

# SERVICING NOTES

## Access for Service

Slide battery cover open then remove and disconnect battery. Pull off volume and tuning knobs then take out the three in-line countersunk screws from underside of cabinet. Prise open cabinet back section, lift off battery compartment slide and pull cabinet back section downwards to clear slot in tuning scale escutcheon.

In addition, to release moulded tuning panel and printed board assembly, take out three screws and washers securing printed board and moulded tuning panel to front of cabinet and also countersunk screw securing aerial socket bracket to cabinet base.

From tag 12 on printed board unsolder cabinet earthing lead(s) then pull chassis down and outwards to free it from the cabinet.

To remove the loudspeaker from the cabinet back, lever up one claw of each fixing clip to loosen, and use new clips to refit.

## Car Aerial Adjustment (C4)

This adjustment is provided to allow the permeability tuner input circuits to be matched for optimum sensitivity into differing lengths of aerial feeder and various types of car aerial.

Trimmer C4 is accessible following withdrawal of metal plug from underside of cabinet. Plug in car aerial feeder, select MW and depress CAR button. Tune receiver to any weak station at high frequency end of range (200–300 metres) and, using trimming tool provided, turn trimmer C4 fully clockwise and then anti-clockwise for maximum output which will normally occur within three turns from fully clockwise position.

A metal screwdriver must not be used.

## ALIGNMENT DATA

A signal from a suitable generator, 30% amplitude modulated by an AF signal, is required for circuit alignment. Tuning indication is best obtained with an output meter having an impedance of  $5\Omega$  and connected in place of the loudspeaker, or a Model 8 Avometer, set to the 2.5V 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 50 mW (0.5V on Avometer) with the volume control set at maximum in order to avoid alignment error due to AGC action.

## IF Circuits

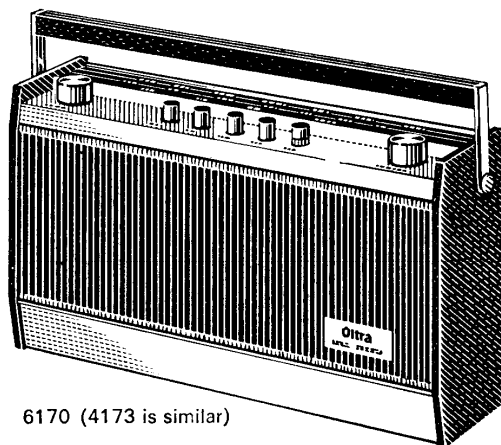
Depress MW button and turn gang to maximum. Apply a 475 kHz modulated signal through a  $0.01\mu\text{F}$  capacitor across C1, the aerial section of the tuning gang. Adjust L17, L16, L13–14, L12 and L9–10 in that order for maximum output. Repeat in the same order until no further improvement is obtainable.

*continued overleaf*

# BRC service manual

Price: 7½p

MARCONIPHONE **4173**  
ULTRA **6170**



6170 (4173 is similar)

The two models are electrically identical, differing only in presentation details. Each model operates from a 9V battery (PP9 or equivalents) and provides reception in the MW and LW bands. Special features include permeability tuning which is switched into circuit in place of the ferrite rod when CAR button is depressed, private listening socket (5–100 $\Omega$  impedance) and tape socket (minimum impedance 20k $\Omega$ ).

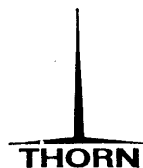
## BRITISH RADIO CORPORATION LIMITED

### SERVICE DEPOTS

**LONDON:**  
P.O. Box No. 121, Lea Valley Trading Estate, Angel Road,  
Edmonton, London, N18 3BP. *Tel. 01-807 3060*  
*Spare Parts Tel. 01-807 0791; Answering Service: 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*



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RF Circuits

With gang at maximum, check that left-hand edge of cursor coincides with set zero pip or notch in scale backing at left-hand end of scale window. Slide cursor along drive cord to correct any error in calibration. MW must be aligned first. Signals should be injected via a loop loosely coupled to the ferrite rod aerial. Pad and trim markers are provided by calibration pips on scale or notches cut in the scale backing plate.

Range	Inject	Cursor Position	Adjust for max.
MW	600 kHz 1500 kHz	500m pad marker 200m trim marker	L6, L1/2* C22, C2
LW	220 kHz	LW calibration marker	C18, L3*

\*Adjust by sliding coil former along aerial rod.

Repeat as necessary for maximum output and calibration.

