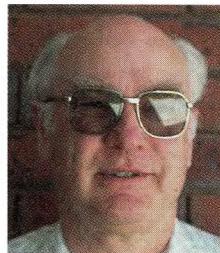


# VINTAGE RADIO

By RODNEY CHAMPNESS, VK3UG



## The miniature STC A-141 mantle radio

**Miniature is a relative term – what was classed as a miniature valve radio in the late 1940s is considered huge today. The set described here is a basic receiver, designed to fit as much as possible into a small cabinet. The parts are crammed together and there is very little space above the heat-producing valves for ventilation.**

The market for polished timber, elaborate console radios in the lounge had virtually been saturated by the late 40s and hence sales were falling. Manufacturers and particularly their sales people were exploring any avenue to expand sales. Suddenly they had the bright idea that the lady of the

house could be persuaded to listen to a simple set tuned to local stations which poured forth the “soapies” of the day.

As the lady of the house was considered to be chained to the kitchen, the set was designed to be placed on the mantle-piece above the stove. The

attitude of the day tended to be that the lounge console belonged to the man of the house and he was the main operator. The lady of the house could have a simple small set perched on the mantle piece to keep her happy.

The gentleman’s ego would not be bruised by the lady having a set of her own because it didn’t compare with his and didn’t cost anywhere near as much. That tended to be the attitude towards women and radio in those days.

### The STC A141

This model and its brothers, the 141, the B-141 and the C-141 are reasonably popular items with collectors. The receiver is installed in an attractive Bakelite cabinet, just big enough to house the set, with little room to spare.

This particular set had a broken cabinet when I received it for restoration. However I was able to repair it, with the assistance of a colleague at Kyabram. This is the subject of another article on cabinet restoration. Whilst the cabinet restoration hasn’t hidden all the break lines completely, it has meant that an interesting little set is now fully functional and looks almost like new.

So if you have a set that has a broken Bakelite cabinet, don’t think that it is impossible to repair.

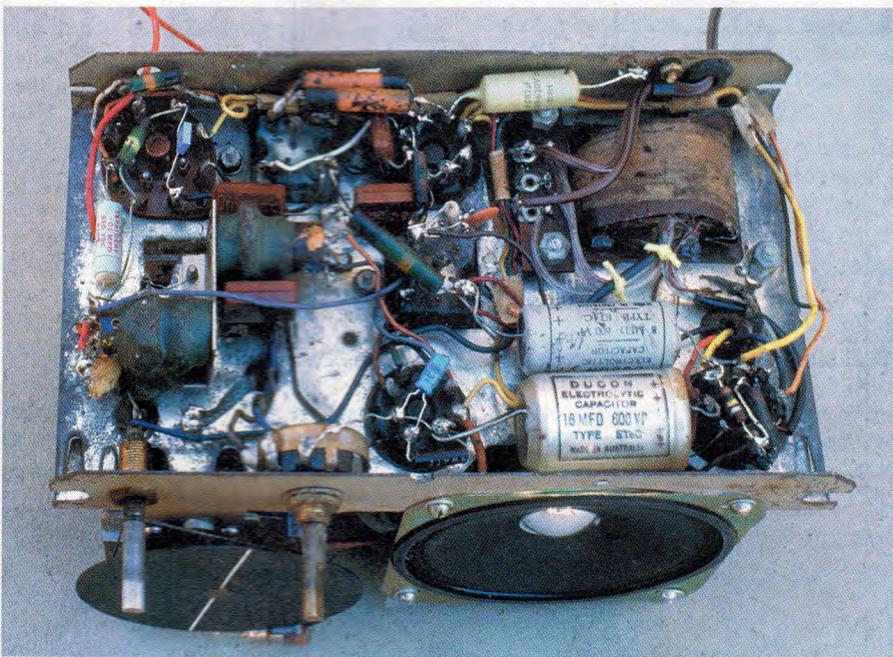
Separating the chassis from the cabinet is quite an easy task. Two screws, one near the aerial lead and the other near the power lead, on the back of the chassis are removed, the two knobs are removed and the chassis is slid out of the case. The speaker and most of the dial are attached to the chassis too. The actual dial scale is attached



The STC A-141 came in a very compact case and was regarded as a miniature set in its time.



The parts on the top of the A-141's chassis are very tightly packed together, although access is reasonable.



The under-chassis view of the STC A-141. Note that the dial scale stays inside the cabinet.

to the front of the cabinet which is a pest when it comes to aligning the tuned circuits for correct tracking across the dial. I'll talk about this problem later.

The circuitry of the A-141 is quite conventional, with a 6K8GT converter, a 6G8G IF and second detector/AGC and a 6AG6G (or KT61) audio output. The original 141 had no automatic gain control (AGC), using only manual

volume control with a 6V6GT in the audio stage. The B-141 and the C-141 are reflexed sets and both use a 6V6GT in the audio output.

