

VINTAGE RADIO

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The Astor KM that blew its power plug off!

Manufactured in the late 1940s, the Astor KM was a popular 4-valve mantle radio with some interesting design features. I was recently given the job of overhauling one of these sets which had developed an unusual fault.

It all started when the lady who owned this particular set rang me to say "that the power plug had blown off the lead". Apparently, the old Astor had been going well prior to that happening and she wanted the plug replaced and the set checked for faults.

Now this sounded really interesting and I was really beginning to wonder whose leg was being pulled. And so I suggested that she bring the set to

my workshop me so I could see what had happened.

Sure enough, the lady eventually turned up with the set in a bag. I went to lift it out by putting my hand under the back of the top of the set and it was obvious that the cabinet was broken. I said "the cabinet's broken" and the lady said "you've broken the cabinet".

Wow, what have I got myself into

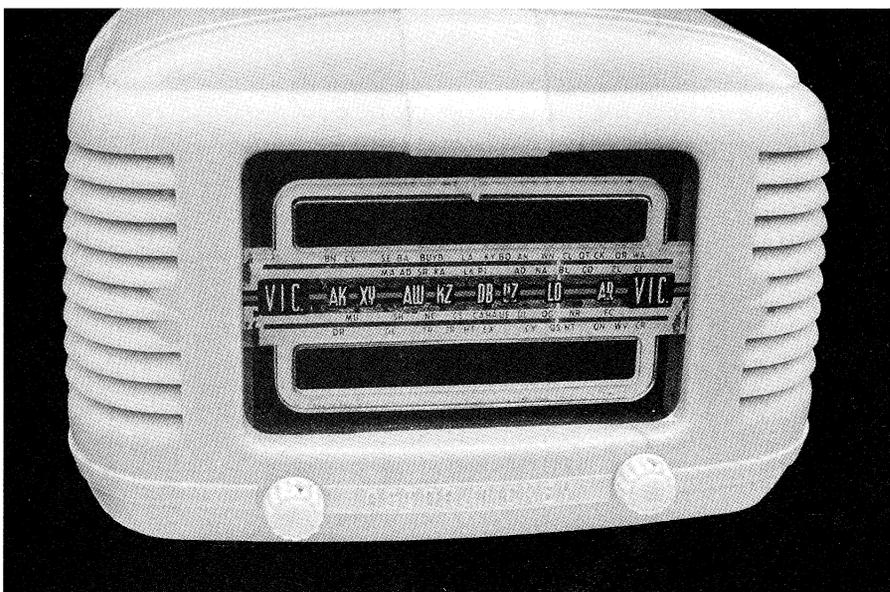
here, I thought! I looked at the cabinet and could see dirt in one of the cracks which meant that it couldn't have been done in the last few moments. She acknowledged this and when I showed her that there were a number of cracks both new and old she changed her mind and said it must have been done by the painters! I said that I could repair the cabinet.

It just goes to show that some people are quite happy to lay the blame for a problem on someone else. So if you are restoring a set for another person, make sure you know exactly what they want. It's also a good idea for them to show you the set and to inspect it together if possible.

