

Serviceman



The customer who'd imported what was very nearly an expensive boat anchor!

Paying to have a piece of very expensive second-hand electronics equipment shipped from the other side of the world can be pretty risky — especially when the equipment concerned is a high-end valve hifi amplifier, as one of this month's stories illustrates. We also have the tale of tracking down weird intermittent faults in an ageing germanium-era electronic organ...

these do have high performance figures.

During the 1960s, one of the last of these classics to appear was the Radford, a 'no compromise' example of the best of valve technology, with a specification that even by today's standards is impressive. Capable of a genuine 100 watts RMS per channel at 0.1% distortion, its two output stages each used a pair of ultralinear connected KT88 tetrodes.

The phase inverter driver stages were long-tailed pairs of frame grid EF184 TV pentodes and the input stages used cascode ECC88 double triodes. The complete stereo amplifier is quite large, massive and very heavy. To lift one entails first taking a deep breath and then risking a hernia!

One local enthusiast was so keen to obtain one of these monsters that he arranged the purchase of one in England and had it air freighted to New Zealand. What his freight bill totalled, I hate to think.

By all accounts, the amplifier had been used in a pub. That it was working at all is more a tribute to Radford quality than to its environment, but the new owner soon discovered that whilst one channel seemed to be operating well enough, the other was not. A new set of very expensive valves did not help, and it was then that my aid was sought. I agreed to look it over and the monster was duly heaved onto my workbench.

Opened and with the bottom cover plate removed, some serious modifications were immediately apparent. The output stage of the faulty channel had been altered to more or less straight tetrode operation, with reduced screen and altered bias voltages.

This suggested that a misguided attempt had been made to change the operating conditions to class AB2 — not possible with conventional driver coupling. This roused some deep suspicions. It is not unknown for

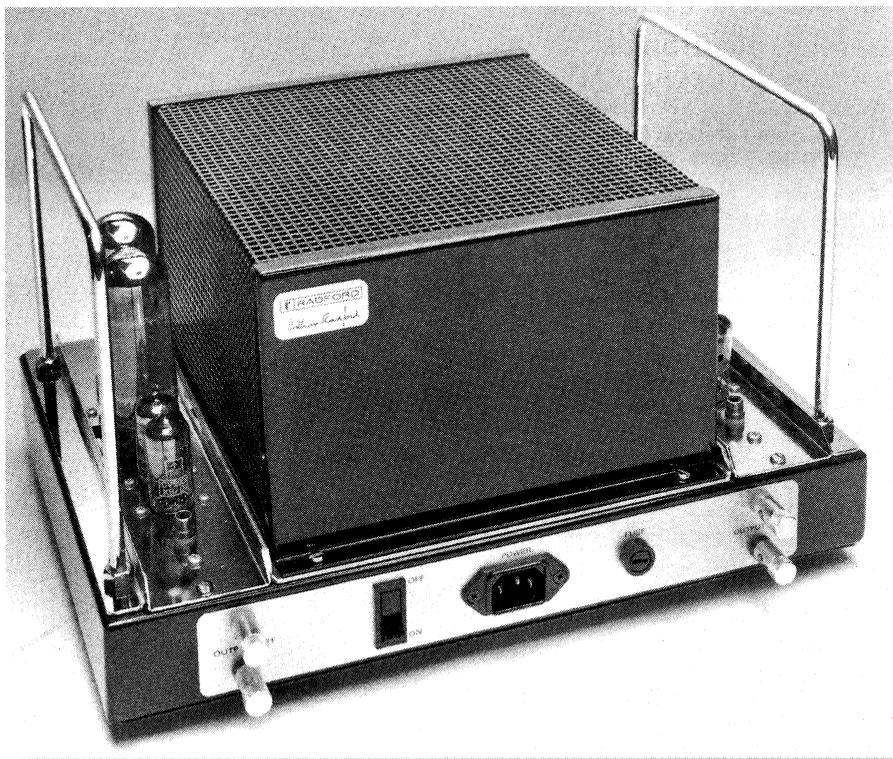
This month we open the column with a story from a familiar contributor over the Tasman, Peter Lankshear. You'll no doubt recall that Peter conducted our Vintage Radio column for many years and from that you might deduct (correctly) that he is a 'full bottle' on valve technology. This story continues his association with the old 'bottles with lights in them', although this equipment is more up-market than the old five-valve mantels he used to write about.

Here's what Peter has to say...

This story is unusual in that it describes a repair job that started in England and was completed 20,000km away, in New Zealand. It also made me aware of the questionable ethics of the service persons concerned.

An unforeseen and remarkable development in the ever-changing world of electronics has been the widespread enthusiasm displayed by a significant number of audiophiles for perpetuating the use of valve audio amplifiers. The outcome has been the manufacture of expensive and technically obsolete equipment and at times an acceptance of what are, in fact, reduced performance standards.

A related group of enthusiasts has gone to great lengths to search out and have refurbished, surviving classic high quality amplifiers such as the Williamson, Leak and Quad. Unlike some present day valve counterparts,



The Radford STA-25 valve power amp, 'little brother' of the model discussed in Peter Lankshear's story.

a circuit to be modified in a vain attempt to cure a fault, but such desperate measures in this type of equipment never work.

At this stage, with no data or circuit available, I was not prepared to do any more until some information could be obtained.

