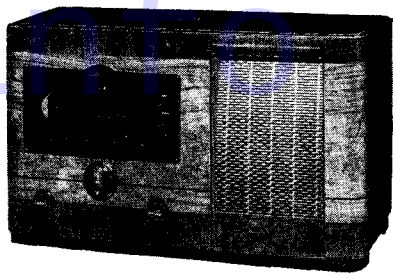
H.M.V. 656 A.C. FOUR-BAND SIX



Separate vernier scale is provided in the H.M.V. model 656 five-valve, plus rectifier, four-band receiver.

CIRCUIT.—The aerial input to the grid of V1, the H.F. amplifier, is via a series aerial condenser to single tuned circuits on all wavebands. A grid isolating condenser enables the A.V.C. potential to be applied direct to the grid instead of through the aerial coils.

V1 is tuned-anode coupled to the triode-hexode frequency changer, V2, and the shortest waveband is double decoupled to obtain constant working conditions. In the oscillator section regeneration modifying resistances are included on all wavebands. The trimmers on the shortest waveband are of special non-drift construction.

An iron-cored I.F. transformer effects the coupling between V2 and the I.F. amplifier valve, V3. V1, V2 and V3 are A.V.C. controlled.

A further I.F. transformer couples V3 to the demodulating diode of V4, a double diode triode. The potentials produced across the diode load are led to the manual volume control via a double filter network. The manual volume control varies the input to the triode grid of V4.

The other diode of V4, fed by a coupling condenser from the anode of V3, operates the A.V.C. network, and also supplies the potentials feeding the visual tuning indicator.

V4 is resistance-capacity coupled to the output valve, V5, between the anode and grid of which is connected a variable condenser operating as a negative feedback tone control circuit. A tone modifier fixed condenser is also connected between anode and cathode.

Bias for V5 is obtained from a potentiometer connected between H.T. negative and chassis, the potentiometer also providing an A.V.C. delay voltage. The smoothing choke (the speaker field coil) is in parallel with this potentiometer.

Mains equipment consists of a mains transformer, a full-wave rectifying valve, V6, electrolytic smoothing condensers and a smoothing choke (the field coil).

Chassis Inspection.—The cabinet has a false bottom, removal of which enables

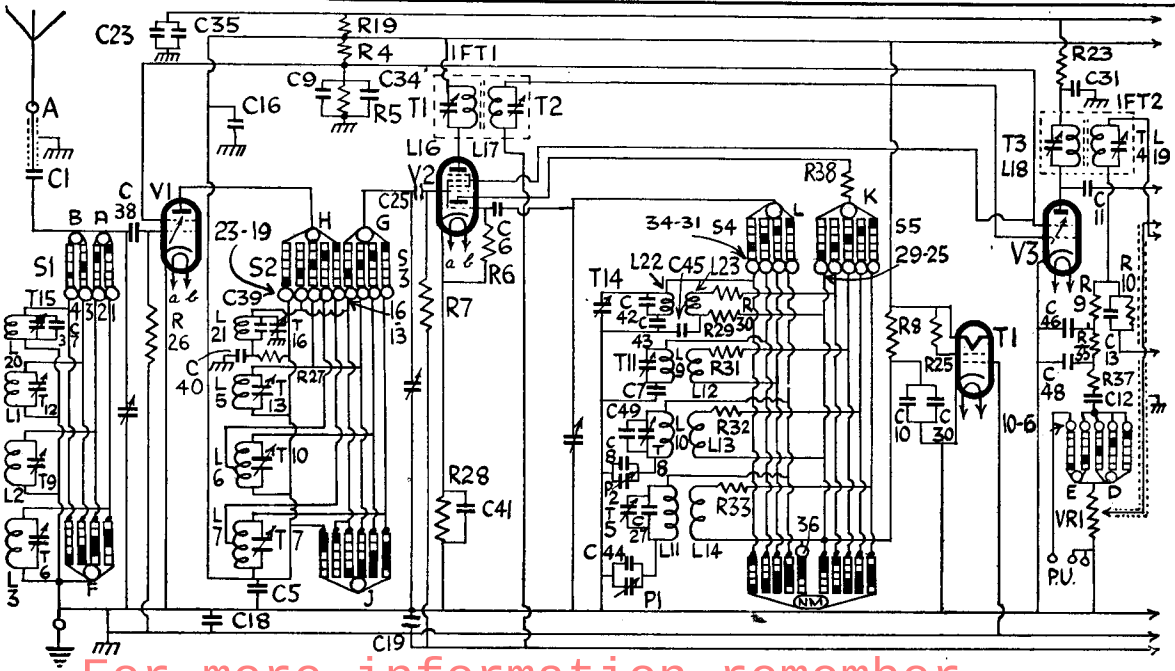
VALVE READINGS

No signal. Volume maximum. M.W. band 220 volt A.C. mains.

