BUSH RADIO

Service Instructions

Model VHF.54

FOR A.C. MAINS

INDEX

SPECIFICATION

BASIC DESIGN

In the " L " or " M " position of the Waveband switch, the circuit is a conventional 6-valve (including rectifier and tuning indicator) superhet employing Mullard valves in the following sequence :—

Mixer ECH81 (V3) : I.F. Amplifier EF85 (V4) : Signal/ A.G.C. Diode and Audio Amplifier EABC80 (V5) : Output EL84 (V6) : Tuning Indicator EM80 or EM81 (V8) : Full-wave Rectifier EZ80 (V7).

In the V.H.F. position of the Waveband switch, the circuit is re-arranged and two additional stages are brought into operation. The valve sequence becomes :—

Wide-band VHF Amplifier EF80 (V1) : VHF Oscillator/ Mixer EF80 (V2) : 1st I.F. Amplifier—Heptode of ECH81 (V3) : 2nd I.F. Amplifier EF85 (V4) : Ratio detector—two diodes from EABC80 (V5) : 1st Audio Amplifier—triode of ECH81 (V3) : 2nd Audio Amplifier—triode of EABC80 (V5) : Output EL84 (V6) : Tuning Indicator EM80 or EM81 (V8) : Full-wave Rectifier EZ80 (V7).

The VHF R.F. stage, V1, is fixed-tuned while the VHF oscillator coil is fitted with a variable iron-dust core operated by a cam attached to the drive drum. On VHF, the triode-heptode, V3, is employed as an A.F. and I.F. Amplifier. Separate I.F. transformers are used for A.M. (470 kc/s) and F.M. (19.5 mc/s.) and a special slider switch, operated by the rotary Waveband switch, ensures positive changeover. The output stage, V6, is fitted with negative feedback to maintain the high fidelity of F.M. signals.

VALVES

Mullard Type	*Heater*
EF80 (V1, V2)	6.3V. 0.3A.
ECH81 (V3)	6.3V. 0.3A
EF85 (V4)	6.3V. 0.3A.
EABC80 (V5)	6.3V. 0.45A.
EL84 (V6)	6.3V. 0.76A.
EZ80 (V7)	6.3V. 0.6A.
EM80 or EM81 (V8)	6.3V. 0.3A.

V8 is octal-based, all others B9A.

VOLTAGE RANGE

100/120V. and 200/250V. 40 to 100 c/s.

MAINS CONSUMPTION

65 watts approx.

SCALE LAMPS

3 at 6.5V. 0.3A.

AUDIO OUTPUT

3 watts approx.

WAVEBANDS

Long—300 kc/s. to 150 kc/s. (1,000 to 2,000 metres).
Medium—1,600 kc/s. to 535 kc/s. (187 to 560 metres).
VHF—87.5 mc/s. to 100 mc/s. (3.4 to 3 metres).

INTERMEDIATE FREQUENCIES

L and M—470 kc/s.
VHF—19.5 mc/s.

CONTROLS (from left to right) :—

(*a*) Tone. (*b*) On/Off Switch and Volume. (*c*) Tuning. (*d*) Waveband and Gramophone Switch.

GRAMOPHONE PICK-UP

The pick-up sockets are situated on the left-hand side of the receiver (rear view).

AERIAL CONNECTIONS

L and M—an internal aerial is fitted which is terminated in a 2-pin plug to mate with a socket at the left-hand side of the chassis (rear view). Sockets are provided for an external aerial, if desired.

VHF—an internal di-pole aerial is fitted which terminates in a 2-pin plug for insertion into the VHF band aerial sockets (top left of cabinet, rear view). An additional 2-pin plug is supplied for use with an external aerial system, if necessary.

EXTERNAL SPEAKER

A permanent-magnet speaker (2.5 ohms impedance) should be used for an extension, connected to the two sockets at top right of the cabinet (rear view).

CABINET DIMENSIONS

Height—15¼ in. Width—19¾ in. Depth—8 in.

