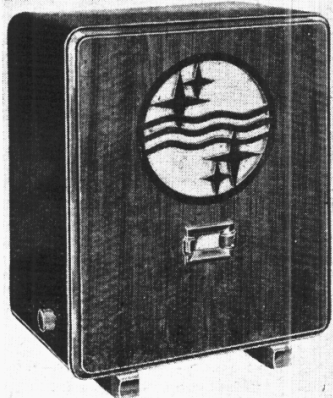


"TRADER" SERVICE SHEET

647

PHILIPS 730A

AND 720A TRF RECEIVERS



The Philips 730A receiver.

TWO RF and three AF valves are employed in the Philips 730A, a 5-valve (plus rectifier) "Superinductance" 2-band receiver designed to operate from AC mains of 100-260 V, 40-100 c/s.

A similar chassis is employed in the 720A, but it is housed in a moulded cabinet and does not include a speaker or output transformer.

Release date: 1931 (both models).

Original prices: 730A, £25 4s.; 720A, £17 17s.

CIRCUIT DESCRIPTION

Aerial input from A2 via a pre-set condenser C30 and tapping on L1 to capacity coupled band-pass filter. Primary coils L1, L2 are tuned by C33; secondaries L3, L4 by C36. Coupling by C2, C3. Input from a second socket A1 is via a very

small capacity C1 to A2 socket, C1 consisting of the mutual capacity between the two sockets.

First valve (V1, Mullard metallised S4VB) is an RF tetraode operating as signal frequency amplifier with gain control by variable potentiometer R5.

Tuned-anode coupling by L5, L6 and C39 between V1 and second RF tetraode (V2, Mullard metallised S4VB) operating as signal frequency amplifier. C7, C8 serve as tracking condensers to keep the tuned circuit in step with the band-pass circuits. It should be noted the C39 is isolated from chassis.

Aperiodic tuned-anode coupling by L7 (MW) plus C13 (LW) between V2 and triode detector valve (V3, Mullard metallised 244V), operating on the grid leak system with C14 and R12. Provision for connection of gramophone pick-up in CG circuit. RF filtering by C17, R16, C18 in anode circuit. Two-position tone control by C19, S5 in anode circuit.

Resistance-capacity coupling by R15, C20 and R17 between V3 and second triode valve (V4, Mullard 244V), operating as AF amplifier, with step-down resistance-capacity coupling by R19, C22, C23 and R20 to directly heated pentode output valve (V5, Mullard PM22A). Fixed tone correction by C25 in anode circuit. Provision for connection of high impedance external speaker, also in anode circuit.

HT current is supplied by full-wave rectifying valve (V6, Philips 1821). Smoothing by iron-cored choke L8, in negative HT lead to chassis, and condensers C26, C27.

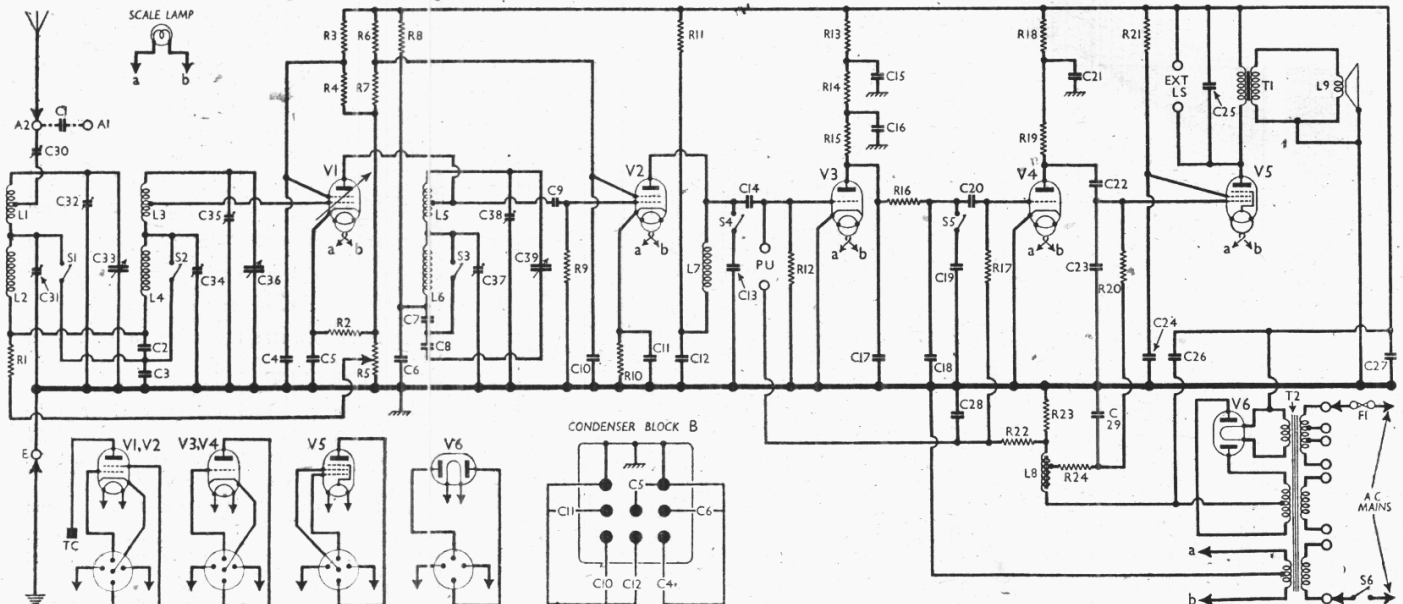
GB potential for V3 (on gram) and V4 is obtained from the drop along R23,

which is in series with L8, while GB for V5 is obtained from a tapping on L8, the control grid circuits being decoupled by C28, R22 and C29, R24 respectively.

