Vintage Radio

By Associate Professor Graham Parslow

HMV's 1951 Portable Model B61D

Portable radios became quite popular in the 1950s and 1960s, especially with the arrival of beach culture. And while they were quite expensive, relatively heavy and their battery life could be quite short, their cabinet designs were attractive and they are now very collectible. The HMV B61D portable is a good example.

This restoration project came about after a spousal edict to clean up the storage shed. Well, "clean up" has a variety of interpretations and I discovered a temporarily forgotten pile of HMV portables, hidden by a bank of shelves. Obviously, I needed to attend to these portables as a first priority – the clean-up could wait!

The set that started this collection was a cream model purchased in 2004 from a shop in Kadina, South Australia, for $15. It had a broken speaker grille, no carry handle and a damaged celluloid dial.

That first radio is unremarkable but it brought back the nostalgic pleasure of visiting the country area where I grew up, having not returned for many years.

At the time, I wanted to restore that first HMV portable but it needed a range of salvaged parts. So over the years a number of these HMV portables had been "found" and subsequently added to the "fix it someday pile". Ultimately, I acquired nine HMV portables, all of them broken in some way.

They exhibit a range of defects likely to found on 1950s HMV portables. The most vulnerable item is the celluloid dial. With age, these dials become very brittle and will crack from even the slightest impact.

The celluloid was manufactured flat then bent into shape by pushing it into internal mouldings of the case that retain the top and bottom. This creates stresses that eventually lead to cracking.

In my collection of nine radios, only one had an intact dial and unfortunately that was accidentally broken after its picture was taken. Apart from cracking, the celluloid also yellows and becomes opaque with age.

The next most common problem is damaged or missing cream plastic collars that enclose the ends of the carry strap. Also common is cracking of the case and the backing panel.

Plasticisers were added during manufacture to make the case resistant to cracking, but they lose their efficacy over the years and the plastic becomes brittle.

The most broken case among the nine is testament to a brush-tail possum that got into the shed and knocked the radio to the floor, creating a Humpty-Dumpty scenario. Fortunately plastic-model glue enabled a durable and neat repair of the cabinet.

The radio featured here was chosen to be the first for restoration because it was largely intact. It is also the earliest of the models that span the period 1951 to 1956. During this time, EMI (the manufacturer of HMV-branded sets in Australia) retained the same case while making changes to circuitry and components.

Another good omen was that the original diagram showing the circuit (Fig.1) and component layout (Fig.2) was still in this radio and is reproduced here. It also appears in the 1951 Australian Official Radio Service manual, where extra details have been included. A date stamped on the loudspeaker indicates that the radio is a 1951 model B61D, despite the seller's tag claiming it was a 1954 model 22-1.

Three of the nine sets in my collection have the optional built-in mains adaptor but the model featured here is a dedicated portable. It needs 1.5V to run the valve filaments that are arranged in parallel; mains-powered models use a series connection. Four of the valves are from the One-series (1T4, 1R5 and 1S5) indicating a nominal filament voltage of 1V.

In practice, all of these valves exhibit low emission at only 1V. The exception is the 3V4 output pentode that has a nominal 3V filament but it's arranged with a centre tap so that it can be run as two 1.5V filaments in parallel.

Using a bench power supply for the low tension and sweeping through the range 1 to 2V provides a workable volume control. This emulates the manner in which many radios of the 1920s provided volume control while minimising battery current. Excellent performance came from this radio with the 1.5V battery delivering 250mA to the filaments (0.375W) while the HT current at 90V drew 12mA (1.1W). The maximum audio output is around 250mW which is adequate for most listening.

The front end gets signal from a loop antenna (wound inside the back panel of the cabinet) that can be augmented by adding an aerial to the screw terminal on the back of the case. This was before the days of ferrite rod antennas which are far more efficient at signal pickup. Hence, an external aerial significantly enhances the performance of this set.

It has a 3-gang tuning condenser and the first tuned circuit is an RF amplifier employing a 1T4 pentode valve. This is followed by a conventional superhet circuit, with a 1R5 mixer-converter (frequency changer) followed by a 1T4 functioning as an IF amplifier stage. Its plate drives the second IF transformer and its secondary feeds the 1S5 which combines a single diode and a pentode. The diode serves the dual role of