V.	Type.	Electrode.	Volts.	Ma.
1	(Marconi). KTW63 ..	Anode ..	210	7
		Screen ..	95	1.5
2	X65	Anode ..	210	1.7
		Screen ..	95	4
		Osc.anode	103	3
3	KTW63 ..	Anode ..	150	8.5
		Screen ..	95	1.7
4	DH63	Anode ..	103	1.1
5	KT63	Anode ..	230	23
		Screen ..	210	4.5
6	U50	Cathode	245	—

CONDENSERS

C.	Purpose.	Mfds.	C.	Purpose.	Mfds.
1	Series aerial	.0000075	29	Tone compensator	.0023
5	V1 anode coupling	.1	30	Osc. anode decoupling (part) ..	4
6	Osc. grid	.0001	31	V3 anode decoupling	.05
7	B1 osc. fixed padder	.0023	34	V1, V2 and V3 screens decoupling (part)	4
8	M.W. osc. fixed padder	.00035			
9	V1, V2 and V3 screens decoupling (part)	.1	35	H.T. line by-pass	.015
			36	Field by-pass condenser	.05
10	Osc. anode decoupling (part) ..	.005	37	B2 aerial fixed trimmer	.000035
11	A.V.C. diode coupling	.000075	38	V1 grid isolating	.000035
12	L.F. coupling	.01	39	B2 anode fixed trimmer	.000015
13	H.F. bypass	.00005	40	V1 anode decoupling B2	.01
14	V4 anode shunt	.00035	41	V2 cathode bias shunt	.1
15	V4 cathode bias shunt	25	42	B2 osc. fixed trimmer	.000005
16	H.T. line decoupling	4	43	B2 osc. fixed padder	.0035
17	L.F. coupling	.05	44	L.W. osc. fixed padder	.00015
18	V1 A.V.C. decoupling	.05	45	B2 regeneration shunt	.0023
19	V2, A.V.C. decoupling	.23	46	H.F. by-pass	.00005
20	V5 grid decoupling	.23	47	V4 anode decoupling	2
23	H.T. smoothing	4	48	H.F. by-pass	.00005
24	H.T. smoothing	8	49	M.W. osc. fixed trimmer	.000015
25	V2 grid coupling	.000035	51	A.V.C. delay resistance shunt ..	.23
27	L.W. osc. fixed trimmer	.000035			



Switch positions, top to bottom are: LW, MW, SW1, SW2, Gram. The field is in the negative lead.

access to the underside of the chassis to be obtained.

Chassis Removal.—Remove back of cabinet and the four grub-screws fixed control knobs. Remove the four chassis securing bolts from the base, uncleat the mains lead from the floor of the cabinet and the speaker cable from the roof. The chassis may be completely withdrawn.

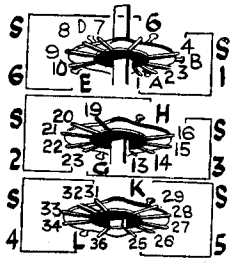
Special Notes.—The visual tuning indicator is a Marconi Y63 or TI65. The anode feed resistance R25 is connected across the valveholder.

Sockets mounted on a bracket at the rear of the cabinet enable an extension speaker to be connected. This should have an impedance of 2 to 4 ohms. The internal speaker may be silenced by removing the plug from the right hand socket of the extension L.S. panel.

The mains adjustment device takes the form of two members marked in voltage values to one of which a flying lead is connected.

The four dial lights are rated at 6.5 volts .3 amp, have M.E.S. bases, and are of the tubular type.

R10, R13, C11 and C13 are inside I.F.T.2 and R31, R32, R33, C27 and C49 are inside the oscillator coil can. R34 is across the extension L.S. socket.



The 656 switch banks numbered and lettered to correspond with the circuit.

Alignment Notes

I.F. Circuits.—Connect an output meter across the primary of the speaker transformer. Switch receiver to L.W. band, set gang to maximum, short circuit oscillator section of gang, turn volume to maximum and tone control to "high" (fully clockwise).

Connect a service oscillator *via* a 1 mfd. condenser to the top grid cap of V1 and chassis, leaving normal set connection attached.

