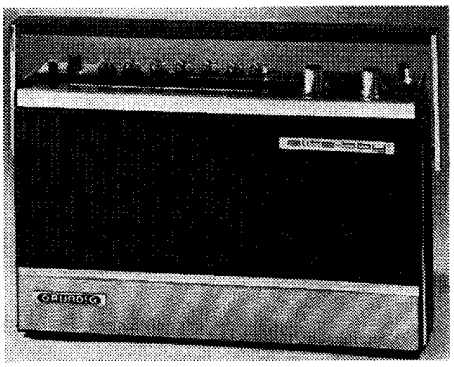
ERT SERVICE CHART 1777



Grundig 10-transistor AM/FM car/portable with switched AFC and 1·5 watts output

INCORPORATING press switches to operate a battery condition indicator and scale illumination, Grundig Elite Boy 209 AM/FM portable radio has a low quiescent current. Using ten transistors this receiver features switched AFC on VHF/FM and permeability tuning when switched to car aerial working.

Battery. One 9V, type PP9.

Wavebands. LW 145-260kHz (2069-1154m), MW 510-1620kHz (588-185m), SW 5.85-7.4MHz, VHF/FM 87.5-108MHz.

Transistors. TR1 BF255, TR2 BF241, TR3 BF241, TR4 BF241, TR5 BF240, TR6 BF241, TR7 BC109C, TR8 BC181A, TR9 AC187K, TR10 AC188K.

Diodes. D2 BA124, D4 BZ102/2V1, D5 DFA007, D6 9654-018.06, D7 AA112, D8 AA112, D9 G088.

VDR's. D1 and D3 2322/574/90002

Thermistor. R39, 200ohm.

IF's. AM 460kHz, FM 10.7MHz.

Aerials. Internal ferrite rod assembly LW and MW. Telescopic rod all wavebands.

Pilot lamp. 7V 80mA.

Speaker. Elliptical $7 \times 3\frac{3}{4}$in., impedance 5ohm.

Output. 1.5W.

Outlets. Earphone—normally closed miniature jack, tape—DIN socket.

Inputs. Car aerial socket, external power supply socket (6.3-9V), tape recorder or pickup via DIN socket.

Dimensions. $12\frac{1}{4} \times 7 \times 3\frac{1}{2}$in.

Weight. $4\frac{3}{4}$lb. (2.1kg).

Price. £35 17s. 1d. (£35.85½)

Manufacturer. Grundig (Great Britain) Ltd.

Service department. Grundig (Great Britain) Ltd, Newlands Park, Sydenham, London SE24. Tel: 01-778 2211.

DISMANTLING

Disconnect and remove battery. Loosen car aerial socket (retaining screw underneath) and push inside case. Unscrew and remove three screws located in base of case and slide chassis out.

SERVICE NOTES

Voltages indicated on the circuit diagram were measured under quiescent conditions with a Grundig electronic voltmeter in the ranges 10, 3 and 1V. The supply line was a nominal 7.5V.

Quiescent DC adjustments. Output stage: Connect a milliameter in place of wire link (X) in TR10 collector circuit and adjust R41 to produce a current of 5.5mA.

IF amplifier: Adjust R504 to produce 1.25V across R507—TR5 emitter resistor.

Alternative transistors and diodes. A BF237 may be used instead of a BF241. The BF240 may be replaced with a BF238. Alternative types for the BC109C are: BC184C or BC239C. BC181A may be a BC252A. Diode DFA007 may be a 1N60ST 0.5 or AA130.

ALIGNMENT

Equipment required. A wobbulator; RF signal generator; cathode ray oscilloscope (CRO); CRO test probe; an electronic millivoltmeter; RF coupling coil; dummy car aerial matching pad; a 15pF capacitor, and one each 50Kohm and 60ohm impedance feeders.

FM IF. Connect CRO via test probe to test point MP5—printed circuit capacitor in TR6 collector circuit, and wobbulator to test point MP4—junction printed circuit capacitor/IFT7. Detune IFT9 and set wobbulator to sweep through centre frequency 10.7MHz. Adjust IFT8 for maximum trace amplitude and symmetry.