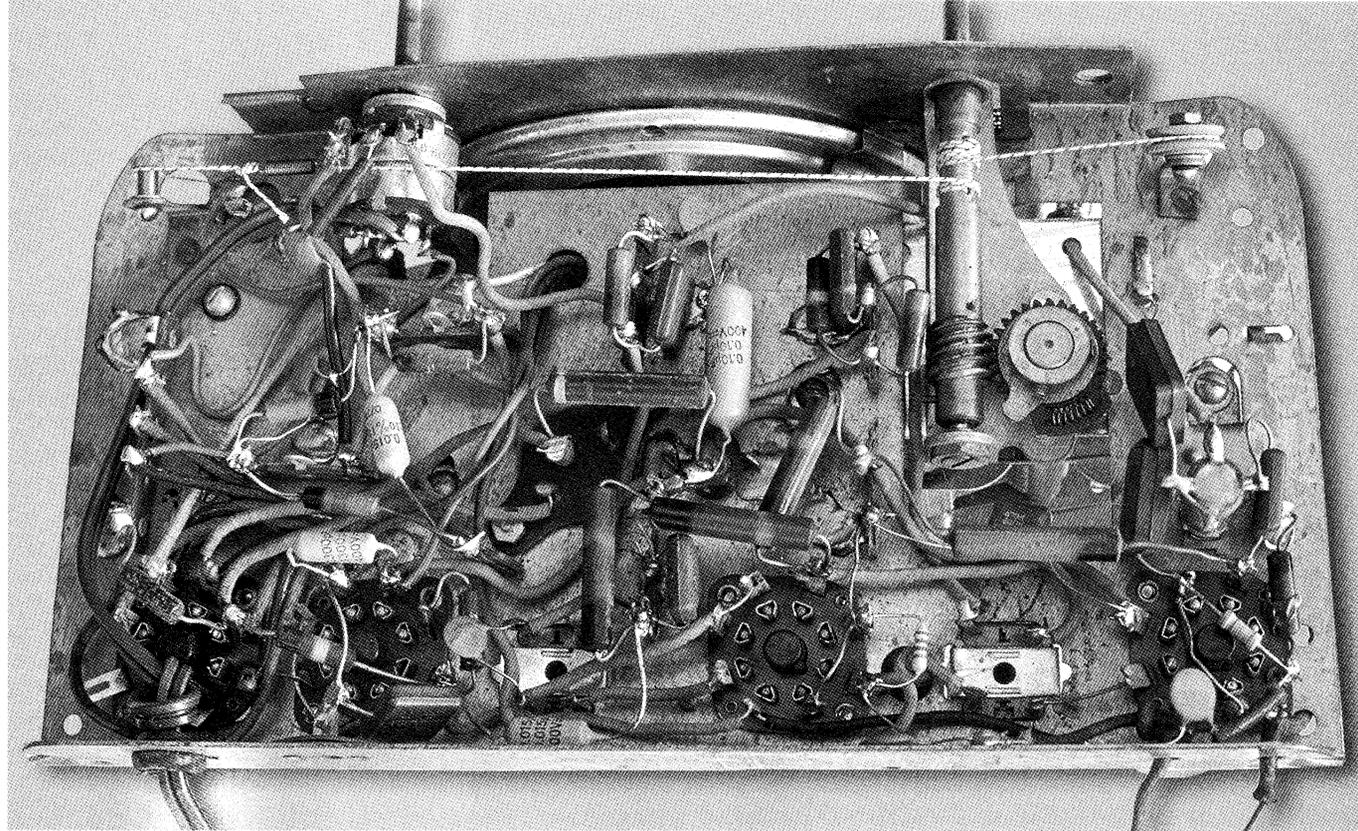
Having overcome that little problem, the lady showed me the power plug and yes, it had literally blown off the twin-flex power lead. And it wasn't hard to see why - the power lead was the original rubber-covered twin-flex and the rubber had perished badly and the two leads had shorted and then melted and blown apart (see photo).

That such a melt-down occurred indicates to me that the mains fuse in the meter box may be much greater than 15A, consisting perhaps of several strands of 15A fuse wire (a dangerous practice). Don't laugh - I've seen up to seven strands in a fuseholder!

Anyway, getting back to the Astor, there were several spots where the power lead had perished and where bare wire was showing. One spot had been taped up but for safety's sake the entire lead should have been replaced years ago. Judging from the liberal coating of grease over the chassis, this



Because of its compact size, the Astor KM was popular as a kitchen set. This particular unit included a number of manufacturing defects which were fixed when the set was overhauled.



The set is easy to work on, with all parts under the chassis readily accessible. Note the wooden dial pulley at top right and the rightangle worm gear drive for the tuning.

set is used in the kitchen so just how close the owner has been to electrocution over the years is anybody's guess. The cooking grease did protect the chassis from going rusty though.