Car Aerial Tuner

MW. Depress MW and CAR buttons and set MW car aerial pad (L4) adjusting screw (cam follower) so that an equal amount of thread appears at each end of its moulded support. Inject signals into car aerial socket via a dummy load comprising an 18pF capacitor in series with signal generator output, followed by a 60pF shunt capacitor.

Inject	Cursor Position	Adjust for max.
1500 kHz 600 kHz	Tune for maximum output at approx. 200m. Tune for maximum output at approx. 500m.	L4† C4

† MW car aerial pad adjusting screw.

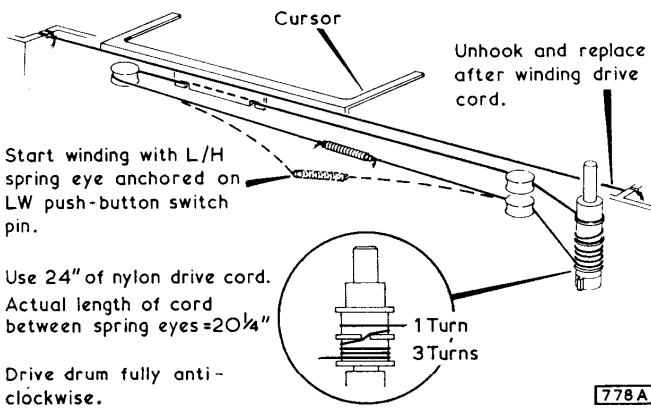
LW. Depress LW and Car buttons.

Inject	Cursor Position	Adjust for max.
220 kHz	Tune for maximum output at LW calibration marker	L5

Repeat as necessary for maximum output and calibration.

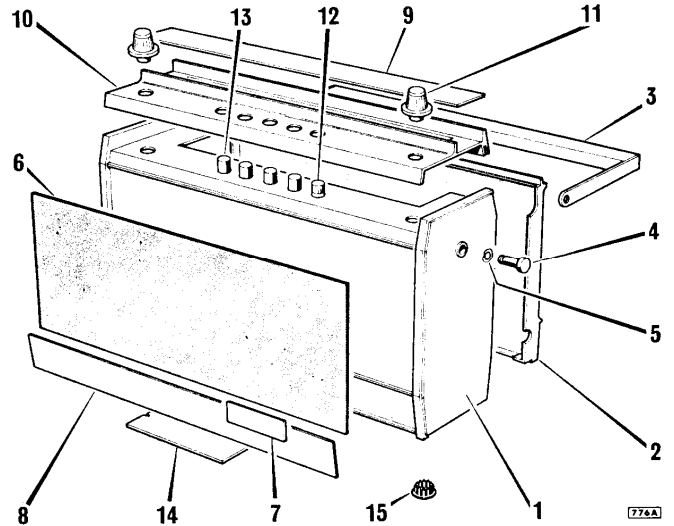
After refitting chassis into cabinet, C4 should be finally peaked after car aerial has been attached.

DRIVE CORD ARRANGEMENT



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When ordering replacement components, please quote Model number and include the description or function given with the part number. Unless otherwise stated, items listed are common to both models.



