HMV 1939 tombstone model 440

By Graham Parslow

The end result of this restoration was most satisfying. It was passed onto me by HRSA member John Oldham who bought the radio on eBay. As it was delivered it looked rather sad. It had holes in the grille cloth, an opaque celluloid dial cover with a hole in it, and serious internal dust.

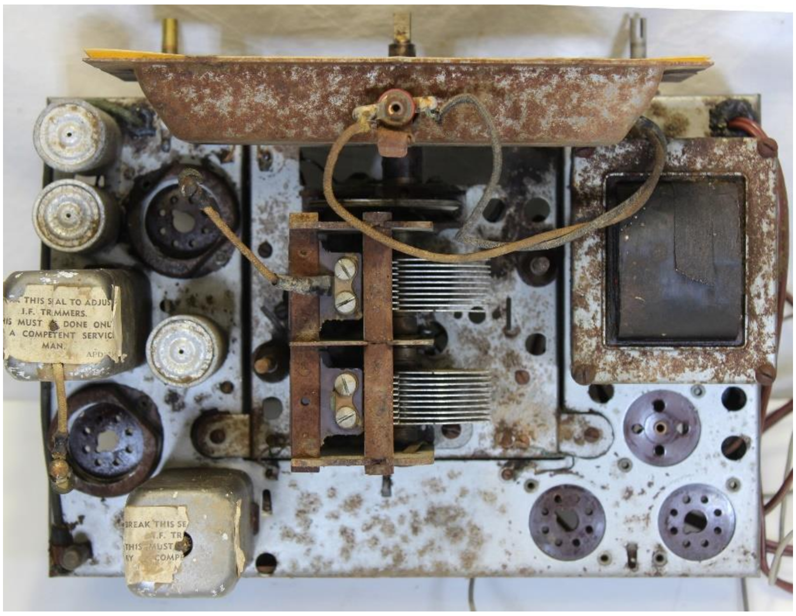
After removing the chassis, the view of the rear of the radio gives some idea of the state it was received in.

Of interest is the middle bar at the back because someone had reversed it to hide the rusty original face that included the plate giving the HMV model and serial number. It was trivial to use steel wool to clean off the bulk of the rust on the bar and bring the brass identity plate back to lustrous.

The knobs on the HMV radios of this period did not clamp with a conventional grub screw but had a long screw that passed through a central slot in the drive shaft. This means that loosening the screw does not release the knob. The knob comes off only by fully unscrewing and extracting the screw.

Thankfully all knobs were present because scavenging these unique HMV knobs from knob boxes has kept me vigilant for some years to complete other HMV radios. Removing the chassis had one quirk. The EL3 output valve is tall and fouls the middle bar across the back. This pushes the valve to an acute angle which stresses the octal orientation spigot. I was not the first to find this quirk because the locating spigot was broken completely off flush at the base of the valve. With no locating spigot the EL3 can be inserted in any of eight possibilities. Fortunately, the impression of the locating flange was still evident on the base of the EL3 so pin 1 could be identified. I filed a groove into the base of the EL3 at pin 1. I put a felt pen mark at pin 1 on the chassis so that lining up the file mark and the chassis mark ensured the correct pin lineup.

The chassis was covered in a thick layer of dirt, largely cleaned away by an initial blow off with compressed air. Turpentine applied with a paint brush followed by compressed air cleaned off most of the remaining surface contamination.



The picture of the cleaned chassis shows the rust that was particularly noticeable on the dial backing and transformer surround. After some abrasive to remove the worst of the rust, some silver-grey paint was brushed on to give a better cosmetic appearance.

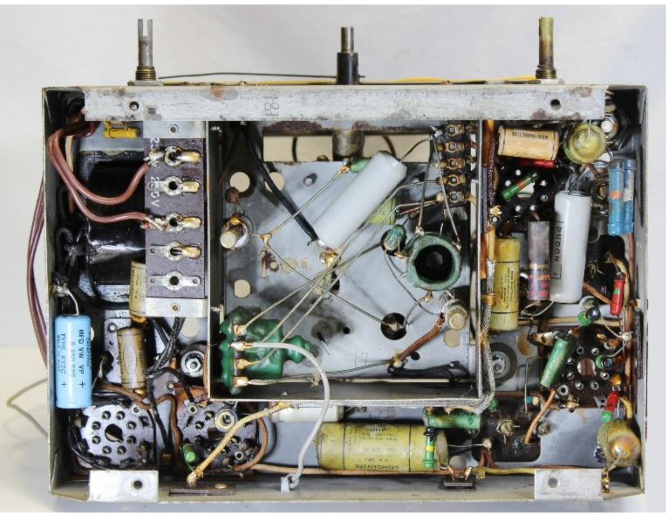
The top view of the chassis shows the four octal valve sockets and the four-pin speaker socket. The first two valves were shielded. The speaker socket was a bit of a challenge to get the right orientation because it was only guided by one pin being slightly larger diameter than the rest. After getting it right I filed a groove into the speaker plug and put a dot on the chassis to show the correct register. During the electrical work that speaker plug went in and out like a yoyo so the orientation groove made this much easier.

