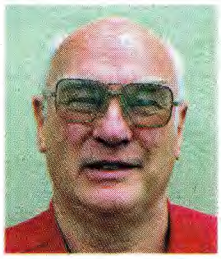
VINTAGE RADIO

By RODNEY CHAMPNESS, VK3UG



The HMV 660 console of 1940

Housed in a stylish cabinet and boasting performance to match, the HMV 660 was undoubtedly one of the better console receivers from the early 1940s. It is a 5-valve dual-wave receiver that's well-made and easy to service.

The large, easy-to-read dial was an impressive feature of the HMV 660 console.

These days, our homes are crowded with electronics equipment, including VCRs, DVD players, large-screen colour TV sets, audio and home-theatre equipment and of course, transistor radios. However, in the early days of electronics, the average home of the 1930s was lucky to have just one radio receiver.

At the start of the 1930s, this would probably have been a TRF receiver of mediocre performance coupled to a large outside antenna and earth system. Later, when superheterodyne receivers became established, large mantel and table sets became more common, while the more affluent lashed out and purchased a console receiver costing many "guineas".

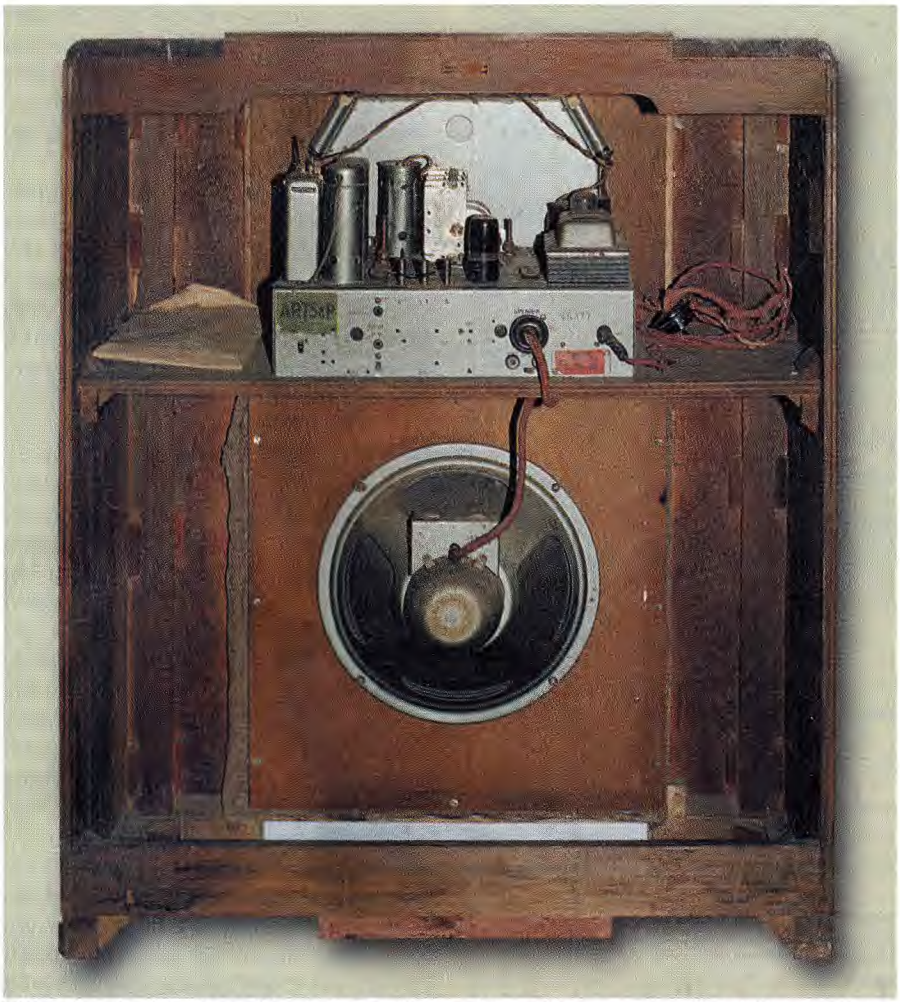
What's a "guinea"?