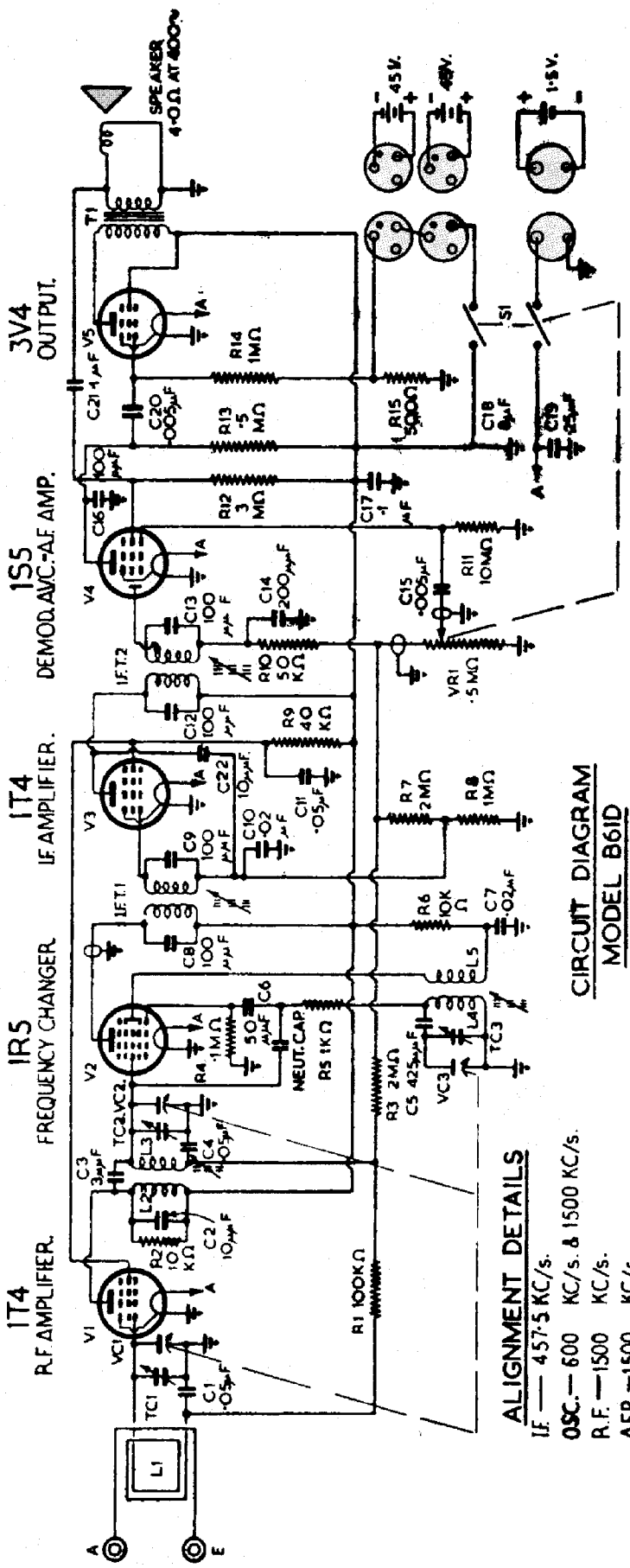


Fig.1: the HMV B61D portable used battery valves with filaments which are run from a 1.5V supply. The 90V HT supply was provided by two 45V batteries connected in series. It is a conventional superhet with a wound loop antenna.

The chassis is mounted upside down in the cabinet and the central area is vacant to provide clear space around the rear of the speaker. The circuit diagram is just visible under the battery pack. The wound loop antenna is on the rear panel of the cabinet.

