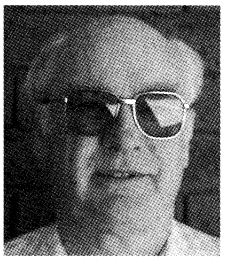
VINTAGE RADIO

By RODNEY CHAMPNESS, VK3UG



Australia's last valve radios

The last gasp for valve radios in Australia occurred around 1973, when Kriesler ceased production of its 11-99 mantle radio. This set and the earlier 11-90 model had some interesting features, as we shall see.

It is hard to know exactly when domestic valve radios ceased being made, as manufacturers often put the date of the acceptance of a design on the circuit diagram and on any allied information. However, it would appear that valve sets ceased production in 1973 or within a year of that time. A few specialist sets of various kinds may have been produced for some time after that but that is not what we are interested in here.

There was still a number of manufacturers producing domestic valve radios during the latter years. The main Australian ones were Astor, AWA, Ferris, Healing, HMV, Kriesler, Operatic, Philips, Pye, STC and Stromberg Carlson.

The Kriesler 11-90

It is possible that the last domestic valve sets were produced by Kriesler. In this article, I'll endeavour to follow the production of the last of their valve mantle sets. The last completely new design occurred at the end of 1961, this being the 11-90. Initially, it was designed as an economy set for the kitchen or workshop/garage and was probably meant to persuade people that transistor radios weren't a viable option for listening around the house.

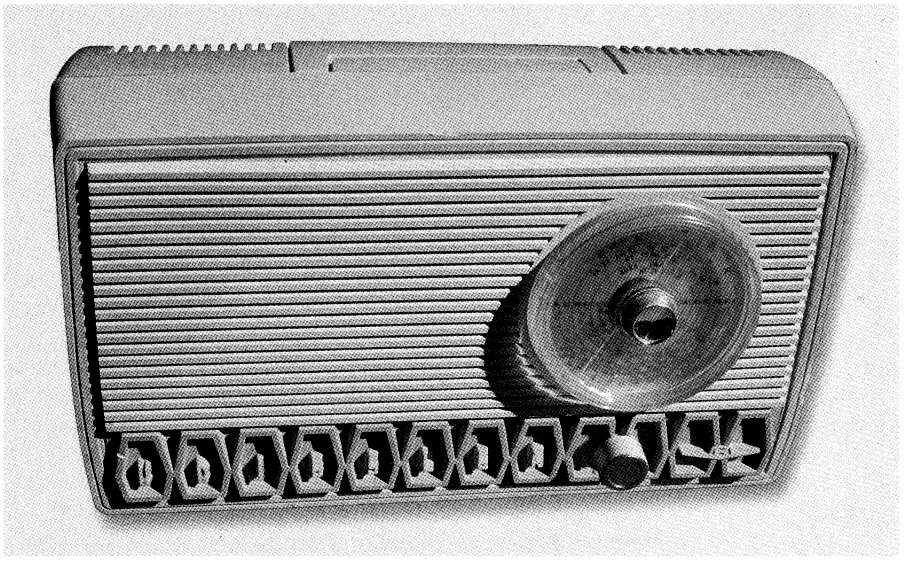
What did Kriesler do to make this an economy set that was well-designed, reliable and able to perform adequately? First, the set was built into a cabinet that had a fold-down carry handle. This, together with its figure-8 power cable, made it easy to gather the set up and move to the next power point.

The cabinet was made in two halves, such that almost all servicing (if required) could be done with just the back half removed. And although there were antenna and earth terminals on the back of the set, the small internal loopstick antenna was quite adequate for most suburban locations.

Circuit design

What did they do in the circuit design to keep costs down and yet still have a set that offered adequate performance? Many of the simpler designs in earlier years used relatively low high-tension voltages – generally around 100V or so. However, although the RF (radio frequency) and IF (intermediate frequency) sections of these sets performed quite well, the audio output was quite limited as 6V6GT valves don't work well with low high-tension voltages.

