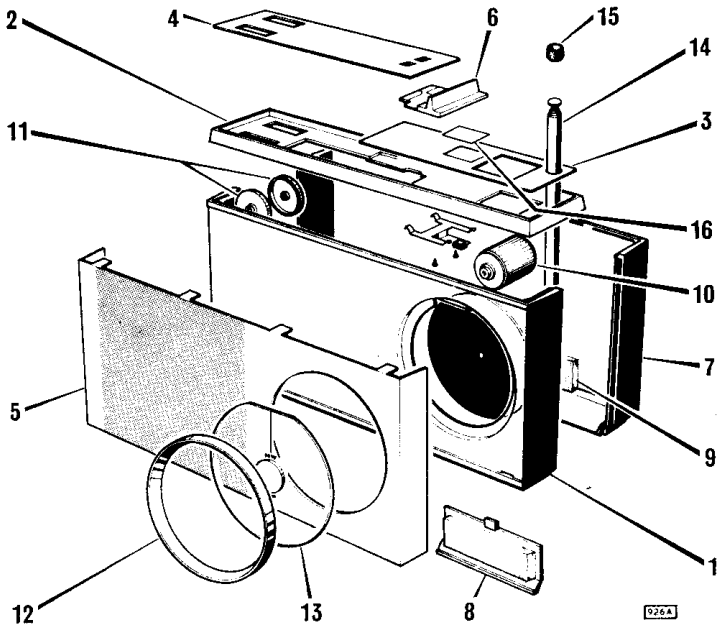
ACCESS FOR SERVICE

Take out two small screws at rear to remove back cover. Release telescopic aerial by taking out securing screw, remove two screws in battery compartment and one screw near tuning control, then take out brass hexagonal pillar to release moulded chassis. Raise bottom edge of chassis to clear cabinet and ease controls clear of escutcheon to lift chassis within the limits of the interconnecting leads. This gives access for general servicing, but disconnect loudspeaker leads to completely free chassis.

Note: When refitting chassis into cabinet front ensure that the PVC sleeving on the switch lever arm isolates it from the wavechange knob mounting spring.

REPLACEMENT PARTS

When ordering replacement components, please quote Model number and include the description or function given with the part number.



Cabinet Assembly

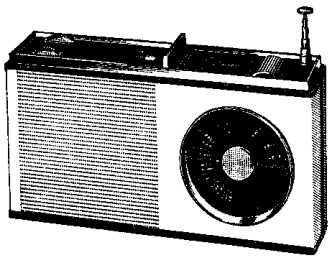
(1)	Cabinet front	00X3-444
(2)	Escutcheon moulding	00X3-178-001
	Screw (1 off)—chrome	00X3-179
	Screw (2 off)—brass	00X3-180
(3)	Escutcheon cover, tuning end	00X3-451
(4)	Escutcheon cover, volume end	00X3-452
(5)	Loudspeaker grille	00X3-448
(6)	Wavechange knob	00X3-184-001
	Mounting spring	00X3-185
	Screw (2 off)	00X3-186
(7)	Cabinet back	00X3-187
	Securing screw (2 off)	00X3-188
(8)	Battery door	00X3-189
	Foam rubber pad	00X3-191
(9)	Foam rubber pad	00X3-190
(10)	Tuning knob	00X3-208
(11)	Tone or Volume knob	00X3-230
(12)	Scale window trim	00X3-446
	Screw	00X3-180
(13)	Scale window	00X3-445
	Scale window centre disc	00X3-447
(14)	Telescopic aerial	00X3-423
(15)	Telescopic aerial bush	00X3-463
(16)	Marconiphone emblem	00X3-453

Continued overleaf

BRC service manual

Price 7½p

MARCONIPHONE **4178**



Model 4178 is a two-waveband portable receiver providing reception in the Medium and VHF-FM bands with AFC on the VHF-FM band. It also incorporates an earphone socket and variable tone control, and is powered by three 1½-volt batteries, type HP11 or equivalents.