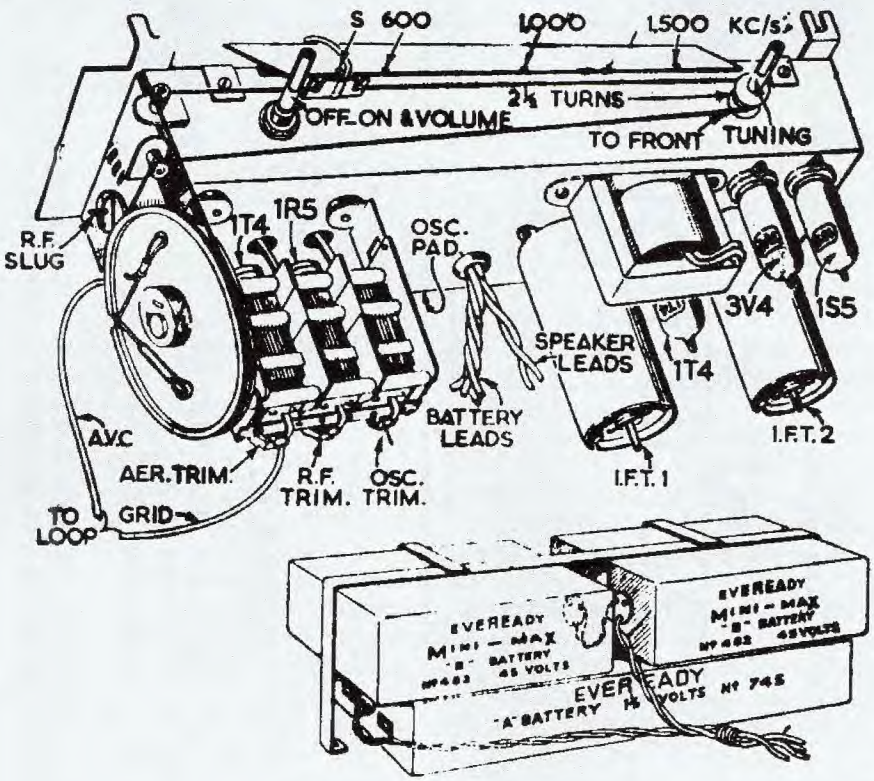
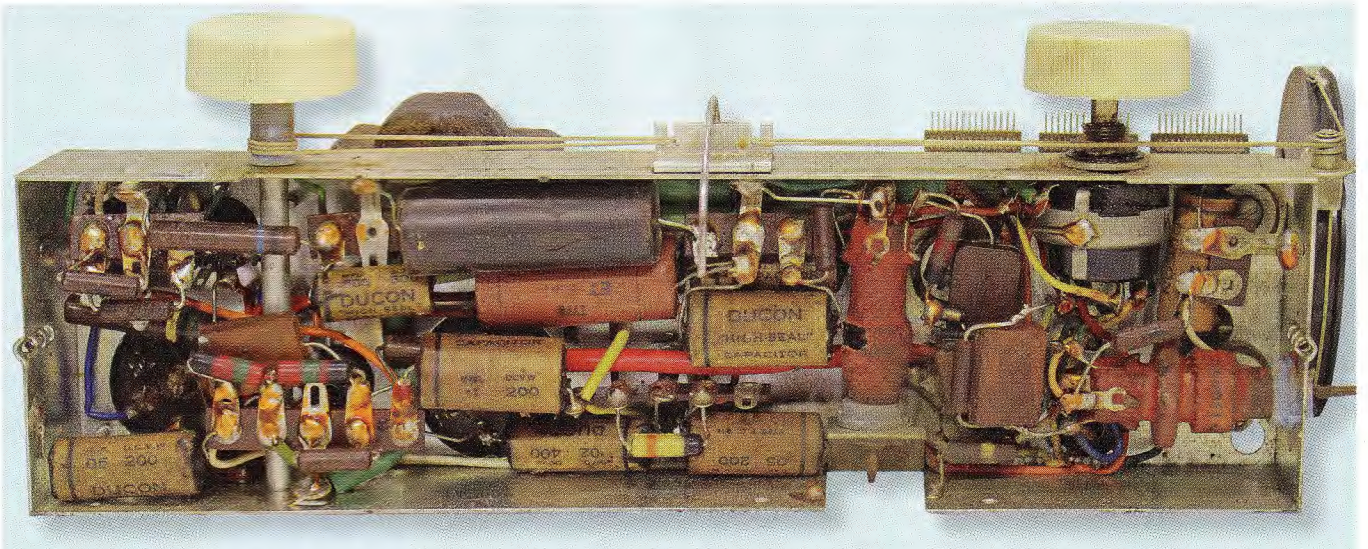


Fig.2: unlike many sets, the dial stringing arrangement for this HMV portable was easy to follow. The battery pack used two 45V batteries for the HT rail and one large 1.5V battery for the filament supply.

Batteries for portable radios were mated with polarised plugs (2 or more pins) to ensure correct connection to the circuit.



The underside of the chassis is in original condition and surprisingly no components needed to be replaced, even though they are all more than 60 years old. It would be more usual to find that many of the capacitors would be leaky or even open-circuit and many the resistors would have gone high in value.

demodulation and producing the AVC (automatic volume control) voltage.

The negative AVC voltage is derived from the junction of R10 and the volume potentiometer VR1 and is applied to decrease amplification in each of the three preceding valves. It is applied to the 1T4 RF amplifier via R3, R1 and C1 and to the 1R5 frequency changer via R3 and C4. Finally, AVC is applied to the 1T4 IF amplifier from the junction of R7 and R8 and filtered with C10.

The demodulated audio signal from the volume control is applied to the grid of the 1S5 pentode section via capacitor C15 which blocks the DC component.

The amplified signal from the plate of the IS5 to the grid of the 3V4 output pentode via C20. This valve gets its negative bias for the grid from the 500Ω resistor which is in series with the negative return for the HT supply.

