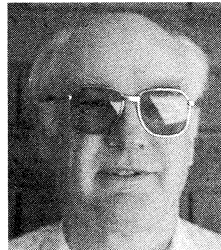


# VINTAGE RADIO

By RODNEY CHAMPNESS, VK3UG



## Making the obsolete useful again

**Radio receivers running off vibrator power supplies were common in many rural areas right up until the 1950s. Many of these sets were later converted to mains operations as 240V AC power became available but some sets were more difficult to convert than others.**

In many country areas of Australia and New Zealand, 240V AC mains power didn't become available until the 1950s. Before that, all sorts of voltages were used in country towns, while those living on farms may not have had any source of power other than batteries for their radios.

Where power did exist, voltages such as 12, 32, 50, 110, and 250V DC were common. Of course, some places had their own 110V or 240V AC supplies, although in general these sources only covered a small area and were

rather limited in output, with frequent interruptions to the supply. Are you old enough to remember having to pay the "electric light bill"? Before the war, electricity was almost exclusively used for lighting with few or no power points in the home, hence the bayonet adaptor that went into the light bulb socket so that the radio could be powered.

To cater for areas where there was no mains supply, radio sets were specifically designed to run off a 1.5V or 2V battery for the filaments and 90-

135V dry cell batteries for the HT supply. Unfortunately, these were expensive to operate relative to the cost of running sets off the 240V AC mains. As a result, to keep costs down, many sets that used battery valves were designed to operate from a 4V or 6V wet cell battery via a vibrator power supply. The valve filaments were usually wired in a series-parallel configuration to minimise current drain.

Suddenly, these sets became obsolete when mains reticulated power came to an area and homes were connected to it. As a result, many old sets were either stored in the garage or thrown onto the local garbage tip – vintage radio collection and restoration was not even thought of in the 1940s, 50s and 60s. This was a shame because these sets were generally very good performers as they were designed for rural areas where signals weren't all that strong.

I hate seeing things that are still in good working order go to waste and, along with many others during that era, converted many of those otherwise obsolete sets to 240V AC mains operation. Of course, you wouldn't do that today as there are few of these receivers still around in origi-



**Left: this is the view inside the cabinet of the converted HMV 268 receiver. The conversion involved replacing the valve line-up and replacing the 6V vibrator circuitry with a mains-operated power supply.**



**The HMV 268 came in a stylish wood veneer cabinet and featured both shortwave and medium-wave AM bands.**

nal condition. At that time however, it was much better to convert the sets rather than have them go to the rubbish tip.

It's worth noting that "Radio & Hobbies" (later "Radio, TV & Hobbies") ran articles on converting many of the common types of sets used in country areas to 240V AC mains operation. It was cheaper to convert than to buy a new set and, what's more, the conversion was usually very successful. Often, a converted set worked better than before and was cheaper to run into the bargain.

### **Ease of conversion**

Some sets were easily converted to mains operation, these being the 32V sets with vibrator power supplies and using "mains-type" valves, eg, 6AQ5, etc. All that was necessary with this type of set was to remove the vibrator power supply, replace it with a mains supply and rewire the heaters and dial lamps for 6V operation. And because they were designed for remote country areas, these sets usually outperformed the newer AC mains sets which invariably lacked an RF stage (as used in the vibrator-powered designs).

Unfortunately, sets using "battery-type" valves were much more difficult to convert. This applied regardless as to whether the set used batteries to supply all the necessary voltages or whether it used a vibrator

