

Vintage Radio

By Associate Professor Graham Parslow



AWA 1946 Fisk Radiola Model 92 Egg Crate



Despite having modest performance and cut-price circuitry, many vintage radios have become collectors' items due to their distinctive cabinet styles. The AWA Fisk Radiola Model 92 "egg crate" radio from 1946 is one such set.

MANY ICONIC radios from the golden age of radio have been given nicknames by collectors due to their appearance. These radio nicknames include "scales", "beehive" and the "plum pudding". In the case of the AWA Model 92 radio, its "egg crate" nickname was derived from the distinctive style of its speaker grille.

Often, the same cabinet style was used for a number of different circuits, so dating this egg crate radio isn't easy. I discovered this when my curiosity

was aroused about the date of a photo that was on the July 2015 cover of the HRSA journal "Radio Waves". It was of a J. P. Aarons store in Melbourne and showed an egg crate radio in the window.

After some discussion with Kevin Poulter who had acquired the image, a date of 1946 emerged as the most probable for the "Radio Waves" photo. The egg crate cabinet definitely existed in 1939 but it may well have been released earlier.

The dial on the radio featured in this article is clearly labelled "The Fisk Radiola" and this is also shown in the Model 92 advertisement reproduced with this article. However, Ernest Fisk left AWA in 1944 and this ended "The Fisk" series of radios, the exception being the Model 92 that continued with his name. By contrast, other post-war models that were housed in the egg crate cabinet bear only the title "Radiola", which was proprietary to AWA and RCA America.

The hyperbole of the AWA advertisement for the Model 92 really is over the top for what I have long-considered to be an ugly duckling. Part of the promotion reads: "The strikingly beautiful cabinet, designed by an artist of distinction, has exquisitely graceful lines and is a masterpiece of streamlined simplicity". However, despite my initial reservations, I became much more favourably inclined to this unique package as the restoration proceeded.

That said, when you cast an eye over the minimalist circuit used in the Model 92, AWA's claim that it was "Australia's finest broadcast receiver" was ludicrous.

As can be seen from the photos, there were just two controls on the front of the cabinet (one on either side of the dial) and these were for volume and tone. The tone switch has only two positions: treble-cut on and treble-cut off. The tuning control is situated on the righthand side of the cabinet.

Circuit details

The Model 92 circuit appears in AORSM (Australian Official Radio Service Manual) Volume 4, which covers 1940-41 radio receivers. It is a 4-valve superhet and uses common valves from the late 1930s.

Fig.1 shows the circuit details as they appeared in the AORSM manual. It's rather unconventional in appearance because the valves are shown "upside down", with the plates to-