BRITISH RADIO CORPORATION LIMITED

SERVICE DEPOTS

LONDON:
P.O. Box No. 121, Lea Valley Trading Estate, Angel Road, Edmonton, London, N18 3BP. *Tel. 01-807 3060*
Spares ordering only: 01-807 0791, or Recordacall: 01-807 6332

MANCHESTER:
Thorn House, Derby Street, Cheetham, Manchester 8. *Tel. 061-832 2499*

GLASGOW:
155 Shieldhall Road, Glasgow, S.W.1. *Tel. 041-882 4512*

THORN

British Radio Corporation Ltd. is a member of the Thorn Group.

Chassis Parts

Moulded chassis	00X3-192-001
Hexagonal brass stud	00X3-193
Screw—14mm (1 off)	00X3-194
Screw—10mm (2 off)	00X3-195
Battery positive contact	00X3-196
Battery negative spring contact	00X3-197
Loudspeaker securing pressure plate	00X3-199
Washer	00X3-201
Screw	00X3-200
Tuning gang securing screw	00X3-202
Moulded plastic aerial holder	00X3-203
Drive drum	00X3-204
Screw	00X3-205
Scale	00X3-457
Screw	00X3-207
Tuning knob shaft	00X3-209
Nut	00X3-210
Tuning shaft bracket	00X3-211
Plastic washer	00X3-458
Screw—tapped (2 off)	00X3-212
Screw—self-tapping (1 off)	00X3-213
Drive cord pulley (3 off)	00X3-215
Washer (2 off)	00X3-222
Pulley spindle (adjacent tuning knob)	00X3-216
Nut	00X3-217
Drive cord spring	00X3-219
Drive cord hook	00X3-220
Printed board securing screw	00X3-223
Wavechange switch lever	00X3-224
Lever spindle	00X3-225
Lever spindle nut	00X3-226
'E' clip securing lever	00X3-227
Wavechange lever sleeving	00X3-232
Screw securing Volume or Tone control	00X3-230-001
Screw securing telescopic aerial	00X3-207
Leather carrying case	00X3-464

COMPONENT DETAILS

When ordering replacement capacitors and resistors for which no part number is given, please quote Model number and component details as stated.

References in the location column refer to the illustration on back page.

CAPACITORS

REF	DESCRIPTION & PART NO.	LOC
C1	5pF, ±0·25pF, 50V, L2 tuning	B2
C2	15pF, 20%, 50V, VT1 base coupling	B2
C3	·02μF, −0 +100%, 50V, Part FM AGC decoupling	B2,3
C4	33μF, Elec., 6·3V, FM AGC reservoir, 00X3-426	B2
C5	·02μF, −0 +100%, 50V, Part FM AGC decoupling	DE3
C6	5000pF, −0 +100%, 50V, VT1 emitter bypass	B2
C7	30pF, 20%, 50V, Oscillator phase correction	B3
C8	100pF, 10%, 50V, FM RF fixed padder	B3
C9*	20pF, Variable, FM RF tuning	B3
C10*	5pF, Preset, FM RF trimmer	A2,3
C11	20pF, 20%, 50V, FM RF fixed trimmer	B3
C12	4pF, ±0·25pF, 50V, VT2 signal coupling	B3
C13	500pF, −0 +100%, 50V, Part 10·7 MHz rejector	B3
C14	5000pF, −0 +100%, 50V, VT2 base bias decoupling	B3
C15	5pF, ±0·25pF, 50V, FM oscillator output coupling	BC3
C16	8pF, 20%, 50V, FM AFC coupling	C3
C17	·05μF, −20 +80%, 50V, Part FM AFC decoupling	C3
C18*	20pF, Variable, FM oscillator tuning	C3
C19*	5pF, Preset, FM oscillator trimmer	B4
C20	14pF, 20%, 50V, FM oscillator fixed trimmer	C3
C21	·05μF, −20 +80%, 50V, FM supply line decoupling	CD3
C22	L6 tuning (part FM IFT1)	C3,4
C23	·01μF, −0 +100%, 50V, VT3 base bias decoupling	C3
C24	L8 tuning (part FM IFT2)	D3
C25	·01μF, −0 +100%, 50V, VT3 emitter bypass	D3
C26	10pF, 20%, 50V, FM AGC signal coupling	D3
C27*	256pF, Variable, AM aerial tuning	B2
C28*	5pF, Preset, AM aerial trimmer	B1
C30	·01μF, −0 +100%, 50V, VT4 base coupling	D2

