This is in turn transformer coupled to the second tuning stage. However, the difference here is that the tuning is in the primary or plate circuit, and the tuning capacitor is isolated from the HT by a 0.1μF paper capacitor.

The secondary is then fed to the diode(s), where the signal is demodulated and the audio voltage appears across the 50k filter and 1M audio load resistors. This audio

