HMV Service Manual – Models 209/660

Consumption – 82W
Wave Length Range – 13.9 metres (21.57 megacycles) to 47 metres (6.38 megacycles). 187.5 metres (1600 kc) to 545 metres (550 kc).
Intermediate frequency – 457.5 kc.
Max. undistorted power output – 4.5 watts.
Loudspeaker – Model 290 uses an 8-inch speaker, the field winding of which acts as filter choke. DC resistance of (the) field coil cold is 1800 ohms. DC resistance of (the) voice coil is 2 ohms. At 400 cycles, impedance of voice coil is 2.35 ohms.
Valves – 6J8G. 6U7G, 6B8G, 6V6G, 5Y3G.

Circuit description

This model is a superheterodyne in which a 6J8G triode-hexode acts as frequency changer. The oscillator circuit is designed to provide relatively constant output voltage over the wide tuning range incorporated in this receiver. The 6J8G is band-pass coupled to a 6U7G which acts as an IF amplifier and which is in turn coupled to a 6B8G, the diodes of which are used as signal and AVC rectifiers respectively, the signal diode being tapped down one-third on the secondary of the IF transformer coupling these two tubes.

The amplifier section of the 6B8G acts as the first AF stage and is resistance-capacity coupled to the 6V6G output stage. AVC (automatic volume control) is applied to the 6J8G, 6U7G and 6B8G tubes.

The aerial coupling transformer on the broadcast band is a high efficiency, iron-cored type employing Litz-wire coils. The IF transformers also use Litz-wire coils and high-efficiency iron-dust cores. The coils are tuned by silver-coated titanium dioxide fixed condensers.

The oscillator circuit padding adjustment is carried out inductively on both bands by means of adjustable iron cores in the oscillator coils, while on the short-wave band a certain amount of equalisation of oscillator output at the low frequency end of the band is obtained by feedback across the 0.00054μF oscillator padding condenser; which feedback is introduced from the oscillator plate circuit by the 0.01μF condenser connected to the top side of the padding condenser. The padding condensers are held to a tolerance of ±1%.

Inverse feedback is applied to the complete audio system, through the Tone Monitor Control from the secondary of the output transformer to a tap on the volume control. In this manner, the whole of the audio system benefits from the distortion reducing properties of the negative feedback system. In addition the circuits associated with the Tone Monitor Control provide selective feedback varying with frequency, thus providing control of tonal balance. Furthermore, the degree of feedback varies with the setting of the volume control in such a way as to provide the best response for both local and distant reception at all volume levels.

The speaker field winding placed in the negative HT line is used as a filter choke in conjunction with two 16μF wet-type electrolytic condensers, one of which is a regulating type which automatically prevents the rise of voltage beyond a safe limit during the warming-up period.

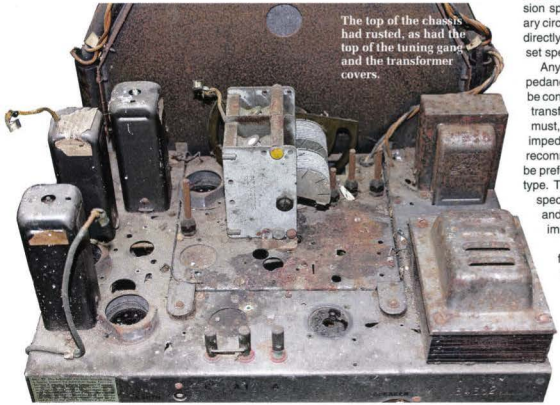
Note: it is essential that the positions of these two condensers in the circuit shall not be inter-changed. These condensers are mounted on the speaker and are thus protected from damage should the power be accidentally switched on while the speaker is out of circuit. A voltage divider is placed across the field to obtain the required bias for RF circuits.

Jacks are provided at the back of the chassis for the connection of an extension speaker. They are in the secondary circuit of the output transformer and directly in shunt to the voice coil in the set speaker.

Any speaker having a voice coil impedance between 2.5 and 4 ohms can be connected to these jacks (the output transformer on the extension speaker must, of course, be first removed). An impedance of 3 ohms at 400 cycles is recommended and the speaker should be preferably of the permanent magnet type. The HMV extension speaker is specially designed for this purpose and has, in addition, its own constant impedance volume control.

The core of the output transformer is internally connected to the positive HT line to prevent corrosion troubles.

Band switching is carried out by means of a single-deck switch. The oscillator primary coils are connected in series and not switched. Capacitive feedback is applied across the



The top of the chassis had rusted, as had the top of the tuning gang and the transformer covers.

padding condenser on the short-wave band and this is switched by contacts on the wave-change switch.

The first position of the switch (extreme anti-clockwise) connects the short-wave and associated components, and the second position the broadcast circuits. Only the broadcast band dial lamp circuit is switched, being cut out when the wave-change switch is in the short-wave position. See that when in the broadcast position, both wave bands are illuminated, while in the short-wave position, only the short-wave band is illuminated.