After looking at the circuitry on all of these models, it appears that the C-141 would have been the pick of them in regard to performance.

While this set is marked as an A-141, it appears that the delayed AGC bias network to V1 and V2 had its

shortcomings. As can be seen, R9, a 1MΩ resistor, comes directly from the centre-tap of the power transformer HT secondary. This puts quite a bit of hum into the detection circuit. If the circuit is to be believed, the AGC bypass capacitor is 25μF (to filter the hum?), which would give a time constant of 55 seconds for the AGC to settle.

In this particular set R9 is made up of two 0.5MΩ resistors. The junction of the two resistors has a 0.25μF capacitor connected between it and the chassis. This filters out the hum from the back bias cum delayed AGC line quite effectively. C3 is .05μF and the system works quite satisfactorily.

The power supply uses a 6X5GT rectifier. It is a little different to most, in that the filter choke is in the negative lead. This is not a common way of accomplishing the filtering but is quite reasonable and means that the choke has virtually no stress on its insulation between core and winding.

STC used this method quite a bit and it was also used in a significant number of broadcast radio transmitters to reduce the insulation stress in the filter choke. In the case of transmitters, the voltage between winding and core could be 10kV or more if it was placed in the high tension positive lead.

## Restoring the set

The set was first given a good clean, being dusted out with a small paint brush. A vacuum cleaner on the blowing mode can be useful too. Some people use air compressors but be very careful when using this method as the tuning capacitor plates can be damaged.

I clean the gunk off with a kitchen scourer soaked in household kerosene. The scourer can be cut into small pieces or into a strip to make the job easier. A rag soaked in kerosene can be effective in some areas too.

Rusty areas will respond to the scourer treatment but there are other methods some find effective. A mixture of molasses and water or bread and water works well according to another restorer I know. I can't vouch for it myself.

It is obvious from the photographs that I haven't repainted and re-stencilled the chassis. Whether a receiver chassis should be cleaned and then left as is, or whether it should be



stripped down with all parts removed, cleaned and repainted or plated and re-stencilled is a vexing question. Some believe sets should look as though they've been around a bit while others believe that sets should be in pristine condition.

I don't believe there is any definite answer to this question. The first option entails a reasonable amount of work. The second option is, however, a very big undertaking and the question that is often asked then is, "Is it authentic?"

## The circuitry

A few odd things had been done to the set by someone in the past; nothing bad, just different. The 6G8G had been replaced with a 6K7G, most probably because whoever had previously worked on the set didn't have a 6G8G. They both work well as the IF amplifier but the 6K7G has no diodes to act in the detector and AGC circuits. To overcome this problem two germanium diodes had been used and they did quite a satisfactory job, as you would expect. As I had a 6G8G, I restored the circuit to standard.

The leaky paper capacitors were replaced. The most critical ones in this circuit are C3, C12 and C13. Here is an interesting little question for you. What happens when C12 (attached to the volume control moving arm) becomes leaky? What is the effect on the receiver's performance across the band?

The resistors were checked and found to be within tolerance and the valves were in good order too.



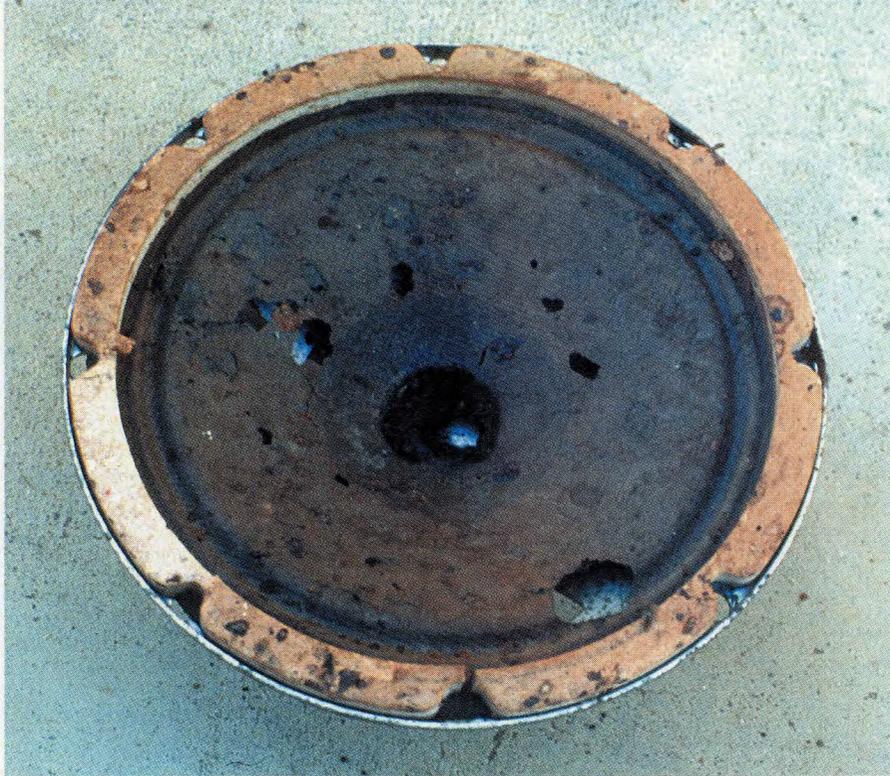
**The rear view of the A-141. Restoring the chassis to pristine as-new condition would be a lot of work and then would raise questions about its authenticity. In this condition, you know it's the genuine article.**

