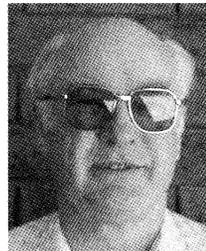


# VINTAGE RADIO

By RODNEY CHAMPNESS, VK3UG



## A mainland Chinese radio receiver from the 1960s

**It's not often that one gets to work on a radio set that was manufactured in mainland China during the 1960s. The set described here had some interesting features, including valves that were pin-for-pin compatible with western types.**

Occasionally, one gets the opportunity to examine vintage radios from behind the Iron Curtain. Many of us are familiar with the Russian transistorised multi-band portable radios that appeared from time to time on the market. One example was the Selena, which evoked curiosity from the elec-

tronic fraternity in the 1970s. This interesting set used a turret tuner to do the band changing, something rarely used by western manufacturers.

But what about sets that were made behind the other end of the Iron Curtain (or was it the Bamboo Curtain)?

What did the communist Chinese make in the way of radio receivers? They didn't export valve radio equipment to the Free World and they were, in fact, quite insular at the time.

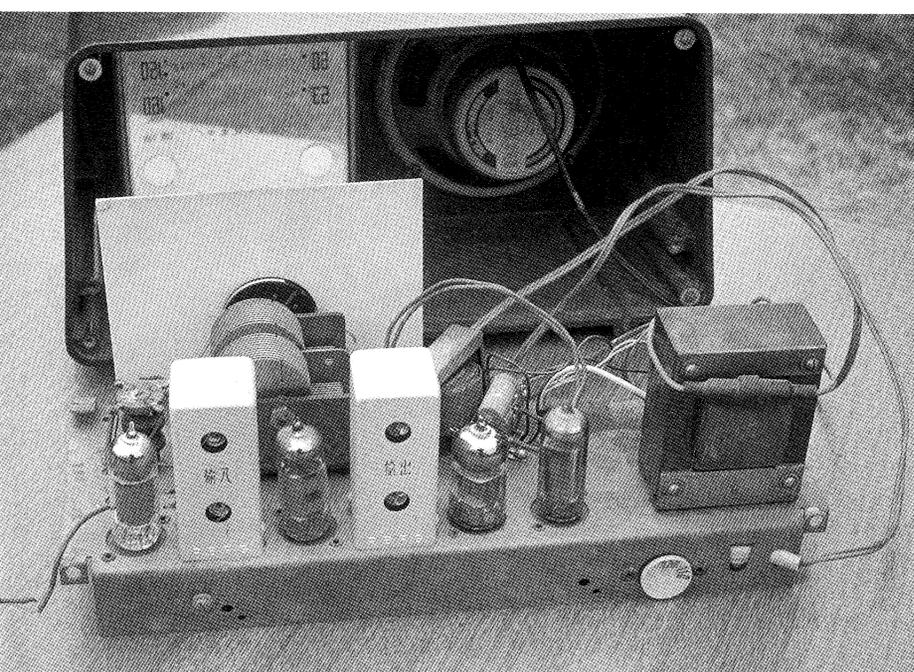
An opportunity to see what they did in the 1960s presented itself towards the end of 1997, when a friend obtained a set from a market in Shanghai. I was keen to see this set and to gain some idea of what the Chinese were doing in electronics around 1963, the year the set was manufactured. It is quite an interesting radio, with one or two unusual ideas.

The receiver itself is a 4-valve BC superhet, designed for use on either 110VAC or 220VAC, with a transformer power supply. The various views of the set show the wiring style used and what the various components looked like.

Some aspects of the set's electronic and mechanical design are similar to our methods. However, we tended to use point-to-point wiring during that era, while this receiver used tag strips quite extensively. This meant that some wiring was unnecessarily long – it certainly wasn't point-to-point.

In addition, the capacitors were generally larger than the types used here for the same ratings. But some things never change – they suffer exactly the same





The 455kHz IF transformers are unusual in that the adjustment slugs are at the back of the cans. Obviously, the coils are mounted side by side, a technique used in some early Australian IF transformers.

problems of excessive leakage. The resistors were similar to the ones used by the Japanese of the same era but appeared to be of better quality.

### IF transformers

The accompanying photographs show that the 455kHz IF transformers are rather different to those used by Australian manufacturers. The adjustment slugs are at the back of the cans and it is obvious that the coils are mounted side by side, as were some early Australian IF transformers. The aerial and oscillator coils are similar to the slug-tuned coils of the same era in Australia.

