PHILIPS

Models 654A, 353A

General Description : Seven-valve (including rectifier), three-waveband (including V.H.F.), combined A.M./F.M. receiver. Model 654A is a radio-gramophone, with AG1003 record-changer unit. Model 353A is a table receiver.

Power Supplies : A.C. mains, 200–250 volts. Consumption, A.M. about 66 watts, F.M. about 71 watts.

Wavebands : M.W. 1604–517 kc/s.; L.W. 261–150 kc/s.; F.M. 87·5–100 Mc/s.

Valves : (V1) EF80 (R.F. amplifier, F.M. only); (V2) EF80 (additive mixer, F.M. only); (V3) ECH81 (frequency changer, A.M.; heptode section as I.F. amplifier on F.M.); (V4) EF85 (dual I.F. amplifier); (V5) EABC80 (one diode as A.M. signal detector and A.G.C. rectifier; two diodes as F.M. radio detector; triode section as common A.F. amplifier); (V6) EL84 (output); (V7) EZ80 (rectifier). Typical voltages are shown on circuit diagram.

Notes : Pilot and scale lamps, Model 654A two 6·5 volts, 0·3 amp. (type 8028D-00) and one 6·0 volts, 0·1 amp. pilot lamp (type 8073D-00), player compartment sign type, clear, 240 volts, 15 watts, S.E.S. base; Model 353A one 6·5 volts, 0·3 amp. (type 8028D-00).

Alignment Procedure :

I.F. : With set on M.W. and gang at mid-position, inject a modulated 470-kc/s. signal to signal grid of V3 via a 47,000-pF. capacitor. Unscrew the cores of all I.F. transformer coils. Then adjust the cores for maximum output in the following order: S33, S32, S27, S26. The cores must not be moved again.
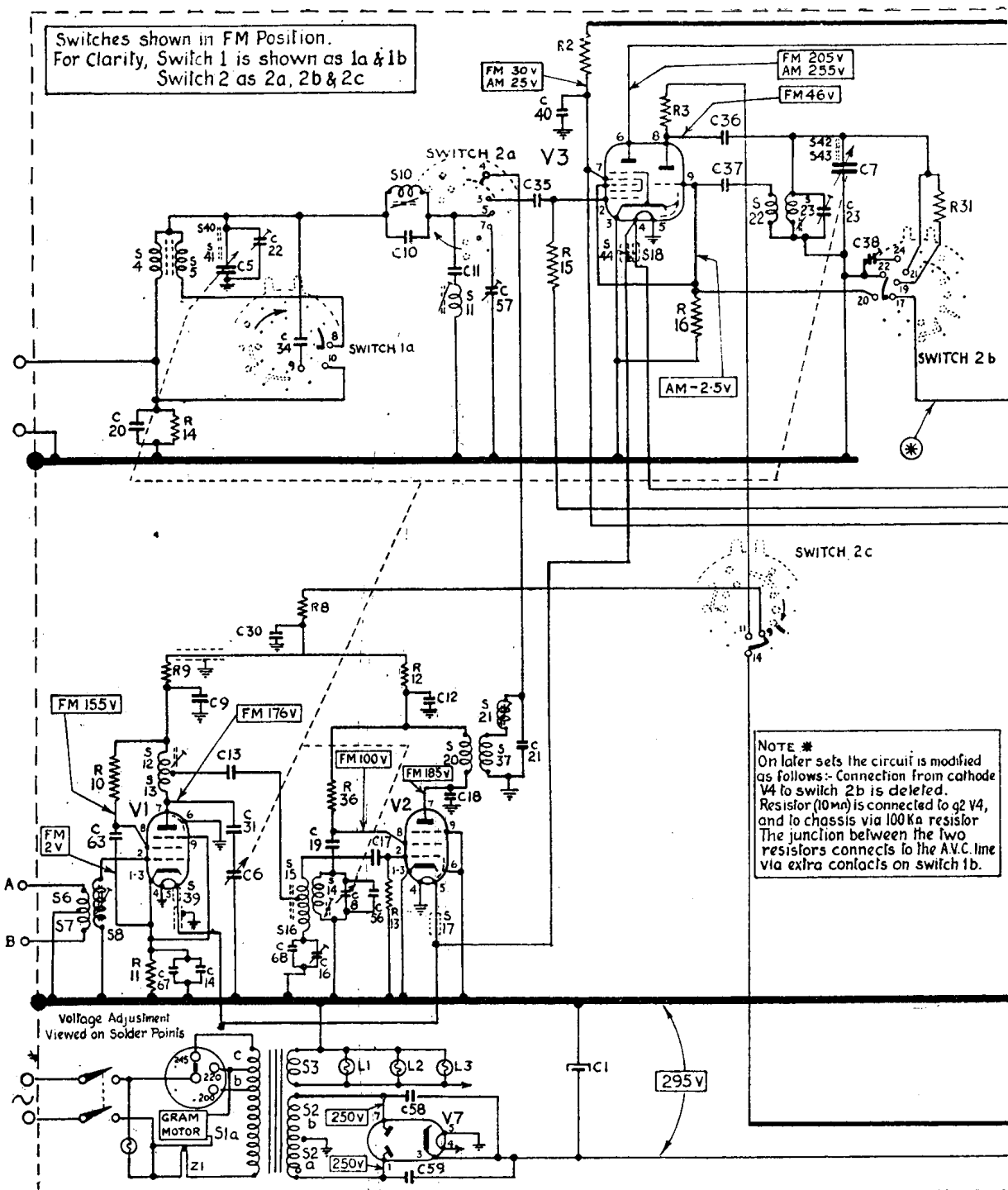
I.F. Filter : Unscrew the cores of S10 and S11. Inject a signal at I.F. resonance frequency via a dummy aerial to the aerial socket. Trim S10 (lower core) for minimum output. Short out S4. Trim S11 (top core) for minimum output. Re-trim S10 for minimum output.

