BUSH RADIO

Service Information

Model VHF.80 three-waveband (inc. VHF) Table Radio

MODEL VHF.80

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SPECIFICATION

GENERAL

Seven-valve (including rectifier) superheterodyne radio receiver covering long, medium and VHF bands.

CABINET

Two-tone moulded plastic with gilt trim. Black and gold scale and fabric-covered loudspeaker grille.

Width 14 in.

Height $9\frac{9}{16}$ in.

Depth $5\frac{3}{4}$ in.

Weight 9 lb.

OPERATING VOLTAGE

200-250 volts a.c., 40-100 c/s.

200-250 volts d.c.

POWER CONSUMPTION

45 watts.

WAVEBAND COVERAGE

Long waveband 1050 to 1935 metres (285 to 155 kc/s).

Medium waveband 187 to 560 metres (1605 to 535 kc/s).

VHF waveband 87·5 to 100 Mc/s.

SCALE CALIBRATION

The long and medium wavebands are calibrated in metres and marked with station names. The VHF waveband is calibrated in megacycles per second with Home, Light and Third stations marked on the scale.

CONTROLS

Two controls are mounted on the tuning scale; on the left, combined Volume and On/off switch; on the right, Tuning. Below the scale is a 3-position wave-change switch.

AERIALS

An internal ferrite-rod aerial is provided for use on the medium and long wavebands and a balanced dipole is fitted for use on the VHF waveband.

Provision is made for the connection of an external aerial for VHF reception.

LOUDSPEAKER

A 6 in. by 4 in. elliptical loudspeaker, having a flux of 8,500 lines per square centimetre, is fitted.

AUDIO OUTPUT

2 watts.

INTERMEDIATE FREQUENCIES

A.M. 470 c/s.

F.M. 10·7 Mc/s.

VALVES

UCC85	grounded-grid r.f. amplifier and mixer/oscillator (f.m. only).
UF89	untuned r.f. amplifier (a.m.), i.f. amplifier (f.m.).
UCH81	mixer/oscillator (a.m.), i.f. amplifier (f.m.).
UF89	i.f. amplifier (a.m. & f.m.).
UABC80	detector, a.g.c. and audio amplifier (a.m. & f.m.).
UL84	power output.
UY85	mains rectifier.

MAINTENANCE

REMOVAL OF CHASSIS

1 Remove the cabinet back.

2 Unscrew the five chassis-retaining screws. Four of the screws are located around the edges of the chassis and one is just above V1.

3 Withdraw the chassis tilting it slightly to clear the top retaining brackets, to the extent permitted by the loudspeaker leads. This should give sufficient access to both sides of the chassis to permit alignment. To remove the chassis completely unsolder the loudspeaker leads from the output transformer.

4 For replacement, reverse the procedure, passing the top of the chassis under the retaining brackets and taking care to resolder the loudspeaker leads to their correct tags.

REPLACEMENT OF VHF TUNING CORD

If a breakage occurs in either the cord or the cores the complete assembly should be replaced. The recommended procedure for replacement is as follows:—

Remove the chassis from the cabinet. Unscrew and remove the top cover of the VHF box. Set the AM tuning capacitor to minimum. Then remove the screw and washer of the pivoted adjuster.

Unhook the core assembly from the return spring and from the pivoted adjuster and remove it. Fit the new core assembly as shown in Fig. 1.