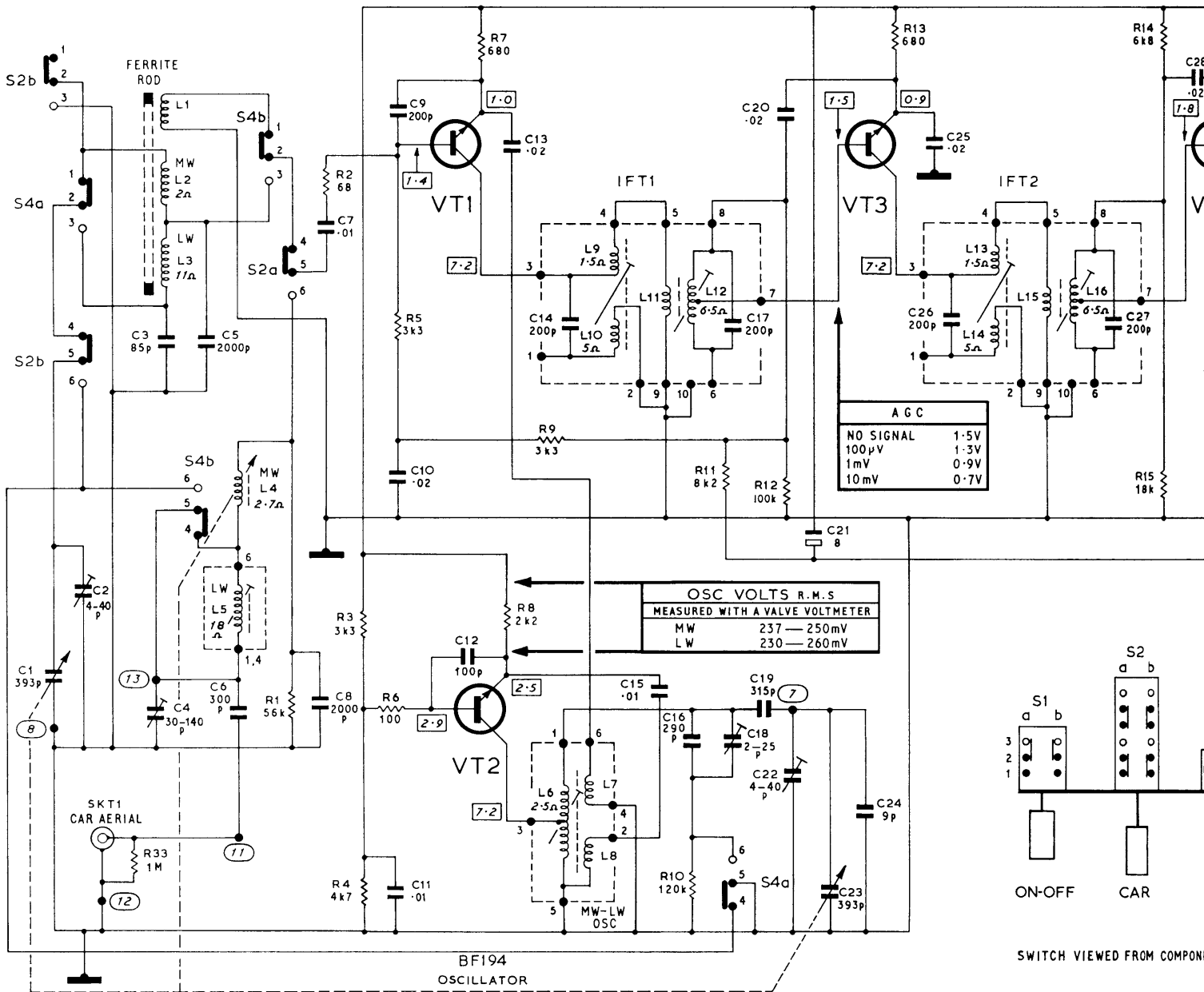
Model 4173 (6170 is similar)

Cabinet Assembly

- (1) Cabinet assembly (including items 3-10) (4173) .. 03M3-481 (6170) .. 03M3-492
- (2) Cabinet back .. .. (4173) .. 03A0-303/001 (6170) .. 03A0-303/002
- (3) Spire clip (screw SZ06KP06/C) .. .. (4173) .. 03L4-167 Handle assembly .. .. (6170) .. 03M3-487
- (4) Handle stud .. .. .. .. (6170) .. 03M3-496
- (5) Handle washer .. .. .. .. 03B3-130/002
- (6) Front grille .. .. .. .. 03L4-177 (4173) .. 03L6-068 (6170) .. 03A4-201
- (7) Emblem .. .. .. .. 03A4-215/001 (4173) .. 08A6-024/006 (6170) .. 08A6-024/007
- (8) Front trim .. .. .. .. 03A2-300
- (9) Scale .. .. .. .. (4173) .. 03A7-758 (6170) .. 03A7-763
- Scale backing strip .. .. .. (4173) .. 03A7-756/001 (6170) .. 03A7-756/002
- (10) Tuning scale escutcheon .. .. (4173) .. 03B2-030/001 (6170) .. 03B2-030/002
- (11) Volume or tuning knob .. .. (4173) .. 03C0-301/001 (6170) .. 03C0-164
- Clip .. .. .. .. 03L3-114
- (12) Tone control knob (clip 03L3-111) .. .. 03C0-176
- (13) Push-button .. .. .. .. 03C0-150/002
- (14) Battery compartment cover .. .. (4173) .. 03B1-410/001 (6170) .. 03B1-410/002
- (15) Car aerial adjuster plug button .. .. 03C0-205

