

BUSH RADIO

Service Instructions

A.C. MODEL - PB.12

A.C. - D.C. MODEL - DAC.12



Front view of receiver

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SPECIFICATION.

BASIC CIRCUIT:

A five valve, including rectifier, three wave range superheterodyne with six tuned circuits.

Eight Push Buttons: Three as wave range switches for manual tuning, four as pre-tuned station selectors, and one for gramophone.

A tone correction circuit which operates when the volume control is retarded, applies inverse feedback to the A.F. amplifier from the cathode of the output valve.

The A.C. model (PB.12) employs a transformer to supply the valve heaters, scale lamp and H.T. A ballast resistor replaces the transformer on the A.C./D.C. receiver (DAC.12).

VALVES:

Mullard	CCH.35	...	Heater	7.0 V.
"	EF.39	...	"	6.3 V.
"	EBC.33	...	"	6.3 V.
"	CL.33	...	"	33.0 V.
"	CY.31	...	"	20.0 V.

Heater Current 0.2 A.

All valves have international octal bases.

VOLTAGE RANGE:

PB.12. 100-120, 200-250 volts, A.C. 40-100 cycles.
DAC.12. 200-250 volts, A.C. or D.C.

MAINS CONSUMPTION:

PB.12. Approximately 40 watts.
DAC.12. Approximately 60 watts.

AUDIO OUTPUT:

Approximately 3 watts.

WAVE RANGES:

Manual Tuning:
S.W. 18.1-20.0 metres (16.5 Mc/s.-14.95 Mc/s.).
M.W. 181.8-585.2 metres (1.65 Mc/s.-515 Kc/s.).
L.W. 857.0-2,142.0 metres (350 Kc/s.-140 Kc/s.).

INTERMEDIATE FREQUENCY: 465 Kc/s.

GRAMOPHONE PICK-UP:

Pick-up sockets are fitted between the mains connector and the aerial sockets.

CONTROLS:

Side of cabinet:—Tone.

Front of Cabinet:—

Left-hand knob. On/Off switch and volume.
Right-hand knob. Manual tuning.

Push buttons (from left to right):—

- Button 1. Gramophone.
- Button 2. Any pre-selected station within the range 1,100-1,875 metres.
- Button 3. Any pre-selected station within the range 325-550 metres.
- Button 4. Any pre-selected station within the range 325-550 metres.
- Button 5. Any pre-selected station within the range 200-350 metres.
- Button 6. Long wave range manual tuning 2,142 metres-857 metres (140 Kc/s.-350 Kc/s.).
- Button 7. Short wave range band spread manual tuning 20.0 metres-18.1 metres (14.95 Mc/s.-16.5 Mc/s.).
- Button 8. Medium wave range manual tuning 585.2 metres-181.8 metres (515 Kc/s.-1.65 Mc/s.).

AERIAL AND EARTH:

A built-in frame aerial for local station reception on the medium and long wave ranges, is provided and is located inside the cabinet.

The external aerial sockets are to be found on the left-hand side (back view) of the receiver. Two aerial sockets are provided. The top socket marked "Max. Sensitivity" is the normal position for the aerial, but when interference from a local or powerful station is experienced or where a large outdoor aerial is used, better results will be obtained if the aerial is connected to the "Max. Selectivity" socket.

The lower socket is for the earth connection, and no direct earth should be made to any other part of chassis on the A.C./D.C. model DAC.12.

EXTERNAL SPEAKER:

Two sockets, located on a small panel at top of cabinet, are provided for a low impedance external speaker. A knurled screw is provided on this panel, which when given a few turns anti-clockwise disconnects the internal speaker.

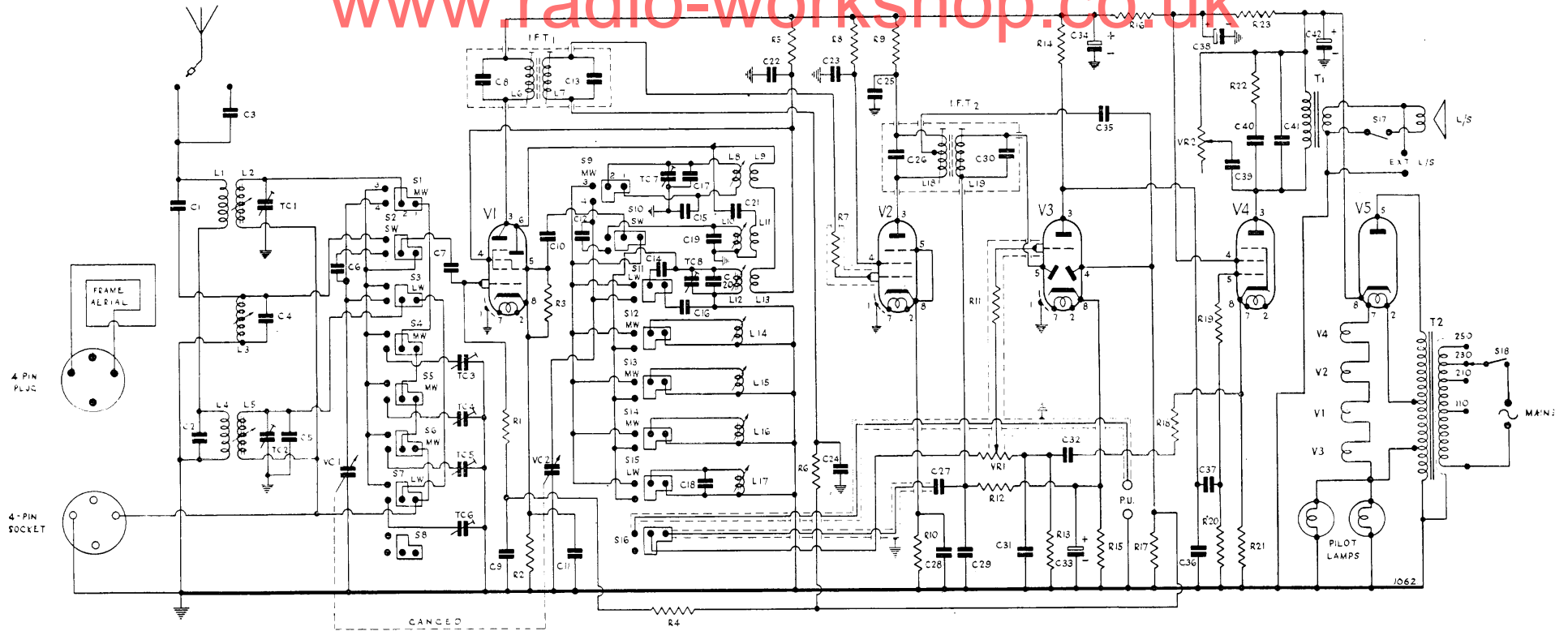
A permanent magnet moving coil speaker having a speech coil impedance of approximately 2.5 ohms should be used for the extension.

CABINET DIMENSIONS:

Height, 17½ ins. Depth, 12½ ins. Width, 21½ ins.

