"TRADER" SERVICE SHEET

1245

REGENTONE A

Covering Models A155, ARG79, ARG89 and Radio

EMPLOYING internal aerials for both A.M. and F.M. reception, the Regentone A155 is a 4-band A.M./F.M. table receiver designed to operate from A.C. mains of 200-250 V, 50-100 c/s. The waveband ranges are: A.M., 17-50 m, 187-550 m, 1,000-2,000 m; F.M., 87-100 Mc/s.

Models ARG79 and ARG89 are 3-speed auto-radiograms employing an unmodified A155 chassis. An A155 chassis is also used in television model 173 Comb. F.M.

Release date, all models, July 1955. *Original prices: ARG79,* £48 10s 5d; *ARG89,* £62 3s 4d; *A155,* £25 15s 6d. *Purchase tax extra.*

CIRCUIT DESCRIPTION

A.M. aerial input via I.F. rejector C18, L15 to coupling coil L16 (S.W.) and common impedance coupler C19 (M.W. and L.W.). Aerial coils L17 (S.W.), L18 (M.W.) and L19 (L.W.) are tuned by C24. L18 and L19 are mounted at opposite ends of a length of ferrite rod to form the internal M.W. and L.W. aerial.

Section a of V2 (Mullard ECH81) operates as local oscillator and section b as mixer for A.M. operation. Oscillator anode coils L23 (S.W.). L24 (M.W.) and L25 (L.W.) are tuned by C35. Parallel trimming by C31 (S.W.), C32 (M.W.) and C33 (L.W.); series tracking by C29 (M.W.) and C30 (L.W.). Reaction coupling from grid circuit by L20, L21 and L22. For A.M. operation, S8 is open and S9 is closed.

V3 (Mullard EF85) is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings C37, L26, L27, C38 and L34, L35, C49.

A.M. intermediate frequency 470 kc/s.

Diode section c of V4 (Mullard EABC80) operates as A.M. signal detector, and the audio frequency component in its rectified output is developed across R27, R29 and passed via tone corrector C56, R30, volume control R32 and C58 to grid of triode section. I.F. filtering by C50, R25, C51. D.C. potential developed across R25, R27, R29 is fed back as bias to V2b and V3 giving automatic gain control on the A.M. bands. Provision is made for the connection of a gramophone pickup across R32 via S30 which closes in the gram position of the band switch. S29 opens in this position and S28 closes to prevent radio break-through.

Resistance-capacitance coupling by R35, C60, R37 between V4d and pentode output valve (V5, Mullard EL84). Negative feed-back tone correction by R42, R43 between winding c on T1 and V4d grid circuit. Tone control in V4d grid circuit by C57, R31.

H.T. current is supplied by I.H.C. rectifying valve (V6, Mullard EZ80). H.T. smoothing by R40 and electrolytic capacitors C63, C64. Residual hum is neutralized by passing H.T. current through winding a on output transformer T1.

Operation on F.M.

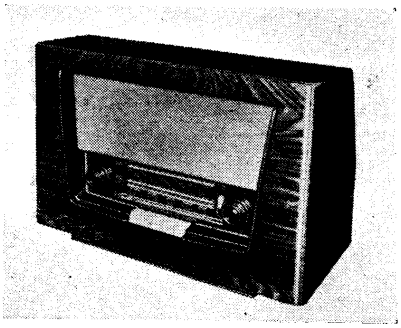
300Ω balanced F.M. aerial input via aerial coupling transformer L1, L2 and coupling coil L3 to fixed-tuned aerial coils L4, L5 which are connected in the cathode circuit of earthed-grid R.F. amplifier, section a of V1 (Mullard ECC85). L4 and L5 are astatically wound in order to provide a suitable balanced to unbalanced coupling. Section b of V1 operates as mixer/oscillator with oscillator coils L10, L11. The amplified output of V1a is coupled via R.F. tuning coils L7, L8 and a tapping on oscillator grid coil L10 to V1b.

I.F. output of V1b is coupled to V2b, which together with V3 operates as F.M. I.F. amplifier with tuned band-pass transformer couplings C15, L13, L14, C16; L28, L29, C40, L30, C41; C46, L31, L32, L33, C47. The inter-electrode capacitances of V2b and V3 are neutralized by C26, C27 and C42, C43 respectively.

F.M. intermediate frequency 10.7 Mc/s.

Diode sections a and b of V4 are connected in a ratio detector circuit whose A.F. output is developed across C48 and passed via de-emphasis circuit R22, R23, C53 to the volume control circuit. Limiting is obtained by R17, C39 in V3 control grid circuit, S24 closing and S25 opening for F.M. operation, and also by the fly-wheel effect of D.C. reservoir C54.