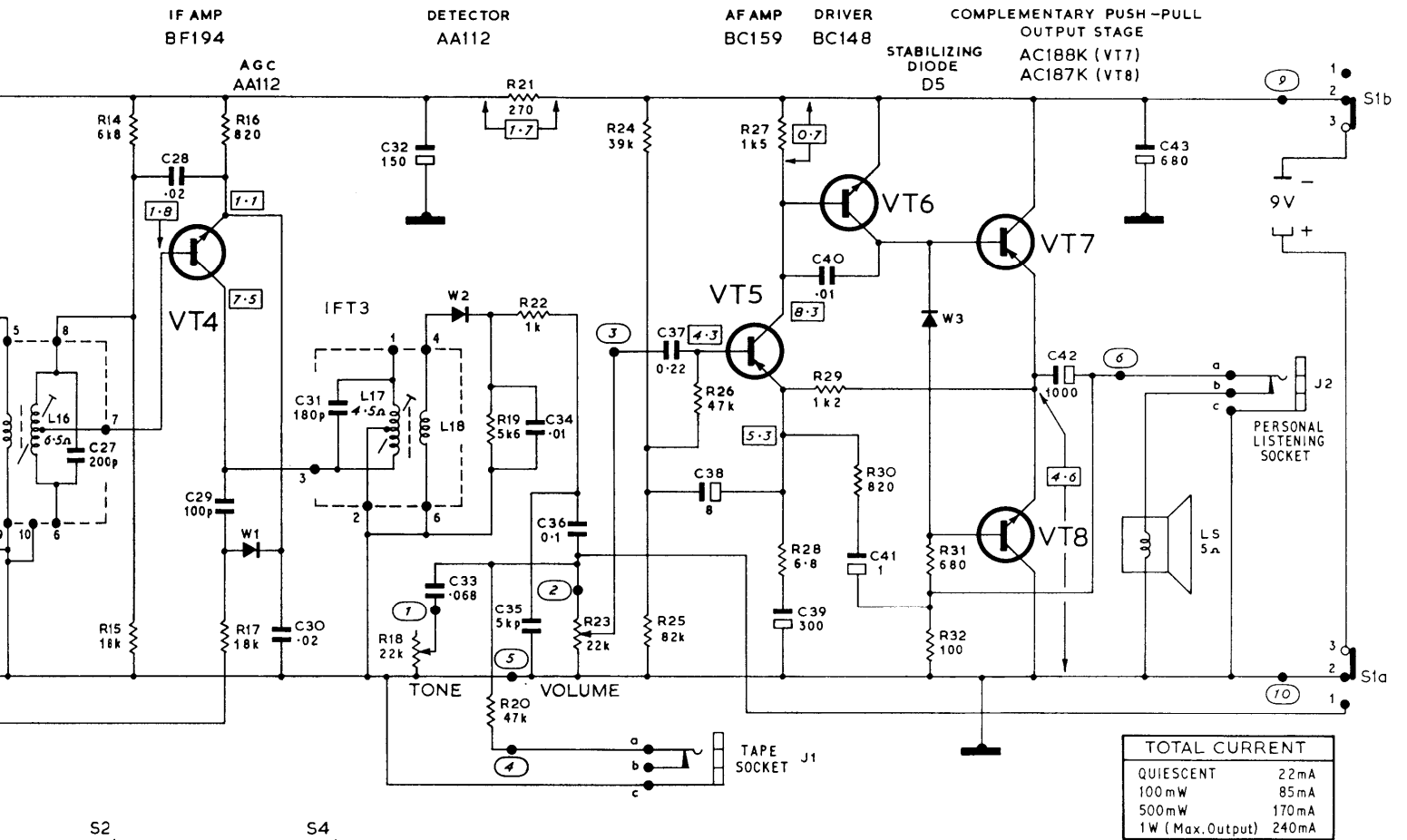
Chassis Assembly

- Chassis moulding .. .. .. .. 03C8-151
- Heat sink .. .. .. .. 03B1-406
- Screw (securing transistor) .. .. .. SA4HH08
- Drive drum (clip 03L3-094) .. .. .. (4173) .. 03F5-050/001 (6170) .. 03B5-100/002
- Cursor .. .. .. .. 03B5-100/001
- Cord tensioning spring .. .. .. 03B5-024
- Drive pulley .. .. .. .. 03C8-112
- Pulley axle—long .. .. .. .. 03C8-119
- Pulley axle—short .. .. .. .. 03C8-120
- Car aerial tuner bracket assembly .. .. 03M3-485
- Screw .. .. .. .. SB6K03
- Screw securing tuning gang .. .. .. 03L6-107/002
- L4 core assembly .. .. .. .. 03E7-013
- Adjusting screw .. .. .. .. 03L6-035
- Ballbearing .. .. .. .. 03C5-003
- Core assembly return spring .. .. .. 03B5-029
- Tuning cam .. .. .. .. 03B6-021
- Grub screw .. .. .. .. SB6GP02
- Bracket supporting car aerial socket .. 03B1-222
- Screw .. .. .. .. SZ06HP04
- Car aerial socket .. .. .. .. 03F6-025/002
- Spacer .. .. .. .. 03L7-016
- Push-on-fix .. .. .. .. 03L2-089
- Battery connector .. .. .. .. 03F6-031