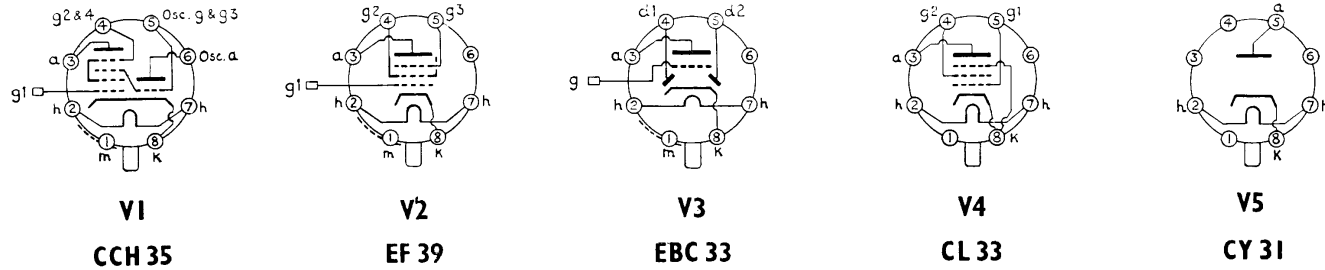
WEIGHT:

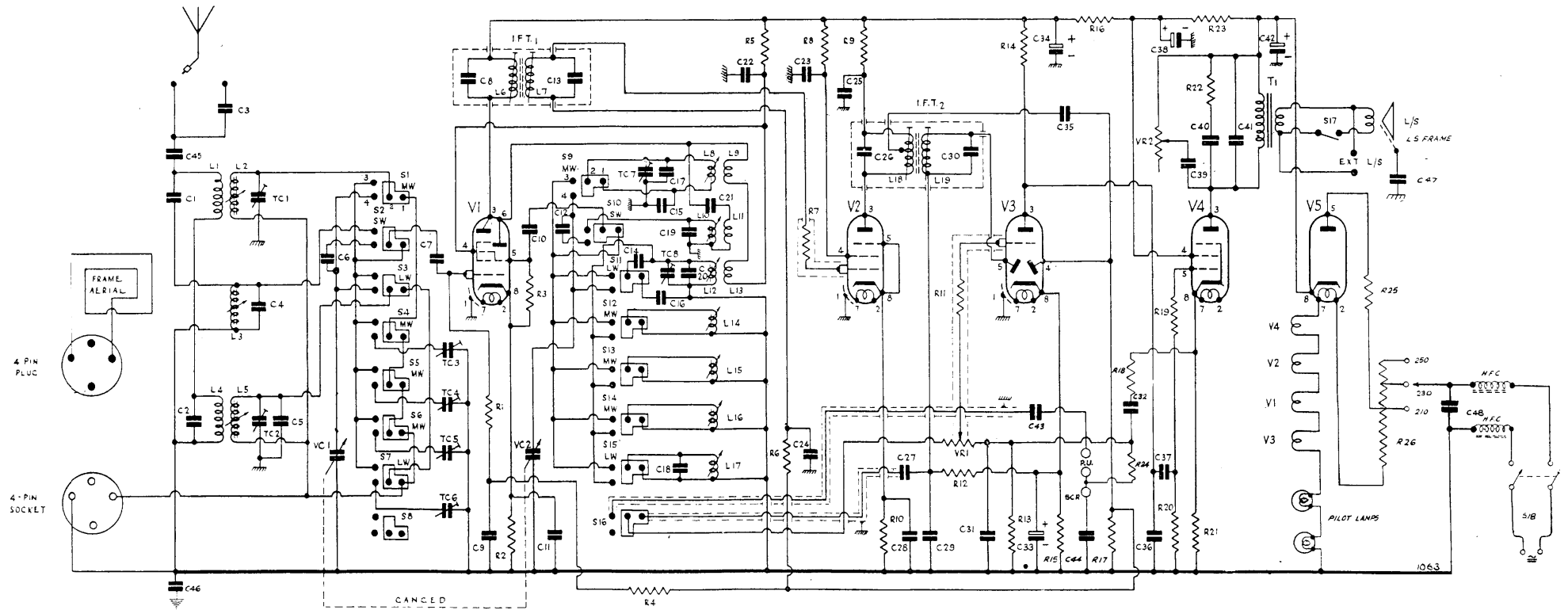
Approximately 33 lbs.



VALVE BASE CONNECTIONS

The pin connections are shown as they would appear when the base of its holder is viewed from the underside of the chassis.





VALVE BASE CONNECTIONS

The pin connections are the same as for the PB.12 opposite.

CAPACITORS.

Ref.	Value		Type.	D.C. Working Volts.	Tolerance \pm %	Part No.	Description.
	mf.	mmfd.					
C 1	—	5	Silver mica	350	20	AP15061	Series aerial capacitor on S.W. range.
C 2	—	800	Mica	350	20	P 3776	L.W. aerial coupling coil parallel capacitor.
C 3	—	50	Silver mica	350	20	AP15067	Series aerial capacitor on "Selective" tap.
C 4	—	68	" "	350	2	AP15729	S.W. R.F. coil fixed trimmer.
C 5	—	27	" "	350	5	AP16273	L.W. R.F. coil fixed trimmer.
C 6	—	60	" "	350	2	AP16188	Fixed padder on S.W. manual tuning.
C 7	—	50	Mica	350	20	P 3774	V1 Control grid capacitor.
C 8	—	110	Silver mica	350	2	AP13286	1st I.F.T. primary capacity.
C 9	.05	—	Paper tubular	350	20	{ P 3770, P12363 or AP13170	V1 A.V.C. decoupling.
C10	—	50	Silver mica	350	10	{ AP15066, P 3770	V1 Oscillator grid capacity.
C11	.05	—	Paper tubular	350	20	{ P12363 or AP13170	V1 Cathode decoupling.
C12	—	60	Silver mica	350	2	AP16188	Fixed padder on S.W. oscillator manual tuning.
C13	—	110	" "	350	2	AP13286	1st I.F.T. secondary capacity.
C14	—	316	" "	350	1	AP16185	Fixed padder on L.W. manual tuning.
C15	—	556	" "	350	1	AP15731	Fixed padder on M.W. manual tuning.
C16	—	340	" "	350	1	AP16187	Fixed trimmer in series with C14 on all push buttons.
C17	—	10	" "	350	10	AP15062	Fixed trimmer on M.W. manual tuning.
C18	—	316	" "	350	1	AP16185	Fixed trimmer on L.W. push button.
C19	—	60	" "	350	2	AP16188	Fixed trimmer on S.W. manual tuning.
C20	—	140	" "	350	1	AP16186	Fixed trimmer on L.W. manual and all push buttons.
C21	—	50	" "	350	10	AP15066	Coupling to oscillator feedback coil on S.W.
C22	.05	—	Paper tubular	350	20	P 3770,	V1 Screen and oscillator anode decoupling.
C23	.05	—	" "	350	20	P12363	V2 Screen decoupling.
C24	.05	—	" "	350	20	or	V2 A.V.C. decoupling.
C25	.05	—	" "	350	20	AP13170	V2 Anode decoupling.
C26	—	110	Silver mica	350	2	AP13286	2nd I.F.T. primary capacity.
C27	.01	—	Paper tubular	350	25	{ P 3769, P12726 or AP13160	Coupling to V3 grid.
C28	.05	—	" "	350	20	{ P 3770, P12363 or AP13170	V2 Cathode decoupling.
C29	—	100	Mica	350	20	P 3775	I.F. filter.
C30	—	110	Silver mica	350	2	AP13286	2nd I.F.T. secondary capacity.
C31	0.1	—	Paper tubular	350	25	{ P 3771, AP13328 or AP13172	Part of feedback circuit.
C32	.05	—	" "	350	25	{ P 3770, P12363 or AP13170	Feedback capacity.
C33	50	—	Electrolytic	12	—	P12162	V3 Cathode decoupling.
C34	2	—	" "	350	—	P12663	H.T. line decoupling.
C35	—	50	Mica	350	20	P 3774	Coupling to A.V.C. diode anode.
C36	.001	—	Paper tubular	350	25	{ P 3768, P12366 or AP13176	I.F. by-pass.
C37	.01	—	" "	350	25	{ P 3769, P12726 or AP13160	Coupling to V4 grid.
C38	16	—	Electrolytic	275	—	{ P12444 or P12788	H.T. line smoothing.
C39	.05	—	Paper tubular	350	25	{ P 3770, P12363 or AP13170	Part of variable tone circuit.
C40	.01	—	" "	350	25	{ P 3769, P12726 or AP13160	Part of tone corrector.
C41	.001	—	" "	500	25	{ P 3768, P12366 or AP13176	Tone corrector.
C42	32	—	Electrolytic	275	—	{ P12444 or P12788	H.T. line smoothing.
C43	.005	—	Paper tubular	500	25	{ P 3767, P12725 or AP13178	Pick-up isolating capacitor.
C44	0.1	—	" "	500	20	{ P 8998, P12988 or AP13173	Pick-up screening isolating capacitor.
C45	.005	—	" "	500	25	{ P 3767, P12725 or AP13178	DAC.12 only. Aerial isolating capacitor.
C46	.01	—	" "	500	25	P 3769,	True earth isolating capacitor.
C47	.01	—	" "	500	25	P12365 or	Speaker chassis isolating capacitor.
C48	.01	—	" "	500	25	AP13167	Mains R.F. filter.

