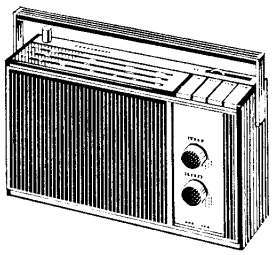
THORN CONSUMER ELECTRONICS

Service Manual

Transistor Portable Radios

MARCONIPHONE 4153

ULTRA 6153

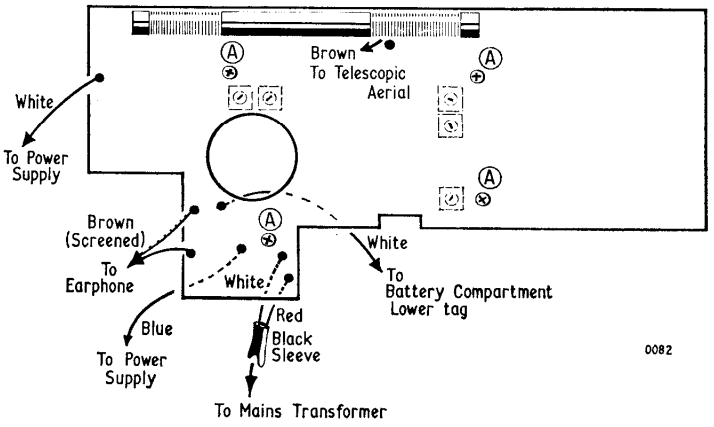


Model 4153
6153 is similar

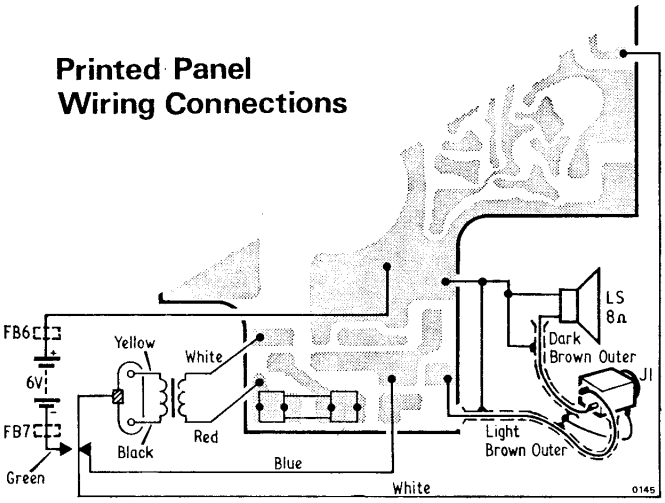
ACCESS FOR SERVICE

Remove battery cover and take out batteries. Take out three screws from cabinet base; two inside battery compartment and one countersunk 4BA screw adjacent to front panel. Pull off tuning and volume knobs, then from cabinet back remove two recessed screws. Lift off front panel within limit of loudspeaker leads. Unclip telescopic aerial lead then remove four self-tapping screws, marked 'A' in diagram, securing printed board. Lift out printed board and, if necessary, unsolder battery and power supply connections from points shown in diagram below, taking note of the lead colours. When refitting printed board ensure that masking piece is in position on AFC switch.

Handle Removal. The handle pivots on studs at each end of cabinet; push handle down to fullest extent and lift each end off its pivot. To refit, place handle over pivot studs and pull each end firmly upward to engage with pivot studs.



Printed Panel Wiring Connections



COMPONENT DETAILS

When ordering replacement components, please quote Model number and component details as stated. References in the location column refer to the illustration on inside page.