The Astor KM

These little sets came out in the late 1940s and were quite popular. They are only a 4-valve set but are reflexed, with the IF stage also acting as the first audio stage. Although the performance is not quite to 5-valve standard it is better than from a normal 4-valve set. If you want more information on reflexing, I suggest you read the article by John Hill and myself in the February 1996 issue of SILICON CHIP.

Despite the fact that they are relatively small and use octal valves, these sets provide good chassis access. What's more, the chassis can be tipped on one end or even placed upside down without any likelihood of damage to other parts.

Having got the chassis out of the cabinet, the only damage I could find was that one of the pulleys in the dial-drive system had broken. Astor, along with some other manufacturers, used

small turned wooden pulleys. I also noticed that the 5Y3GT rectifier had been replaced by a 5AS4. The 5AS4 is much bigger physically, has a much higher rated rectified current (as required for valve TV sets) and a higher heater current (3A compared to the 2A for the 5Y3GT).

It had been in there a long time and there was no sign (smell) of overheating, so the power transformer was obviously not being run to its maximum capability. Despite this, I decided to replace the 5AS4 with a 5Y3GT, in the interests of long-term reliability. In fact, a later check with a contact thermometer showed that the transformer ran around 5° cooler with the correct rectifier fitted.

However, before doing anything, the power lead had to be replaced (to ensure my personal safety as much as anything else). That done, the set was carefully checked for shorts using a high voltage insulation tester (several of these have been described in SILICON CHIP, the latest in January 1999). In particular, the power transformer mains winding was tested for leakage or shorts between it and the chassis. Fortunately, testing at 500V and 1000V

showed no discernible leakage.

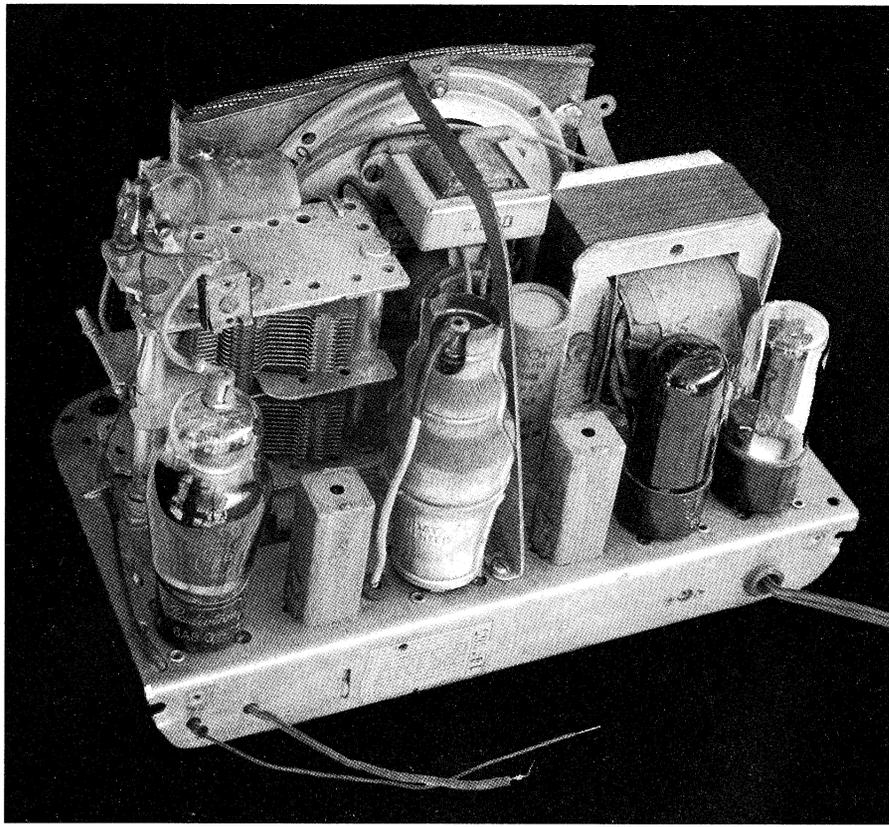
I also like to test the transformer by applying power for half an hour or so with all valves removed to see whether it heats up to any extent, as this can indicate shorted turns. It tested 100%.

