

VINTAGE RADIO

By RODNEY CHAMPNESS, VK3UG



The Diason P.P. 32/6 DC receiver



Designed for rural communities, the Diason P.P.32/6 employed six valves and ran off 32V DC. It was a good performer with some interesting design features.

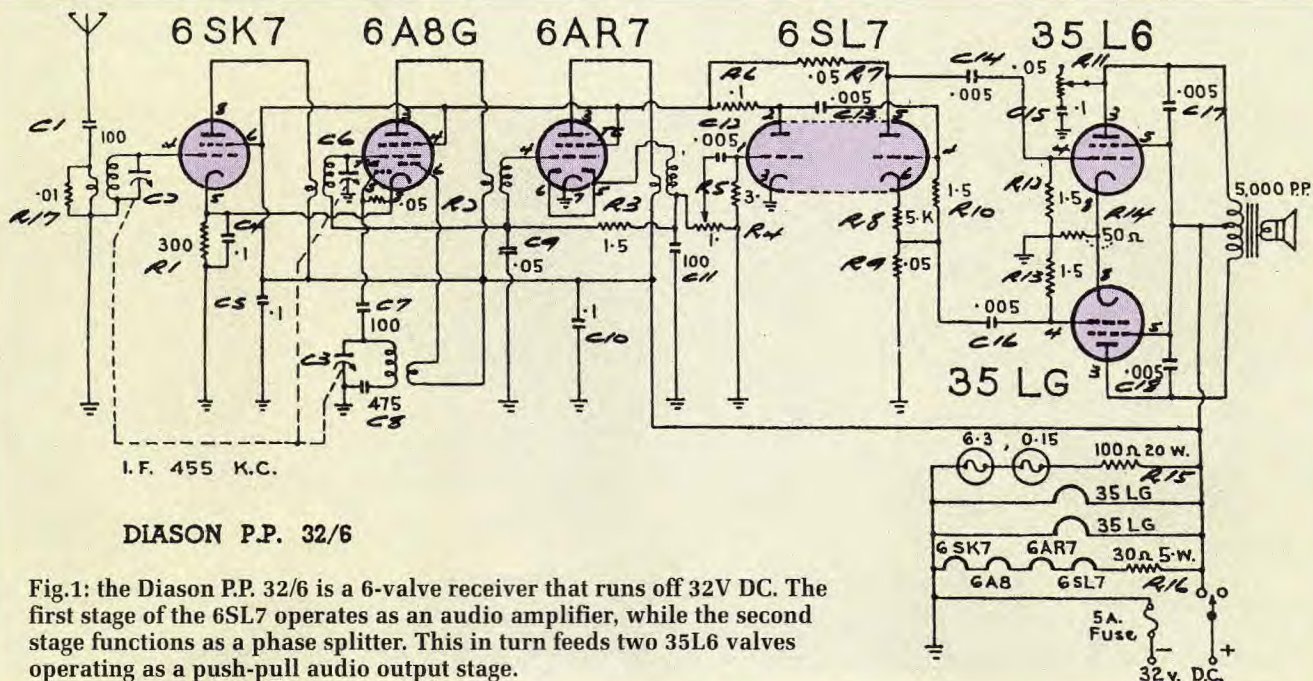
Many will not know the Diason brand, as Diason Radio was a small family company and was not a major player in the 1950s domestic marketplace. They produced a couple of portable receivers, one exclusively battery operated and another a battery/AC model in 1950. In addition, they produced three DC-powered receivers – the 32/6, 50/6 and 110/6 – in the same year.

The 32/6 and 50/6 were virtually identical except for the way the heaters were wired in these 32V and 50V DC receivers. The 110V (model 110/6) receiver used the same heater wiring circuitry as the 50/6 but employed 12V heater series valves instead of the 6V series. For example, a 12SK7 was used in lieu of a 6SK7, while the audio output valve was a 50L6 instead of a 25L6. The high tension (HT) to the

plates and screens came directly from the supply voltage, as was common with some Astor 32V receivers.

Just how well these near identical receivers worked would be interesting to know. The gain of each stage with 32V HT would not be very high, so even with a radio frequency (RF) stage and two intermediate frequency (IF) stages, the set would have been quite stable despite the minimal use of decoupling throughout the set.

