Vintage Radio

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Kriesler 11-59 5-Valve Dual-Wave Mantel Receiver

Like many manufacturers, Kriesler built numerous 5-valve, dual-wave receivers with quite good performance. The 11-59 receiver was aimed at the low-priced end of the market but its performance was still quite acceptable, with good reception on the shortwave stations.

Dual-wave and multi-band receivers were quite popular during the late 1930s through to the mid 1950s. These sets covered both the broadcast band and a selection of shortwave bands between 1.5MHz and 30MHz.

Initially, multi-band receivers covered just the medium-wave band of 550-1500kHz and the long-wave band of around 150-400kHz. In the early days of wireless, it was considered by "the powers that be" (ie, government authorities) that wavelengths shorter than 200 metres (1500kHz) were useless for long-range radio operation. As a result, they decided to allow amateur radio operators to use wavelengths shorter than 200 metres in the belief that they would be able to do no more than "get over the back fence".

In practice, the amateurs quickly demonstrated that shortwave was the best to use for long-range communications. That, in turn, soon led to the authorities (having wiped the egg from their faces) allowing various broadcasting stations to use the shortwave bands. These early shortwave broadcasts were mainly nationalistic programs loosely disguised as general entertainment.

Eventually, various segments of the shortwave bands were allocated by international agreement for these broadcasters. These bands became known as the 120, 90, 75, 60, 49, 41, 31, 25, 19, 16, 13 and 11-metre bands, with a 23-metre (13MHz) band added at a later date.

Like millions of others throughout the world, Australians grasped the opportunity to listen to shortwave radio broadcasts, particularly the direct test cricket broadcasts from England. There was nothing like listening through the static and fading while Bradman compiled another century!

Multi-band receivers

Multi-band receivers, like the AWA 6-valve 7-banders (see March & April 2002) were used by many keen shortwave listeners during the late 1930s and into the 1950s. However, the cost of these radios was quite high due to the complexity of the switching that was necessary in order to tune the various bands.

For this reason, many manufacturers produced sets with just one shortwave band. The international broadcast bands of most interest were in the 6-18MHz range or the 7-22MHz range. By only tuning one or the other of these ranges, it was practical to have just one shortwave band plus the broadcast band installed in the set.

This drastically reduced the complexity and the price of the receiver and opened up a new market for such radios.

Up until the late 1940s and even into the 1950s, most dual-wave receivers

The Kriesler 11-59 was a budget-priced dual-wave mantel receiver. It covered the broadcast band from 540-1650kHz and the 6-18MHz shortwave band.

