SERVICE NOTES

Slide the battery cover downwards to release it and remove the battery. Unscrew the handle fixing studs to free the back cover. Note spring washer on handle pivot screw between handle and case.

For access to the copper side of the printed board, pull off the tuning knob, remove screw and washer securing printed board then gently prise up the lower end of the board which is clipped into moulded lugs on the case.

If the loudspeaker requires replacement, lever up one claw of each fixing clip to loosen and use new clips to secure the replacement loudspeaker.

CIRCUIT NOTES

FM Operation

The telescopic aerial applies FM signals, developed across aerial coil L1, to the base of VT1.

The collector circuit of VT1 is tuned by L2, C2, C3, C5 and C59. The amplified signal is coupled by C6 into the emitter of grounded base oscillator and mixer transistor VT2.

The collector of VT2 is loaded by oscillator coils L4, L5, tuned by C10, C13, C14 and C15 with C16 providing feedback into the emitter of VT2. L3 and C12 form a 10·7 MHz FM IF rejector with C11 acting as an input phase corrector at oscillator frequencies. AM transistor VT3 is rendered inoperative when contacts 1 and 2 open to disconnect its emitter and base supply line connection from the negative rail.

AM Operation

Medium and Long wave windings and base coupling coil L11 on the ferrite rod are selected by switch S2A and coupled by C26 to the base of AM oscillator-mixer transistor VT3. FM transistors VT1 and VT2 are rendered inoperative when contacts 2 and 3 of switch S1B open to disconnect their emitter and base supply line connection from the negative rail.

W4 Diode Operation

The diode (W4) is biased by VT8 collector current and acts as a variable resistance which is sensitive to voltage and temperature variations. The voltage developed across W4 equals the sum of the nominal output transistor (VT9 and VT10) base/emitter voltages and so determines the correct quiescent operating conditions. During low ambient temperature conditions the resistance of W4 increases thus compensating for the falling current of the output transistors. This effect also takes place in the event of a falling battery voltage. The diode W4 also assists thermal stability at high temperatures and opposes high current drain from the battery.

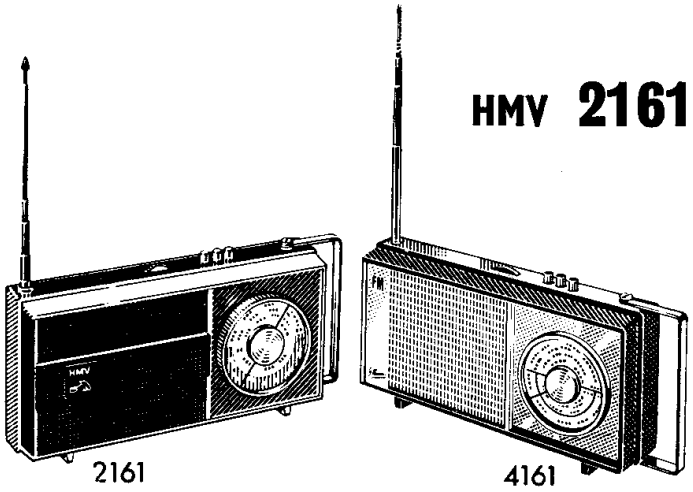
BRC

SERVICE MANUAL

Price: Two Shillings and Sixpence

MARCONIPHONE 4161

HMV 2161



2161 4161

SPECIFICATION

Battery: 9V Drydex DT6, Ever Ready PP6, Vidor VT6 or equivalent.

Waveranges: Medium Wave: 185–565 metres (1620–530 kHz.: Long Wave: 1120–2026 metres (268–148 kHz). VHF-FM: 87·5–100 MHz. Short Wave: 17·6–51 metres (17–5·9 MHz).

Aerials: MW and LW: 6″ long × 3″ dia. ferrite rod. VHF-FM 7-section telescopic aerial (24″ extended).

Loudspeaker: 3⅜″ round, 15 ohm impedance, PM moving coil.

Sockets: Car aerial socket and earphone or tape recorder socket.

Power Output: 300 mW.

Case Dimensions (excluding handle): 5″ high × 2⅜″ deep × 9″ wide.

"Marconiphone" products are made to a standard of design and quality approved by The Marconiphone Co. Ltd., registered proprietor of the name and signature trade-marks.

"His Master's Voice" products are made to a standard of design and quality approved by The Gramophone Co Ltd., registered proprietor of the name and trade-mark.

BRITISH RADIO CORPORATION LIMITED

SERVICE DEPOTS

LONDON
PO Box No. 121, Eley's Estate, Angel Rd., Edmonton, N.18
Tel. 01–807 3060 *Ansafone Spares Tel. 01–807 6332*

BIRMINGHAM
24 Sheepcote St., 15 *Tel. 021–643 9988*

GLASGOW
160/162 Battlefield Rd., S.2
Tel. Langside 9251/2/3/4

THORN

British Radio Corporation Limited is a Member of The Thorn Group

ALIGNMENT DATA

A signal from a suitable AM-FM generator is required. Tuning indication is best obtained either with an output meter having an impedance of 15 Ω and connected in place of the loudspeaker or a Model 8 Avometer, set to the 10V AC range, connected in parallel with the loudspeaker.

