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SERVICE MANUAL

SPECIFICATION

Printed circuit superheterodyne receiver for AC/DC mains. An internal ferrite rod aerial for broadcast band reception and sockets for external aerial and earth are provided. Valve heaters are in a series parallel arrangement for 115V and in series for 200-250V, and half-wave rectification provides the HT supply. A two position treble control switch is incorporated.

Power Supply

AC/DC mains 115V or 200-250V (50-60 c/s).

Power consumption 42 watts.

Waveranges

- | | |
|-----|--|
| BC | { 515 Kc/s—1640 Kc/s.
580 Mtrs.—183 Mtrs. |
| SW1 | { 2.9 Mc/s—9.4 Mc/s.
100 Mtrs.—32 Mtrs. |
| SW2 | { 8.8 Mc/s—25.7 Mc/s.
34 Mtrs.—12 Mtrs. |

Cabinet Dimensions

13½" wide x 9" high x 5¾" deep

Output Power

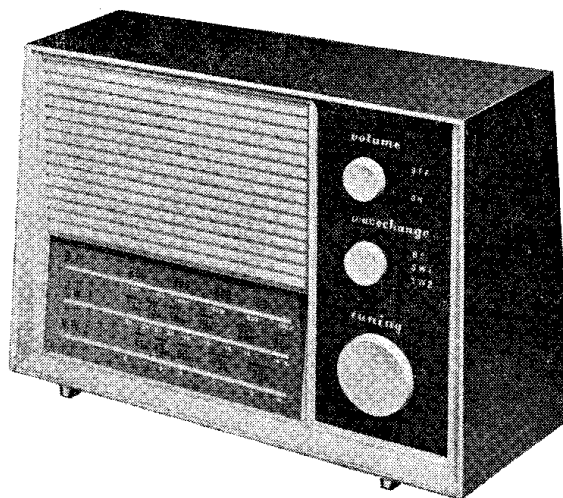
2 watts

Loudspeaker

7" x 4" elliptical, permanent magnet type, 3Ω speech coil; with socket provision for an extension loudspeaker.

Gramophone Reproduction

Sockets are provided for connecting a gramophone pick-up. The radio is automatically muted when the plug is inserted into the pick-up sockets.



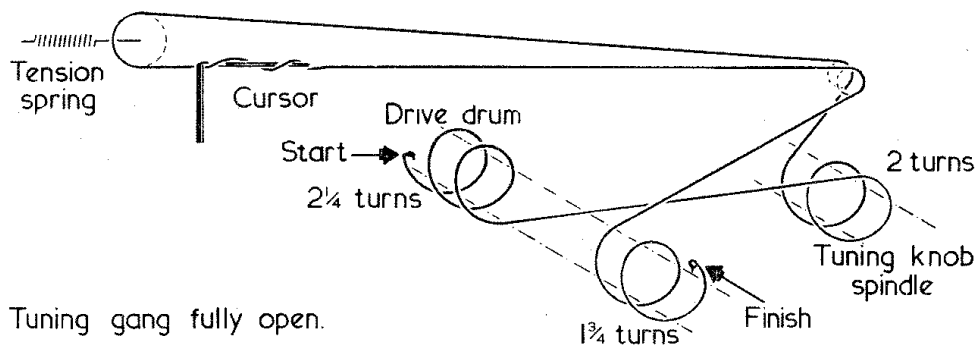
SERVICING THE PRINTED BOARD

Should the necessity arise for servicing the printed circuit panel, it must be remembered that excessive heat can loosen the bond between the copper conducting circuits and the insulating board, consequently, particular care is necessary if any connections must be soldered to the "wiring" side of the panel. For this reason, when replacing a resistor or capacitor, cut out the faulty component so that as much as possible of the original lead-out wires remain for connecting the new component, soldering to the ends of the wires instead of to the printed conductors. Use a small low-consumption iron and do not apply the bit for longer than is necessary to produce a sound joint.