CAPACITORS

REF	DESCRIPTION	LOC
C1	50pF 10% 500V, FM aerial tuning	B1
C2	100pF 10% 500V, VT1 emitter signal coupling	B1
C3	1000pF 10% 500V, VT1 base decoupling	B2
C4	37pF 5% 500V, FM RF amplifier fixed trimmer	BC2
C5*	5pF Preset, FM RF amplifier trimmer	C2
C6*	20pF Variable, FM RF amplifier tuning	BC2
C7	3pF ±¼pF 500V, VT2 emitter coupling	B2
C8	25pF 5% 500V, Part 10.7 MHz rejector	C2
C9	680pF 10% 500V, Part 10.7 MHz rejector	BC2
C10	3pF ±¼pF 500V, FM oscillator coupling	C1,2
C11	1000pF −20 +80% 50V, VT2 base decoupling	C2
C12	22pF 5% 500V, FM oscillator fixed trimmer	C2
C13	50pF, L5 tuning (part FM IFT1)	C2
C14*	5pF Preset, FM oscillator trimmer	C2

Continued overleaf

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THORN CONSUMER ELECTRONICS LIMITED—Service Depots

LONDON: P.O. Box 121, Lea Valley Trading Estate, Edmonton, N18 3BP; *Tel. 01-807 3060. Spares ordering only: 01-807 0791, or Recordacall: 01-807 6332, Telex: 264905, Cablegrams: Britradco Edmonton.* MANCHESTER: Thorn House, Derby Street, Cheetham, Manchester M8 8HD; *Tel. 061-832 2499.* GLASGOW: 155 Shieldhall Road, Glasgow, G51 4DH; *Tel. 041-882 4512.*

THORN

A member of the Thorn Group

Price: 10p

Component Details—*continued*

REF	DESCRIPTION	LOC
C15*	20pF Variable, FM oscillator tuning	C2
C16	1pF ±¼pF 500V, VT3 neutralizing	C2
C17	3pF ±¼pF 500V, FM IFT1/FM IFT2 bandpass coupling	C2
C18	10pF 20% 500V, AFC feed	C1
C19	50pF, L7 tuning (part FM IFT2)	C2
C20	.05μF 20% 250V, AFC line decoupling	BC1
C21	.05μF 20% 250V, VT1 emitter supply decoupling	B2
C22	.05μF 20% 250V, VT1/VT2 bias supply RF bypass	B1
C23	330pF 10% 500V, L8 tuning	C2
C24	.05μF 20% 250V, VT3 emitter bypass (FM)	C2
C25	.01μF −20 +80% 50V, VT3 base signal coupling	C2
C26	.01μF −20 +80% 50V, VT3 emitter bypass	C2
C28	50pF, L19 tuning (part FM IFT3)	C2,3
C29	330pF 10% 500V, VT4 base bias decoupling	B3
C30	180pF, L17 tuning (part AM IFT1 primary)	C2
C31	2.5pF ±¼pF 500V, AM IFT1 bandpass coupling	BC3
C32	180pF, L18 tuning (part AM IFT1 secondary)	BC2
C33	.015μF −20 +80% 50V, VT4 AGC line decoupling	C2
C34	.05μF 20% 250V, VT4 collector supply decoupling	B2
C35	.01μF −20 +80% 50V, VT5 base signal coupling	B2
C36	4.7μF Elec 10V, AGC reservoir	B3
C37	.05μF −20 +80% 50V, supply line RF bypass	C1
C38	.05μF 20% 250V, VT5 emitter bypass	B2
C39	1.5pF ±¼pF 500V, Ratio detector frequency correction	B2
C40	30pF 5% 500V, FM IFT4 primary tuning	B2
C41	90pF 5% 500V, L24 tuning (part FM IFT4)	B2
C42	10μF Elec 6.3V, Ratio detector stabilizing	A2
C43	470pF 10% 500V, Ratio detector decoupling	A2
C44	470pF 10% 500V, Ratio detector decoupling	A1,2
C45	180pF, L25 tuning (part AM IFT2)	B2
C46	100pF 10% 500V, L26 tuning	B2
C47	.02μF −20 +80% 50V, Part AM IF filter	B2
C48	.01μF −20 +80% 50V, Part AM IF filter	B2,3
C49	.01μF −20 +80% 50V, AM/FM balance	CD2
C50	.01μF −20 +80% 50V, Part de-emphasis	B2
C51	5000pF −20 +80% 50V, Part FM IF filter	B2
C52	1μF Elec 10V, VT6 audio coupling	D2
C53	.02μF −20 +80% 50V, Part tone control	C3
C54	5000pF −20 +80% 50V, Part signal input pot.	A2
C55	.022μF 10% 250V, Tone correction	D3
C56	0.1μF 20% 250V, Part signal input pot.	A2
C57	330μF Elec 6.3V, Supply line decoupling	B1,2
C58	47μF Elec 6.3V, VT6 collector decoupling	A1,2
C59	1μF Elec 10V, VT7 base coupling	A2
C60	470pF 10% 500V, Part VT7 base bias decoupling	A2
C61	.01μF 10% 500V, Tone correction	A2
C62	100μF Elec 10V, Part bootstrap	A2
C63	220μF Elec 10V, Loudspeaker coupling	A2
C64	2000pF 20% 500V, Tone correction	A2
C65	1000μF Elec 10V, Supply reservoir	A2
C67*	266pF, Variable AM aerial tuning	BC2
C68*	5pF Preset, AM aerial trimmer	BC2
C69	2-25pF Preset, LW aerial trimmer	C1
C70	20pF 5% 500V, AM fixed oscillator trimmer	C2
C71*	5pF Preset, MW oscillator trimmer	C2
C72*	266pF Variable, AM oscillator tuning	C2
C73	150pF 10% 250V, LW oscillator fixed padder	C2
C74	2-25pF Preset, LW oscillator trimmer	C2
C75	42pF 10% 250V, LW oscillator fixed trimmer	C2
C76	330pF 10% 250V, MW oscillator padder	C2
C77	.01μF 20% 250V, W7 RF bypass	AB3
C78	34pF 5% 500V, VT8 phase correction	A2
C79	.02μF 10% 250V, Supply line RF bypass	A2