Tune service oscillator to 465 kc. (645.2 metres) and adjust T1, T2, T3 and T4 in

(Continued on page 56)

H.M.V. 656 on Test

MODEL 656.—For A.C. mains, 195-255 volts, 50-100 cycles. PRICE.—14 gns.

DESCRIPTION. — Five-valve, plus rectifier, table model superhet with four wavebands.

FEATURES. — Full-vision scale, calibrated in metres and station names, traversed by vertical pointer. Short band letter-indicated for main stations. Separate vernier scale. Controls for combined volume and master switch, tuning, wave selection and tone. Visual tuning indicator. Elliptical speaker at side of chassis. Sockets for P.U. and L.S. with control of internal speaker.

LOADING.—80 watts.

Sensitivity and Selectivity

SHORT WAVES (13-30 and 30-90 metres).—Excellent gain and selectivity with very easy handling and well maintained sensitivity over both bands.

MEDIUM WAVES (200-550 metres). —Very good gain and selectivity with a good background and small local station spread.

LONG WAVES (800-2,000 metres).—Similar performance to medium waves with substantially no interference on Deutschlandsender.

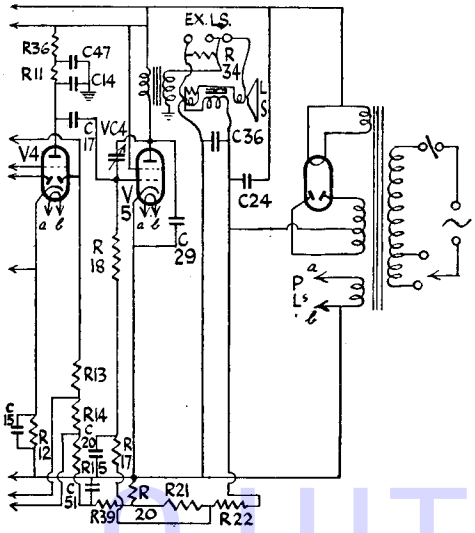
Acoustic Output

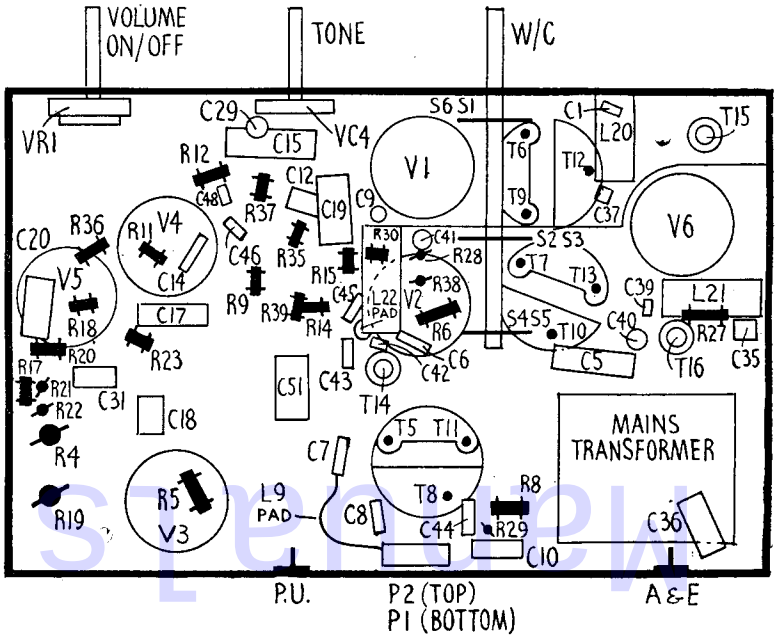
Ample volume for a large room without overloading, with very good upper registers and excellent middle- and low-note radiation. Marked freedom from colouration on speech.

RESISTANCES

R.	Purpose.	Ohms.	R.	Purpose.	Ohms.
4	V1, V2 and V3 screens potr. (part)	10,000	23	V3 anode decoupling	10,000
5	V1, V2 and V3 screens potr. (part)	23,000	25	T.I. anode feed	1,000
6	Osc. grid leak	100,000	26	V1 A.V.C. feed	500,000
7	V1 A.V.C. feed	500,000	27	V1 anode decoupling B2	1,000
8	Osc anode decoupling	35,000	28	V2 cathode bias	150
9	H.F stopper	50,000	29	B2 regeneration modifier	150
10	Demodulating diode load	350,000	30	B2 regeneration modifier	50
11	V4 anode load	50,000	31	B1 regeneration modifier	350
12	V4 cathode bias	750	32	M.W. regeneration modifier	500
13	A.V.C. diode load (part)	500,000	33	L.W. regeneration modifier	1,000
14	A.V.C. diode load (part)	500,000	34	External L.S. shunt	50
15	A.V.C. diode load (part)	500,000	35	H.F. stopper	50,000
17	V5 grid decoupling	350,000	36	V4 anode decoupling	23,000
18	V5 grid resistance	150,000	37	H.F. stopper	50,000
19	H.T. line decoupling	1,000	38	Regeneration modifier	75
20	Bias potr. (part)	1,000	39	A.V.C. delay volts	100,000
21	Bias potr. (part)	7,500	VR1	Volume control	1 meg.
22	Bias potr. (part)	50,000			

