

Test Report

H.M.V. Model 1356 table radio receiver

THE H.M.V. 1356 is a six-valve semi-midget table receiver for d.c. and a.c. mains from 195–255V. Waveband coverage is 192–567m (medium wave) and 900–2,000m (long wave). The receiver is equipped with a built-in frame aerial and an external aerial is normally not required. Release date October, 1948.

The consumption of the receiver is about 50 watts; power output 4 watts maximum. A 5in. p.m. loudspeaker is used with a speech coil impedance of 3 ohms. Intermediate frequency is 465 kc/s.

CIRCUIT DETAILS

Frequency Changer

The frame aerial L1 and loading coil L2 are tuned by one section (VC1) of the gang condenser for m.w. On l.w. an additional loading coil L3 is switched in series with L1 and L2. The signal is fed to the grid of the triode-heptode frequency changer V1 (X145).

The triode section of V1 has a tuned grid circuit (L7, VC2 for m.w. and L6, VC2 for l.w.), which is inductively-coupled (L8) on m.w. and capacity-coupled (C12) on l.w. An inductively tuned iron-dust cored i.f. transformer (IFT1) couples the heptode anode of this valve to the grid of V2.

I.F. Amplifier

This valve V2 (W145) amplifies at the intermediate frequency of 465 kc/s. A second inductively tuned iron-dust cored i.f. transformer (IFT2) couples this valve to the detector.

Detector, A.V.C. and L.F. Amplifier

The double-diode-triode valve V3 (DL145) has one diode used as detector and a.v.c. rectifier, the other diode being strapped to chassis. The volume control VR1 forms the diode load; i.f. and r.f. filtering is effected by C16, R13 and C17. The d.c. component of the rectified voltage across VR1 is fed to the grids of V1 and V2 as a.v.c. bias; the a.v.c. supply is decoupled by R12 and C8. The i.f. signals are taken from V1 and are applied via C18 to the grid of the triode section of V3.

The anode of this valve is resistance-capacity coupled to the auto-transformer (T1).

Output

The phase-inverting auto-transformer T1 feeds the grids of the two N145 pentode valves (V4 and V5) operating in push-pull, the output from these valves being applied to the loudspeaker via the output transformer (T2).

Negative feedback is applied to the grid circuits of the output stage from the primary of the output transformer via R22. Negative

feedback is also applied to the cathode circuits of V4 and V5 from either side of the balanced secondary of the output transformer, the centre tap of which is "earthy" to ensure that the audio signals on the cathodes are in opposite phase.

The auto-bias of V4 and V5 is effected by R20 and R21 and decoupled by C24 and C25 respectively. A permanent degree of pentode tone correction is introduced by C26, while variable tone control is given by VR2 and C22.

H.T. and Heater Supplies.

On a.c. mains the h.t. is derived from the half-wave rectifier V6 (U145). On d.c. mains, the valve acts as a low series resistance. The reservoir condenser is C29, and smoothing is effected by the choke CK and condensers C27 and C28.

One side of the mains input is applied to the mains dropping resistance, via the scale lamps



(LP1 and LP2) and their shunt resistances, R23 and R24; the other side of the mains is connected to the chassis. The supplies to the h.t. rectifier and heaters are taken via separate sections of the mains dropping resistance, that for the rectifier via R25, R27 and R29 and for the heaters via R26, R28 and R30. The supplies are adjusted by means of a shorting plug.

COMPONENT NOTES

On earlier models C22 is 0.022 μ F, and VR2 is 0.5M Ω . On later models an additional condenser C33 (0.01 μ F, 250V wkg.) is connected across the primary of the output transformer T2. Also on later models C10 is on top of chassis adjacent to L6, and R6 is to the left of R9.

REMOVAL OF CHASSIS

Disconnect the receiver from the mains, and, if an external aerial is fitted, remove the plug from the aerial socket. Remove the back panel (4 screws) and the four control knobs which are secured by spring clips. Remove the insulator caps covering the two rear screws and the wax from the two front screws underneath the cabinet, and then remove the chassis bolts thus revealed.

The chassis may now be withdrawn, taking care not to damage the frame aerial or its mounting. Note that the loudspeaker is attached to the cabinet, but sufficient lead is provided to allow the receiver to be operated outside the cabinet.

Alignment Procedure

IF the i.f. circuits have been disturbed, complete i.f. and r.f. alignment must be carried out. The input to the receiver must be progressively reduced as the circuits are brought into line so that the output to the receiver does not exceed 500mW (1.4V across speech coil). An a.c. (rectifier type) voltmeter connected across the speech coil may be used as an output meter.

I.F. Alignment

Set waveband switch to m.w., volume control fully clockwise, tone control fully clockwise and gang condenser to minimum capacity (plates fully disengaged).

(i) Inject a modulated signal of 465 kc/s between the grid of V1 and chassis, inserting a 0.1 μ F condenser in each of the signal input leads.

(ii) Adjust L10, L9, L5 and L4 in that order for maximum output.

