Vintage Radio

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The little 1934 Astor Mickey

From the 1920s onwards, Astor produced many fine receivers, the Astor Mickey being one of their early mantel receivers. It was a very compact 5-valve receiver and the "OZ" model number that was used to denote the Australian model now seems quite relevant.

It's probably just coincidence that Astor used "OZ" to denote the Australian version of this receiver. The term "OZ" didn't become slang for Australia until much later on, so it's impossible to say just why the "OZ" model number was used.

The Astor Mickey "OZ" was a modified version of an American receiver that was designed to run off 110V mains. In the US, Radio Corporation must have thought that they had it made with the "Mickey Mouse" name, since it reminded people of the Walt Disney character of the same name. However, the people at Walt Disney were not amused and legal action eventually resulted in the name being altered to just plain "Mickey".

The Astor Mickey model OZ was built into an attractive walnut cabinet. Note the very small elementary dial scale. It consists of a reduction drive and uses a gramophone pick-up needle(!) as the dial pointer.

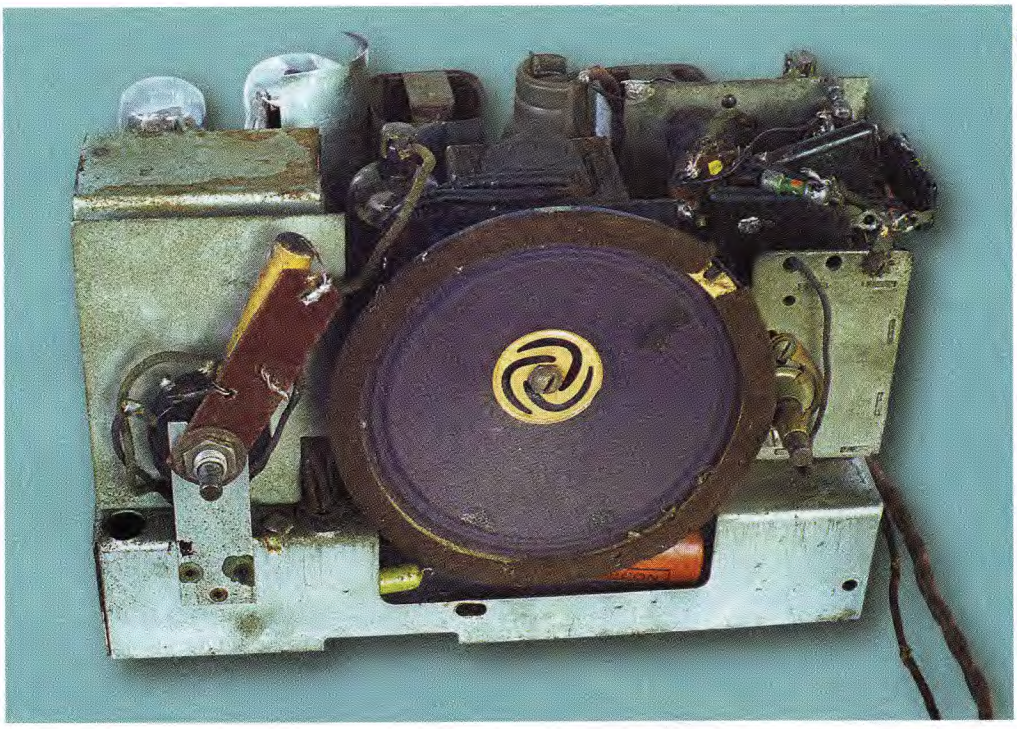
US designs

Quite a few of the receivers sold in Australia during the 1920s and 1930s were close copies of American sets of the era, often being built under a licence agreement. Australia's manufacturing base for radio receivers was not as advanced as America's at that time and so the use of American designs made good business sense for manufacturers looking to steal a march on their rivals.

The Astor Mickey "OZ" was quite a compact receiver for its time, despite the fact that it included a power transformer, a couple of intermediate frequency (IF) transformers, a tuning gang, various coils, a loudspeaker, an output transformer, miscellaneous passive components and, last but not least, five large valves. In fact, Astor did a marvellous job of shoe-horning them all into such a small space.