Tone Monitor: this is a four-position switch. The following effects are secured in the various switch positions:

1st Position (Wide Range): normal bass response and treble boosted to compensate for side-band attenuation for highest fidelity.

2nd Position (Normal): normal bass and small degree of treble cut for normal and long-distance reception.

3rd Position (Bass): as in "Normal" position, but additional treble cut for reduced background noise and particularly for pick-up operation.

4th Position (Speech): boosted treble response and bass cut for improved intelligibility of speech.

Note: the RF trimmers on this model are of a plunger type with air dielectric, and possess exceptionally high stability and efficiency. A special adjusting tool can be obtained from the factory, incorporating a box spanner for the condenser lock nut and an adjusting hook for the plunger.

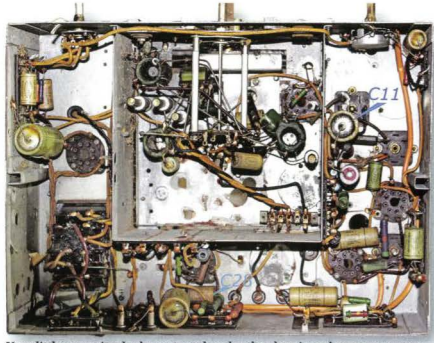
After loosening the lock nut at the top of the condenser, the adjusting hook is inserted in the hole which will be found in the top of the plunger, which can then be easily adjusted by moving up or down as required with a slight rotary movement. When adjustment is completed, tighten the lock nut securely.

Author's comments

(1) The RF trimmers referred to above are the four metal rods adjacent to the tuning gang;

(2) Litz wire is designed to reduce the skin effect and proximity effect losses in conductors used at frequencies up to about 1 MHz.

(3) The current use of Hertz (Hz) for frequency officially replaced "cycles" in 1960 but only became widely accepted in the 1970s.



Very little corrosion had penetrated under the chassis and most parts were still in good condition. Capacitor C11 (labelled) had failed though, while C28 operates at high voltage and was replaced as a precaution.

This view shows the chassis after it had been cleaned and painted to stop further corrosion.

Everything appeared to be in good condition under the chassis. However, the original figure-8 mains flex was still in place, so this was replaced with 3-core mains cable so that the chassis could be securely earthed.

One point of interest is that HMV recommended swapping around the Active and Neutral connections to the transformer to determine if one set of

The two HT electrolytic filter capacitors are located in a box that's spliced into the speaker cable. These capacitors had previously been replaced, as had electrolytic capacitors C11 & C29.

connections generated less hum. This recommendation is displayed on a label inside the cabinet (see Fig.2).

The two HT filter electrolytics (C34 & C35) are located in a box spliced into the speaker cable and had previously been replaced, as had electrolytic capacitors C11 & C29. No other component replacements were evident and the under-chassis parts all checked OK.

By contrast, the four 6.3V dial lamps had all gone dark and checking revealed that they had all gone open circuit. These were replaced and the set then powered up without the valves in place while some initial checks were made. The power consumption remained at a steady 14W and the mains transformer remained cool.

The valves were then refitted and my optimism that it would work was rewarded when the radio was powered up. However, while it sounded quite reasonable, its 105W power consumption was uncomfortably above the specified 82W. A quick check with the power switched off revealed that the 0.5μF AVC (AGC) bypass capacitor (C11) was hot. Replacing this immediately reduced the power consumption to 82W, exactly as specified.

As a precaution, I also replaced

This view shows the front of the chassis and the dial prior to restoration. Despite its unusual shape, the large dial scale is easy to read.

This speaker coil cover from another HMV radio illustrates how HMV re-badged the Rola speaker used in the model 209 and other sets.

capacitor C28 which feeds the audio signal from the anode of the 6B8 to the grid of the 6V6 output stage. The original capacitor was still performing faultlessly but this part operates at high voltage, so replacing it is a good idea in order to guard against short-term failure.

Cabinet restoration

This part of the restoration initially involved sanding the cabinet back to bare timber using aluminium oxide grade 80 abrasive paper. This type of abrasive is particularly good for this job, since it doesn't tend to clog with the removed debris.

When using coarse abrasive, it is essential not to cut across the grain. In addition, a smooth finish relies on careful sanding of the polyurethane coatings that are applied, rather than fine sanding the bare timber.

The black highlights in the cabinet were painted with acrylic paint after the first sealing coat. This prevents the black paint from running into the adjoining wood grain by capillary action.

Multiple coats of Cabot's CFP clear gloss finish were then applied, with sanding between coats. The gloss was a personal choice; the cabinet originally had a satin finish.

Another problem was that the original celluloid dial cover had yellowed. This was replaced with a clear dial cover fabricated from thermo-moldable PETG plastic.

The performance of this set illustrates the value of buying a quality radio back in 1939. It had few failures and now, fully restored, continues as an object of beauty and function. SC