Continued

REF	DESCRIPTION & PART NO.	LOC
C31*	256pF, Variable, AM oscillator tuning	C2
C32*	5pF, Preset, AM oscillator trimmer	C1
C33	110pF, 10%, 25V, AM oscillator fixed padder	C2
C34	·01μF, −0 +100%, 50V, oscillator output coupling	D2,3
C35	L14 tuning (part AM IFT1)	D3
C36	1000pF, 20%, 50V, FM neutralizing	D3
C37	2pF, ±0·5pF, 50V, AM neutralizing	D3
C38	33μF, Elec., 6·3V, AM AGC reservoir, 00X3-426	D3
C39	470μF, Elec., 6·3V, Supply line decoupling, 00X3-138	DE2
C40	470μF, Elec., 6·3V, Supply line decoupling, 00X3-138	E2
C41	L18 tuning (part AM IFT2)	DE3
C42	L16 tuning (part AM IFT3)	DE3
C43	·05μF, −20 +80%, 50V, Part FM AFC decoupling	EF2
C44	·02μF, −0 +100%, 50V, VT5 emitter bypass	D3
C45	·02μF, −0 +100%, 50V, VT6 base bias decoupling	E3
C46	300pF, −0 +100%, 50V, Part FM IF filter	E3
C47	·02μF, −0 +100%, 50V, VT6 emitter bypass	E3
C48	L20 tuning (part FM IFT4)	E3
C49	L24 tuning (part AM IFT3)	E3
C50	·02μF, −0 +100%, 50V, Part AM IF filter	F3
C51	L23 tuning (part FM IFT4)	EF3
C52	·01μF, −0 +100%, 50V, Part AM IF filter	F3
C53	·02μF, 20%, 50V, Part de-emphasis	F2
C54	1000pF, 20%, 50V, Part ratio detector decoupling	F3
C55	1000pF, 20%, 50V, Part ratio detector decoupling	F2,3
C56	330μF, Elec., 6·3V, Supply line decoupling, 00X3-428	G2
C57	10μF, Elec., 6·3V, Ratio detector stabilizing, 00X3-135	F3
C58	10μF, Elec., 6·3V, Audio output coupling, 00X3-135	F2
C59	4·7μF, Elec., 6·3V, VT7 AF coupling, 00X3-425	FG3
C60	0·3μF, 20%, 50V, Part tone control	GH2
C61	4·7μF, Elec., 6·3V, VT7 output coupling, 00X3-425	G2
C62	47μF, Elec., 6·3V, VT8 emitter bypass, 00X3-427	H3
C63	330μF, Elec., 6·3V, Supply line decoupling, 00X3-428	G2
C64	470μF, Elec., 6·3V, Loudspeaker coupling, 00X3-128	H2