VARIABLE CAPACITORS.

Ref.	Value mmfd.	Type.	Part No.	Description.
TC1	—	Barrel Trimmer	Special Assembly	M.W. Aerial coil trimmer.
TC2	—	Barrel Trimmer		L.W. Aerial coil trimmer.
TC3	15-150	Double Trimmer	P2224	Button 5 preset station trimmer.
TC4	100-450			Button 4 preset station trimmer.
TC5	100-450	Double Trimmer	P1938	Button 3 preset station trimmer.
TC6	100-450			Button 2 preset station trimmer.
TC7	—	Barrel Trimmer	Special Assembly	M.W. Oscillator coil trimmer.
TC8	—	Barrel Trimmer		L.W. Oscillator coil trimmer.
VC1	528	Ganged	AP16171	Manual aerial circuit tuning.
VC2	528			Manual oscillator circuit tuning.

RESISTORS.

Ref.	Value in Ohms.	Rating in Watts.	Part No.	Description.
R 1	470,000	1	P7031	V1 Grid/earth return.
R 2	100	1	P6107	V1 Cathode bias.
R 3	33,000	1	P6737	V1 Oscillator grid/cathode return.
R 4	1 meg.	1	P7115	V1 A.V.C. decoupling.
R 5	15,000	1	P6651	V1 Screen and oscillator anode decoupling.
R 6	2.2 meg.	1	P7199	V2 A.V.C. decoupling.
R 7	220	1	P6191	V2 Grid stabiliser.
R 8	47,000	1	P6779	V2 Screen decoupling.
R 9	10,000	1	P6610	V2 Anode decoupling.
R10	220	1	P6191	V2 Cathode bias.
R11	100,000	1	P6863	V3 Grid stabiliser.
R12	330,000	1	P6989	Diode load.
R13	4,700	1	P6527	Part of feedback circuit.
R14	68,000	1	P6821	V3 Anode load.
R15	1,500	1	P6401	V3 Cathode bias.
R16	4,700	2	P6524	H.T. line smoothing.
R17	1 meg.	1	P7115	A.V.C. diode load.
R18	1,000	1	P6359	Part of feedback circuit.
R19	10,000	1	P6611	V4 Grid stabiliser.
R20	330,000	1	P6989	V4 Grid/earth return.
R21	150	1	P6155	V4 Cathode bias.
R22	10,000	1	P6609	Part of fixed tone corrector.
R23	3,300	2	P6482	H.T. line smoothing.
R24	47,000	1	P6779	DAC.12 only—P.U earth return.
R25	150	3	AP15532	DAC.12 only—V5 surge current limiter.
R26	600 + 100 + 100	30	AP12753	DAC.12 only—Heater circuit ballast.
VR1	2.2 meg.	—	CP16169 PB.12	Volume control with S18 ganged.
VR2	50,000	—	CP16211 DAC.12	
			CP16170	Tone control.

The tolerance on all resistors is + 20% except R21 which is ± 10%.

Owing to supply difficulties it may be found that the colour coding of some resistors does not correspond with the value shown in the above table. The measured value of the component fitted, however, will come within the tolerance of the specified resistance.

MAINS TRANSFORMER.

PB.12 only.

Part No. DS.15906.

Voltage readings taken on an Avometer, Model 7, 1000 volt range (10 volt range for lower readings) with 230 volts input and adjustable connection in "230" position.

Winding.	Tag.	Approx. D.C. Resistance.	A.C. Voltage No load.	A.C. Voltage Full load.
<i>Primary</i> :—				
Start of winding to	9	—	—	—
110 V. tap	110	14.0 ohms	105	105
210 V. tap	210	28.0 "	210	210
230 V. tap	230	31.0 "	230	230
250 V. tap	250	34.5 "	252	252
<i>Secondary</i> :—				
Start of winding to	5	—	—	—
Scale lamp tap	6	0.7 ohms	4.5	4.0
Heater tap	7	14.0 "	80.0	76.5
H.T. tap... ..	8	225.0 "	270.0	250.0

Primary magnetising current at 230 volts A.C. 50 cycles 70 mA.
 Primary full load current at 230 volts A.C. 50 cycles 230 mA.

CONNECTIONS TO MAINS TRANSFORMER

The external connections to the transformer are made to a panel on the opposite side to the mains voltage adjustment sockets. The tags are numbered from left to

right when viewed from the back of the chassis. Tags 10, 6 and 7 across the top and 9, 5 and 8 across the bottom.

DISMANTLING.

REMOVING CHASSIS FROM CABINET.

Take off the two control knobs on the front of the cabinet.

Disconnect the frame aerial plug from the back of the chassis, the two leads from the output transformer (tags 2 and 3) and the earth lead to the speaker frame.

Lay the receiver on its front and remove the four bolts on the cabinet bottom.

NOTE: On the DAC.12 these bolts are hidden by fibre strips.

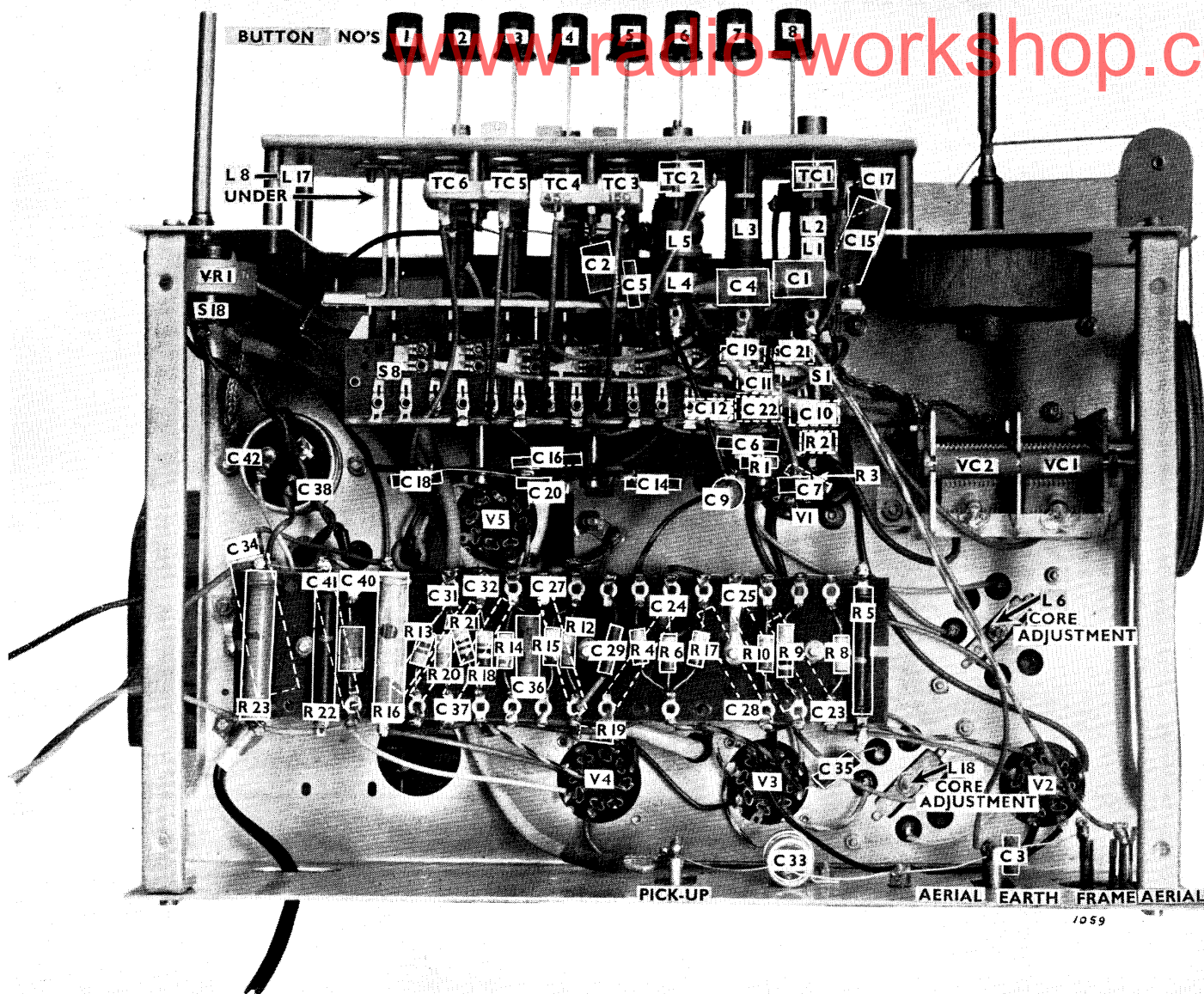
The chassis may now be withdrawn from the cabinet, care being taken to avoid damaging the frame aerial passing under the chassis.