D.C. potential developed across R29 in the D.C. load circuit R28, R29, is fed via R27, R25 and R29 to the A.G.C. line. The total D.C. potential developed across R28, R29 is fed as an A.G.C. bias direct to V1a grid and via S8, potential divider R13, R14, and R11 to V2b control grid circuit. S9 opens for F.M. operation.

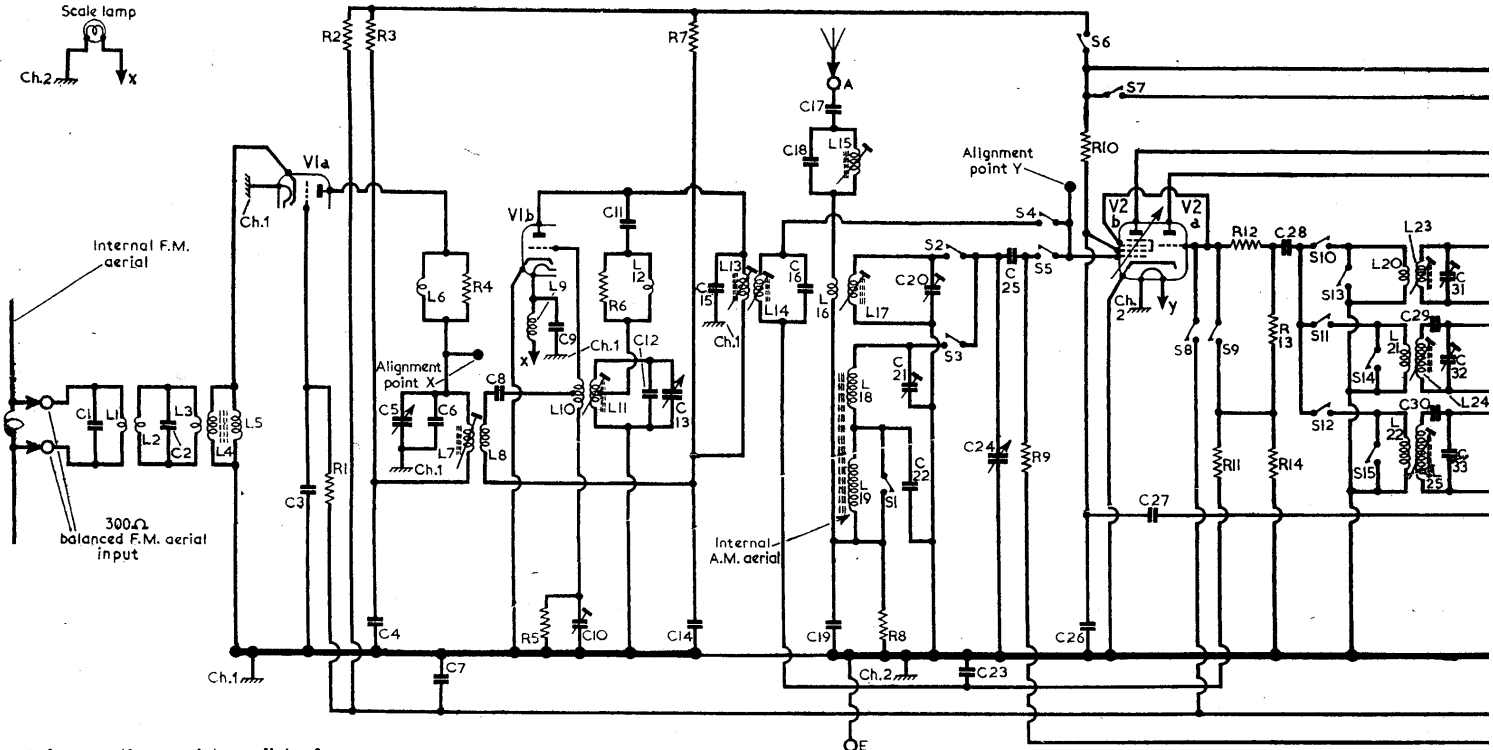


Appearance of the Regentone A155.

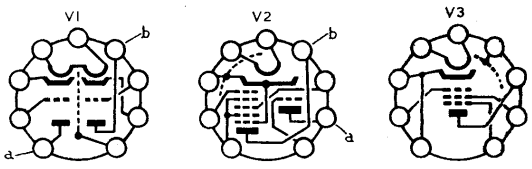
GENERAL NOTES

Switches.—S1-S30 are the band/gram switches ganged in a 5-way push-button unit beneath

(Continued col. 1 overleaf)



Circuit diagram of the Regentone A155. F.M. aerial tuning coils **L4, L5** are astatically wound to maintain the balance of the aerial input circuit. **L28, L29** and **L30** in the F.M. I.F. amplifier form a triple-tuned band-pass coupling circuit.