The electrolytic (C29/C35/C36)

is secured on the board by clip lugs which also make electrical connections to the panel. To remove, use a heavier type iron and apply heat and pressure to the lug—not the printed circuit—so that when the solder melts, the lug is pressed clear of the connecting point. In some cases a small stiff-haired brush will assist in breaking the connection.

If a section of the printed conductor is damaged or fused, scrape off the damaged portion and restore the connection with a jumper wire on the component side of the panel. Should it become necessary, however, to solder directly to a printed conductor, use a 60/40 resin cored solder and make the joint quickly to avoid overheating. **Do not use a corrosive type flux.**



Length of cord — approximately 42 in

Fig. 1. Drive Cord Arrangements, viewed from the front

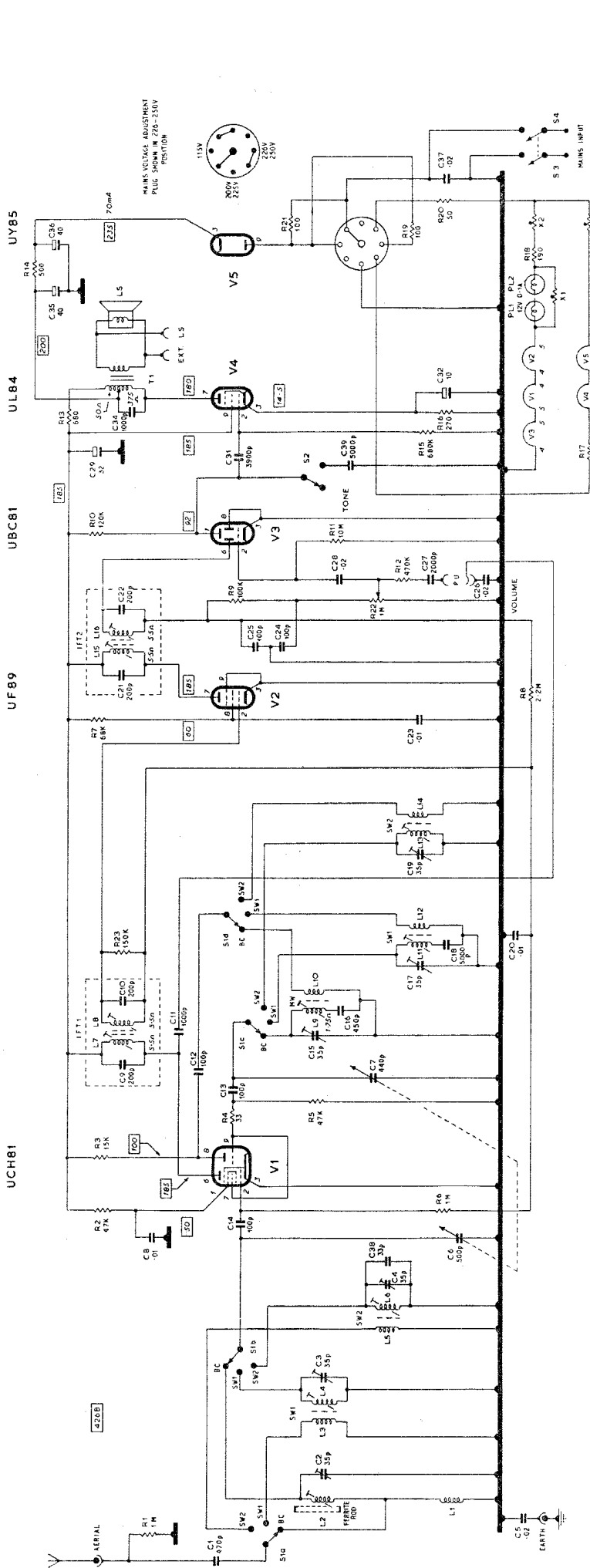


Fig. 2. Circuit diagram. Figures adjacent to valve electrodes denote pin connections. Figures in rectangles indicate voltages measured with a 20,000 ohm/voltmeter. DC resistances are shown against inductances where these are 1 ohm or greater.