(iii) Repeat operation (ii) until no further improvement can be obtained.

R.F. Alignment

As the waveband scale is attached to the cabinet, a calibration fixed beneath the pointer bars on the scale backing plate should be used for r.f. alignment. The scale is calibrated in inches and sixteenths of an inch which correspond to frequencies given in the ganging tables, and should be read against the pointer fitted to the right-hand cursor (looking at the front of the receiver).

Before commencing the r.f. alignment, it is essential to check the setting of the pointers in relation to the calibration scale, i.e., with the gang condenser at maximum capacity the pointer should coincide with "0" inches on the scale. The pointer attached to the left-hand cursor should then coincide with 5in. on the scale. If adjustment is necessary, slacken the screws securing the cursors to the drive cord and adjust, then tighten the screws.

Medium Waves

Set volume control fully clockwise, tone control fully clockwise and waveband switch

to m.w. Inject test signal into aerial socket via m.w. dummy aerial, chassis connection being via a 0.1 μ F condenser.

(i) Set pointer to 37/32in. on calibration scale. Tune signal generator to 1,429 kc/s (210m), and adjust TC3 and TC2 for maximum output.

(ii) Set pointer to 19/32in. on scale. Tune signal generator to 588 kc/s (510m) and adjust L7, L2 for maximum output.

(iii) Repeat operations (i) and (ii) until maximum output is obtained, taking care that operation (i) is the last performed.

Long Waves

Controls as for m.w., but with waveband switch at l.w.

(i) Set pointer to 27/32in. on calibration scale. Tune signal generator to 300 kc/s (1,000m) and adjust TC4 and TC1 for maximum output.

(ii) Set pointer to 17/32in. on calibration scale. Tune signal generator 162.2 kc/s (1,850m) and adjust L6 and L3 for maximum output.

(iii) Repeat operations (i) and (ii) until maximum output is obtained, taking care that operation (i) is the last performed.

**SERVICE SNAPS OF THE
H.M.V. 1356**

Valves: X145 (f.c.); W145 (i.f.); DL145 (det. a.f.); two N145 (p.p. o/p); U145 (h.w. rect.).

I.F.: 465 kc/s.

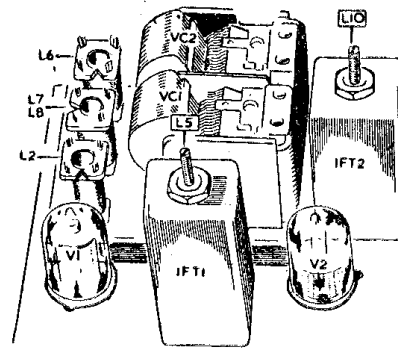
Volume Control: 0.5M Ω with d.p. switch.

Tone Control: 20k Ω .

Electrolytics: 16 + 16 μ F, 350V can; 24 μ F 250V can; two 20 μ F, 12V bias.

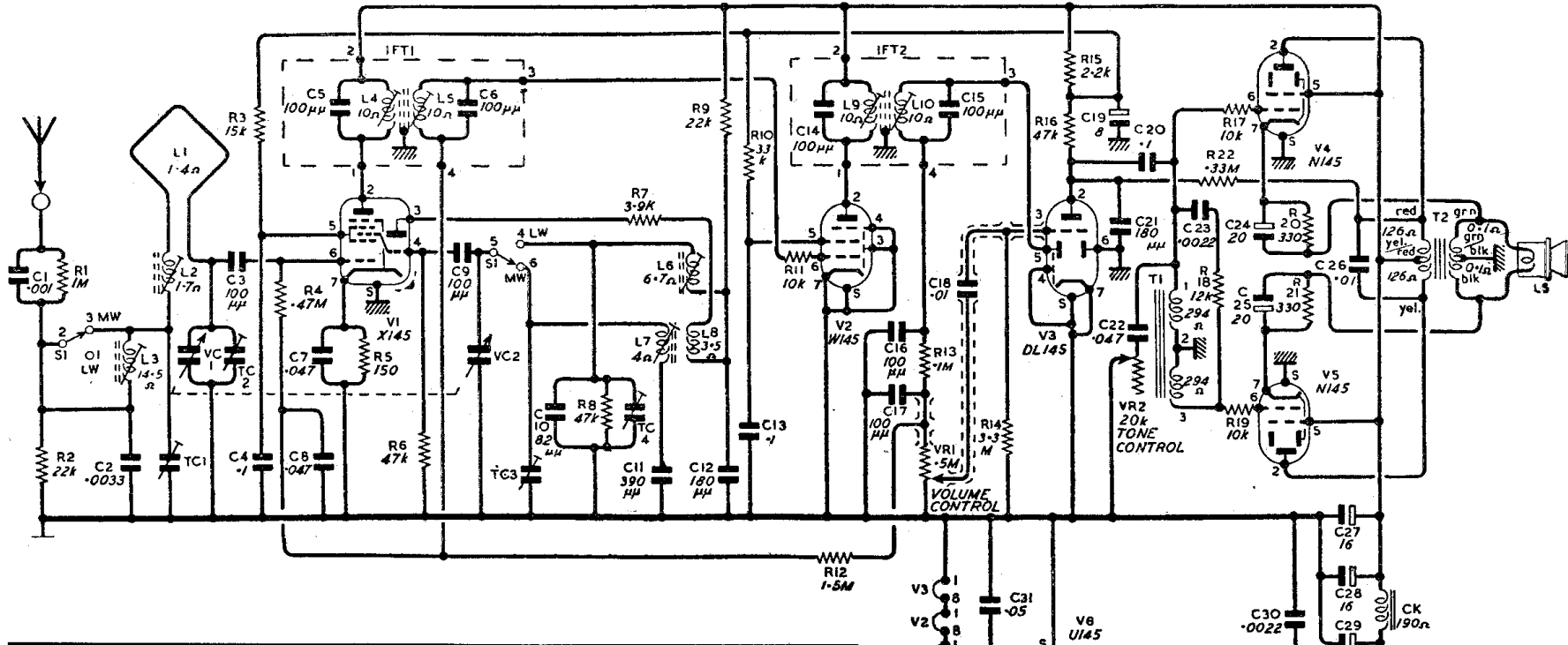
Pilot Lamps: two 5V, 0.15A, m.e.s.