For those born after the abolition of pounds, shillings and pence, a guinea was equal to one pound and one shilling (a pound was equal to two dollars when decimal conversion was introduced at the start of 1966). So why was the term "guineas" used?

Well, it always sounded so much more upmarket (or "toffy") than pounds and shillings and it also had the advantage, at least from a salesman's point of view, of making the price sound less that it really was. Racehorses were always sold in guineas, for example, so why not upmarket radio receivers?

The console receiver held pride of place in the lounge room right through the 1940s but waned in popularity in the 1950s when radiograms took over. In turn, radiograms were relegated to second place when TV was introduced.

During the heyday of the console receiver, many fine examples were manufactured. Recently, I was given the opportunity to closely examine a



This view inside the cabinet shows the quality of the construction. The envelope to the left of the chassis contained the original instructions and the guarantee.

HMV 660 owned by one of my friends, Laurie Tilley.

Cabinet style

The HMV 660 was one of the better quality units available on the Australian market around the start of the World War II. It is an extremely solid (heavy) unit made from high-quality plywood and has an attractive veneer on the outside surfaces.

The half-round dial-scale on these receivers always impressed me, perhaps because I liked seeing my grandfather's HMV 660 set. I used to be fascinated by the colourful lighting of the dial which, to an 11 year old boy, was very impressive. This model is claimed by some to be the best console made by HMV and probably one of the best of any makes for that matter.

The cabinet has a walnut finish with figured walnut inlays on the front and is a well-made, quality item. The original HMV decal with the familiar "His Master's Voice" logo is still on the top of the cabinet.

This particular cabinet is in very good condition and has not been stripped back. However, a few marks are visible and they will be polished out in due course. In fact, Laurie prefers to keep the cabinets looking as original as possible and a few minor blemishes are allowed to remain.

This brings us back to the old argument as to whether a receiver should be restored to "as new" condition or simply made look to respectable and restored to good working order, while keeping it as original as possible. Much depends on the sets themselves, some of which may be 70 years or more old. And, of course, individual restorers will have their own ideas.

A glance inside the back of the cabinet reveals the battleship-grey chassis and chassis-mounted components that were typical of HMV sets. Everything looks solid and neatly laid out. The loudspeaker is a 12-inch (305mm) HMV electrodynamic unit attached to the substantial baffle board in the lower section of the cabinet.

Guarantees and instructions

An interesting aspect of this old HMV 660 is that the installation and operating information, along with the guarantee card, were still with the set when Laurie obtained it. This is very

This view shows the partially-restored chassis. The power cord (far right) had badly perished and was still awaiting replacement when this photo was taken.