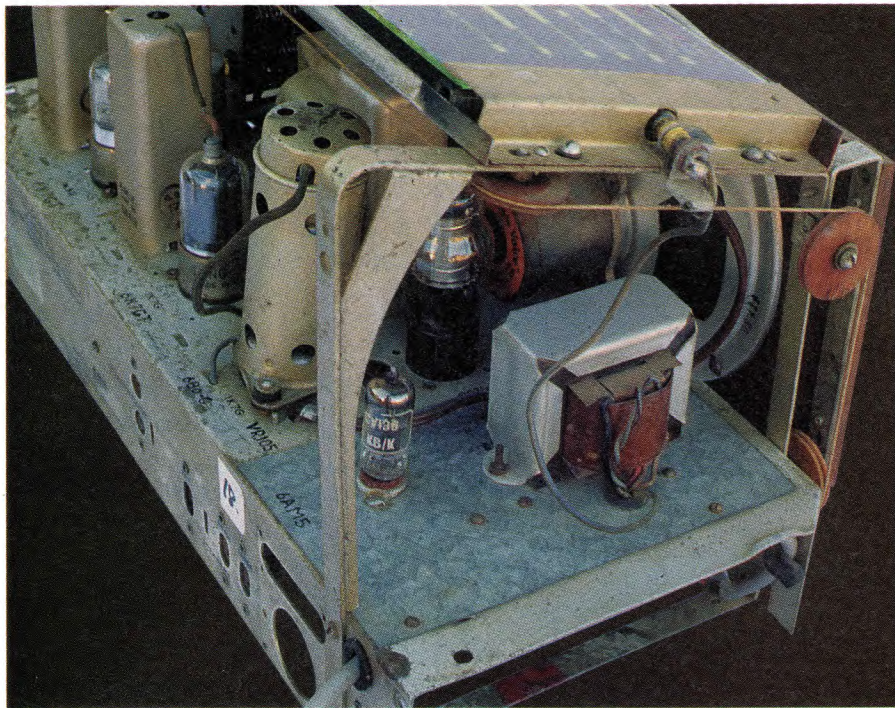
power supply to derive the necessary voltages from one battery.

It really was much more of a challenge with the battery sets. First, it was necessary to change all the valves and this involved finding out which valves in the AC range had similar characteristics to the battery valves being replaced. Second, AC valves usually work on higher supply voltages (usually 200-250V), whereas the battery sets usually ran on 135V and some on only 90V. This meant that many of the paper capacitors had to be replaced with higher voltage types.

Third, quite a bit of redesign was necessary in order to obtain good performance from the new valve line-ups. However, many servicemen in country areas rose to the challenge and many fine conversions were made to radios otherwise destined for the local rubbish tip.

Converting 32V sets that used only 32V of high tension was a challenge too. That's because the valves, although AC types, run at very low voltage and have low gain. For starters, it was necessary to replace the 25L6 valves with 6V6GTs or similar but because of the large increase in gain with the increased supply voltage, considerable redesign was necessary – even to the point of removing some stages.

The RF and IF sections were usually left running off 30-45V which meant that no modifications were nec-



This end view shows the location of the “new” power transformer and audio output valve. The new supply was much simpler than the vibrator supply it replaced.

essary to their operating conditions. This usually achieved a satisfactory result – after all it was only the audio section that needed beefing up.

### Converting an HMV 268 6V vibrator Receiver to 240V AC

My parents owned an HMV 268 dual-wave table model, a 6V vibrator receiver using five 2V battery valves. The circuit is shown on page 193 of Volume 7 of the Australian Official Radio Service Manual.

In its original format, the old HMV 268 was an excellent set. The short-wave band extended from 6-18MHz but where I lived, the local emergency fire service used a frequency of 2.836MHz and we had no radio capable of listening to important fire calls.

As a young and relatively new devotee to radio, I decided that I would modify the shortwave coils so that it tuned from around 1.7-5MHz, so that the fire calls and amateurs on the 1.8MHz and 3.5MHz bands could be heard. The receiver was duly modified and I had a lot of fun listening to these stations – when my parents weren’t using the set of course.

Unfortunately, recharging the 6V battery that powered the receiver was something of a chore, requiring a trip to the local garage. However, my parents had a smart, young son who reck-

oned he could save them the trouble of this ritual.

I decided that I could charge the unit directly from our 32V lighting plant by putting two 12V globes in series with the battery. The total calculated voltage added up to 30V, so the globes weren’t going to be drastically overloaded. What’s more, by only charging the battery at night, the two globes would become part of our home lighting system – waste not want not.

I found out after I had installed the system that it was very effective, provided the 32V batteries were off charge. However, it was a different story when they were on charge, the 12V globes glowing brilliantly for a short while until they blew!

The real test of my radio prowess came at the end of the 1950s, when we got 240V AC power after having had 32V DC for about 15 years. The set would either have to be converted to 240V AC operation or thrown out, as we no longer had a ready source to charge the battery. Fortunately, there was an article on converting receivers to mains operation in the December 1953 issue of “Radio & Hobbies” and this steered me in the right direction.