REMOVING THE SPEAKER FROM THE CABINET.

Remove the tone control knob on the side of the cabinet and release the control from the escutcheon.

Take off the nuts and washers from the four bolts holding the speaker to the baffle board.

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COIL DECK CONNECTIONS TO CHASSIS.

After removing the four bolts, distance pieces, also screw from bracket at back of coil deck, the complete coil assembly can be withdrawn from the chassis by unsoldering the following wires.

1. Earth braids from L3 tag 4, L11 tag 4, and L12 tag 4.
2. VC1 fixed plates to S1 contact No. 4.
3. M.W. aerial coil, L1 tag 1 to "sensitive" aerial socket.
4. VC2 fixed plates to S9 contact No. 4.
5. M.W. oscillator coil L9 tag 1, to V1 pin 6.
6. C10 on S10 contact No. 2 to V1 pin 5.
7. L.W. oscillator coil, L13 tag 1, to V1 pin 4.
8. From junction R1, C7 on coil deck panel to grid of V1 (top cap).
9. M.W. aerial coil L2 tag 4, to frame aerial socket.
10. From junction C7, R1 to R4 on main resistor condenser panel.
11. S16 contact No. 1 screened lead to chassis and C27 on main resistor and condenser panel.
12. S16 contact No. 2 to volume control.
13. S16 contact No. 4 to top pick-up socket on PB.12 or C43 on DAC.12.

IMPORTANT.

When replacing the aerial and oscillator coils, note carefully the direction of the trimmer clips (at the base of each coil) in relation to the Push Button Unit. Replace the new coil in exactly the same position as the one taken out. If this is not done the wrong connections will be made to the coil tags.

Earth or chassis connections required to be taken off for servicing should always be replaced on the tags from which they were taken. This is most important for the successful operation on the short wave range.



← UNDER CHASSIS VIEW OF
PB.12 RECEIVER

CIRCUIT ALIGNMENT.

The use of a reputable generator with a modulated and variable output is essential for the accurate alignment of the R.F. and I.F. circuits.

A dummy aerial, consisting of a 400 ohm non-inductive resistor for the short wave range, and a fixed capacitor of 200 mmfd. for the medium and long wave ranges.

A sensitive output meter should be used as a visual indicator.

To obtain the most accurate adjustment of the tuned circuits, use the lowest possible input to the receiver from the signal generator with the volume control at maximum.

Check the position of the pointer in relation to the tuning condenser. With the plates of the condenser fully meshed the cord opening on the edge of the drive drum should be approximately half an inch to the top-right of a vertical line passing through the centre of the condenser spindle.

INTERMEDIATE FREQUENCY CIRCUITS—465 Kc/s.

Set the receiver to the medium wave range with the tuning control at approximately 300 metres and away from powerful stations.

Care should be taken to avoid a sub-harmonic of the I.F. Do not connect an aerial to the receiver.

Set the signal generator to 465 Kc/s. and connect it to V2 control grid (top cap).

Adjust L19 and L18 in that order for maximum output.

Transfer the signal to V1 control grid (top cap) adjusting L7 and L6 for maximum output. With the signal still applied to V1 control grid make a finer adjustment of L19, L18, L7 and L6 and repeat in the reverse order for a final adjustment.

RADIO FREQUENCY CIRCUITS.

Because of the inductance and stray capacities of the frame aerial it is advisable to re-align the receiver in the cabinet. All trimmers and core adjustments are accessible upon the removal of the push button escutcheon.

MANUAL TUNING.

Connect a signal generator to the sensitive aerial socket, via a dummy aerial.

If all wave ranges require adjustment, they should be aligned in the following order.

IMPORTANT.

Adjustment of the L.W. oscillator L12 and TC8 will affect the tuning of the pre-selected stations.

After the L.W. manual circuit adjustment, re-check L14, L15, L16 and L17.

Adjustment of the M.W. manual aerial trimmer TC1 will necessitate a re-adjustment of the M.W. pre-selected station trimmers TC3, TC4 and TC5. Similarly an adjustment of TC2 on L.W. manual tuning will necessitate a re-adjustment of TC6.

The L.W. oscillator core and trimmer are painted red.

LONG WAVE RANGE. 2142-857 Metres (140 Kc/s.—350 Kc/s.).

Set signal generator to 2,000 metres (150 Kc/s.).

Press L.W. button No. 6, set pointer to 2,000 metres (150 Kc/s.).

Adjust the cores of L12 and L5 in that order for maximum output.

The tuning condenser should be rocked slightly while trimming.

Retune signal generator and receiver to 1,000 metres (300 Kc/s.), and adjust TC8 and TC2 in that order.

Check calibration.

MEDIUM WAVE RANGE. 585.2-181.8 Metres (515 Kc/s.—1.65 Mc/s.).

Set signal generator to 500 metres (600 Kc/s.).

Press M.W. button No. 8, set pointer to 500 metres (600 Kc/s.).

Adjust cores of L8 and L2, in that order for maximum output.

The tuning condenser should be rocked slightly while trimming.

Retune signal generator and receiver to 200 metres (1,500 Kc/s.), and adjust TC7 and TC1 in that order for maximum output.

Check calibration.

SHORT WAVE RANGE. 20-18.1 Metres (14.95 Mc/s.—16.5 Mc/s.).

Set signal generator to 20 metres (15 Mc/s.).

Press S.W. button No. 7, set pointer to 20 metres (15 Mc/s.).

Turn L10 fully anti-clockwise.

Adjust L10 for first peak and tune for maximum output. L3 should now be adjusted for maximum output.

Check calibration.

PRE-SELECTED STATION ADJUSTMENT. Buttons 2 to 5.

Connect a signal generator to the receiver.

Set the signal generator to the frequency of the station required and press the corresponding button.

Turn the screw above the push button so that the groove round the "head" of the screw is in approximate alignment with the mark on the scale corresponding to the wavelength of the station required. Carefully rotate the screw in either direction until the programme is heard. Turn down the volume a little as the station comes into tune. Tune for the loudest signal.

Having tuned the station with the top screw, rotate the recessed screw, below the push button, again tuning for maximum volume and bearing in mind that it is easier to hear variations in volume when the volume control is turned back.

The top screw adjusts the oscillator coil cores whilst the bottom screw trims the aerial circuit.

NOTE: Unless the aerial circuit trimmer is tuned approximately to the wavelength of the desired station it may not be possible to obtain the correct tuning with the oscillator circuit. So as far as possible both the trimmer and core adjustments should be aligned together.

VALVE DATA.

PB.12.

Receiver set to medium wave range with no signal input. Mains input 230 volts 50 cycles.

All measurements taken on an Avometer, Model 7, with chassis negative; 1000 volt range for H.T. and 10 volt (or appropriate range) for cathode measurements. All values are approximate.

Valve.	Electrode.	Pin No.	Voltage.	Current.
V1	Hexode Anode	3	130	7.0 mA.
	Oscillator Anode	6	55	
	Screens	4	55	
	Cathode	8	0.5	
V2	Anode	3	90	5.0 mA.
	Screen	4	65	
	Cathode	8	1	
V3	Anode	3	70	1.0 mA.
	Cathode	8	1.5	
V4	Anode	3	250	48.0 mA.
	Screen	4	200	
	Cathode	8	7	
V5	Anode	5	255 A.C.	62.0 mA.
	Cathode	8	260	

DAC.12.