The required manual eventually arrived, and I was able to check all components likely to have deteriorated, and restore the circuit to its original state. Most resistors and capacitors were mounted on printed circuit component boards with numerous connections to the valve sockets and power supplies.

A methodical progress through the amplifier revealed only a few components out of close specification, and most of the work entailed tidying the wiring, replacing butchered terminals and sockets and correcting the modifications. Because I had found no really faulty capacitors or resistors, I was had an open mind as to whether or not the crippled channel would now work.

One hand in pocket...

With the amplifier switched on I took a detailed set of meter readings and found that the voltages of both channels were close to specification. (With 600 volts of HT floating around the chassis, I made sure one hand was firmly in my pocket!) So far so good. It was now time to listen to the audio quality.

To connect a 100-watt amplifier directly into a workshop speaker is a bit pointless and potentially damaging, so I fitted up an 8Ω high wattage load resistor with a small sample of the output for the speaker. With an FM tuner connected and the gain wound well up, both channels produced what seemed to be plenty of high quality output. Certainly, the horrible sound from the modified stage had gone. I sat back, enjoyed the music and speculated as to the real reason for the modifications.

There was however still a lingering doubt, so I dusted off the oscilloscope, an audio oscillator and a meter known to be accurate at audio frequencies and set about measuring the output. The good channel produced a fraction over the required 28.3 volts into 8 ohms, but the other managed only half of this figure, equal to 25 watts. This confirmed (a) the futility of using ears to measure audio levels, and (b) that there was still a fault.

What was left to go wrong? It had to be the output transformer. Swapping the connections over to the good channel confirmed that there was indeed one faulty transformer. It was the worst possible fault — and the most expensive item by far, assuming a spare could be found, which was unlikely.

Here was the real reason for the modifications. Someone had probably discovered the faulty transformer and had attempted to correct the lack of output by altering the output stage. And when this was unsuccessful, the owner must have decided to quit the amplifier. I couldn't help but wonder if it would have been exported to New Zealand had it been in good condition...

A 100W wide range output transformer is a massive beast. It has about twice the amount of iron required for a power transformer of the same power rating and is at least twice the size of the mains transformer for a large valve receiver. But the real problem is the very specialised sectional winding methods. The Radford transformer has four secondary and four primary windings and each primary section is tapped for the ultra linear screen connections.

Furthermore, two of the primaries are wound in the reverse direction and as each pair is connected in parallel, the number of turns on each section has to be exactly the same (in this instance 1000 turns). If the transformer could not be repaired or replaced, there would be an unhappy owner of a very expensive boat anchor.

Valve amplifier enthusiasts are purists, and only a Radford transformer would have really been acceptable.

There was one possible solution. New Zealand Vintage Radio Society members are fortunate in that one of their number is a REAL transformer rewinding expert. He has been at the game for over 60 years and will tackle anything, invariably turning out a superb job with better craftsmanship and materials than the original.

He also has an extensive database of transformer specifications and when he is confronted with a new transformer, his first action is to meticulously unwind it, noting the exact number of turns and the configuration. But would he take on the complex Radford? A phone call ascertained that he would!

The beautifully rewound transformer duly arrived back and was soon in operation with full output now available on both channels. One very happy owner was able at long last to enjoy his music, and I was able to reflect on the perils and expenses of repairing old amplifiers, and the inadvisability of importing used equipment.

However, there was one last sting in the Radford's tail. A few weeks later the owner called to say that he now had a small annoyance. He listened in rapture to the Radford daily, but about once a week it would briefly produce a small frying sound that would disappear as soon as the occupant of one particular EF184 socket was touched.

He had tried several new valves to no avail. After all we had gone through, to now have an intermittent fault was as welcome as the proverbial hole in the head!

There was nothing for it but to invert the chassis on the workbench and leave it running. Nothing happened for a few days. I felt it was a dry joint of some sort and eventually resorted to prodding around. Here I found that one section of the PC board was at times microphonic.

Out came the board — again — but a close inspection with a magnifying glass showed nothing unusual. I then unsoldered one of the joints in the troublesome area, to discover that the resistor lead

was quite black under the solder.

This had to be the problem and although externally they appeared OK, several similar joints were found. To make completely sure I unsoldered all the component leads, cleaned and then carefully resoldered them. This was a year ago and the Radford has not given any further trouble.

If a conclusion can be drawn from this adventure, it is that all equipment has a finite life — which can be extended, but often with considerable and uneconomic effort. I believe it also shows why it is unwise to import used equipment without some safeguards.

So how about that? I wonder what would have happened if the Transformer Whizz had been unable or unwilling to tackle the rewinding job. As you say, Peter, it would have been a very expensive boat anchor...

Of course, we don't know the history of the amplifier. The modifications may have been authorised by an owner who was quite satisfied with the compromised performance. I've struck people who are happy to have quite expensive gear patched up rather than properly repaired.

The argument often is that they aren't sufficiently interested in high quality to warrant the extra cost of full repairs. And I suppose the attitude is quite legitimate. But then, why did they go to the expense of buying costly gear in the first place, if quality wasn't important? Did they only buy the brand name?

The practice of 'rough patching' only becomes unethical when the equipment is sold off and the new owner is not told of the service history. It's not often possible to conduct full output trials on high-end audio products, and low level tests can be quite misleading. I imagine that's what has happened in this story.

Thanks for that tale, Peter, and we are looking forward to your next contribution, whenever it may be.