With higher voltages, the gain would have increased and I suspect that the higher voltage sets could be quite unstable. Additionally, the bias on the 25L6 (50L6 in 110V set) was only -1.5V, as supplied by a dry cell.



On 32V, this would have been quite adequate but with 110V on the plate and screen of the 50L6, the bias should have been -7.5V.

In the standard format that is shown in the Australian Official Radio Service Manual (AORSM) Volume 9 for 1950, I believe the higher voltage sets would have been absolute disasters. For this reason, I suspect that either no 50V or 110V sets were produced or if they were, the circuit was altered to overcome the problems of the higher voltage supply.

A worthy successor

The successor to the 32/6 (50/6 and 110/6) receiver was the interesting 32V DC-operated P.P.32/6 model of 1953. This set overcame the very real faults that were evident in the previous models. Some time ago, I had an opportunity to examine one of these later sets, which belonged to Ralph Robertson, a fellow member of the Vintage Radio Club in northeast Victoria.

It is noticeably better in design than the earlier models and there is no sign of instability – just good performance. It uses a 6SK7 RF stage, a 6A8G converter and a 6AR7 IF amplifier and detector. This then drives a 6SL7 audio amplifier and phase splitter, which in turn feeds two 35L6 valves operating as a push-pull audio output stage.

This general circuit layout is inherently quite stable with a low HT sup-



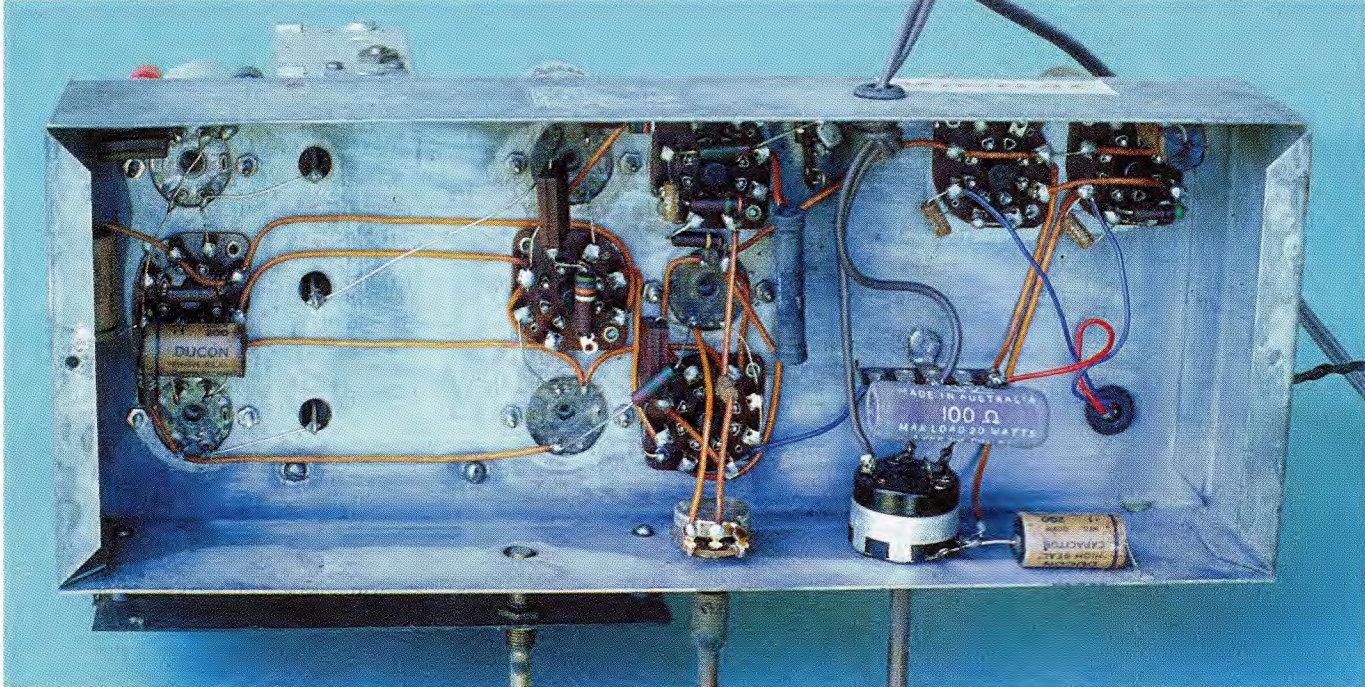
The chassis is easily removed from the cabinet for service, although the loudspeaker also has to be removed since its leads are too short.