CAPACITORS

Ref.	Value mfd.	Value pfd.	Type	D.C. Working Voltage	Tolerance ± %	Part No.	Description
C1	0.001	—	M.P.	350	20	AP24116 or AP22248	V1 cathode by-pass.
C2	0.001	—	M.P.	350	20	AP24116 or AP22248	V1 screen decoupling.
C3	0.001	—	M.P.	350	20	AP24116 or AP22248	V1 anode decoupling.
C4	0.001	—	M.P.	350	20	AP24116 or AP22248	V1 heater by-pass.
C5	—	4.7	S.C.	750	20	AP22252	V1 anode tuning.
C6	—	4.7	S.C.	750	20	AP23258	V2 oscillator tuning.
C7	—	22	S.C.	750	20	AP22253	V2 grid block.
C8	—	4.7	S.C.	750	20	AP22252	V2 oscillator grid.
C9	0.003	—	M.P.	350	20	AP24115 or AP22249	V2 anode decoupling.
C10	—	39	S.M.	350	5	AP22260	I.F.T.1 primary tuning.
C11	0.001	—	M.P.	350	20	AP24116 or AP22248	V2 heater by-pass.
C12	—	22	S.M.	350	5	AP20404	I.F.T.2 secondary tuning.
C13	—	50	M.M.	350	20	P3774	Aerial capacitor.
C14	—	600	S.M.	350	10	AP19652	L.W. aerial tuning.
C15	Not included.						
C16	—	100	S.C.	750	20	AP17336	M.W./L.W. coupling to V3 signal grid.
C17	0.02	—	M.P.	150	20	AP22251	V3 cathode by-pass (R.F.).
C18	100	—	Elec.	6	—	AP22258	V3 cathode by-pass (A.F.).
C19	0.01	—	M.P.	350	20	AP24117 or AP22250	R.F. earthing for output from I.F.T.1.
C20	0.02	—	M.P.	150	20	AP22251	A.F. coupling to V3 (triode section).
C21	0.01	—	M.P.	350	20	AP24117 or AP22250	Decoupling for input to V8 (L. and M.)
C22	0.003	—	M.P.	350	20	AP24115 or AP22249	V3 screen decoupling.
C23	—	56	S.C.	750	20	AP18162	V3 oscillator grid capacitor.
C24	—	33	S.M.	350	2	AP17919 or AP19690	Part of V3 sc. opotential divider.
C25	—	240	S.M.	350	2	AP19648 or AP19649	L.W. oscillator tuning.
C26	—	515	S.M.	350	1	AP17207 or AP17175	M.W. oscillator padder.
C27	—	365	S.M.	350	1	AP19650 or AP19651	L.W. oscillator padder.
C28	0.001	—	P.T.	500	25	P3768	V3 oscillator anode block.
C29	0.005	—	P.T.	500	25	P3767	Decoupling for input to V8 (V.H.F.).
C30	0.003	—	M.P.	350	20	AP24115 or AP22249	V3 heptode anode decoupling.
C31	0.1	—	M.P.	150	25	AP21245	A.G.C. decoupling.
C32	—	110	S.M.	350	2	AP17058 or AP16304	I.F.T.4 primary tuning.
C33	—	39	S.M.	350	5	AP22260	I.F.T.2 primary tuning.
C34	—	110	S.M.	350	2	AP17058 or AP16304	I.F.T.4 secondary tuning.
C35	—	39	S.M.	350	5	AP22260	I.F.T.2 secondary tuning.
C36	0.1	—	M.P.	150	25	AP21245	V4 cathode by-pass.
C37	0.003	—	M.P.	350	20	AP24115 or AP22249	V4 screen decoupling.
C38	0.002	—	P.T.	500	25	P8995	Part of P.U. correction circuit.
C39	—	110	S.M.	350	2	AP17058 or AP16304	I.F.T.5 primary tuning.
C40	0.01	—	P.T.	500	25	P3769	V4 anode decoupling.
C41	—	110	S.M.	350	2	AP17058 or AP16304	I.F.T.5 secondary tuning.
C42	—	47	S.M.	350	5	AP22838	I.F.T.3 secondary tuning.
C43	—	100	M.M.	350	20	P3775	V5 signal diode reservoir.
C44	0.01	—	M.P.	350	20	AP24117 or AP22250	H.T. isolating.
C45	0.01	—	M.P.	350	20	AP24117 or AP22250	Audio coupling to V5.
C46	—	500	M.M.	350	20	P3728	De-emphasis circuit.
C47	40	—	Elec.	350	—	AP22257	Smoothing (with C56 and C58).
C48	—	300	M.M.	350	10	AP12374	Ratio detector reservoir.
C49	—	300	M.M.	350	10	AP12374	Ratio detector reservoir.
C50	5	—	Elec.	50	—	AP22255	Ratio detector voltage stabilizer.
C51	—	300	M.M.	350	10	AP12374	Part of negative feedback circuit.
C52	0.01	—	M.P.	350	20	AP24117 or AP22250	Audio coupling to V6.
C53	0.1	—	P.T.	350	25	P3771	Tone corrector circuit.
C54	—	500	M.M.	350	20	P3728	Part of P.U. correction circuit.
C55	0.001	—	P.T.	500	25	P3768	Tone corrector circuit.
C56	20	—	Elec.	350	—	See C47	Smoothing.
C57	0.003	—	M.P.	350	20	AP24115 or AP22249	Part of negative feedback circuit.
C58	40	—	Elec.	350	—	See C47	Reservoir.
TC1	—	2 to 8	—	—	—	AP22241	V.H.F. oscillator trimmer.
TC2	—	4 to 40	—	—	—	AP19637	M.W. aerial trimmer.
TC4	—	60 to 120	—	—	—	AP19637	L.W. aerial trimmer.
TC3	—	4 to 40	—	—	—	AP19637	M.W. oscillator trimmer.
VC1	—	528	—	—	—	BP22455	Tuning.
VC2	—	528	—	—	—	BP22455	Tuning.

Elec.—Electrolytic. M.M.—Moulded Mica. M.P.—Metallized Paper. P.T.—Paper Tubular. S.C.—Silver Ceramic S.M.—Silver Mica.

RESISTORS

Reference	Value (Ohms)	Rating (Watts)	Tolerance ± %	Part No.	Description
R1	15K	¼	10	P6659	V1 screen dropper.
R2	180	¼	10	P6173	V1 cathode bias.
R3	470	¼	20	P6275	V1 anode decoupling.
R4	2.2K	¼	10	P6449	V1 anode load.
R5	47K	¼	20	P6779	V2 grid bias.
R6	2.2K	¼	10	P6449	V2 anode decoupling.
R7	680K	¼	20	P7073	V3 signal grid resistor.
R8	180	¼	10	P6173	V3 cathode bias.
R9	47K	¼	20	P6779	V3 oscillator grid resistor.
R10	470K	¼	20	P7031	V3 triode grid resistor (V.H.F. only).
R11	22K	½	10	P6700	V3 screen decoupling.
R12	100K	½	20	P6862	Standby dropper to V1 and V2.
R13	470	¼	10	P6281	Part of cathode bias circuit to V4.
R14	10K	¼	10	P6617	V3 triode anode load (V.H.F. only).
R15	15K	¼	10	P6659	V3 oscillator anode load.
R16	1K	¼	20	P6359	V3 heptode anode decoupling.
R17	56K	½	10	P6802	Part of screen potentiometer to V4.
R18	150	¼	10	P6155	Part of cathode bias circuit to V4.
R19	1K	¼	20	P6359	V4 anode decoupling.
R20	1.5M	¼	20	P7157	A.G.C. filter (L. & M.).
R21	100	¼	20	P6107	Phasing resistor to V5.
R22	100K	¼	20	P6863	A.G.C. load.
R23	220K	¼	20	P6947	Audio load.
R24	15M	¼	33⅓	AP14548	V5 grid resistor.
R25	180K	¼	10	P6929	V5 triode anode load.
R26	100K	¼	20	P6863	De-emphasis circuit.
R27	22K	¼	10	P6701	Ratio detector load.
R28	3.3K	¼	20	P6485	Grid stopper to V6.
R29	1M	¼	20	P7115	V6 grid resistor.
R30	220	½	5	P6202	V6 cathode bias resistor.
R31	470K	¼	5	P7043	Part of negative feedback circuit.
R32	4.7K	½	10	P6532	Additional smoothing.
R33	100K	¼	20	P6863	Part of screen potentiometer to V4.
R34	68K	¼	10	P6827	Part of P.U. correction circuit.
R35	68K	¼	10	P6827	Part of P.U. correction circuit.
R36	470K	¼	20	P7031	V8 Target anode limiter.
R37	2.2M	¼	20	P7199	Filter to V8 input (L. and M.)
R38	2.2M	¼	20	P7199	Filter to V8 input (V.H.F.).
R39	1M	¼	20	P7155	A.G.C. filter (V.H.F.).
VR1	2M	—	—	BP20851	Volume.
VR2	50K	—	—	BP20852	Tone.