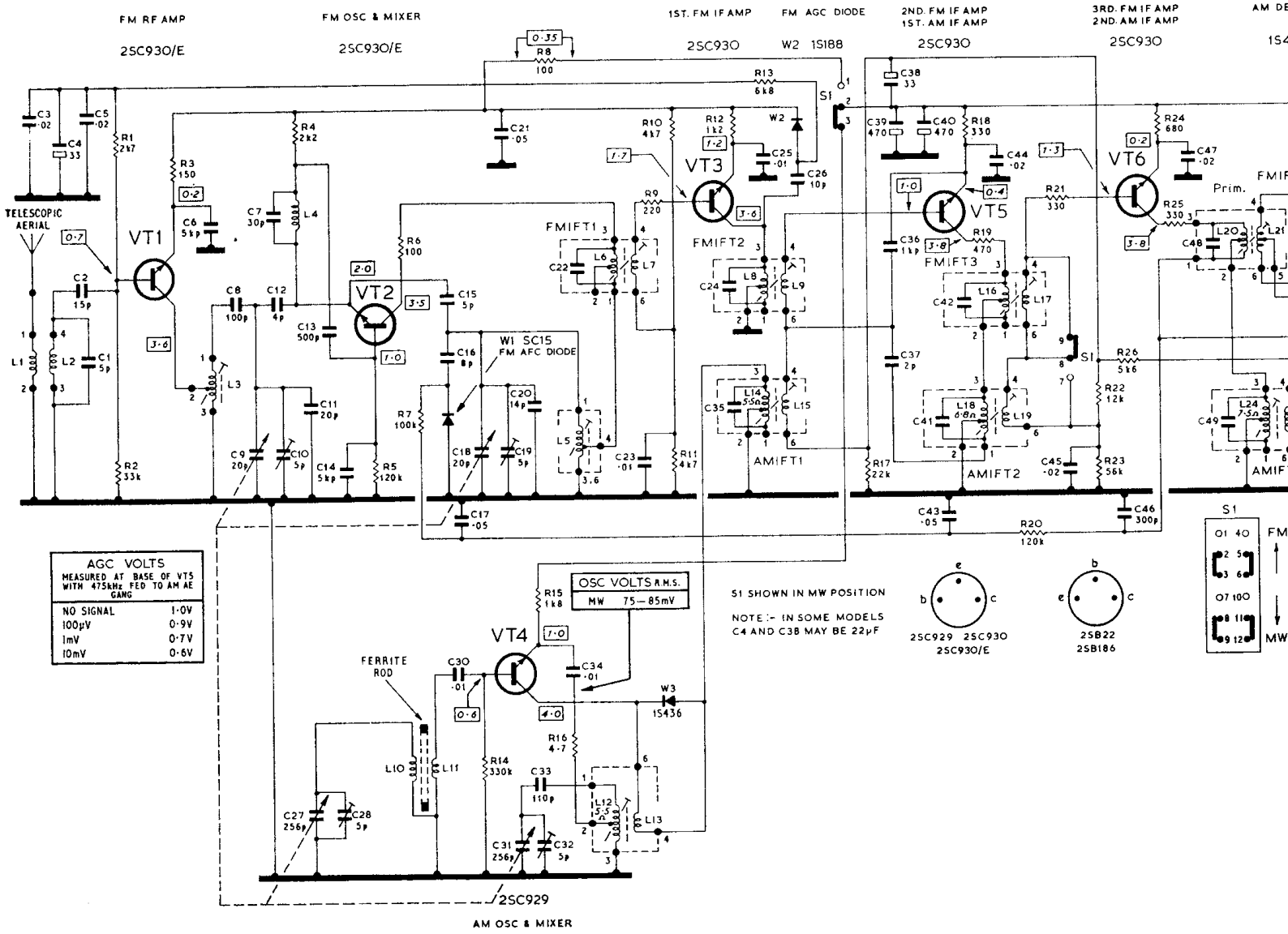
** Part tuning gang, Part No. 00X3-424.*

TRANSISTORS AND DIODES

REF	DESCRIPTION & PART NO.	LOC
VT1	FM RF amplifier, 00X3-415	B2,3
VT2	FM oscillator and mixer, 00X3-415	B3
VT3	1st FM IF amplifier, 00X3-416	D3
VT4	MW oscillator and mixer, 00X3-417	D2
VT5	2nd FM and 1st AM IF amplifier, 00X3-416	D3
VT6	3rd FM and 2nd AM IF amplifier, 00X3-416	E3
VT7	Audio amplifier, 00X1-366	G3
VT8	Audio driver, 00X1-366	GH3
VT9	Part push-pull output, 00X3-131	GH2
VT10	Part push-pull output, 00X3-131	H2
W1	FM AFC diode, 00X3-421	C3,4
W2	FM AGC diode, 00X1-344	D3,4
W3	MW oscillator amplitude limiting, 00X1-344	D3
W4	AM detector, 00X1-344	EF3
W5	Part ratio detector, 00X1-344	F3
W6	Part ratio detector, 00X1-344	F3
X1	VT9 bias stabilizing, Type SDT-20, 00X3-132	H2
X2	VT10 bias stabilizing, Type SDT-20, 00X3-132	H2