A side effect of this "shoe-horning" was that the audio output and rectifier valves cause other components in their near vicinity to get quite hot as well. For example, the tops of the valve envelopes are quite close to the top of the cabinet and this inevitably became heat-damaged. To minimise this, vertical ventilation slots were cut into the lefthand end of the cabinet to assist airflow, while a sheet of asbestos(!) was fitted above the valves to reduce heat transfer to the cabinet.

Most of these sets will still have the asbestos fitted, so be careful if you are working on one of these receivers. Asbestos is a carcinogen and should be treated with great caution. To prevent fibres of asbestos coming off the sheet, it could perhaps be sprayed with clear Estapol which should seal



This front view shows the chassis after it has been removed from the cabinet. Notice how closely the components have been packed together. There's no wasted space here!

Below: a rear view of Astor OZ. This shows the very compact nature of the set, considering that it uses full-sized components. Be aware that a sheet of asbestos is used above the two valves at the right of the photograph.

its surface and thus prevent any loss of material. How you deal with it is up to your own good commonsense. I'm certainly not an expert on dealing with asbestos safely.

Front-panel controls

The front panel of the receiver carries the volume and tuning controls, with the volume control to the left and the tuning to the right. A brass plate behind each knob identifies its function and these plates are attached to the wooden cabinet via escutcheon pins. The loudspeaker is fitted behind a fret in the front of the cabinet, which is covered with speaker cloth.

The tuning control is similar to that used in many other early sets and features a small circular dial-scale that's located behind the knob – in fact, it's hardly worth calling a "dial scale". There is a reduction drive to the gang and the pointer for the tuning consists of a gramophone pick-up needle that's inserted into the reduction drive brass ring. There are no frequency calibrations or station callsigns on the dial scale – just a 0-100 scale.

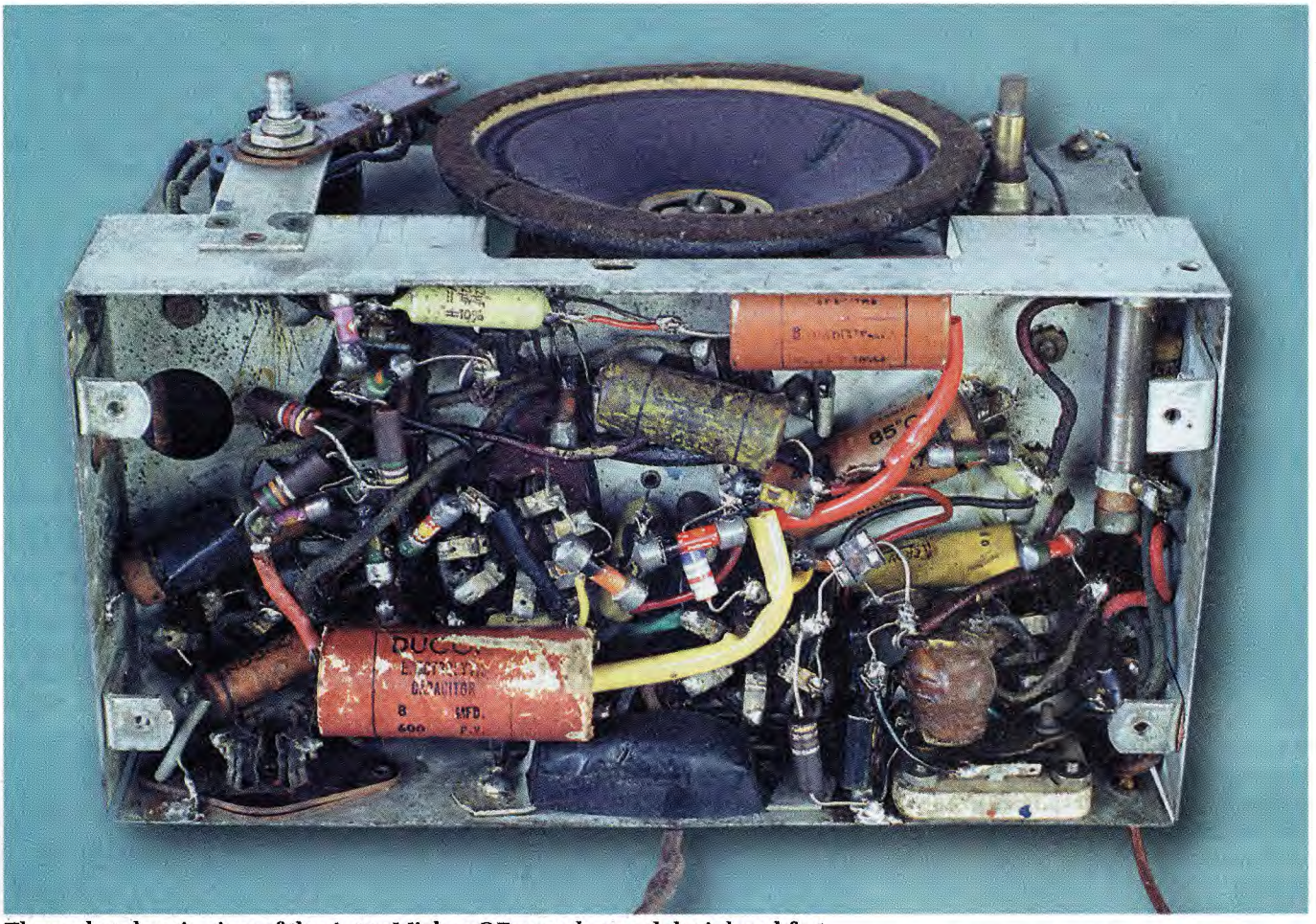
There were certainly some big improvements made to dial-scales in the years following 1934, when this set was manufactured.