THE CIRCUIT

The aerial is inductively coupled to the heptode section of V1 (UCH81), the frequency changer. Turning the wavrange switch selects the coils for the wavrange required. On BC, a ferrite rod aerial L2 and external aerial coupling coil L1 are employed. Separate capacitance trimmers are provided for each aerial circuit and an adjustable core on each range permits inductance trimming at the low frequency end. The aerial circuit selected is tuned by section C6 of the gang capacitor.

The triode section of V1 operates at a tuned grid oscillator, and separate coils with their associated trimmers are brought

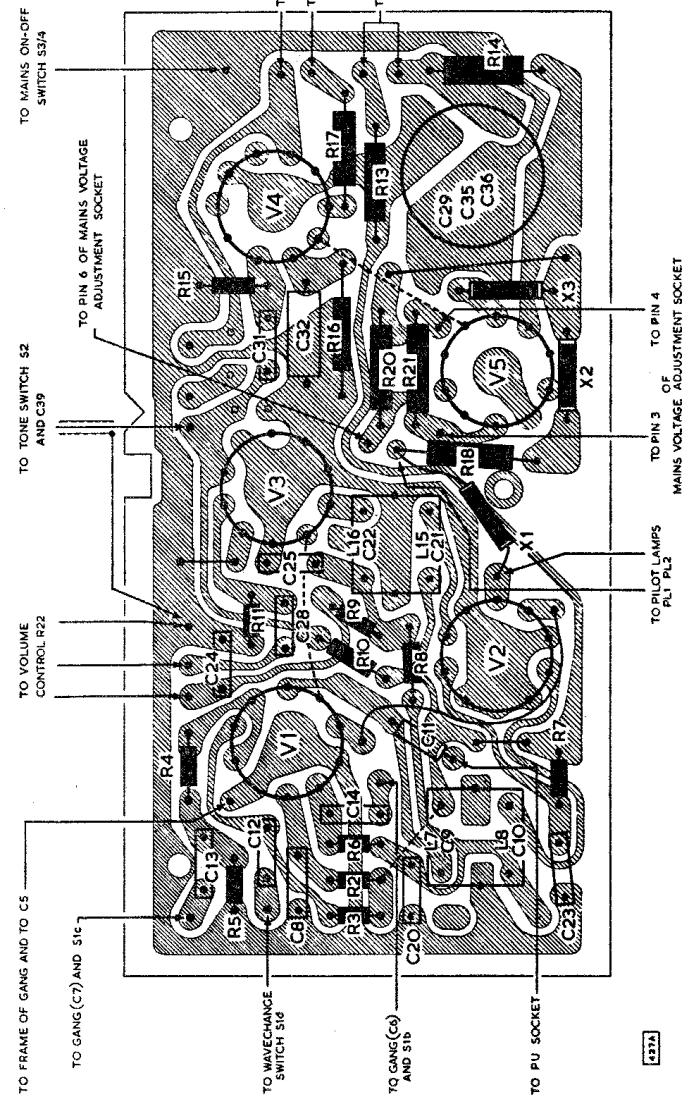


Fig. 3. Component side view of printed board. Note : R23 is beneath the board and is not shown.

ALIGNMENT

into operation on each wave-range. Fixed series padders are incorporated on BC (C16) and SW1 (C18) ranges only. Trimming at the low frequency end is by adjusting the coil on each range. Section C7 of the gang capacitor tunes the oscillator circuit.

V2 (UF89) is the IF amplifier, coupling from V1 being through IFT1, a tuned transformer.

The amplified IF signal is passed through IFT2, another tuned transformer, to V3 (UBC81), a double diode triode acting as detector and audio amplifier. The rectified signals are developed across the volume control R22 and fed to the grid of V3 via C28. C24, C25 and R9 act as an IF filter. The DC component of the rectified signal is fed back as AGC bias to the control grids of V1 and V2, R8 and C20 comprising the AGC time constant. Sockets are provided for connecting an external gramophone pick-up across the volume control through C27 and R12. The lower pick-up socket is fitted with a secondary contact which connects to the socket when a plug is inserted. This automatically mutes radio reception by connecting an RF earth at V1 anode through C11 and C26.

