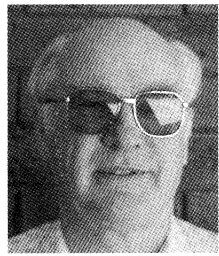


# VINTAGE RADIO

By RODNEY CHAMPNESS, VK3UG



## The case of the disappearing TV sets

**Vintage black and white TV receivers from 1956 onwards are now almost impossible to find. If we don't start saving the remaining examples now, these sets may well go the way of the Tasmanian Tiger and the Moa.**

Valved black and white TV sets are now quite rare animals. Is black and white valved television a part of our electronics heritage? You bet it is and the time to start collecting is now, otherwise the sets will be gone for good.

Back in the March issue of "Silicon Chip", in the Publisher's Letter, Leo Simpson suggested that it was time to save those old black and white TV sets. Leo and I have discussed this subject on a number of occasions and this article will be followed by others later on. I would like to dedicate this

particular article to the late Rex Wales of the Historical Radio Society of Australia (HRSA) who was encouraging members to get into vintage television restoration. Sadly, he died before much work could be done to find and restore these old sets.

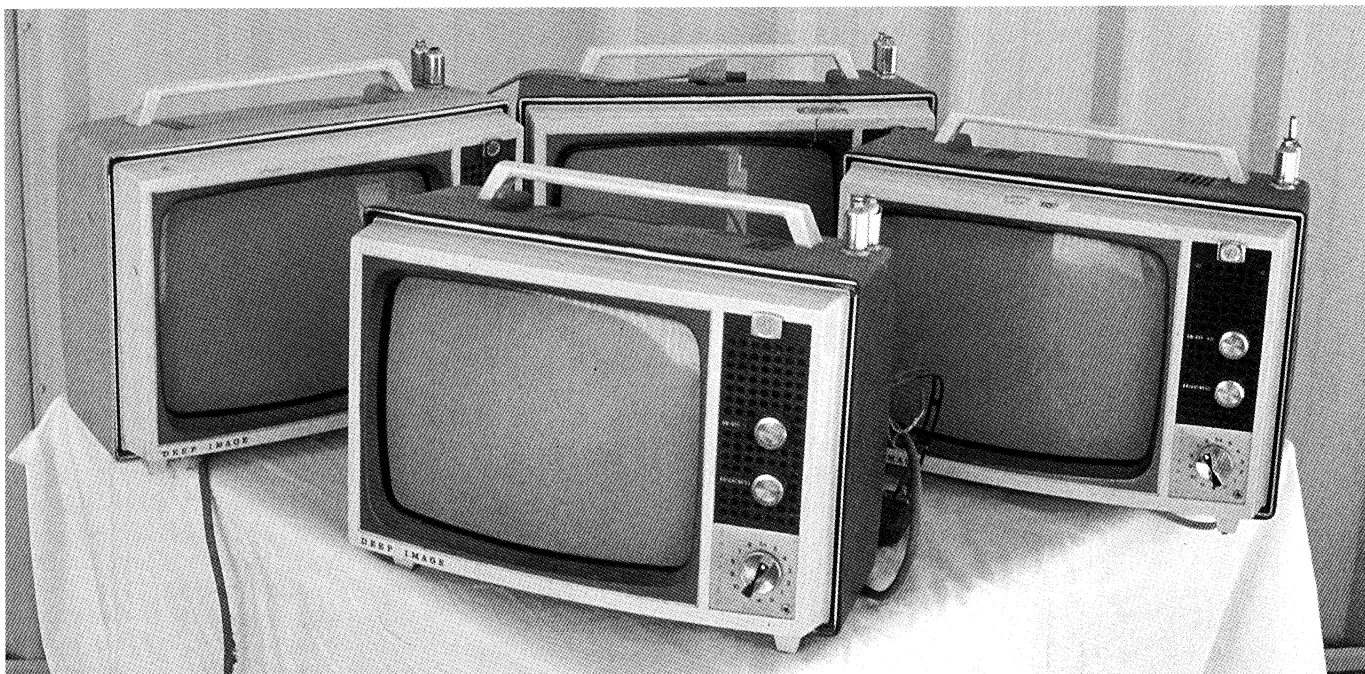
Why write about vintage television? And what has television got to do with vintage radio anyway? Directly, probably very little. However some members of the Historical Radio Society of Australia (HRSA) and the New Zealand Vintage Radio Society (NZVRS) have started to show an in-