Voltages and currents on the DAC.12 will be approximately the same as above on A.C. mains but slightly less on the equivalent D.C. supply.

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OUTPUT TRANSFORMER.

Part No. BS16093.

D.C. Resistance:
 Primary 700 ohms.
 Secondary 0.41 ohms.

Ratio: 45 to 1.

Primary inductance: 6.0 H. at 400 cycles 5 volts with 40 mA. D.C. flowing and no load on secondary.

CONNECTIONS TO OUTPUT TRANSFORMER.

The tags are numbered 1 to 5 from top to bottom.

Tag No. 1 to left-hand external L.S. socket.

Tag No. 2 to C39 and anode V4.

Tag No. 3 to VR2 right-hand tag and H.T. line.

Tag No. 4 to C39 and VR2 centre tag.

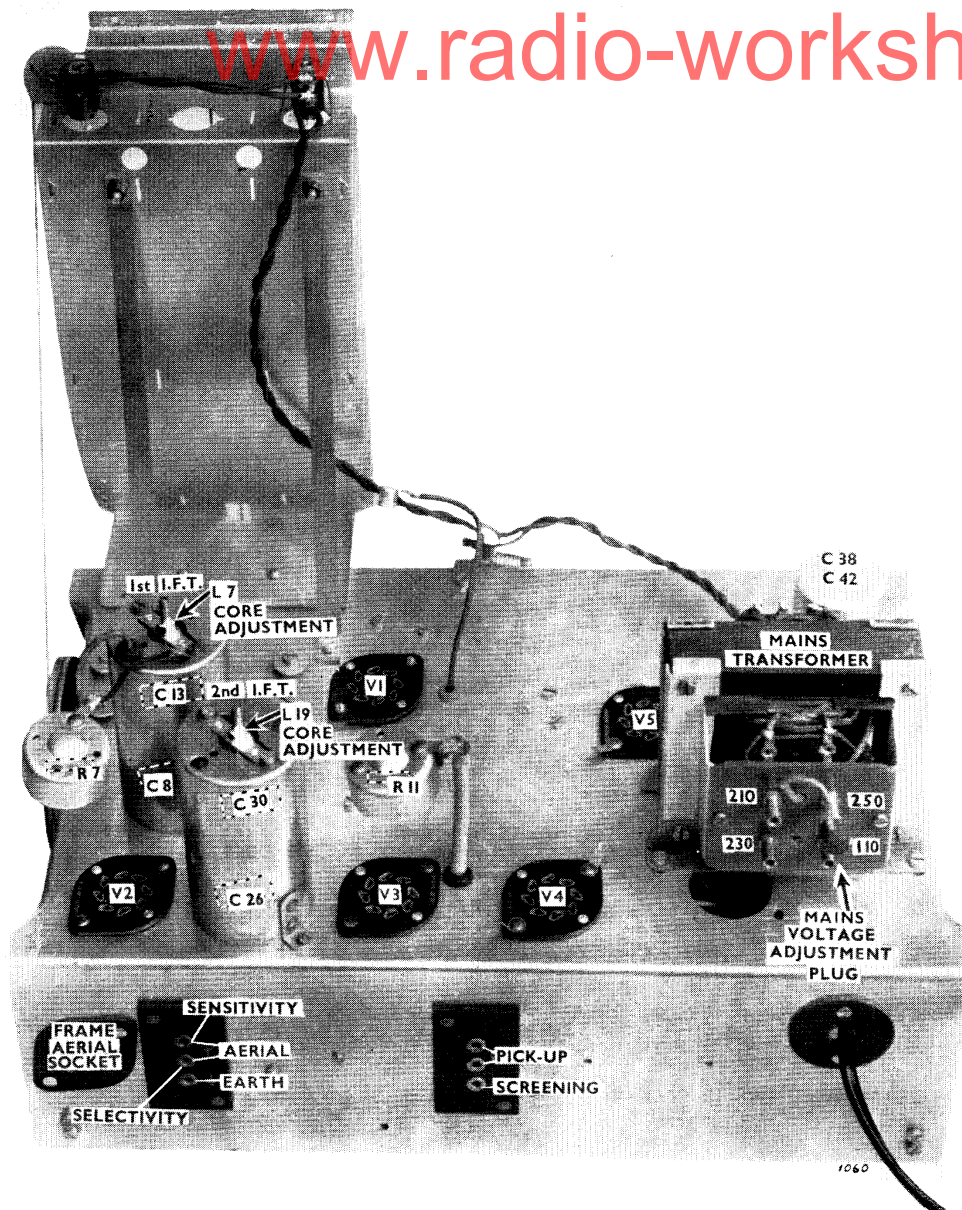
Tag No. 5 to speaker speech coil and right-hand external L.S. socket.

SPEAKER.

Part No. BP16182.

Type: Rola 10 in. permanent magnet.

D.C. Resistance of speech coil 2.5 ohms.



← TOP VIEW OF PB.12 RECEIVER.

FITTING CORD DRIVE.

Part Numbers:

Cord and anchor for tuning drive	AS16089
Drive pressure spring	P1941
Pointer	AS16082

The length of the cord after clenching in the anchor is forty-nine inches.

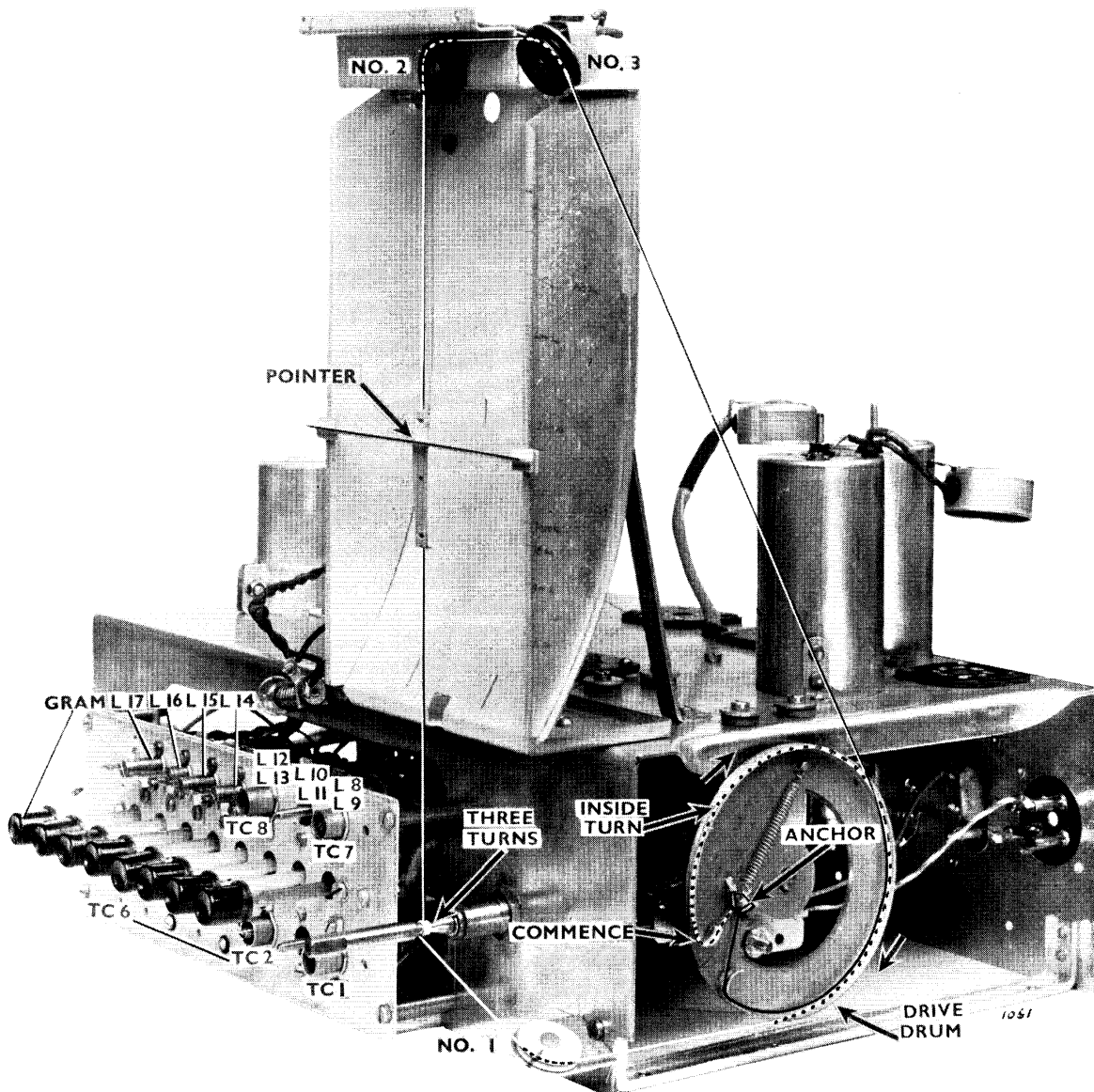
With the plates of the tuning condenser fully meshed the cord opening on the edge of the drive drum should be approximately half an inch to the top-right of a vertical line passing through the centre of the condenser spindle.