MISCELLANEOUS

REF	DESCRIPTION & PART NO.	LOC
J1	Private listening socket, 00X3-175	FG4
LS	Loudspeaker, PM, round 8 Ω, 00X3-173	—
S1	Wavechange switch, 00X3-422	C3
S2	Off/On switch (part tone control, R38)	GH1
	Earphone, 00X3-176	—



RESISTORS

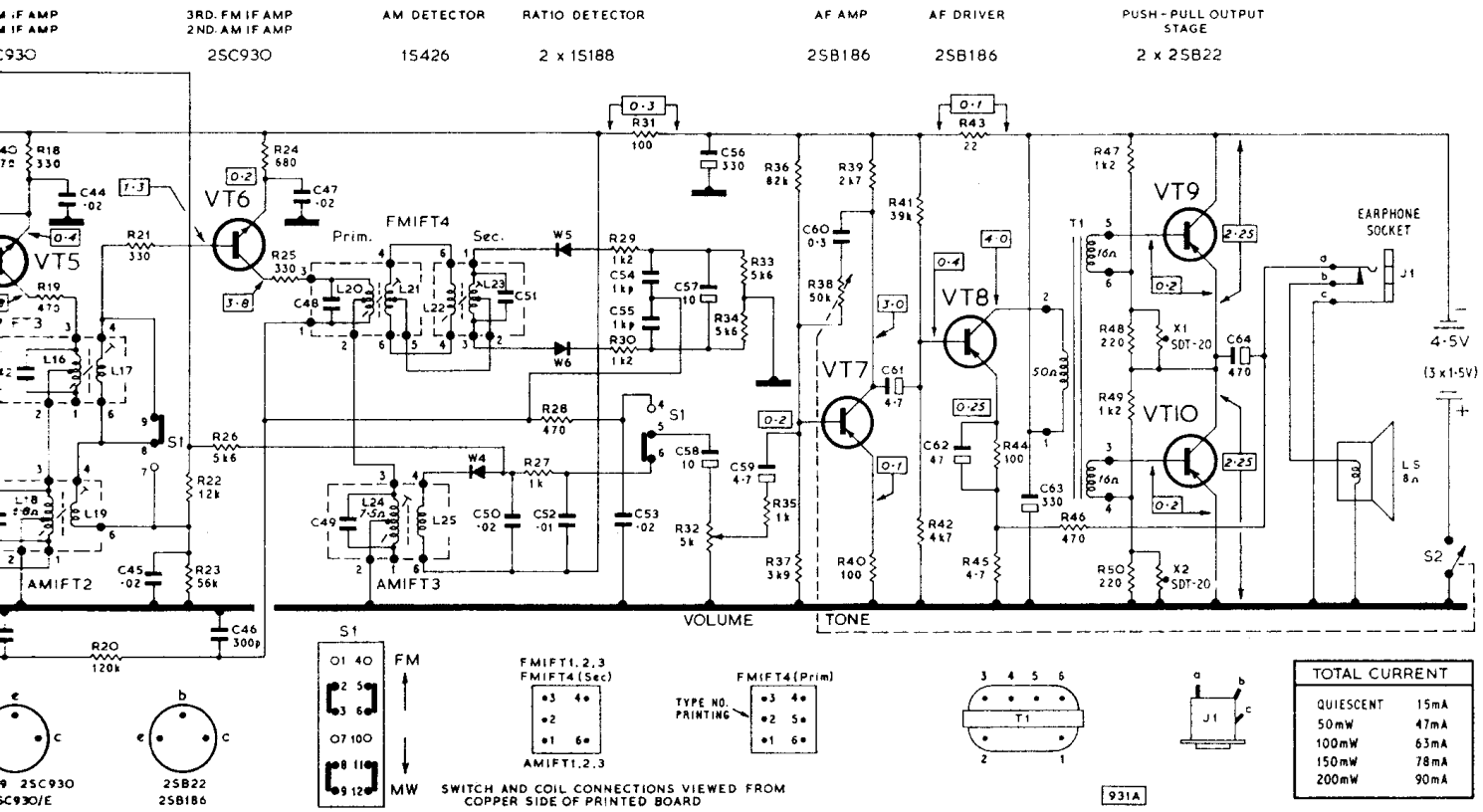
(All fixed resistors 10% tolerance, ⅓ watt)