A155 Series

io Chassis in TV Model 173 Comb. F.M.

	RESISTORS	Values	Locations
R1	F.M. A.G.C. decoup.	500kΩ	G3
R2	F.M. G.B. ...	3MΩ	G3
R3	H.T. feed	20kΩ	G3
R4	Coil shunt ...	100Ω	G3
R5	V1b C.G.	500kΩ	G3
R6	Coil shunt ...	100Ω	G3
R7	H.T. feed	10kΩ	G3
R8	A.M. aerial shunt	10kΩ	F3
R9	V2b C.G.	1MΩ	F3
R10	V2b S.G. feed ...	33kΩ	F4
R11	F.M. G.B. feed ...	500kΩ	F3
R12	V2a C.G. stopper ..	200Ω	F3
R13	V2a C.G.	100kΩ	F3
R14		50kΩ	F3
R15	H.T. feeds... ...	30kΩ	F3
R16		1kΩ	F4
R17	V3 C.G.	47kΩ	E4
R18	V3 S.G. feed ...	82kΩ	E4
R19	V3 G.B.	220Ω	E4
R20	H.T. feed	1kΩ	E4
R21	F.M. balancing ...	39Ω	E4
R22	Part de-emphasis	10kΩ	D4
R23		47kΩ	E4
R24	A.G.C. decoupling	1·2MΩ	E4
R25	I.F. stopper ...	100kΩ	E4
R26	F.M. A.G.C. de-	300kΩ	F3
R27	couplings	220kΩ	E4
R28	F.M. D.C. load ...	22kΩ	E4
R29		10kΩ	E4
R30	Tone corrector	100kΩ	D3
R31	Tone control ...	500kΩ	D3

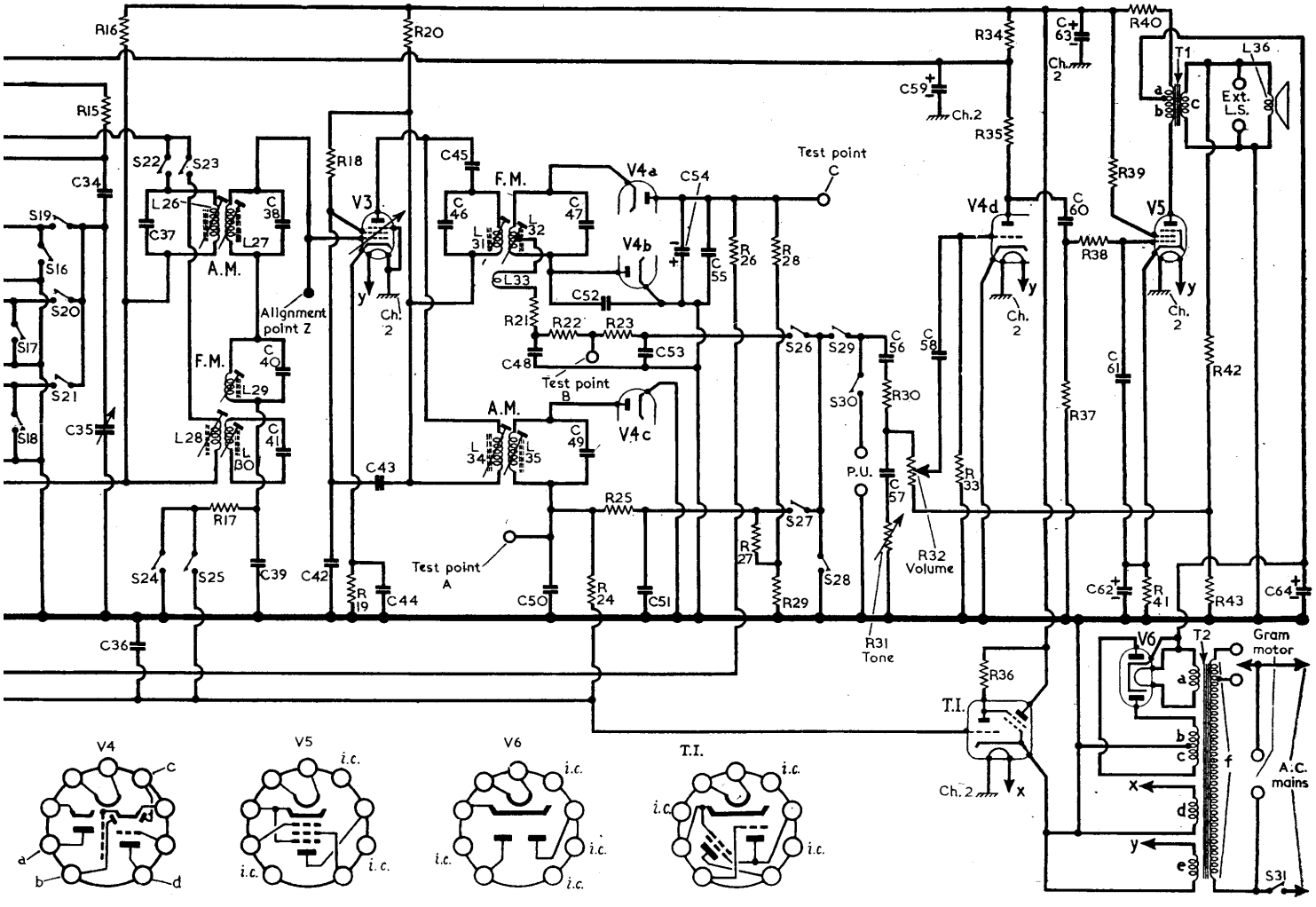
(*Continued next col.*)

