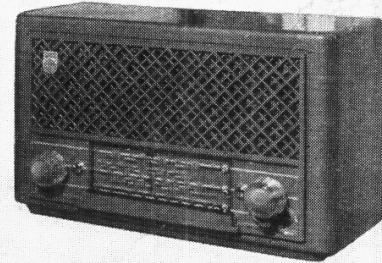


"TRADER" SERVICE SHEET
1006

PHILIPS 200U

3-band A.C./D.C. Table Superhet



DESIGNED to operate from 200-250 V A.C. or 200-230 V D.C. mains, the Philips 200U is a 4-valve (plus rectifier) three-band table superhet housed in a plastic cabinet. The wave-band ranges are 13.8-50 m, 185.2-580.3 m, 1,150-2,000 m.

Release date and original price: May 1951, £12 10s, plus purchase tax.

CIRCUIT DESCRIPTION

Input from self-contained plate aerial, or external aerial, via coupling coils **L2** (S.W.), **L3** (M.W.) to single-tuned circuits **L4**, **C25** (S.W.), **L5**, **C25** (M.W.). On L.W. **S1** closes and **S3** opens, coupling the aerial input via the common impedance of **C2** to the tuned circuit formed by **L5**, **L3** and **C25**. I.F. filtering by **L1**, **C22**. **R1** shunts the aerial input to prevent modulation hum. On M.W. **S2** closes, shunting **R2** across **L3**.

First valve (**V1**, Mullard **UCH42**) is a triode hexode valve operating as frequency changer. Oscillator anode coils **L8** (S.W.), **L9** (M.W.) are tuned by **C29**. **L9** is also used for L.W., when it is shunted by **C26**. Parallel trimming by **C28** (M.W.) and **C26**, **C28** (L.W.); series tracking by **C27** (M.W. and L.W.). Inductive reaction coupling by **L6** (S.W.) and **L7** (M.W. and L.W.) with additional coupling across the common impedance of **C27** on M.W. and L.W.

Second Valve (**V2**, Mullard **UF41**) is a variable-mu R.F. pentode with tuned transformer couplings **C5**, **L10**, **L11**, **C6** and **C11**, **L12**, **L13**, **C12**.

Intermediate frequency 470 kc/s. Diode signal detector is part of double diode triode valve (**V3**, Mullard **UBC41**). A.F. component in rectified output is developed across volume control **R10**, which acts as diode load, and is passed via series capacitor **C15** and grid stopper **R12** to grid of triode section. Second diode of **V3** is connected to chassis. Bass boost at the low level settings of the volume control is provided by **R9**, **C14**.

D.C. potential developed across volume control **R10** is fed back to F.C. and I.F. stages as bias giving automatic gain control. I.F. filtering by **C13**.

Resistance-capacitance coupling between **V3** triode and pentode output valve (**V4**, Mullard **UL41**). Tone correction in anode circuit by **C18**, by the negative feed-back voltage developed

across **R15** in the cathode circuit, and by feed-back of speech coil voltages appearing across **T1** secondary to the grid circuit of **V3** via **C17**. H.T. current is supplied by I.H.C. rectifying valve (**V5**, Mullard **UY41**). Smoothing by electrolytic capacitors **C19**, **C20** and resistor **R21**. R.F. filtering by **C21**. **R16** protects **V5**, and thermistor **R17** protects the scale lamp and heater chain, against current surges.

Valve heaters, together with scale lamp, thermistor, ballast resistors **R18**, **R19** and voltage adjustment resistor **R20**, are connected in series across the mains input.

GENERAL NOTES

Switches.—**S1-S10** are the waveband switches, ganged in a three-position rotary unit below the chassis. Its position is indicated in our under-chassis view, and shown in detail in the diagram overleaf, where it is drawn as seen from the rear of an inverted chassis.

The table below it gives the switch positions for the three control settings, starting from the fully anti-clockwise position of the control. A dash indicates open and C closed.