Transfer wobbulator output to MP3—junction printed circuit capacitor/IFT5. Adjust IFT7 and IFT6 for maximum trace amplitude and symmetry.

Transfer wobbulator output to test point MP2—junction printed circuit capacitor/R503. Adjust IFT5 for maximum amplitude and symmetry.

Loosely couple wobbulator output to TR2 collector circuit and adjust IFT4, IFT3 and IFT1 for maximum trace and symmetry.

GRUNDIG

ELITE BOY

MODEL 209

Additional copies of this chart 2s. 6d., including postage. Payment with order please to E R T, Dorset House, Stamford Street, London, SE1.

Ringed letters and figures are test points referred to in the alignment instructions

RESISTORS

R11	1K5	A1
R12	5K6	A1
R13	560	A1
R16	330K	A2
R17	150K	A2
R18	250K	A2
R19	22K	A2
R21	4K7	A2
R22	150K	A2
R23	3K3	A2
R24	1K5	A2
R26	100K	—
R27	68K	B2
R28	56K	B2
R29	330K	B2
R30	18	A2
R31	1K	B2
R32	3K3	B2
R33	100	B2
R34	100	B2
R36	2K7	B2
R37	39	A2
R38	560	B2
R39	200	B2
R41	500	B2
R42	470	B2
R43	180	B2
R311	560	D1
R312	1K	D1
R313	1K2	D1
R314	1K	D1
R316	10K	D1
R317	10K	D1
R318	100K	D1
R501	3K3	C1
R502	560	C1
R503	1K	C1
R504	500K	C1
R505	3K3	C1
R506	1K	C1
R507	1K	C1
R508	390	C1
R509	10K	C2
R510	10K	C2
R511	10K	C2
R512	1K	C2
R513	27K	C2
R514	10K	C2
R515	1K5	C2
R516	100K	C2
R517	1K	C2
R518	1K	C2
R519	1K	C2
R520	10K	C2
R521	10K	C2
R522	10K	—
R523	100K	C1
R524	100K	C2