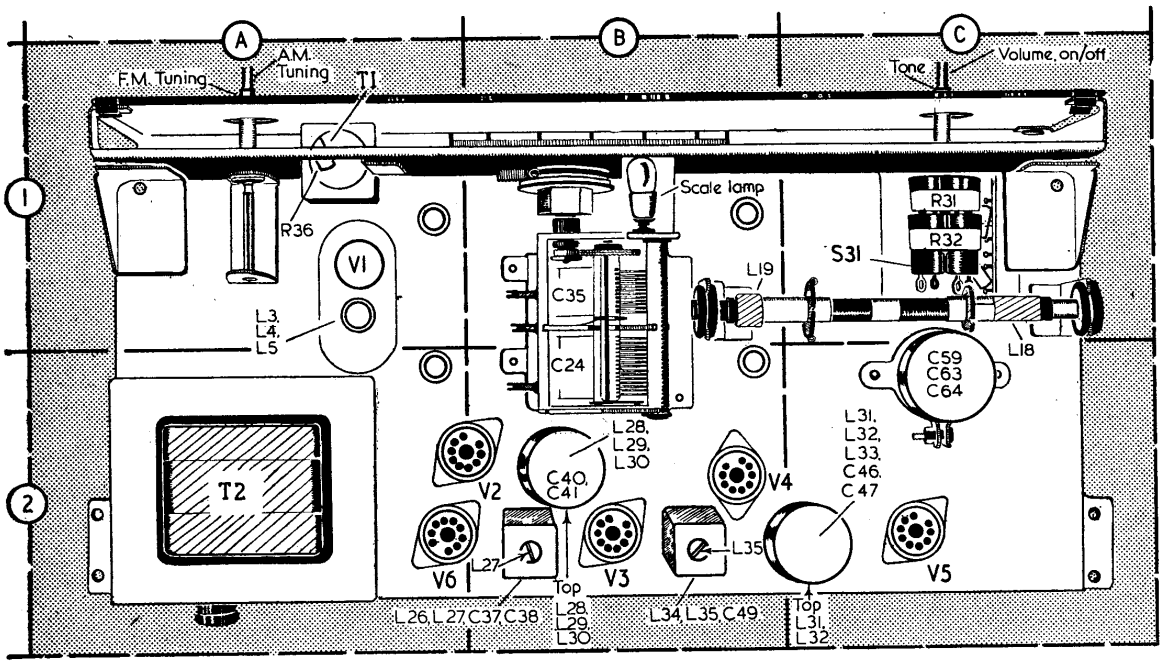
	RESISTORS (*Contd.*)	Values	Locations
R32	Volume control ...	500kΩ	D3
R33	V4d C.G.	5·6MΩ	E4
R34	H.T. feed	2·2kΩ	D4
R35	V4d anode load ...	220kΩ	E4
R36	T.I. load	470kΩ	A1
R37	V5 C.G.	560kΩ	D4
R38	V5 C.G. stopper ...	47kΩ	D4
R39	V5 S.G. stopper ...	39Ω	D4
R40	H.T. smoothing ...	1·5kΩ	D4
R41	V5 G.B.	180Ω	D4
R42	Neg. feed-back ...	1·2kΩ	D3
R43		39Ω	D3