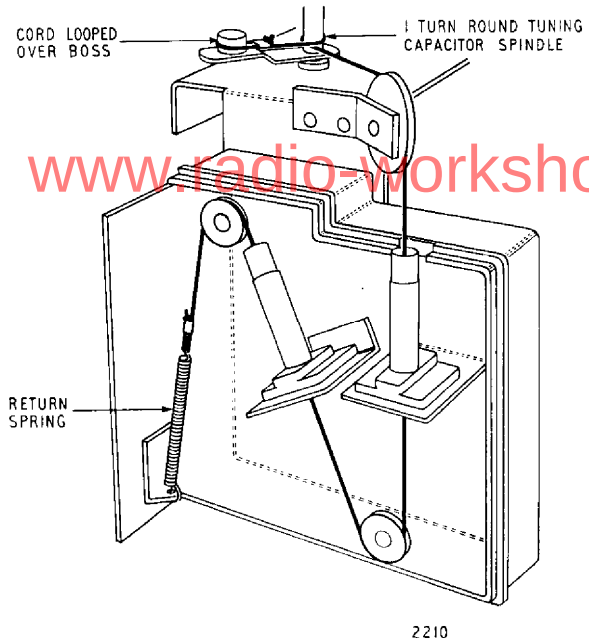

Fig. 1 V.H.F. tuning cord

After reassembly, check that the pointer lines up with the datum line dots at the right-hand end of the scale when the tuning capacitor is at maximum capacity and reset the pivoted adjuster as described in the v.h.f. alignment procedure.

REPLACEMENT OF THE TUNING CORD

1 Remove the chassis from the cabinet.

2 Remove the two control knobs.

3 Slacken the tuning scale clamps at each end of the scale (these are retained by Philips-head screws accessible from the back of the chassis) and remove the scale.

4 Remove the old cord drive and assemble the new one as shown in Fig. 2.

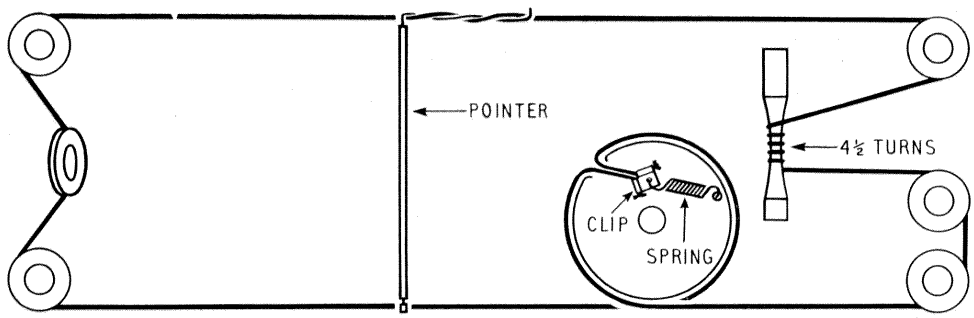

Fig. 2 Main tuning cord

5 Replace the tuning scale and knobs. When the tuning scale is set to maximum capacity the pointer should be set to line up with the datum dots at the right-hand end of the scale.

REMOVAL OF VHF BOX

1 Unsolder the five connections to the box (see Fig. 3) they are:—

(a) to S3G

(b) to tag A

(c) to pin 4, V2

(d) coaxial lead to S3D

(e) outer conductor of coaxial lead to chassis.

2 Remove the screw and washer fixing the pivoted adjuster.

3 Remove the cord loop from the boss on the pivoted adjuster.

Fig. 3 Component layout

4 Remove the two screws which retain the VHF box and the VHF aerial-socket panel to the tuning capacitor.

5 Remove the screw retaining the VHF box to the gang bracket (top centre of the box) and the two screws retaining the box to the lower fixing bracket.