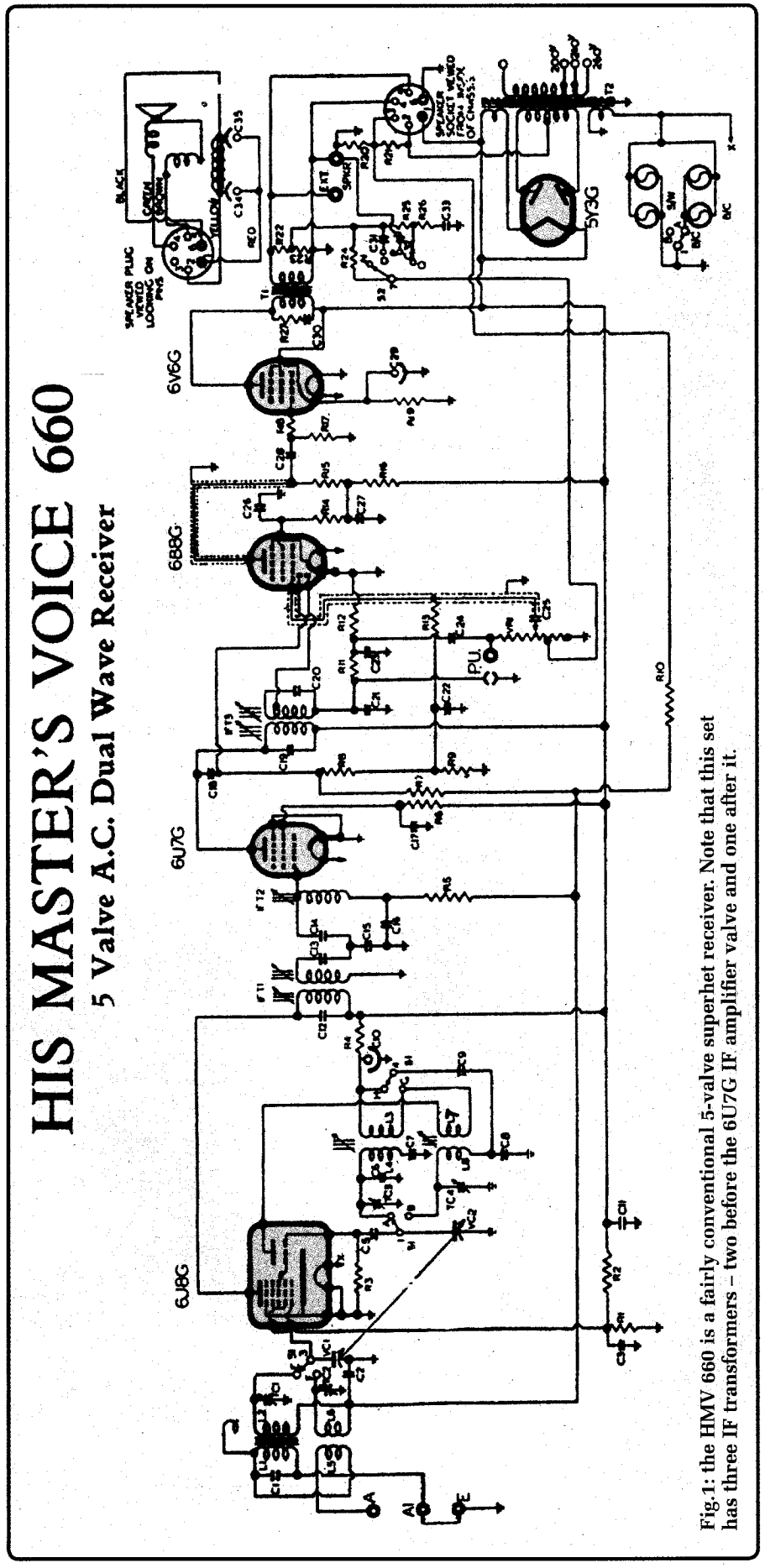


Fig.1: the HMV 660 is a fairly conventional 5-valve superhet receiver. Note that this set has three IF transformers – two before the 6U7G IF amplifier valve and one after it.

unusual, as most of these "extraneous" bits and pieces never survived more than a few years. Today, these items and the packing cartons are often considered to be more valuable than the sets themselves.

The accompanying photographs give will you some idea of the contents of these documents, which make fascinating reading. If you are fortunate enough to obtain a receiver with any (or all) of the literature and accessories, be sure to keep them, as they too are part of our radio heritage.

Dismantling the set

Dismantling the set is a straightforward task. First, the four knobs are removed and all except the tuning knob have screws which go through a slit in the control shaft. HMV appeared to be the only manufacturer that did this at the time. It has the advantage of placing minimal pressure on the bakelite knobs while still retaining good rotational ability. In fact, I haven't seen a single broken knob where this technique has been used.

Once the knobs are off, the celluloid strip labelled with the control functions, is removed from the shafts, along with the felt shaft washers. The two long (6mm diameter) bolts that attach the chassis to the chassis shelf are then removed, after which the speaker lead can be unplugged and the chassis slid out from the back of the cabinet.

Once it's out, the chassis can sit on one end quite comfortably for servicing or you can use a servicing jig such as the one described in the October 2000 issue of SILICON CHIP.

Laurie has not found it necessary to replace many components at this stage, apart from the electrolytic capacitors and the power cord. If you want to keep old sets looking original, by the way, 3-core (brown) fabric-covered power lead is available from Direct Components, PO Box 437, Welshpool, 6986 (phone 08 9479 4850); and from Elizabeth Trading, 15 Station St (PO Box 374), East Kew, 3102 (phone 03 9859 8799).

In addition, one bypass capacitor earth lead has come adrift from its mounting lug but everything else was in quite reasonable condition. The remaining components will be checked further at a later date, with emphasis on the critical audio coupler and AGC bypass capacitors. The speaker cloth was replaced with a plain brown cloth

and although it doesn't have the same pattern as the original, it doesn't look out of place.