Throughout alignment the signal input level to the receiver should be adjusted to maintain the 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

Select MW and turn gang to maximum capacitance. Apply a 475 kHz modulated signal through a 0·1μF capacitor between tag 4 and frame of tuning gang. Adjust L28/29, L20/21 and L15/16 in that order for maximum output.

Repeat in the same order until no further improvement is obtainable.

AM RF Circuits

MW must be aligned first. Medium and Long wave signals should be injected via a loop loosely coupled to the ferrite rod aerial. Set signal generator and cursor as indicated in the table and make all adjustments for maximum output.

Range	Inject	Cursor position	Adjust
MW	600 kHz 1500 kHz	Centre of 500 m Centre of 200 m	L17, L10* C39, C20
LW	200 kHz	Centre of 1500 m	C61, L12*

*Adjust by sliding coil former along ferrite rod.

Repeat adjustments as necessary to obtain maximum output and accurate calibration.

FM IF Circuits

Select FM. Inject 10·7 MHz (25 kHz deviation) signal, via a 0·1μF blocking capacitor, between tag 2 and frame of tuning gang and peak L24/25, L22/23 and L8/9 for maximum output. Switch signal generator to AM (30% modulation) and adjust L26/27 for minimum output (AM rejection).

Repeat as necessary for maximum FM output and minimum AM output.

Transfer signal generator input to junction of R7/C12 and peak L6/7 for maximum output.

FM RF Circuits

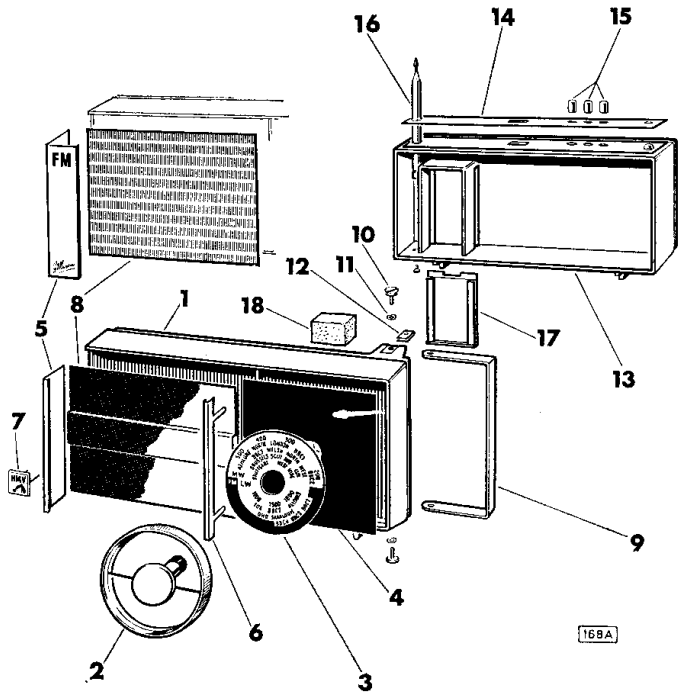
Inject FM RF signals into telescopic aerial lead with aerial disconnected.

Range	Inject	Tune to centre of	Adjust
FM	88 MHz 96 MHz	'A' in 'Athlone' 96 MHz calibration	L4, L2† C13, C3

†Adjust by slightly opening or closing coil turns.

Repeat in the same order until no further improvement results.