During this period, the 6BM8 triode-pentode was used extensively in television sets as an audio amplifier/output stage and as a vertical oscillator/deflection amplifier. However, it had reached its limits and new valves were needed for the audio and vertical sections of such sets. In particular, more was required out of the vertical deflection valve for the latest wide angle (110 degree) deflection picture tubes and Philips designed and pro-



The author's Kriesler 11-99 mantel receiver. The unit was built into a plastic case with a fold-down carry handle.

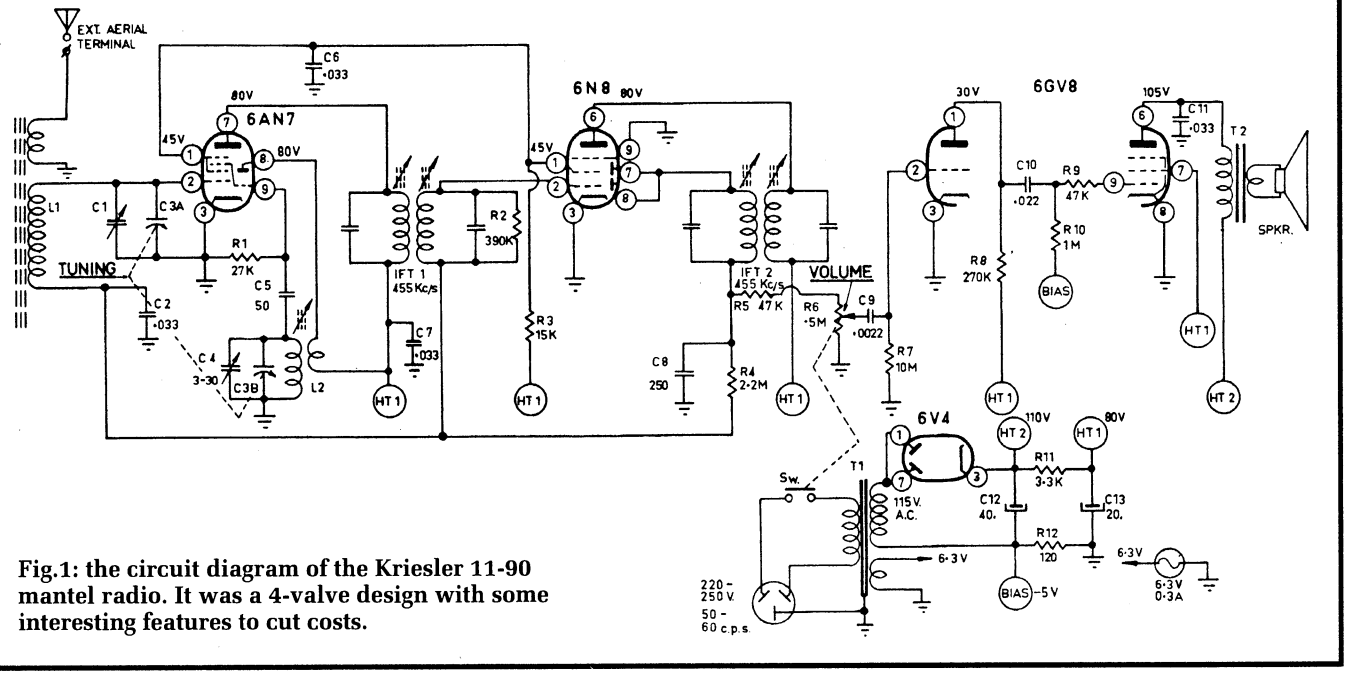


Fig.1: the circuit diagram of the Kriesler 11-90 mantel radio. It was a 4-valve design with some interesting features to cut costs.

duced the 6GV8 to do the job.