COILS, CHOKES & TRANSFORMERS

Reference	Resistance in Ohms	Part Number	Description
L1	Less than 0.5	BS22853	F.M. Aerial
L2	,,	BS22852	F.M. R.F. Anode.
L3	,,	BS22851	F.M. Oscillator.
L4	2.0	BS23920	M.W. Aerial.
L5	6.5		
L6	50	BS23921	L.W. Aerial.
L7	20		
L8	5	BS17259	M.W. Oscillator.
L9	1		
L10	5	BS19714	L.W. Oscillator.
I.F.T.1	P. Less than 0.5	BS22867	F.M. 1st I.F.T.
	S. ,,		
I.F.T.2	P. ,,	BS22868	F.M. 2nd I.F.T.
	S. ,,		
I.F.T.3	P. ,,	CS22856	F.M. 3rd I.F.T.
	S. (1) ,,		
	S. (2) ,,		
I.F.T.4	P. 12.5	ES16447	L.W./M.W. 1st I.F.T.
	S. 12.5		
I.F.T.5	P. 12.5	ES16448	L.W./M.W. 2nd I.F.T.
	S. 12.5		
T1	P. 410		
	S. (1) 360	BS22460	Audio Output Transformer.
	S. (2) 0.28		
T2	P. 27	DS22877	Mains Transformer.
	S. (1) Total 280		
	S. (2) 0.1		
CH.1	550	CS22858	H.T. line smoothing choke.

The cores required for the above coils are as follows :—
L1—AP22298 or AP23944. L2—AP22440. L3—AP22847. L4 to L10 and I.F.T.1 to I.F.T.3—AP17109.

Note.—Cores for I.F.T.4 and 5 are not normally supplied separately.

Assembly of Osc. Coils—BS22870.
Assembly of Aerial Coils—BS23935.
Complete Coil Deck—ES23919.