A few of the rubber insulated wires in the set wiring were also perished and were replaced. This is a common problem in sets that used rubber-covered hook-up wire.

As I normally do, I removed all the critical paper capacitors and replaced them with polyester or ceramic types. In particular, I replace all audio coupling and AGC bypass capacitors before applying power to the set's amplifying stages. Often, just by doing that, the set will operate - perhaps not at its peak performance but enough to show that the restoration work will be successful.

In this case, I decided to go one step further and replace all the leaky paper capacitors. Note however that it's possible for a capacitor to be leaky but not cause any trouble in the set. For example, cathode bypass capacitors can be quite leaky but will cause no problems as they are usually in parallel with low-value resistors.

Further checks revealed a couple of resistors that had gone high so they were also replaced. After that, it was



Despite its age, the old Astor was in pretty good nick. The set used four valves in a reflex circuit, with the IF stage also acting as the first audio stage. It worked well, although the performance is not quite up to 5-valve standards.

down to the serious business of getting the set running at peak performance.

Alignment

In this case, the set performed quite well without any attention to the alignment. In fact, some restorers leave the alignment well alone but I always prefer to go over it and make any necessary adjustments to ensure peak performance. In practice, alignment is a straightforward procedure once the techniques are understood and will be dealt with in detail in a future article.

I start by aligning the IF stages with the tuning gang closed. First, the signal generator is set to produce a strong signal on the expected IF of 455kHz and this signal is applied to the aerial terminal and adjusted until the receiver responds. Note that the converter stage is acting purely as a poor-quality IF amplifier at this stage. Once the IF amplifier responds, the signal level is reduced so that it is audible without significant noise with the volume turned up high.

In most cases, the frequency will be close to 455kHz but variations of 10-

20kHz from the nominated frequency are usually unimportant. The slugs or screws in the top and bottom (and sometimes on the sides) of the IF cans are then adjusted for peak audio output. These adjustments can either be done by ear (ie, by listening for maximum audio output) or by putting a sensitive AC millivoltmeter across the speaker terminals and reading the peak audio level. There are usually only four slugs to adjust for best performance.

In this set, I found that the slug that tuned the IF winding feeding the diode detector was all the way in but the stage hadn't been peaked. It was close but just wouldn't quite get there. This problem was solved by connecting a 3-30pF trimmer capacitor across the winding and adjusted it for maximum output. It peaked quite satisfactorily at about 18pF.

Often, if the slug appears to be getting close to a peak but can't quite get there, it's an indication that the IF transformer is faulty. I'll go into that situation another time. In this case, the 18pF of additional capacitance allowed the detector tuned circuit to be peaked quite nicely but why it

needed the additional capacitance is a bit of a mystery.

The Astor's performance improved considerably after the IF adjustments, so the exercise was well worthwhile.

The aerial and oscillator coils were very close to optimum adjustment. However, a couple of turns of fine wire had to be removed from the "wire-type" oscillator trimmer to get the correct tuning range. The aerial coil has no adjustment for the low frequency end of the broadcast band and only required a very minor tweak on the trimmer at around 1400kHz.

By the way, any aerial coil adjustments should be carried out with the intended aerial connected to the aerial socket of the receiver (not the signal generator). That's because the different characteristics of the signal generator could cause the aerial alignment to be incorrect in some cases.

The signal from the generator is coupled in by wrapping its lead around the aerial lead and then increasing the output until there is enough signal pickup for the alignment to be carried out. It's important to pick a spot on the dial away from any station otherwise, it will interfere with the alignment work.