R.F. : With gang at minimum the pointer should be over " O " on the log scale (654A) or over " M " at the left of the scale (353A). Short out S4. Trim as table below.

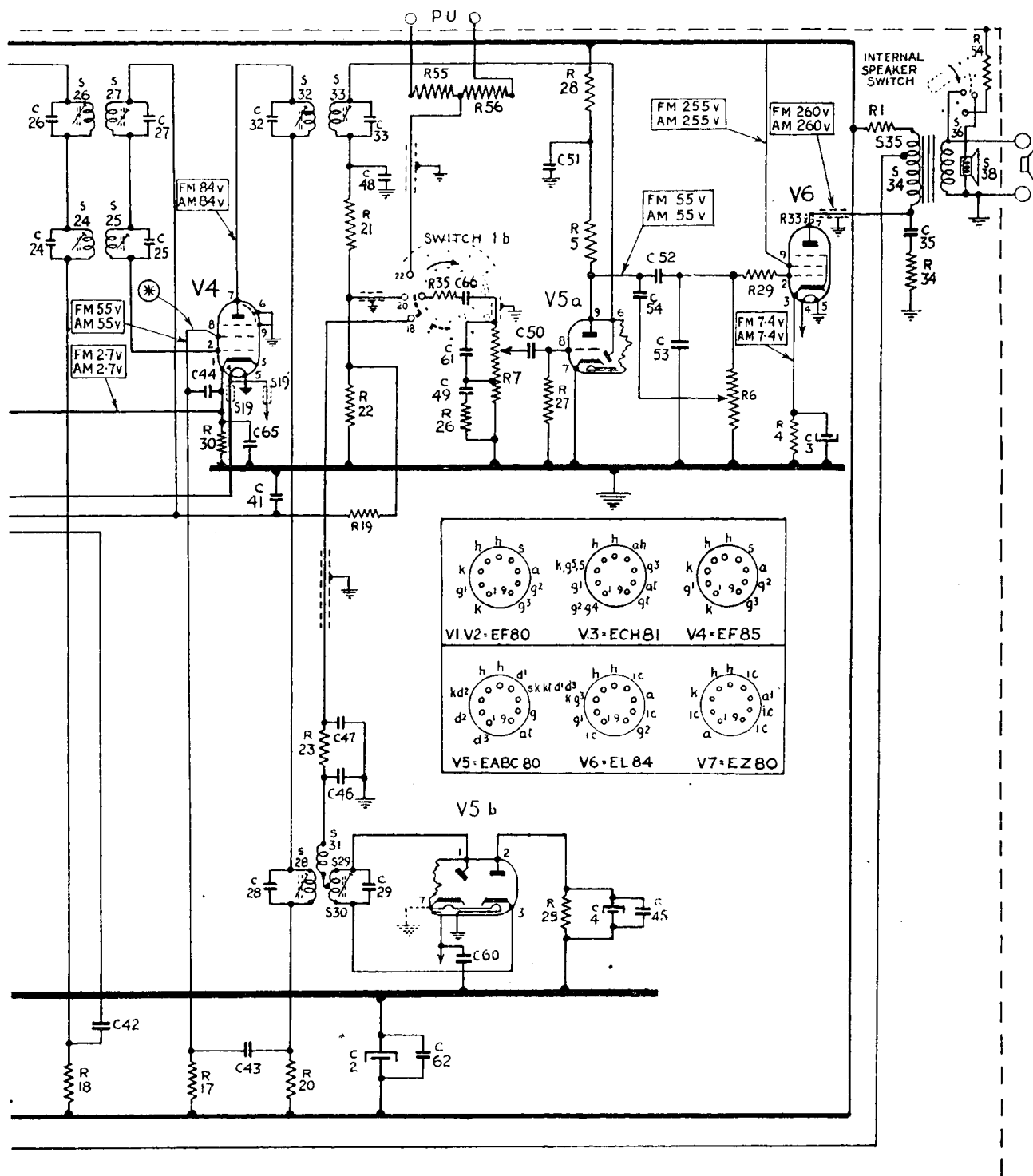| Operation	M.W.	L.W.
Pointer to 640-kc/s. mark	640 kc/s.	—
Trim for max. output	S23	—
Gang at minimum	1610 kc/s.	—
Trim for max. output	C23	—
Pointer to 172-kc/s. mark	—	172 kc/s.
Trim to max. output	—	C38
Remove short from S4	—	—
Tune to 172 kc/s.	—	—
Trim for max. output	—	S4
Tune to 640 kc/s.	—	—
Trim for max. output	S5	—
Tune to 1610 kc/s.	—	—
Trim for max. output	C22	—

