

Trader

SERVICE SHEET

A compact battery-operated portable AM/FM receiver, the Bush VTR175 employs ten transistors and seven diodes to cover the long and medium wave and VHF broadcast bands. An internal ferrite rod aerial is used for AM reception, with a telescopic rod aerial for FM reception. Edgewise rotary volume and tone controls are fitted, with a three-position slide switch in the cabinet back for waveband selection. Personal reception is via an earphone, which, when plugged in, mutes the receiver loudspeaker; this earphone jack can also be used for an external loudspeaker of the appropriate impedance. The receiver is contained in a two-piece black and simulated wood moulded cabinet, with aluminium trim. A hinged carrying handle is fitted. The Dansette DTR48 is electrically identical with the Bush VTR175, but differs in cabinet presentation. Instructions in this Service Sheet therefore apply to both models.

Brief Specification (VTR175 and DTR48)

Power supply	Four HP11 batteries (or equivalent) (6V d.c.)
Consumption	Average 21mA at normal listening level
Wavebands	AM: LW 158 to 285kHz (1050 to 1900m) MW 520 to 1610kHz (186 to 570m)
Intermediate frequencies	FM: 87.5 to 104MHz AM: 470kHz FM: 10.7MHz
Transistors	2SB187C (two), 2SC537E2, 2SC537G1, 2SC929C, 2SC930C (three), 2SC930D (two)
Diodes	1S563 varicap, 1S188AM (three), 1S188FM (two), CDG22
Loudspeaker	4½ x 2¾in (106 x 70mm) elliptical, impedance 8Ω
Audio output	250mW rms at 1000Hz
Outputs	Earphone: impedance 20 to 1000Ω External loudspeaker: impedance 8Ω (both via 3.5mm jack)
Dimensions and weight (VTR175)	Width: 9¼in (233mm) Height: 5¾in (145mm) Depth: 2¾in (72mm) Weight: 1½lb (0.68kg) without batteries
Manufacturer	Rank Radio International, Power Road, Chiswick, London W4. 01-994 6491
Service Department	Drayton Road, Boreham Wood, Herts. 01-953 6151

Dismantling

1. Remove battery cover and batteries.
2. Remove two screws from back cover, and lift off cover. To detach cover completely from receiver, unscrew and release earphone jack.
3. To remove chassis, release 4 screws holding p.c. board, lift out chassis to extent of leads.
4. To remove chassis completely from cabinet, unsolder leads to battery holder, telescopic FM aerial and loudspeaker.

Alignment

AM

Equipment required

1. AM signal generator covering 140 to 1650kHz, modulation 400Hz at 30 per cent.

2. Suitable output meter, with ranges indicating up to 1 watt or equivalent, impedance 8Ω.

3. Inductive loop for signal input.

During alignment:

- (a) Maintain volume control at maximum unless otherwise stated.
- (b) Feed in signal from generator via the inductive loop in series with a resistor whose value matches the generator output impedance. Place loop at right angles to ferrite rod aerial.
- (c) Keep receiver output at 50mW by progressively reducing the signal input as circuits come into alignment.

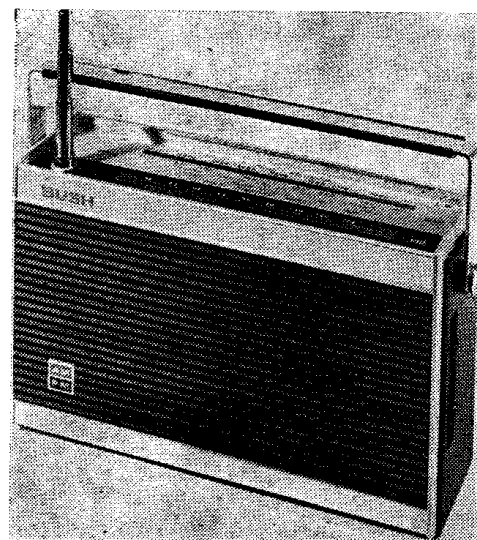
IF Stages

1. Set waveband switch to "MW", and tuning scale cursor to approximately 300m. Inject 470kHz signal modulated

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Bush VTR175 AM/FM Portable radio

(Also covering Dansette DTR48)



400Hz via inductive loop. Connect output meter across loudspeaker leads, having disconnected speaker.