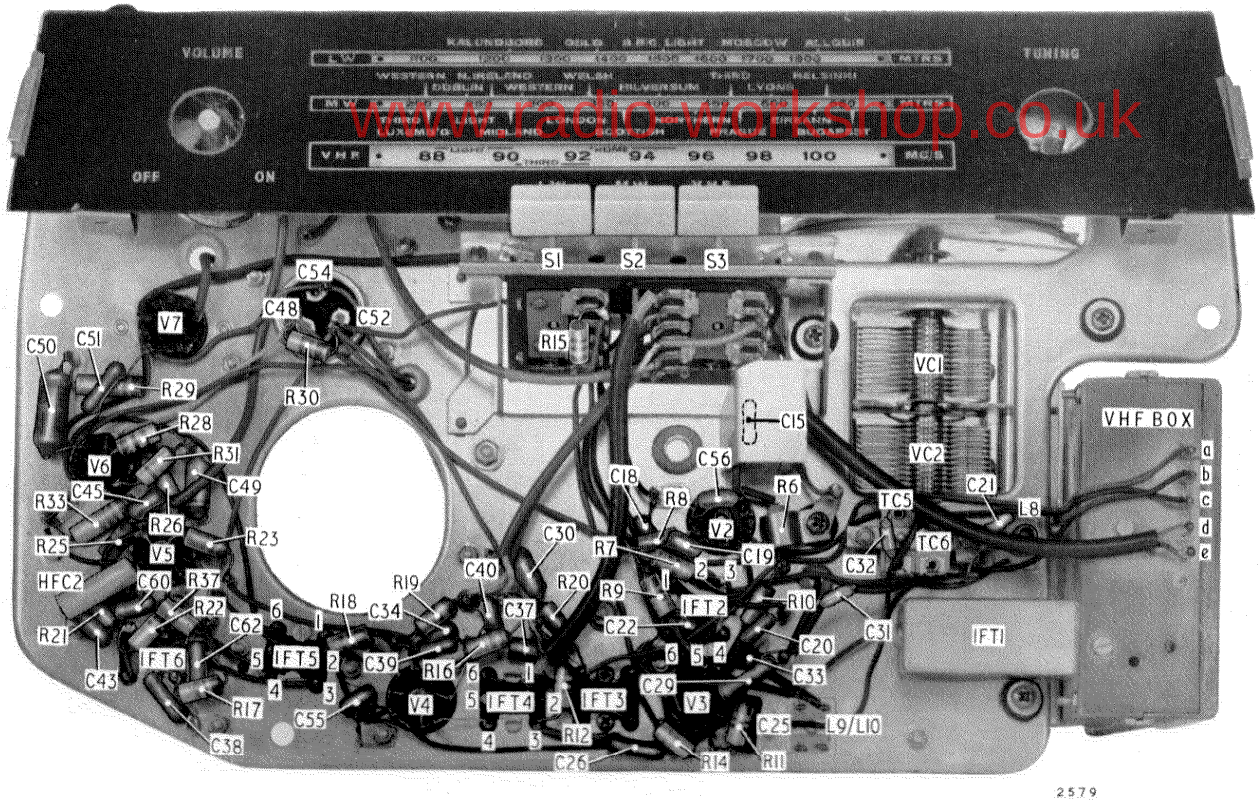

Fig. 4 *Front view of chassis*

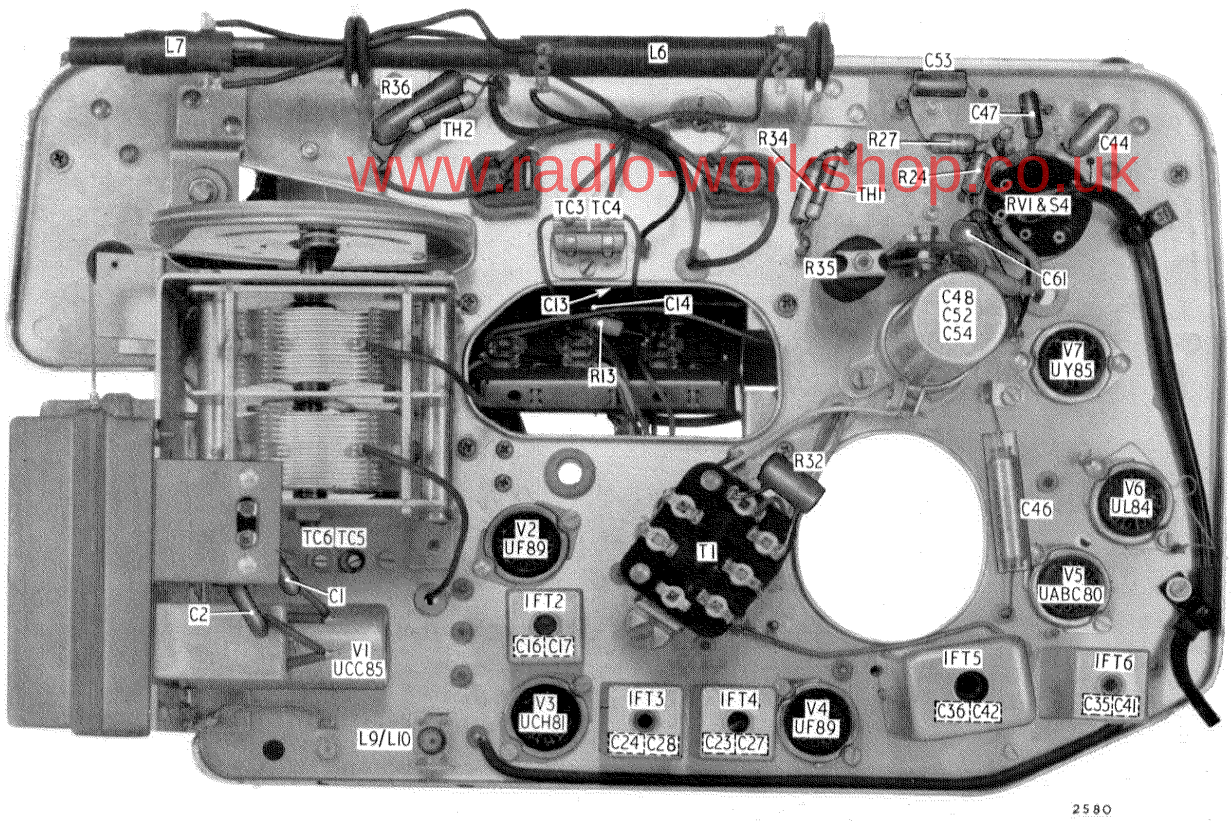

Fig. 5 *Back view of chassis*

ALIGNMENT PROCEDURE

GENERAL NOTES

1 The receiver must be aligned outside the cabinet (the method of removing the chassis is given on page 0) both it and the signal generator should be switched on about 15 minutes before beginning the alignment.

2 The equipment required is:—

(i) an amplitude-modulated signal generator to cover 200 kc/s to 1,500 kc/s, 10·7 Mc/s and 87·5 Mc/s to 100 Mc/s.

(ii) an output meter to match to 2·5-3 ohms impedance.

(iii) a non-metallic trimming tool (about 10 in. long for adjustment of IFT1) and a special trimming tool for the 470 kc/s i.f. transformers).

(iv) an Avometer model 8 or both a d.c. valve voltmeter and a microammeter (50μA f.s.d.).

(v) two 47k, $\frac{1}{4}$ watt resistors, matched.

(vi) one 1k, $\frac{1}{4}$ watt resistor.

I.F. ALIGNMENT

A.M.

Notes:—In IFT3 and IFT6 the primary core is adjusted from the base and the secondary core from the top of the can.

Switch the receiver to the M.W. band, set the tuning control to 300 metres and turn the volume control to maximum.

Each time an adjustment is made, reduce the i.f. input signal so as to maintain the output at 50mW.

1 Inject a signal of 470 kc/s, 30% modulated at 400 c/s via a 0·1μF capacitor and adjust the cores of IFT6 for maximum output.