	CAPACITORS	Values	Locations
C1	F.M. aerial tuning	40pF	F4
C2		40pF	F4
C3	V1a C.G.	0·001μF	F3
C4	H.T. decoupling	0·005μF	G3
C5	F.M.R.F. tuning ...	10·5pF	G3
C6	F.M.R.F. trimmer	10pF	G3
C7	F.M. A.G.C. decoup.	0·05μF	F3
C8	F.M.R.F. coupling	60pF	G3
C9	R.F. by-pass ...	0·001μF	F3
C10	F.M. osc. neut. ...	10pF	G3
C11	F.M. osc. coupling	15pF	F3
C12	F.M. osc. trimmer	18pF	G3
C13	F.M. osc. tuning ...	10·5pF	G3
C14	H.T. decoupling	500pF	G3
C15	1st F.M. I.F.T.	10pF	F3
C16	tuning	10pF	F3
C17	A.M. aerial coupling	500pF	F4
C18	A.M. I.F. filter tun.	0·001μF	F3
C19	M.W., L.W. aerial coup.	0·005μF	E3
C20	S.W. aerial trim. ...	45pF	F3
C21	M.W. aerial trim	10pF	E3
C22	L.W. aerial trim ...	65pF	E3

(*Continued next col.*)

	CAPACITORS (*Contd.*)	Values	Locations
C23	V2b F.M. G.B. decoup ...	0·05μF	F3
C24	Aerial tuning ...	500pF	B2
C25	V2b C.G.	170pF	F3
C26	V2b S.G. decoup	1,800pF	F4
C27	V2b neutralizing...	0·005μF	F4
C28	V2a osc. C.G. ...	100pF	F3
C29	A.M. osc. trackers	385pF	E3
C30		200pF	E3
C31	A.M. osc. trimmers	45pF	F3
C32		30pF	E3
C33		130pF	E3
C34	A.M. osc. coupling	500pF	F3
C35	A.M. osc. tuning ...	440pF	B1
C36	A.G.C. decoupling	0·05μF	F4
C37	1st A.M. I.F.T.	100pF	B2
C38	tuning	100pF	B2
C39	V3 C.G.	0·005μF	F4
C40	2nd F.M. I.F.T.	15pF	B2
C41	tuning	35pF	B2
C42	V3 S.G. decoup. ...	0·003μF	E4
C43	V3 neutralizing ...	0·005μF	E4
C44	V3 cath. by-pass	0·05μF	F4
C45	F.M. coupling ...	100pF	E4
C46	3rd F.M. I.F.T. ...	15pF	C2
C47	tuning	50pF	C2
C48	F.M. A.F. load ...	500pF	E4
C49	A.M. I.F.T. tun ...	100pF	B2
C50	A.M. I.F. by-pass	100pF	E4
C51		50pF	F4
C52	F.M. balancing ...	12·5μF	E4
C53	Part de-emphasis	0·001μF	F3
C54	D.C. load ...	4μF	E4
C55	F.M. I.F. by-pass	0·01μF	E4
C56	A.F. coupling ...	0·01μF	D3
C57	Part tone control	0·005μF	D3
C58	A.F. coupling ...	0·01μF	E4
C59	H.T. decoupling ...	8μF	C2
C60	A.F. coupling ...	0·05μF	E4
C61	I.F. by-pass ...	100pF	D4
C62	V5 cath. by-pass	25μF	D4
C63	H.T. smoothing ...	32μF	C2
C64		32μF	C2





Plan illustration of chassis showing the A.M. internal aerial **L18, L19** in location reference C1.

	OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	F.M. aerial coupling transformer		—	F4
L2			—	F4
L3	F.M. aerial coils		—	A1
L4			—	A1
L5			—	A1
L6	R.F. choke		—	G3
L7	F.M. R.F. tuning coils		—	G3
L8			—	G3
L9	R.F. choke		—	F3
L10	F.M. oscillator coils		—	G3
L11			—	G3
L12	R.F. choke		—	G3
L13	1st F.M. I.F.T.	Pri.	—	G3
L14		Sec.	—	F3
L15	A.M. I.F. filter		2·0	F3
L16	S.W. aerial coup.		1·0	F3
L17			—	F3
L18	A.M. aerial coils		—	C1
L19			4·0	B1
L20	A.M. oscillator reaction coils		—	F3
L21			1·0	E3
L22			1·4	E3
L23	A.M. oscillator tuning coils		—	F3
L24			4·0	E3
L25			8·0	E3
L26	1st A.M. I.F.T.	Pri.	20·0	B2
L27		Sec.	20·0	B2
L28	2nd F.M. I.F.T.	Pri.	—	B2
L29		Sec.	—	B2
L30		Tert.	—	B2
L31	3rd F.M. I.F.T.	Pri.	—	C2
L32		Sec.	—	C2
L33		Tert.	—	C2
L34	2nd A.M. I.F.T.	Pri.	18·0	B2
L35		Sec.	18·0	B2
L36	Speech coil		2·5	—
T1	O.P. trans.	a	45·0	E3
		b	800.0	
		c	1·0	
T2	Mains trans.	a	1·0	A2
		b	180·0	
		c	180·0	
		d	—	
		e	—	
		f	35·0	
S1-S30	Band switches		—	F3
S31	Mains sw., g'd R32		—	D3

General Notes—*continued*

the chassis. This unit is indicated in location reference E3. The switch connections are identified in the detailed diagram of the unit in column 6. In column 2 above, the associated table shows the switch operations when each button is depressed. A dash indicates open, and **C**, closed.