Mains Supply: 195–255V, a.c. or d.c. *Live chassis.*

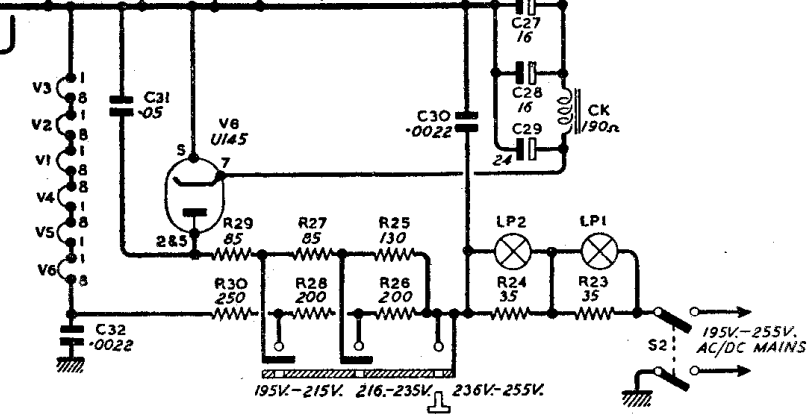
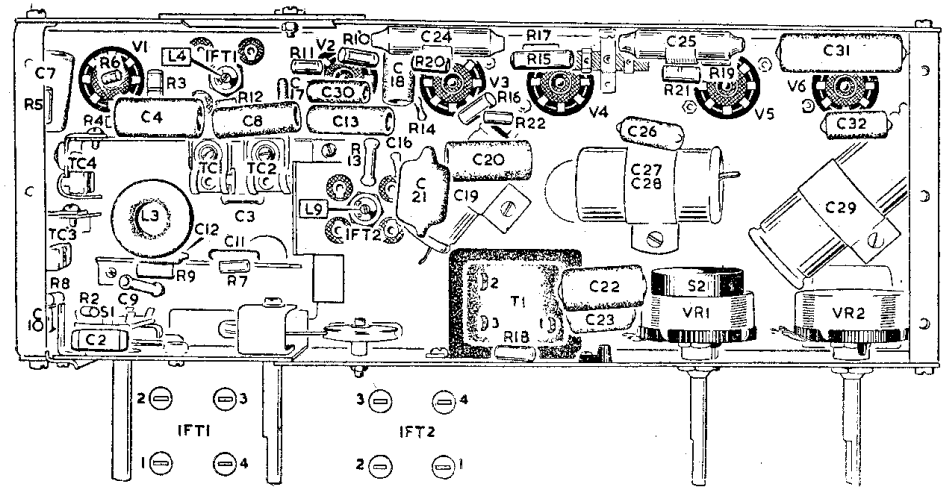


Layout of r.f. section of chassis.

Circuit Diagram of the H.M.V. Model 1356



Layout of Components under Chassis



VALVE VOLTAGE TABLE

Valves	Anode V mA	Screen V mA	Cathode V
V1 (X145) (Mx)	180 2.0	80 5	1.5
(Osc)	80 5.0	—	—
V2 (W145)	180 8.2	80 2.5	—
V3 (DL145)	50 2.5	—	—
V4 (N145)	175 22	180 5	8.2
V5 (N145)	175 22	180 5	8.2
V6 (U145)	195 —	—	195

The table at left indicates the approximate voltage and current readings obtained on each valve when the receiver is connected to a 220V 50 c/s mains supply, and operating with volume control at maximum at a point of no reception on the m.w. band. Variations of ± 15 per cent. may be anticipated between models.

Total h.t. current, 80 mA (d.c.). Total h.t. voltage, 180V (d.c.). Voltage across CK, 15V (d.c.).