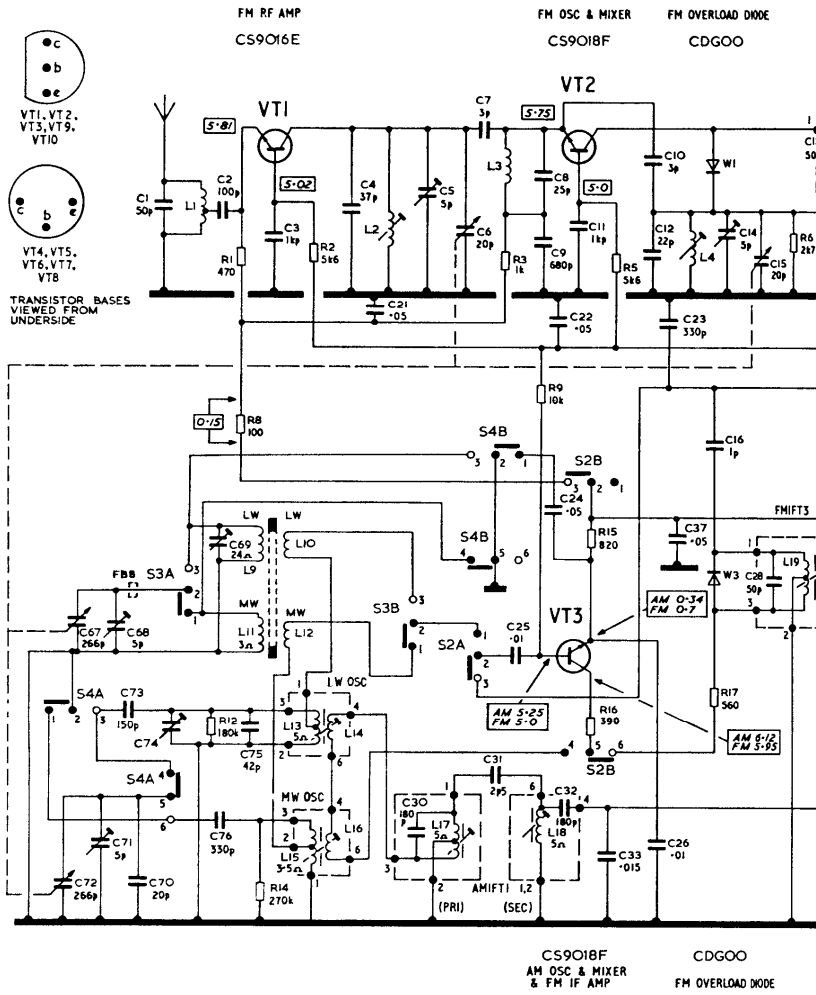
* *Part tuning gang assembly.*

INDUCTORS

REF	DESCRIPTION	LOC
L1	FM aerial coil	B1,2
L2	FM RF amplifier tuning	B2
L3	Part 10.7 MHz rejector	C1,2
L4	FM oscillator coil	C1,2
L5/L6	FM IFT1	C2
L7/L8	FM IFT2	C2
L9/L12	Ferrite rod aerial coils	AB1
L13/L14	LW oscillator coils	C2
L15/L16	MW oscillator coils	D1
L17	AM IFT1 primary	C2
L18	AM IFT1 secondary	B2
L19/L20	FM IFT3	C2
L21/L22	FM IFT4 primary	B1,2
L23/L24	FM IFT4 secondary	B1,2
L25/L26	AM IFT2	B2
T1	Mains transformer	—

MISCELLANEOUS

REF	DESCRIPTION	LOC
F1	Fuse 250mAT anti-surge	B3
FB1-FB8	Ferrite beads	—
J1	Earphone socket	—
LS	Loudspeaker 3 inch round, 8Ω impedance	—
S1-S4	On/Off and waveband switches	CD2
S5	AFC switch	D2
SKT1	AC mains input socket assembly (incl. S6)	—



RESISTORS

REF	DESCRIPTION	LOC
R1	470Ω 5% 1/5W, VT1 emitter stablizing	BC2
R2	5.6kΩ 5% 1/5W, VT1 base bias feed	B1
R3	1kΩ 5% 1/5W, VT3 emitter stabilizing	B2
R4	47Ω 5% 1/5W, W2 limiter	C1
R5	5.6kΩ 5% 1/5W, VT2 base bias feed	C1,2
R6	2.7kΩ 5% 1/5W, FM oscillator damping	C2
R7	560kΩ 5% 1/5W, AFC feed	C1
R8	100Ω 5% 1/5W, VT1/VT2 emitter supply line decoupling	C1
R9	10kΩ 5% 1/5W, VT3 base bias feed	C1,2
R10	10kΩ 5% 1/5W, VT5 base bias feed	B2
R11	2.7kΩ 5% 1/5W, Part VT1-VT3 and VT5 base bias pot. divider	B1
R12	180kΩ 5% 1/5W, LW oscillator damping	C2
R13	820kΩ 5% 1/5W, AFC feed	B2