REPLACEMENT PARTS LIST

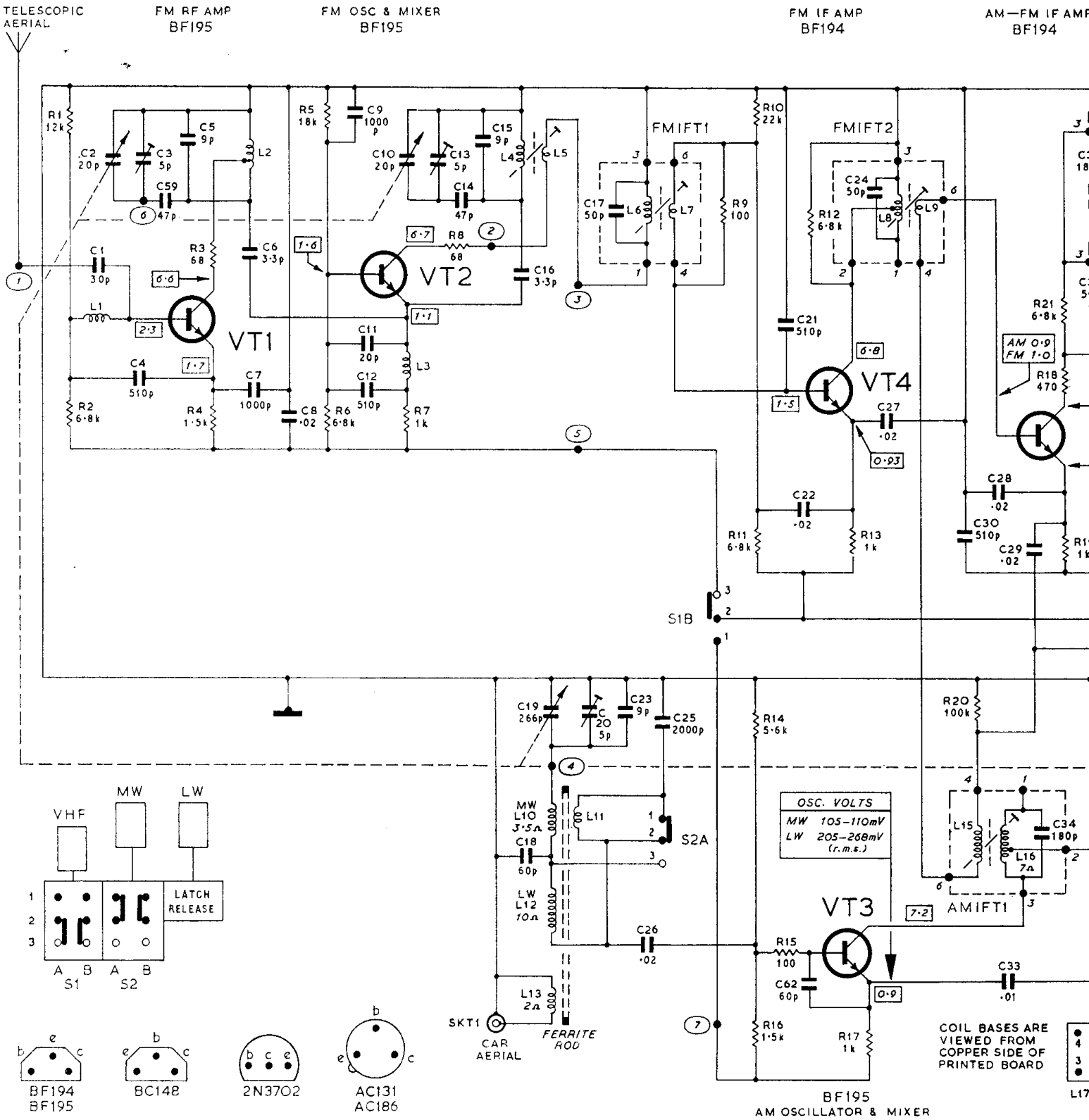


Cabinet Assembly

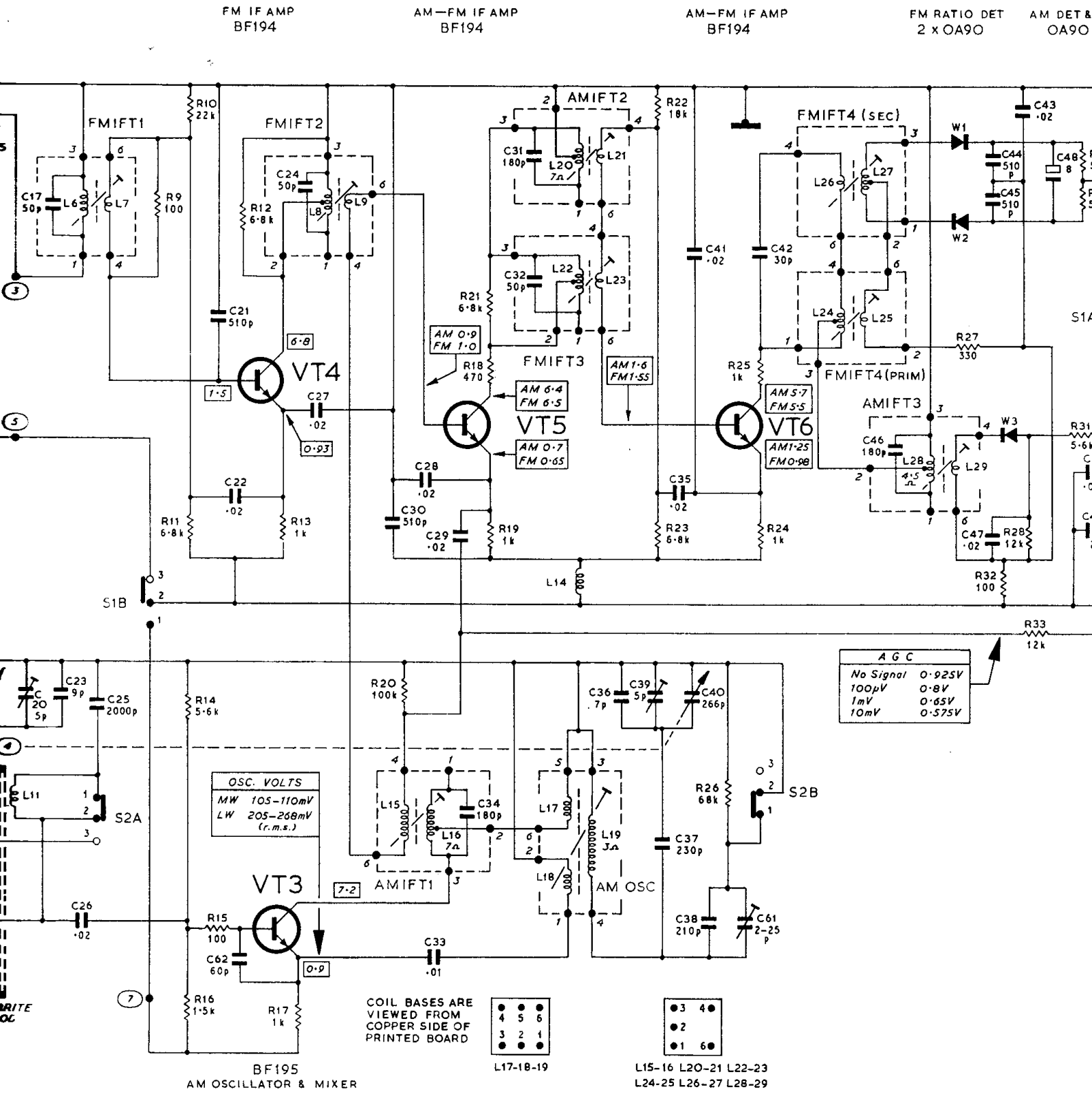
	2161	4161
(1) Cabinet front—Model 2161 (inc. items 3–8)	3M4–849	
Cabinet front—Model 4161 (inc. items 4, 5, 6 & 8)		3M4–856
(2) Tuning dial knob (clip 3L3–091)	3C0–160/001	3C0–160/001
(3) Scale backing disc	3A7–413	—
(4) Scale facia plate	3A4–094/001	3A4–094/002
(5) End trim	3A2–174	3A2–176
(6) Centre trim	3A2–175	3A2–135
(7) Emblem	3A6–033	—
(8) Speaker grille	3A2–124	3A4–123
(9) Handle	3A9–064	3A9–064
(10) Handle pivot screw	3L6–089	3L6–089
(11) Spring washer	3L6–068	3L6–068
(12) Cabinet front retaining 'U' clip	3L4–030	3L4–030
(13) Cabinet back including top escutcheon ...	3M4–847	3M4–855
(14) Top escutcheon	3A2–137/001	3A2–137/002
(15) Push-button	3C0–033/001	3C0–033/001
(16) Telescopic aerial (screw WB06KP04) ...	3F0–033/002	3F0–033/002
(17) Battery door	3C8–079/001	3C8–079
(18) Rubber cushion (fitted between cabinet front and ferrite rod)	3L6–081	3L6–081