Removing the chassis

The set is reasonably easy to dismantle. First, the knobs are unscrewed and the brass dial-scale is levered off. That done, four bolts are removed from the base of the cabinet, after which the chassis is can be slid out of the case. This has to be done carefully, as it is a tight fit.

With the chassis exposed, it quickly becomes clear that there is a lot of radio packed into a small space! There is very little space between the chassis-mounted items and you need nimble fingers to remove the detector-cum-first-audio valve. That said, I've seen more awkward layouts than this. However, it is just as well that tuning capacitors are usually trouble free, as the gang is completely covered by the oscillator and antenna coils and their associated components.

The view underneath the chassis is a bit more frightening, with a mass of components and various leads going



The under-chassis view of the Astor Mickey OZ reveals a real dog's breakfast, with a mass of components and leads going everywhere! It is a difficult receiver to service because the components are so crowded together.

all over the place. This particular set had been serviced on several occasions in the past and this has only added to the confusion with the layout. Replacement components appear to have been tacked in wherever possible and, over the years, a significant number of the capacitors and resistors have been replaced. However, they were not all replaced at the same time, as components from several eras are evident.

Circuit details

Redrawing the circuit diagram of this radio using circuit symbols from the end of the valve era would quickly disguise the fact that it was designed in 1933. In fact, if the valve type numbers were unknown and if the field coil on the speaker is ignored, this circuit could easily be mistaken for one of many dozens produced during the 1960s. Even by the mid-1930s, the superhet receiver had been almost fully developed.

Of course, there are differences between this set and later sets but these are purely refinements of what had already been produced. For example, the quality of the coils improved with the advent of iron dust and ferrite cores, as well as then being able to make them much smaller. In addition, the valves became much smaller with the introduction of 7-pin and 9-pin units, but their characteristics remained similar to the octal and pre-octal valves that they replaced.

For example, the 6D6 (in this set) later became the 6U7G, which has almost the same characteristics as the later miniature 6BH5.

Another difference is that electrodynamic loudspeakers gave way to permanent magnet units, which saved power because they didn't require a field coil to produce a magnetic field. And over the years, the electrolytic and paper capacitors gradually became smaller for the same capacitance, with the unreliable paper types ultimately replaced by polyester capacitors.

Finally, towards the end of the valve era, thermionic power rectifiers were replaced by more efficient silicon power diodes. So while there were significant improvements in the components used, the circuit designs of common domestic radio receivers remained much the same.

Australian modifications

This receiver was, as mentioned earlier, an "Australianised" version of an American radio. The American design was for a transformerless set which ran directly off the 110V mains. In this design, the valve heaters would have all been connected in series, which meant that 69V was needed across them for best performance (possibly achieved by using a dropping resistor).