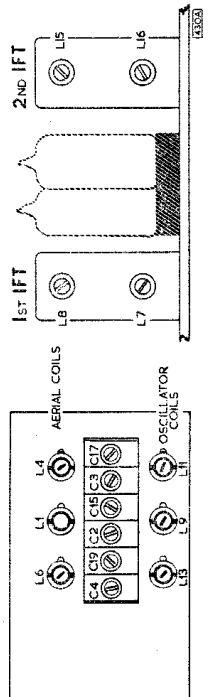
The audio stages, V3 (triode section) and V4 (UL84), are resistance capacitance coupled with the tone control connected in the intervalve coupling. The switching of S2 brings C39 into or out of V4 grid circuit giving two positions of treble response.

HT is supplied to the valves by a half wave rectifier V5 (UY85) the heaters being series connected for 200-250V operation and in a series parallel arrangement for 115V.

ALIGNMENT FREQUENCIES

Range	Frequency	Cursor Position	Adjustments
BC	560 Kc/s	PAD Marker	L9, L2*
	1500 Kc/s	TRIM Marker	C15, C2
SW1	3.2 Mc/s	PAD Marker	L11, L4
	8.6 Mc/s	TRIM Marker	C17, C3
SW2	9.6 Mc/s	PAD Marker	L13, L6
	24 Mc/s	TRIM Marker	C19, C4

* Adjust by sliding ring along ferrite aerial rod.



IF CIRCUITS

Switch receiver to Broadcast Band (BC) turn the tuning gang to minimum capacitance position and volume control to maximum. Inject a 470 Kc/s modulated signal through 0.1uF isolating capacitors of adequate working voltage across the aerial section of the tuning gang.

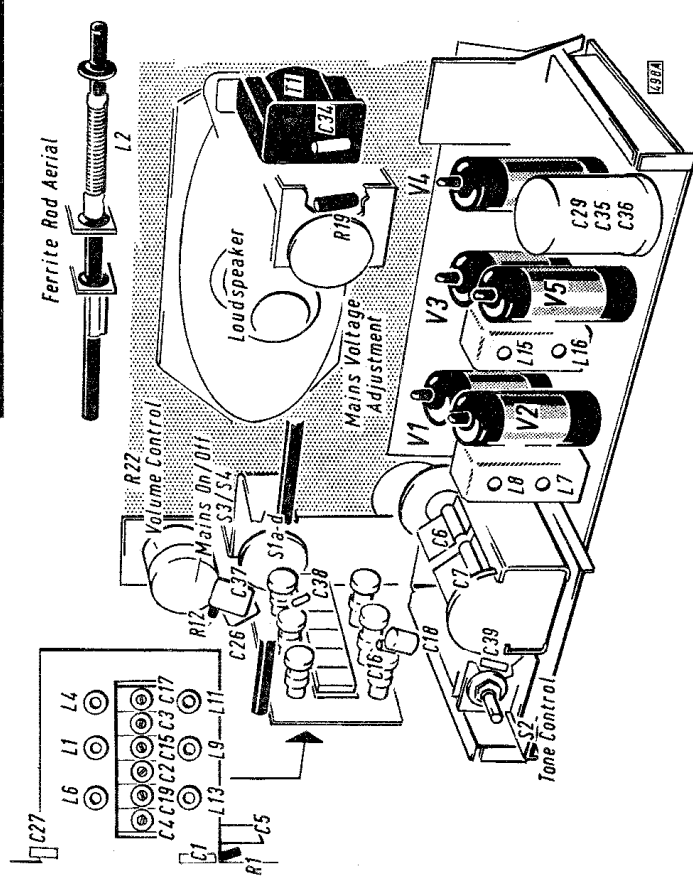
Peak L16, L15, L8 and L7 in that order for maximum output, reducing signal input as necessary to maintain audio output at about 50mW.

RF CIRCUITS

Calibration markers are provided on the scale backing plate. The notch at the top right-hand corner is provided for setting the cursor when the tuning gang is fully closed. The PAD marker is a notch 15mm to the left of the cursor check point and the TRIM marker is approximately 11cm from the cursor check point. Inject signals via aerial socket and, throughout alignment, adjust signal input to prevent the audio output exceeding 50mW.

