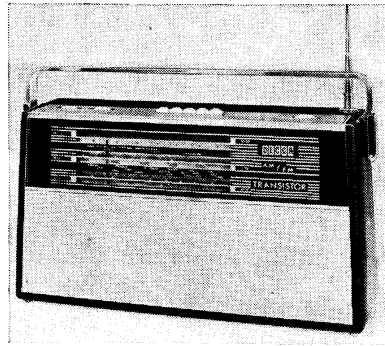


E R T

**SERVICE
CHART
1603
New Series**



DECCA TP86 AM/FM RADIO

Additional copies of this chart price 1s. 6d. post free. Payment with order please to ERT, 40 Bowling Green Lane, London EC1

NINE-transistor three-waveband AM/FM portable radio with rod and telescopic aerials and pickup socket as well as earphone and tape sockets. Tone compensation at low volume is possible by use of a Mute switch.

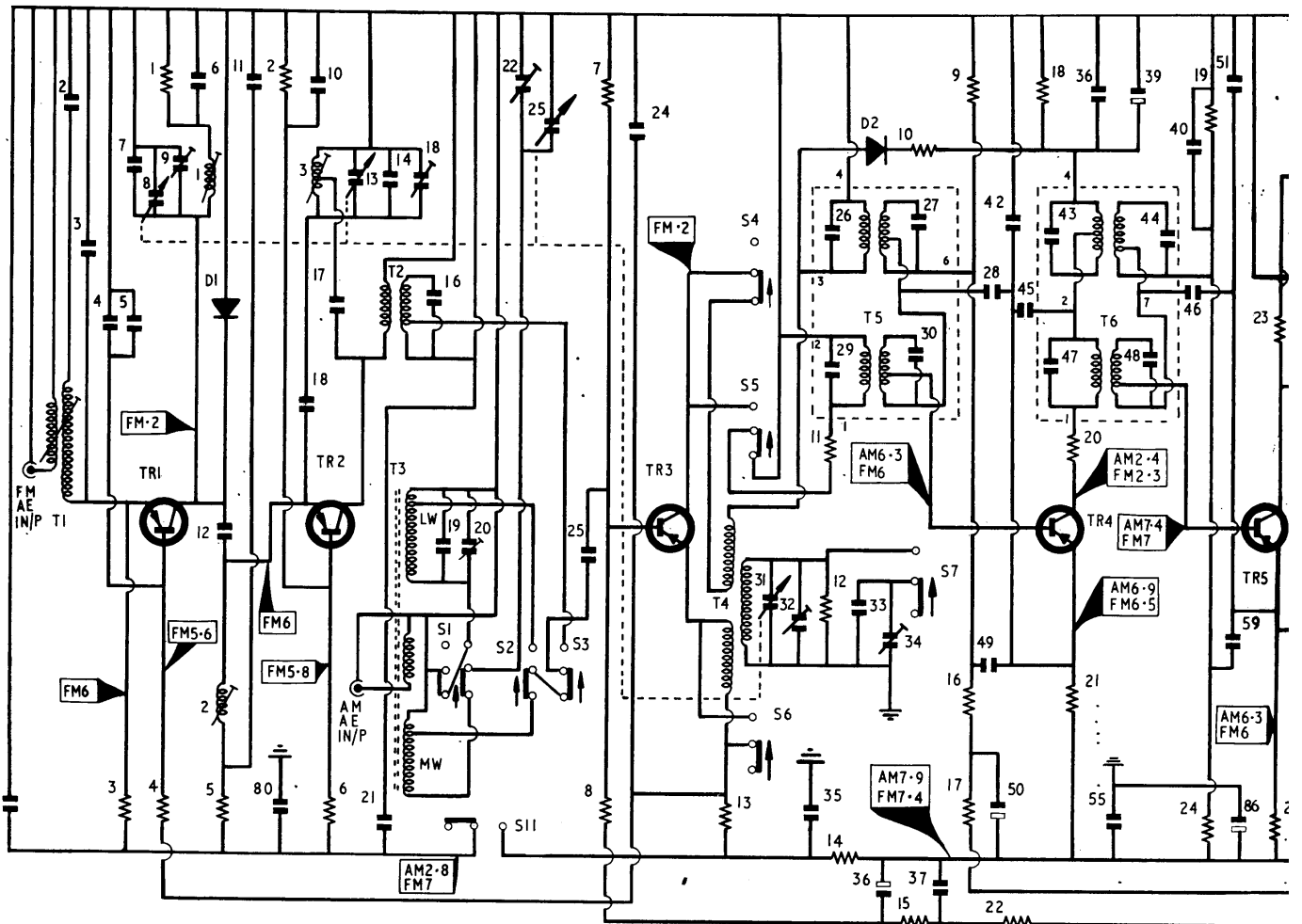
Size. 8in. high, 3½in. deep, 13in. wide.
Weight. 7¼lb. (including batteries).
Output. 400mW.
Battery life. Approximately three months.
Controls. Tone, volume, on/off, mute, MW, LW, FM/VHF, tuning.