CAPACITORS

C11	100KpF	A1
C12	100KpF	A1
C13	60pF	—
C14	33pF	A1
C16	47pF	A1
C17	12pF	A1
C18	20pF	A1
C19		
C21		
C22		
C23		
C24		
C25		
C26		
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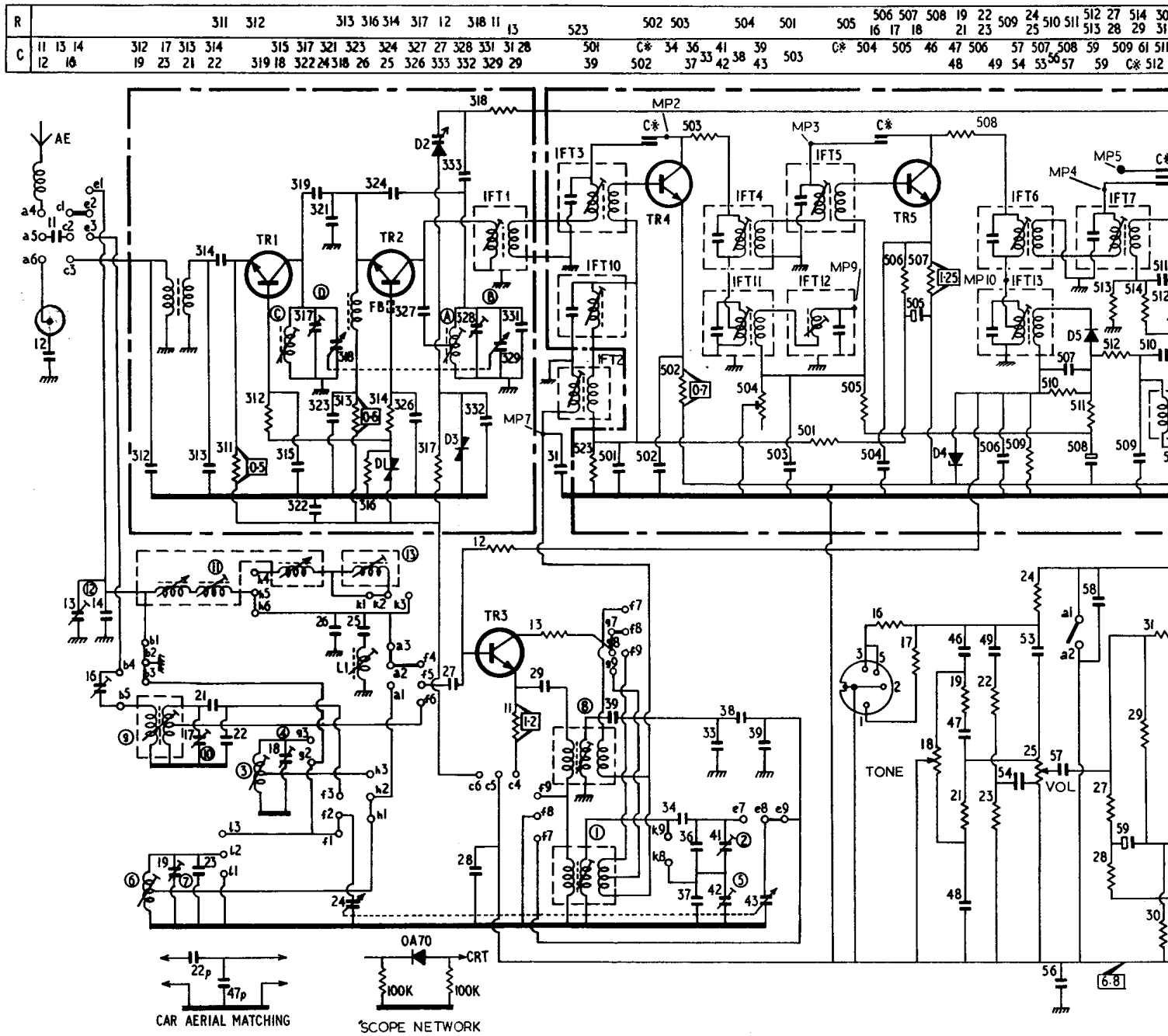
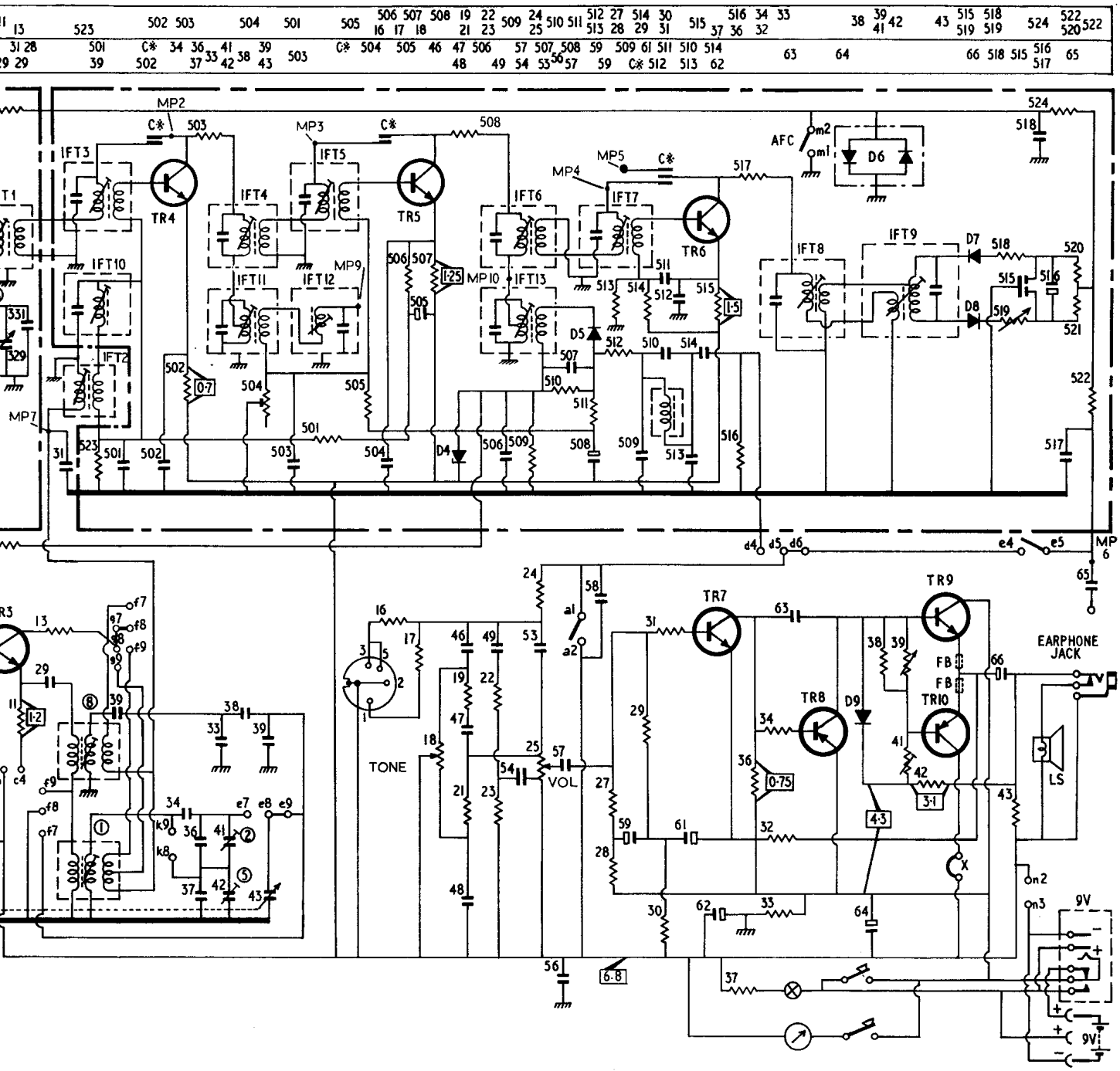