R14	270kΩ 5% 1/5W, MW oscillator damping	C2
R15	820Ω 5% 1/5W, VT3 emitter stabilizing	C1,2
R16	390Ω 5% 1/5W, Part VT3 collector load	C2
R17	560Ω 5% 1/5W, Part VT3 collector load (FM)	D2
R18	56kΩ 5% 1/5W, VT4 bias feed	B2
R19	1kΩ 5% 1/5W, VT4 collector load	B2
R20	820Ω 5% 1/5W AM limiting	B2
R22	5.6kΩ 5% 1/5W Part, AGC decoupling	B2
R23	470Ω 5% 1/5W, VT5 emitter stabilizing	B2
R24	15kΩ 5% 1/5W, AGC feed	B2
R25	560Ω 5% 1/5W, AM limiting	B1,2
R26	82Ω 5% 1/5W, Ratio detector tertiary series	B2
R27	1.2kΩ 5% 1/5W, Ratio detector equalizing	A2
R28	1.2kΩ 5% 1/5W, Ratio detector equalizing	A1
R29	5.6kΩ 5% 1/5W, W4 diode load	A2
R30	5.6kΩ 5% 1/5W, W5 diode load	A1,2
R31	3.3kΩ 5% 1/5W Part, AM IF filter	B2,3
R32	15kΩ 5% 1/5W Part, AM/FM audio balance	B3
R33	1.5kΩ 5% 1/5W Part, AM/FM audio balance	CD2
R34	4.7kΩ 5% 1/5W Part, de-emphasis	B2
R35	100kΩ Log. pot., Tone control	C3
R36	100kΩ Log. pot., Volume control	D2,3
R38	560kΩ 5% 1/5W, VT6 bias feed	A2
R39	560Ω 5% 1/5W, VT6 supply decoupling	A1
R40	4.7kΩ 5% 1/5W, VT6 collector load	A2
R41	10Ω 5% 1/5W, VT6 emitter stabilizing	A2
R42	220Ω 5% 1/5W, Supply decoupling	A1
R43	100Ω 5% 1/5W, Part bootstrap	A1,2
R44	330Ω 5% 1/5W, Part bootstrap	A2
R45	270Ω 5% 1/5W, VT8 bias feed	A2
R46	390Ω 5% 1/5W, VT7 collector load	A2
R47	82kΩ 5% 1/5W, VT7 bias feed	A2
R48	10kΩ 5% 1/5W, Negative feedback	A2