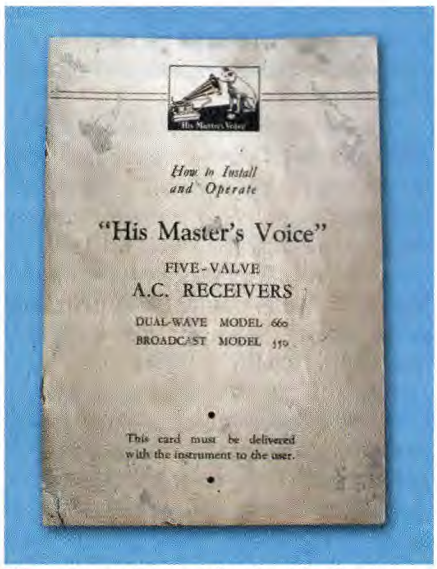
The dial system still works well, with no slipping. As mentioned earlier, this is an impressive set to look at from the front and equally impressive in its build quality when viewed from the rear.

Circuit details

HMV receivers of this era have always impressed me with their attention to circuit detail. The HMV 660 is a 5-valve set with a 6J8G converter. This is followed by a 6U7G IF amplifier on 457.5kHz, a 6B8G as a combined diode detector, AGC diode and pentode audio amplifier, and then a 6V6G as the audio output stage. The power supply uses a 5Y3G as the rectifier.

Let's first take a look at the front end. This radio is a dual-wave unit, covering 550-1600kHz on the broadcast band and approximately 6.4-21.6MHz on the shortwave band. Due to the smooth dial-drive system, shortwave stations are fairly easy to tune in. The dial-scale is illuminated by four lamps but only two at a time are used, depending on whether the broadcast or shortwave band is selected. As a result, only the appropriate section of the dial scale is illuminated.

The connections to the antenna system are rather unusual. As shown on the circuit diagram (Fig.1), the "earthy" end of the antenna coil goes to an unearthed antenna terminal (A1).



This manual was also inside the large envelope. It describes how to install and operate the receiver and covers both the 660 and 550 models.

The HMV 660's original guarantee form and registration card were inside the large envelope that was adjacent to the chassis. It's rather unusual for this type of printed material to survive intact,

This is normally bridged to the earth terminal, so why have this terminal at all if it is earthed out anyway?

The answer is that for normal operation, the additional terminal is superfluous. However, on shortwave, the performance can be considerably enhanced if the A and A1 terminals are connected to a balanced 75-ohm transmission line which terminates on a horizontal dipole antenna. Note that, for best performance, the dipoles need to be cut to suit the particular bands of interest.