VHF.54 CIRCUIT DIAGRAM

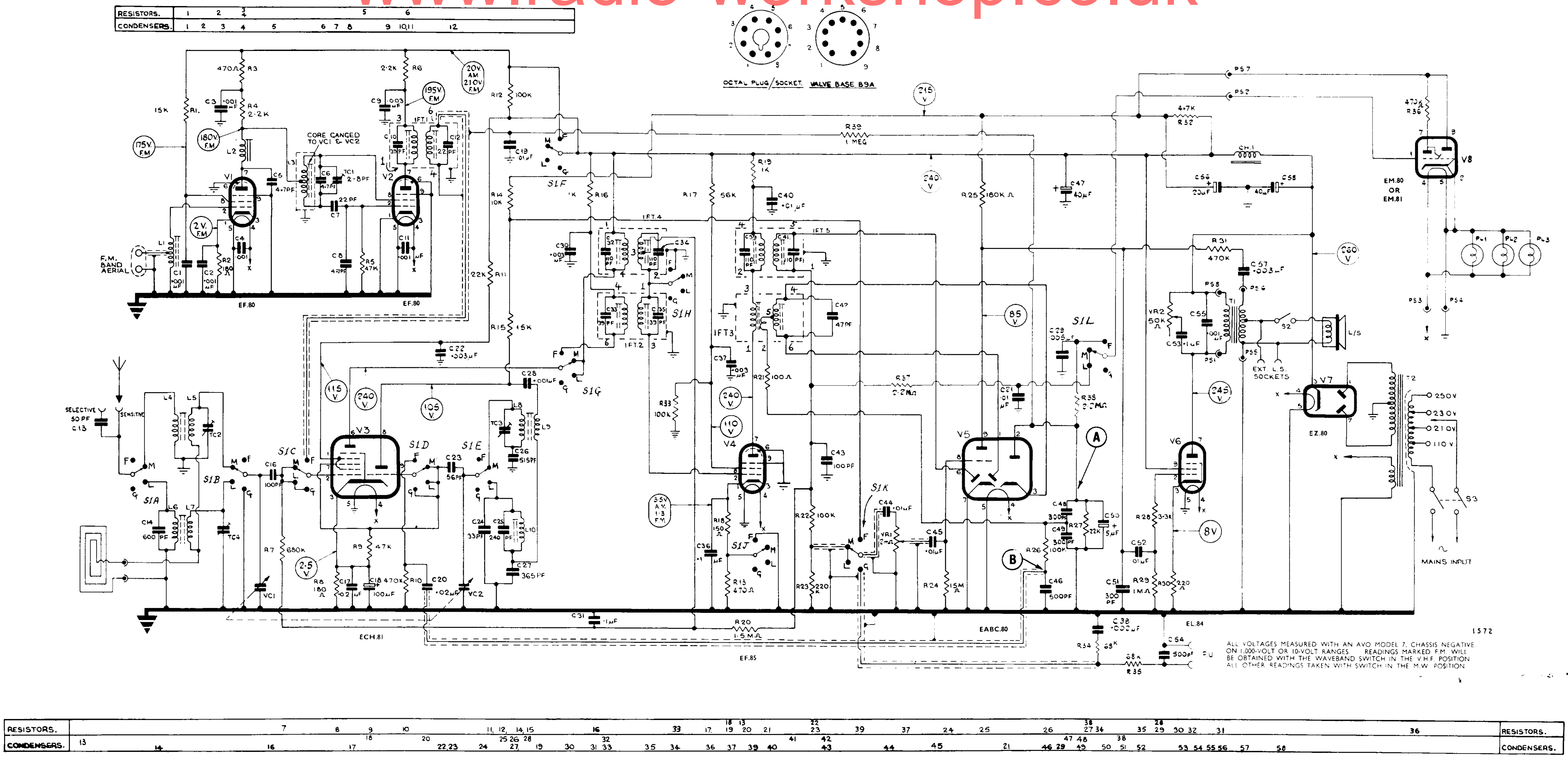

Fig. 1

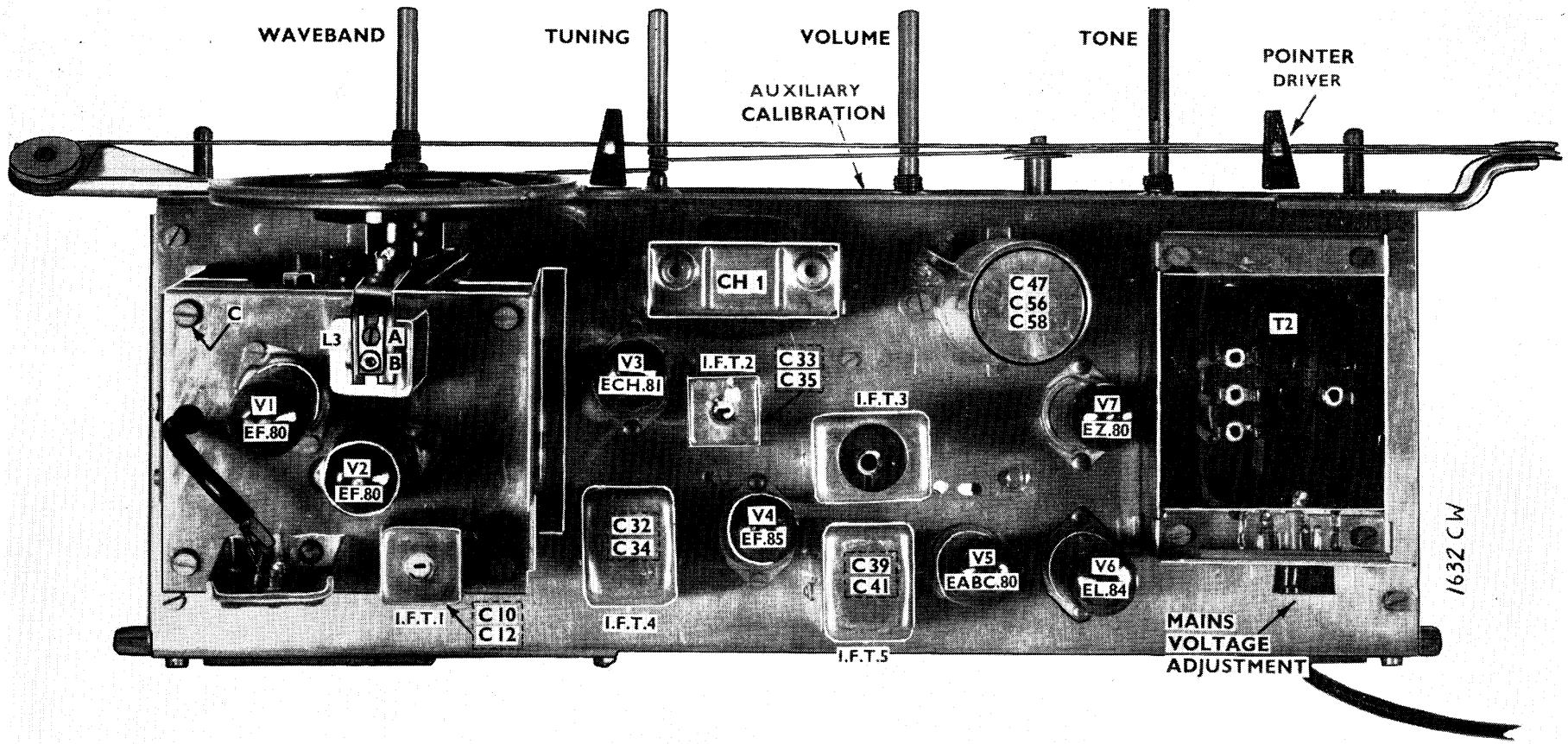

Fig. 2—Top View of Chassis

ALIGNMENT PROCEDURE (GENERAL)

(*a*) Remove receiver from cabinet.
(*b*) The receiver and signal generator should be switched on 15 minutes before alignment is attempted.
(*c*) With tuning capacitor at maximum capacity, a temporary pointer should be clipped to the drive cord to coincide with the DATUM mark on the auxiliary calibration scale at the front of the receiver chassis.
(*d*) Use a non-metallic screw-driver or tube spanner when aligning all cores and trimmers.

ALIGNMENT PROCEDURE (A.M.)

TEST EQUIPMENT REQUIRED

(1) Signal Generator—covering 150 kc/s to 1,600 kc/s with calibration accuracy of ± 1% and modulation 400 c/s at 30%.

(2) Standard Dummy Aerial—suitable for M.W. Aerial alignment.

(3) Output Meter—50 to 1,000 mW.

I.F. ALIGNMENT (470 kc/s.)

(*a*) Switch the receiver to M.W. Connect signal generator to pin 2, V4 (generator set to 470 kc/s., 30% mod.) and the output meter to the secondary of T1. Disconnect speech coil.
(*b*) Tune Sec. and Pri. of I.F.T.5 (in that order) for maximum.
(*c*) Transfer generator to pin 2, V3 and tune Sec. and Pri. of I.F.T.4 (in that order) for maximum.

NOTE.—I.F.T.1, 4 and 5 — Secondary top.
I.F.T.2 and 3 — Primary top.