ply, as the gain of each individual stage is relatively low. There is some gain at RF frequencies, some at the converter and some at the IF frequency. However, the receiver does not have a lot of gain within any one frequency range, although the total gain throughout the receiver when the gain of all stages is totalled up is quite significant.

The low-level audio stages have

quite reasonable gain and feed the push-pull 35L6 valves. A single class-A 35L6 would be struggling to provide enough audio output to satisfy listeners, since the output would only be in the order of 100-150mW. With two push-pull valves, the audio output is more than doubled.

Radio Corporation's Astor receivers also used two 25L6 valves (similar to the 35L6) operating in push-pull in



This under-chassis view shows just how few components there are. This made for a reliable set that's very easy to work on.

the audio output stages of their 32V HT receivers.

Restoring the PP 32/6

When Ralph obtained his radio, it was in rather a sorry state. The 6A8G and 6SL7 valves were missing and the loudspeaker had been damaged when someone had carelessly put the chassis back in the cabinet, putting the volume control spindle through the cone in the process. Admittedly, the set's physical layout is at fault in allowing this to occur.

The loudspeaker is attached to the cabinet and its leads are too short to allow the chassis to be withdrawn easily. Additionally, it is not practical to work on the set with the speaker in the cabinet. The leads can be extended or the speaker removed from the set to allow service as shown in the accompanying photograph (extending the leads is my preference).

After removing the chassis, both it and the inside of the cabinet were cleaned. Fortunately, this was not a particularly difficult job as there had been no rodents as house guests.

Inspection of the underside of the chassis didn't reveal any paper capacitors sufficiently leaky to warrant replacement. They must have been a good batch – either that or the low HT doesn't stress the capacitors as much as in a set with higher HT voltages.

And of course, there would not be much heat generated under the chassis.

Even so, I would still replace the most critical capacitors, these being C9 and C13 in this set.

The twin power lead was fitted with a 2-pin polarised plug. It's interesting to note that many DC sets were fitted initially with the normal 3-pin mains plug and, as a result, many 32V sets have been plugged into the 240V AC mains with disastrous results. People forget that voltages other than 240V AC were often used in earlier times.

Typically, the owners of secondhand shops, eager to see if the sets work, plug them into the 240V AC. Hopefully, a fuse blows and no further damage is done.

No other components proved defective in Ralph's set so it was time to give it a test run. It was connected to a 32V DC supply but it soon became evident that the set was not well. Checking revealed that one 35L6 had no emission and a replacement soon had the audio section up and running.

The voltages around the receiver were then checked and found to be in order. So what voltages do you expect in a radio with a 32V HT supply? The plates and screens of all valves other than the 6SL7 should be 32V; the cathodes of the 6SK7 and 6A8G should be about 1V; and the cathodes of the 35L6