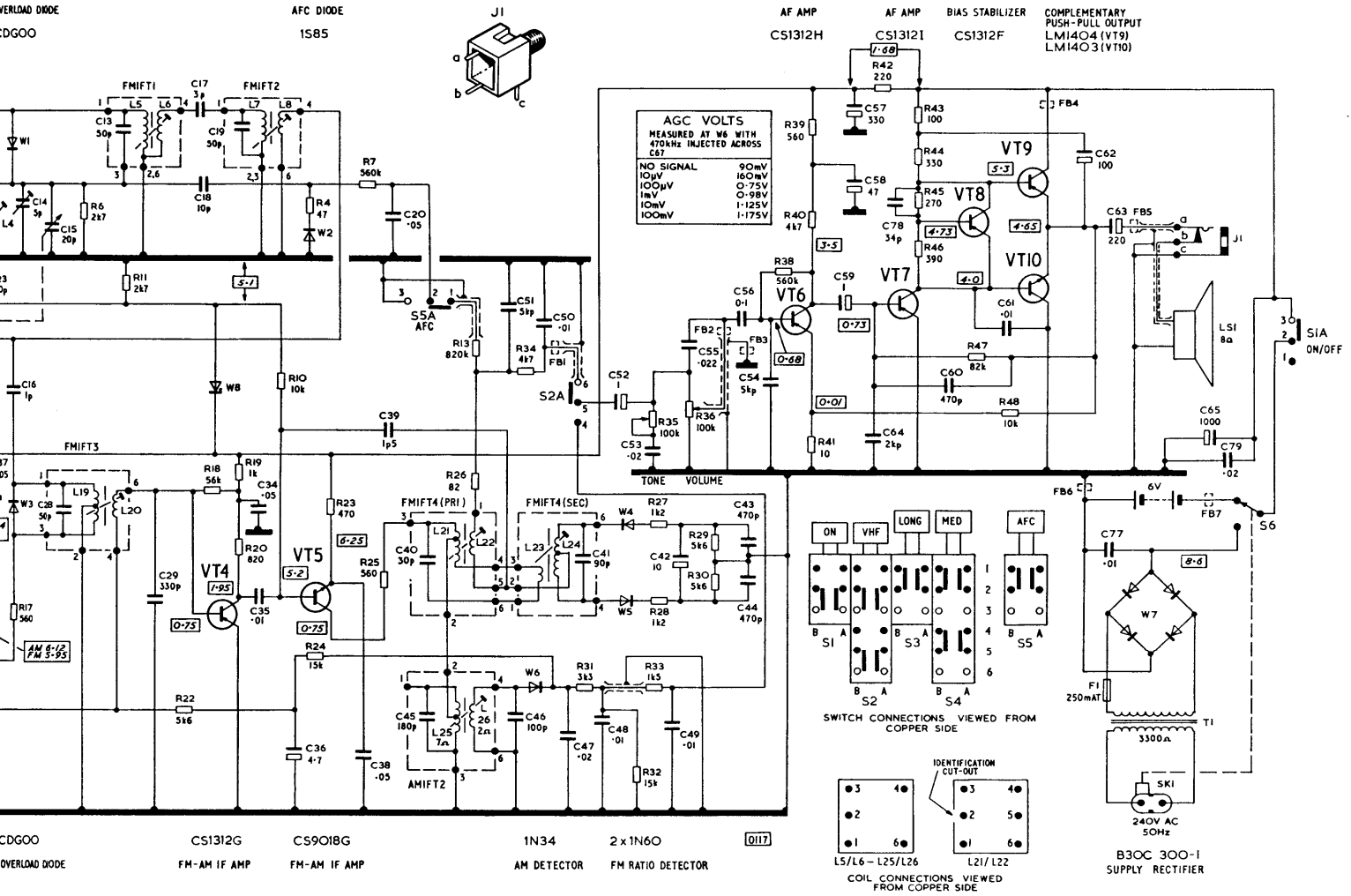
GRID
VT1
VT2
VT3
VT4
VT5
VT6
VT7
VT8
VT9