The picture of the top of the chassis shows a brown twin core flex leading to the mains. It was left in circuit for the first switch on to establish whether the radio was in working condition. I am ever the optimist. All valves and the speaker plug were installed, but at switch on the power meter rapidly climbed over 140W before it was quickly switched off. The HMV data indicate 56W consumption for this model. The most obvious power sink is failed electrolytic capacitors and this turned out to be the case. Removing the speaker plug disconnects the 1500 Ohm speaker field coil that is part of the high tension pi-filter circuit. With only C25 and C8 in the high tension circuit the switch on power drain remained evident. Sometimes if the initial power use is in the 60 to 70W range I will wait for the electrolytics to re-form. This is easily followed by watching the power consumption decrease with time. I do not continue this re-forming if a capacitor gets concerningly hot.

The underside of the chassis was in original condition except for addition the of three Ducon electrolytic capacitors.

The three added 8µF capacitors were simply paralleled across the original 8µF metal can electrolytics C8, C24 and C25. Leaving the oldies in circuit was not a good move, but I can see why they were left. It was because access to the base of all original electrolytics was near impossible due to being overlayered with bulky paper capacitors

The surge voltage at switch on went over 440V DC before the valves started conducting and loading the high tension. The added electrolytics should not have failed with 525 VP (Volts peak), but the blue one definitely had failed and I was not going to leave the

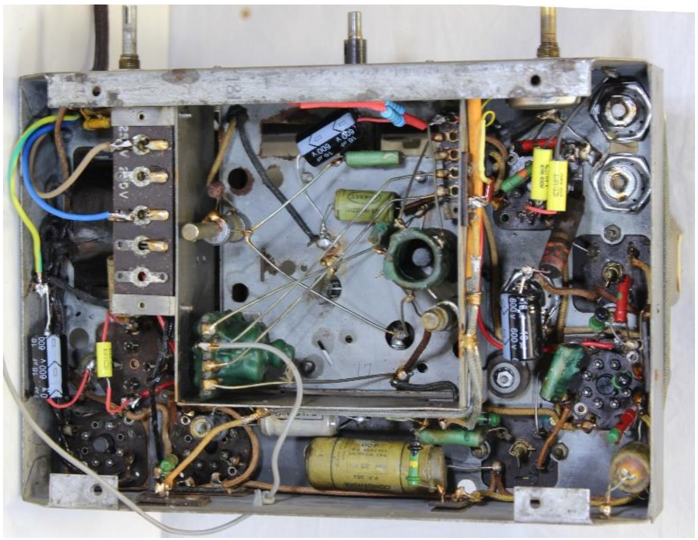


others in circuit. C8, C24 and C25 were replaced with new black 16µF 600VW capacitors.

Old paper capacitors C2, C3, C20 and C23 were replaced to open up the access to the base of the old electrolytics. A sturdy pair of side cutters snipped off the tags to the old electrolytics and took them out of circuit while leaving the cans for cosmetic appearance. New wires were then used to replace a number of wire-runs to the old electrolytics.

After this work and adding a 3-core cloth mains line it was time for testing again. Power rose to 44W and all was silent. The answer turned out to be R5 that was two old type 60K resistors in parallel to make 30K Ohm.

This “30K” pair cuts voltage to the screens of the first two valves. Trouble was that the pair measured 208K Ohms. A new pair of 62K 2W resistors in parallel brought the radio back to life. Fixing the dial light was all that remained to complete the electrical work.