Chassis Assembly

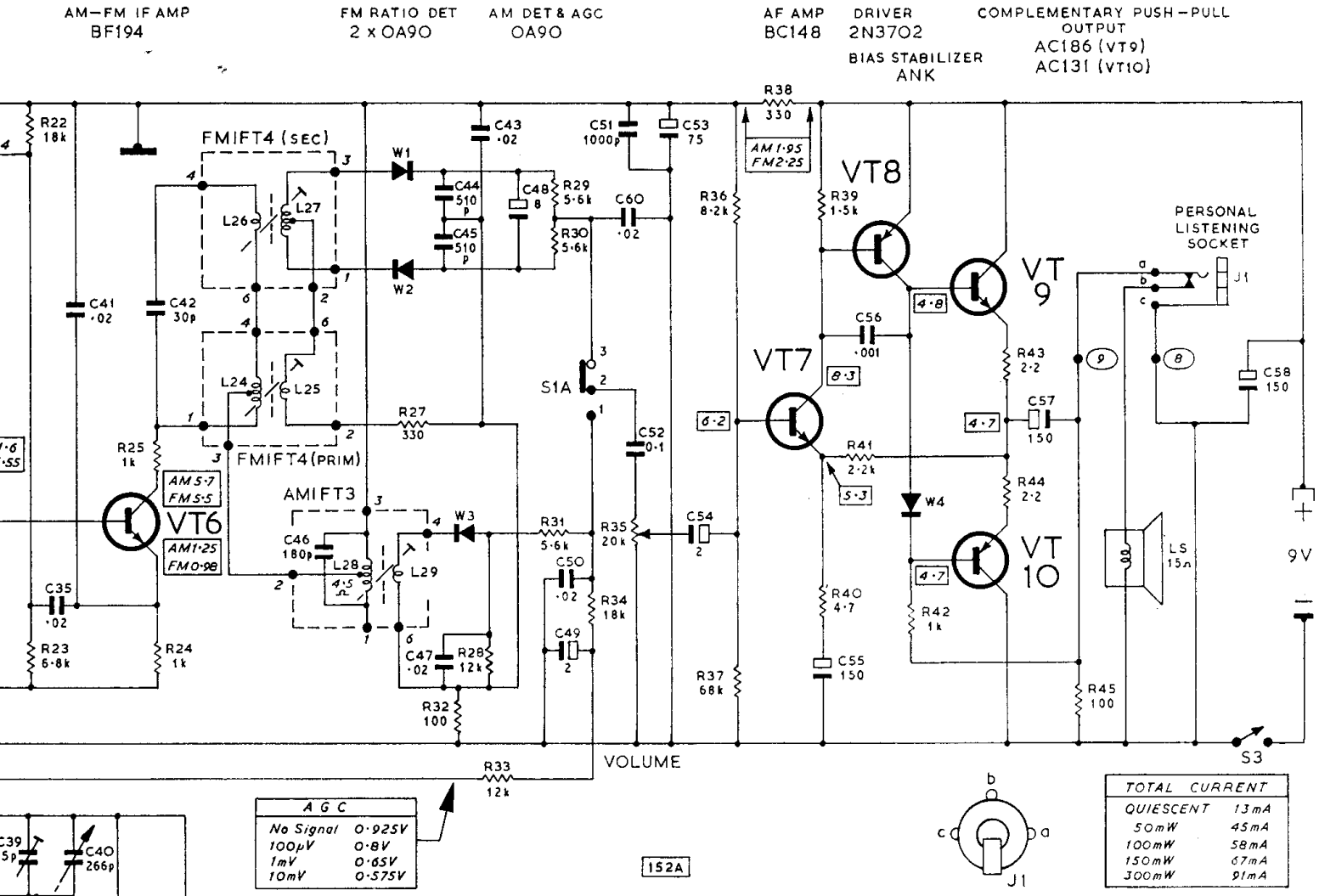
Printed board—PC190 (screw SZ03HP04; washer WPMB04) ...	0V6–190
Gang mounting bracket	3B1–111
Mounting cradle for ferrite rod aerial	3B6–013
Cradle bracket	3B1–010
Printed board screen (affixed to cabinet back)	3B1–252
Battery connector	3F6–028/001



CIRCUIT DIAGRAM M



CIRCUIT DIAGRAM MODELS 2161 & 4161



PLEASE NOTE

All voltages were measured with a 20,000 Ω/volt meter and are with respect to the negative supply line of each transistor except where otherwise shown. Ringed figures indicate printed board tag connection points. DC resistance readings are shown against inductors where these are 1 Ω or greater.