Batteries. Two PP9, VT9 or equivalent.

Wavebands. FM/VHF 87.5-101mc/s, MW 172-577m. (1620-520kc/s), LW 1200-2000m. (250-150kc/s)

Transistors. TR1 AF114, TR2 AF115,

R	3	4	1	5	2	6	7	8	13	11	14	12	10	15	9	16	17	22	18	20	21	19	24	23																				
C	1	2	3	4	5	6	11	12	80	18	10	17	13	21	14	18	16	19	20	22	25	24	31	32	26	29	35	33	36	27	30	37	28	49	45	50	47	55	44	41	40	86	51	51
L	T1		1		2		3		T2		T3		T4		T5		T6																											



RESISTORS

R1	180
R2	6KB
R3	560
R4	1K
R5	560
R6	1K5
R7	27K
R8	3K9
R10	680
R11	220
R12	120K
R13	1K
R14	47
R15	1K
R16	3K9
R17	3K9
R18	1K5
R19	18K
R20	220
R21	470
R22	4K7
R23	100
R24	5K6
R25	470
R26	82
R27	1K

A3	R28	1K
A3	R29	22K
B3	R30	390
B3	R31	22K
B3	R32	4K7
A3	R34	180K
A3	R35	3K3
A3	R36	82K
A2	R37	10K
B2	R38	1K
A3	R39	18K
A2	R40	470
B2	R41	2K2
B2	R42	100
B2	R43	2.2
A2	R44	2K2
A2	R45	100
A2	R46	2.2
A2	R47	100
A2	R48	120K
A2	R49	18K
A2	R50	5K6
A2	R51	82K
A1	R52	470