terest in preserving another aspect of our electronic entertainment medium. Therefore, an article on vintage television sets is very appropriate at this time.

Unfortunately, most black and white valve TV sets have been consigned to the rubbish heap. In the process, quite a few were scavenged for parts, power transformers, valves and other odd bits and pieces. If you don't have a 6BX6 or a 6BL8 in your radio junk box, you have never wrecked a B & W TV set.

Have you considered how rare early black and white television sets really are? Could you lay your hands on one of the original 17-inch Astor, Philips or AWA TV sets, for example? Very

**Below: these four sets are all AWA P1s and have yet to be restored. Often, it's necessary to strip parts from one set to get the others going.**



few of us could. Fortunately, some sets been stored in garages (or even under the house), so there are still a few sets around.

Most vintage radio collectors have probably shunned collecting black and white TV sets for several reasons:

(1) the sets are usually bulky (there aren't any mantle set size B & W TVs!);  
(2) they haven't considered B & W TVs as being "vintage" sets. We didn't think of old radios as vintage until about 15 years ago and we are now waking up (almost too late) that B & W TV sets are vintage as well.

(3) B & W TV sets are perceived as being complex – which they are compared to an AM radio receivers. However, this and the following articles may help to dispel some of the mystery.

(4) Replacement parts such as picture tubes, line output transformers and deflection yokes can be difficult to obtain.

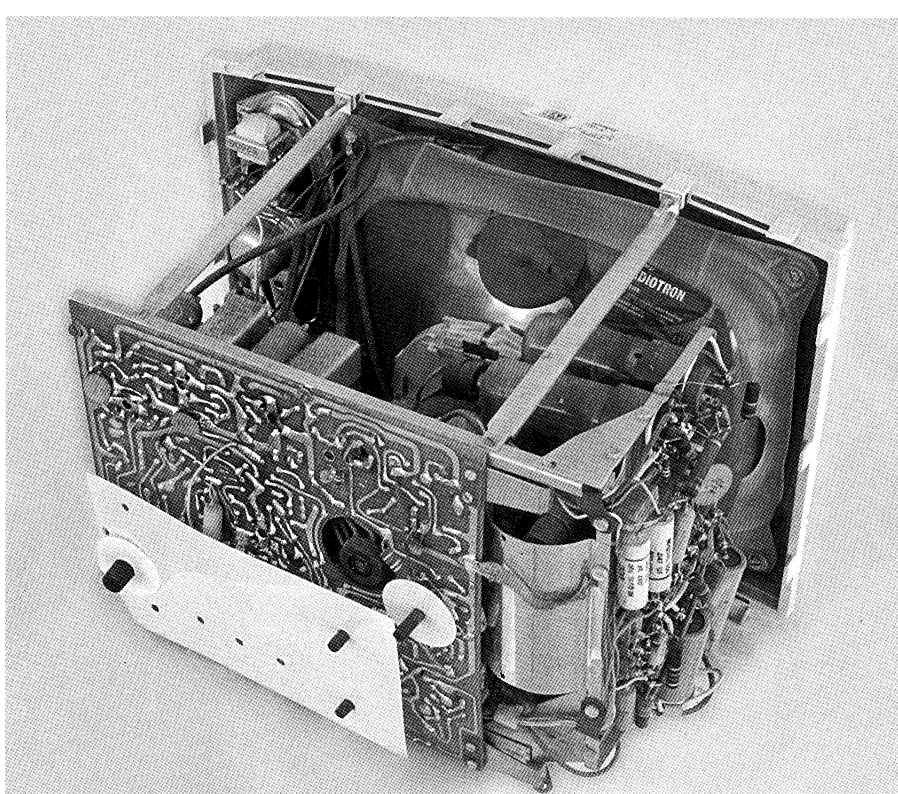
However, even if specialised parts are hard to get, it doesn't mean that sets shouldn't be collected – after all, static displays of our early TV heritage are much better than no displays at all. For this reason, I hope that this article and later ones will help readers to get into this exciting "new" aspect of vintage radio/television collecting and restoration.