By this stage, the old Astor was performing really well. No valves needed replacing except for the rectifier, as explained earlier. However, dial lamps usually do need replacing and this set was no exception, requiring two 6V 0.3A MES lamps.

Dial drive

The dial drive mechanisms on some Astors leave a lot to be desired and this set initially looked like falling into that category.

In this case, the set used the tried and proven rightangle worm gear drive from the tuning shaft to the gang. Fortunately, the fibre gear hadn't been damaged (like so many are) but of the four pulleys in the dial system, only two were free to move and one of these had been broken (probably during the fall that cracked the cabinet). The other two pulleys couldn't move at all as they were held tight by the mounting screws, which meant that the dial cord could only slide over them. And although the dial cord probably lasted a long time, it would last even longer if the pulleys turned.

I decided to dismantle the two immoveable pulleys from their mounts

and see if I there was any way that I could make them rotate freely. Once I had dismantled one of them, it became obvious that the star shakeproof washer had been put on in the wrong sequence and when the assembly was tightened up the pulley was squeezed against the mount and the star washer. No wonder the pulley couldn't move.

Installing the star washer under the head of the screw instead of between the nut and the pulley left enough room for the pulley to rotate freely and so both assemblies were modified accordingly. I suspect that this was an error that was made at the factory and it has subsequently escaped detection by various service personnel.

The broken wooden dial-drive pulley initially looked like being a real problem. However, during discussions with the set's owner, the idea that a wood turner may be able to make up a suitable pulley was floated. As it turned out, the lady knew a wood turner and the manufactured part, along with a new dial cord, did the job quite nicely.

Tidying up

Although the set was now working properly, there was still quite a bit of tidying up to do. First, the original speaker cloth was in a mess and had to be replaced. I fitted some dark-brown open-weave cloth that I had, gluing this to the front of the speaker frame with a thin smear of contact adhesive. Once the adhesive had dried, the cloth was trimmed around the edges of the speaker frame to give a neat finish.

The on-off switch/volume control knob also needed attention. This control had been replaced at some stage but either the correct style either wasn't available at the time or the repairer couldn't be bothered obtaining the correct part, as the switch in the replacement unit is a push-pull type. The problem with the push-pull unit is that the original slide-on knob comes off in your hand after the control has been operated a few times. In this case, the repairer had overcome that problem by fitting a different knob.

Unfortunately, the tuning knob was missing and it looked as though I would have to fit a couple of knobs that were roughly the right size but which certainly wouldn't match the



The rubber insulation on the power cord had perished so badly that the wires shorted together and melted, detaching the power plug. Just how close the set's owner had come to electrocution is anyone's guess.

set. But as luck would have it, a friend had a couple of knobs that are similar to the originals and these are the ones that were finally fitted. They certainly look a lot better on this set than any of the knobs that I had in my junkbox.

Finally, although the details of the cabinet repairs have been left until last, they were in fact done early in the piece. Sets with broken cabinets are not often viable to repair but in this case there were no missing pieces and the job was quite straightforward.

First, the cabinet was given a good clean in warm, soapy water and then thoroughly rinsed, making sure all the cracks were as clean as possible. Most of these cracks were at one end of the cabinet. Where possible, each crack was sprung open, the gap filled with Araldite® and the crack allowed to close again. Any excess glue was removed after drying with a sharp blade.

Of course, some of the cracks couldn't be sprung open without the risk of wrecking the cabinet but these are hardly noticeable. The glue on the larger cracks did a good job and the cabinet repair was quite successful.

Performance

The Astor KM was a popular 4-valve reflex set, its small size making it ideal for use as a kitchen set or second set. It doesn't boast super sensitivity but it works and works well even in country areas.

Like most Astor sets, it has a rather complex negative feedback tone/loudness control. Its effectiveness is ques-

tionable in such a small set but similar tone control networks were very effective in some of the larger Astor sets.

The set is also easy to work on and is apparently very reliable. Radio Corporation deservedly had a little winner in this little receiver. **SC**