CAPACITORS

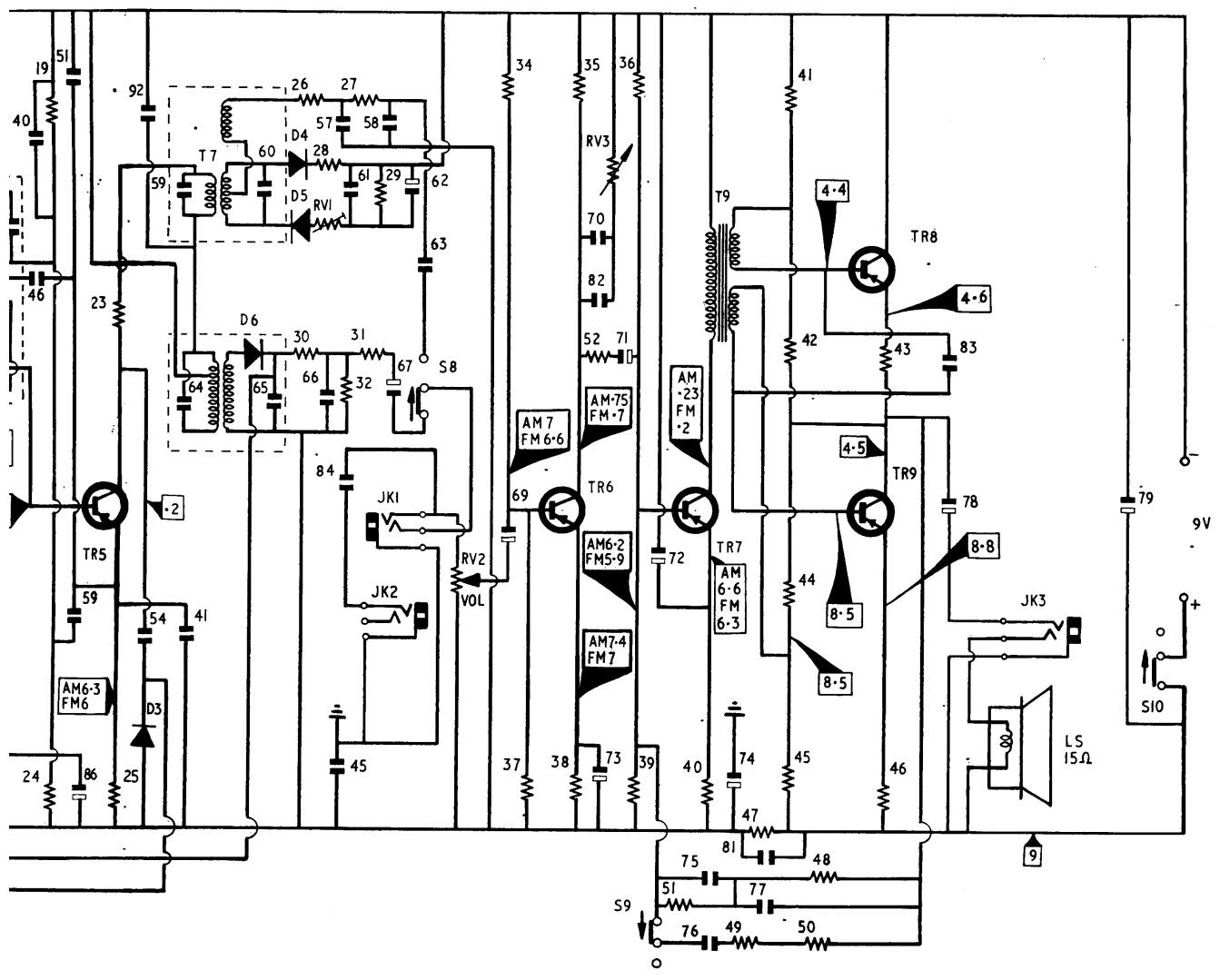
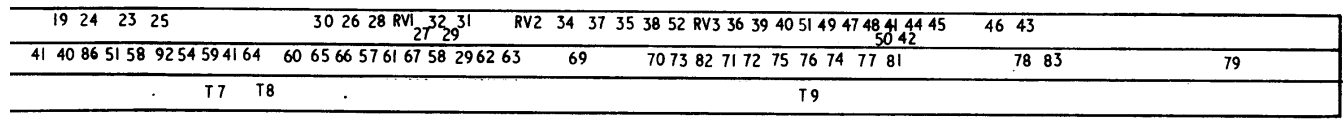
C1	10KpF
C2	15pF