Aligning the oscillator and aerial coils at the high frequency end of the tuning range is a bit of a problem. The trimmer capacitors are similar to the all-wire types used by Philips and some other manufacturers. They use a 16-gauge (or thereabouts) enamelled wire as one lead and fine tinned wire wound around the enamelled wire as the other lead. They can only be easily adjusted once. I removed the one on the aerial coil and replaced it with a conventional trimmer capacitor, which is easier to adjust.

### Chassis layout

From the photographs, it can be seen that the chassis layout is quite conventional. However, there is one

thing I really do like about this receiver when it comes to servicing – tip it upside down and it rests fairly evenly on the two IF transformers and the power transformer. This makes it very easy to work on the under-chassis components. The set will also sit quite nicely on the end that's adjacent to the power transformer.

It's a pity more Australian radios weren't made like this – servicing them would have been so much easier.

Getting the set out of the cabinet is a breeze too. First, you remove the plywood back panel (no cheap cardboard here) by removing four screws. After that, you simply pull the two knobs off, unscrew two bolts on the back of the chassis and pull it out. One point of interest is that the front edge of the chassis is wedged into a slot made in the plastic, which stops it from moving around. Operatic sets used a similar method of attaching the chassis to the cabinet.

The set had previously been serviced on a few occasions and the work was rather rough, so some of my criticisms regarding the layout are not entirely directed at the manufacturer. That said, the manufacturer must have had some training on wiring from Radio Corporation, as single-strand insulated wire was used and the wires were all wrapped around their respective terminals several times! This

means that the parts can only be easily removed by cutting them out, as it isn't easy to unwind the soldered leads without cooking everything in the near vicinity.

### Circuit details

I find that having a circuit of a set makes servicing so much easier. Unfortunately, my trusty copies of the Australian Official Radio Service Manuals were of no help this time, so I had to trace the circuit out myself.

I started by checking the valve types, as this can give a good idea of the style of circuit used. The line-up included a 6A2, a 6K4, a 6N1-J and a 6Z4, none of which I'd ever heard of before. They are all miniature types and all have seven pins except the 6N1-J which is a 9-pin valve. These valves are taller than a 6BA6 but shorter than a 6AQ5.

In short, the valves were all "home-grown" types, the exception being the 6Z4 which appears to be a miniature version of the 84/6Z4.

These unknown valves certainly added to the difficulties of tracing out the circuit. The set appeared to be a superhet of some sort, with two coils



creased somewhat but was otherwise OK. I then substituted another 6BQ7A and it really went well except that it was unstable.

The audio amplifier appeared to be taking off due to RF signal from the IF strip feeding back into it. This problem was cured by placing a 47kΩ resistor in series with the grid (pin 7) of the audio amplifier output stage. This was yet another example where insufficient IF filtering in the audio amplifier causes trouble.

I didn't try substituting a 6X4 rectifier in place of the 6Z4, as a wiring modification would have been necessary. However, I'm sure it would have worked well had this been necessary.

### Other problems

By now the set wasn't performing too badly but there were still a few things to be sorted out. First, the power transformer had one half of its HT secondary winding open circuit and I suspect that it had been in this condition for quite some time. To overcome this problem, the two plate leads (pins 1 and 7) of the 6Z4 were joined together and the faulty winding lead was cut off.

This step increased the HT voltage by about 20V. In addition, a 240V AC supply is rather high for a set designed for run off 220V AC, so a 180Ω 5W resistor was wired in series with the mains. This gave a nominal 220V AC on the primary of the transformer. Running the set for a few hours in this condition showed no abnormal temperature rise in the transformer despite the open circuit winding.