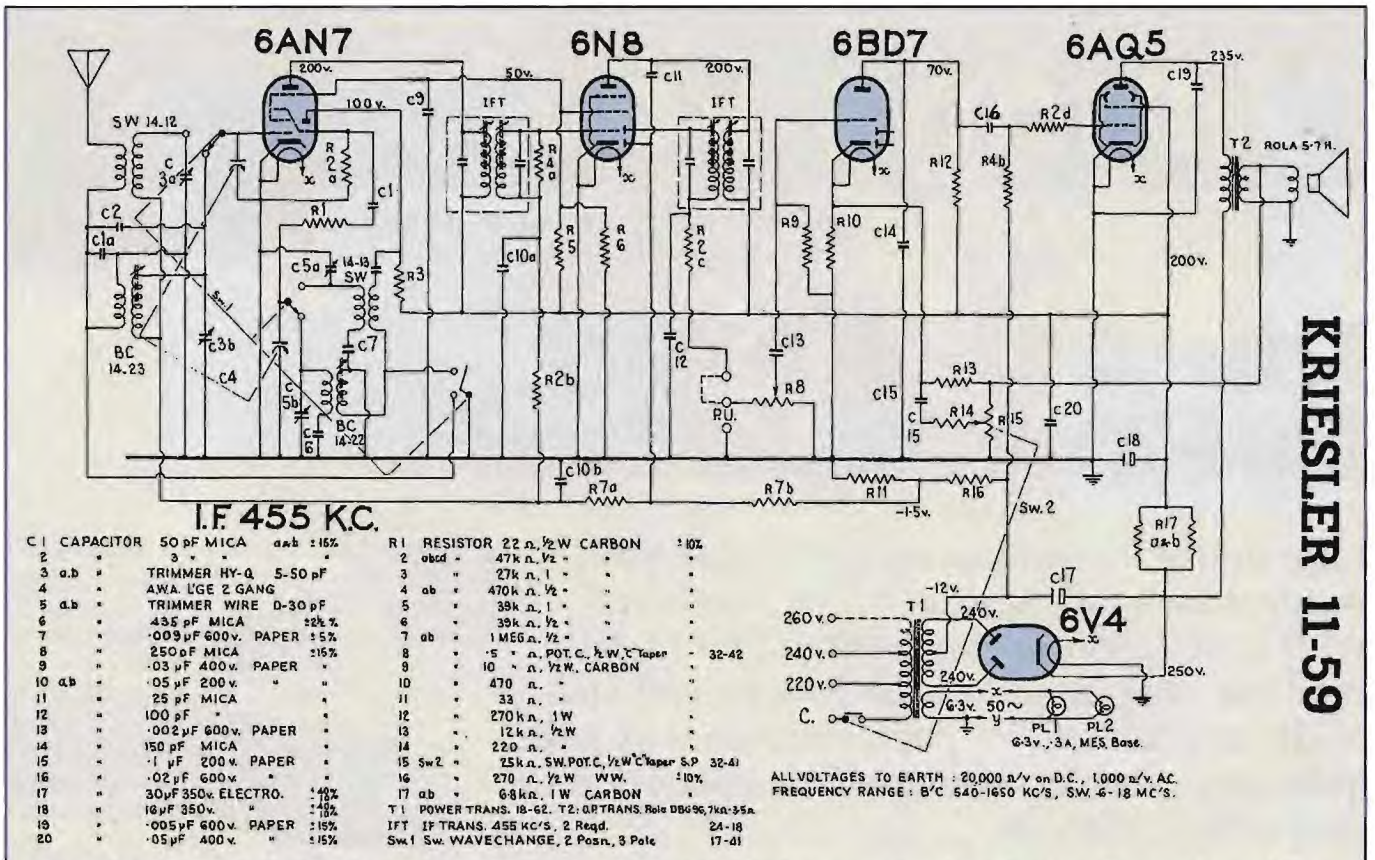


Fig.1: the circuit of the Kriesler 11-59 dual-wave receiver. It's a fairly conventional 5-valve superhet receiver with a 6AN7 converter, a 6N8 IF amplifier and 6BD7 & 6AQ5 audio amplifier stages. A 6V4 is used as the rectifier.

with decent shortwave performance included a radio frequency (RF) stage. However, the introduction of valves such as the 6AN7, 6AE8, 6AJ8 and other triode-hexode valves for the converter stages made it possible to obtain good performance without an RF stage, thus further reducing receiver cost. These valves are low-noise converters, whereas valves like the 6BE6 and similar pentagrid converters are inherently noisy by comparison.

An additional feature of shortwave broadcasting during that period was that the transmitter powers were being increased, as were the antenna gains. Today, Radio Australia at Shepparton uses transmitters of 100kW output. These feed antennas with gains that give an effective radiated power in the favoured direction of up to 10MW. No wonder an RF stage is no longer needed!

In fact, I know of one listener in Rockhampton who can listen on 9MHz to Radio Australia (Shepparton) on a crystal set.

Some very good dual-wave receivers were manufactured but there were some duds too, such as the dual-wave 4-valve sets. The latter just didn't have enough gain to be useful on shortwave.

By the mid-1950s, most Australians were no longer interested in listening to shortwave. The average dual-wave set was probably tested on shortwave a few times during its life but generally, the wave-change switch was left in the broadcast position.