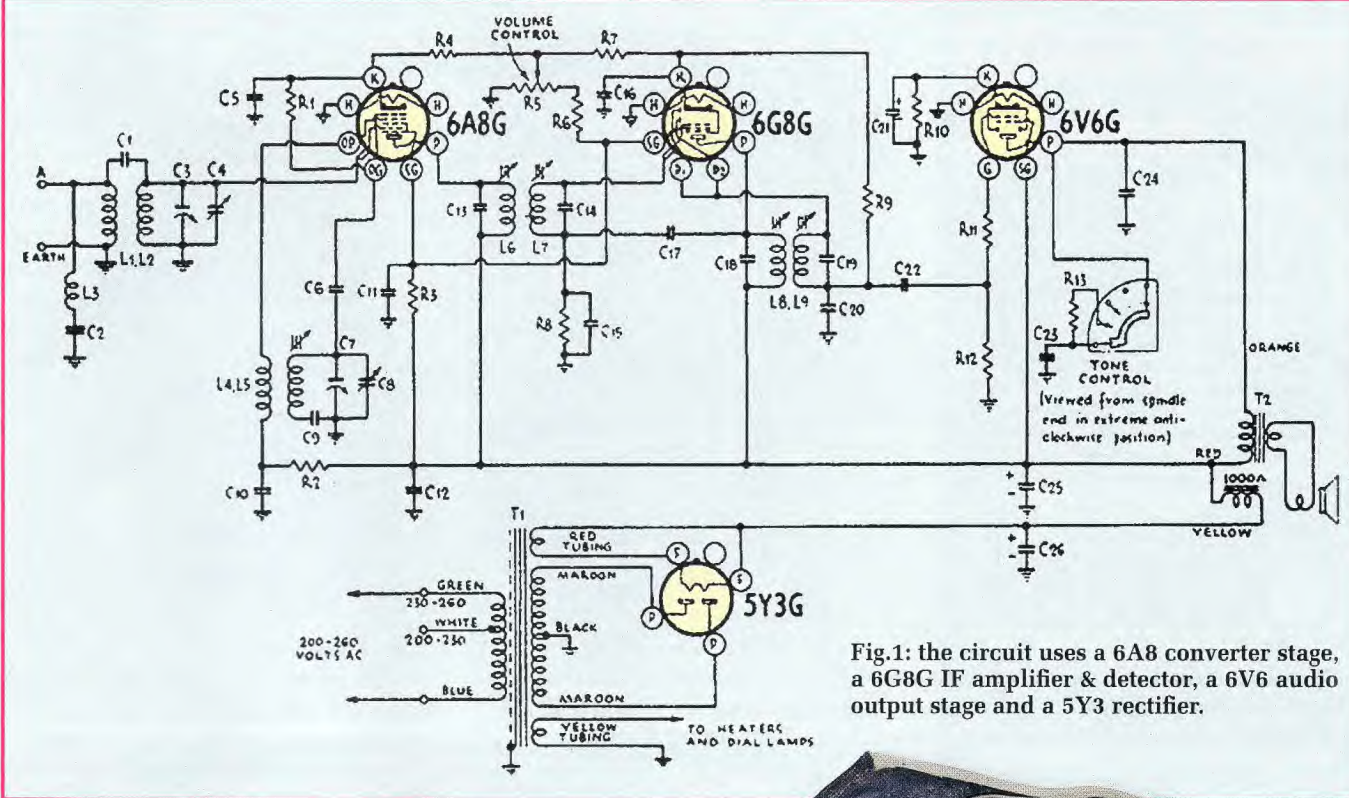


Fig.1: the circuit uses a 6A8 converter stage, a 6G8G IF amplifier & detector, a 6V6 audio output stage and a 5Y3 rectifier.

wards the bottom and the heaters at top.

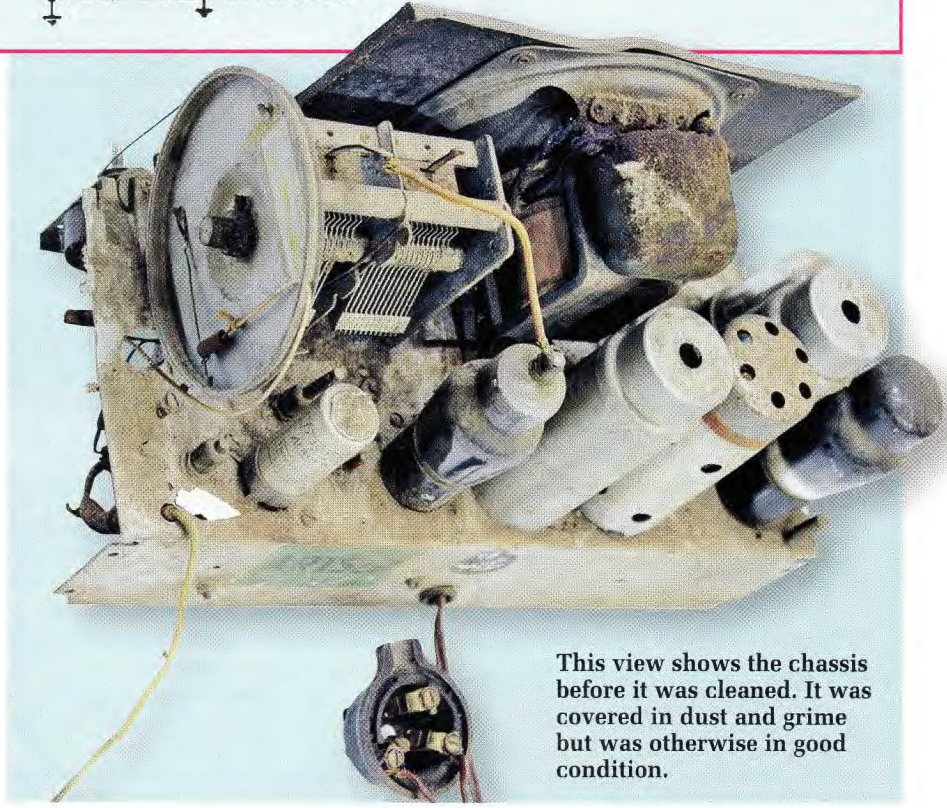
As shown, a 6A8 mixer oscillator stage is followed by a 6G8 which functions as an IF amplifier and detector (there's no AGC). A single 6V6 pentode is used as the audio output stage, while the rectifier is a 5Y3 which has its heater powered from a separate 5V power transformer winding.