REF	DESCRIPTION & PART NO.	LOC
R1	2·7k Ω, Part VT1 base bias pot. divider	B2
R2	33k Ω, Part VT1 base bias pot. divider	B2
R3	150 Ω, VT1 emitter stabilizing	B2
R4	2·2k Ω, VT2 emitter stabilizing	B3
R5	120k Ω, VT2 base bias	B3
R6	100 Ω, VT2 AM limiting	B3
R7	100k Ω, FM AFC feed	BC3
R8	100 Ω, FM supply dropper	C3
R9	220 Ω, FM RF stopper	D3,4
R10	4·7k Ω, Part VT3 base bias pot. divider	C3
R11	4·7k Ω, Part VT3 base bias pot. divider	CD3
R12	1·2k Ω, VT3 emitter stabilizing	CD3
R13	6·8k Ω, FM AGC decoupling	D3,4
R14	330k Ω, VT4 base bias	D2
R15	1·8k Ω, VT4 emitter stabilizing	D2,3
R16	4·7 Ω, MW oscillator harmonic suppressor	D3
R17	22k Ω, VT5 base bias	F3,4
R18	330 Ω, VT5 emitter stabilizing	D3
R19	470 Ω, VT5 AM limiting	D3
R20	120k Ω, Part FM AFC IF filter	E2,3
R21	330 Ω, VT6 RF stopper	E2
R22	12k Ω, VT6 AGC feed	DE3
R23	56k Ω, VT6 base bias	E2

Continued

Resistors—continued

REF	DESCRIPTION & PART NO.	LOC
R24	680 Ω, VT6 emitter stabilizing	E3
R25	330 Ω, VT6 AM limiting	E2
R26	5·6k Ω, VT5 AGC feed and W4 load	F3
R27	1k Ω, Part AM IF filter	F3
R28	470 Ω, Part de-emphasis	F2
R29	1·2k Ω, Ratio detector diode equalizing	F3
R30	1·2k Ω, Ratio detector diode equalizing	F2
R31	100 Ω, Supply dropper and decoupling	F2
R32	5k Ω, Log. pot., Volume control, 00X3-154	H1
R33	5·6k Ω, W5 load	F3
R34	5·6k Ω, W6 load	F2
R35	1k Ω, VT7 RF stopper	F3,4
R36	82k Ω, Part VT7 base bias pot. divider	G3
R37	3·9k Ω, Part VT7 base bias pot, divider	G3
R38	50k Ω, Lin. pot., Tone control, incl. S2, 00X3-155 ...	G1
R39	2·7k Ω, VT7 collector load	G3
R40	100 Ω, VT7 emitter stabilizing	G3
R41	39k Ω, Part VT8 base bias pot. divider	GH3
R42	4·7k Ω, Part VT8 base bias pot. divider	H3
R43	22 Ω, Supply dropper and decoupling	G2, 3
R44	100 Ω, VT8 emitter stabilizing	H3
R45	4·7 Ω, VT8 negative feedback	H3
R46	470 Ω, Negative feedback	H3
R47	1·2k Ω, Part VT9 base bias pot, divider	GH2
R48	220 Ω, Part VT9 base bias pot. divider	H2
R49	1·2k Ω, Part VT10 base bias pot. divider	H2
R50	220 Ω, Part VT10 base bias pot. divider	H2



CIRCUIT DIAGRAM

Figures in rectangles are typical DC voltages measured with a 20,000 Ω/volt meter. Except where otherwise shown, they were taken with respect to the positive battery line. DC resistance of inductors is shown where it exceeds 1 Ω.