EXACT replacement condensers available from A. H. Hunt, Ltd., are for C15, 2,918, 1s. 9d.; and for the block containing Cs. 24, 23, 31, 30, 16 and 47, unit 4,218, 13s. 6d.





The circuit diagram is shown in two sections solely for reasons of presentation. H.T. secondary centre point is 117 volts negative and R20, 21 and 22 form a potentiometer across the field coil. Right, is the under-chassis diagram. Top "deck" view is on page 56.

H.M.V. 656 Four-band Six

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that order for maximum response, reducing the input from the service oscillator as the circuits come into line to keep the signal below the A.V.C. point.

Signal Circuits.—With the gang at maximum the pointer should register exactly on the small mark just below the L.W. calibration on the right hand end of the scale.

Connect the service oscillator to the A. and E. sockets. Only feed sufficient input to obtain reliable peaks in the output meter and progressively reduce the input as the circuits come into line. Remove short circuit from oscillator section of gang.

Long Waves.—Turn gang to maximum, tune service oscillator to 725 metres (413.8 kc.) and adjust T5 for maximum response.

Set oscillator to 850 metres (352.9 kc.), tune in on receiver and adjust T6 and then T7 for maximum.

Set oscillator to 1,900 metres (157.9 kc.), tune in on receiver and adjust P1 for maximum, simultaneously rocking the gang.

Return to 725 metres and check setting of T5.

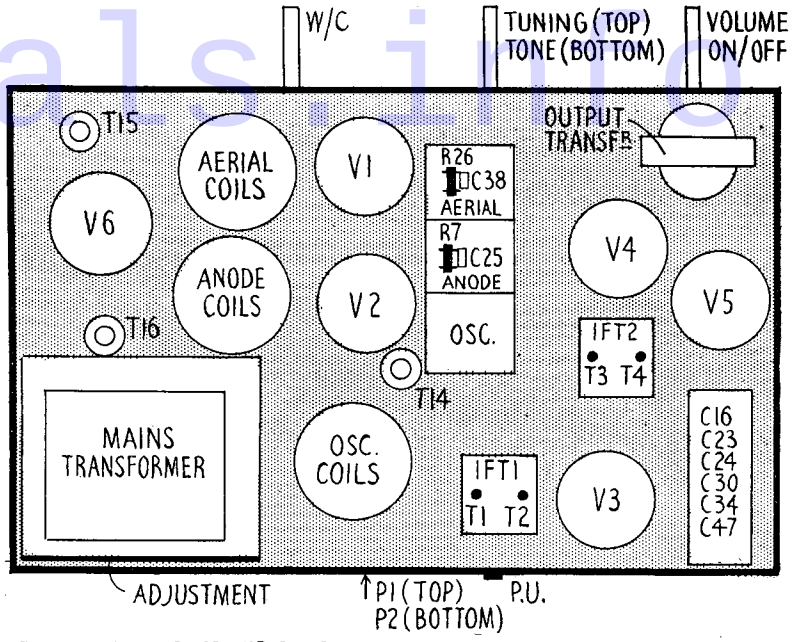
Medium Waves.—With gang at maximum and service oscillator tuned to 195 metres (1,538.5 kc.), adjust T8 for maximum response.

Set service oscillator to 210 metres (1,428.6 kc.), tune in on receiver and adjust T9 and then T10 for maximum.

Set oscillator to 530 metres (566 kc.), tune in on receiver and adjust P2 for maximum, simultaneaously rocking the gang.

Return to 195 metres and check setting of T8.

Short Wave 1 (30 to 90 metres).—With gang at maximum and service oscillator tuned to 30 metres (10 mc.), adjust T11 for maximum.



Components can be identified and valve positions located with the aid of this layout diagram of the top of the H.M.V. model 656 chassis.

Set oscillator to 32 metres (9.38 mc.), tune in on receiver, and adjust T12 and then T13 for maximum.