Whether by design or by good luck, the 6GV8 proved to be a very versatile valve. As well as working well in its intended role in television sets, it was also found to work well in small regulated power supplies and as an RF output valve in low-power HF and VHF transmitters. What's more, the 6GV8 worked very well as an audio amplifier at low HT voltages and was quickly adopted by Kriesler for the 11-90 receiver.

The 6GV8 drew quite a considerable amount of current (about 40mA) with 100V on the plate and screen and with about -5V of bias. This meant that at about 100V or a bit more, quite a reasonable amount of audio output could be obtained. Kriesler used the 6GV8 as an audio preamplifier and audio output stage, which gave between 1W and 1.5W into a 4-inch speaker. This would be more than adequate for the environment in which it was intended to operate.

The RF section followed almost exactly the designs that Kriesler had found to be effective since the mid 1950s. After all, why change a proven formula? The set ended up with a loop stick antenna/aerial with a 6AN7A converter feeding a 6N8 as the IF amplifier on 455kHz. The diodes in the 6N8 were strapped together to form the second detector and a simple AVC/AGC (automatic volume control/automatic gain control) network. To keep the tuning system simple, a "hand-span" dial was used. These were cheap to produce and simple to maintain, but are not as easy to tune as good cord drive systems.

The power supply had to be designed at this time too. In Australia, we have stuck fairly rigidly to designs that completely isolate the mains from the chassis, so a mains transformer was a necessity. To keep costs down, the transformer has only a single untapped 115V HT winding and one 6.3V heater winding on the secondary side, plus an untapped primary winding for 220-250V input.

A 6V4 valve with both plates strapped together was used as a half-wave rectifier. The use of a 6V4 as the rectifier seems a little strange when it is considered that an OA210 or similar solid-state rectifier could have easily done the job (they were used in the power supplies in some TV sets at this time). I suspect that the 6V4 was used as they probably had tens of thousands of them and needed to use them up.