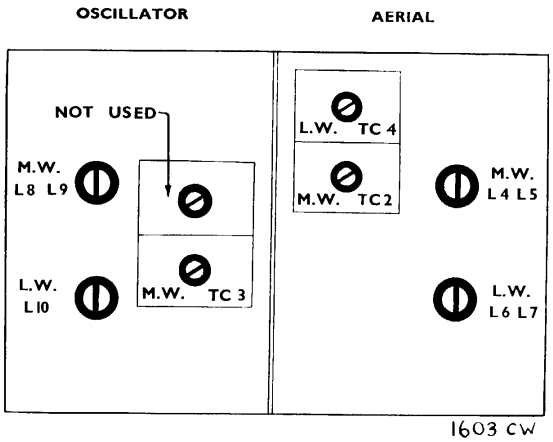

Fig. 3—Key to Cores and Trimmers in Coil Deck

R.F. ALIGNMENT (Fig. 3)

Connect generator to aerial socket and proceed as follows:

Operation	Waveband	Generator (kc/s.)	Receiver Calibration Mark	Adjust for Maximum
1	M.W.	600	0.6	L8/9 (Osc.) and L4/5 (Aerial).
2	M.W.	1,500	1.5	TC3 (Osc.) and TC2 (Aerial).
3	Repeat operations 1 and 2—		check calibration.	
4	L.W.	150	0.15	L10 (Osc.) and L6/7 (Aerial).
5	L.W.	300	0.3	TC4 (Aerial).
6	Repeat operations 4 and 5—		check calibration.	

ALIGNMENT PROCEDURE (F.M.)

TEST EQUIPMENT REQUIRED

(1) Signal Generator for 19.5 mc/s. (I.F.) and 87.5 to 100 mc/s.
(2) AVOmeter model 8,
OR
(2) D.C. valve-voltmeter and microammeter with 50 μA. F.S.D.
(3) Two ¼- or ½-watt resistors of 47K each, matched.

I.F. ALIGNMENT (19.5 mc/s.)

Switch receiver to VHF band. Inject 19.5 mc/s. unmodulated to pin 2, V3 and turn volume control to minimum. Connect the two matched 47K resistors, in series, between point "A" (see circuit diagram—Fig. 1) and chassis. Connect AVO model 8 (on 10V. D.C. range) or valve-voltmeter between point "A" and chassis.

During alignment, it is advisable to ensure that the input from the generator is just sufficient to maintain an output of 4V. on the voltmeter. Proceed as follows :—

(*a*) Adjust Pri. and Sec. of I.F.T.2 and Pri. I.F.T.3 for maximum voltage output.

(*b*) Now connect the AVO (on 50 μA. range) or microammeter between the junction of the two resistors and point " B ". Adjust Sec. I.F.T.3 to produce zero on the microammeter.

NOTE.—Zero response can only occur when the Sec. I.F.T.3 is in balance. When de-tuned, either positive or negative output will be obtained. The AVO model 8 has a reversing button to allow readings in either direction, but the connections to the microammeter (if used) will need to be changed over as necessary.

(*c*) Re-connect the voltmeter between point "A" and chassis. Re-trim Pri. I.F.T.3 for maximum voltage output.

(*d*) Re-connect microammeter as in (*b*) above, and check Sec. I.F.T.3 for zero response.

NOTE.—It is essential that maximum voltage output coincides with minimum response on the microammeter.

R.F. ALIGNMENT (See Fig. 4)

Transfer signal input to the F.M. aerial sockets. Re-connect voltmeter between point "A" and chassis and proceed as follows :—

Operation	Generator (mc/s.)	Receiver Calibration Mark	Adjust for Maximum
1	87.5	87.5	Core L3 (Osc.).
2	100	100	Trimmer TC1 (Osc.).
3	94	94	Cores L2 (R.F.) and L1 (Aerial).
4	Repeat operations—check calibration.		