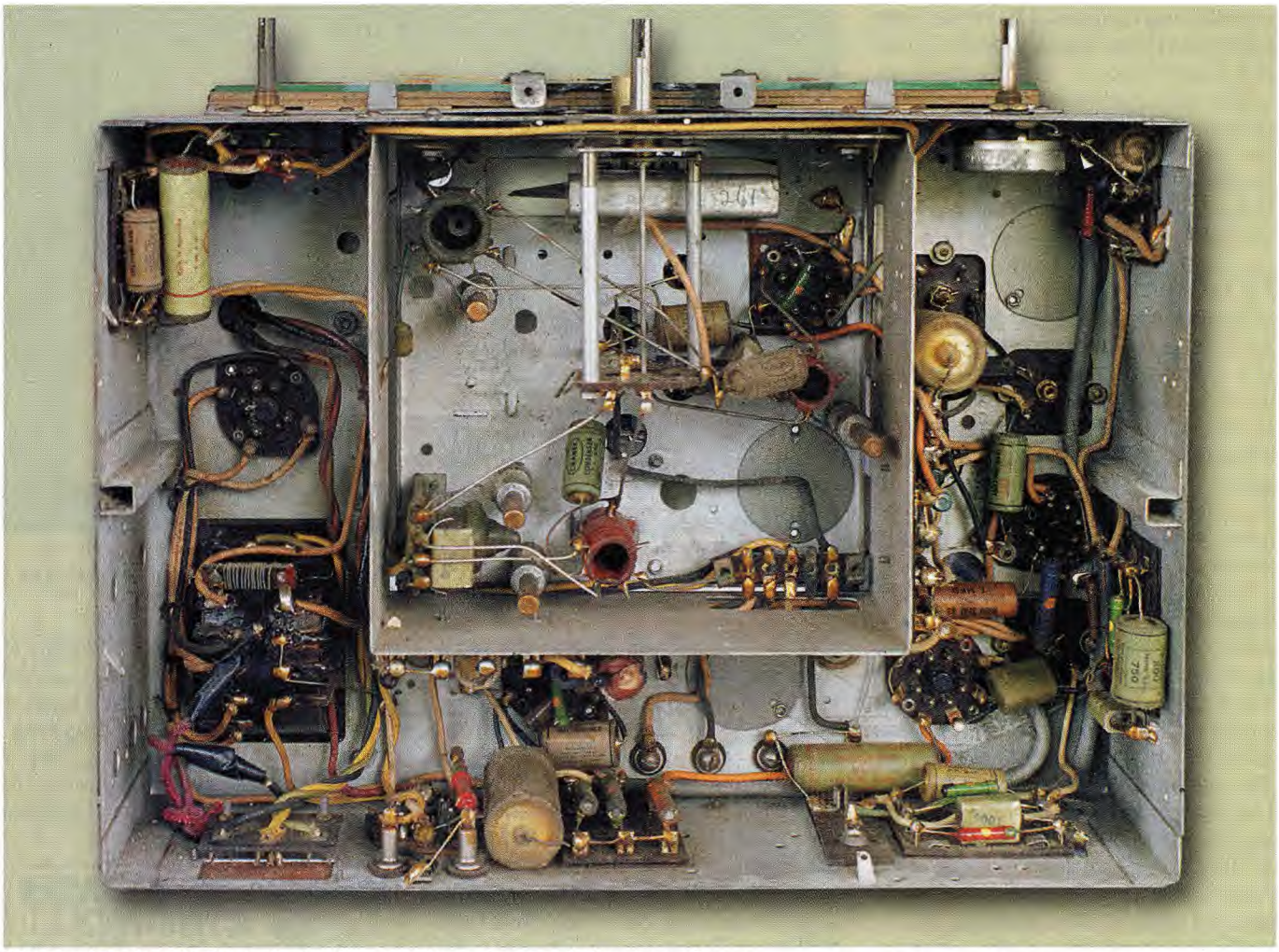
Apart from the unusual antenna input circuit, the antenna coils are quite standard for the time. The primary windings of both antenna coils are in series with each other, which saves one switch position. L5 has so little inductance that it doesn't affect the operation of L1 and, in fact, acts as a small loading coil to slightly improve broadcast band performance.

Conversely, L1 looks like a large RF choke in series with L5 when the set is tuned to shortwave. However, this has no effect as the shortwave signals are passed through capacitor C1 with very little attenuation.

L1 and C1 together form a resonant circuit which resonates at a frequency just below the broadcast band. This increases the performance at the low-frequency end of the dial and the loop at the top of L1 improves the coupling at the high-frequency end.

The IF (intermediate frequency) amplifier stage is more elaborate that in most sets of the era. As shown on Fig.1, there are two IF transformers at the input of the IF amplifier and one after it. The type of coupling used is called "shunt capacitance coupling" or "bottom coupling".

The two transformers at the amplifier input are designed to give a response



This under-chassis view shows the open layout around the wave-change switch and the coils. Other sections of the receiver follow in a logical circuit progression from the top righthand corner, down the side and along the bottom, with the power supply down the lefthand side. The chassis was designed for more than one model, judging by the plates used to cover several spare holes.

curve that has a slight dip in the centre at 457.5kHz and a reasonably sharp cut-off outside the pass-band. Taken together, the IF transformers give a substantially flat response right across the pass-band. This added complexity results in an audio frequency range out to 8-9kHz, as compared to around 4-5kHz in most other sets.

So the HMV 660 was indeed a quality receiver!