A.M. Drive Cord Replacement.—About 48 inches of nylon-braided glass yarn is required for a new A.M. drive. It should be run as indicated in the sketch on the right.

F.M. Drive Cord Replacement.—About 46 inches of nylon-braided glass yarn is required for a new F.M. drive, which should be run as indicated in the sketch below.

Scale Lamp.—This is a 6.5 V, 0.3 A lamp with a clear tubular bulb and an M.E.S. base.

Switch Table

Switches	L.W.	M.W.	S.W.	F.M.	Gram
S1	—	C	C	C	C
S2	—	—	C	—	—
S3	C	C	—	C	C
S4	—	—	C	—	—
S5	C	C	C	—	C
S6	—	—	—	C	—
S7	C	C	C	—	C
S8	—	—	—	C	—
S9	C	C	C	—	C
S10	—	—	C	—	—
S11	—	C	—	—	—
S12	C	—	—	—	—
S13	C	C	—	C	C
S14	C	—	C	C	C
S15	—	C	C	C	C
S16	C	C	—	C	C
S17	C	—	C	C	C
S18	—	C	C	C	C
S19	—	—	C	—	—
S20	—	C	—	—	—
S21	C	—	—	—	—
S22	C	C	C	—	C
S23	—	—	—	C	—
S24	—	—	—	C	—
S25	C	C	C	—	C
S26	—	—	—	C	—
S27	C	C	C	—	C
S28	—	—	—	—	C
S29	C	C	C	C	—
S30	—	—	—	—	C

CIRCUIT ALIGNMENT

Equipment Required.—An A.M. signal generator covering the frequency ranges 200-1,500 kc/s and 6-15 Mc/s; an F.M. signal generator covering the frequencies of 470 kc/s, 10.7 Mc/s and 94 Mc/s; a sound output meter; an electronic voltmeter; an oscilloscope.

A.M. I.F. Stages

1.—Switch receiver to M.W. and turn gang to minimum capacitance. Connect output of F.M. signal generator between chassis and alignment point Y (location reference **F4**). Connect oscilloscope between chassis and test point A (**E4**).

2.—Feed in a 470 kc/s signal deviated by ±25 kc/s and adjust the cores of **L35** (B2), **L34** (E4), **L27** (B2) and **L26** (F4) for maximum response and symmetry of curve on oscilloscope. Repeat these adjustments.

F.M. I.F. Stages

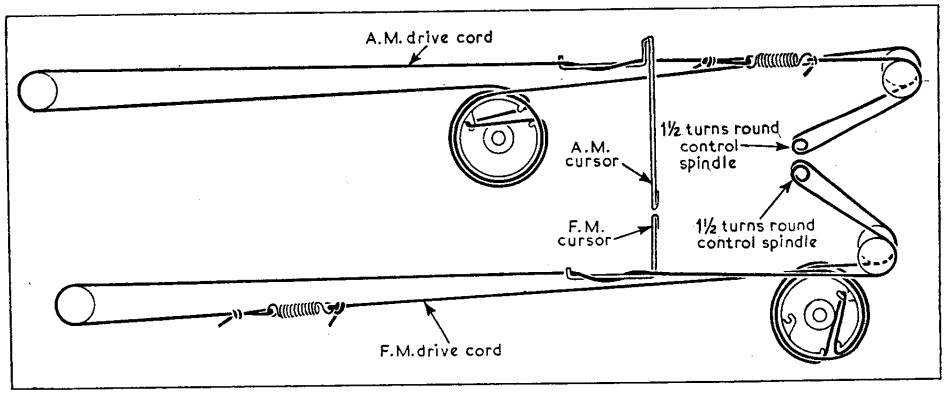
3.—Transfer oscilloscope "live" lead to test point B on test panel (E4). Switch receiver to F.M. and tune it to 92 Mc/s.

4.—With output of wobbulator connected to alignment point Y, feed in a 10.7 Mc/s signal, deviated by ±200 kc/s and adjust the core of **L32** (C2) so that the centre of the response curve on the oscilloscope is at 10.7 Mc/s. (The A.M. generator can be used to feed in a 10.7 Mc/s marker pip.)

5.—Adjust the core of **L31** (C2) for maximum amplitude of response curve, and adjust the cores of **L30** (B2), **L29** (B2) and **L28** (B2) until a response similar to curve 1 in column 6 is obtained on the oscilloscope.

6.—Repeat operations 4 and 5.