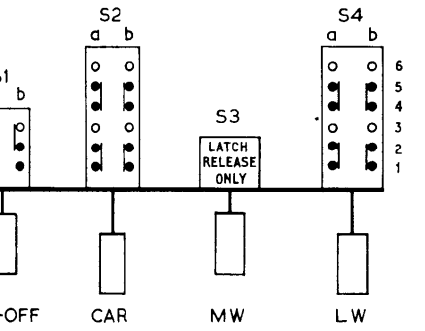


**CIRCUIT DIAGRAM**

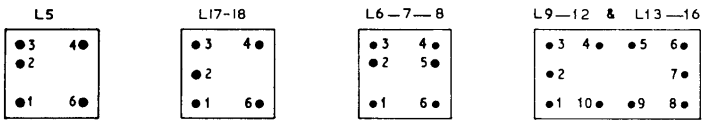
All voltages were measured with a 20,000Ω/volt meter and are with respect to the emitter supply line of each transistor except where otherwise shown. Ringed figures indicate printed board tag connection points. DC resistance readings are shown against inductors where these are 1Ω or greater. In some receivers a 100Ω resistor (not shown in circuit) is fitted in parallel with W3, and R12 is 150kΩ.



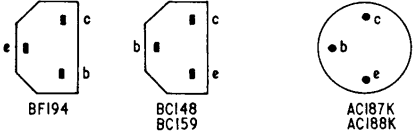
TOTAL CURRENT	
QUIESCENT	22mA
100mW	85mA
500mW	170mA
1W (Max. Output)	240mA