1

2

FM

3

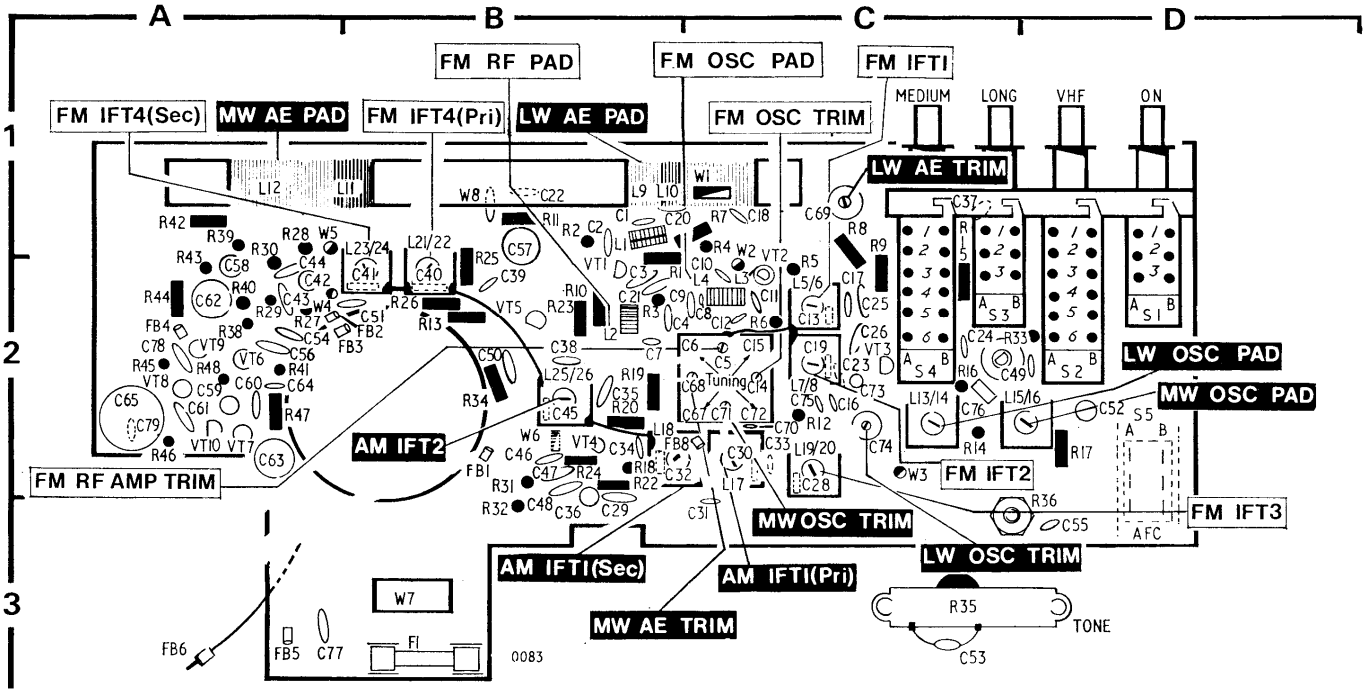


GRID REFERENCES FOR SEMICONDUCTORS

VT1 ..	B1,2	VT10 ..	A2
VT2 ..	C1,2	W1 ..	C1
VT3 ..	C2	W2 ..	C1,2
VT4 ..	B2	W3 ..	C2
VT5 ..	B2	W4 ..	AB2
VT6 ..	A2	W5 ..	AB1
VT7 ..	A2	W6 ..	B2
VT8 ..	A2	W7 ..	B3
VT9 ..	A2	W8 ..	B1

Circuit Diagram

Voltage measurements, shown in rectangles, were taken with a 20,000Ω/volt meter and were measured relative to the positive chassis line unless otherwise indicated.



ALIGNMENT DATA

Tuning indication is best obtained either with an output meter having an impedance of 8 ohms and connected in place of the loudspeaker, or a Model 8 Avometer set to the 10V range connected in parallel with the loudspeaker. Throughout alignment the signal input level to the receiver should be adjusted to maintain an audio output at approximately 50mW, with the volume control set at maximum, in order to avoid alignment error due to AGC action.

AM IF Circuits

Switch to MW and turn gang to maximum capacitance. Apply a 470 kHz (30% modulated) signal through a 0.1μF capacitor across C67 (AM aerial section of tuning gang) then adjust AM IFT2, AM IFTI (secondary) and AM IFT1 (primary) for maximum output. Repeat in same order until no further improvement is obtainable.