That said, there was a niche market for dual-wave receivers from the late 1940s right through to the early 1960s, due to Australia's expanding migrant population. Many were homesick and shortwave radio broadcasts gave them the opportunity to listen to news from home.

Kriesler 11-59

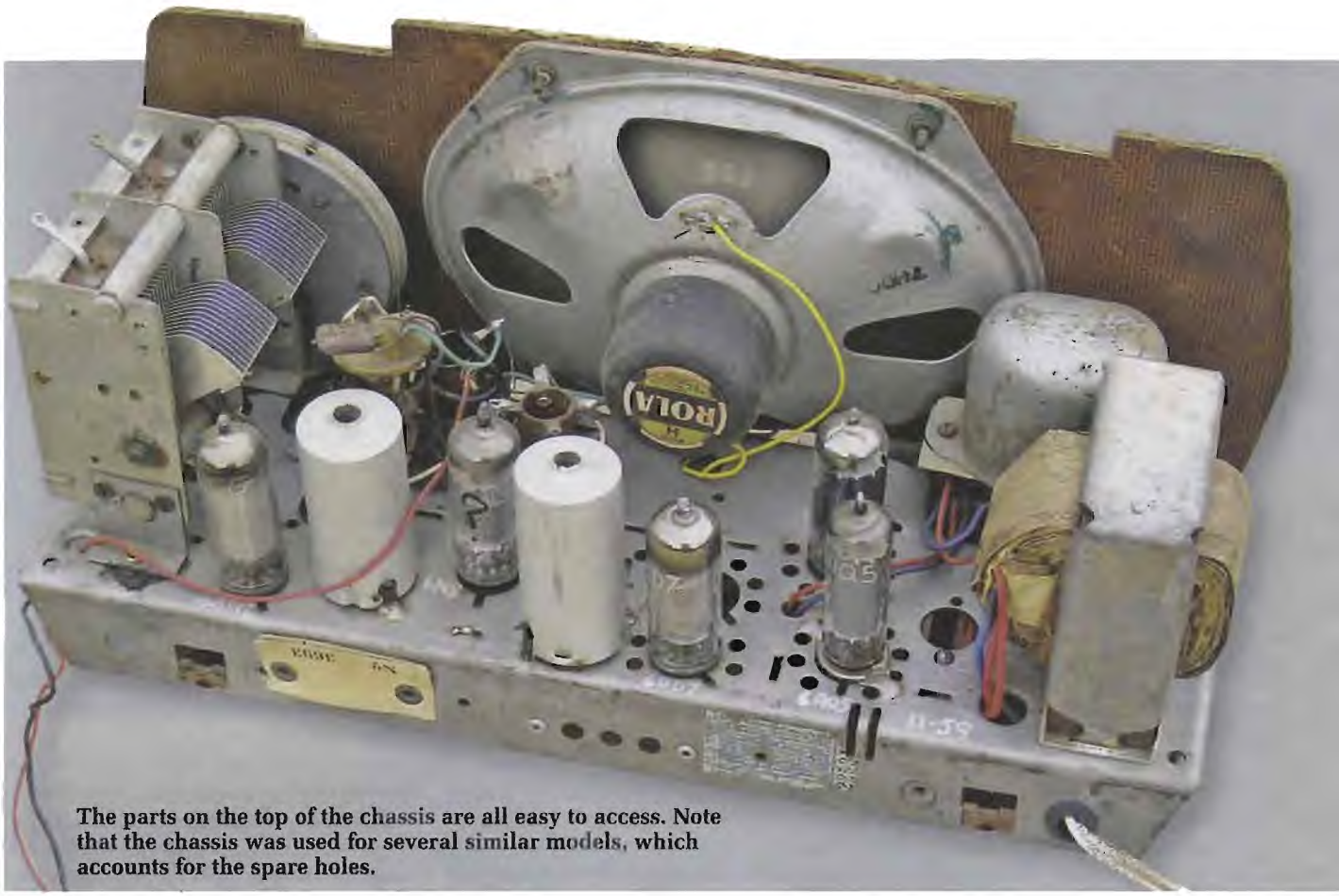
During the 1950s, Kriesler built a number of different mantel receiver models on a common chassis and mounted them in the same cabinet. The main difference in the appearance of these sets was the front escutcheon, which had provision for either two or four control knobs. The dial scales were also different, to suit particular models.