2 Transfer the signal to pin 2, V3 and adjust the cores of IFT3 for maximum output.

3 Transfer the signal to pin 2, V2 and adjust the core of L8 for minimum output.

F.M.

Notes:—In IFT1, IFT2 and IFT4 the primary is adjusted from the base and the secondary core from the top of the can. In IFT5 (the discriminator transformer) the primary core is adjusted from the top and the secondary core from the base. With the exception of the primary of IFT5 the correct peak for all cores is that of the outer core position. The primary of IFT5 should be peaked on the inner core position.

Switch the receiver to the VHF band and pre-set the i.f. tuning cores in the following manner:—

IFT2 and IFT4—primary and secondary cores to be $\frac{1}{8}$" inside the coil former. IFT5—primary core to be $\frac{3}{4}$" inside coil former, secondary core to be $\frac{3}{8}$" inside the coil former.

Connect the two 47k resistors and the meters as shown in Fig. 6.

1 Inject a signal of 10·7 Mc/s unmodulated via a 0·1μF capacitor between the grid (pin 2) of V3 and chassis. Set the volume control to minimum and adjust the signal level of the generator to produce an output of 4V d.c. on the d.c. output meter. Subsequently, maintain this reading at a level of 4V d.c. throughout the alignment procedure by reducing the i.f. input signal as necessary.