AM RF Circuits

Signal should be injected via a loop loosely coupled to the ferrite rod aerial. Adjust coils for maximum meter reading.

Range	Inject	Cursor Position	Adjust
MW	600 kHz	500 m	L15/L16, L11/L12*
	1500 kHz	200 m	C71, C68
LW	150 kHz	2000 m	L13/L14, L9/L10*
	300 kHz	1000 m	C74, C69

** Adjust by sliding coil formers along ferrite rod*

Repeat adjustments as necessary until no further improvement results.

FM IF Circuits

Switch to VHF. Inject 10.7 MHz signal (25 kHz deviation) via a .01μF capacitor between VT2 emitter and chassis. Adjust FMIFT4 (primary), FMIFT3, FMIFT2 and FMIFT1 for maximum output.
Switch signal generator to 10.7 MHz AM (30% modulated) and adjust FMIFT4 (secondary) for minimum AM output. Repeat adjustments as necessary for optimum output, maximum AM rejection and accurate calibration.

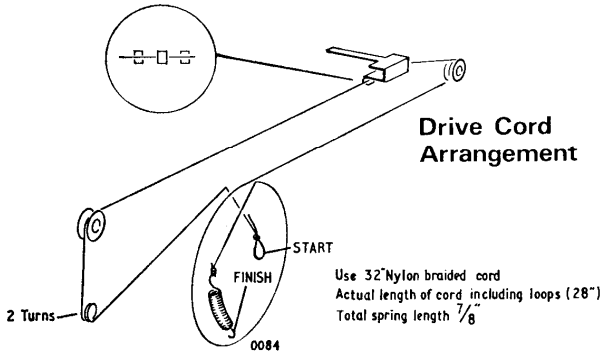
FM RF Circuits

FM signal (25 kHz deviation) should be injected between telescopic aerial lead and chassis.