F.M. Section

For the convenience of those who have no suitable F.M. generator the instructions below involve the use, as a signal source, of an A.M. generator only. If an F.M. generator is avail-

Switches shown in FM Position.
For Clarity, Switch 1 is shown as 1a & 1b
Switch 2 as 2a, 2b & 2c

CIRCUIT DIAGRAM—

Capacitors.

C1	50 (350 v.)	C20	3,000 pF. (5%)	C34	3·9 pF.	C48	100 pF. (10%)
C2	50 (350 v.)	C21	15 pF.	C35	100 pF. (10%)	C49	8,200 pF. (10%)
C3	100 (12 v.)	C22	20 pF.	C36	470 pF. (10%)	C50	4,700 pF.
C4	5 (75 v.)	C23	3–30 pF.	C37	56 pF. (10%)	C51	0·1 (400 v.)
C9	1,000 pF.	C24	33 pF.	C38	400 pF.	C52	15,000 pF. (400 v.)
C10	270 pF. (10%)	C25	33 pF.	C40	3,900 pF.	C53	470 pF. (10%)
C11	12 pF. (10%)	C26	110 pF.	C41	10,000 pF.	C54	15,000 pF. (400 v. 10%)
C12	4,700 pF.	C27	195 pF.	C42	1,500 pF.		
C13	100 pF. (10%)	C28	22 pF.	C43	1,500 pF.	C55	1,000 pF. (800 v., 10%)
C14	1,000 pF.	C29	47 pF.	C44	3,900 pF.		
C16	10 pF.	C30	1,000 pF.	C45	4,700 pF.	C56	8·2 pF. (± 0·5 pF.)
C17	33 pF. (10%)	C31	82 pF. (10%)	C46	2,200 pF.		
C18	18 pF. (10%)	C32	195 pF.	C47	2,200 pF. (400 v. 10%)	C57	100 pF.
C19	22 pF. (10%)	C33	195 pF.			C58	500 pF.

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C59	500 pF.	R3	33k (10%, 1 W.)	R17	56k (10%)	R33	Ferroxcube bead
C60	4,700 pF.	R4	180 (10%, 1 W.)	R18	2·2k	R34	18k (1 W., 10%)
C61	33 pF.	R5	0·22M (1 W.)	R19	1·2M (10%)	R35	0·1M
C62	6,800 pF.	R6	0·5M (Pot.)	R20	4·7k (10%)	R36	22k
C63	1,000 pF.	R7	1·6 + 0·4M (Pot.)	R21	0·18M (10%)	R54 *	12 (1 W., 10%)
C65	10,000 pF.	R8	1k (10%)	R22	0·22M (10%)	R55 *	0·27 (10%)
C66	10,000 pF.	R9	2·2k (10%)	R23	47k (10%)	R56 *	0·47 (10%)
C67	1,000 pF.	R10	10k (10%)	R25	10k (10%)	R57	10M
C68	8·2 pF.	R11	180 (10%)	R26	82k (10%)	R58	0·1M (10%)
		R12	2·2k (10%)	R27	10M		
Resistors.		R13	0·1M (10%)	R28	0·1M	¼ watt unless otherwise	
R1	1·2k (10%, 3 W., W.W.)	R14	33k (10%)	R29	1k	stated.	
		R15	1·2M (10%)	R30	220		
R2	39k (10%, 1 W.)	R16	47k (10%)	R31	33k	* Model 654A.	