Using the article as a guide, I started by checking out which AC valves had similar characteristics to those that were being replaced. I decided on a

12AH8 converter to replace the 1C7G but a 6J8G or a 6K8G may have been a better choice, as I wouldn’t have needed to change the valve socket. In addition, a couple of 6K7GT valves were wired in place of the 1M5G and 1K7G valves in the IF amplifier, as their mutual conductance is similar to the valves they replaced and I didn’t want any problems with instability.

A 6B6G was used in place of a 1K7G for the second detector and first audio stage, the gain of a pentode being considered unnecessary in this position as the overall gain of the set would be higher with AC valves anyway. The audio output stage became a 6AM5 instead of a 1L5G. I would have liked to have used an octal output valve but I didn’t have one with a similar output impedance and the 6AM5 nearly matched the 1L5G.

It was then necessary to look at the voltage ratings of the capacitors. The set ran on 135V but now it would run on about 250V. Most of the capacitors had a 200V rating and were replaced with 400V units where necessary.

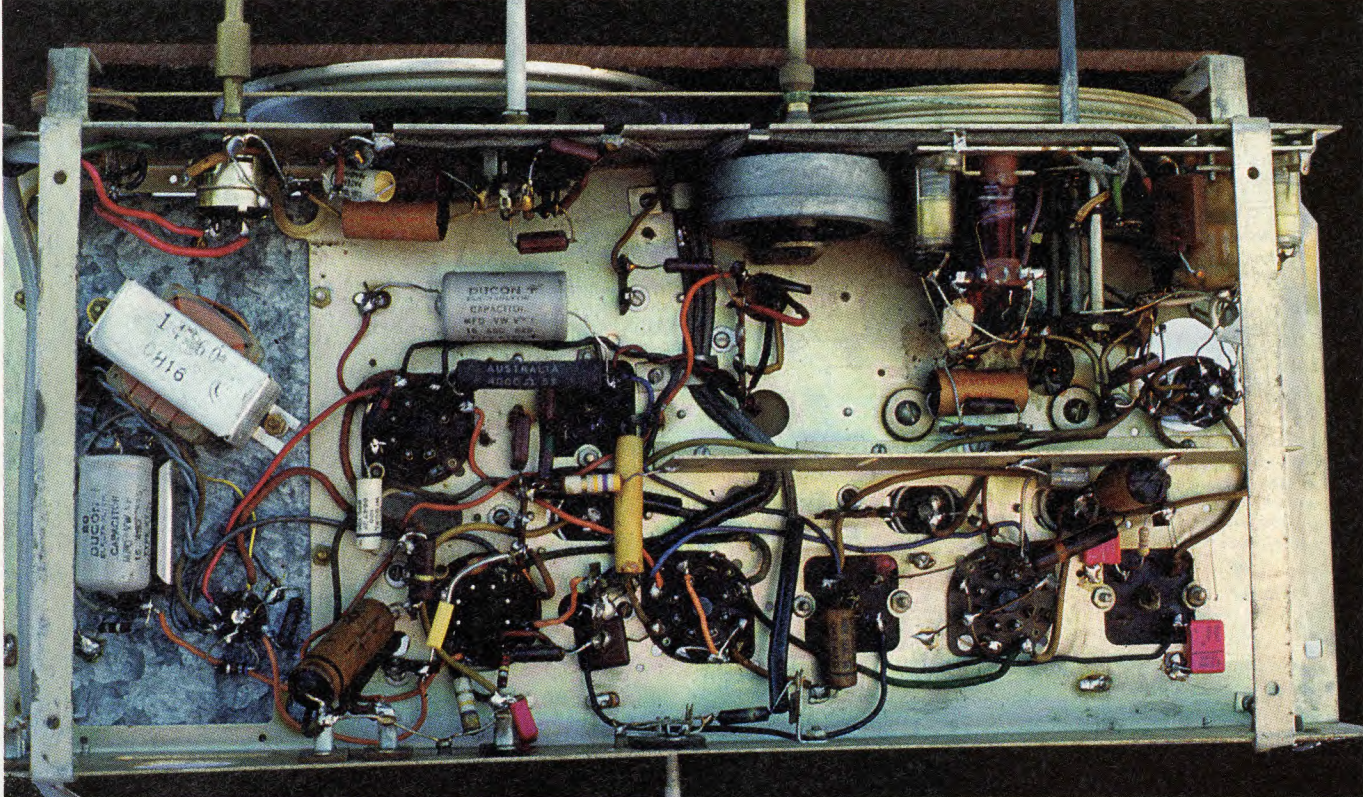
At this stage, the 6V vibrator power supply was taken out of the set and consigned to the junk box. A metal sheet was then bolted across where the vibrator supply had been and a power transformer and a selenium block rectifier fitted in its place. The electrolytic filter capacitors were wired into position under the chassis.