Range	Inject	Cursor Position	Adjust
VHF	88 MHz	88 MHz	L4*, L2*
	100 MHz	100 MHz	C14, C5

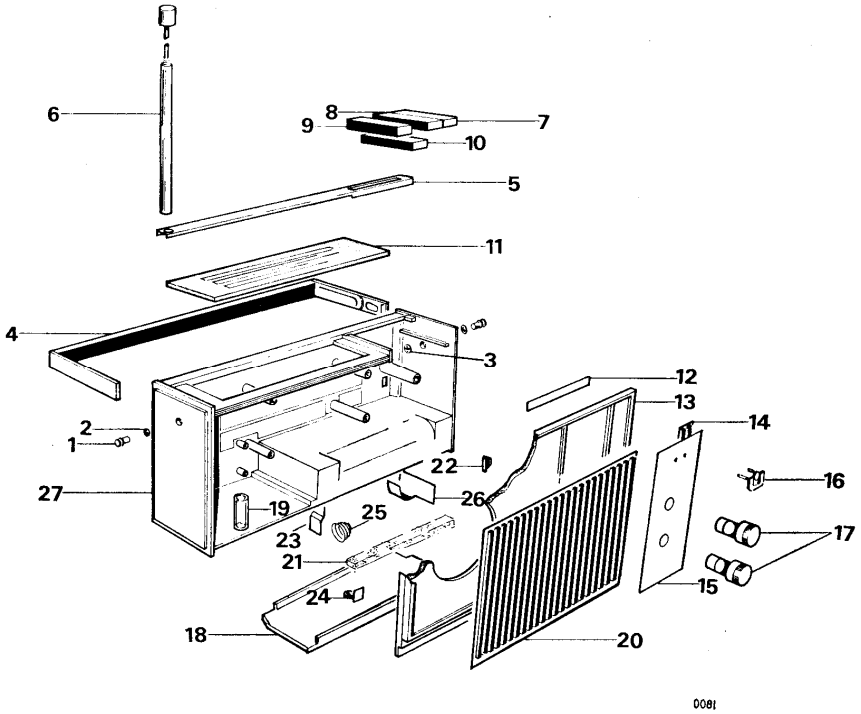
** Adjust by opening or closing coil turns.*

Repeat adjustments as necessary until no further improvement results.



REPLACEMENT PARTS

When ordering replacement parts, please quote Model number, description and item numbers as listed.



Cabinet Assembly

Handle pivot stud	1
Flat plastic washer on item 1	2
Circlip securing item 1 to cabinet	3
Handle	4
Top trim	5
Telescopic aerial	6
ON switch button	7
VHF switch button	8
Medium wave switch button	9
Long wave switch button	10
Tuning scale	11
Switch button dressing piece	12
Loudspeaker and front escutcheon moulding	13
Right-hand grille moulding	14
Control panel	15
Emblem	16
Control knob (including spring circlips)	17
Battery cover	18
Insulating sleeve on item 6	19
Loudspeaker grille	20
Foam pad on item 18	21
Loudspeaker clamp	22
Battery positive contact	23
Cabinet fixing post on item 13	24
Battery negative terminal spring	25
Battery link contact	26
Cabinet shell	27
Screw securing item 6	28*
Mains lead assembly	29*
Earphone assembly	30*
Cabinet fixing screws:	
Two in cabinet back	31*
Two inside battery compartment	32*
Countersunk screw in cabinet base	33*

Chassis Assembly

Tuning drive moulding	34*
Screw securing item 34	35*
Drive drum	36*
Screw securing item 36	37*
Drive cord tension spring	38*
Scale pointer	39*
Drive cord pulley	40*
Nylon pulley spindle	41*

** Not shown in illustration*

The manufacturers reserve the right to vary specifications or use alternative materials as may be deemed necessary or desirable at any time.