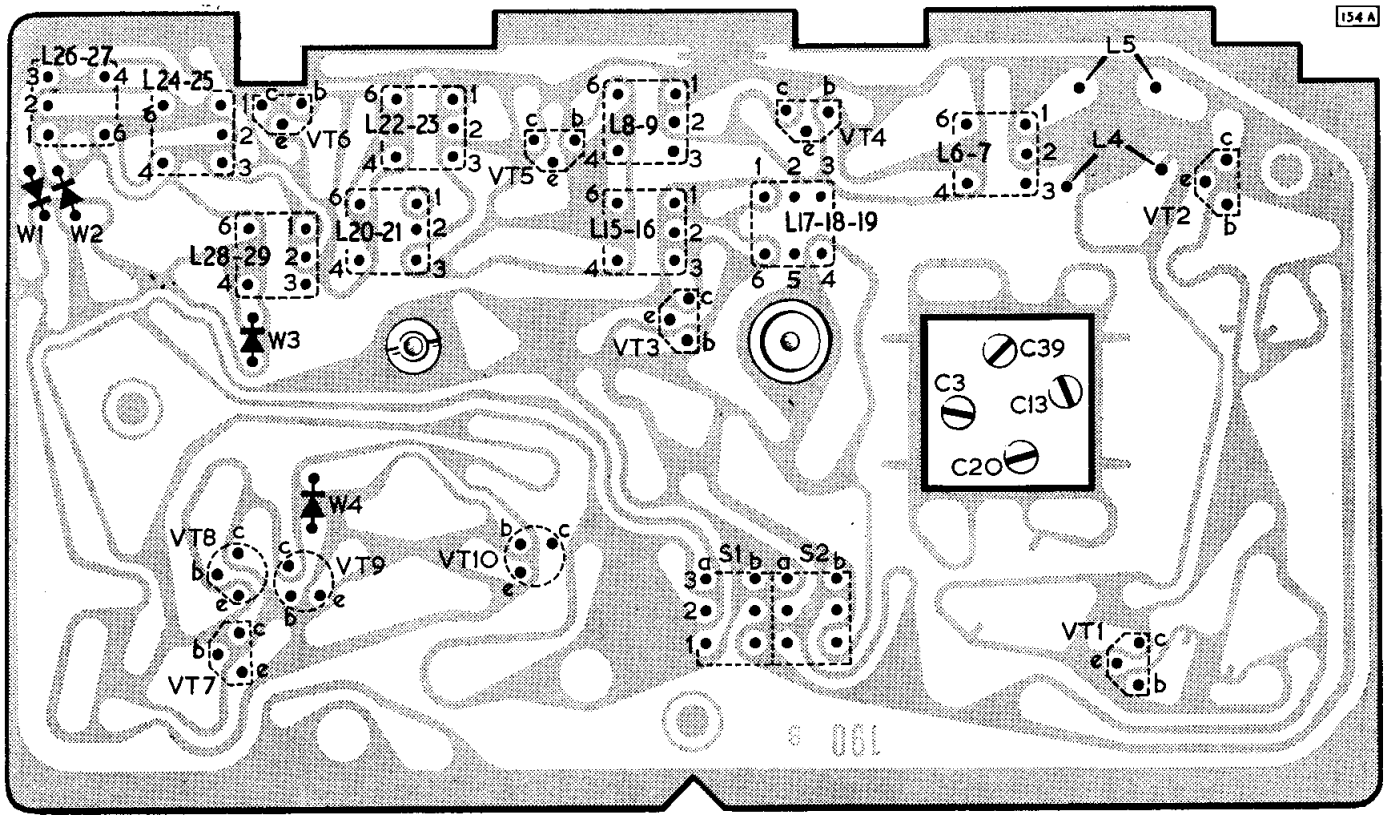
W1, W2 & W3 Alternatives

Diodes W1, W2 and W3, type OA90, may be replaced with type AA112.

VT9, VT10 & W4 Alternatives

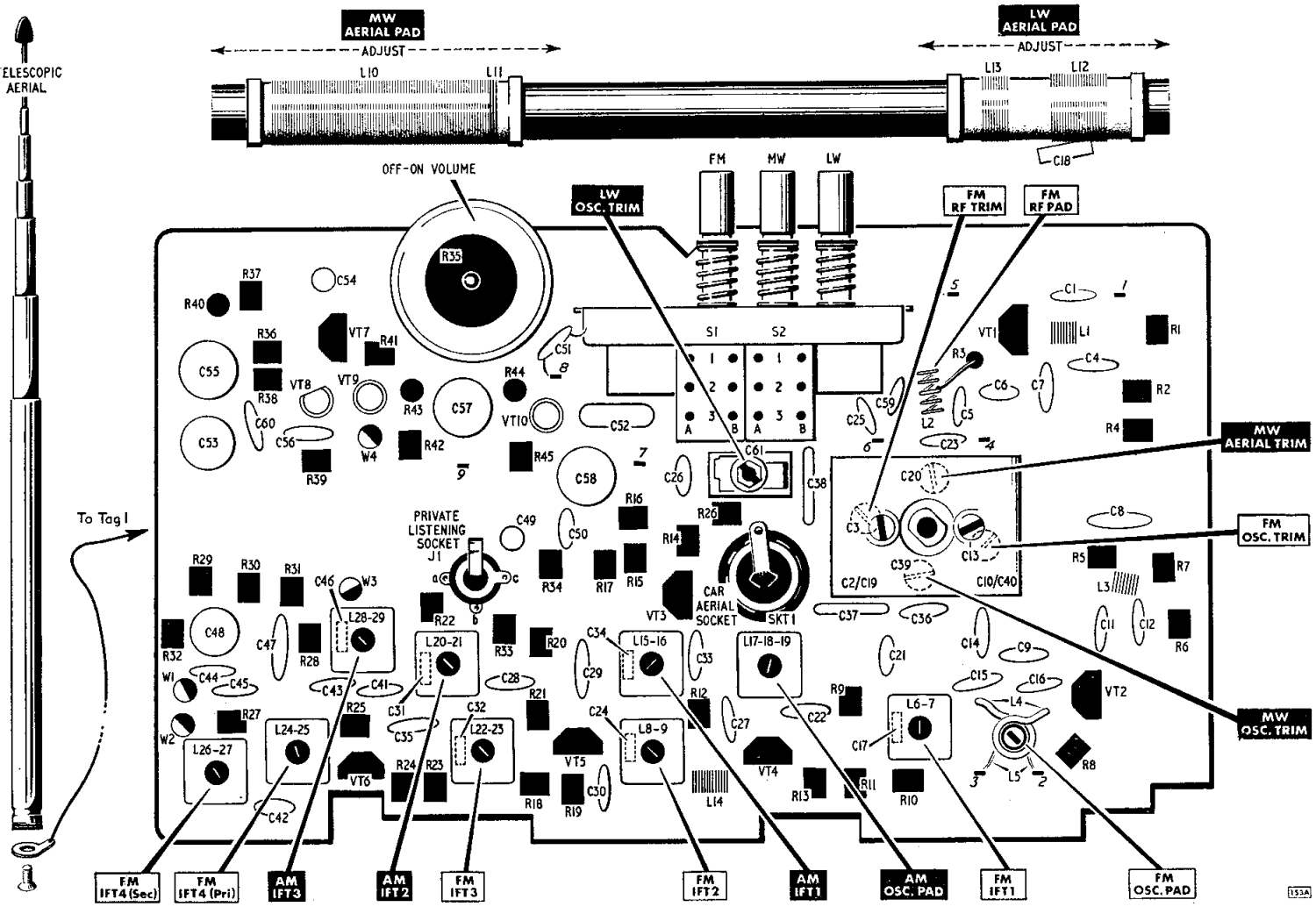
In some models alternative output transistors (VT9 & VT10) are used in conjunction with an alternative bias stabilizer (W4) as listed below:

VT9 (NPN)	VT10 (PNP)	Bias Stabilizer (W4)
AC176	AC153	A8
AC141	AC142	ATES D3



C62 (if fitted) is located on copper side of board between base & emitter connections of VT3

Copper side of Printed Board



Component Locations & Alignment Adjustments

COMPONENT DETAILS

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

CAPACITORS

Ref.	Value	Tol.	Rating	Function	Part No.
C1	30pF	5%	500V	FM aerial coupling	1051
C2	20pF	Variable		FM RF amp. tuning	*
C3	5pF	Preset		FM RF amp. trimmer	*
C4	510pF	10%	500V	VT1 neutralizing	1054
C5	9pF	5%	500V	FM RF amp. fixed trimmer	1050
C6	3·3pF	±0·25pF	500V	Mixer signal coupling	1058
C7	1000pF	20%	500V	VT1 emitter bypass	1055
C8	0·02μF	−20+80%	50V	FM supply line RF bypass	1057
C9	1000pF	20%	500V	VT2 base decoupling	1055
C10	20pF	Variable		FM osc. tuning	*
C11	20pF	5%	500V	Osc. phase correction	1053
C12	510pF	10%	500V	Part 10·7 MHz rejection	1054
C13	5pF	Preset		FM osc. trimmer	*
C14	47pF	5%	500V	FM osc. fixed padder	1052
C15	9pF	5%	500V	FM osc. fixed trimmer	1050
C16	3·3pF	±0·25pF	500V	FM osc. feedback	1058
C17	50pF			L6 tuning Inside FM	IFT1
C18	60pF	±2½%	2V	LW fixed aerial trimmer	1M89
C19	266pF	Variable		AM aerial tuning	*
C20	5pF	Preset		MW aerial trimmer	*
C21	510pF	10%	500V	RF decoupling	1054
C22	0·02μF	−20+80%	50V	VT4 base bias decoupling	1057
C23	9pF	5%	500V	MW fixed aerial trimmer	1050
C24	50pF			L8 tuning Inside FM	IFT2
C25	2000pF	20%	500V	AM aerial bottom end coupling	1056
C26	0·02μF	−20+80%	50V	VT3 signal coupling	1057
C27	0·02μF	−20+80%	50V	VT4 emitter bypass	1057
C28	0·02μF	−20+80%	50V	VT5 emitter bypass	1057
C29	0·02μF	−20+80%	50V	VT3/VT5 AM IF coupling	1057
C30	510pF	10%	500V	RF decoupling	1054
C31	180pF			L20 tuning Inside AM	IFT2
C32	50pF			L22 tuning Inside FM	IFT3
C33	0·01μF	20%	50V	AM osc. emitter coupling	7M82
C34	180pF			L16 tuning Inside AM	IFT1
C35	0·02μF	−20+80%	50V	VT6 base bias decoupling	1057
C36	7pF	±0·25pF	500V	AM osc. fixed trimmer	1065
C37	230pF	2%	350V	MW osc. padder	5M37
C38	210pF	2%	350V	LW osc. fixed trimmer	7M60
C39	5pF	Preset		MW osc. trimmer	*
C40	266pF	Variable		AM osc. tuning	*
C41	0·02μF	−20+80%	50V	VT6 emitter bypass	1057
C42	30pF	5%	500V	L24, L26 tuning	1051
C43	0·02μF	−20+80%	50V	FM detector decoupling	1057
C44	510pF	10%	500V	Ratio detector decoupling	1054
C45	510pF	10%	500V		1054
C46	180pF			L28 tuning Inside AM	IFT3
C47	0·02μF	−20+80%	50V	Part AM IF filter	1057
C48	8μF	Elec.	6V	Ratio detector stabilizing	0E0–222/02
C49	2μF	Elec.	25V	AGC decoupling	0E0–230/13
C50	0·02μF	−20+80%	50V	Part AM IF filter	1057
C51	1000pF	20%	500V	RF bypass	1043
C52	0·1μF	20%	50V	AM-FM audio coupling	7M82
C53	75μF	Elec.	9V	Supply line decoupling	0E0–228/04
C54	2μF	Elec.	25V	VT7 audio coupling	0E0–230/13
C55	150μF	Elec.	9V	VT7 NFB DC blocking	0E0–229/11
C56	1000pF	20%	500V	Tone correction	1055
C57	150μF	Elec.	9V	Loudspeaker signal coupling	0E0–229/11
C58	150μF	Elec.	9V	Supply decoupling	0E0–229/11
C59	47pF	5%	500V	FM RF amp. fixed padder	1052
C60	0·02μF	−20+80%	50V	RF decoupling	1057
C61	2–25pF	Preset		LW osc. trimmer	3E4–015
C62†	60pF	2½%	20V	VT3 stabilizing	1M89