RESISTORS

R11	1K5	A1
R12	5K6	A1
R13	560	A1
R16	330K	A2
R17	150K	A2
R18	250K	A2
R19	22K	A2
R21	4K7	A2
R22	150K	A2
R23	3K3	A2
R24	1K5	A2
R26	100K	—
R27	68K	B2
R28	56K	B2
R29	330K	B2
R30	18	A2
R31	1K	B2
R32	3K3	B2
R33	100	B2
R34	100	B2
R36	2K7	B2
R37	39	A2
R38	560	B2
R39	200	B2
R41	500	B2
R42	470	B2
R43	180	B2
R311	560	D1
R312	1K	D1
R313	1K2	D1
R314	1K	D1
R316	10K	D1
R317	10K	D1
R318	100K	D1
R501	3K3	C1
R502	560	C1
R503	1K	C1
R504	500K	C1
R505	3K3	C1
R506	1K	C1
R507	1K	C1
R508	390	C1
R509	10K	C2
R510	10K	C2
R511	10K	C2
R512	1K	C2
R513	27K	C2
R514	10K	C2
R515	1K5	C2
R516	100K	C2
R517	1K	C2
R518	1K	C2
R519	1K	C2
R520	10K	C2
R521	10K	C2
R522	10K	—
R523	100K	C1
R524	100K	C2