## A concise history

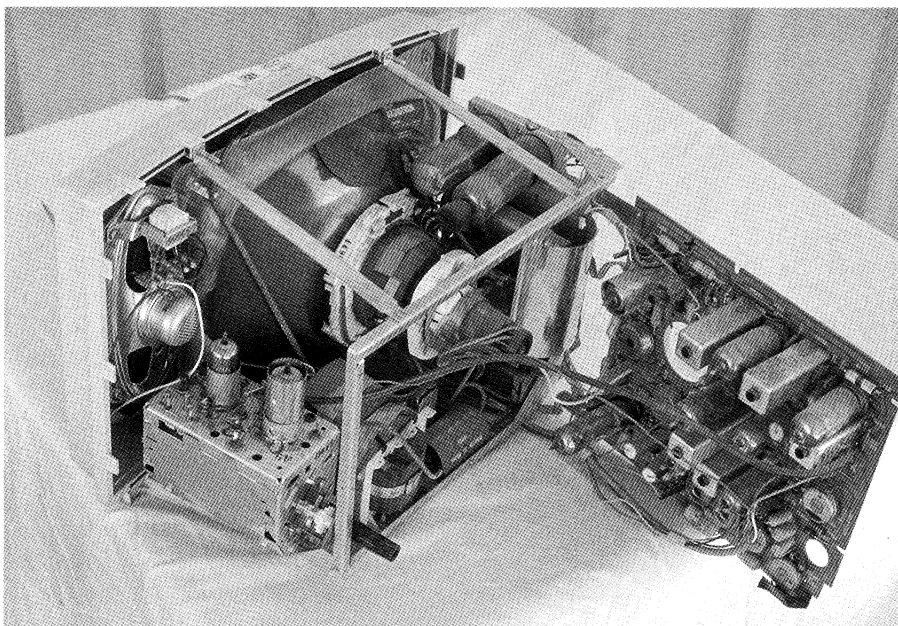
Television in its various forms has been around for quite a long time. However, like wireless (radio), it has taken quite a few decades to evolve into the sophisticated communications medium that it is today.

When the question is asked as to who invented television, the usual answer is John Logie Baird in the 1920s. But although he was at the forefront in developing the mechanical television system, there were many others who had also experimented with mechanical systems, including here in Australia.

Baird pushed for his system to be accepted by the relevant authorities but it was never going to be suitable for domestic use for many reasons – the prime one being that it was a mechanical nightmare. But although the mechanical system was unsuitable for use by the general public, it did show that moving pictures could be sent by radio waves. This opened the way for a fully electronic method



This photo shows an AWA P1 with the cabinet removed. This set is compact, has an 11-inch picture tube and uses 13 valves.



The AWA P1 set is quite easy to service, as the PC board swings out to give access to all the parts. The picture tube can be replaced in around 15 minutes.

to take over a decade later.

As a matter of interest, the mechanical scanning type of TV system only had 30-60 lines to convey the picture. By contrast, a modern PAL TV system has 625 lines and between 150 and 600 times the definition of the mechanical systems. The early pictures were sent on the AM broadcast band

and on nearby frequencies and only required 10-40kHz of bandwidth, depending on the number of lines used in the particular system.