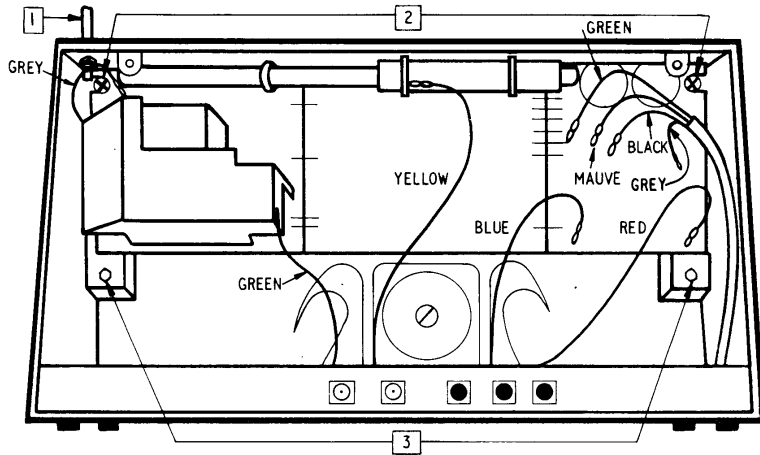
B1	C3	35pF
B1	C4	1KpF
A2	C5	10KpF
B2	C6	2KpF
B2	C7	27pF
B1	C8	Gang
B1	C9	1.8pF
A2	C10	2KpF
B1	C11	390pF
B1	C12	5.6pF
A1	C13	Gang
A1	C14	22pF
A1	C15	1.8pF
A1	C16	68pF
A1	C17	68pF
A1	C18	8.2pF
A1	C19	39pF
A1	C20	3-30pF
A1	C21	.1mF
A1	C22	3-30pF
B1	C23	Gang
B1	C24	30KpF
B1	C25	10KpF
B1	C26	In T5
B1	C27	In T5
B3	C28	3KpF
B3	C29	In T5

B3	C30	In T5
B3	C31	Gang
A3	C32	Trimmer
A2	C33	200pF
A2	C34	3-30pF
B3	C35	.1mF
A3	C36	10mF
A3	C37	10KpF
A3	C38	1KpF
A3	C39	2mF
B3	C40	.1mF
A3	C41	.5mF
A3	C42	.1mF
A3	C43	In T6
A3	C44	In T6
A3	C45	2KpF
A1	C46	3KpF
B1	C47	In T6
A3	C48	In T6
B3	C49	.1mF
B3	C50	10mF
B2	C51	.1mF
B2	C52	1KpF
A2	C53	.5mF
A2	C54	4pF
A2	C55	.1mF
A2	C56	200mF

A2	C57	1KpF
B3	C58	20KpF
B3	C59	In T7
B3	C60	In T7
B3	C61	300pF
B2	C62	2mF
B2	C63	.5mF
B2	C64	In T8
A2	C65	In T8
A2	C66	20KpF
A2	C67	10mF
A2	C68	.5mF
A2	C69	10mF
A2	C70	.5mF
A2	C71	10mF
A2	C72	2KpF
A2	C73	100mF
A2	C74	500mF
A2	C75	20KpF
A2	C76	15KpF
A1	C77	150pF
A2	C78	500mF
A1	C79	100mF
A2	C80	10KpF
A2	C81	2KpF
A2	C82	.5mF
A2	C83	3KpF
A2	C84	.1mF

B2	A2	A1	B1	B2	B2	B2	B1	B1	B1	B1	A1	B1	B1	A1	B1	A1	B1	A1	B1
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TR3 TR4 TR5 AF116, TR6 OC71, TR7 OC81D, TR8 TR9 OC81.

Diodes, D1 D3 D6 OA91. D2 D4 D5 OA79.

IFS. AM 472kc/s, FM 10.7mc/s.

Aerial. Ferrite rod (MW/LW), telescopic rod (VHF/FM), sockets for external AM and FM aeriels.

Speaker. 7 x 3 3/8 in., 15ohm.

Outlets. Earpiece or extension speaker (15ohm), tape recorder, pickup.

Maker. Decca Radio & Television.
Service dept. 15-17 Ingate Place, Queenstown Road, London SW8.

DISMANTLING

To remove chassis, take out and disconnect batteries. Remove cable connections to chassis as shown in diagram. Push telescopic aerial (1) to top of case. Unscrew both top screws (2) until free (these are captive screws). Remove two hexagon-head bolts (3). When replacing chassis first fix by loosely positioning of top and lower screws. Adjust top screws

to get controls central in apertures, then tighten all screws.

To replace drive cord, remove scale plate, tie one end of cord (see diagram) to spring and thread through drive drum and over pulley assembly as shown. Make sure spring is under tension.