CAPACITORS

C11	100KpF	A1
C12	100KpF	A1
C13	60pF	—
C14	33pF	A1
C16	47pF	A1
C17	12pF	A1
C18	20pF	A1
C19	60pF	A2
C21	100pF	A1
C22	68pF	A1
C23	47pF	A2
C24	322pF	—
C25	220pF	A2
C26	1K8pF	A1
C27	10KpF	A1
C28	220pF	A1
C29	15KpF	A1
C31	4K7pF	A1
C33	27pF	A1
C34	280pF	A1
C36	5.6pF	A1
C37	200pF	A2
C38	150pF	A1
C39	83pF	A1
C41	12pF	A1
C42	60pF	A2
C43	257pF	—
C46	15KpF	A2
C47	1K5pF	A2
C48	47KpF	A2
C49	820pF	A2
C53	47KpF	A2
C54	68KpF	A2
C56	22KpF	B1
C57	150KpF	B2
C58	220pF	A2
C59	10µF	B2
C61	250µF	B2
C62	500µF	A2
C63	560µF	B2
C64	1000µF	B2
C65	22pF	—
C66	500µF	B2
C312	18pF	D1
C313	27pF	D1
C314	1KpF	D1
C316	470pF	D1
C317	20pF	D1
C318	12.7pF	—
C319	3.3pF	D1
C321	33pF	D1
C322	10KpF	D1
C323	1KpF	D1
C324	3.3pF	D1
C326	470pF	D1
C327	220pF	D1
C328	6pF	D1
C329	12.7pF	—
C331	3.9pF	D1
C332	10KpF	D1
C333	7pF	D1
C501	8K2pF	C1
C502	47KpF	C1
C503	3K3pF	C1
C504	47KpF	C1
C505	10µF	C1
C506	220KpF	C2
C507	3K3pF	C2
C508	4.7µF	C1
C509	3K3pF	C2
C510	1K2pF	C2
C511	3K3pF	C2
C512	3K3pF	C2
C513	3K3pF	C2
C514	33KpF	C2
C515	2×560pF	C2
C516	1µF	C2
C517	1K5pF	C2
C518	330KpF	C2



Disconnect CRO and test probe from MP5 then connect CRO via a 50Kohm cable to test point MP6—junction C65/C517.

Connect wobbulator output to MP4, amplitude modulate wobbulator signal at about 35 per cent. Check input to TR6 base is 50mV and adjust IFT9 for optimum linearity at 75kHz deviation. Adjust R519 for minimum AM.

Transfer wobbulator output to TR2 base via a blocking capacitor, check trace and, if necessary, readjust IFT8.