Warning: As FM IFT4 primary has six equally spaced pins, should it be necessary to replace this item, note position of Type No. printing on can and fit replacement with printing in same position.

INDUCTORS

REF	DESCRIPTION & PART NO.	LOC
L1-L2	FM aerial coupling coils, 00X3-401	B2
L3	FM RF tuning coil, 00X3-402	A3
L4	Part 10·7 MHz rejector, 00X3-403	B3
L5	FM oscillator coil, 00X3-404	BC4
L6-L7	FM IFT1, 00X3-407	C4
L8-L9	FM IFT2, 00X3-408	CD4
L10-L11	AM aerial coils (ferrite rod aerial), 00X3-405	C1
L12-L13	AM oscillator coils, 00X3-406	D1
L14-L15	AM IFT1, 00X3-412	DE1
L16-L17	FM IFT3, 00X3-409	D4
L18-L19	AM IFT2, 00X3-413	E1
L20-L21	FM IFT4 primary, 00X3-410	EF1
L22-L23	FM IFT4 secondary, 00X3-411	FG3
L24-L25	AM IFT3, 00X3-414	EF4
T1	Push-pull driver transformer, 00X3-127	H3

RT NO.	LOC
lizing	E3
... ...	E2
and W4 load	F3
... ...	F3
... ...	F2
liode equalizing	F3
liode equalizing	F2
nd decoupling	F2
control, 00X3-154	H1
... ...	F3
... ...	F2
... ...	F3,4
as pot. divider	G3
ias pot, divider	G3
ontrol, incl. S2, 00X3-155 ...	G1
ad	G3
ilizing	G3
as pot. divider	GH3
ias pot. divider	H3
d decoupling...	G2, 3
ilizing	H3
dback	H3
k	H3
ias pot, divider	GH2
as pot. divider	H2
bias pot. divider	H2
ias pot. divider	H2

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

ALIGNMENT DATA

During alignment it is recommended that new batteries are used and that the chassis is fitted into the cabinet front cover.

A signal from a suitable AM/FM signal generator is required for circuit alignment. Tuning indication is best obtained either with an output meter having an impedance of 8 ohms connected in place of the loudspeaker, or a Model 8 Avometer, set to the 10V AC range, connected in parallel with the loudspeaker. In addition a centre-zero meter (25-0-25μA) with a 22kΩ series resistor is required for checking FM discriminator balance. Throughout alignment the signal level to the receiver should be adjusted to maintain an audio output of approximately 50mW, with the volume control set to maximum, to avoid alignment errors due to AGC action.

AM IF Circuits

Switch to MW and turn gang to maximum capacitance. Apply a 472 kHz (30% modulated) signal via a 0·1μF capacitor across C27 (aerial tuning section of gang), then adjust AM IFT3, AM IFT2 and AM IFT1 (in that order) for maximum output.

Repeat alignment until no further improvement results.

AM RF Circuits

Inject MW signals (30% modulated) via a loop loosely coupled to the ferrite rod aerial. Align in the following order:

Range	Inject	Cursor Position	Adjust for max.
MW	600 kHz 1500 kHz	500 metres 200 metres	L12-L13, L10-L11* C32, C28

** Adjust by sliding coil along ferrite rod.*

Repeat adjustments until no further improvement results.

FM IF Circuits

Switch to FM and inject 10·7 MHz (25 kHz deviation) signals via a 0·1μF capacitor into the base of VT2. Adjust L20/L21, L16/L17, L8/L9 and L6/L7 for maximum reading on output meter.

Connect the centre-zero meter between the junction of S1/5 and chassis. Adjust L22/L23 for a balanced output (zero indication) on center-zero meter). Repeat all adjustments to obtain maximum output consistent with zero reading on centre-zero meter.