This is a conventional transformer-coupled Class-A output stage. Negative feedback is applied from the secondary of the transformer to the screen grid of the previous pentode stage. Overall, this is a high quality design for the times.

Interestingly, there is only one electrolytic capacitor in the whole circuit; the 8µF capacitor which bypasses the 90V HT rail.

Chassis layout

The chassis is mounted upside-down at the top of the radio. The flanges on the top cover slide into moulded grooves to make installation and removal easy. The arrangement guides the control knobs to neatly line up with the access slots at the front.

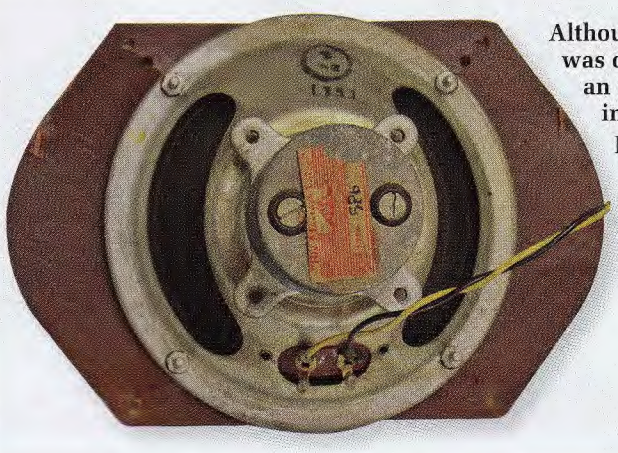
The chassis is held in place by nuts tightening onto screw threads that are embedded in the case. A pair of long-nose pliers and a socket driver are needed to remove and install the nuts in the confined space at the front of the case.

Later models had the model number stamped on the chassis. This one only has the serial number 078112 impressed into the metal so that it aligns with a hole in the back panel to allow reading without taking the back off.

The generous battery compartment at the bottom allows for high capacity batteries that may have lasted for a year or so of typical service. Models with a mains adapter have less battery space and use a different set of batteries. The batteries connect to a wiring loom that has plugs configured so that only correct connections can be made. The sockets in the batteries can be seen in a picture of the Eveready battery.

Sockets are located at the top of the 45V type 482 and at the side of the 1.5V type 745. Eveready was the top selling brand of the time, but another of the HMV portables in my collection had a set of Diamond brand batteries installed.

As seen in the rear view, the loop antenna terminates on a tag strip connected to leads from the chassis via solder joints. This is inconvenient and later models used a plug and socket connection to allow the back to be completely separated. Conveniently,



Although the cabinet was designed to have an elliptical speaker installed, early production examples often used 5-inch round speakers and a Masonite baffle adaptor.

the speaker has clip-on connectors that make disconnection easy.

The case has been designed to take an elliptical speaker but these speakers were uncommon at the time this radio was made in 1951, although they could be found in radios made by specialist manufacturers like Stromberg Carlson. This early model has a Masonite baffle to adapt a 5-inch round speaker to the elliptical space.

HMV models manufactured later in the 1950s were fitted with correctly dimensioned elliptical speakers and these could be expected to provide a better sound level, important when there is only 250mW of power available.

On the positive side, the fitted 5-inch speaker has a substantial field magnet which would no doubt give good acoustic efficiency. Miscellaneous ferrous objects stuck to this magnet tenaciously.

The chassis is quite spartan and components are placed in logical progression from the front end to output. An awkward aspect for bench work is that the dial pointer is under the upright chassis and can easily be bent if not suspended appropriately. Wood blocks at the ends can protect it.

The dial stringing is simple and effective and all of the examples in my collection were intact. A nuisance after getting ever more fragile over 75 years is that the hubs of the cream plastic knobs have a tendency to disintegrate. It is much like the stalk coming out of a mushroom.

Despite considerable care, both knob hubs broke on this radio during removal. Short sections of rubber hose that firmly fitted over the ¼-inch shafts were epoxy glued to the centre of the knobs to restore their function. The lid that is at the top in the assembled radio also anchors the brown backplate for the dial.

This early radio has large capacitors and resistors with the old colour markings found in radios of the 1940s. Later models in this series had smaller components and relatively more space for servicing. Fortunately, this radio worked from the outset so the clutter and over-layering of parts was not a problem.

In fact, it worked first time and sounded good, with excellent selectivity, volume and accuracy of dial calibration. There was no need to touch up the alignment and the usually suspect coupling capacitor to the 3V4 output pentode worked fine, causing no problem with bias to the grid.