The speaker was a sorry mess, as can be seen in one of the photographs. It had been eaten by moths and it didn't sound the best either. An exact replacement was not available, so a slightly smaller speaker of the same impedance was fitted. The original speaker had a bracket for the speaker transformer and I had to make one so that the transformer could fit into the same place as the original. There was

no room to fit it anywhere else, plus it was necessary to keep it as far away from the power transformer as possible. Even then, the speaker transformer had to be orientated so that minimal hum was induced into it.

## Checking for shorts

Now it was time to get serious with the receiver and see what it would do on air. I did all the usual checks, be-



The loudspeaker cone was badly motheaten which meant that the speaker had to be replaced.

ginning with the transformer, for any potential shorts between frame and the various windings using the high voltage tester. All was well.

While this set has a twin-core power cord as originally manufactured, if you cannot test the transformer as I did, I would suggest that the twin-core lead be replaced with a 3-core power cord so that the chassis is earthed.

I then ran the set with no valves to check whether the transformer had any shorted turns. Both tests were successful and the transformer was quite cool after a half-hour run. Next, I checked for any shorts between the high tension (HT) line and earth. There were none and I plugged in the 6X5GT and measured the HT voltage as the set warmed up. I turned it off after about 30 seconds to let the capacitors discharge and went through the same procedure a few times until the voltage reached a consistently high voltage on each test.

Really, what I was doing was making sure that the electrolytic capacitors "formed up" without getting too hot or causing the 6X5GT to be overloaded by the forming current. All was well. The rest of the valves were then installed and the set turned on

again with an aerial attached. Music, glorious music.

### Alignment

The alignment of a simple receiver like this is not unduly difficult. With a digital voltmeter connected across the volume control, it is possible to align the IF by tuning to a station and adjusting the four IF transformer cores for a peak DC reading on the meter. I prefer to align sets with a signal generator but this method works fairly well.

The aerial and oscillator circuits are a bit more complex. As I mentioned earlier, the dial scale stays in the cabinet so the dial pointer has no real reference point. Firstly, slide the chassis into the cabinet and make sure that the pointer coincides with the one of the end of scale markings when the gang is closed or fully open. At the low end of the dial, tune to a station that you know well around 600kHz. It might not coincide with the markings on the dial.

Next, set the pointer to the position that identifies that station. If you are lucky, the station and the markings on the scale will coincide. If the station is not heard on its indicated position, it will be necessary to adjust the slug

in the oscillator coil, L2. To gain access to the coil, it is then necessary to withdraw the chassis from the cabinet again. If the station is heard at a higher indicated frequency than it should, screw the slug out and if heard lower in frequency screw the slug in, until you hear it. The core of the aerial coil, L1, can now be adjusted for maximum reading on the digital voltmeter.

At the other end of the dial, around 1500kHz, select another station that you know and repeat the same procedure to tune the station in on the correct spot on the dial. This time however, you adjust C5, which is the trimmer across the oscillator tuning capacitor. C1, the aerial trimmer, is then adjusted for best performance as indicated on the voltmeter.

It will be necessary to go over these aerial and oscillator adjustments a few times as they interact with each other. This is a simple method of aligning a receiver. With practice you can become quite speedy with it. It isn't the quickest method but is one that can be done with minimal equipment.

Now would you like the answer to the question I put to you earlier? If C12 goes leaky, not a lot happens with weak stations that are listened to at low volume. However, if the volume is turned up and you tune across the band, the volume of strong stations will decrease and in some sets it may even disappear. Adjusting the volume control in some cases causes very little change in volume.

Why? When C12 becomes leaky it puts a negative voltage onto the grid of V3 which reduces its amplification and may even cut the valve off. This effect is more obvious in sets that use a 6AV6 or similar, with contact potential bias (10MΩ grid resistor). The amount of extra negative bias is controlled by the position of the slider on the volume control and the strength of the station being received.

### Summary

This model is quite a nice little receiver that fits very snugly into its cabinet. It is rather crowded on top of the chassis but things underneath are quite accessible. It performs well but I'm sure that the C-141 version would have been a much better set. As a kitchen radio it does its job very well and is quite attractive in its own way. It is well worthy of a place in any vintage radio collection. **SC**