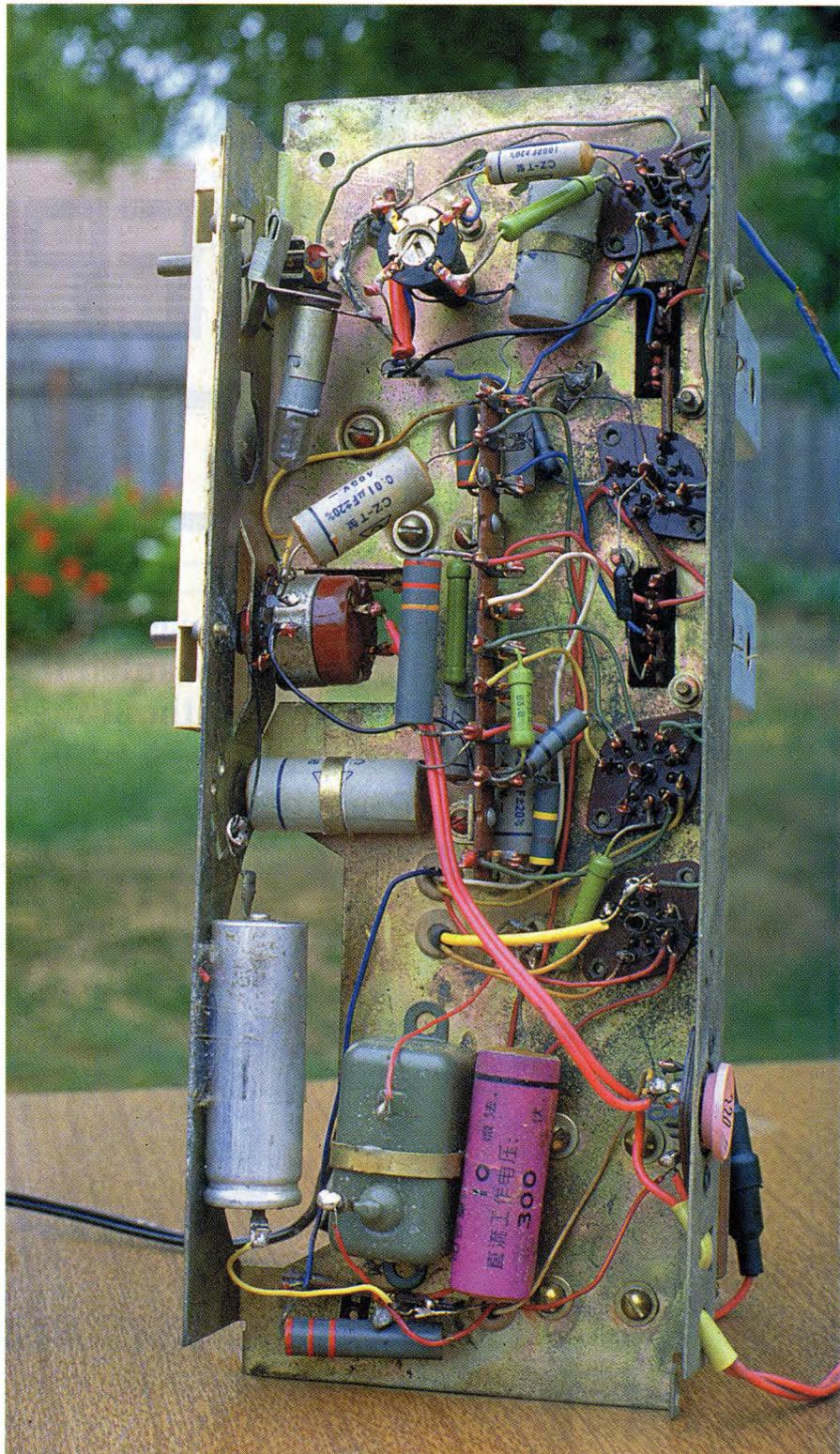
As pointed out, the valves used are similar to ones we know and they draw the same heater currents, the exception being the 6N1-J which draws 0.6A compared to the 6BQ7A's 0.4A. For replacement purposes, the 6A2 = 6BE6, 6K4 = 6BA6, 6N1-J = 6BQ7A and the 6Z4 = 6X4 (with some wiring modifications).

Did the Chinese copy our valve types and give them different type numbers or was it just coincidence?

### Summary

In many ways, the set is not greatly different from the average Australian 4/5 valve superhet radio of the era. As already pointed out, the main difference concerns the use of a twin-triode audio output stage.

I suspect that the pin-for-pin com-



The Chinese receiver used tag strips quite extensively, while Australian sets of the same era mainly used point-to-point wiring. In addition, the capacitors are generally larger than the types used here for the same ratings.

patibility of valves and the general similarity in many areas to sets in the West is just too much of a coincidence. However, other areas of the set's design are quite original and different.

It's hard to judge what market it was intended to fill but at a guess it was probably intended for the upper class market in China of that period. A similar set here would have been considered an austerity model. **SC**