REMOVING THE CHASSIS

1. Remove the tone control knob (push-fit type).
2. Detach the cabinet back, held by four screws.
3. Remove the three front control knobs, all push-fitted types.
4. Dismount the three socket assemblies; aerial/earth and pick-up, external loudspeaker and mains voltage selector, held by two screws each.
5. Release the chassis from the cabinet by removing the three fixing screws, one at each side of the chassis and one at the top of the control panel metal work.
6. Dismount the loudspeaker by slackening off the four clamps.
7. Remove the chassis, with the three socket panels, loudspeaker and audio transformer attached.



VOLTAGE AND CURRENT MEASUREMENTS

The following readings were taken with a Model 8 Avometer, voltages being measured on the 250V range wherever practicable. The gang was fully open with no signal input, the mains adjustment set for 226-250V with a 237Volt 50 c/s supply.

GENERAL MEASUREMENTS

Total HT current	74mA
HT voltage (unsmoothed)	240V
HT voltage (1st section smoothing)	203V
HT voltage (2nd section smoothing)	185V

VALVE MEASUREMENTS

Ref.	Valve Type	Anode		Screen		Cathode
		Volts	mA	Volts	mA	Volts
VI Heptode	UCH81	184	1.3	50	2.9	—
VI Triode	UCH81	97.5	5.8	—	—	—
V2	UF89	184	5.2	63	1.75	—
V3	UBC81	91	0.8	—	—	—
V4	UL84	184	49	185	2.8	14.4

RESISTORS

All carbon types unless otherwise stated. Where no tolerance or power rating is given for fixed resistors, these should be taken as $\pm 20\%$ and $\frac{1}{4}$ Watt respectively

Ref	Value	Rating	Function	Part No.
R 1	1M Ω		Aerial shunt	
R 2	47K Ω	10%	V1 screen grid HT feed	
R 3	15K Ω	10%	V1 triode anode HT feed	
R 4	68 Ω	10%	Oscillator limiter	
R 5	47K Ω	10%	V1 oscillator grid leak	
R 6	1M Ω		V1 heptode grid leak and AGC feed	
R 7	68K Ω	10%	V2 screen grid HT feed	
R 8	2.2M Ω	10%	AGC decoupling	
R 9	100K Ω	10%	Part IF filter	
R 10	120K Ω	10%	V3 triode anode load	
R 11	10M Ω		V3 grid leak	
R 12	470K Ω		Pick-up series	
R 13	680 Ω	10% $\frac{1}{2}$ W	HT decoupling with C29	
R 14	500 Ω	5% 3W WW	HT smoothing	501GW03
R 15	680K Ω	10%	V4 grid leak	
R 16	270 Ω	10% $\frac{1}{2}$ W	V4 cathode bias	
R 17	50 Ω	5% 3W WW	V4, V5 heater series	500GW03
R 18	190 Ω	5% 3W WW	V1, V2, V3 heater series	191GW03
R 19	100 Ω	5% 3W WW	Heater series on 226-250V range	101GW03
R 20	50 Ω	5% 3W WW	Heater series on 115V range	500GW03
R 21	100 Ω	10% 5W WW	V5 series on 200-225V and 226-250V ranges; heater series on 226-250V range	101SW05 Z13147/10
R 22	1M Ω	Log. Pot.*	Volume control	
R 23	150K Ω		IFT 1 secondary damping	

*Combined with on/off switch

INDUCTORS AND TRANSFORMERS

Ref.	Description	Part No.
L 1	BC aerial coupling coil	Y32929
L 2	Ferrite rod aerial (BC)	Y33424
L 3	SW1 aerial coupling	Y32922
L 4	SW1 aerial tuning	
L 5	SW2 aerial coupling	Y32926
L 6	SW2 aerial tuning	
L 7	1st IF transformer	Z29447
L 8		
L 9	MW oscillator tuning	Y32928
L 10	MW oscillator feedback	
L 11	SW1 oscillator tuning	Y33730
L 12	SW1 oscillator feedback	
L 13	SW2 oscillator tuning	Y32924
L 14	SW2 oscillator feedback	
L 15	2nd IF transformer	Z29446
L 16		
T 1	Audio output transformer	Z32892