A comment in Vol.4 of the "Australian Official Radio Service Manual" (AORSM) stated that one of the tone control positions was designed to boost the high-frequency audio output to make up for the sloping response of the IF amplifier. So it appears that HMV made every effort to produce high-fidelity audio output from their receiver. And although we may not consider 8-9kHz as hifi today, it certainly was back in 1940!

The circuitry following the 6U7G IF amplifier is conventional, with the 6B8G providing delayed AGC and diode detection. AGC is applied to the 6J8G converter stage and the 6U7G IF amplifier, while around half this amount is applied to the audio amplifier. This is designed to ensure that the set produces an audio output that's at the same volume for both strong and weak stations.

An undesirable byproduct of AGC can be a high level of noise when tuning between stations. This could have been overcome by using extra circuitry to partially mute the receiver between stations. However, because this increases the complexity and therefore the cost, it was rarely done.

The audio amplifier

The detected audio output is applied to a tapping on the secondary of the final IF transformer (IFT3). From there, it is then fed through an IF filter network (C21, R11 & C23) and a volume control to the grid of the 6G8G first audio amplifier stage. The resulting signal is then applied to the 6V6G, which in turn drives the 12-inch 2-ohm loudspeaker via output transformer T1.

Note the resistive divider consisting of R22 and R23 across the secondary of the speaker transformer. This applies a feedback signal via the switched tone control network to a tap on the volume control. This was a very effective method of tone control and provided good quality sound with minimal distortion (for those times).

The chassis is also wired so that a record player pick-up can be connected to the audio output stages, just ahead of the volume control (ie, at P.U.). In practice, the pick-up leads were plugged into two banana type sockets on the rear apron of the chassis. Note that the earth socket is split so that when the plug is inserted, the junction of R11 and C21 is earthed,

thereby shorting out the audio from the receiver's detector stage.

This was a neat system that obviated the use of an additional switch section to switch off the HT voltage to the converter and IF stages. However, it didn't remove the AGC voltage from the 6G8G, so variations in volume could be expected if the set was tuned to a station that was fading and causing the AGC voltage on the 6G8G to change. In practice, this really wasn't much of a problem as most people listened to local broadcast band stations where fading didn't occur.

The pick-up inputs were probably a selling point but you have to wonder how many people actually took advantage of them by connecting a turntable. Probably very few!

The power supply

The power supply is quite conventional, the only minor variation being that the field coil (filter choke) in the electrodynamic speaker is placed in the negative lead. This meant that the coil winding and the earthed frame had very little voltage between them, ensuring very little insulation stress.

The back bias and delayed AGC voltage is obtained by tapping off part of the voltage developed across the field coil via a voltage divider network.

Under the chassis

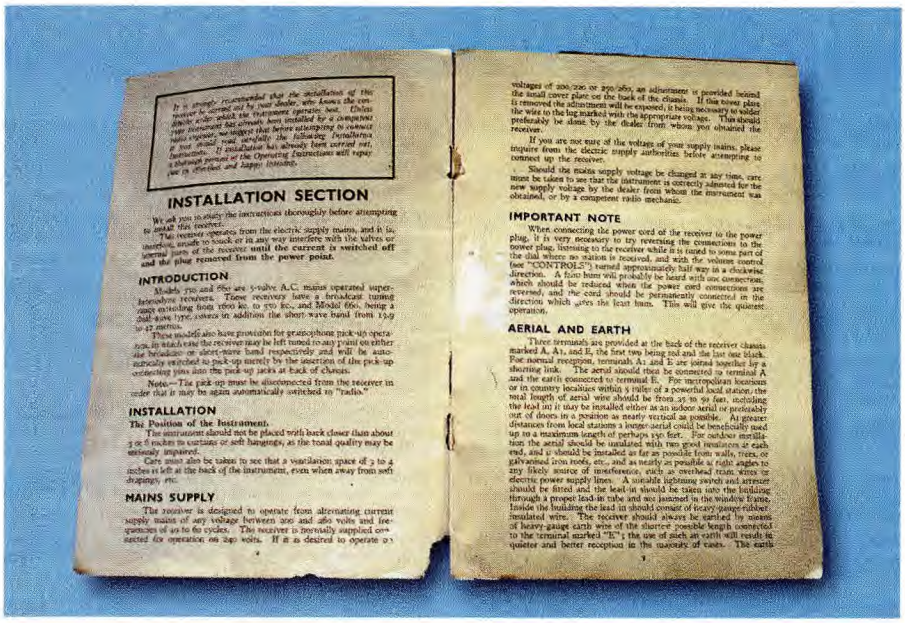
The view under the chassis shows a neatly laid out set using small groups of components which are mostly soldered onto insulated mounting boards. Access is quite good and restoration is not a problem. It really is a pleasure to work on such a well laid out set.