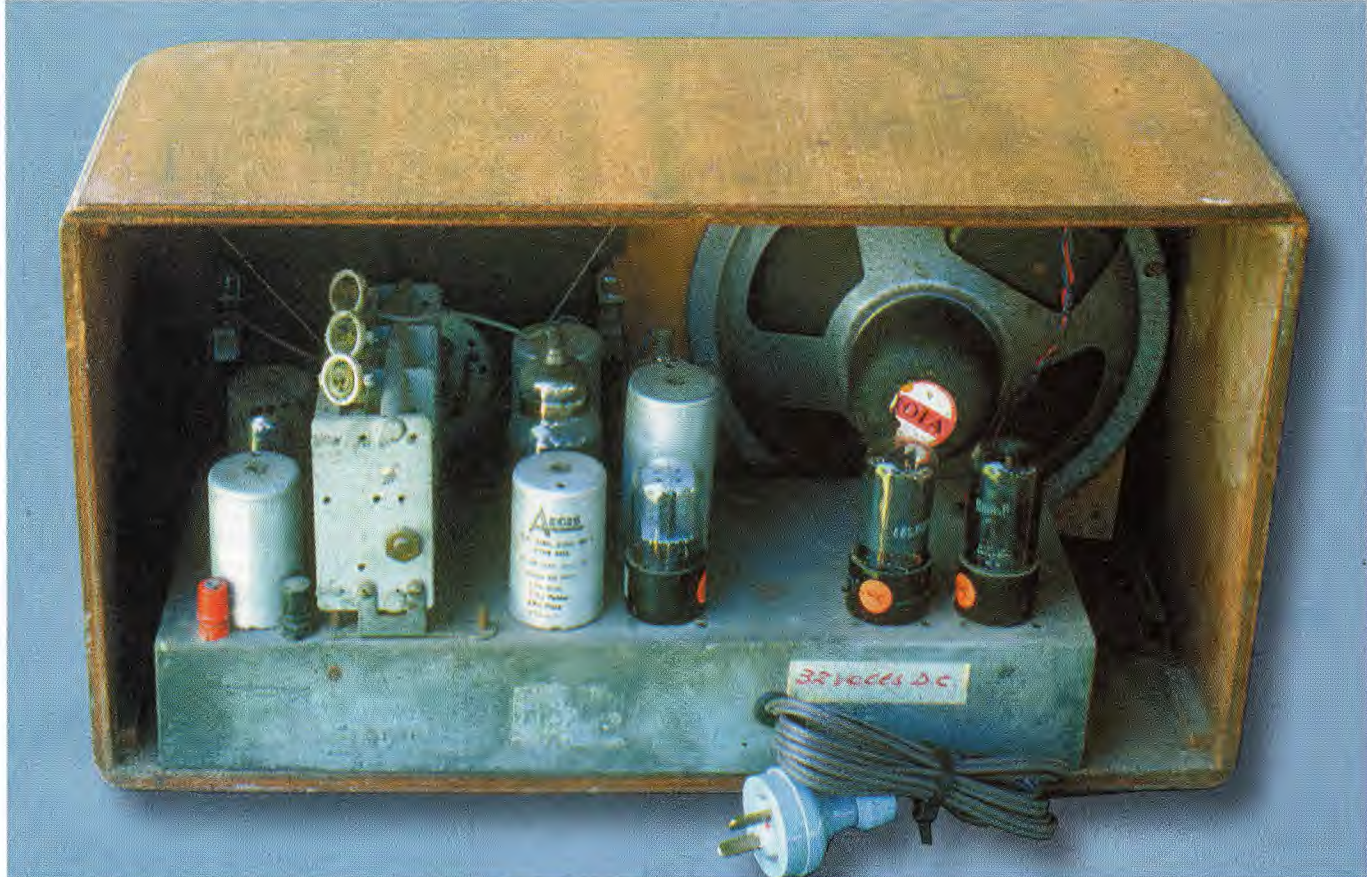
valves should be around 1.5V with respect to chassis. Pin 2 of the 6SL7 should be around 15-20V, pin 6 about 8V and pin 5 approximately 24V. There are no high voltages here!

Aligning the receiver

The alignment procedure for this type of set is quite straightforward. First, the IF is aligned with a signal from a generator on 455kHz. A digital multimeter (DMM) set to the 20V DC range and connected across the volume control or C9 will read higher voltages as the IF alignment is peaked. The oscillator, RF and aerial coil cores are adjusted for peak output at around 600kHz and the trimmers (not shown on the circuit diagram) are adjusted at around 1450 kHz or, in each case, on a known station near to these frequencies. Stations 3RN (3AR) on 621kHz and 2QN on 1521kHz can be used where I live.

One problem with the alignment is that the dial scale remains in the cabinet when the chassis is removed. In cases like that, I tend to close the gang and adjust the oscillator so that the receiver will tune 530kHz and then adjust it at the other end of the dial so that it will tune to 1620kHz. The dial scale itself will give you some idea of what the tuning range actually is.