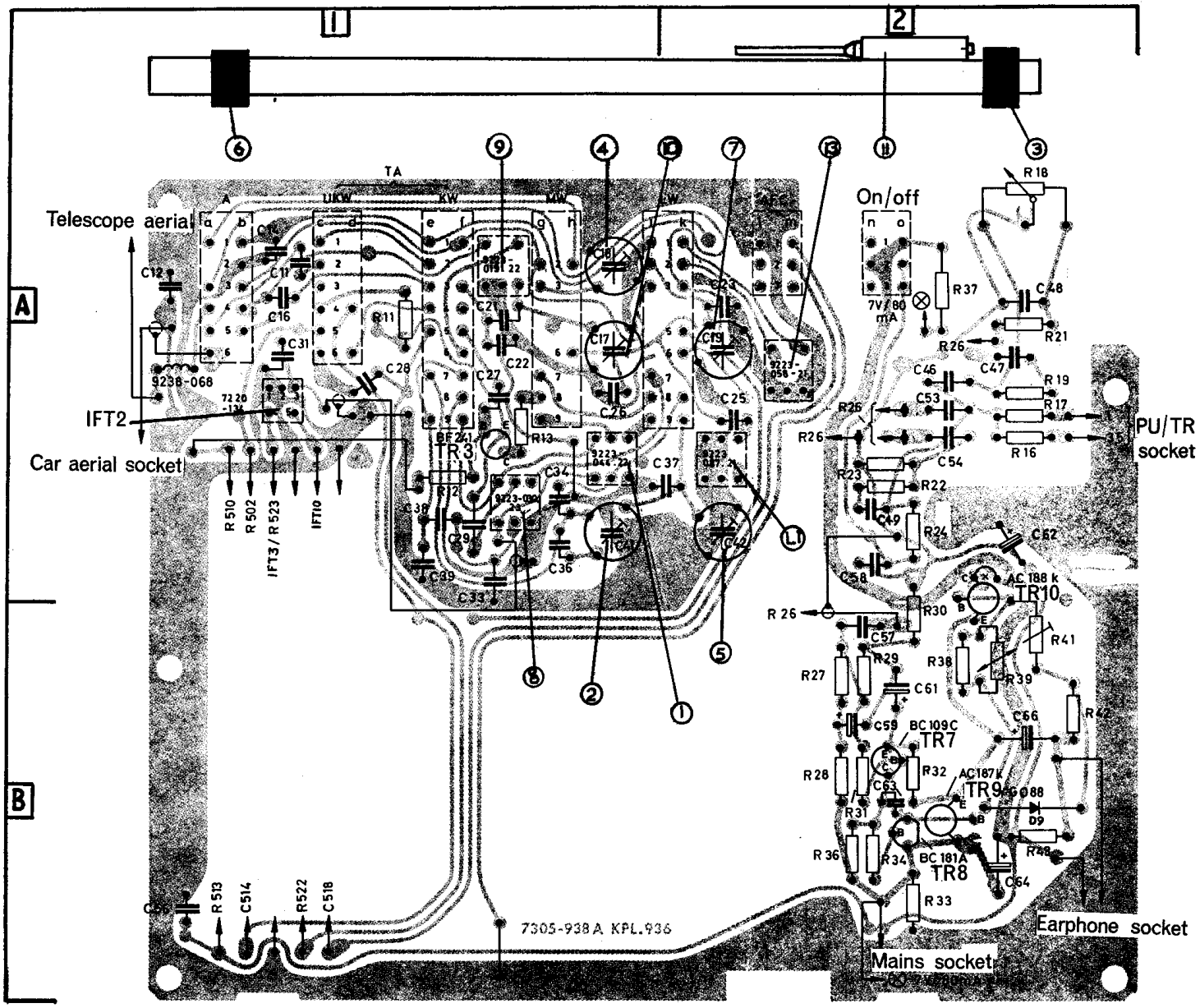
AM IF. Switch receiver to MW and connect CRO via test probe to MP10—TR5 emitter. Set wobbulator to sweep through centre frequency 460kHz. The following adjustments to be made for maximum trace amplitude and optimum symmetry.

Connect wobbulator output to MP9—tag 3 IFT12. Adjust IFT13.

Transfer wobbulator output to MP7—tag 3 IFT2. Adjust IFT12, IFT11 and IFT10. Disconnect wobbulator.

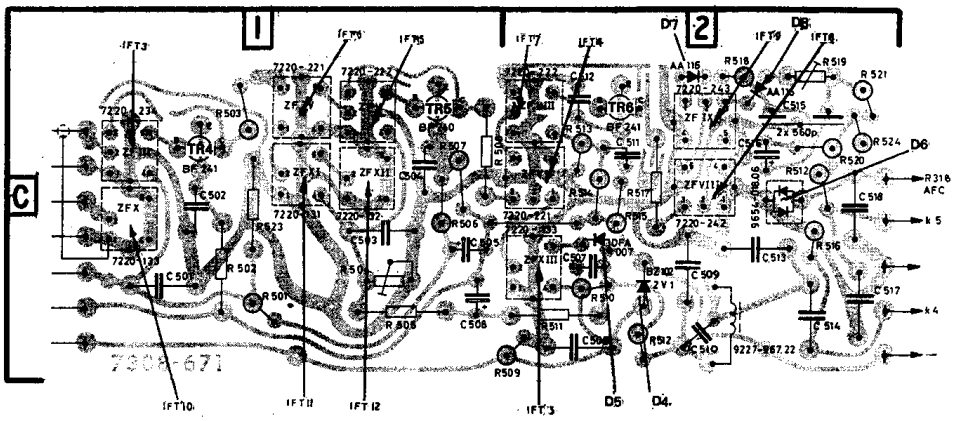
Loosely couple wobbulator output to telescopic aerial and adjust IFT2.