The retrofitted power supply can be seen in the photographs. The new AC supply was certainly much simpler than the vibrator supply it replaced.

Wiring the heaters of the new valves was straightforward, since it was no longer necessary to use a series-parallel arrangement. However, it was necessary to fit a resistor and capacitor between each cathode and earth to give the bias required and rewire the valve sockets to suit the new valves.

In my enthusiasm to stabilise the screen voltages, I also wired in a VR105 105V gaseous regulator. This was really an overkill and quite unnecessary (at that time, I wasn’t as competent as I thought I was).

Anyway, it all worked reasonably well and the old HMV once again took pride of place in the lounge room. Eventually, my sister took possession of it and it continued to work satisfactorily until a brush with lightning caused the shortwave aerial coil to go



This "under-chassis" view of the converted HMV 268 shows the wiring layout. The electrolytic capacitors for the new power supply are at left, adjacent to the socket for the audio output valve.

open circuit. After that, she didn't want it any more so I got custody of it and decided to get it operating again.

Being more knowledgeable now than I was then, I soon found a few problems with my original conversion which caused the set to be slightly unstable. After some investigation, I found that the automatic gain control (AGC) line was radiating a signal at the intermediate frequency (IF) and this was being picked up by the IF front end – hence the instability.

Don't assume that the AGC line is always "cold" with no signals on it – some have quite a lot of IF signal on them. The original valves in the old HMV didn't have as much gain as their replacements, so this problem didn't occur with the original circuit.

Carefully re-routing the AGC lead and adding some extra bypassing solved the instability problem and the set now goes extremely well. It is one of the favourites in my collection and has quite a lot of sentimental value.

### Converting an AWA 532MF 32V receiver to 240V AC

A number of these radios were going to be thrown out as the reticulated power mains snaked around the coun-

try area in which I lived. These sets used a 6BA6 RF amplifier, a 6BE6 converter, a 6BA6 in the IF stage, a 6AV6 detector and a 6AQ5 audio output stage. They also used a synchronous vibrator power supply which ran from a 32V DC supply.

This valve line-up is the same as used in many high-performance AC sets, so they were well worth converting. And the conversion was even simpler than for the HMV 6V vibrator set described above.

In brief, the vibrator power supply was removed from the set and the dial lamps and valves heaters all wired in parallel to run off 6.3V. A power transformer was also installed and solid-state diodes used to rectify the high-tension voltages. The electrolytic capacitors were reused since they were quite adequate for the job.

These sets and similar 32V sets that had AC valves and a vibrator supply were very easy to convert and the sets performed better than before. That's because there was no longer any residual vibrator hash.

### Should we convert sets now?

My personal belief is no, we shouldn't convert any more vibrator

sets to mains operation. There are several reasons for this: these radios are now quite scarce, they are a part of our radio heritage and they are interesting receivers in their own right.

Some collectors wrongly believe that these battery or vibrator-powered radios are useless because there is no easy way of powering them. However, suitable AC-operated power supplies are available to operate these sets and occasional advertisements can be seen in electronics magazines. Articles on making your own power supplies have featured in the magazines too, so there is no reason why these radios cannot be made fully operational.

So why did I do conversions on these sets if I now believe that they shouldn't be done? Well, it was a different era and the conversions were done to save good high-performance sets from the rubbish tip during the period that the 240V reticulated mains spread throughout the countryside. In the period from the mid-50s into the early 60s, these conversions were commonplace and made good economic sense.

And even though those converted receivers are no longer 'standard' they are an example of what happened in that era. It was a short but interesting period in the history of radio in Australia.

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