As a result, the circuitry of the receiver were designed to operate efficiently off 110-140V DC. At this voltage, the 43 output stage gives quite reasonable audio output.

Modifying the set for Australia involved adding a mains transformer to supply the voltages required. This transformer allowed the set to be used with the Australian 240V mains and featured three heater windings to cater for the various heater voltages. In ad-

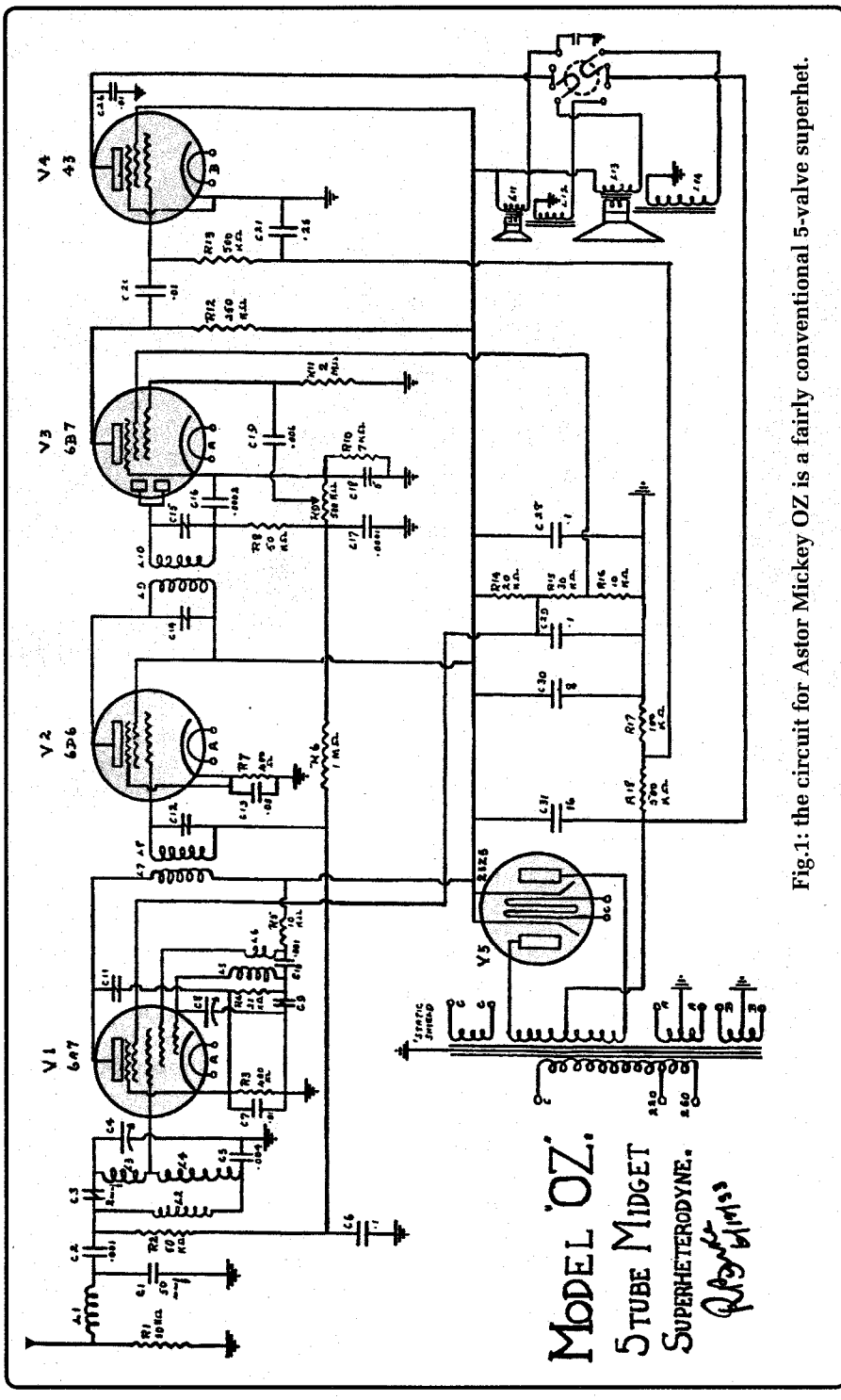
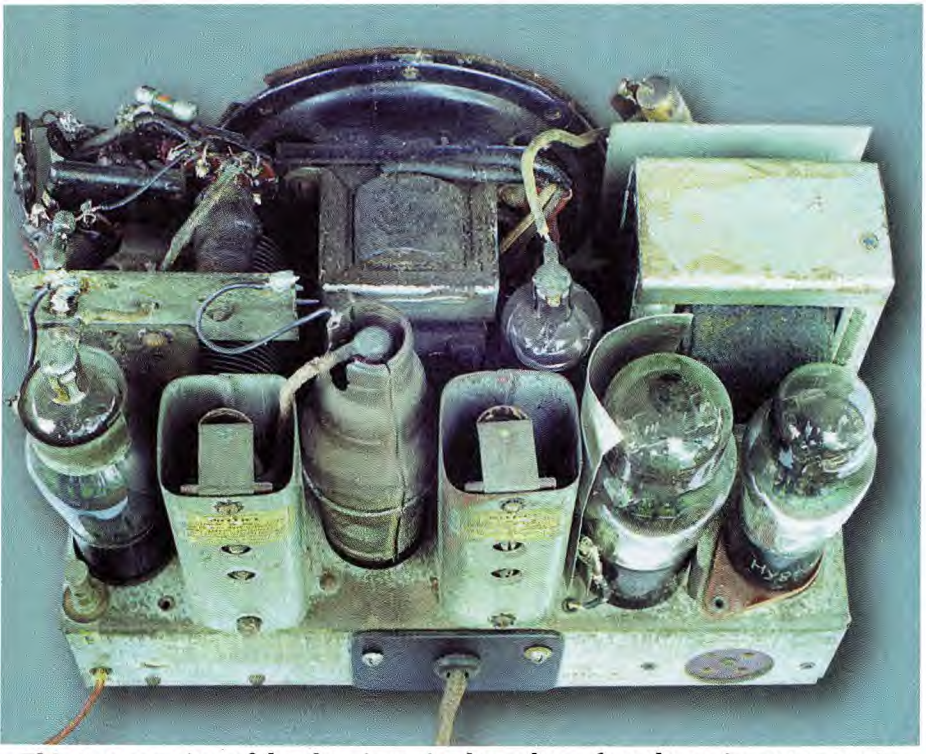