Television became practical only when a fully electronic system was developed in the mid 1930s. In fact, Britain had a working electronic television system by 1936, using a 405



**The AWA 242 was an up-market 21-inch set that was made during the mid 1960s. It had 21 valves and was fitted with a rotary VHF tuner.**

line system. Of course, a number of quite complex problems had to be overcome before this became a reality, including the development of the first practical cathode ray tube (picture tube) by V. K. Zworykin in 1929.

Note that, in those early days, the pictures were rather small, being only a few inches across.

### **Australian & NZ television**

Television for the masses came to Australia in 1956, in time for the Melbourne Olympic Games. So, we've had TV in Australia for over 40 years! Who'd have thought that it was as long ago as that? Before that, there were some early experiments following the 1920s with mechanical low-definition systems which were transmitted mostly on the broadcast band.

New Zealand had experimental TV transmissions in Auckland from 1957 onwards and television for the masses by 1960. Much earlier experiments probably took place there as well but I have no information on that subject.

It's interesting to note that "Radio & Hobbies" ran a television course in

instalments during the early 1950s. This would have helped many servicemen later in the decade, when it came to servicing the new technology.

Before the introduction of TV, servicemen were used to the 4/5-valve mantle AM receiver and the occasional 8 or 9-valve multiband receiver which had a few extra bells and whistles on it. What a shock TV was! Sets typically had up to 25 valves (eg, the STC 730-SU1), with several of these valves having at least two functioning sections (eg, the 6BL8). Some later sets used as few as nine valves but many of these were multifunction "compactrons".

In short, the circuitry and its functions were a whole new ballgame for many servicemen of the era. Some older servicemen hastily decided to retire but many others went back to school and learnt all about the new marvel.

### **Early TV sets**

In most cases, the black and white valve TV sets were consoles, as were the more elaborate radio sets of the

late 1920s through to the late 1940s. The average wage in the early 1960s was around 20 pounds a week and I remember large console sets costing up to 300 pounds at that time, or about 12 weeks pay. Today a colour TV set can be purchased for one week's average pay.

In this first article, I have no intention of describing the restoration of any particular set. Instead, the accompanying photos are intended to show readers what some of the sets looked like from the outside and to give a few glimpses of the internal circuitry. Note that the sets shown here have yet to be restored.

The AWA 242 console in the photographs was one of the more up-market sets during the mid 1960s. It had 21 valves and the picture tube was nominally a 21-inch unit. It was fitted with a VHF tuner as only VHF stations were available in Australia until the advent of colour TV.

The AWA P1 is my favourite valve black and white portable TV set. It is compact, has an 11-inch picture tube and has a total of 13 valves. The set is quite easily serviced, as the PC board swings out as shown in the photographs.

In fact, it is so easy to service that a picture tube can be replaced in around 15 minutes.

I have a total of five P1 sets, which means that I will be able to get at least one operational using one or more of the others for spare parts. I suspect that this is the approach most vintage TV restorers will have to adopt when it comes to restoring sets to working condition.

Another very interesting set shown in the photos is the Healing. This is a solid state receiver made towards the end of the black and white era.

### **Technical details**

TV receivers are very different from AM radio receivers, although there are a few similarities between them. For example, TV sets are superhets as are most vintage radios from around 1935 onwards. TV sets use much higher operating frequencies, however.

During the black and white era in both Australia and New Zealand, the frequency range tuned by the sets was in the very high frequency (VHF) band, from around 44MHz to 225MHz. This is considerably higher than the high-

est frequency tuned on most dual-wave AM receivers, which usually don't go past 18MHz.

As in AM broadcast receivers, the local oscillator operates higher than the frequency to which the set is tuned by a fixed amount. This is known as the intermediate frequency, or IF. The IF for the picture carrier was 36MHz, and the sound carrier IF is 30.5MHz. These frequencies are slightly different today.