Hook the cord and anchor to the drive pressure spring and attach the opposite end of the spring to the drive drum.

Pass the cord half a turn round the drive drum in a clockwise direction and over pulley No. 1. Take three clockwise turns round the tuning spindle. Pass the cord over pulleys 2 and 3 and continue for one turn clockwise round the drive drum back to the drive pressure spring.

Clip the pointer to the cord and adjust it so that the upper edge of the pointer pad coincides with the top point on the calibration scale. Clench the clips on the pointer.

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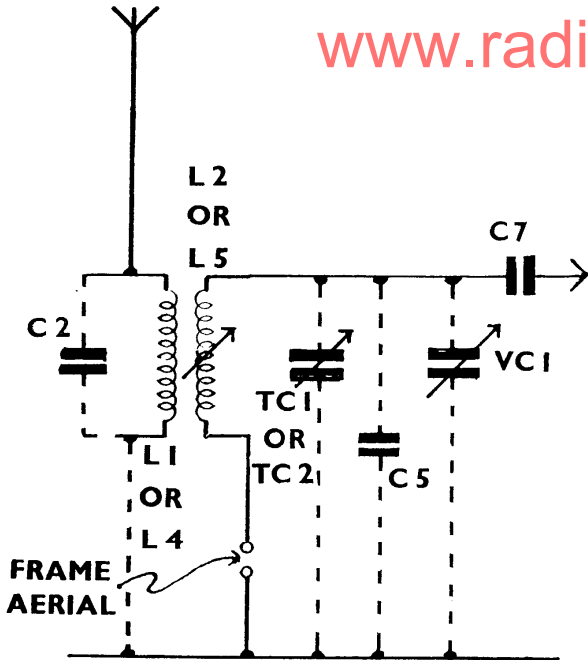


VIEW SHOWING CORD DRIVE.

SIMPLIFIED CIRCUIT DIAGRAMS

AERIAL CIRCUITS

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Components shown dotted vary with the wave range and push button selected as follows.

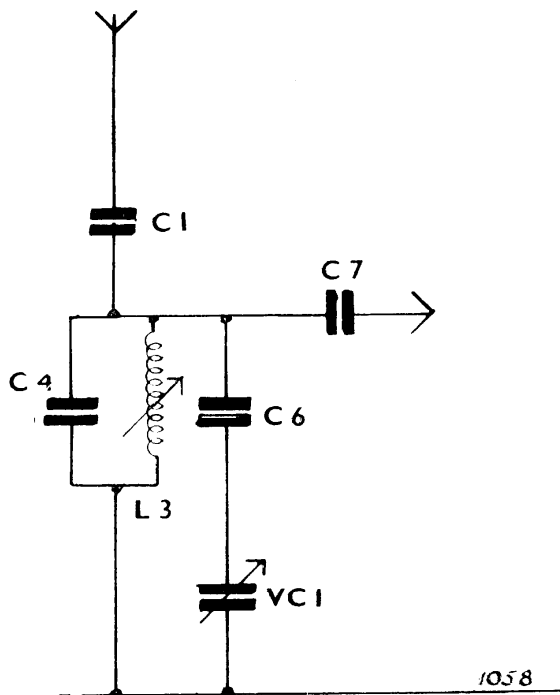
L.W. Manual Tuning, diagram as illustrated.

L.W. Preset Stations, diagram as illustrated with VC1 replaced by TC6.

M.W. Manual Tuning, diagram as illustrated with C5 and C2 out of circuit.

M.W. Preset Stations, diagram as illustrated with C5 and C2 out of circuit and VC1 replaced by TC3 to TC5.

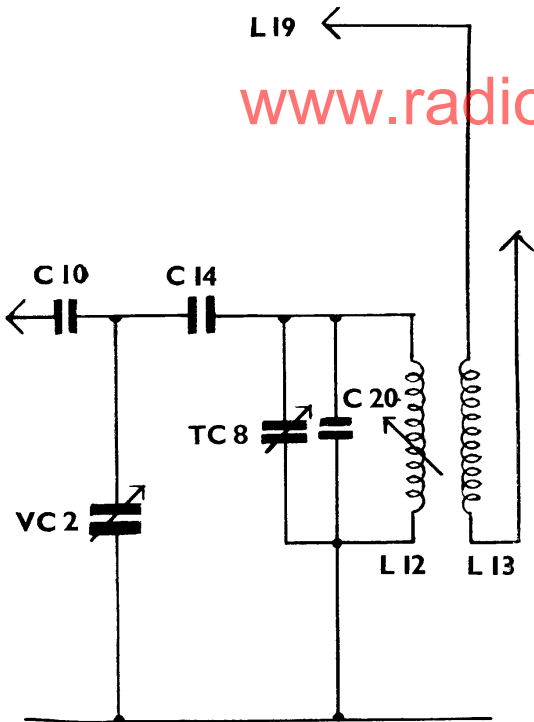
L.W. MANUAL, M.W. MANUAL AND PRESET STATIONS