If L9 has been replaced, tune service oscillator to 86 metres (3.88 mc.), tune in on receiver and adjust loop of wire joining C7 to coil tag for maximum, at the same time rocking the gang.

Return to 30 metres and check setting of T11.

Short Wave 2 (13-30 metres).—The trimmers of this band are adjusted from the top of the chassis by slackening the hexagonal lock-nut sufficiently for the rod to be moved up or down with a piece of bent wire. After adjustment the hexagonal nut should be tightened.

With gang at maximum and service oscillator tuned to 13 metres (23.08 mc.), adjust T14 for maximum.

Set service oscillator to 14 metres (21.43 mc.), tune in on receiver and adjust T15 and then T16 for maximum, simultaneously rocking the gang.

If L22 has been replaced, set oscillator to 30 metres (10 mc.), tune in on receiver and adjust loop of L22 for maximum, simultaneously rocking the gang.

Ferranti 617PB Push-button Six

(Continued from page 55)

tune in the new station, then replace the condensers according to the wavelength required. Sets of fixed condensers can be obtained from the set makers.

Alignment Notes

I.F. Circuits.—Set volume control to maximum, pointer to 200 metres, wave selection switch to L.W. band and tone to "high" position.

Connect an output meter across the primary of the speaker transformer and a service oscillator between the top grid cap of V1 (via a .05 mfd. condenser) and chassis.

Tune the service oscillator to 450 kcs. and adjust the trimmers of the second I.F. transformer, and then the first I.F. transformer for maximum, reducing the input as the circuits come into line to keep the A.V.C. inoperative.

Signal Circuits.—Connect the service oscillator to the A. and E. sockets via a dummy aerial. Only feed sufficient input to obtain reliable peaks in the output meter and progressively reduce the input as the circuits come into line.

Medium Waves.—With gang at minimum, tune service oscillator to 200 metres (1,500 kcs.) and adjust T1 for maximum.

Tune set and oscillator to 228 metres (1,315 kcs.) and adjust T2 for maximum.

Tune set and oscillator to 500 metres (600 kcs.) and adjust P1 for maximum simultaneously rocking the gang.

With the gang at maximum, tune service oscillator to 450 kcs. and adjust T3 for minimum.

Repeat the medium wave alignment at 200, 228 and 500 metres and then finish at 200 metres.

Long Waves.—Tune set and oscillator to 1,128 metres (266 kcs.) and adjust T4 and then T5 for maximum.

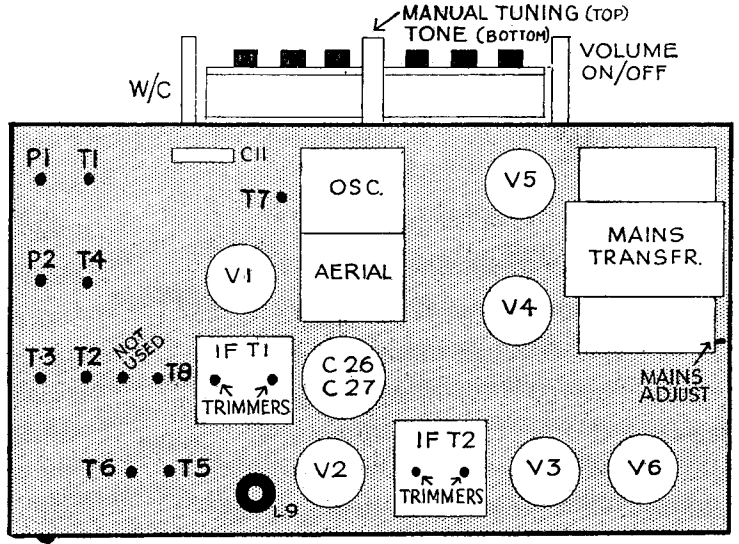
Tune set and oscillator to 1,807 metres (166 kcs.) and adjust P2 for maximum, simultaneously rocking the gang.

Tune set to 1,200 metres, inject a strong 261 metres (1,149 kcs.) signal and adjust T6 for minimum.

Then repeat 1,128 and 1,800 metres operations until no increase in signal strength can be obtained.

Short Waves.—With gang at maximum, tune service oscillator to 18 mcs. (approx. 16.6 metres), screw T7 right up and then unscrew until the second peak (lower capacity) is heard.

Tune set and service oscillator to 20 metres (15 mcs.) and adjust T8 for maximum.



The trimmers—excluding those for automatic tuning—are accessibly arranged on the top of the Ferranti model 617PB.