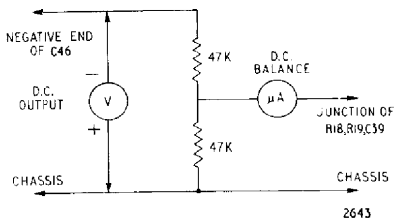

Fig. 6 Connection of meters

2 Adjust the primary core of IFT5 for maximum d.c. output.

3 Adjust the secondary core of IFT5 for zero on the d.c. balance meter.

4 Connect the 1k damping resistor across the secondary of IFT4 and adjust the primary core for maximum d.c. output.

ALIGNMENT PROCEDURE contined

5 Transfer the lk damping resistor to the primary of IFT4 and adjust the secondary core for maximum d.c. output. Remove the damping resistor.

6 Transfer the i.f. signal to pin 2, V2. Connect the lk damping resistor across the secondary of IFT2 and adjust the primary core for maximum d.c. output.

7 Transfer the lk damping resistor to the primary of IFT2 and adjust the secondary core for maximum d.c. output. Remove the damping.

8 Readjust the primary core of IFT5 for maximum d.c. output.

9 Readjust the secondary core of IFT5 for zero on the d.c. balance meter.

10 Transfer the i.f. signal to the VHF aerial sockets. Connect the lk damping resistor across the primary of IFT3 and adjust the secondary core of IFT1 for maximum d.c. output.

11 Disconnect the two 47k resistors and the d.c. output and d.c. balance meters.

12 Seal the cores.

R.F. ALIGNMENT

A.M.

Notes:—During alignment of the long and medium wavebands, the signal generator should be coupled to the receiver by a loop of insulated wire placed about 3 ft. from the receiver. Alignment signals should be 30% modulated at 400 c s. Turn the volume control to maximum. Slightly unscrew the adjusting screw on each long-and medium-waveband trimming capacitor. Ensure that the output of the receiver is maintained at a level of 50mW on the output meter by adjusting the r.f. input as necessary. Check the datum setting of the scale pointer at the low frequency end of the scale with the tuning capacitor set to maximum capacitance.

Operation	*Waveband*	*Single Generator Frequency*	*Receiver Calibration*	*Adjust for maximum*
1	M.W.	600 kc/s	500 metres	L9/L10 (Osc.)
2	M.W.	1,500 kc/s	200 metres	TC6 (Osc.) and TC3 (aerial)
3	repeat operations 1 and 2 and check calibration.			
4	L.W.	214 kc/s	1,400 metres	TC5 (Osc.) and TC4 (aerial)
5	seal the trimmers.			

F.M.

Notes:—Switch the receiver to the VHF band and turn the volume control to maximum. Reconnect the two 47k resistors and the meters as shown in Fig. 6. Inject a signal of 87·5 Mc/s unmodulated at the VHF aerial sockets and set the dial pointer to 87·5 Mc/s. This corresponds to the third programme station block on M.W. Then

1 Slacken the locking screw on the pivoted adjuster (Fig. 1) and rotate the arm (thus adjusting the cores of L3 and L4/L5) for maximum d.c. output. Tighten the locking screw.

2 Set the signal generator and the dial pointer to 94 Mc/s and adjust the core of L1/L2 for maximum d.c. output.

3 Seal the core of L1/L2.

Note:—TC1 (the oscillator-bridge balancing trimmer) has been pre-set at the factory for minimum oscillator radiation and TC2 has been pre-set in conjunction with mechanical adjustment of the former of L3 for optimum calibration. It is unlikely that these settings will subsequently vary and therefore no data are given for them.

Replacement of V1 may cause slight changes in oscillator calibration. Resetting the cores as in 1 above will correct this.