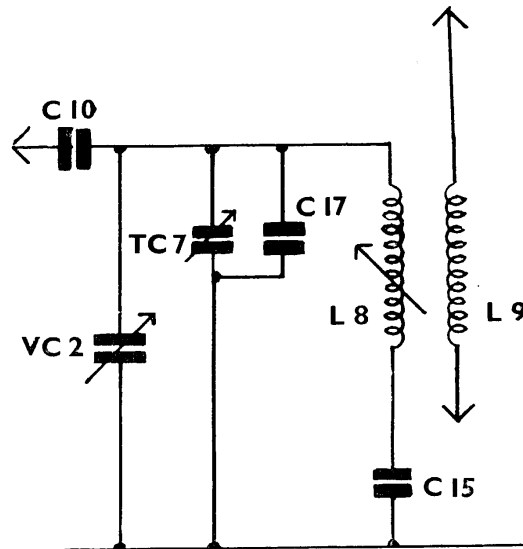
S.W. MANUAL

OSCILLATOR CIRCUITS

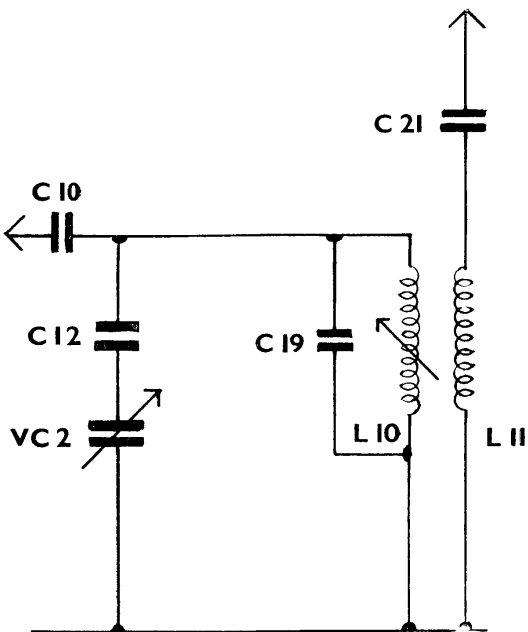
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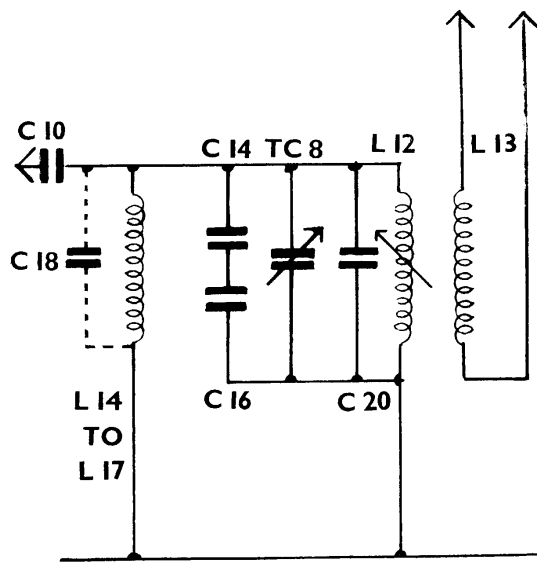
L.W. MANUAL



M.W. MANUAL



S.W. MANUAL

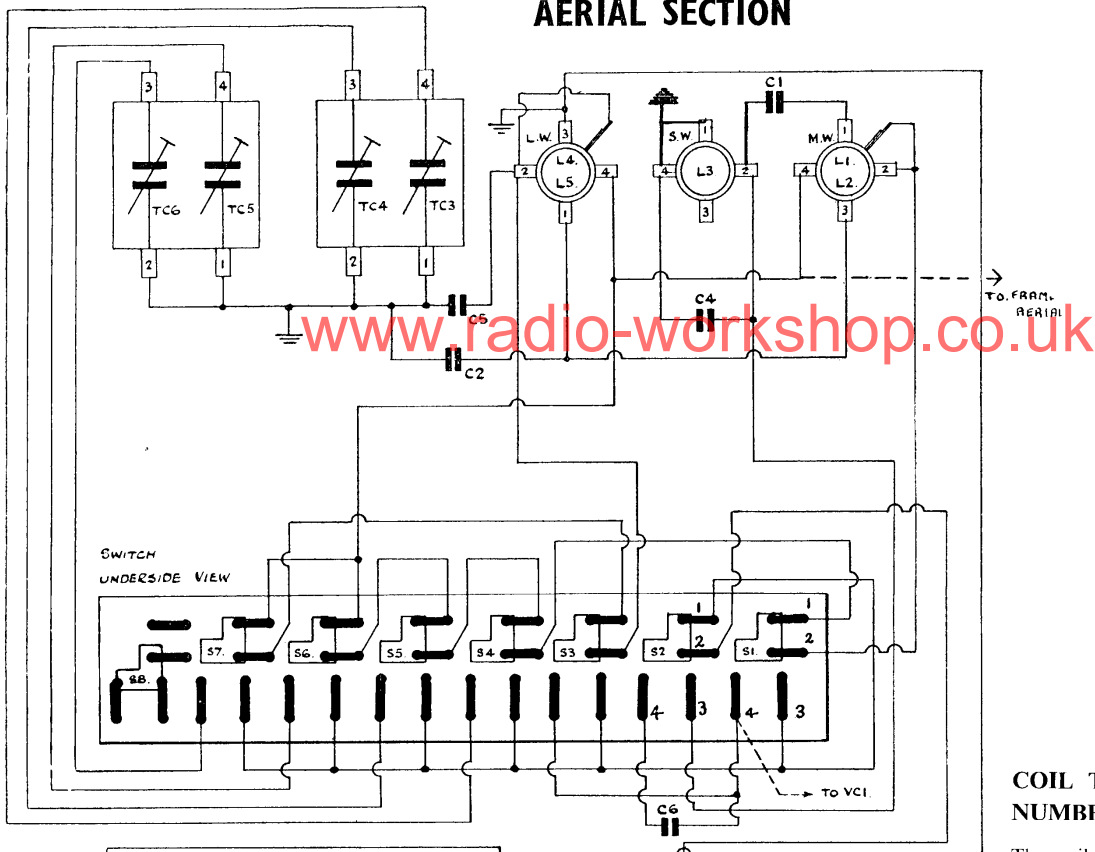


PRE-SET STATIONS

C18 ONLY IN CIRCUIT WITH L17

1057

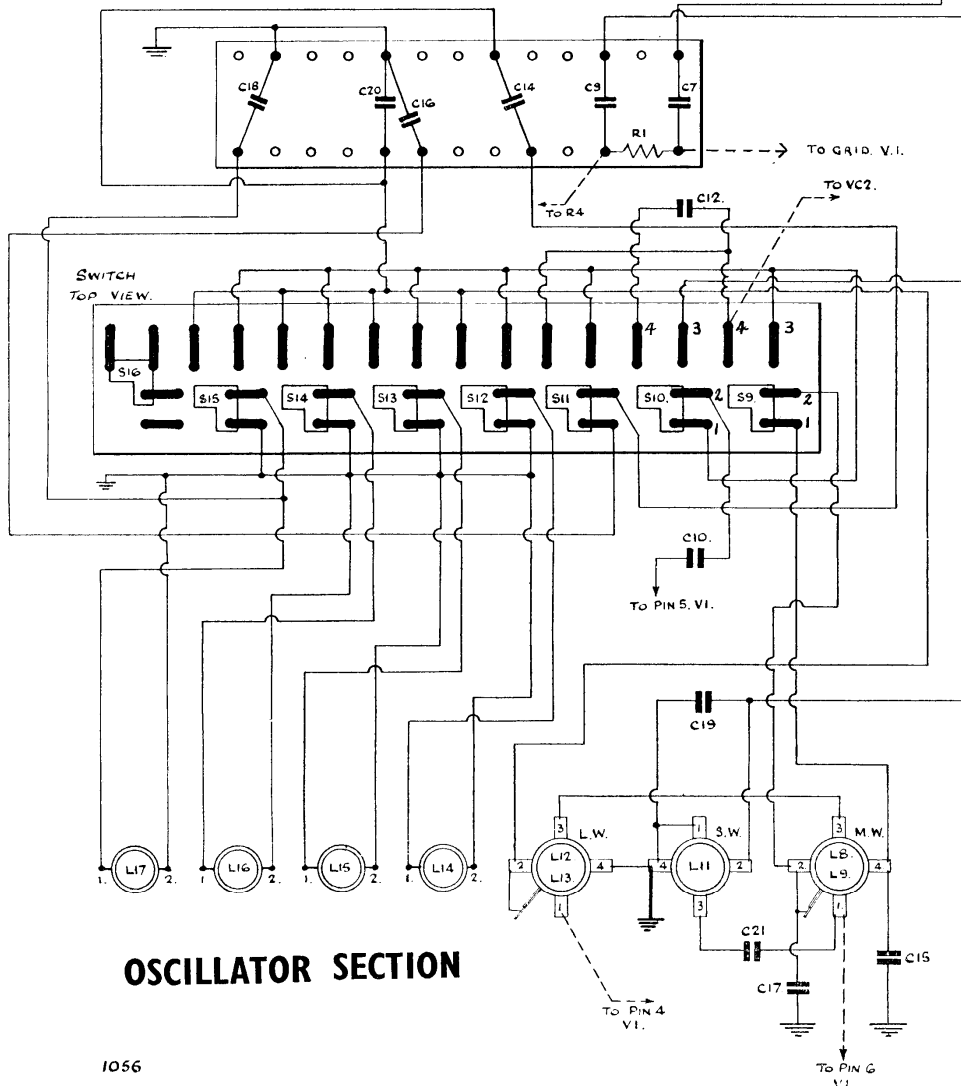
AERIAL SECTION



TO FRAM. AERIAL

COIL TAG NUMBERING

The coil tag numbers are shown as they appear when the coil is viewed from the rear of the mounting plate.