MISCELLANEOUS

Ref.	Function and Description	Part No.
SLA-D	Wavechange switch	Y10250/4
S2	Tone switch	Z33334
S3-4	Mains on/off switch and Volume control	R22 Y13147/10
LS	Loudspeaker, 7" x 4" elliptical, 3 Ω speech coil	N33248
PU	Pick-up sockets	Z29078
PLI-2	Pilot lamps 12V, 0.1A	33774

CAPACITORS

Electrolytics excepted, tolerance $\pm 20\%$ unless otherwise stated. Where no working voltage is given, this should be taken as 350 Volts DC

Ref	Value	Rating	Function	Part No.
C 1	470pF		Aerial series	
C 2	5-35pF	Trimmer*	BC trimmer	
C 3	5-35pF	Trimmer*	SW1 trimmer	
C 4	5-35pF	Trimmer*	SW2 trimmer	
C 5	.02 μ F	350V AC	Earth isolating	
C 6	500pF	Variable†	Aerial tuning	
C 7	440pF	Variable†	Oscillator tuning	
C 8	.01 μ F		V1 screen grid decoupling	
C 9	200pF	2.5%	L7 tuning } IFT 1	
C 10	200pF	2.5%	L8 tuning }	
C 11	1000pF		RF muting on P.U. insertion	
C 12	100pF		V1 oscillator anode coupling	
C 13	100pF		V1 oscillator grid coupling	
C 14	100pF		V1 heptode control grid coupling	
C 15	5-35pF	Trimmer*	BC oscillator trimmer	
C 16	450pF	2%	BC oscillator padder	Y451R35
C 17	5-35pF	Trimmer*	SW1 oscillator trimmer	
C 18	5000pF	5%	SW1 oscillator padder	Y502G35
C 19	5-35pF	Trimmer*	SW2 oscillator trimmer	
C 20	.01 μ F		AGC decoupling	
C 21	200pF	2.5%	L15 tuning } IFT 2	
C 22	200pF	2.5%	L16 tuning }	
C 23	.01 μ F		V2 screen decoupling	
C 24	100pF }		Part IF filter	
C 25	100pF }			
C 26	.02 μ F	350V AC	Pick-up shield isolating	
C 27	2000pF	10%	Pick-up isolating	
C 28	.02 μ F		V3 triode grid coupling	
C 29	32 μ F	Elec. 275V	HT decoupling with R13	Y13237/8
C 31	3900pF		V4 grid coupling	
C 32	10 μ F	Elec. 25V	V4 cathode bias	Y13222/6
C 34	100pF		Tone correction	
C 35	40 μ F }	Elec. 275V	{ HT smoothing }	Y13237/8
C 36	40 μ F }			
C 37	.02 μ F		Mains RF bypass	
C 38	33pF	5%	SW2 fixed aerial trimmer	
C 39	5000pF		Tone alternative	

* Trimmer block Part No. Z13902
† Swing value Part No. Y33500

SPARE PARTS LIST

Part Description	Part No.
Cabinet	{ *V33033/3 †V33033/5 V33026/2
Cabinet back	
Control knobs :	
Tone (clip 45931)	Y29332/2
Volume on/off and Wavechange (clip 45977)	Y32440/2
Tuning (clip 45931)	X32439/1
Cursor	Z33058
Drive drum (spring clip 45977)	Y29434
Mains voltage adjustment plug	X29635
Pilot Lampholder	Z13305/2
Scale	{ *N33214/1 †N33214/2
Scale clip (top)	47465
Scale clip (bottom)	Z33218/1
Two colour schemes—* Light Grey and Red—† Dark Grey and Green	