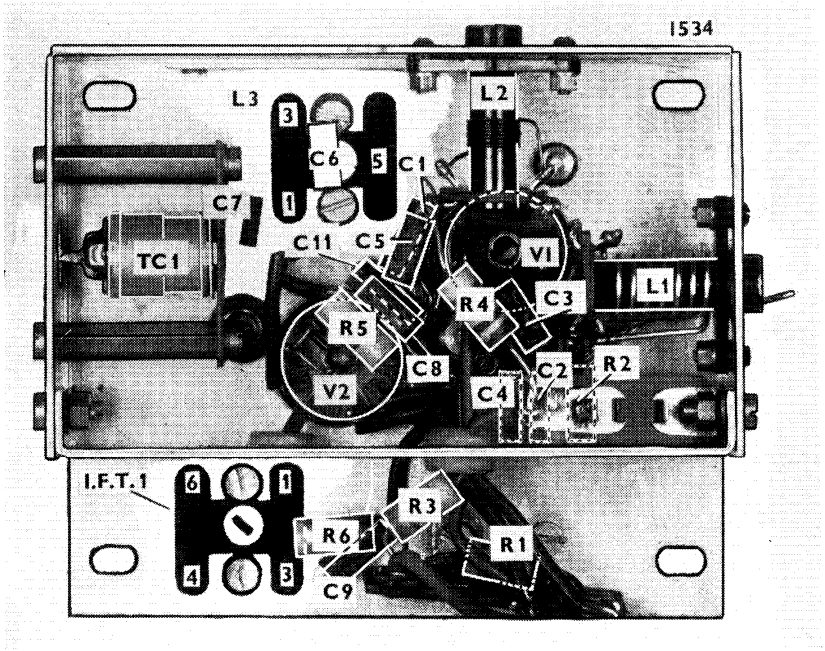

Fig. 4—Under View of F.M. Sub-chassis

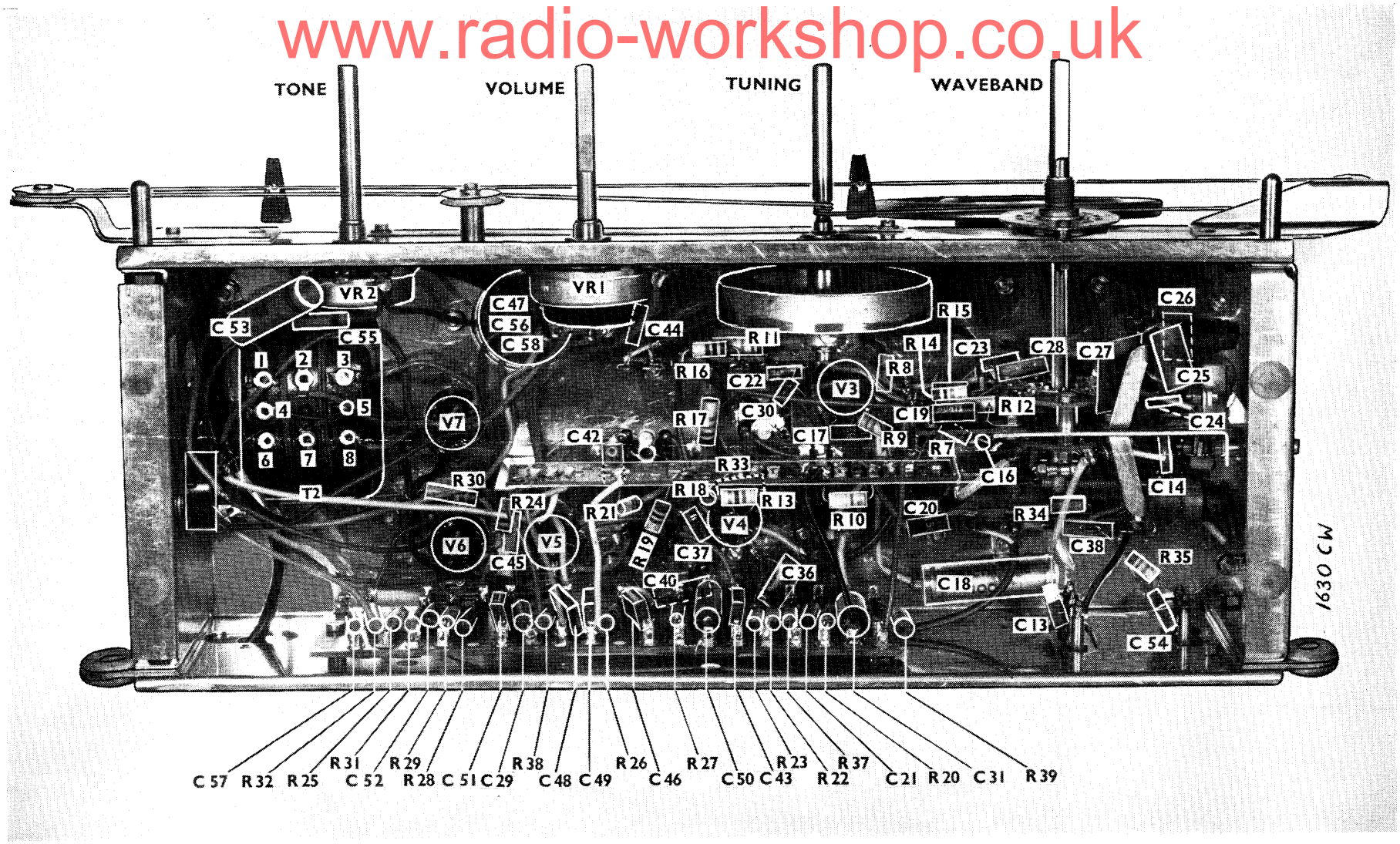

Fig. 5—Under View of Chassis

REPLACING CORD DRIVE

The diagram, Fig. 6, shows the position of the drive drum with the tuning capacitor at maximum. The length of glass nylon cord required is 52¾″ after clenching in the clip.

Hook the cord and clip to the spring and attach the other end of the spring to the drive drum. Now pass the cord through the opening in the drum and take three turns in a clockwise direction around the spindle. The cord is then placed over pulley 2, around pulleys 1 and 3 and finally passed round the drive drum in a clockwise direction.

PART NUMBERS

Carriage	AP16329
Clip, cord drive	P1940
Cord drive assembly	AS23931
Driver, pointer	AP16296
Drum, drive	BP23620
Drum, drive and cam	BS23934
Pointer	AP20441
Pointer and Carriage	AS20502
Pulley	P12416
Scale, tuning	DP23627
Spindle, drive	AP20849
Spring, cord tension	P1941

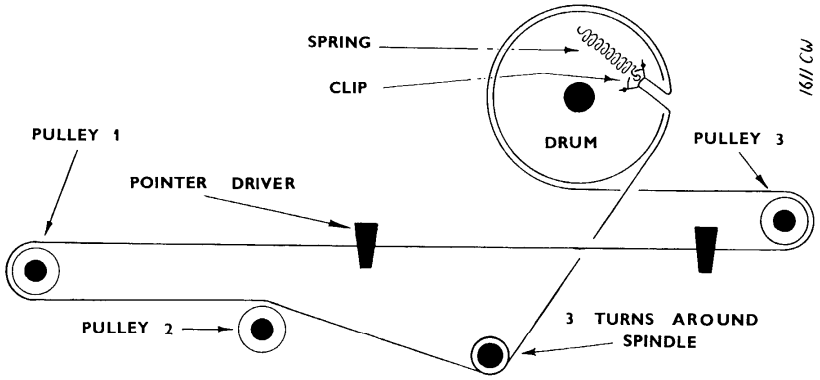

Fig. 6—Assembly of Drive Cord

VALVE VOLTAGES AND CATHODE CURRENTS (See Fig. 1)

The figures quoted are approximate and variations may occur without impairing the performance of the receiver.

Valve	Anode Volts	Screen Volts	Cathode Current (mA)	Cathode Volts
V1 (EF80)	180 (F.M.)	175 (F.M.)	1 (M.W.), 10 (F.M.)	2 (F.M.)
V2 (EF80)	195 (F.M.)	180 (F.M.)	1.5 (M.W.), 15 (F.M.)	—
V3 (ECH81)	Heptode—240 (M.W.)	95 (M.W.)	14 (M.W.)	2.5 (M.W.)
	Triode—110 (M.W.)	—		
V4 (EF85)	240 (M.W.)	120 (M.W.)	5 (M.W.)	3.5 (M.W.), 1.3 (F.M.)
V5 (EABC80)	80 (M.W.)	—	1 (M.W.)	—
V6 (EL84)	245 (M.W.)	240 (M.W.)	36 (M.W.)	8 (M.W.)
V7 (EZ80)	—	—	66 (M.W.), 86 (F.M.)	265 (M.W.)