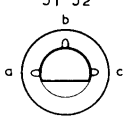
SWITCH VIEWED FROM COMPONENT SIDE OF PRINTED BOARD



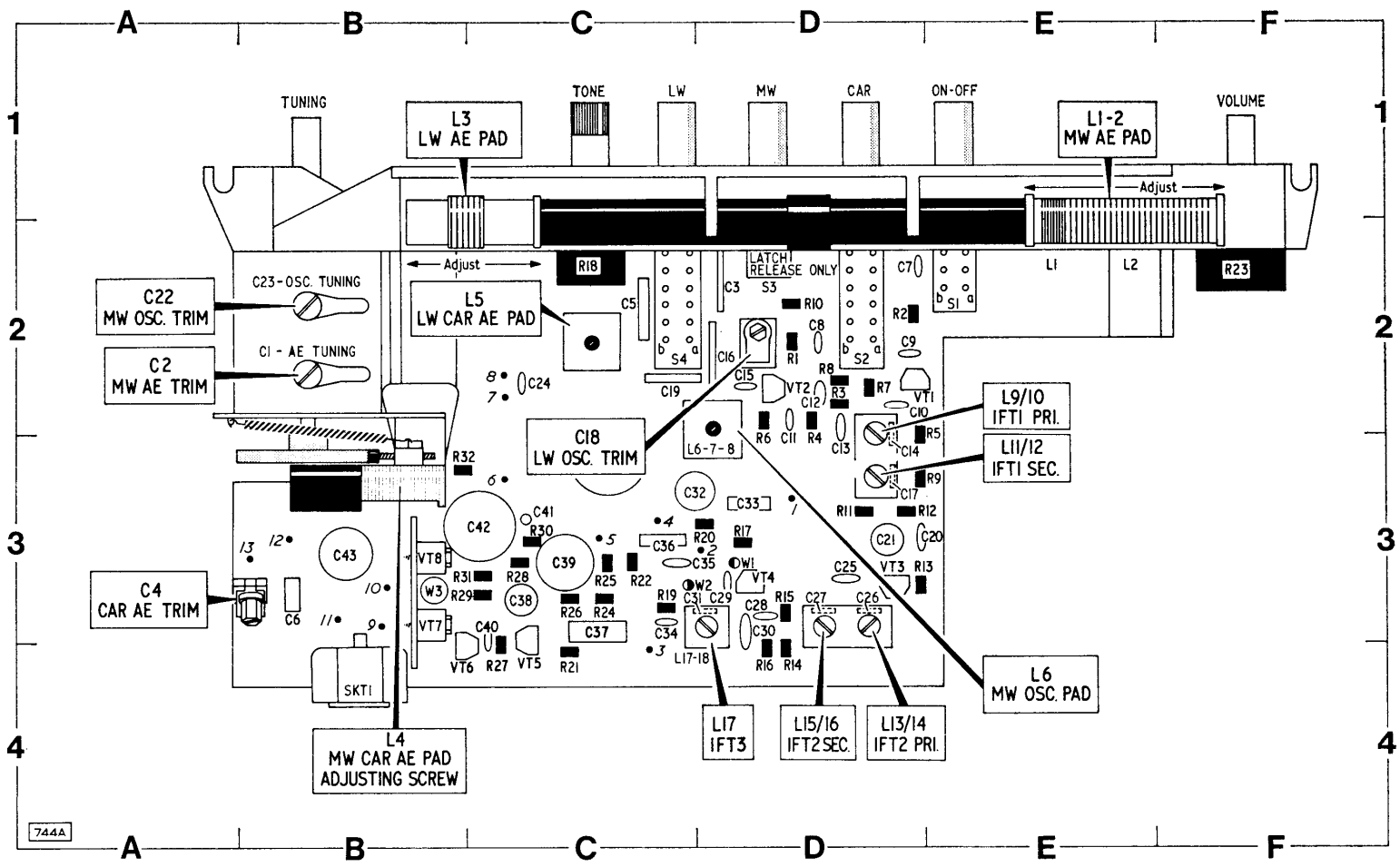
COIL CONNECTIONS VIEWED FROM COPPER SIDE OF PRINTED BOARD



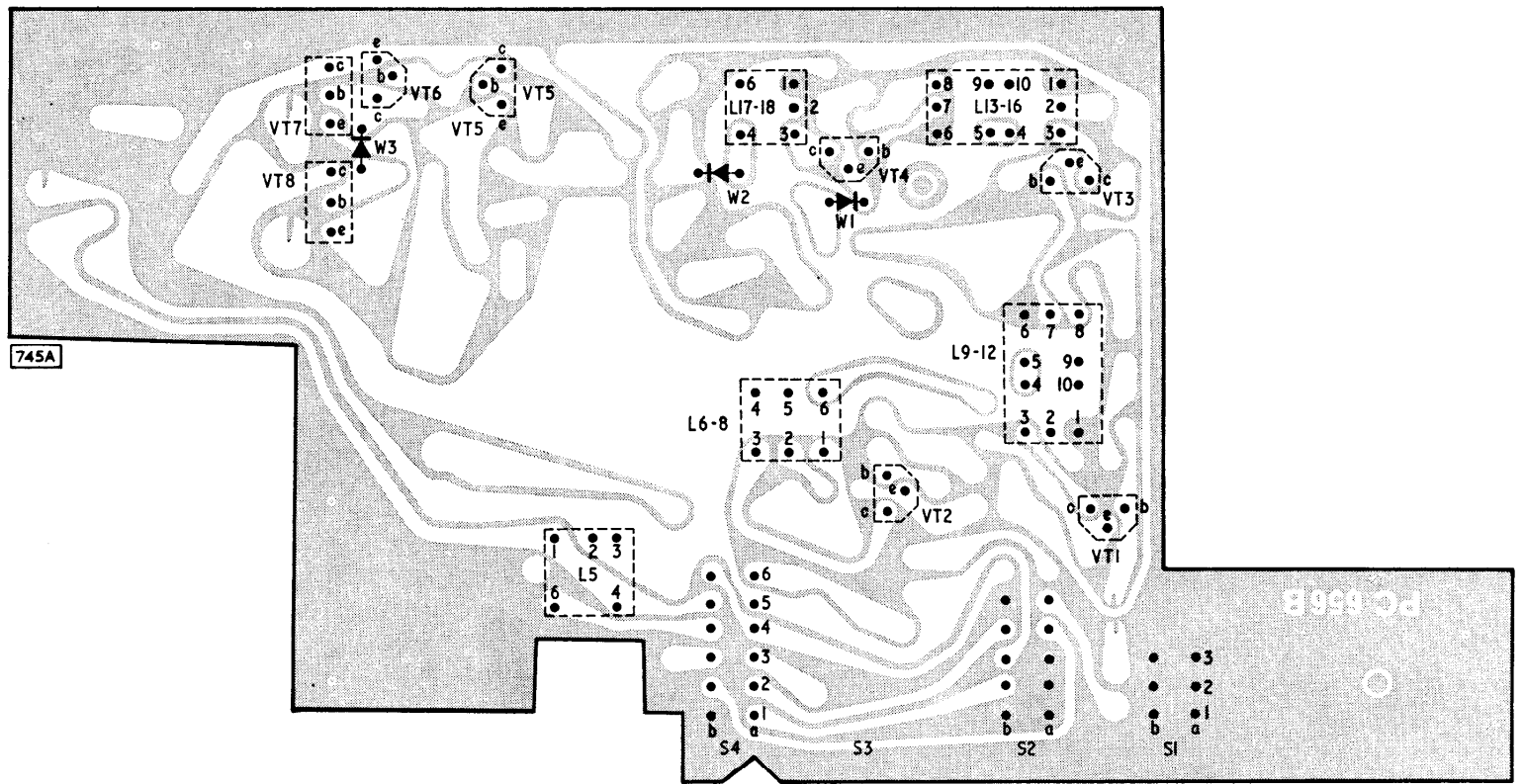
TRANSISTOR BASES VIEWED FROM COPPER SIDE OF PRINTED BOARD



J1 J2



Component locations, alignment adjustments and copper side of printed board showing transistor and coil connections



# COMPONENT DETAILS

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

## RESISTORS

REF	DESCRIPTION & PART NO.	LOC
R1	56kΩ, 10%, 1/4W, Car aerial input damping	D2
R2	68Ω, 10%, 1/4W, RF stopper	D2
R3	3.3kΩ, 10%, 1/4W, Part VT2 base bias pot. divider	D2
R4	4.7kΩ, 10%, 1/4W, Part VT2 base bias pot. divider	D2,3
R5	3.3kΩ, 10%, 1/4W, VT1 bias feed	E2,3
R6	100Ω, 10%, 1/4W, RF stopper	D2,3
R7	680Ω, 10%, 1/4W, VT1 emitter stabilizing	D2
R8	2.2kΩ, 10%, 1/4W, VT2 emitter stabilizing	D2
R9	3.3kΩ, 10%, 1/4W, VT1 base bias decoupling	DE3
R10	120kΩ, 10%, 1/4W, MW oscillator damping	D2
R11	8.2kΩ, 10%, 1/4W, AGC feed	D3
R12	100kΩ, 10%, 1/4W, VT3 base bias	DE3
R13	680Ω, 10%, 1/4W, VT3 emitter stabilizing	DE3
R14	6.8kΩ, 10%, 1/4W, Part VT4 base bias pot. divider	D4
R15	18kΩ, 10%, 1/4W, Part VT4 base bias pot. divider	D3