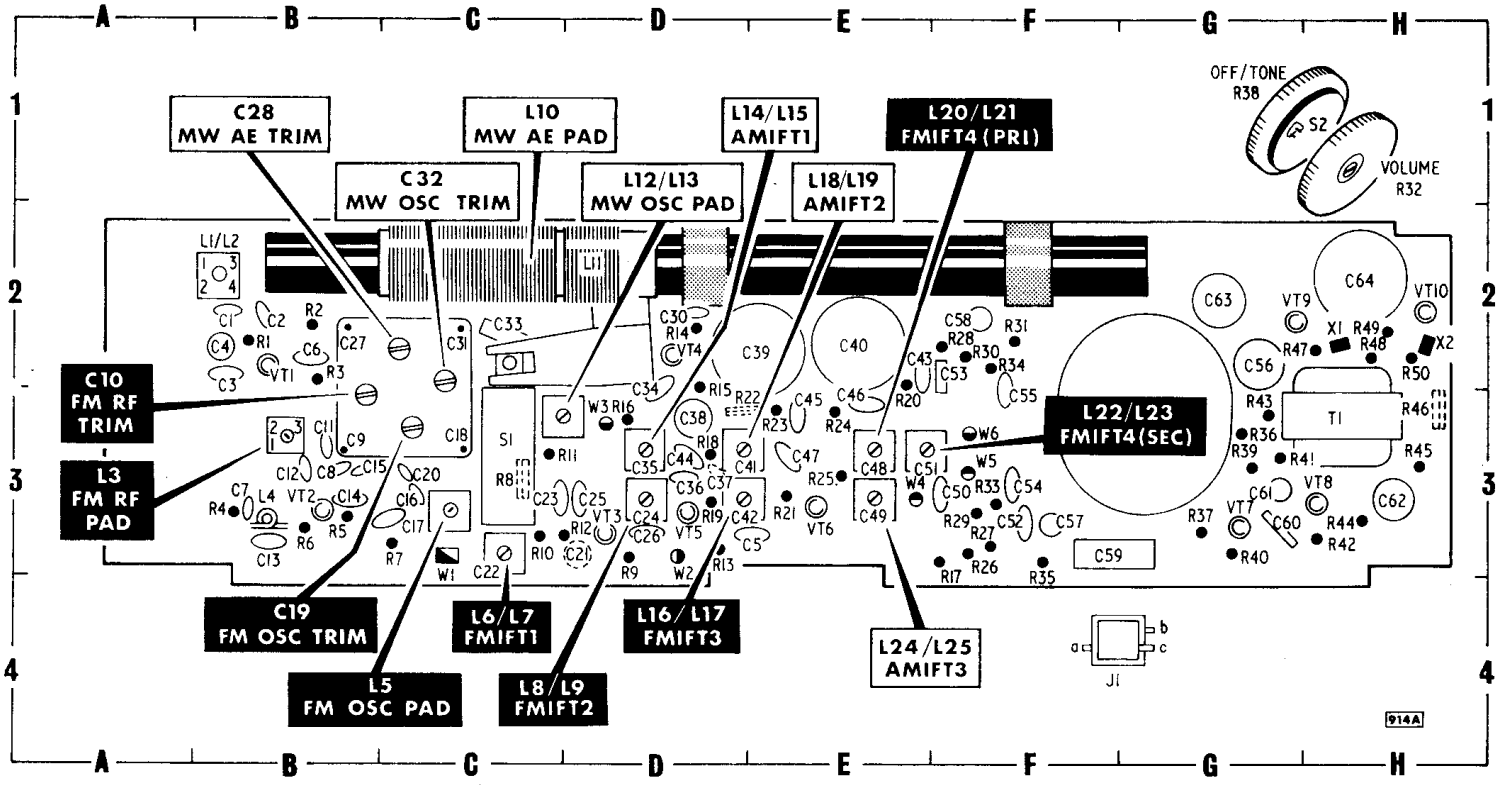
FM RF Circuits

Inject FM signals (25 kHz deviation) into telescopic aerial and adjust as follows for maximum reading on output meter:

Range	Inject	Cursor position	Adjust for max.
FM	88 MHz 96 MHz	88 MHz 96 MHz	L5, L3 C19, C10

Repeat adjustments until no further improvement results.

COMPONENT LAYOUT



DRIVE CORD ARRANGEMENT