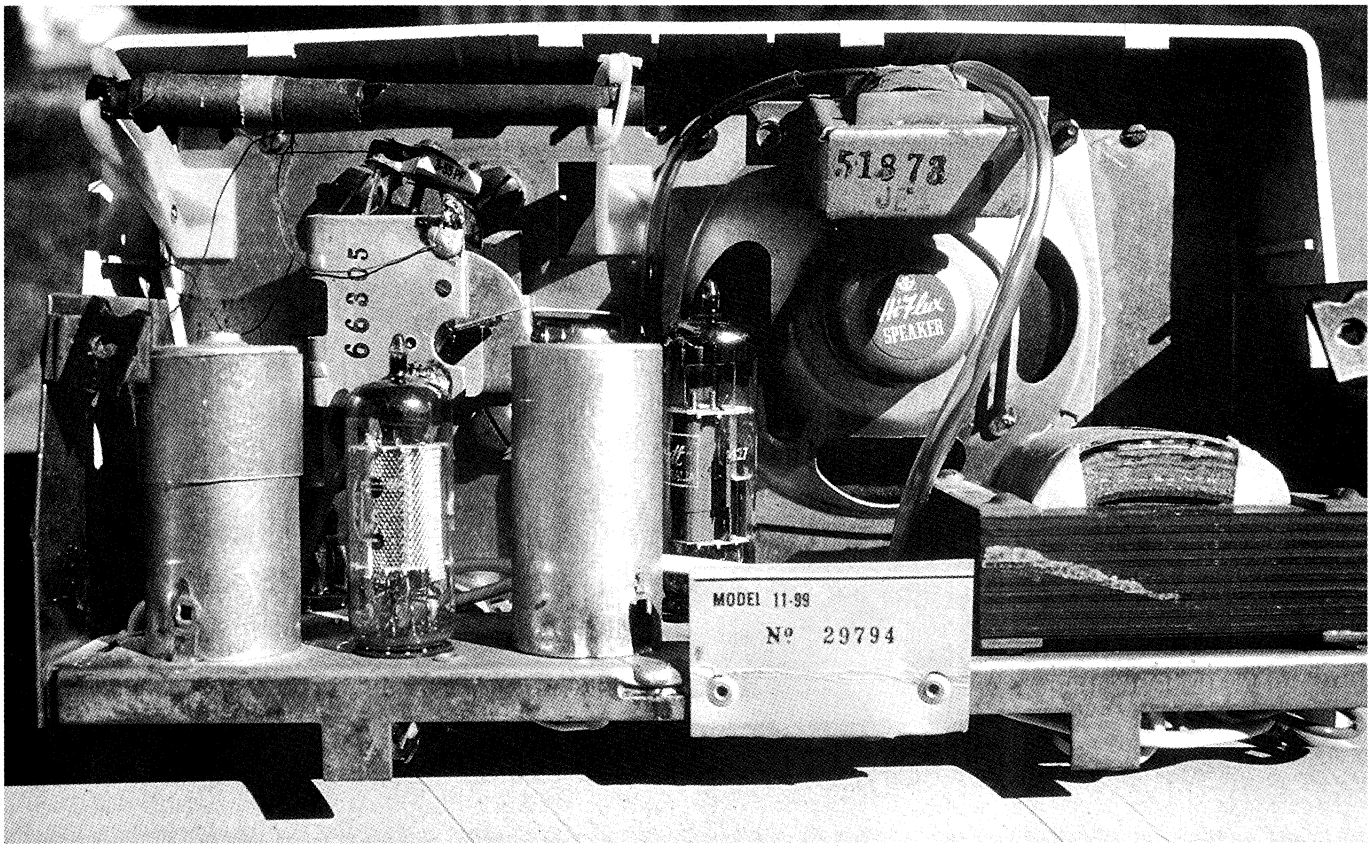
The Kriesler 11-99

The Kriesler 11-90 was up and running by 1962 and was no doubt doing the job that it was designed for. However, the inroads that transistorised sets were making into the traditional valve mantle set market were soon to become apparent, with many people choosing to use transistor sets despite their inferior performance to valve sets at that time.

The 11-90 also proved to be a relatively reliable set, mainly I suspect because of its low high-tension voltages. It used paper capacitors and these do become leaky over time, although this is less pronounced when the HT is relatively low. Even so, in both the 11-90 and the 11-99 receivers, capacitors C2, C9 and C10 (see Fig.1) should be replaced with polyester types to ensure proper circuit operation. The other paper capacitors are not in such critical locations so their replacement is optional if they don't becomes warm during operation (an indication of excessive leakage).

Although the 11-90 was doing a good job, some extra features were needed to keep the set selling against transistorised receivers. The 11-99 was the outcome of these deliberations.

First, the set was modified so that it could tune to a few interesting stations that were just outside the normal broadcast band, at the 1600kHz end of the dial. To do this, the set was tweaked to get it to tune up to around 1750kHz (mine goes to 1790kHz). The stations "just off the end of the dial" of normal sets were the university stations like VL2UV and the inshore marine radio services between



The 11-99 (and the earlier 11-90) featured an uncluttered chassis that's easy to service. Late-model 11-99s used a solid-state rectifier instead of the 6V4 valve.

1700kHz and 1750kHz.

Although most of these stations no longer operate, there are now a number of different special interest stations in the 1600-1700kHz band. These include Greek, Italian and Turkish language stations, as well as some RPH (Radio Print Handicapped) stations.

The cabinet of the 11-99, although basically the same as the 11-90 in shape and size, featured a different front grille and logo. And because it tuned higher in frequency than the 11-90, it had a new dial scale.

Because the sensitivity of the 11-90 was only just adequate, it was necessary to jazz up the performance of the 11-99 to receive the (low power) special-interest stations. Indeed, my 11-99 is a superb performer – it is one of the most sensitive sets that I have and is able to (noisily) resolve signals as weak as 1μV. The circuit is virtually identical to the 11-90 so I am not really sure what they did to get such a dramatic lift in sensitivity. They may have redesigned some of the IF transformers, or perhaps it was just the increase in HT voltage due to the solid-state rectifier used in the power supply.