R16	820Ω, 10%, 1/4W, VT4 emitter stabilizing	D4
R17	18kΩ, 10%, 1/4W, AGC line decoupling	D3
R18	22kΩ, Lin. pot., Tone control, 03E1-035/007	C2
R19	5.6kΩ, 10%, 1/4W, W2 load	C3
R20	47kΩ, 10%, 1/4W, Tape recorder isolating	CD3
R21	270Ω, 10%, 1/4W, VT1-4 supply decoupling	C4
R22	1kΩ, 10%, 1/4W, Part IF filter	C3
R23	22kΩ, Log. pot., Volume control, 03E1-027/003	F2
R24	39kΩ, 5%, 1/4W, Part VT5 base bias pot. divider	C3
R25	82kΩ, 5%, 1/4W, Part VT5 base bias pot. divider	C3
R26	47kΩ, 10%, 1/4W, VT5 bias feed	C3
R27	1.5kΩ, 10%, 1/4W, VT5 collector load	C4
R28	6.8Ω, 10%, 1/4W, NFB current limiting	C3
R29	1.2kΩ, 10%, 1/4W, VT5 emitter stabilizing	BC3
R30	820Ω, 10%, 1/4W, Part bass compensation	C3
R31	680Ω, 10%, 1/4W, VT6 collector load	BC3
R32	100Ω, 10%, 1/4W, Output transistors protective load	BC3
R33	1MΩ, 10%, 1/4W, Car static suppression	—

## MISCELLANEOUS

REF	DESCRIPTION & PART NO.	LOC
J1	Tape socket, 03F6-096	*
	Clip, 03L2-103	—
J2	Personal listening socket, 03F6-096	*
	Clip, 03L2-103	—
LS	Loudspeaker, 5Ω impedance, 03E3-100/001	—
	Gasket, 03B4-305	—
S1-4	Push-button switch assembly, 03E2-101	C2-E2
SKT1	Car aerial socket, 03F6-025/002	B4
W1	AGC diode, AA112	D3
W2	Detector diode, AA112	CD3
W3	Bias stabilizer, D5	B3

\*Mounted in cabinet.