2. Adjust **IFT5**, **IFT3** and **IFT2** in that order for maximum output.

RF Stages

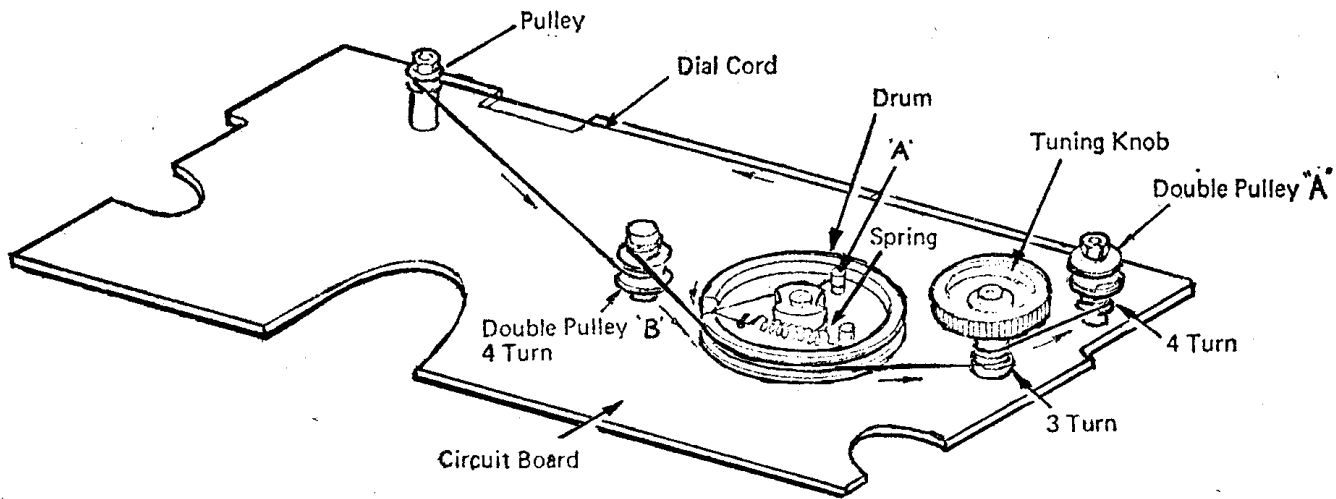
1. Check that tuning scale pointer coincides with datum notch in scale backplate when tuning gang is fully meshed.
2. Inject r.f. signal and connect output meter as for i.f. stage alignment.

LW (set waveband switch to "LW")

1. Tune signal generator to 140kHz, and receiver to low frequency end of scale (tuning gang fully meshed). Adjust LW oscillator coil **L8** for maximum.
2. Retune signal generator to 310kHz and receiver to high frequency end of scale (tuning gang fully open). Adjust LW oscillator trimmer **CT6** for maximum.
3. Repeat steps 1 and 2 for optimum results.

MW (set waveband switch to "MW")

4. Tune signal generator to 505kHz and receiver to low frequency end of scale. Adjust MW oscillator coil **L7** for maximum.
5. Retune signal generator to 1650kHz and receiver to high frequency end of scale. Adjust MW trimmer **CT4** (on tuning gang) for maximum.
6. Repeat steps 4 and 5 for optimum results.



▲ Dial cord routing

Alignment (continued)

Aerial tuning

7. Select "LW". Tune signal generator to 1667kHz and receiver to 500m. Adjust **L6** along ferrite rod for maximum.
8. Retune signal generator to 250kHz and receiver to 1200m. Adjust trimmer **CT5** for maximum.
9. Select "MW". Tune signal generator to 1200kHz and receiver to 500m. Adjust **L5** along ferrite rod for maximum.
10. Retune signal generator to 1200kHz and receiver to 250m. Adjust trimmer **CT3** (on tuning gang) for maximum.

FM

Equipment required

1. 10.7 sweep marker generator.
2. Oscilloscope.

3. FM signal generator covering 87.2 to 104 MHz.
4. Suitable output meter with ranges up to 1 watt or equivalent, impedance 8Ω.