I obtained my Kriesler 11-59 dual-wave receiver back in 1992 as just a dirty, greasy chassis with no cabinet. I initially thought that I would scrap the set and use the parts as spares for other sets. However, when I looked at it more closely, it was plain that it was a dual-wave model, which I didn't have. As a result, I decided to clean it up, restore it to full working order and scrounge a cabinet from a similar broadcast-band only Kriesler set.

The clean-up

Most of the cleaning was done using rags and kitchen scouring pads soaked in household kerosene. To get into the awkward spots, I used a screwdriver to push a kerosene-soaked rag around. This proved effective and the majority of the muck was removed from the chassis and the components. It certainly wasn't pristine but it certainly looked a lot better than when I started.

Note that because kerosene is slightly oily, it also acts as a rust inhibitor.



The parts on the top of the chassis are all easy to access. Note that the chassis was used for several similar models, which accounts for the spare holes.

As a result, the set's metalwork hasn't shown any obvious increase in rust since it was obtained 1992.

I was fortunate to have a cabinet from another receiver that I could use for the set. It responded well to automotive cut and polish compound to get rid of some small scratches and the cabinet now looks quite presentable. I had three knobs that were in good order but the fourth was slightly damaged and I have so far been unable to get a suitable replacement.

The felt washers that go between the knobs and the front of the cabinet were missing so I had to cut some out. The felt sheet was obtained from a craft shop and two hollow hole punches were used to cut out the centre and the outer edge of each washer.

Another problem was that the paintwork on the front panel behind the dial escutcheon had faded. This was given a coat of gold-coloured spray paint and it came up looking quite good.

Circuit details

The circuit is similar to many other 5-valve dual-wave sets of the 1950s. It covered the broadcast band from 540-1650kHz and a shortwave band from 6-18MHz. Fig.1 shows the details.

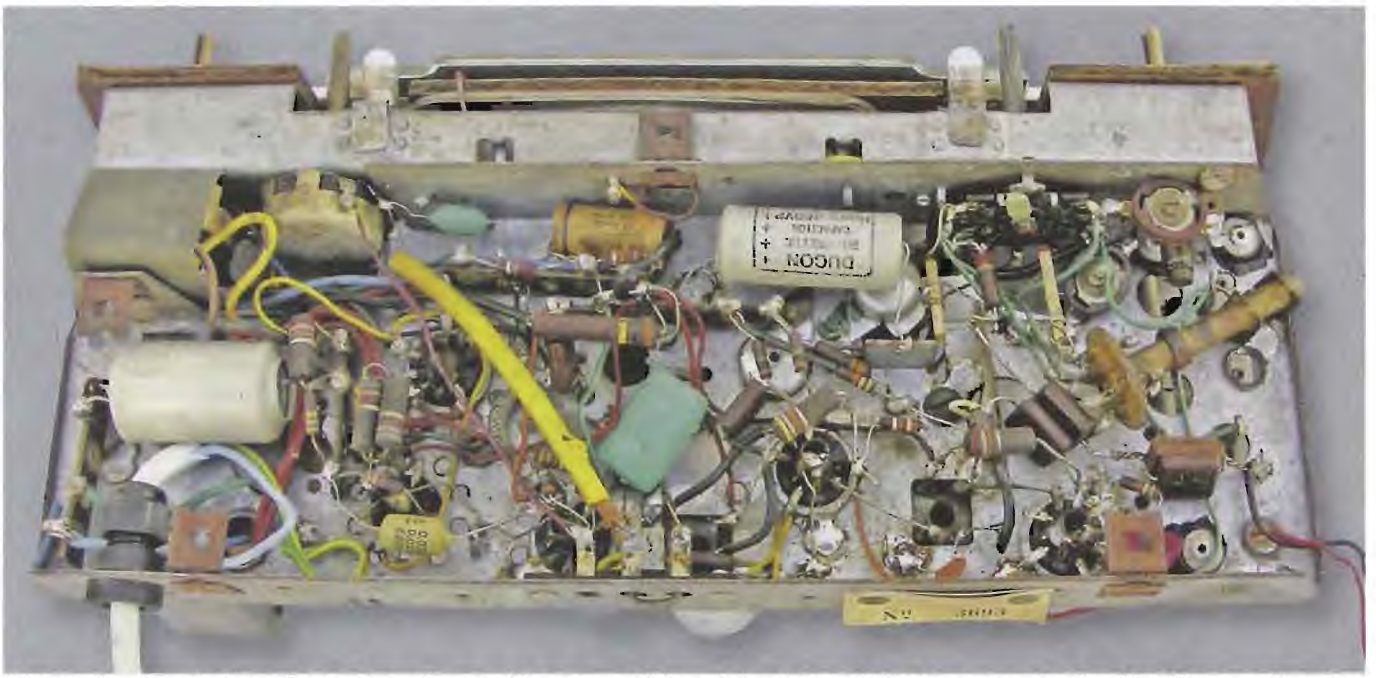
As shown on Fig.1, a 6AN7(A) is used as the converter valve. This stage converts the incoming signal (either broadcast band or shortwave band) to the intermediate frequency (IF) of 455kHz.