Interestingly, the speaker is an electrodynamic type and its 1kΩ field coil also filters the HT rail from the rectifier. It's very much a pre-war design, although the ARTS&P label on the featured radio indicates that this particular radio was manufactured post-war, ie, in 1946. This date is also consistent with the plastic figure-8 twin-core flex that was used for the 240VAC power lead.

Cleaning up

This radio had waited on a shelf for over five years before the "Radio Waves" cover finally motivated me to restore it. Its initial appearance was quite untidy, due mainly to a torn speaker grille cloth (styled with coarse mesh fabric), a loose dial window, dirty knobs and a faded Bakelite cabinet.

Internally, the radio was covered in grime and that meant that the chassis



This view shows the chassis before it was cleaned. It was covered in dust and grime but was otherwise in good condition.

would have to be thoroughly cleaned before I could work on the circuit.

I tackled the cabinet first. The original speaker grille fabric was beyond repair and that presented a problem because its coarse pattern is part of the character of this radio. Fortunately, I soon discovered that I had some similar fabric on hand, the only problem

being that it was pale blue. That problem was quickly solved by spraying the fabric with ivory-coloured paint, a technique that works quite well.

Next, the knobs were removed and cleaned using a brush and warm, soapy water. I then cleaned the cabinet and wiped it over with "Armor All" and it came up looking almost like new.

TABLE MODEL 92

*Incomparable in performance,
beauty and value*

These Fisk Radiola table models strike an entirely new note in radio receiver design. They are extremely efficient, reproduce the programmes with excellent tone quality and feature improved and more convenient tuning arrangements. They are ideal for those who desire to enjoy the advantages of a second set in the home. The strikingly beautiful cabinet, designed by an artist of distinction, has exquisitely graceful lines and is a masterpiece of modern streamlined simplicity. Moulded in durable "Radelec," it is available in a range of attractive colours.

The Fisk RADIOLA

AWA's claim that the Fisk Radiola Model 92 was "Australia's finest broadcast receiver" was a bit over the top, considering the modest circuit it employed.

Once the outside was looking good, the chassis was brushed out to remove any fluff and then liberated from its grime using a turpentine wash. It was then blown out with compressed air to thoroughly dry it.

That done, the broken dial cord was removed and replaced. I also discovered that the 5-inch speaker cone had a small tear and this was repaired using PVA glue.

Electrical restoration

The original fly leads to the top-cap grids of the 6A8 and 6G8 valve were sheathed in cotton-covered rubber insulation. Over the years, this covering had frayed and now looked tatty. As a result, the corroded grid caps at the ends of these leads were removed and cleaned so that they would later

make good connections to the valve grids. The valve-cap wiring was then sleeved with yellow heatshrink tubing, both for appearance and to ensure good insulation, and the valve caps reattached.

Next, the two dial globes were removed and checked. Blown dial globes are a common problem in old radios but these both tested OK, so they were simply cleaned and reinstalled in their positions behind the colourful dial glass.