A solid-state rectifier was only fitted in very late model sets and this increased the HT(2) voltage from 110V to 133V. It's quite possible that this may have been enough to get the 6AN7A and 6N8 valves really firing. The HT current drawn by the 11-90 is 42mA, while the 11-99 draws 48mA. This represents an increase of nearly 1W in power consumption, however the power transformer is not overloaded as it no longer has to supply current to a 6V4 heater - a saving of nearly 4 watts. The result is a net saving of 3 watts in overall power consumption.

The new set, like many from this era, used a twin tuning gang with dissimilar gang sections. The manufacturer of the gang, MSP (Manufacturers Special Products, a subsidiary of AWA), did a really good job with the plate shapes. The oscillator and signal circuits accurately track each other 455kHz apart right across the tuning range. In fact, the tracking is as accurate as I have seen, which made aligning the set a breeze and ensures uniform sensitivity right across the band.

As an aside, some other tuning gangs made for padderless operation had incorrectly shaped plates. As a result, the oscillator and signal sections do not accurately track each other 455kHz apart, which means that it is impossible to get the tuned circuits accurately aligned for the entire broadcast band. This is very disappointing, as some potentially high-performance transistor sets are mediocre performers because of this.

As can be seen by looking at the circuit of the 11-90 (Fig.1), it is quite basic. In fact, the same circuit diagram was supplied with both the 11-90 and the 11-99 receivers right up until production ceased, even though the 11-99 circuit is slightly different.

The photographs of the set show that it is not cluttered and as a result, is easy to service. The back of the set is removed by taking out two screws and lifting it off. This allows access to all components that would normally require service. How many sets require so little work to gain access to the internals and also have a circuit diagram supplied with them to make it just that bit easier? It could be described as a serviceman's dream - easy and quick to service, with the circuit supplied.

The differences in components and voltages between the 11-90 and the

11-99 are not great but as has been said, the performance of the latter is better. In the 11-99, C12 = 47µF 160 VW, C13 = 47µF 160 VW, and a BY126 solid-state diode has been used instead of the 6V4 rectifier valve. The 11-99 high tension voltages are also higher, with HT2 = 133V, HT1 = 90V, RF screen volts = 53V and the bias = -5.7V.

My Kriesler 11-99

I came across my 11-99 in a small country town. It was up on a cupboard and the ticket on it said that it didn't work. Because it didn't work, the price paid for it was very reasonable, especially considering that "working" sets were 4-5 times the price.

When I got it home, I removed the back and carefully checked it for any signs of major problems, such as a faulty power transformer. The critical capacitors were all replaced and I checked for any shorts on the HT line and tested the speaker transformer. When I turned it on, it behaved just as the ticket said – it didn't work. In fact, there wasn't even a peep out of it.

The voltages were checked and they all appeared on the high side, the exception being the bias voltage which was -1.5V instead of -5.7V. The 6GV8 would normally draw most of the set's current but it wasn't hot to the touch, which suggested that it may be faulty and not drawing current at all. A replacement 6GV8 was installed and the set sprang into life.

The alignment of the set was slightly out and so this was adjusted. It peaked up quite nicely and the sensitivity was very high. After that, the set was given a general clean up and allowed to run for some time. It proved to be a very good performer.

Well, was Kriesler successful with the 11-99? I would say yes. It was a sensitive set that worked very well on a reasonable aerial and earth. The very fact that more than 40,000 sets were produced over a number of years, until around 1973, indicates that this little set prolonged the valve era in Australia, because it effectively tapped into a niche market. **SC**

CORRECTION: Last month's Vintage Radio was incorrectly attributed to John Hill who has now retired. The author was, in fact, our new regular columnist Rodney Champness.