CIRCUIT DESCRIPTION

VHF/FM tuner sub-assembly employs TR1 RF amplifier and TR2 mixer-oscillator, both with signals applied to emitter. Telescopic rod, or external aerial, is coupled to TR1 by transformer with aperiodic tuning. Collector circuit is tuned by section of gang and diode D1 clamps the signal to "safe" level.

Signal is capacitance coupled to emitter TR2 with shunt IF trap circuit L2 C11. Oscillator frequency is determined by L3, tuned by gang section, and oscillation caused by feedback to emitter via C18. T2 passes 10.7mc/s IF to TR3.

TRANSISTOR VOLTAGES

Taken with Avo Model 8 MkII with negative lead to frame or chassis, 10V DC range

TR	Type	Function	E	B	C
1	AF114	FM RF amp.	6	5.6	0.2
2	AF115	FM osc-mixer	6	5.8	0
3	AF116	AM-osc-mixer FM IF amp.	5.8(5.6)	5.4(5.1)	0 (.2)
4	AF116	IF amp.	6.9(6.5)	6.3(6)	2.4 (2.3)
5	AF116	IF amp.	6.3(6)	7.4(7)	.2 (.2)
6	OC71	AF amp.	7.4(7)	7 (6.6)	.75(.07)
7	OC81D	Driver	6.6(6.3)	6.2(5.9)	.23(.2)
8	OC81	Output	4.6	4.4	0
9	OC81	Output	8.8	8.5	4.5

Other voltages—Across R47 9V and 7.9 (7.4) At S11 2.8 (7).

On AM, TR3 is mixer-oscillator. Input is from ferrite rod which has MW and LW windings and a coupling for the external-aerial socket, all with earthy side grounded to -9V line. Supply to the VHF tuner is interrupted in the positive line.

Aerial and oscillator coils are tuned by C23 C31 of the gang. Oscillator circuit is energised by coupling winding in collector circuit and feeds into emitter circuit by further coupling. For LW, S7 brings in extra capacitance.

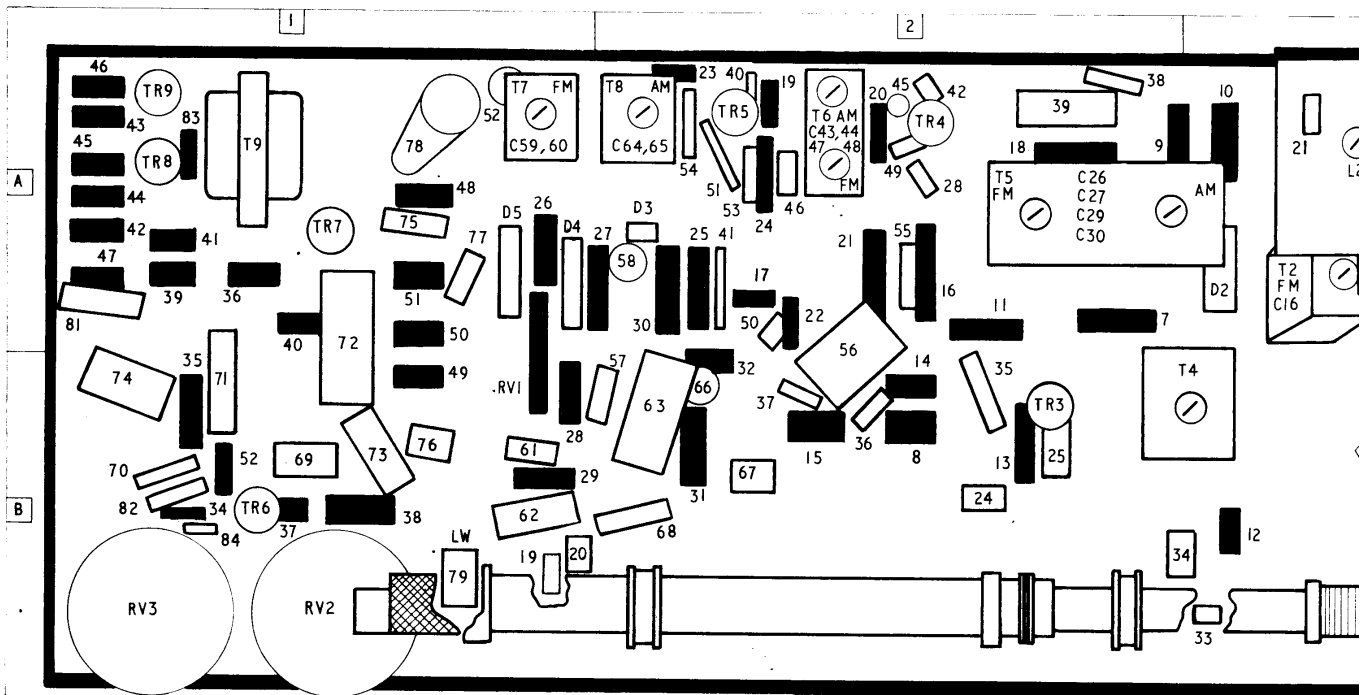
In AM positions, S4 brings in the coupling to T4 while S5 shorts out the FM transformer section of T5.