Finally, adjust IF trap L1 for minimum

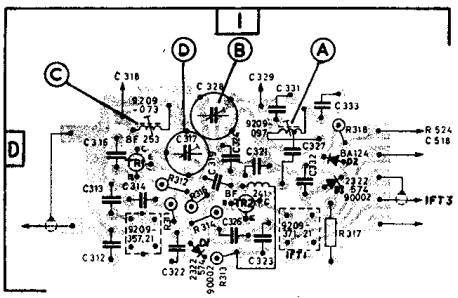


Component layout seen from copper print side of circuit board. Alignment and test points are indicated by ringed figures (see text)

IF amplifier and demodulator stages viewed from copper print side of circuit panel



Component side of FM RF amplifier and mixer printed circuit panel



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output. Disconnect wobbulator and CRO.

FM RF. Switch receiver to VHF, and connect RF signal generator via a 60ohm feeder to C312 (input of VHF tuner module), the test signal amplitude should not exceed 2mV. Connect an electronic millivoltmeter to TR2 emitter.

Tune receiver to 88MHz and feed in an 88MHz CW signal. Adjust (*A*) and (*C*) for maximum output.

Tune receiver to 106MHz and feed in a 106MHz CW signal. Adjust (*B*) and (*D*) for maximum output.

AM RF. Terminate RF signal generator in an RF coupling coil and loosely couple to ferrite rod aerial assembly. Connect an electronic millivoltmeter to TR3 emitter.

Switch receiver to MW and tune to 560kHz. Feed in a 560kHz CW signal and adjust (*1*) and (*3*) for maximum output.

Tune receiver to 1450kHz and feed in a 1450kHz CW signal. Adjust (*2*) and (*4*) for maximum output.

Switch receiver to LW and tune to 160kHz. Feed in a 160kHz CW signal and adjust (*5*) and (*6*) for maximum output.

Tune receiver to 240kHz and feed in a 240kHz CW signal. Adjust (7) for maximum output. Disconnect and remove RF coupling coil.

Connect RF signal generator to car aerial socket via car aerial matching pad. Depress car button.

Switch receiver to MW and tune to 560kHz. Feed in a 560kHz CW signal and adjust (12) for maximum output.

Tune receiver to 1450kHz and feed in a 1450kHz CW signal. Adjust (11) for maximum output.

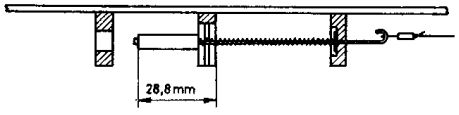
Switch receiver to LW and tune to 160kHz. Feed in a 160kHz CW signal and adjust (13) for maximum output. Disconnect signal generator and matching pad.

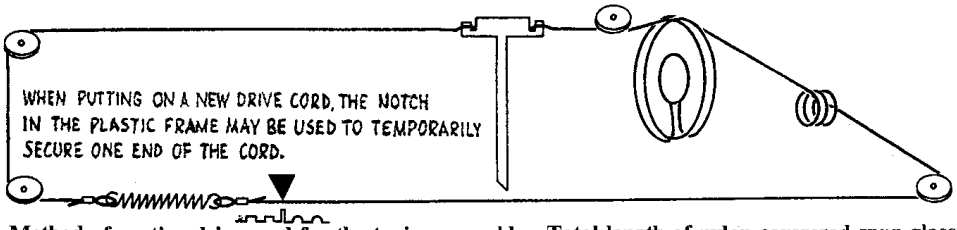
Unsolder lead to telescopic aerial and connect RF signal generator via a 15pF capacitor to this lead.

Switch receiver to SW and tune to 6.1MHz. Feed in a 6.1MHz CW signal and adjust (8) and (9) for maximum output.

Tune receiver to 7.2MHz and feed in a 7.2MHz CW signal. Adjust (10) for maximum output. Disconnect and remove signal generator, capacitor and millevoltmeter. Reconnect telescopic aerial.

With tuning gang at maximum capacity the permeability connecting rod and core should comply with details given in the sketch below





Method of routing drive cord for the tuning assembly. Total length of nylon coverered spun glass cord is approximately 35in. (875mm)

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