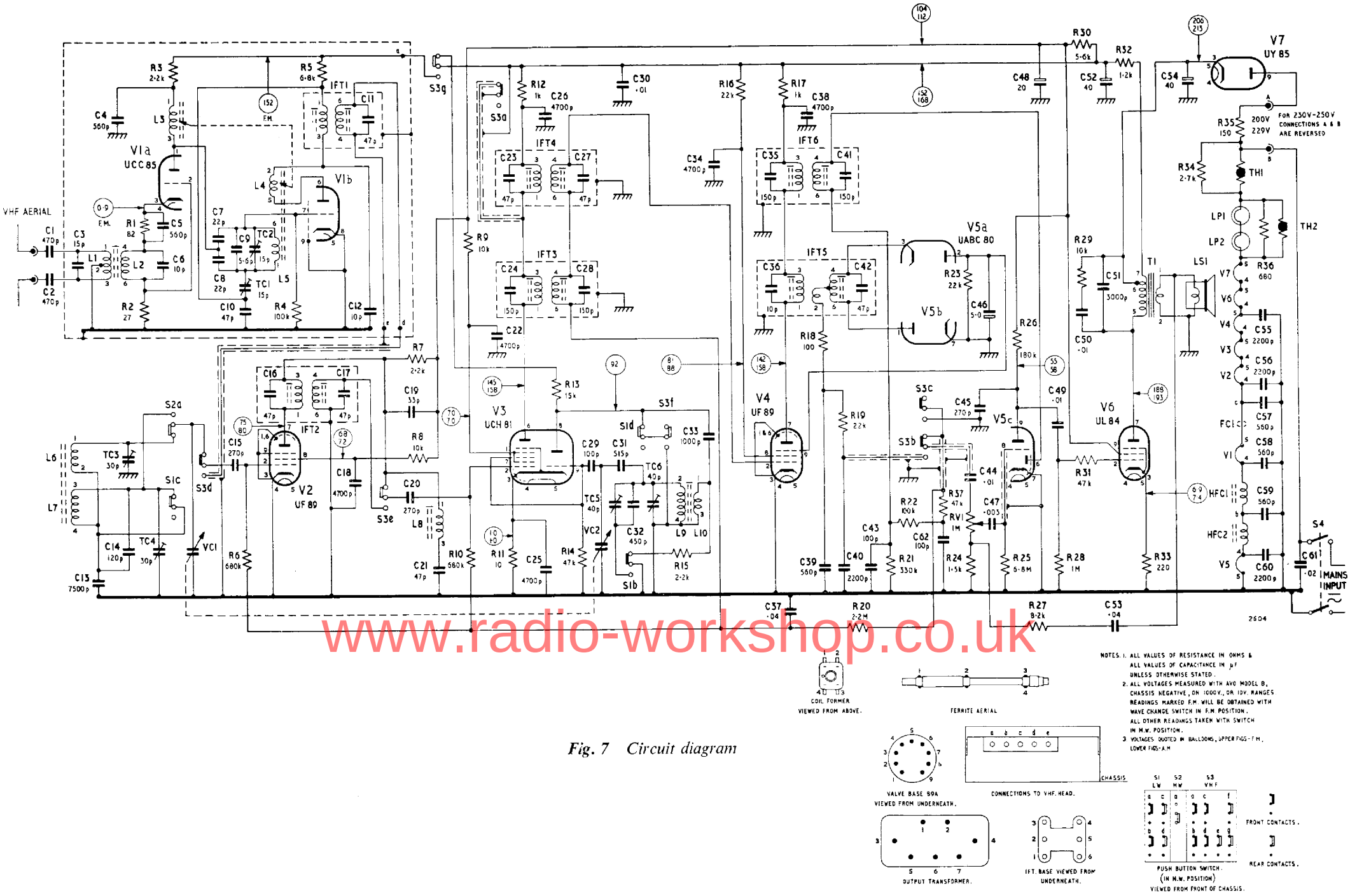

Fig. 7 Circuit diagram

NOTES. 1. ALL VALUES OF RESISTANCE IN OHMS & ALL VALUES OF CAPACITANCE IN µF UNLESS OTHERWISE STATED.
2. ALL VOLTAGES MEASURED WITH AVO MODEL 8, CHASSIS NEGATIVE, ON 1000V., OR 10V. RANGES READINGS MARKED F.M. WILL BE OBTAINED WITH WAVE CHANGE SWITCH IN F.M POSITION. ALL OTHER READINGS TAKEN WITH SWITCH IN M.W. POSITION.
3 VOLTAGES QUOTED IN BALLOONS, UPPER FIGS - F.M., LOWER FIGS - A.M

COIL FORMER VIEWED FROM ABOVE.
FERRITE AERIAL
VALVE BASE B9A VIEWED FROM UNDERNEATH.
CONNECTIONS TO VHF. HEAD.
OUTPUT TRANSFORMER.
I.F.T. BASE VIEWED FROM UNDERNEATH.
PUSH BUTTON SWITCH. (IN M.W. POSITION) VIEWED FROM FRONT OF CHASSIS.
S1 LW S2 MW S3 V.H.F.
FRONT CONTACTS.
REAR CONTACTS.