In some early TV sets, two separate IF amplifier stages were used for these two separate parts of the TV signal. However, apart from some rare exceptions, all the sets made in Australia (and, I imagine, New Zealand) used only one IF channel for both sound and vision.

In a normal AM broadcast receiver, the IF bandwidth required for high-quality music reproduction is around 20kHz. However, a vision signal requires a very much wider IF bandwidth for quality pictures to be reproduced – around 7MHz in fact, for both the sound and picture.

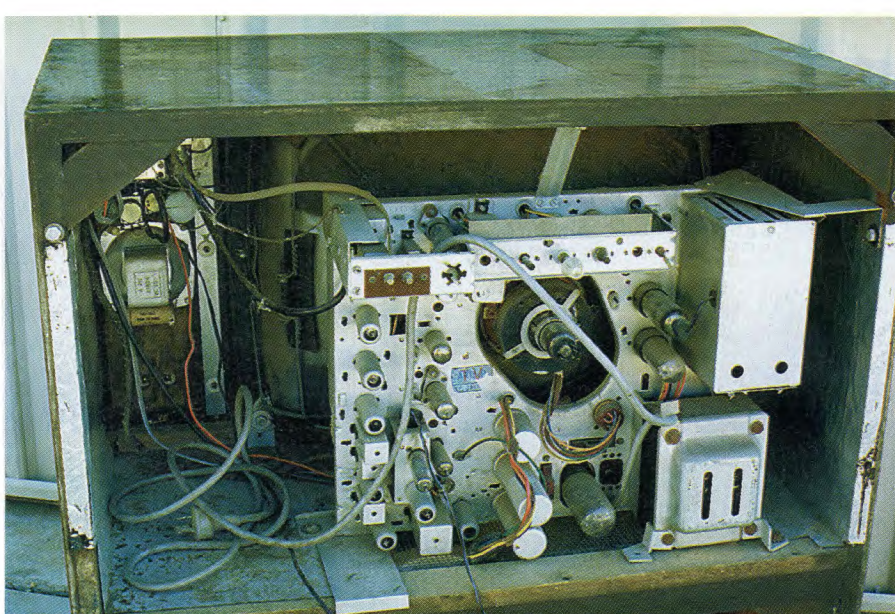
We'll explain why this much bandwidth is required in a later article.

The signals are usually detected by a germanium diode, after which the audio and picture signals are separately processed. The audio is fed to an IF amplifier stage on 5.5MHz and thence to an FM detector and audio amplifier. At the same time, the video (picture) information is amplified by a video amplifier which usually has a response from DC to about 5.5MHz.

A number of other important components also appear at the detector. These include the vertical and horizontal synchronising (or sync) pulses. These pulses are processed and ensure that the picture is "locked" vertically and horizontally into position on the screen. The horizontal sync pulse peak level is also used to provide automatic gain control.

As an aside, most people will have seen pictures that roll vertically or tear horizontally. This is usually caused by a fault in the vertical or horizontal sync circuitry.

The other two important components are the vertical and horizontal blanking pulses. These pulses are necessary to blank the screen at set intervals, so that retrace lines aren't visible when the electron beam jumps to the start of a new line or to the top of the screen.



This view shows the chassis layout of the AWA 242 TV receiver. The set is fairly easy to work on, with good access to most of the major parts



This portable b&w TV set carries the Healing brand name. It was made towards the end of the B&W era and uses solid state (transistorised) circuitry.

As can be appreciated from this, quite a bit of circuitry is required to process a "composite" video signal to achieve the quality of picture and sound that we have become accustomed to.

In later articles, simplified descriptions of how the sets work will be presented, to assist restorers in the task of restoring their black and white TV receivers. As Leo pointed out in

his Publisher's Letter, these sets are worth restoring and are part of our history, so start collecting even if a complete restoration is beyond you at this stage.

Finally, a few words of caution – be very careful how you treat the picture tube. A leather apron and protective glasses should always be worn when working with a picture tube, to give protection if the tube implodes. **SC**