M.W.—Medium-wave position of Waveband switch.
F.M.—V.H.F. position of Waveband switch.

DISMANTLING

REMOVING CHASSIS FROM CABINET

Set the tuning control so that the pointers are near the right-hand side of the tuning scale (when viewed from the rear). Remove the control knobs, the F.M. aerial plug, the A.M. aerial plug and the octal plug. Remove the two bolts securing the chassis to the cabinet. Gently ease the chassis back about ½″ and then lift the pointer drivers off their respective carriages.

REMOVING F.M. SUB-CHASSIS (See Fig. 2)

Turn the tuning capacitor to minimum. Remove the two fixing bolts on either side of the slider return spring. Remove the screw "A" at the top of the slider and carefully lift out the core " B " from the coil L3. After removing the four screws, " C ", at the corners of the sub-chassis, the whole unit may be lifted in an arc, hinging on the flexible leads at the rear.

NOTE.—Re-assembly should present no difficulty if it is remembered that the core " B " must be free to move in the coil L3. The holes for fixing bolts are elongated and the top of the slider is slotted to give the necessary latitude for aligning the core in the coil.

REMOVING THE COIL DECK

ELECTRICAL OPERATIONS :

Aerial Section

1. Remove co-axial inner from Tag No. 1 (S1C).
2. Remove co-axial outer from Tag C.
3. Remove green lead from Tag C.
4. Remove yellow lead from Tag F.
5. Remove lead from pin 2, V3.
6. Remove lead from VC1 stator.
7. Remove connection to frame aerial socket.
8. Remove lead to A.M. aerial socket.

Oscillator Section

1. Remove red lead from Tag No. 1 (S1F).
2. Disconnect red lead from Tag D.
3. Remove screened lead from Tag No. 3 (S1K).
4. Remove orange lead from Tag E.
5. Remove blue lead from Tag B.
6. Remove screened lead from the junction of R22/R23.
7. Remove screened lead from the junction of R34/R35.
8. Remove green lead from Tag A.
9. Remove lead from VC2 stator.
10. Remove earthing braid from the frame of VC1/VC2.

NOTE.—Certain of the above connections must be removed from the old coil deck and replaced on the new one.

MECHANICAL OPERATIONS :

1. Turn waveband switch to GRAM.
2. Unbolt and remove the slider switch operating lever from the end of the switch operating bar.
3. Unscrew the switch locating plate from the front of the chassis.
4. Withdraw the switch operating bar from the coil deck.
5. Unbolt and remove the coil deck.

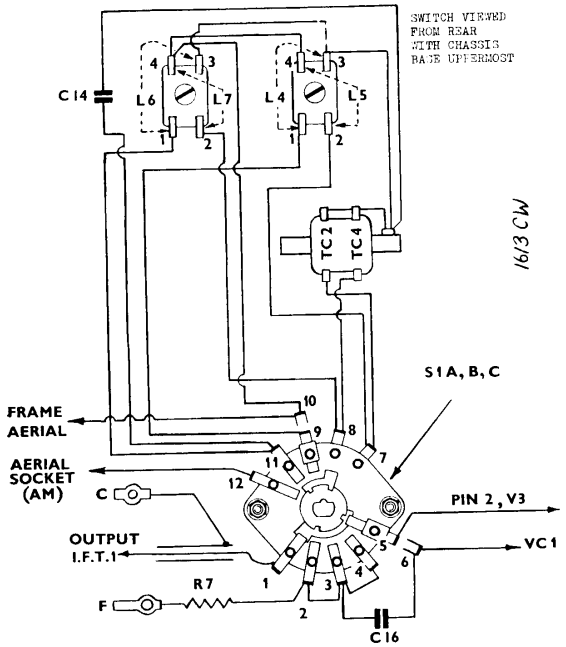

Fig. 7—Coil Deck (Aerial Section)

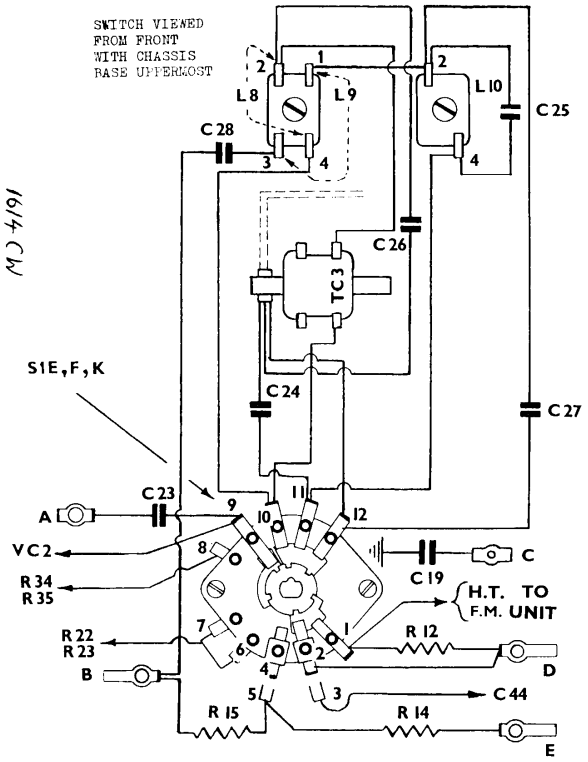

Fig. 8—Coil Deck (Oscillator Section)