A 3-pole, 2-position switch is used to switch the aerial and oscillator coils. The untuned windings on the coils are wired in series with one another in such a way that operation on either band is not compromised. This method of wiring saves using a bigger switch to achieve the band changes.

The converter's output is fed via an IF transformer to the pentode section of a 6N8 valve which acts as an IF amplifier stage. A diode inside the 6N8 acts as the detector, while a second diode is used to provide delayed AGC.

The gain of the IF amplifier is apparently high enough to cause the IF stage to be regenerative, so the secondary of the first IF transformer has a 470kΩ resistor across it to improve stability. The cathodes of both RF stages are earthed and -1.5V of bias is applied to these stages via a back bias arrangement consisting of resistors R11 and R16. This -1.5V also sets the delay for the AGC system, so a reasonable amount of output is obtained before any AGC is applied to the front-end of the receiver.

In addition, a bias voltage of -12V is derived for the 6AQ5 output valve



This under-chassis view shows the rather untidy nature of the wiring. The original 2-core mains lead has been replaced by a 3-core lead, so that the chassis could be earthed for improved safety.

(ie, at the junction of R16 and the transformer's HT secondary centre tap). Note that 235V of HT is applied to the 6AQ5's plate, while 200V is applied to its screen and to the plate circuits of the two RF valves (6AN7 & 6N8). The 6BD7 has a plate voltage of just 70V.

Following the detector, the extracted audio signal is applied to a plug and socket arrangement on the back of the chassis. This allowed the set to be used as a normal radio receiver or simply as an audio power amplifier (mono) for a turntable. I'm not sure how often this facility was used in the real world but it was probably rarely used. Basically, it was a handy sales gimmick that didn't cost much to provide.

Two stages of audio amplification are provided, first by a 6BD7 and then by a 6AQ5 output stage. Note that feedback from the voice coil of the loudspeaker is applied to the cathode of the 6BD7 to lower distortion. This feedback network also acts as a tone control in conjunction with potentiometer R15. The audio quality from the Rola 5-7H loudspeaker is quite good.

Power supply

The power supply is quite conventional and is based on a 6V4 rectifier. This is driven by the centre-tapped secondary of the mains transformer and delivers a nominal 250VDC of HT. Capacitors C17 & C18 and resistor R18 provide the necessary filtering.

Overhauling the circuit

My first step in overhauling the circuit was to replace the paper capacitors with polyester types. The only one I didn't replace was the tone control capacitor (C13), as even quite high leakage here would have little effect on the operation of the set.