OSCILLATOR SECTION

1056

WIRING DIAGRAM OF COIL DECK

COILS.

Ref.	D.C. Resistance in ohms.	Part No.	Description.
L 1	1.0	BS15986	M.W. Aerial coupling.
L 2	4.0		
L 3	Very small	BS15910	M.W. Aerial tuning.
L 4	30.0	BS15895	S.W. Aerial tuning.
L 5	17.5		
L 6	5.5	S12680	L.W. Aerial coupling.
L 7	5.5		
L 8	3.0	BS15898	1st I.F.T. primary.
L 9	0.5		
L10	Very small	BS15897	1st I.F.T. secondary.
L11	" 4.0 "	BS15899	M.W. Oscillator tuning.
L12	4.0		
L13	1.0	S10010	M.W. Oscillator coupling.
L14	2.0		
L15	2.3	S10011	S.W. Oscillator tuning.
L16	2.3	S10011	S.W. Oscillator coupling.
L17	4.0	S10012	L.W. Oscillator tuning.
L18	5.5	S12683	L.W. Oscillator coupling.
L19	5.5		
L20	3.0	AS16196	M.W. P.B. No. 5 Oscillator tuning 200-350 m.
L21	3.0		
			M.W. P.B. No. 4 Oscillator tuning 325-550 m.
			M.W. P.B. No. 3 Oscillator tuning 325-550 m.
			L.W. P.B. No. 2 Oscillator tuning 1100-2000 m.
			2nd I.F.T. primary.
			2nd I.F.T. secondary.
			H.F. filter choke.
			H.F. filter choke. } DAC.12 only.

SERVICING NOTES.

Before proceeding to locate a fault in the receiver it is important to ensure that all valves are up to standard and are making good contact in their holders.

Voltage readings should be checked on all valves. The windings of the output transformer, mains transformer and speaker speech coil should be checked for continuity, short circuit, etc.

If these preliminary tests give satisfactory results apply an A.F. signal to the control grid of V3 to check stages V4 to V5.

If there is little or no output check all the components from the anode resistor of V3 to the grid of V4, including the cathode circuits of both valves.

To check the I.F. circuits of the receiver. Inject a 465 Kc/s. signal (modulated) into the control grid (top cap) of V2 and if the output of the receiver is low check the second I.F. transformer, the decoupling components of V2, the A.V.C. components and the detector and input circuits of V3.

Check the first I.F. transformer by transferring the 465 Kc/s. signal to the hexode anode of V1 (via a 0.1 mfd. capacitor). No greater output should be expected than from the previous test, but if it is considerably reduced check the first I.F. transformer and the input circuit of V2.

Apply an R.F. (modulated) signal (within the limits of the particular push button) to the grid (top cap) of V1. If the signal can be tuned the oscillator circuits are functioning and the input circuit of V1 should be checked.

No signal would appear to indicate a fault in the oscillator circuits. A check can be made by injecting into the oscillator grid of V1 an unmodulated signal which is 465 Kc/s. higher than the frequency of a station known to be transmitting, when normal tuning should be possible.

Transfer the R.F. signal to the aerial socket to check the aerial input circuits.

COMPONENTS AFFECTING CALIBRATION.

S.W. L10, L11, C19.
M.W. L8, L9, C15, C17, TC7.
L.W. L12, L13, C20, TC8.
Button 2. L17, C18, L12, L13, C20, TC8, C14, C16.
Button 3. L16, L12, L13, C20, TC8, C14, C16.
Button 4. L15, L12, L13, C20, TC8, C14, C16.
Button 5. L14, L12, L13, C20, TC8, C14, C16.

A.V.C. LINE COMPONENTS.

R4, R6, R17, C9, C24, C35.

DECOUPLING AND BIAS COMPONENTS.

V1. Screens and oscillator anode R5, C22, Bias R2, C11.
V2. Anode R9, C25, Screen R8, C23, Bias R10, C28.
V3. Bias R15, C33.
V4. Bias R21.
H.T. line decoupling C34, C38, C42.

REPLACEMENT OF LAMPS.

SCALE LAMP.

To replace the scale lamp press the side of the lamp holder and withdraw from the scale frame.

The lamp can now be unscrewed and replaced by one having rating of 6.2 V., 0.3 A.

ESCUTCHEON LAMP.

The bracket holding the escutcheon lamp can be removed by loosening the knurled nut securing it to the chassis and sliding the bracket sideways.

The lamp can now be unscrewed and replaced by one having a rating of 6.2 V., 0.3 A.

GRAMOPHONE PICK-UP.

A good quality pick-up of any type may be used, but crystal pick-ups should be wired and connected as recommended by the pick-up manufacturers.

Connections should be made by two leads from the pick-up which are inserted in the two upper sockets. The leads should be completely screened and the screening taken to the bottom socket.

On the A.C./D.C. model—DAC.12—best results will be obtained by using a pick-up with a D.C. resistance

between 1,000 and 2,000 ohms, and the screening of the leads should itself be insulated. No connection must be made between the screening and any metal part of the pick-up or turntable motor, both of which must be earthed by separate lead or leads to true earth (earth socket). When using the pick-up with the receiver on A.C. mains and a slight hum is present some improvement may be obtained if the mains plug is reversed in its socket.

WARNING.

When servicing the DAC.12 remember that one side of the main electricity supply is connected directly to the chassis and may under certain conditions be "live".

Do not connect any earthed equipment or a direct earth to the chassis without first isolating it by a fixed capacitor of approximately .005 mfd.

Care should be taken to avoid handling the chassis.

LIST OF PART NUMBERS.

The following part numbers are not shown elsewhere in this manual.

When ordering replacements or spare parts please quote:—

- (a) Type and serial number of receiver.
- (b) Part number and description of item.
- (c) Quantity required.

Cabinet	...	...	...	EP15901
Cabinet back (PB.12)	...	...	...	EP15904
Cabinet back (DAC.12)	...	...	...	AS16201

Coil Deck	...	...	...	...	ES16196
Escutcheon (8 button)	...	...	...	...	DP15890
Escutcheon (for tone control knob)	...	...	...	...	P 2128
Grid Cap V1	...	...	...	...	S9189A
Grid cap V2	...	...	...	...	S9380E
Knob, tone	...	...	...	...	P 2363
Knob, tuning	...	...	...	BP15820 or	AP16327
Knob, volume	...	...	...	...	AP16212
Knobs, push button	...	...	...	...	AP16219
Scale	...	...	...	...	DP16033
Scale Lamp holder	...	...	...	...	S 9219
Station name tabs	...	...	...	...	AP16181

MODIFICATION.

DAC.12. The DAC.12 receiver is now fitted with two scale lamps.

MODIFICATION : PB.12 and DAC.12

The values of the following capacitors are now:—

- C5. 25 mmfd. 350 V. wkg. Silver Mica. AP16306
- C17. 5 mmfd. 350 V. wkg. Silver Mica. AP16307
- C20. 130 mmfd. 350 V. wkg. Silver Mica. AP16308

An alternative part number for C38/42 is AS16476.

On later models of the PB.12 receiver the position and mounting of the mains transformer has been modified.

Commencing with serial No. 12001, the range of the 4th push button from the left (front view) is altered to provide medium wave range coverage of 240 metres to 415 metres (the corresponding new indicator showing coverage of 250—400 metres.)

Changes in components are as follows:—

- Variable capacitor TC.4 altered to 40—300 mmfd. AP16872.
- Push button coil L15, altered to part No. AS16871.
- Wavelength indicator altered to AP16873.

ERRATUM : MODEL PB.12 and DAC.12

Coils page 13. M.W. aerial coil correct Part No. BS15896.

MODIFICATION : MODEL PB.12 and DAC.12

On and after Serial No. 15,000 new type I.F. transformers are fitted.

1st. I.F. Part No. ES16447.

2nd. I.F. Part No. ES16448.

These new type transformers are unsuitable for use on receivers prior to Serial No. 15,000.

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