Under the chassis

At first glance, the under-chassis wiring and parts were all original except for the electrolytic capacitor (25 μ F 25V) used as a cathode bypass on the 6V6 output pentode.

A close inspection indicated that the

The cabinet came up looking like new but the torn speaker cloth had yet to be replaced when this photo was taken. It was later swapped out for a similar coarse-weave fabric that had been sprayed with ivory-coloured paint to match the original colour.



AUSTRALIA'S FINEST
BROADCAST RECEIVER



two chassis-mounted HT filter electrolytics (C25 & C26) had dried out, with perished red rubber at the base of the cans. Rather than remove them, these capacitors were left in place on the chassis in order to maintain the original appearance. It was just a matter of cutting the appropriate leads to disconnect them and then installing two 33 μ F 450V electrolytics under the chassis to serve as the HT filters.

In addition, paper capacitor C22 (0.05 μ F), which couples the detected signal from the 6G8 to the 6V6 audio output stage, was replaced with a 0.047 μ F 630V Mylar unit. Based on long experience, I always replace this usually leaky capacitor as a matter of routine. This prevents leaked HT from overloading the output pentode with positive grid bias, which can quickly destroy both the output valve and the output transformer.

The identical 0.05 μ F tone control capacitor was also replaced as a matter of course.

The last modification before switch-on was to remove the old 2-core mains flex and install a 3-core cable. This allowed the chassis to be securely earthed, making the unit much safer to work on. In addition, the new cable was securely clamped into position. The original cable had been secured by tying a knot in the lead just inside the chassis (see photo), which is illegal these days. It was common practice back then, though.

Applying power

Power was first applied with all the valves removed. This resulted in glowing dial globes and a steady power consumption of about 10W (as expected), so I was optimistic that the set would work as soon as the valves were installed. Unfortunately, my optimism was misplaced, as I quickly found out.

To test the set, I reinstalled the valves, set the volume control to about one third, applied power and allowed time for the valves to warm up. The power consumption settled down to 56W (AWA quote 60W) but not a sound could be heard.

Tuning across the dial gave no result but when I turned the volume up to full, the set gave a sudden "crackle" and multiple stations became audible. It sounded rather like a poor crystal set.

I again tuned the set across the dial and the result was much the same, although the mix of stations did change.



This is the fully restored chassis, ready for re-installation into its cabinet. In addition to the electrical repairs, the dial cord required restringing and a small tear in the speaker cone was repaired with PVA glue.



This view shows the underside of the chassis prior to restoration. Note the knot (now illegal) tied in the twin-flex mains cord that was originally fitted to the set. The volume control and several faulty electrolytic and paper capacitors had to be replaced to restore the set to operation, along with various other repairs.

That indicated a fault somewhere in the mixer-oscillator circuitry.

Checking under the chassis did not reveal any problems so I moved on to the above-chassis components. It didn't take long to spot the problem – the lead to one section of the tuning capacitor had come adrift. This was quickly resoldered and the radio could then be correctly tuned to individual stations.

However, that wasn't the end of the set's problems because the sound could only be heard when the volume control was close to its maximum setting. Below this setting, there was complete silence (no hiss at all) and this

indicated that either the oscillator or the IF amplifier wasn't working. This seemed weird until a look at the circuit diagram revealed that the volume control was in an unusual location.

In this circuit, the volume control (R5) is a 4kΩ wirewound pot. It was easily disassembled by removing the backplate and a quick check with a multimeter located an open circuit in the middle of the resistance wire. As a result, a replacement pot was substituted with the expectation that this would fix the problem but it made no difference. Even with the good pot in place, the radio still had only two modes of operation – either complete

standard performance from the radio. However, I got one more surprise when I checked the voltages around the 6V6 output pentode. Its plate was at 247V, the screen at 272V and the grid bias, as set by the cathode resistor, was -14.3V. This bias is too high for a 6V6 to give undistorted amplification; instead, it normally needs -7V to -9V.

Despite this, the audio was quite clean. So why wasn't there any evident distortion?