S1a = 45 Ω	S6 = <1 Ω	S13 = <1 Ω	S37 = <1 Ω	S27 = 5 Ω	S33 = 5 Ω
S2a = 150 Ω	S7 = <1 Ω	S14 = <1 Ω	S22 = 7 Ω	S28 = <1 Ω	S34 = 430 Ω
S2b = 150 Ω	S8 = <1 Ω	S15 = <1 Ω	S23 = 12 Ω	S29 = <1 Ω	S35 = 1
S3 = <1 Ω	S10 = 10 Ω	S16 = <1 Ω	S24 = <1 Ω	S30 = <1 Ω	S36 = <1 Ω
S4 = 1 Ω	S11 = 45 Ω	S20 = <1 Ω	S25 = <1 Ω	S31 = <1 Ω	S37 = <1 Ω
S5 = 3·7 Ω	S12 = <1 Ω	S21 = <1 Ω	S26 = 8 Ω	S32 = 5 Ω	S38 = 4 Ω DC

Numbered leads connect to under chassis

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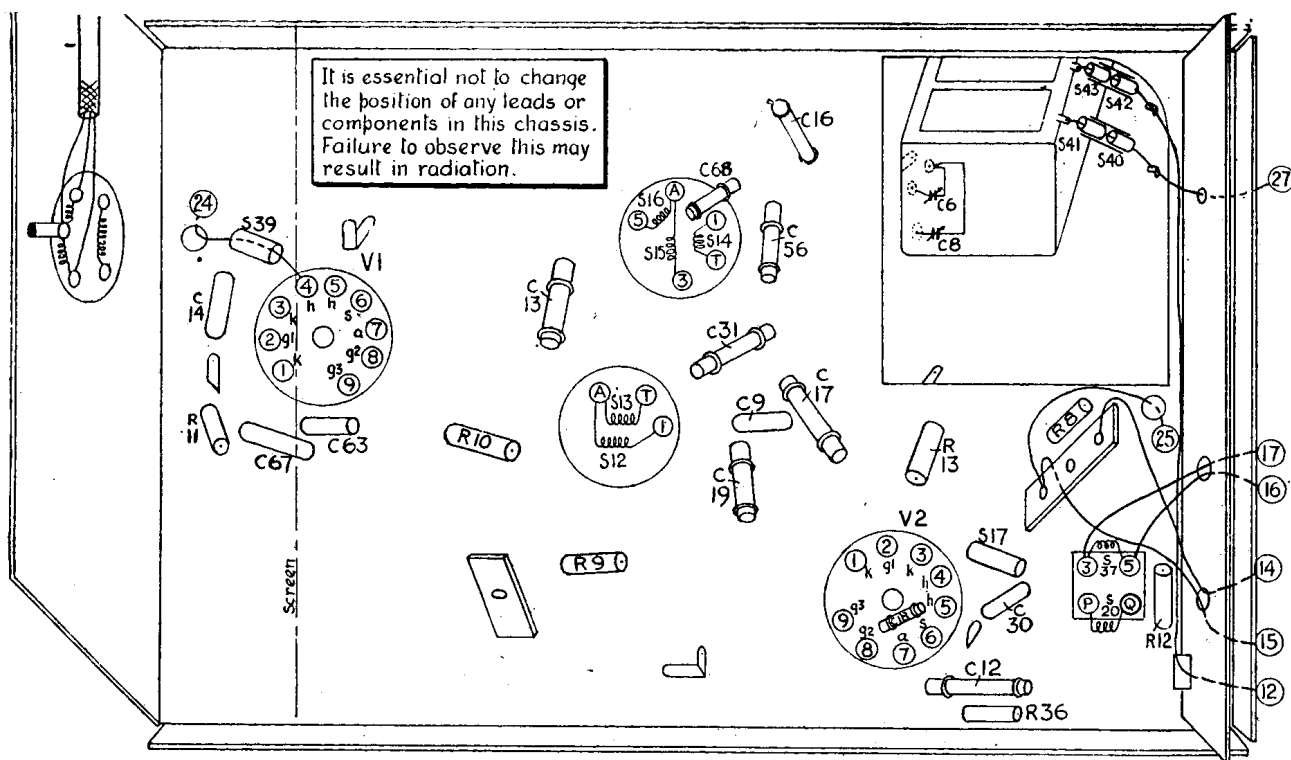Speaker