IF Stages

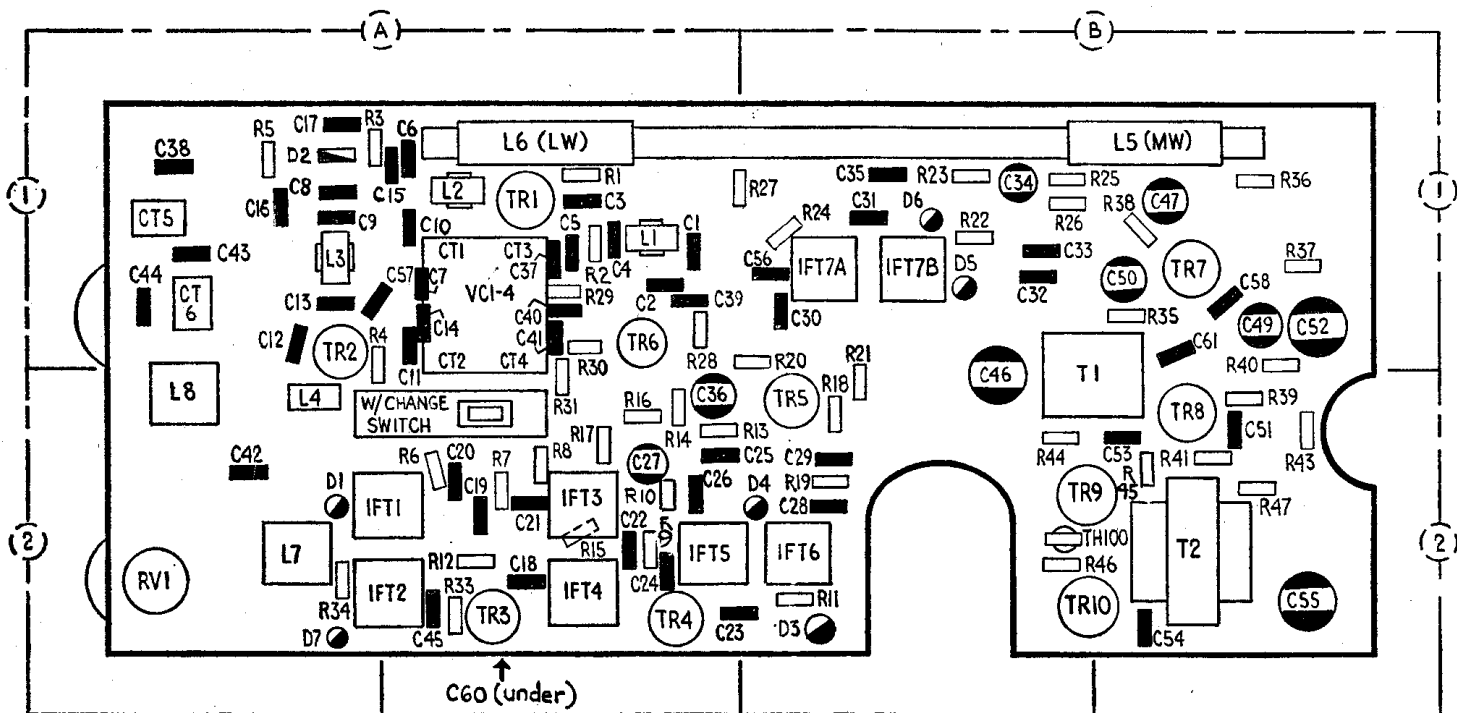
1. Set waveband switch to "FM", and set tuning pointer to 94 MHz. Connect output meter in place of loudspeaker, and oscilloscope to junction **R24/C56** and chassis. Connect sweep generator between telescopic aerial and chassis. Inject 10.7MHz and adjust **LFT7A**, **IFT6**, **IFT4** and **IFT1** in that order for maximum gain and symmetry.
2. Adjust **IFT7B** for symmetrical "S" curve centred on 10.7MHz marker.
3. Repeat steps 1 and 2 for optimum results.