One possible answer was that the valve fitted to the set wasn't really a 6V6. Unfortunately though, this valve had no identifying markings on it, even though I had been careful not to rub any markings off the valves during the cleaning process.

As it turned out, an experienced member of the HRSA knew the answer. AWA immediately post-war may have substituted a 6F6 for the 6V6, since the 6F6 was sometimes more readily available. It's also possible that a repair technician with a spare 6F6 made the substitution at a later time. However, the clincher that this radio has a 6F6 is that its cathode resistor (R10) has a value of 325Ω, not 250Ω as specified in the parts list for a 6V6.

The higher-value resistor generates the higher bias required for a 6F6, so that explains the mystery.

More egg crates

There is more to the egg crate story than the Model 92 because AWA also housed the R84, R86 509M and 174 models in this cabinet. A publicity release from AWA dated December 1939 states that the new Radiola Model 174 is "housed in a strikingly beautiful cabinet of moulded Radelec available in a variety of attractive colours." Those colours were ebony, walnut, jade, blue, pink and ivory. This model also featured a loop aerial that "obviates the need for both aerial and earth connections for local reception".

In summary, the egg crate radios might be electrically unremarkable but their distinctive style and variant colours make them collectable. Provided they are obtained in reasonable condition, they are generally easy to work on and repair.

Footnote: a special thank you to HRSA President Mike Osborne for reviewing this article. His suggestion of adding AGC, as in the AWA model 500MY, will be a future project.

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The ARTS&P label on the back of the chassis indicates that this Model 92 set was manufactured in 1946. It's in quite good condition considering its age.

silence or overload at high volume.

It was time to take a closer look at the circuit. As shown on Fig.1, the wire-wound volume pot varies the voltage at the cathodes of both the 6A8 mixer-oscillator and the 6G8 IF amplifier. As a result, the pot varies the negative bias on the control grid of each valve and thus varies its amplification. What's more, because this gain control works partly in the RF section, it explains the lack of AGC.

Modifying the volume control

Unlike other volume control circuits, this arrangement means that the set's volume increases as the wiper

moves towards earth. In other words, the volume increases as the grids become less negatively biased by the voltage developed across the cathode resistance. This meant that even with an open circuit in the middle of the original pot's winding, the high volume end still worked because the wiper was still connected to earth via the intact section.

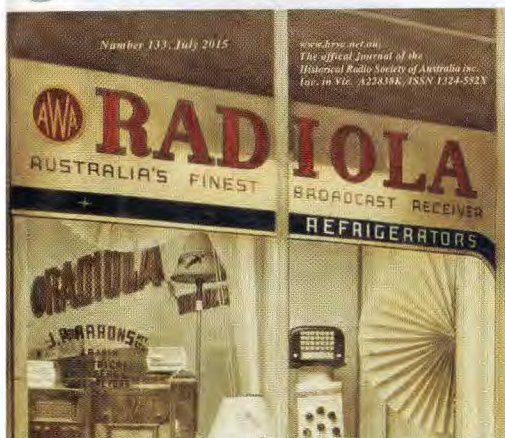
The problem was that this radio had a critical cut-off bias that prevented the front-end from working at low volume settings. As a result, I decided to modify the circuit and install a more conventional volume control circuit.

After some experimentation, I ended up permanently installing a 100Ω resistor in place of the wirewound pot. This gave a sufficient reduction in front-end gain to avoid overload on strong local stations while still preserving enough gain for weaker stations. A conventional volume control was then installed by replacing R12 (500kΩ) in the grid circuit of the 6V6 output stage with a pot and connecting C22 to its wiper.

One surprise discovery was the existence of a 25μF electrolytic capacitor between the original volume pot's wiper and earth. This capacitor isn't shown on the circuit diagram (but is in the parts list) and was apparently installed as a cathode bypass. As a result, a new 22μF capacitor was paralleled with the fixed 100Ω bias resistor I'd installed in place of the pot.

The end result was a reasonably

RADIO WAVES



The July 2015 cover of *Radio Waves* carried a photo of a J. P. Aarons radio store in Melbourne. Note the Model 92 egg crate radio in the window display.