## INDUCTORS

REF	DESCRIPTION & PART NO.	LOC
L1	MW base coupling	E2
L2	MW aerial coil	E2
L3	LW aerial coil	BC1
L4	Car aerial tuning coil, 03D1-043	B4
L5	Car aerial LW loading coil, 03D1-050	BC2
L6-8	Oscillator coils, 03D1-053	CD3
L9-12	IFT1, 03D0-026	D3
L13-16	IFT2, 03D0-026	D4
L17-18	IFT3, 03D0-038	CD4

## CAPACITORS

REF	DESCRIPTION & PART NO.	LOC
C1	393pF, Variable, Aerial tuning, Part tuning gang*	B2
C2	4-40pF, Preset, MW aerial trimmer, Part tuning gang*	A2
C3	85pF, 2%, 350V, LW aerial bottom end coupling	D2
C4	30-140pF, Preset, Car aerial trimmer, 03E4-019	A3
C5	2000pF, 20%, 500V, LW aerial fixed trimmer	C2
C6	300pF, 2%, 160V, Car aerial coupling	B3
C7	0.1μF, -20+80%, 50V, VT1 base coupling	D2
C8	2000pF, 20%, 500V, Car aerial bottom end coupling	D2
C9	200pF, 10%, 500V, VT1 stabilizing	D2
C10	0.2μF, -20+80%, 50V, VT1 base bias decoupling	DE2
C11	0.1μF, -20+80%, 50V, VT2 base bias decoupling	D2,3
C12	100pF, 10%, 500V, VT2 stabilizing	D2
C13	0.2μF, -20+80%, 50V, Oscillator/mixer coupling	D3
C14	200pF, IFT1 primary tuning, Part IFT1	DE3
C15	0.1μF, 25%, 500V, Oscillator emitter coupling	D2
C16	290pF, 2%, 200V, LW oscillator fixed trimmer	D2
C17	200pF, IFT1 secondary tuning, Part IFT1	DE3
C18	2-25pF, Preset, LW oscillator trimmer, 03E4-015	C2,3
C19	315pF, 1%, 200V, MW oscillator padder	C2
C20	0.2μF, -20+80%, 50V, VT2 base bias decoupling	DE3
C21	8μF, Elec., 18V, AGC line decoupling, 00E0-222/13	D3
C22	4-40pF, Preset, MW oscillator trimmer, Part tuning gang*	A2
C23	393pF, Variable, Oscillator tuning, Part tuning gang*	B2
C24	9pF, 5%, 500V, MW oscillator fixed trimmer	C2
C25	0.2μF, -20+80%, 50V, VT3 emitter by pass	D3
C26	200pF, IFT2, primary tuning, Part IFT2	D3
C27	200pF, IFT2 secondary tuning, Part IFT2	D3
C28	0.2μF, -20+80%, 50V, VT4 base bias decoupling	D3
C29	100pF, 10%, 500V, AGC diode signal feed	D3
C30	0.2μF, -20+80%, 50V, VT4 emitter bypass	D3,4
C31	180pF, L17 tuning, Part IFT3	CD3
C32	150μF, Elec., 10V, VT1-4 supply line decoupling, 00E0-229/59	CD3
C33	0.068μF, 20%, 250V, Part tone control circuit	D3
C34	0.1μF, -20+80%, 50V, Part IF filter	C3,4
C35	5000 pF, 20%, 500V, Part IF filter	CD3
C36	0.1μF, 20%, 250V, Audio signal coupling	C3
C37	0.22μF, 20%, 250V, VT5 base coupling	C3,4
C38	8μF, Elec., 18V, VT5 base bias decoupling, 00E0-222/13	C3
C39	300μF, Elec., 10V, NFB DC blocking, 00E0-229/85	C3
C40	0.1μF, -20+80%, 50V, Tone correction	C3
C41	1μF, Tantalum Elec., 35V, Bass compensation, 00E0-220/17	C3
C42	1000μF, Elec., 6V, Audio output coupling, 00E0-230/19	BC3
C43	680μF, Elec., 10V, Battery supply decoupling, 00E0-229/A6	B3

\*Tuning gang; Part No. 03E4-051.

## GRID REFERENCES FOR TRANSISTORS AND TAGS

TRANSISTORS			
VT1	..	DE2	VT5 .. .. C4
VT2	..	D2	VT6 .. .. BC4
VT3	..	D3	VT7 .. .. B3
VT4	..	D3	VT8 .. .. B3

TAGS			
1	..	D3	8 .. .. C2
2	..	CD3	9 .. .. B3
3	..	C3,4	10 .. .. B3
4	..	C3	11 .. .. B3
5	..	C3	12 .. .. B3
6	..	C3	13 .. .. AB3
7	..	C2	

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