R.F. Stages

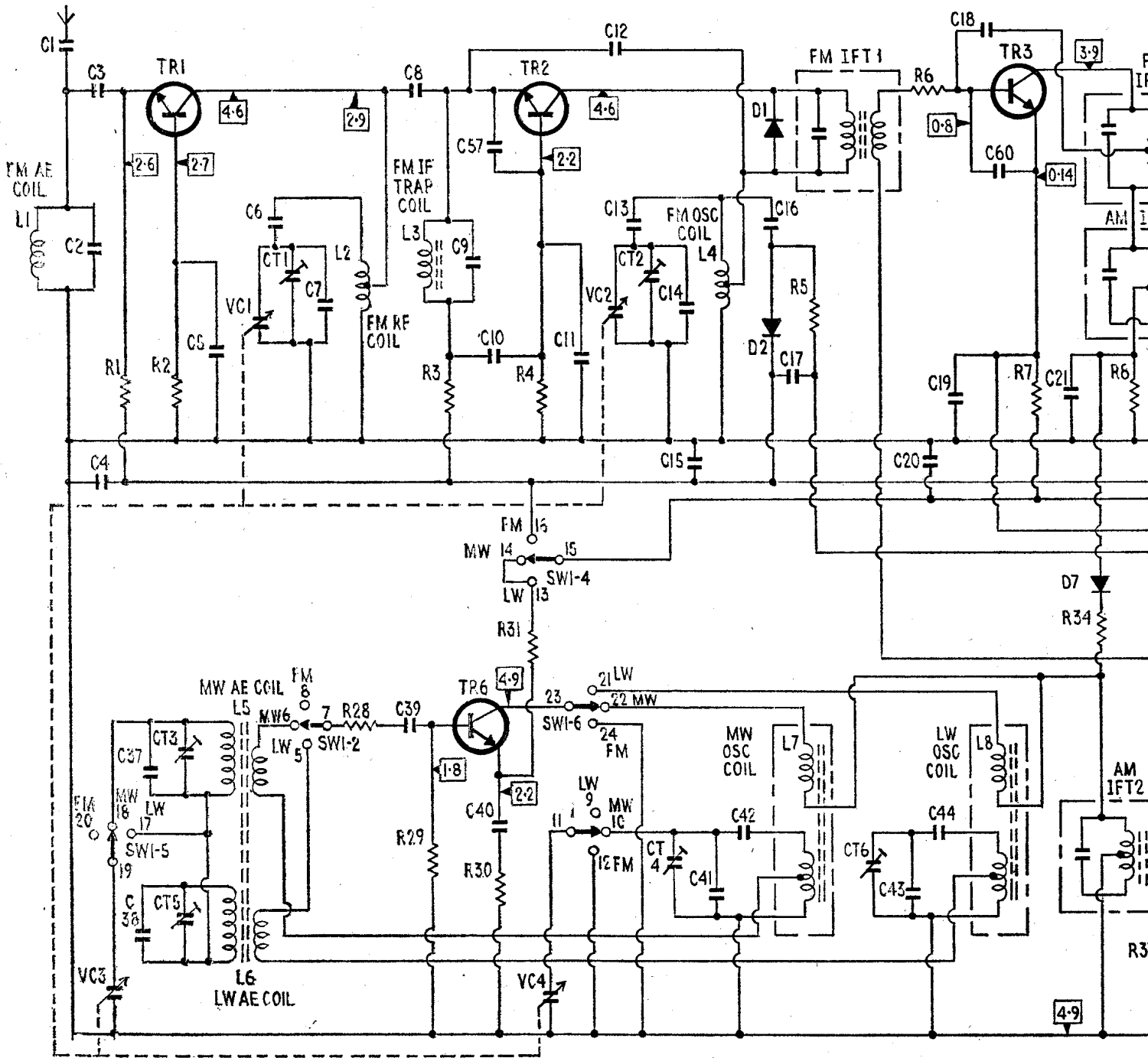
Check that tuning pointer coincides with datum mark at low frequency end of scale with tuning capacitor fully meshed. Connect FM signal generator between telescopic aerial and chassis, and proceed as follows.

1. Tune signal generator (unmodulated) to 87.2MHz, tune receiver to low frequency end of scale. Adjust **L4** for maximum.
2. Retune signal generator to 106 MHz, receiver to high frequency end of scale. Adjust trimmer **CT2** for maximum.
3. Tune signal generator and receiver to 88 MHz; adjust coil **L2** for maximum.
4. Retune signal generator and receiver to 104 MHz; adjust trimmer **CT1** for maximum.
5. Repeat steps 1 to 4 for optimum results.