See also the note on the circuit diagram.
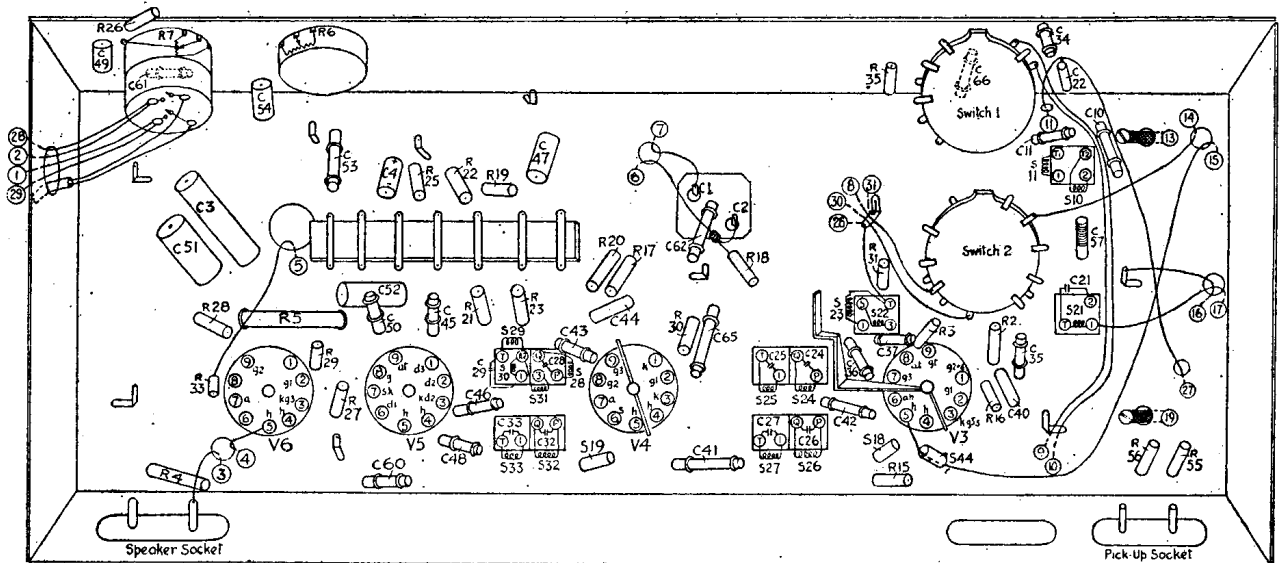
LAY-OUT DIAGRAMS—PHILIPS MODELS 654A, 353A

able an output meter connected to the loudspeaker sockets may be used, in this case the F.M. generator should be modulated with a deviation of $\pm$ 22·5 kc/s.

I.F. Switch to F.M., turn volume control to minimum and gang to maximum capacitance. Connect a valve voltmeter via a 0·1M resistor across C4. Inject an unmodulated 10·7-Mc/s. signal to control grid of V3 via a 1500-pF. ceramic capacitor. During trimming the voltage across C4 should not exceed 6–8 volts, and the generator output should be adjusted accordingly.

Damp S24 with a 47k resistor. Trim S25 for maximum reading on the voltmeter. Remove the damper from S24 and connect it across S25. Trim S24 for maximum output. Remove damping. Trim S28 for maximum reading, then adjust generator output to give a reading of 8 volts. Transfer voltmeter connection to the junction R23/C47. Trim S30 to give 4 volts on meter. Restore voltmeter connection to C4. Change the signal-input point to control grid of V2. Damp S21 and trim S20 for maximum output on meter. Remove damping, and trim S21 for maximum output. Adjust signal input to give an

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LAY-OUT V.H.F. SUB-CHASSIS MODEL 654A

8-volt reading. Tune the generator to find the maximum output on the meter; this should not be more than 8½ volts, and should occur at a frequency between 10·67 and 10·73 Mc/s. If these conditions are not met, the I.F. circuits should be re-trimmed.

R.F. : Adjust pointer to 87·5 Mc/s. Connect valve voltmeter across C4. Apply an unmodulated 87·5-Mc/s. signal to the F.M. aerial sockets. Trim S15/S16 and then S12 for maximum output. Trim C16 for minimum radiation (to do this connect anode of V1 to a valve voltmeter via a 3·9-pF. capacitor in series with a crystal diode; the valve voltmeter is shunted by a capacitor of 150 pF., and the junction between the 3·9-pF. capacitor and the diode is joined to chassis via a 0·1M resistor). Set pointer to 87·5 Mc/s. and re-trim S15/S16 and S12. Set pointer to 94 Mc/s. and trim S8 for maximum output. Repeat as necessary.

Note : It is essential not to change the position of any leads or components in the V.H.F. sub-chassis. Failure to observe this may result in oscillator radiation.