(Continued col. 1 overleaf)

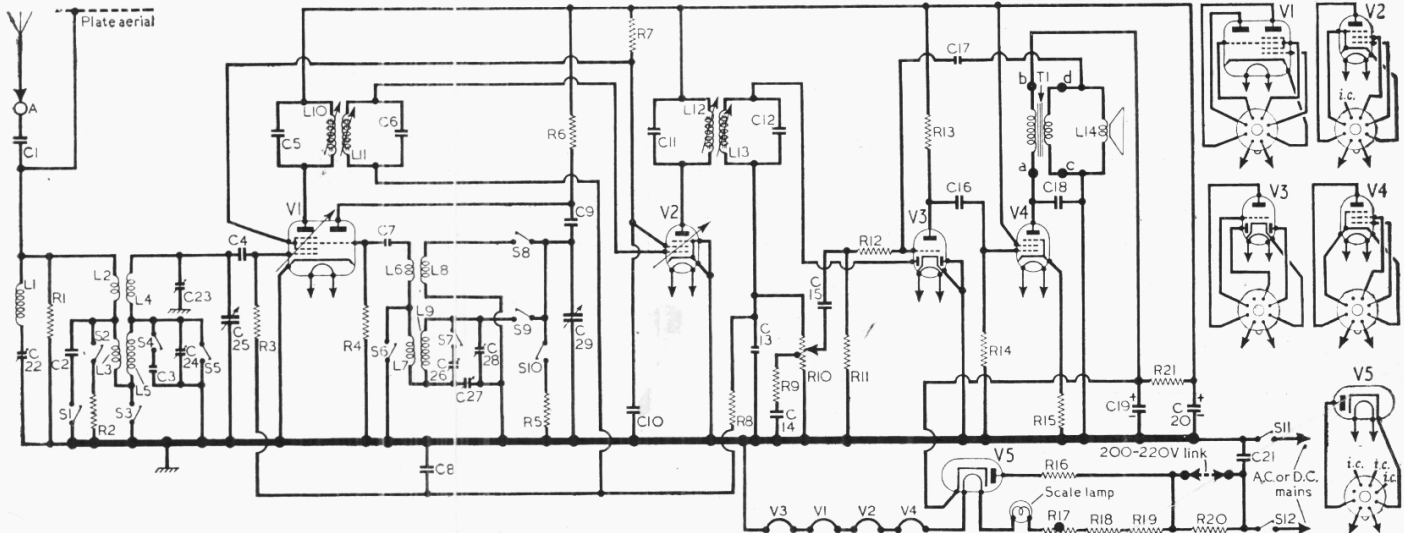
COMPONENTS AND VALUES

RESISTORS		Values	Locations
R1	Aerial shunt	10kΩ	G2
R2	M.W. aerial shunt	2.2kΩ	G3
R3	V1 hex. C.G.	820kΩ	F2
R4	V1 osc. C.G.	22kΩ	F2
R5	M.W. osc. shunt	10kΩ	G3
R6	Osc. anode feed	22kΩ	F3
R7	V1, V2 S.G. feed	18kΩ	F3
R8	A.G.C. decoupling	1.5MΩ	E3
R9	Tone compensator	15kΩ	D3
R10	Volume control	850kΩ	D2
R11	V3 C.G.	4.7MΩ	E3
R12	V3 C.G. stopper	56kΩ	E3
R13	V3 anode load	220kΩ	E2
R14	V4 C.G.	680kΩ	E3
R15	V4 G.B.	150Ω	E3
R16	V5 surge limiter	180Ω	E3
R17	Thermistor	—	C1
R18	Heater ballast resistors	430Ω	C1
R19	resistors	200Ω	C1
R20	Voltage adjust.	82Ω	C1
R21	H.T. smoothing	1kΩ	E2

CAPACITORS

Values	Locations
0.001μF	—
0.0018μF	G2
90pF	G3
100pF	F2
110pF	A1
110pF	A1
47pF	F3
0.047μF	F3
470pF	G3
0.1μF	F2
110pF	B1
110pF	B1
56pF	E3
0.01μF	E2
0.0022μF	E3
0.01μF	D3
22pF	E2
0.0047μF	C1
50μF	C1
50μF	C1
0.033μF	D2
30pF	—
30pF	F2
12.5pF	G3
5489pF	A1
575pF	F3
575pF	G3
30pF	G3
5489pF	A1

* Electrolytic. † Variable. ‡ Pre-set.
§ "Swing" value, min to max.