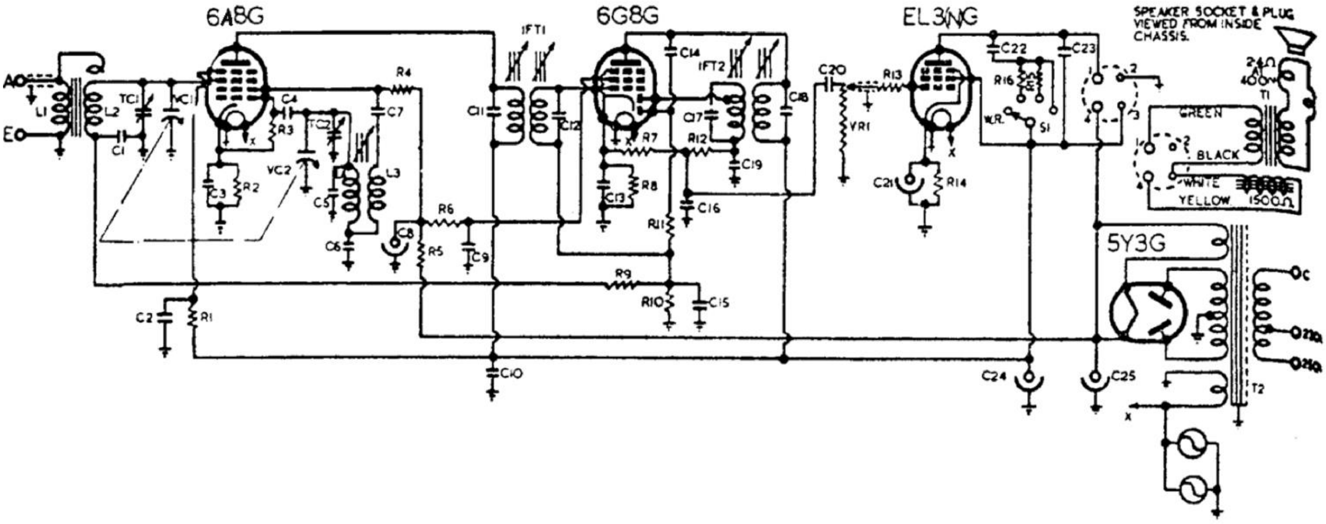
THE CICUIT

There are no circuit surprises in this four-valve set. The green aerial coil is located in the central shielded enclosure under the chassis. It features a gimmick (the curly bit on the circuit diagram) to give additional high frequency coupling to the aerial coil secondary. The 6A8 mixer has the basic grid bias set by R2 (300 Ohms) to the cathode. Further AGC negative bias is applied via R9 and R11 that connects to one of the diodes in the 6G8. The other 6G8 diode detects the amplified IF and produces audio. Negative AGC bias is applied to the 6G8 grid via R11. The IF transformer 2 that is tuned to 457.5KHz

HMV models 440, 441, 444, & 451

4 Valve Broadcast Band A.C. Mantel Receivers.

CONSUMPTION: 56 watts. WAVE-LENGTH RANGE: 187.5 to 550 metres, or 1600 to 545 kilocycles.
MAX. UNDISTORTED POWER OUTPUT: 3.0 watts. INTERMEDIATE FREQUENCY: 457.5Kc.
LOUDSPEAKER: 6" cone speaker. DC resistance of field, cold - 1500 ohms. DC resistance of voice coil - 2.2 ohms. 400 cycle impedance of voice coil - 2.4 ohms.
VALVES: 6A8G, 6G8G, EL3(N)G, 5Y3G.



sharpens the tuning before signal from the secondary is sent to the detector diode. C20 (0.01µF) passes signal to the 1M volume control. Since this is a low voltage section of the circuit it would not be as stressed as the coupling capacitors subjected to high voltage in conventional five valve circuits. Even so C20 was replaced, both to remove clutter and ensure that the EL3 grid was not subjected to leakage voltage. The EL3 is capable of producing 3W of audio and the six-inch electrodynamic speaker in this radio proved commendably capable of handling high volume.

The high tension power supply from the 5Y3 is conventional for 1939. The mains transformer had retained high efficiency consuming only 3W with no dial lamp or other circuits connected. Back-bias was not employed and all cathodes had a series resistor bypassed with a capacitor to set the control grid voltage.

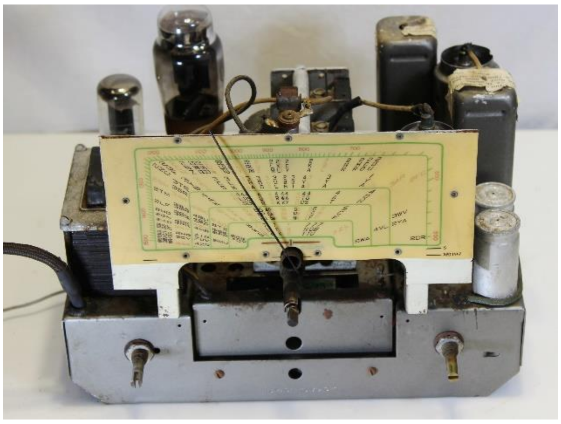
In a high signal reception area of Melbourne a two metre aerial pulled in all main stations. I found that the four-position tone control S1 set at the first level of treble attenuation produced my preferred sound.

THE CASE

The Bakelite case is tinted conventional mahogany with intricate walnut-like patterns. The true glory of the case was disguised by dirt and the patina of age.