Alignment

Unfortunately, the AORSM does not give any information on aligning this receiver. However, the procedure for aligning the signal input and oscillator circuits will be quite conventional, as described in the article in the February 2003 issue of SILICON CHIP.

The alignment of the IF amplifier stage may require a different technique to that commonly used. I have not had an opportunity to align this set and Laurie hasn't found it necessary to do so either, as the set is already performing quite well.

Should alignment be required, the secondary of IFT1 should be loaded with a 10kΩ resistor when its primary and IFT2 are being adjusted.



INSTALLATION SECTION

INTRODUCTION

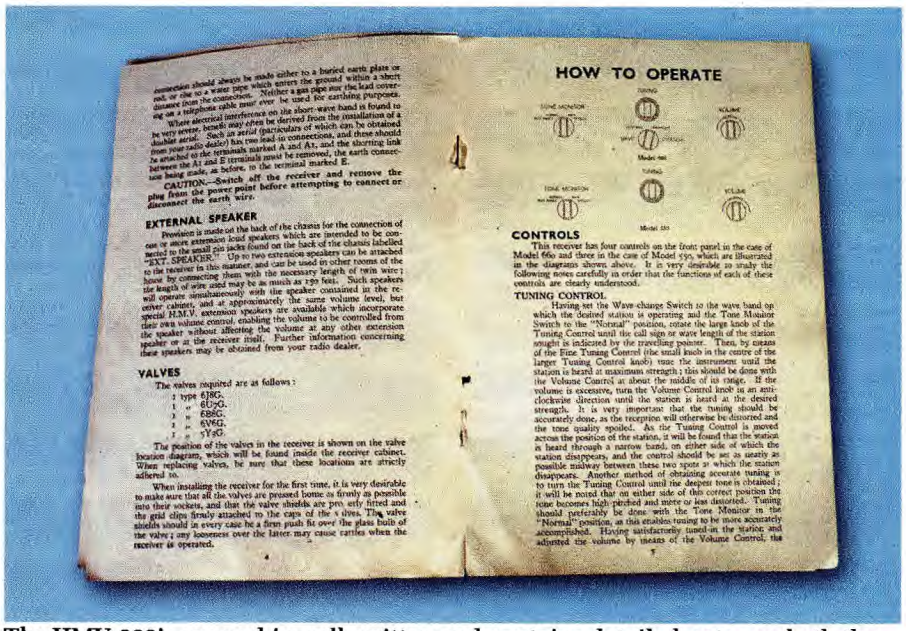
INSTALLATION

The Position of the Instrument.

MAINS SUPPLY

IMPORTANT NOTE

AERIAL AND EARTH



HOW TO OPERATE

EXTERNAL SPEAKER

CONTROLS

VALVES

TUNING CONTROL

The HMV 660's manual is well written and contains detailed notes on both the installation and operation of the receiver. It even explains the procedure for connecting an external loudspeaker.

Similarly, remove the 10kΩ load and place it across IFT2 when adjusting the secondary of IFT1. By using this method, you should have a good chance of successfully obtaining the correct IF transformer response shape.

IFT3 can be aligned in the usual manner, as discussed in the articles in the December 2002 and January 2003 issues.

Summary

In summary, the HMV 660 is an impressive 5-valve dual-wave receiver with better than average performance. To match this performance, it is installed in a solid, well-made console cabinet.

Despite its age, Laurie found that it required very little work on the circuitry to restore it to good working order. The dial is particularly impressive, both in terms of looks and performance. It's a well-made unit with little sign of wear in the mechanism, despite its age.

Finally, this is an easy set to service, particularly when compared to many other sets. The only thing you have to watch out for is the method of aligning the IF transformers, to get the correct pass-band response. **SC**