Fig.1: the circuit for Astor Mickey OZ is a fairly conventional 5-valve superhet.

dition, the rectifier circuit was modified to function as a full-wave unit, instead of the half-wave unit used in the original design.

However, some later versions of this radio used valve heaters that were wired in series and a half-wave rectifier was used to supply the HT voltage for the set. These later receivers were very much an American design, with a power transformer "hung" on the mains to give the right voltages. As before, it was no longer necessary to use a dropping resistor to reduce the 110V to 69V as the heater winding on the transformer provided just the right voltage.

The power transformer probably fitted in the space vacated by the heater dropping resistor in the American sets. And as well as providing the correct voltages, it certainly makes the set



This top rear view of the chassis again shows how close the major components (valves, IF transformers, etc) are together. Note the side adjustments on the air-cored IF transformers at the rear of the chassis

safer to work on. Indeed, Australians have always had a dislike of live chassis equipment, in contrast to the Europeans and Americans.

Circuit details

As mentioned earlier, the circuit layout is quite standard, although the tuned input circuit does require some comment. This tuned circuit consists of L3, L4, C4 and C5, with tuning capacitor C4 being adjusted to tune to the desired station. In addition, these components, together with the remainder of the parts in the input circuit, form a complex network that's designed to have a broad response across the broadcast band but with the response dropping off rapidly outside this band.

The reason for this is that the designers were concerned about breakthrough from marine Morse code stations in the 400-513kHz frequency range into the intermediate frequency (IF) amplifier. That said, it probably would have been simpler to have put an IF trap in the antenna circuit on 456kHz. However, this is one of the earlier sets using a 456kHz (455kHz) IF amplifier stage and, because it uses air-cored low-Q transformers, the frequency response was probably sufficiently broad to allow signals well away from 456kHz to get through.