This was lucky because it meant that I could keep the original under-chassis look which is characteristic of radios of the 1940s into the early 1950s. After all, some people spend hours putting polyester capacitors in the old shells to keep the original look – which they then hide in the assembled radio.

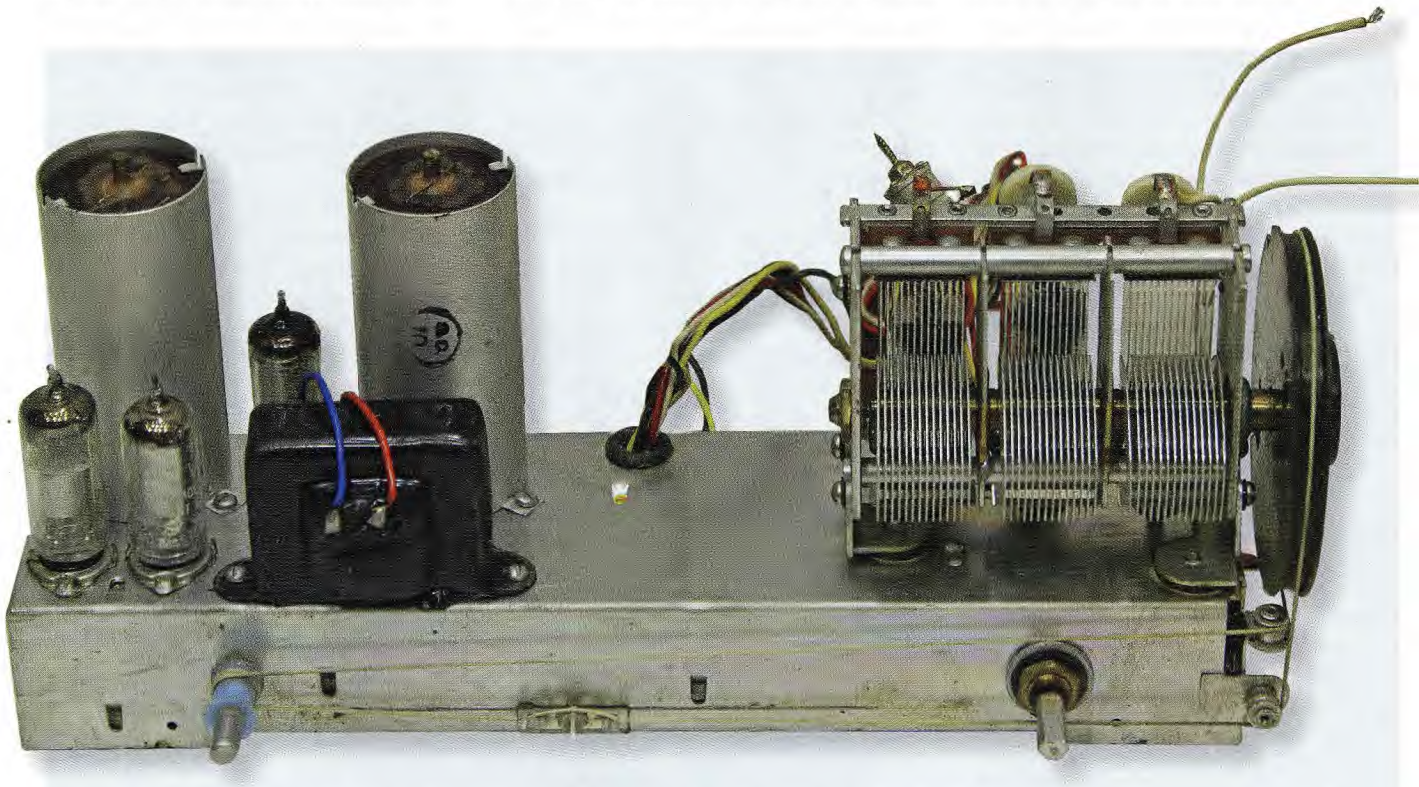
Two coils have provision for external adjustment when the lid is installed. They are the RF coupling coil under the dial-cord drum and the local oscillator located two thirds along the chassis.

Fixing the dial

The dial from this radio had a crack that was very apparent when the celluloid was under tension in the radio.

My solution was to photo scan the dial in black and white, edit out the blemishes, and then colour back to yellow. The artwork was then printed on an overhead projector transparency. In this case it was a batch job to create dials for all the other HMV portables in the collection.

Satisfyingly, Little Nipper could happily resume listening to His Master's Voice on this radio. SC



The topside view of the chassis shows its very clean condition. Note the simple dial stringing arrangement. Virtually all of the restoration work involved the cabinet and the making of a replacement for the celluloid dial.