Circuit diagram of the Philips 200U A.C./D.C. superhet. On L.W. **S3** opens and **S1** closes connecting the S.W. coil **L4**, the M.W. coil **L5**, and the M.W. coupling coil **L3** in series to form the L.W. aerial tuning coil.

OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	I.F. filter coil	30-0	—
L2	Aerial coils	2-1	G2
L3		22-0	G2
L4		0-2	G2
L5		4-4	G2
L6	Oscillator coils	0-5	G3
L7		1-6	G3
L8		0-2	G3
L9		2-1	G3
L10	1st I.F. trans	12-3	A1
L11			A1
L12	2nd I.F. trans	12-3	B1
L13			B1
L14	Speech coil	5-0	—
T1	Primary	380-0	C1
S1-S10			Secondary
S11, S12	Waveband switches	—	—
	Mains sw. g'd R10	—	D2

General Notes—continued

S11, S12 are the mains switches mounted on the volume control R10.

Plate Aerial.—This consists of a strip of metallized paper gummed to the roof of the cabinet.

Scale Lamp.—This is a Philips type 8097D with a tubular bulb and an M.E.S. base. It is rated at 20 V, 0.1 A.

Mains Voltage Adjustment.—This consists of a single link, indicated in our under-chassis view, which when set for 200-220 V A.C. or D.C. operation (figure 1 on paxolin strip in line with window) shorts out R20. For 220-250 V A.C. or 220-230 V D.C. operation (figure 2 in line with window) the link is open and R20 is in circuit.

Tuning Coils.—Only four coils are used to cover the three wavebands in both the aerial and oscillator circuits, these coils being connected in the conventional way for S.W. and M.W. coupling and tuning, and in the following manner for L.W. operation.

M.W. coupling coil L3 is connected in series with M.W. tuning coil L5 to form the L.W. tuning coil, the aerial being coupled via the common impedance of C2. In the oscillator stage, L.W. coverage is obtained by using the M.W. circuit and shunting it with C26.

Drive Cord Replacement.—About 3ft of cord is required, and it should be made up with a loop at each end to measure 865 mm (34.06in or 34.7in) overall, using special metal collars to clamp the ends. Turn the gang to maximum capacitance, hook one end of the cord to the spring and run on as shown in the sketch (col. 2), starting anti-clockwise round the drum. Do not hook the end of the spring to its anchor tag until the end of the run, when both cord loops are secured to it.

Modifications.—In some models a 1kΩ grid stopper is connected between the junction of C16, R14 and V4 control grid, and a 27Ω resistor is connected between S6 and the junction of L6, L7.

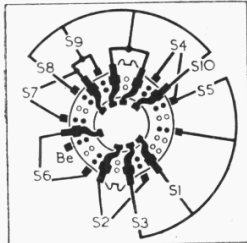
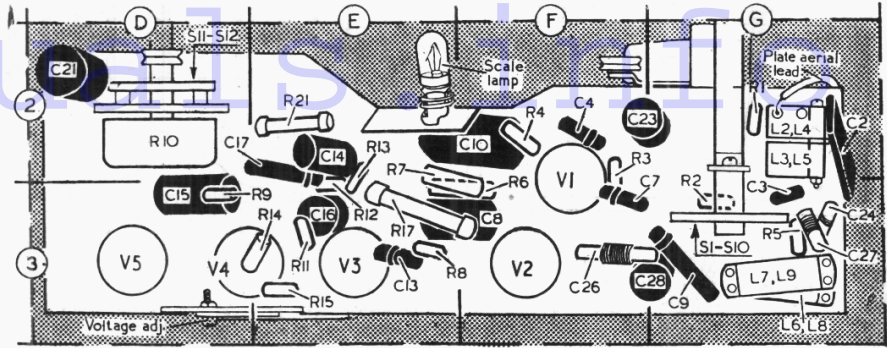


Diagram of the waveband switch unit, with the associated table below.