Series-connected bandpass IF transformers couple FM and AM signals to IF amplifiers TR4 TR5. D3 across TR5 develops AGC voltage connected back to base TR3.

Output of appropriate detector is conducted by S8 to volume control RV2 and base of AF amplifier TR6. Jack sockets for tape and pickup connections are in shunt across RV2.

TR6 is RC coupled to driver TR7 with tone control RV3 C79 C82 across collector load. TR7 feeds series-connected push-pull pair TR8 TR9 through transformer with two secondaries. Transformerless output is used, the 150hm speaker being fed via 500mF (C78) from between the two transistors.

Negative feedback tone circuit from



active lead to frame of

B	C
i.6	0.2
i.8	0
5.4(5.1)	0 (.2)
i.3(6)	2.4 (2.3)
7.4(7)	.2 (.2)
7 (6.6)	.75(.07)
i.2(5.9)	.23(.2)
i.4	0
i.5	4.5
.4) At S11	2.8 (7).

output to base TR7 includes a section, controlled by "Mute" switch S9, that provides tone compensation at low volume.

Battery is decoupled by C79. Between output stage and rest of circuit voltage dropper R47 is fitted in the positive line together with HF bypass C81 and decoupler C74.

NOTES

Connection of earphone or extension speaker (which must be 15ohm type) mutes internal speaker. When tape recorder is connected (by JK2), its impedance should not be below 10K and the sensitivity required is about 50mV.

Pickup socket (JK1) is terminated in effect by 5K volume control and PU can be low-impedance type. With crystal PU, 560K resistor should be connected in series. Tone may be improved when record playing by operating with Mute switch depressed.