PARTS LIST

CAPACITORS

Reference	*Value*		*Tolerance*	*Rating*	*Part Number*
	μF	*pF*	*(±%)*	*(volts)*	
C1	—	470 (BS415)	20	750	AP61234
C2	—	470 (BS415)	20	750	AP61234
C3	—	15	10	750	AP24519
C4	—	560	20	750	AP23405
C5	—	560	20	750	AP23405
C6	—	10	5	350	AP18211
C7	—	22 (P100)	2	750	AP24626
C8	—	22 (P100)	2	750	AP24626
C9	—	5·6 (N750)	·5p	750	AP24628
C10	—	47 (N750)	5	750	AP24630
C11	—	47	5	350	AP24848
C12	—	10 (N750)	5	750	AP24629
C13	—	7500	5	125	AP61529
C14	—	120	2	125	AP60753
C15	—	270	20	500	AP21906
C16	—	47	5	350	AP24848
C17	—	47	5	350	AP24848
C18	—	4700	10	750	AP61528
C19	—	33	5	750	AP27426
C20	—	270	20	500	AP21906
C21	—	47	5	750	AP24630
C22	—	4700	10	750	AP61528
C23	—	47	5	350	AP24848
C24	—	150	2	125	AP61925
C25	—	4700	10	750	AP61528
C26	—	4700	10	750	AP61528
C27	—	47	5	350	AP24848
C28	—	150	2	125	AP61925
C29	—	100	20	750	AP17336
C30	0·01	—	25	350	AP24117
C31	—	515	1	125	AP62775
C32	—	450	2	125	AP61527
C33	—	1000	+75—0	750	AP22746
C34	—	4700	10	750	AP61528
C35	—	150	2	125	AP61925
C36	—	10	5	350	AP24847
C37	0·04	—	20	200	AP24028
C38	—	4700	10	750	AP61528
C39	—	560	20	750	AP23405
C40	—	2200	10	750	AP24717
C41	—	150	2	125	AP61925
C42	—	47	5	350	AP24848
C43	—	100	20	750	AP17336
C44	0·01	—	25	350	AP24117
C45	—	270	20	500	AP21906
C46	5·0	—	+50—20	50	AP61921
C47	0·003	—	10	400	AP21908
C48	20	—	+50—20	275	AP62776
C49	0·01	—	25	350	AP24117
C50	0·01	—	25	500	P3769

Reference	Value µF	Value pF	Tolerance (±%)	Rating (volts)	Part Number
C51	—	3000	20	750	AP61595
C52	40	—	+50−20	275	AP62776
C53	0·04	—	20	200	AP24028
C54	40	—	+50−20	275	AP62776
C55	—	2200	10	750	AP24717
C56	—	2200	10	750	AP24717
C57	—	560	20	750	AP23405
C58	—	560	20	750	AP23405
C59	—	560	20	750	AP23405
C60	—	2200	10	750	AP24717
C61	0·02	—	20	500	P8996
VC1	—	528	—	—	
	—	Ganged	—	—	AP62777
VC2	—	528	—	—	
TC1	—	3–15	—	—	AP24623
TC2	—	3–15	—	—	AP24623
TC3	—	3–30	—	—	
TC4	—	3–30	—	—	AP21918
TC5	—	3–40	—	—	
TC6	—	3–40	—	—	AP24820