Removal of the speaker was relatively easy by undoing two screws on a retaining bar across the back then removing four nuts around the edge of the speaker. This revealed that the ornate speaker grill moulding was a separately unit retained by four screws. It popped out complete with the grille fabric glued to the back of the moulding. The gluing surface was only 3mm wide around the edge and this presented a challenge to select a glue that would not bleed into the replacement grille fabric and produce unsightly blemishes. I found Mont Marte clear school gel purchased from Office Works did the job perfectly. After gluing an oversize piece of cloth to the moulding a surgical scalpel was used to cleanly trim the cloth flush with the edges.

The dial surrounding is likewise a rectangular escutcheon retained by four screws and easily popped out releasing the moulded celluloid dial cover. Because the dial cursor is set back from the celluloid cover, I was able to use a flat piece of clear polycarbonate to replace the opaque and brittle original without fouling the rotating dial cursor. The dial mechanism is a two-stage arrangement with course and fine tuning.



The Bakelite case was soaked in a tub of water for 3 days to loosen up all surface dirt. I try to avoid using harsh detergents because this can damage the surface and reduce the sheen. Careful wiping over with a microfibre cloth and attention to paint spatter spots produced a clean case.

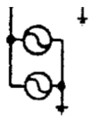
And now for the ultimate secret treatment which can be shared with you. A comprehensive spray with five-star brand silicon-based car-tyre sheen. The spray was

left untouched to soak into the surface over four days with a few hours in the sun to let UV light do its magic. After that a wipe over with a microfibre cloth to remove excess silicon, produced a gloss even better than new.

The before and after pictures shown here of the face were taken under the same lighting conditions. This shows how effective some patience can be with restoring a case.

All that remains now is to show the completed rear view.

The case is in some ways a me-too style comparable to other manufacturers like Airzone, but sufficiently unique to claim a place of distinction in a collection.



R1 -30,000 ohm 1 Watt
R2 -300 ohms ¼W
R3 -50,000 ohms ¼ Watt
R4 -25,000 ohms 2 Watt
R5 -30,000 ohms 2 Watt
R6 -30,000 ohms 1 Watt
R7 -250,000 ohms ¼ Watt
R8 -400 ohms ¼W
R9 -100,000 ohms ¼ Watt
R10-2 meg. ¼W
R11-2 meg. ¼W
R12-10,000 ohms ¼ Watt
R13-50,000 ohms ¼ Watt
R14-150 ohms 3W
R15-4000 ohms ¼W
R16-10,000 ohms ¼ Watt
C1 -0.05mfd 200V
C2 -0.1mfd 400V
C3 -0.1mfd 200V
C4 -25 mmfd
C5 - 20mmfd
C6 -437 mmfd
C7 -0.01mfd 600V
C8 -8mfd 515PV elec.
C9-0.1mfd 400V
C10-0.25mfd 400V
C11-100 mmfd
C12-50 mmfd
C13-0.1mfd 200V
C14-50 mmfd
C15-0.02mfd 400V
C16-100 mmfd
C17-100 mmfd
C18-100 mmfd
C19-250 mmfd
C20-0.01mfd 600V
C21-25mfd 25V elec.cond.
C22-0.05mfd 400V
C23-0.005mfd 600V
C25-8mfd 515PV elec.
VC1&VC2-417mmfd 2 gang cond.
VR1-1 meg.pot.
dial lamps 6.3V 0.15 amp.
IFT1-1st IF tran.
IFT2-2nd " "
T1-Output tran.
T2-Mains tran.
S1-Tone monitor switch
L1&L2-Aerial coil
L3&L4-Osc.coil
TC1&TC2-air trim. 1.5mmfd - 18mmfd
C24-8mfd 515PV el.

VOLTAGE TABLE

Values given may vary plus or minus 10% and are taken on 240 volt mains (250-volt primary tap). Receiver tuned to no signal point unless otherwise stated.

	V1 Amplr.Sect.	Osc. Sect.	V2 (6G8G)	V3 (EL3(N)G)	V4 5Y3G
Plate to chassis volts	248	116	248	236	-
Screen to chassis volts	93*	-	190*	262	-
	92	-	131	248	-
Heaters	-	6.1	6.1	6.1	4.8
Cathode to chassis volts	-3.0	-	-4.1	-5.4	-

* Tuned to strong local station

Total HT current measured at terminal 4 of speaker socket	52 ma
V1 oscillator anode current measured at Junction R4 & R5	2.7 ma
V1 screen current measured at V1 socket	5.2 ma
V2 screen current measured at V2 socket	2.1 ma
V3 screen current measured at screen terminal of V3 socket	3.6 ma
V3 plate current measured at terminal 1 of speaker socket	33 ma