The electrolytic capacitors all proved to be in good order and reformed readily (the techniques used to reform electrolytic capacitors were discussed in the October 2006 issue). The resistors were then checked and were all found to be within tolerance, which is within around 10% of the marked value.

Next, the speaker transformer windings were checked for continuity, as was the power transformer. The power transformer was also tested using my 1000V insulation tester for any breakdown between the primary and the chassis. No discernible leakage

resistance was detected so it was still in good order.

As can be seen from one of the photos, the wiring in the set is rather untidy with bits and pieces added here and there in any available space. This is probably due to the fact that the same chassis was also used for a variety of broadcast-band sets. That said, the set isn't difficult to work on.

Testing

Having determined that no obvious faults were present, the set was connected to the mains and switched on. Unfortunately, it wasn't working, there being no audible output.

Because the audio amplifier input is at the back of the chassis, it was easy for me to place my finger on the link. A healthy "blurt" immediately came from the speaker which meant that the audio amplifier stages (6BD7 & 6AQ5) were OK. The problem was therefore in the RF section of the set so I initially decided to try replacing the two valves in that section. Replacing the 6AN7 had no effect but when I replaced the 6N8, the set burst into life.

Alignment of the receiver was quite routine and was along the lines described in the December 2002 and January & February 2003 issues. The sensitivity of the receiver is quite good and shortwave stations are quite easily heard.

As with most dual-wave receivers of the era, tuning on shortwave is extremely touchy and care is needed to accurately tune stations in. Perhaps this is one of the reasons why these sets were not used to any great extent on shortwave. By contrast, sets that had bandspread shortwave bands were much easier to tune and were more popular.

Postscript

Having restored this receiver around 15 years ago and not using it since, I wondered how it would go after such a long period of inactivity. Initially, I once again reformed the electrolytic capacitors by turning the set on for around 30 seconds, then off for a short period and then repeating this procedure several times. No overheating or any other untoward things occurred but one dial lamp was not working and the set refused to operate correctly.

There was plenty of noise from the set on the broadcast band, which increased as lower frequencies were tuned. This indicated that the local oscillator wasn't working. I then operated the band-change switch and the set worked but with quite a bit of "crackling".

The cure was quite simple. First, the chassis was removed from the cabinet and the band-change switch sprayed with Inox to clean the contacts. That done, the non-operative dial lamp was tightened down in its socket (it had come slightly loose).

Once those simple steps had been completed, the set burst into life as soon as power was re-applied. It just goes to show that, having restored these old radios, they require little maintenance and will keep going with reasonable care.

Like most sets of the era, this set had a 2-core power lead, so the chassis wasn't earthed. That said, I have never encountered a faulty power transformer that had shorted between its primary and metal frame.

However, there's always a possibility of this occurring, with the danger that someone could be electrocuted. As a result, the 2-core lead was replaced with a 3-core lead so that the chassis could be earthed.

The best way of obtaining a 3-core lead is to buy a low-cost 3-metre extension cord. It's then just a matter of cutting the socket off and wiring the cable in to the equipment.

Summary

The 11-59 is a good performer, its main drawback being that the tuning on shortwave requires critical adjustment. There's no noticeable backlash in the tuning though and although a better tuning mechanism would have been nice, the set was designed for the low-cost end of the market.

Finally, the components are all run well within their ratings and this would contribute to a long operational life for the set. In summary, the 11-59 was a fine example of Kriesler's design and and manufacturing expertise. It's a set I am happy to have in my collection. SC

Photo Gallery: 1934 Emmco "Little Jewel"

PRODUCED BY THE ELECTRICITY METER MANUFACTURING CO., Waterloo, NSW, the "Little Jewel" was another example of a small wooden mantel set in a style that was popular at the time. The set is a 5-valve autodyne superhet and was manufactured in 1934.

The valve line-up was as follows: 57 autodyne mixer; 58 IF amplifier; 57 anode bend detector; 2A5 audio output and 80 rectifier. Photo: Historical Radio Society of Australia, Inc.