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

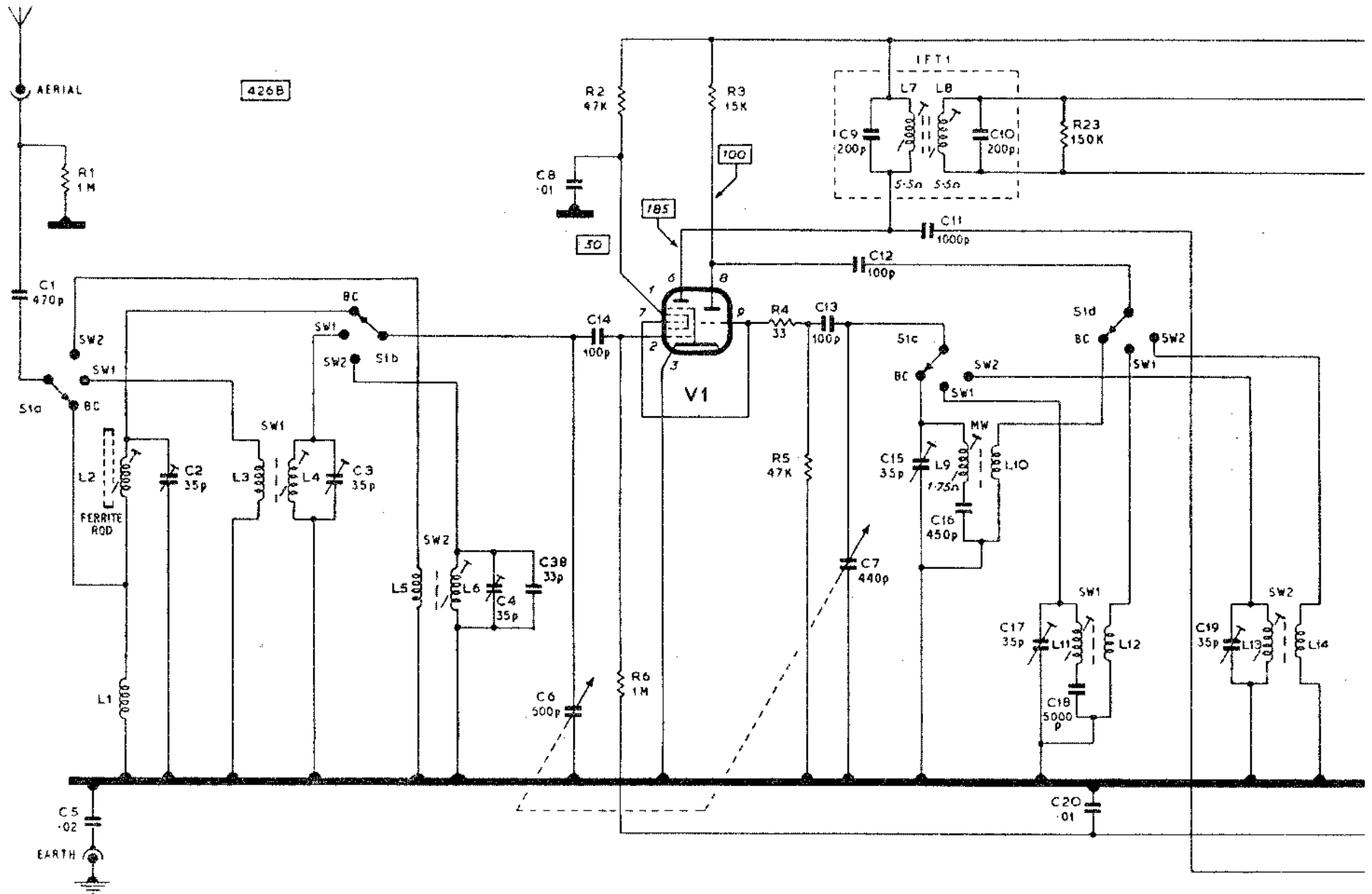
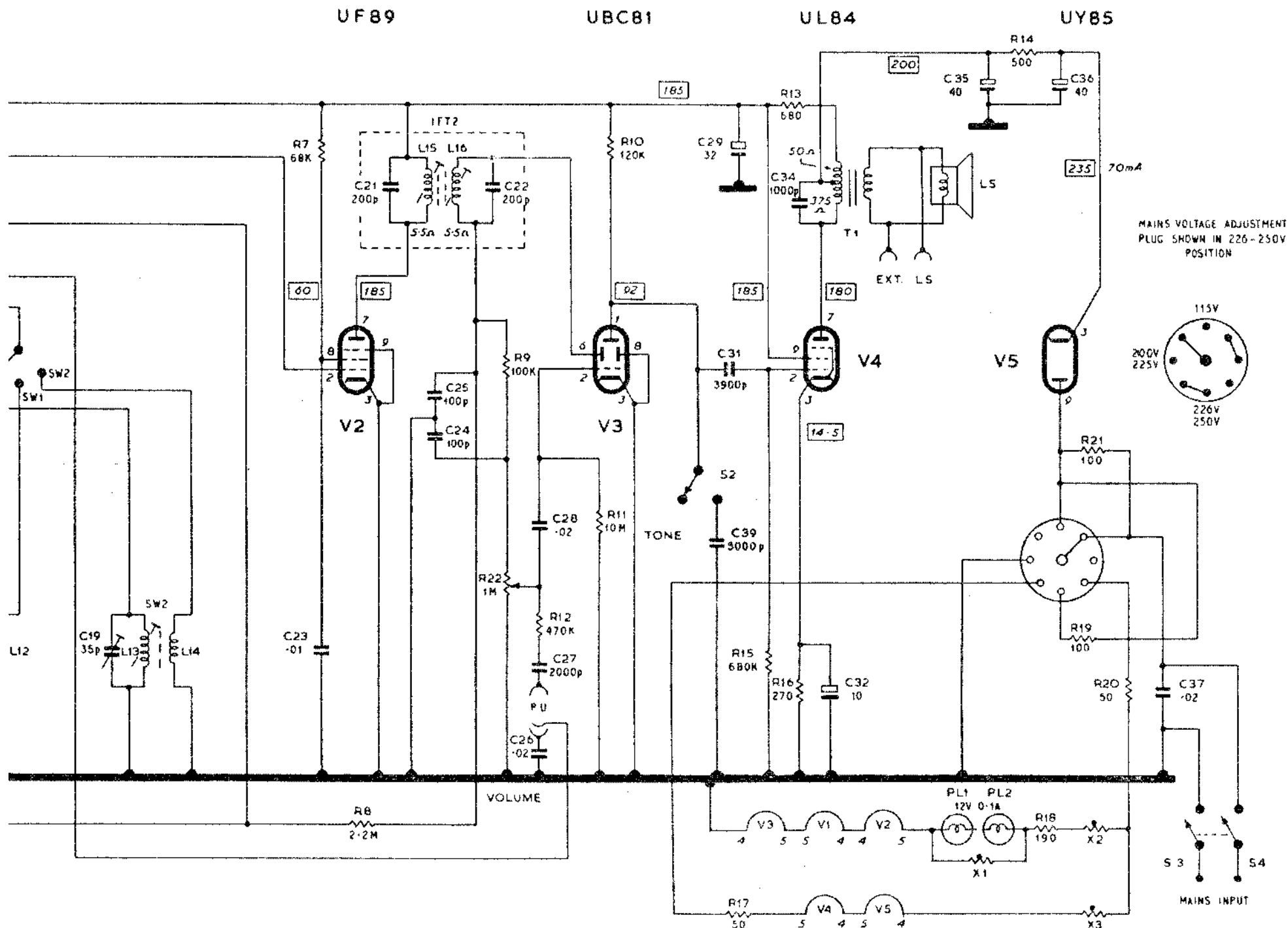


Fig. 2. Circuit diagram. Figures adjacent to valve electrodes denote pin connections. | DC resistances are shown against inductances where these are 1 ohm or greater



pin connections. Figures in rectangles indicate voltages measured with a 20,000 ohm/voltmeter. 1 ohm or greater.