Switches	M.W.	S.W.	L.W.
S1	—	○	○
S2	—	—	—
S3	○○	—	—
S4	—	—	—
S5	—	○○	—
S6	—	—	—
S7	—	○	○
S8	—	—	—
S9	○○	—	—
S10	—	—	—



Underside view of the chassis. C24, C26 and C27 are special Philips trimmers.

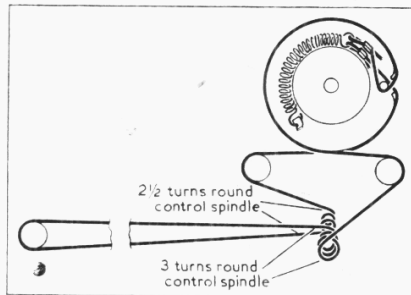
VALVE ANALYSIS

Valve voltages and currents given in the table below are those taken from the manufacturers' information. They were measured on a receiver which was operating from A.C. mains of 220 V with the voltage adjustment set appropriately. The volume control was turned to maximum but there was no signal input.

Voltage readings were measured with a 20,000 ohms per volt meter, chassis being negative.

Valves	Anode		Screen		Cath.
	V	mA	V	mA	
V1 UCH42	155	2.5	0.5	3.5	—
	Oscillator				
V2 UF41	93	3-0	155	2-0	—
	—				
V3 UBC41	155	5-0	—	—	—
V4 UL41	65	0-4	—	—	—
V5 UY41	151	4-0	155	9-0	8-5
	208†	—	—	—	180-0

† A.C. volts.



Sketch showing the tuning drive.

DISMANTLING THE SET

Removing Chassis.—Remove two control knobs (recessed grub screws passing through spindles); unsolder plate aerial lead from its termination on L2 (location reference G2); remove two cheese-head bolts with clamps securing the rear edge of the chassis;

slacken off the screw on the cursor carriage, accessible through the base of the receiver, and disengage the drive cord; withdraw chassis to the extent of the speaker leads, and unsolder them from the speech coil tags.

When replacing, connect the black lead to the lower speech coil tag and the yellow lead to the top tag.

CIRCUIT ALIGNMENT

All the following adjustments can be made accessible upon the removal of the cabinet back and base cover (one unit).

I.F. Stages.—Switch set to M.W., turn gang to minimum and volume control to maximum. Unscrew the cores of coils L13, L12 (location reference B1) and L11, L10 (A1). Connect the output of signal generator via a 0.032 μF capacitor in the "live" lead to control grid (pin 6) of V2 and chassis. Feed in a modulated 470 kc/s (638.3 m) signal and adjust the cores of L13 and L12 for maximum output. Transfer signal generator leads to control grid (pin 6) of V1 and chassis. Adjust the cores of L11 and L10 for maximum output, reducing the input as the circuits come into line to avoid A.G.C. effects. Do not readjust the cores of L13 and L12.

I.F. Filter.—Transfer "live" signal generator lead to A socket, and with the set switched to M.W. and the gang at maximum, feed in a strong 470 kc/s signal and adjust C22 (in top front of cabinet) for minimum output.

R.F. and Oscillator Stages.—Check that with the gang at maximum the cursor is about 1 mm to the left of the "M" at the end of the M.W. tuning scale. C24, C26 and C27 are trimmed by adjusting the amount of wire with which they are wound. Wire can be removed but none must be added. If it is found that the capacitance of one of these trimmers needs increasing, a new trimmer should be fitted.

S.W.—Switch set to S.W. and connect the output of the signal generator "live" lead, via a suitable dummy aerial, to the A socket. Feed in a 13.76 m (21.8 Mc/s) signal, tune it in, and adjust C23 (F2) for maximum output.

M.W.—Switch set to M.W., turn gang to minimum capacitance and feed in a 184 m (1,630 kc/s) signal. Adjust C28 (G3) and C24 (G3) for maximum output. No adjustment should be required at the L.F. end of the band and C27 (G3) should not need adjustment. It is set at 600 kc/s.

L.W.—Switch set to L.W. and tune to approximately 1,245 m. Feed in a 1,245 m (241 kc/s) signal and adjust C26 (F3) for maximum output.

Plan view of the chassis. The tags on T1 are coded a-d to agree with corresponding points in the circuit diagram.