To get the oscillator tracking accurately across the band, it will be necessary to put the chassis in and take it out of the cabinet a few times while doing the adjustments – a tedious job.



There's plenty of room for the chassis inside the cabinet. In this case, the twin power lead was fitted with a 2-pin polarised plug but many early DC sets were initially fitted with a 3-pin mains plug. As a result, many 32V sets have been plugged into the 240V AC mains with disastrous results.

The aerial and RF circuits can be adjusted out of the cabinet as their adjustments do not affect the accuracy of the oscillator tuning.

By the way, the latter job is made more difficult because the dial pointer is about 15mm behind the dial scale so there can be considerable parallax error.

Having completed the restoration, the set proved to be quite a good performer and is well-suited for use in

country areas, away from broadcast stations.

Shortcomings and features

The set is designed to have the negative side of the 32V supply attached to the chassis. However, the fuse is in the negative line so, under some circumstances, the fuse could blow and the set would still be supplied via the set's earth system (assuming that one side of the 32V supply was earthed). It

would have been a better idea to have placed the fuse in the positive line.

Having said that, one interesting feature is the use of C1. This capacitor would prevent "burn out" of the aerial coil if the antenna fell across the live +32V line from the lighting plant (most 32V supplies on farms used bare overhead cables).

It is odd that incorrect component values are often used in receivers. The series dropping resistor for the dial lamps (R15) is 100 Ω but for use on 32V, this should be 127 Ω , otherwise the dial lamps will each have more than 6.3V across them. What's more, a

Photo Gallery: Astor Model JN



Manufactured by Radio Corporation (Melbourne) in 1948, the Astor Model JN is a 6-valve dual-wave superhet housed in a substantial Bakelite cabinet and fitted with an 8-inch (200mm) loudspeaker. The combination of the large loudspeaker and an effective loudness compensation circuit around the volume control resulted in good audio performance, for which Astor sets were renowned. The set was fitted with the following valves: 6U7-G RF amplifier; 6J8-G frequency changer; 6U7-G IF amplifier; 6B6-G first audio/detector/AVC rectifier; 6V6-G output; and 5Y3-F rectifier. (Photo and information courtesy of Historical Radio Society of Australia).

32V set of batteries on charge can reach 40V, so even 127 Ω is too low. In fact, R15 should be around 180 Ω . And although a 20W resistor is used, a 10W unit would be quite adequate for the job.

Conversely, R16 should be lower at around 23 Ω for use off 32V. However, most better quality 32V sets used a 3-position power switch instead of the 2-position switch used in this set. The first position was "off", while the second position was "charge". In the latter case, a resistor was switched in series with the supply to drop the voltage to the valve filaments to around 32V when the batteries were on charge. However, with the set connected to a set of charging batteries it doesn't matter if the valve plates and screens do get 40V – they'll just perform more effectively.

The third position of the power switch was "on", where the 32V was connected directly to the valves.

There are no trimmer capacitors shown on the circuit but they are fitted nonetheless. The fixed capacitors inside the IF transformers are not shown either and neither are the adjustment cores for the IF transformers or the front-end coils.

Another oddity is that the circuit shows the set as having one 35L6 valve in the output and one 35LG. The latter is simply a drafting error – the valve is in reality a 35L6. The valves probably all had the suffix GT.

At this stage, the cabinet has not been restored although it has been cleaned. The cabinet itself is quite light, being made of relatively thin veneered plywood.

Summary

The set is a good performer and was quite suitable for use by the farming community. However, I suspect that it would have been prone to picking up commutator whine from the 32V lighting plant when it was charging batteries or, for that matter, from any small motor attached to the 32V supply. That's because there is absolutely no filtering of the 32V rail before it is applied to the valve plates and screens, other than for the 6SL7.

However, the set works well when powered from a 32V DC filtered power supply (eg, as described on p88 of the January 2001 issue). If you like collecting 32V sets, this one deserves a place in your collection. **SC**



AWA TEACHING AID

Made by AWA during the 1960s, this device was designed to teach radio technology students how valves worked. The valve envelopes were large so that students could easily see the various parts that made up the two valves (one a triode, the other a CRT) on top of the chassis.