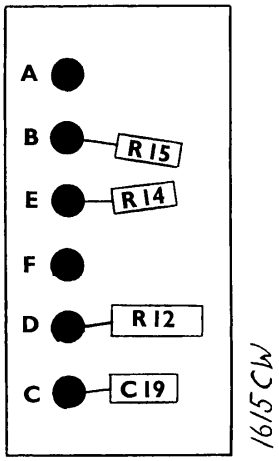

Fig. 9—Coil Deck Tag Board

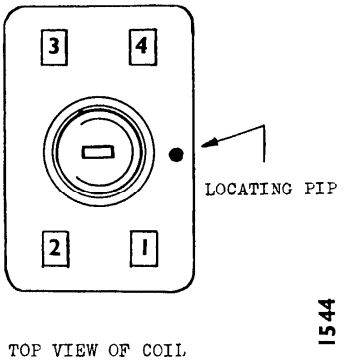

Fig.—10—Key to MW/LW Coil Connections

CONNECTIONS TO I.F. TRANSFORMERS

External connections are made to pins at the base of each transformer. Pin numbers are shown in Fig. 11 and connections are as follows :—

I.F.T. No.	Part Number	Pin Number	To
1	BS22867	1	V2, pin 7.
		3	C9 and R6.
		4	Co-axial outer.
		6	Co-axial inner.
2	BS22868	1	S1H (slider switch tag 9) and I.F.T.4, pin 2.
		3	V4, pin 2.
		4	R16 and C30.
		6	S1G (slider switch tag 15).
3	CS22856	1	V4, pin 7.
		2	R21.
		3	I.F.T.5, pin 2.
		4	V5, pin 3 and C42.
		6	V5, pin 1 and C42.
4	ES16647	1	H.T. + and R16, etc.
		2	I.F.T.3, pin 1.
		3	Coil deck tag F and C31.
		5	S1G (slider switch tag 17).
5	ES16648	1	C43.
		2	I.F.T.2, pin 3.
		4	R19 and C40.
		5	V5, pin 6.

Note—Connections to the F.M. slider switch are shown in Fig. 12 and coil deck tags in Fig. 9.

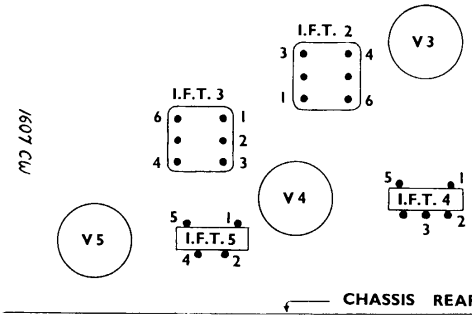

Fig. 11—I.F. Transformer Base Key

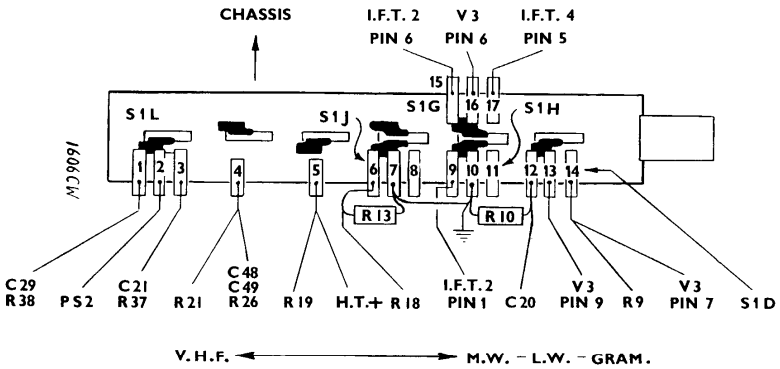

Fig. 12—Connections to Slider Switch

CONNECTIONS TO F.M. OSC. COIL (Fig. 4)

Coil No.	Part No.	Pin No.	To
L3	BS22851	1	V2, pin 8 ; TC1 and C6.
		3	TC1, C6 and C7.
		5	L2.

CONNECTIONS TO MAINS TRANSFORMER

(Part No. DS22877)

External connections are made to tags on the base of the transformer (Fig. 5). Connections are as follows :—

Tag. No.	To.
1	Octal socket, pin 3 : V6, pin 4 : V7, pin 4.
2	S3.
3	V7, pin 1.
4	Octal socket, pin 4 and chassis.
5	Chassis.
6	Chassis.
7	S3.
8	V7, pin 7.

GRAMOPHONE PICK-UP

The waveband switch should be set to the " G " position when the receiver is being used for record reproduction. A good quality crystal pick-up should be employed—the Acos HGP.37 or Garrard GC.2 is recommended.

An input of 150 mV. is necessary to give a standard output of 50 mW.

PART NUMBERS

The following part numbers are not shown elsewhere in these Service Instructions. **When ordering replacements please quote :—**

1. Type and Serial Number of receiver.
2. Part Number and Description of item.
3. Quantity required.

Part No.	*Description*	*Use*
EP23623	Back, Cabinet.	
EP23622	Cabinet.	
AP16423	Clip, knob (1 per knob)	Part of knob assemblies.
AP16663	Flywheel.	
CP23904	Knob, Volume and On/Off (less clip).	
CP23905	Knob, Tune (less clip).	
CP23907	Knob, Tone (less clip).	
AP24326	Knob, Waveband (less clip).	
AP18628	Pilot Lamp, 6.5V. 0.3A.	
AP23630	Plate, switch locating.	
P3733	Plug, red	Aerial.
P3734	Plug, black	Earth.
AP16336	Plug, 2-pin	A.M. int. aerial plug.
AP17295	Plug, octal	Connector for dial lamps, etc.
AP20161	Plug, 2-pin	VHF aerial plug.
BS23933 or BS24144	Slider Switch, 5-pole, assembly.	Slider switch complete (interchangeable).
AP16335 or AP22854	Socket, 2-pin	A.M. int. aerial socket.
BP20499	Speaker, elliptical.	
AP22436	Switch wafer, aerial.	
AP22435	Switch wafer, oscillator.	
P3900	Valveholder, octal ..	Connector for dial lamps, etc.
P3936	Valveholder, octal ..	EM.80, EM.81
AP22419	Valveholder, B9A.	
AP22755	Valveholder, B9A, with skirt.	

MODIFICATIONS

V8 was type EM80 but is now type EM81 (*CN*5689).

ERRATUM

Page 1 — VALVES — Delete ' V8 is octal-based, all others B9A' and substitute 'All bases B9A'

Page 12 — PART NUMBERS — Delete ' P3936 Valveholders, octal .. .. EM.80, EM.81'

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