The antenna circuit used in the Astor Mickey was obviously designed to overcome this problem by rapidly attenuating signals outside the broadcast band. Without this circuitry, either an annoying thumping noise or a tone-modulated series of short and long signals would have been evident to the listener. Indeed, one of my receivers from the 1960s was prone to this problem.

Of course, this is no longer an issue, as the marine medium frequency (MF) stations closed down at the turn of the century.

The IF amplifier is quite conventional and uses trimmers to tune each IF transformer winding. The adjustments are made from the side of each transformer and as can be seen in photograph, they can be adjusted with the set in the cabinet.

The IF stage is followed by a diode detector cum-AGC-diode stage, followed in turn by a pentode first audio stage and a pentode audio output stage. Provision is made for an extension speaker, as shown in the lower right of the circuit diagram.

All stages use cathode bias except for the audio output stage, which uses back bias. The field coil is in the negative lead of the power supply and 1/6th of the voltage across this is applied as the back bias.

The power supply is conventional and uses a mains transformer and full-wave rectifier (V5) to produce the high-tension (HT) voltage (135V). Lower voltages for various sections of the receiver are obtained from a voltage divider network across the HT rail, consisting of resistors R14, R15 & R16.

Alignment

The alignment of the IF stage is conventional and involves applying a modulated signal from a signal generator (set to the IF frequency) to the grid of the 6A7 RF stage. The audio output level at the speaker (or the DC voltage across the volume control) is then measured and the tuning peaked for a maximum reading.

The alignment of the antenna and oscillator circuits is also conventional. The set nominally tunes 550-1500kHz but by carefully adjusting the two trimmers on the tuning gang at the high-frequency end of the band and the padder capacitor (C9) at the low-frequency end, the set can be made to tune the entire broadcast band as it is today.

The padder capacitor (C9) is accessed through the back of the chassis, near the aerial and earth terminals. However, it really is guess work as to where the alignment points of 600kHz and 1400kHz should appear on the dial, as it is only calibrated 0-100!

The procedure for tuning the front end is fully explained in "Vintage Radio" for February 2003. On a cautionary note, don't adjust C3 unless you really know what you are doing. This small capacitor (about 2pF) consists of two short lengths of insulated wire twisted together and forms part of the broadcast bandpass image and IF rejection circuit.

Performance

It's a bit hard to judge just how well this set performs, since it has yet to be restored. However, it's doubtful that it will be up to the standards of

Photo Gallery: Philips Model 6506 – Medium Wave (1937)

With its vertical edge beading, chrome-plated grille bands and chrome-plated station pointer, the Philips Model 6505 is a classic example of art deco styling. The set came with either "E" series or "A" series valves, the former with 6.3V heaters and a 4V rectifier, the latter with 4V heaters and a 6.3V rectifier. Tuning was accomplished using a large disc and wedge wheel, with an anti-backlash mechanism. (Set restored by Maxwell L. Johnson; photo by Ross Johnson).

comparable receivers from the 1950s and 1960s, due to the low Q of many of the coils.

The cabinet

The cabinet is quite small for the era, being just 305mm long, by 180mm high and 140mm deep. It is, however, quite attractive and is made from walnut ply, with the front made from a piece of figured walnut. Black paint highlights the controls, the speaker grille and the base of the cabinet.

As shown in one of the photos, the cabinet style is different in that the top is curved down in the centre – almost like a small seat! It does look quite effective and this set would have looked every bit as good as many other high-quality sets of the era.

The cabinet has been restored using flat clear polyurethane and looks quite impressive. However, a little later on, its owner intends to finish the cabinet restoration with a mixture of 60% gloss nitro-cellulose lacquer. The interior will be given a coat of matt black paint to finish it off.

Summary

Despite being a 1933 design, the circuit of the Astor Mickey is similar to many radios that appeared towards the end of the valve era. It only suffers in performance compared to these later sets because of the inferior components that were available in 1933-4.

Astor managed to cram a lot into a cabinet that is similar in size to most mantel sets of the later valve era. Considering this, access to the works is quite reasonable. The cabinet is of an eye-catching design and even today the set would look good and sound good in the home.

It's no wonder that these receivers command high prices when sold. If you have the opportunity of obtaining one at a reasonable price, then "go for it". SC