ALIGNMENT

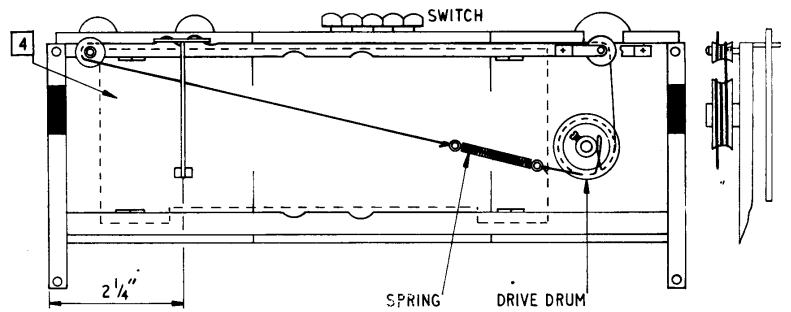
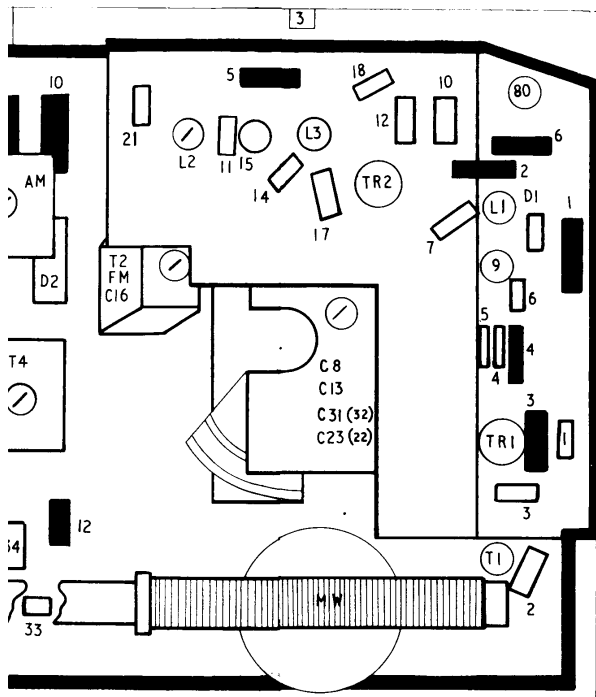
AM IF circuits. Switch to MW, fully close gang, disconnect tag lead connecting MW aerial coil to TR3 base, connect signal generator tuned to 472kc/s and peak AM cores of T5 and T6 and core of T8.

MW. Reconnect MW coil, tune set to 550m. on scale, inject 545kc/s via 1K resistor to aerial socket (other lead to chassis). Adjust T4 and position MW coil on rod for max.

Tune to 200m., inject 1500kc/s and adjust C32 C22 for max. Repeat.

LW. Tune to 1200m., inject 250kc/s, adjust C34 C20 for max. Tune to 1900m., inject 158kc/s and adjust LW coil on rod for max.

FM IF circuits. Set must be aligned with chassis on bench. Connect low AC range meter across speaker. Switch to FM, close gang, connect generator via .01mF between base TR2 and chassis. Inject 10.17mc/s, 22kc/s deviation, to get low output.

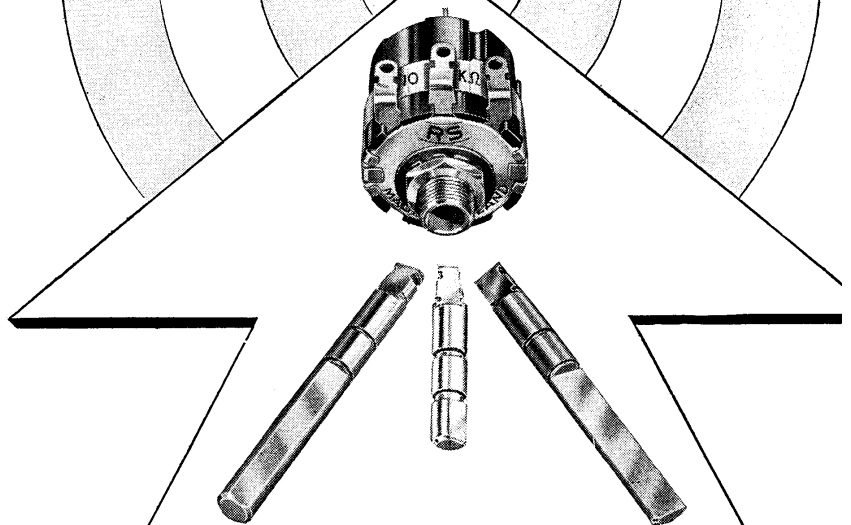


Peak top and bottom cores T7, T6, T5 and T2. Adjust L2 for *minimum*. Switch generator to AM and set RV1 for minimum. Repeat.

RF. Connect gen. to FM socket, tune

set to 88mc/s on scale, inject 88mc/s, 22kc/s deviation, and adjust cores L3 L1 for max. Tune to 100mc/s, inject this and trim C15 C9 for max. Tune set to 95mc/s and adjust T1 for max.

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