RESISTORS

Reference	Value (ohms)	Tolerance (±%)	Rating (watts)	Part Number
R1	82	10	¼	P6089
R2	27	10	¼	P5963
R3	2·2k	10	¼	P6449
R4	100k	10	¼	P6869
R5	6·8k	10	½	P6574
R6	680k	20	¼	P7073
R7	2·2k	10	¼	P6449
R8	10k	10	¼	P6617
R9	10k	10	¼	P6617
R10	680k	20	¼	P7073
R11	10	20	¼	P5855
R12	1k	20	¼	P6359
R13	15k	20	¼	P6653
R14	47k	20	¼	P6779
R15	2·2k	10	¼	P6443
R16	22k	10	¼	P6701
R17	1k	20	¼	P6359
R18	100	20	¼	P6107
R19	22k	20	¼	P6695
R20	2·2M	20	¼	P7199
R21	330k	20	¼	P6989
R22	47k	20	¼	P6779
R23	22k	10	¼	P6701
R24	1·5k	10	¼	P6407
R25	6·8k	20	¼	P7325
R26	180k	20	¼	P14227
R27	8·2k	10	¼	P6593
R28	1M	20	¼	P7115
R29	10k	20	½	P6610
R30	5·6k	20	¼	P13957
R31	47k	20	¼	P6779
R32	1·2k	5	4	AP23453
R33	220	5	½	P6202
R34	2·7k	10	½	P6466
R35	150	5	10	AP62938
R36	680	2	5	AP62940
RV1	1M	20	—	BP62774

COILS, CHOKES AND TRANSFORMERS

Reference	*Description*	*D.C. Resistance (ohms)*	*Part Number*
L1	Aerial coil	less than 0.5	CS61612
L2		less than 0.5	
L3	Anode coil	less than 0.5	BS24885
L4	Osc. coil	less than 0.5	BS24883
L5		less than 0.5	
L6	Aerial coil M.W.	less than 0.5	DS62893
L7	Aerial coil M.W.	less thah 0.5	
L8	I.F. rejector coil	18	BS62891
L9	Osc. coil M.W. and L.W.	1.5	BS62954
L10		4.8	
IFT1	I.F. transformer	primary less than 0.5 secondary less than 0.5	BS24879
IFT2	I.F. transformer	primary less than 0.5 secondary less than 0.5	BS61560
IFT3	I.F. transformer	primary 14 secondary 14	BS61924
IFT4	I.F. transformer	primary less than 0.5 secondary less than 0.5	BS61560
IFT5	Discriminator transformer	primary less than 0.5 secondary less than 0.5 tertiary less than 0.5	CS24882
IFT6	I.F. transformer	primary 14 secondary 14	BS61924
HFC1	Heater choke	less than 0.5	AS24886
HFC2	Heater choke	less than 0.5	AS24886
T1	Output transformer	primary 600 secondary less than 0.5	AS62895 or BS24916 with components mounted.

NOTE:—L1 & 2 use iron dust core part number AP17109.
IFT1, 2, 4 & 5 use iron dust core part number AP17109.
IFT3 & 6 and L8 use iron dust core part number AP61784.
L9 & 10 use iron dust core part number AP62818.

MISCELLANEOUS

Description	*Part Number*
Ferroxcube core	AP22966
Pilot lamp M.E.S., 6·3V, 0·1A	AP19916
Push button switch	DS62429
Push button switch with associated components	DS62892
Mains switch	see RV1
Thermistor Type V1010	AP62939
Control knob	AS70239
VHF unit	ES62884
Tuning core assembly for VHF unit	CS62885
Ferrite-rod aerial	DS62893
Cabinet	FP62221
Cabinet back	AS62903
Core drive assembly A.M.	AS70222
Loudspeaker	BP26490
Scale	EP62754

BUSH RADIO

Service Information

MODEL VHF.80c

TABLE RADIO

(For use with Service Information for VHF.80, TP1245)

Model VHF.80c

SPECIFICATION

GENERAL

The VHF.80c receiver is identical in all respects to the VHF.80 receiver with certain exceptions, the details of which are listed below.

The service information issued for the VHF.80 (TP1245) should be used in conjunction with this publication (TP1358) if service information is required for the VHF.80c.

CABINET

Black and light grey moulded plastic cabinet with grey and white fabric-covered speaker grille. Light grey control knobs with chrome trim and pearl grey push buttons. The tuning scale is coloured red with white figures.

MISCELLANEOUS Part Numbers

Description	Part Number
Baffle (complete with fret)	DS64893
Cabinet	AP64829
Cabinet, back	AP64891
Knob, Tuning and Volume On/Off	AS64895
Pointer, tuning	AS64896
Pulley (3 used on VHF unit)	AP24684
Pulley (6 used on A.M. drive)	AP62772