7.—Disconnect **negative** end of **C54** (**E4**). Transfer oscilloscope "live" lead to test point C on test panel (E4). Feeding in a 10.7 Mc/s signal deviated by ±150 kc/s, check



Sketch of the separate A.M. and F.M. tuning drive systems as seen from the front of an upright chassis with both of the gangs at maximum capacitance.

that curve 2 is obtained on oscilloscope. The cores of **L28, L29** and **L30** may be readjusted slightly, if necessary, for symmetry.

8.—**Transfer "live" F.M. generator lead to alignment point X (G3). Feed in a 10.7 Mc/s signal deviated by ±150 kc/s and adjust the cores of L13 (G3) and L14 (G3) until a response curve similar to curve 2 is obtained on the oscilloscope, consistent with maximum output.**

9.—Reconnect **C54.** Disconnect oscilloscope and A.M. generator.

A.M. R.F. and Oscillator Stages

10.—Switch receiver to M.W. and tune it to 521.7 m. Connect output meter across external speaker sockets. Connect output of A.M. generator, via dummy aerial, to **A** and **E** sockets.

11.—**Feed in a 575 kc/s signal and adjust the core of L24 (E3) for maximum output.**

12.—Tune receiver to 200 m, feed in a 1,500 kc/s signal and adjust **C32** (E3) for maximum.

13.—**Feed in a 470 kc/s signal and adjust the core of L15 (F3) for minimum output.**

14.—Repeat operations 11 and 12 until no further improvement results.

15.—Retune receiver to 521.7 m, feed in a 575 kc/s signal and adjust the inductance of **L18** (C1) for maximum output by sliding the coil along its ferrite rod.

16.—Retune receiver to 200 m, feed in a 1,500 kc/s signal and adjust **C21** (E3) for maximum.

17.—Repeat operations 15 and 16 until no further improvement results.

18.—**Switch receiver to L.W. and tune to 1,333 m. Feed in a 225 kc/s signal and adjust the core of L25 (E3) for maximum output. Adjust the inductance of L19 (B1) for maximum output by sliding the coil on its ferrite rod.**

19.—Switch receiver to S.W. and tune it to 6 Mc/s. **Feed in a 6 Mc/s signal and adjust the core of L23 (F3) for maximum output.**

20.—**Tune receiver to 15 Mc/s, feed in a 15 Mc/s** signal and adjust **C31** (F3) for maximum.

21.—Repeat operations 19 and 20 until no further improvement results.

22.—Retune receiver to 6 Mc/s, feed in a 6 Mc/s signal and adjust the core of **L17 (F3) for maximum output.**

23.—Retune receiver to 15 Mc/s, feed in a 15 Mc/s signal and adjust **C20** (F3) for maximum output, rocking the gang while making this adjustment for optimum results.

F.M. R.F. and Oscillator Stages

24.—Switch receiver to F.M. Connect output of F.M. signal generator to F.M. aerial sockets. Tune receiver to 94 Mc/s, feed in a 94 Mc/s signal and adjust the core of **L11** (G3) for maximum output, choosing the middle peak.

25.—Disconnect F.M. generator. Connect electronic voltmeter between chassis and alignment point X (G3). Adjust **C10** (G3) for minimum reading on voltmeter.

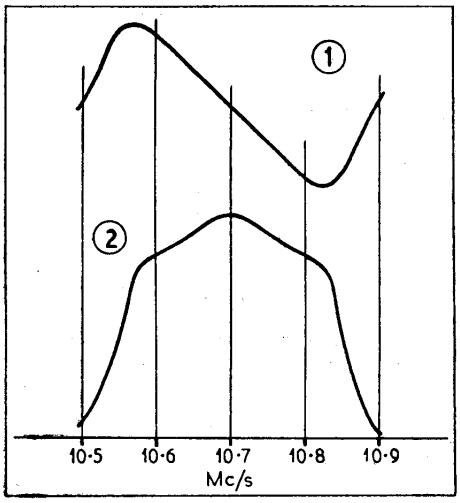
VALVE ANALYSIS

Valve voltages and currents given in the table below are those derived from the manufacturers' information. They were measured with the receiver switched to M.W.

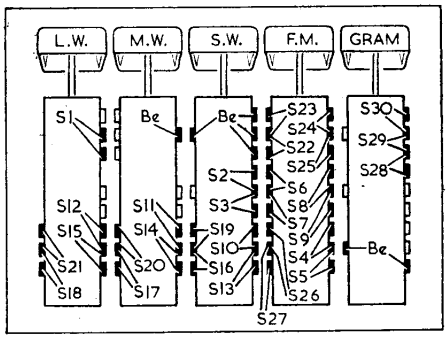
Voltages were measured on the 10 V and 400 V ranges of a Model 7 Avometer, chassis being the negative connection in every case.