▼ P.C. Board (Main chassis)



C	1	2	3	4	CT3	5	6	7	8	9	57	11	12	13	14	15	16	17	43	20	19	18	21	
R		1		2			VC1	CT1		39	10	40	VC4		VC2	CT2	CT4	41	42		CT6	44	60	
L	1				5	6			2	3							4	7					8	



Components

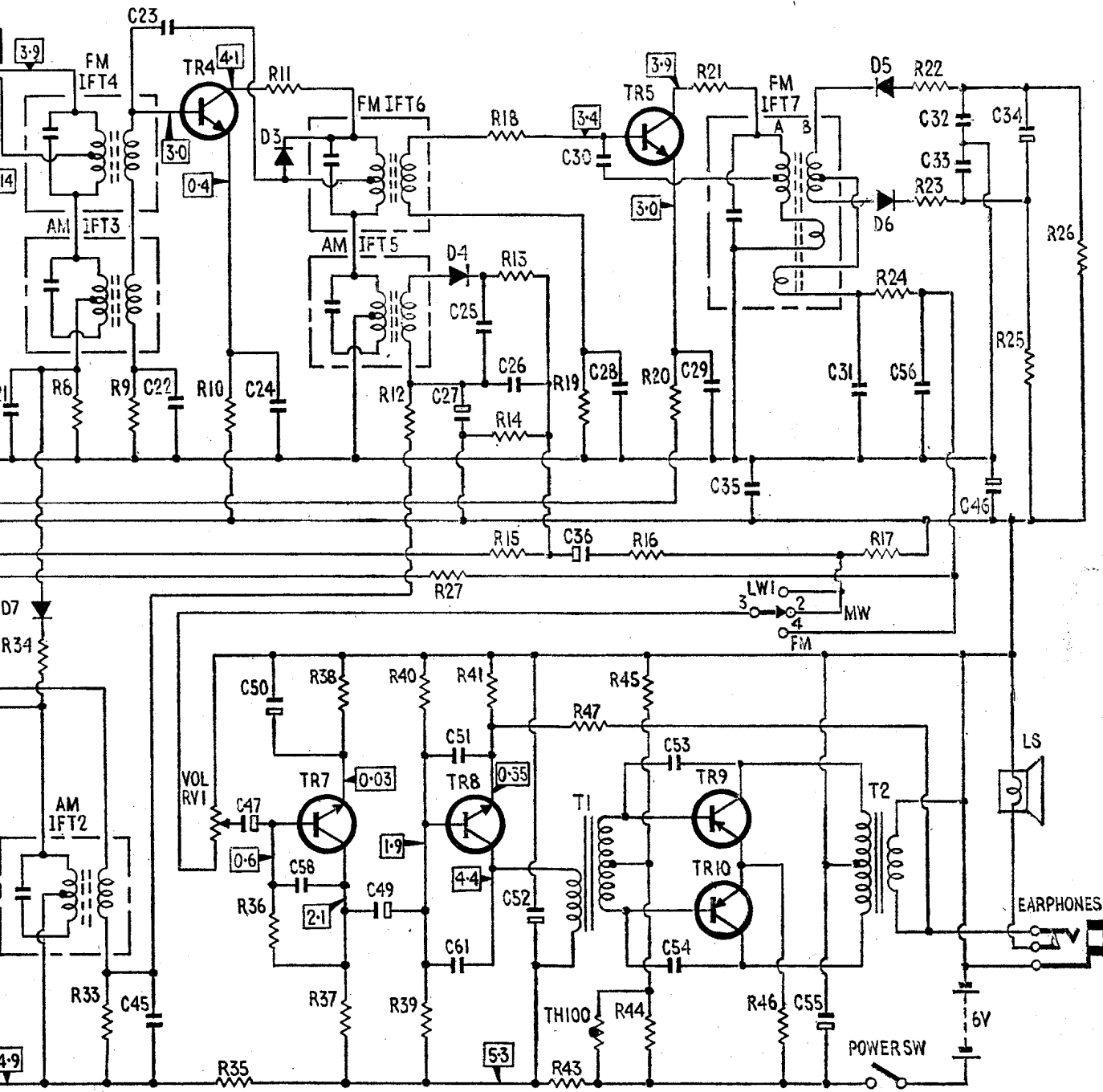
Resistors

R1	2.2kΩ	A1	R13	1kΩ	A2	R25	5.6kΩ	B1	R38	10Ω	B1
R2	100kΩ	A1	R14	5.6kΩ	A2	R26	5.6kΩ	B1	R39	56kΩ	B2
R3	3.9kΩ	A1	R15	39kΩ	A2	R27	330kΩ	B1	R40	15kΩ	B1
R4	220kΩ	A1	R16	3.9kΩ	A2	R28	100Ω	A1	R41	100Ω	B2
R5	100kΩ	A1	R17	15kΩ	A2	R29	270kΩ	A1	R43	100Ω	B2
R6	22Ω	A2	R18	100Ω	B2	R30	10Ω	A1	R44	120Ω	B2
R7	100Ω	A2	R19	82kΩ	B2	R31	3.3kΩ	A2	R45	2.2kΩ	B2
R8	1kΩ	A2	R20	3.3kΩ	B1	R33	68kΩ	A2	R46	3.3Ω	B2
R9	180kΩ	A2	R21	820Ω	B1	R34	2.2kΩ	A2	R47	1.2kΩ	B2
R10	330kΩ	A2	R22	1.5kΩ	B1	R35	100Ω	B1	RV1	10kΩ*	A2
R11	680Ω	B2	R23	1.5kΩ	B1	R36	680kΩ	B1	TH100	Thermistor	B2
R12	1.5kΩ	A2	R24	3.9kΩ	B1	R37	5.6kΩ	B1			

Capacitor

C1	35pF	A1	C13	200pF	A1	C25	
C2	30pF	A1	C14	6pF	A1	C26	
C3	100pF	A1	C15	0.001μF	A1	C27	
C4	0.02μF	A1	C16	8pF	A1	C28	
C5	0.001μF	A1	C17	0.04μF	A1	C29	
C6	100pF	A1	C18	1pF	A2	C30	
C7	15pF	A1	C19	0.04μF	A2	C31	
C8	4pF	A1	C20	0.02μF	A2	C32	
C9	30pF	A1	C21	0.02μF	A2	C33	
C10	500pF	A1	C22	0.02μF	A2	C34	