*Tuning gang—Part No. 3E4–041

†Not fitted in a few models

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

RESISTORS

All 10% tolerance, ¼ watt carbon unless otherwise stated.

Ref.	Value	Rating	Function	Part No.
R1	12K Ω		VT1 base bias	5B75
R2	6·8K Ω		potential divider	5B73
R3	68 Ω		FM RF stopper	9A46
R4	1·5K Ω		VT1 emitter stabilizing	5B70
R5	18K Ω		VT2 base bias	5B76
R6	6·8K Ω		potential divider	5B73
R7	1K Ω		VT2 emitter stabilizing	5B69
R8	68 Ω		VT2 RF stopper	5B65
R9	100 Ω		L7 damping	5B66
R10	22K Ω		VT4 base bias	5B77
R11	6·8K Ω		potential divider	5B73
R12	6·8K Ω		L8 damping	5B73
R13	1K Ω		VT4 emitter stabilizing	5B69
R14	5·6K Ω		Part VT3 bias pot. divider	5B72
R15	100 Ω		RF stopper	5B66
R16	1·5K Ω		Part VT3 bias pot. divider	5B70
R17	1K Ω		VT3 emitter stabilizing	5B69
R18	470 Ω		VT5 AM limiting	5B68
R19	1K Ω		VT5 emitter stabilizing	5B69
R20	100K Ω		VT5 base bias	5B80
R21	6·8K Ω		L22 damping	5B73
R22	18K Ω		VT6 base bias	5B76
R23	6·8K Ω		potential divider	5B73
R24	1K Ω		VT6 emitter stabilizing	5B69
R25	1K Ω		VT6 AM limiting	5B69
R26	68K Ω		MW osc' damping	5B79
R27	330 Ω		Ratio detector current limiter	5B67
R28	12K Ω		AM detector load	5B75
R29	5·6K Ω		Ratio detector load	5B72
R30	5·6K Ω			5B72
R31	5·6K Ω		AM IF filter	5B72
R32	100 Ω		DC dropper and decoupler	5B66
R33	12K Ω		AGC decoupling	5B75
R34	18K Ω		AGC feed	5B76
R35	20K Ω		Volume control with switch S3	3E1–053/001
R36	8·2K Ω	5%	VT7 base bias	5B74
R37	68K Ω	5%	potential divider	5B78
R38	330 Ω		DC dropper & decoupler	5B67
R39	1·5K Ω		VT7 collector load	5B70
R40	4·7 Ω	±½ Ω	VT7 NFB current limiting	5B64
R41	2·2K Ω		Negative feedback	5B71
R42	1K Ω		VT8 collector load	5B69
R43	2·2 Ω	±½ Ω	VT9 emitter limiting	5B63
R44	2·2 Ω	±½ Ω	VT10 emitter limiting	5B63
R45	100 Ω		Output transistor protective load	5B66

INDUCTORS

Ref.	Function	Part No.
L1	FM aerial coil	3D8–002
L2	FM RF coil	3D1–178
L3	10·7 MHz rejector	3D8–002
L4, L5	FM osc. coil assembly	3D1–171
L6, L7	FM IFT1	3D0–055
L8, L9	FM IFT2	3D0–055
L10, L11, L12, L13	Ferrite rod AM aerial assembly	3F0–044
L14	RF choke	3D8–003
L15, L16	AM IFT1	3D0–036
L17, L18, L19	AM osc. coil	3D1–070
L20, L21	AM IFT2	3D0–037
L22, L23	FM IFT3	3D0–055
L24, L25	FM IFT4 pri.	3D0–050
L26, L27	FM IFT4 sec.	3D0–051
L28, L29	AM IF3	3D0–038

MISCELLANEOUS

Ref.	Description	Part No.
J1	Earphone jack socket (earphone assembly 3D7–001)	3F6–043
LS	Loudspeaker (push-on-fix 3L2–097; rubber washer 3L6–017)	3E3–034
S1–2	Wavechange switch assembly	3M4–989
SKT1	Car aerial socket (spacing washer 3L7–017/001; push-on-fix 3L2–092)	3F6–025/001
W1	0A90 Ratio detector	0V4–610
W2	0A90 Ratio detector	0V4–610
W3	0A90 AM detector	0V4–610
W4	ANK Bias stabilizer	—