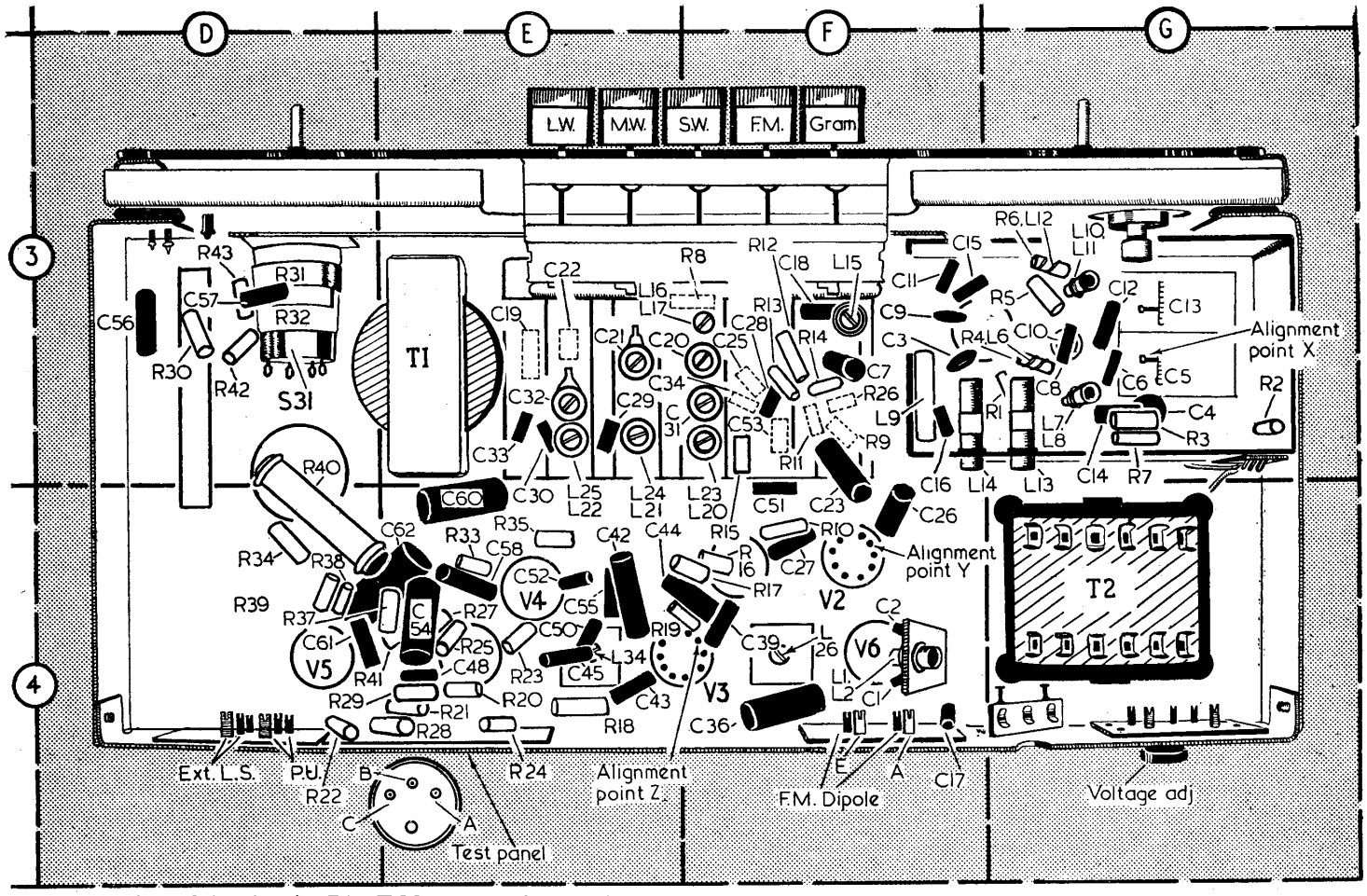
Valve	Anode		Screen		Cath.
	V	mA	V	mA	V
V1 ECC85					
a ...	—	—	—	—	—
b ...	—	—	—	—	—
V2 ECH81					
a ...	105	4·0	—	—	—
b ...	230	2·3	65	4·0	—
V3 EF85	220	7·5	95	1·5	1·9
V4 EABC80					
a-c ...	—	—	—	—	—
d ...	70	0·6	—	—	—
V5 EL84	260	36·0	235	4·5	7·5
V6 EZ80	225*	—	—	—	280·0†
T.I. EM80	40‡	—	—	—	—

*A.C., each anode. †Cathode current 75mA. ‡Target anode 235V.



Above: F.M. response curves.
Below: Band/gram. switches.





Underside view of the chassis. The F.M. tuner unit cover has been removed in location reference G3 to reveal the hidden components.

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