C11	0.001μF	A1	C23	2pF	A2	C35	
C12	9pF	A1	C24	0.04μF	A2	C36	

23	22	24		27	25	26		30	28	29		31		32	34								
45		50	47	58	49		51	61	52	36		53	54	35	55	56	33	46					
8	9	10	11		12		13	14	15	18	19	16	45	20	21		17	24	23	22	25	26	
34	33		RV1	35	36	37	38	39	40	27	41	43	47	TH100	44								
T1												T2											



C25	0.01µF	A2	C37	6pF	A1	C50	33µF	B1
C26	0.005µF	A2	C38	37pF	A1	C51	0.01µF	B2
C27	22pF	A2	C39	0.01µF	A1	C52	200µF	B1
C28	0.01µF	B2	C40	0.01µF	A1	C53	0.005µF	B2
C29	0.01µF	B2	C41	10pF	A1	C54	0.005µF	B2
C30	1pF	B1	C42	250pF	A2	C55	470µF	B2
C31	0.002µF	B1	C43	60pF	A1	C56	0.002µF	B1
C32	300pF	B1	C44	100pF	A1	C57	30pF	A1
C33	300pF	B1	C45	0.02µF	A2	C58	0.001µF	B1
C34	4.7µF	B1	C46	470µF	B1	C60	100pF	A2
C35	0.04µF	B1	C47	1µF	B1	C61	200pF	B1
C36	1µF	A2	C49	1µF	B1			

CT1-CT6 Trimmers } A1
 CV1-CV4 Tuning }

Transistors

Tr1	2SC930D	A1
Tr2	2SC930D	A1
Tr3	2SC930C	A2
Tr4	2SC930C	A2
Tr5	2SC930C	B2
Tr6	2SC929C	A1
Tr7	2SC537 G1	B1
Tr8	2SC537 E2	B2
Tr9	2SB187C	B2
Tr10	2SB187C	B2

Diodes

D1	1S188AM	A2
D2	1S553	
	Varicap	A1
D3	CDG22	B2
D4	1S188AM	B2
D5	1S188AM	B1
D6	1S188AM	B1
D7	1S188AM	A2

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