COMPONENTS AND VALUES

CONDENSERS		Values (μF)
C1	Aerial A2 series	—
C2	Band-pass coupling	0.05
C3		0.05§
C4	V1 SG decoupling	0.5
C5	V1 cathode by-pass	0.5
C6	V1 Anode Decoupling	1.5
C7	V1 anode trackers	0.05
C8		0.05§
C9	V2 CG condenser	0.00008
C10	V2 SG decoupling	0.5
C11	V2 cathode by-pass	0.5
C12	V2 anode decoupling	0.5
C13	V2 anode LW shunt	0.00064
C14	V3 CG condenser	0.0001
C15	V3 anode decoupling	1.0
C16		1.0
C17	RF by-pass condensers	0.002
C18		0.0025
C19	Tone control condenser	0.002
C20	V3 to V4 AF coupling	0.008
C21	V4 anode decoupling	0.5
C22	V4 to V5 AF coupling	0.05
C23		0.0016
C24	V5 SG decoupling	0.5
C25	Fixed tone corrector	0.0016
C26	HT smoothing condensers	3.0
C27		4.0
C28	V4 CG decoupling	0.5
C29	V5 CG decoupling	0.5
C30†	Aerial series coupling	0.00003
C31†	B-P pri. L.W. trimmer	0.00004
C32†	B-P pri. MW trimmer	0.00002
C33†	Band-pass pri. tuning	0.00063
C34†	B-P sec. LW trimmer	0.00004
C35†	B-P sec. MW trimmer	0.00002
C36†	Band-pass sec. tuning	0.00063
C37†	V1 anode LW trimmer	0.00004
C38†	V1 anode MW trimmer	0.00002
C39†	V1 anode tuning	0.00063

§ Actual ratio $\frac{C3}{C8} = \frac{0.9}{1.1} \mu F$. † Variable. ‡ Pre-set.



Circuit diagram of the Philips 730A TRF 'Superinductance' receiver. The 720A chassis is identical, but the speaker and T1 are omitted. Beneath the circuit is a diagram showing the internal connections of condenser block B.

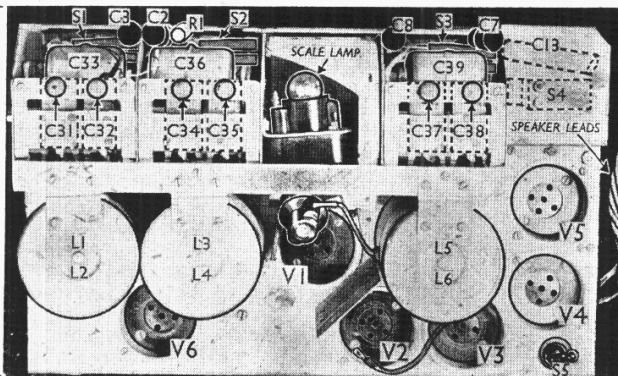
RESISTORS		Values (ohms)
R1	V1 CG decoupling ...	1,000,000
R2	V1 fixed GB resistor ...	400
R3	V1 SG potential divider ...	50,000
R4		40,000
R5	V1 gain control ...	6,200
R6	V2 SG potential divider ...	50,000
R7		64,000
R8	V1 anode HT feed ...	16,000
R9	V2 CG resistor ...	1,000,000
R10	V2 GB resistor ...	400
R11	V2 anode HT feed ...	20,000
R12	V3 CG resistor ...	1,000,000
R13	V3 anode decoupling ...	16,000
R14		10,000
R15	V3 anode load ...	32,000
R16	RF stopper ...	1,000,000
R17	V4 CG resistor ...	500,000
R18	V4 anode decoupling ...	20,000
R19	V4 anode load ...	32,000
R20	V5 CG resistor ...	80,000
R21	V5 SG HT feed ...	16,000
R22	V4 CG decoupling ...	500,000
R23	Auto GB resistor ...	100
R24	V5 CG decoupling ...	100,000

OTHER COMPONENTS		Approx. Values (ohms)
L1	Band-pass primary coils ...	3-0
L2		15-0
L3		3-0
L4	Band-pass secondary coils ...	15-0
L5		3-0
L6	V1 anode tuning coils ...	15-0
L7	V2 anode RF choke ...	37-0
L8	HT smoothing choke, total ...	1,350-0
L9	Speaker speech coil ...	24-0
T1	Speaker input trans. { Pri. ...	200-0
	{ Sec. ...	1-0
	{ Pri., total ...	38-0
T2	Mains { Heater sec. ...	0-05
	{ Rect. heat. sec. ...	0-1
	{ HT sec., total ...	560-0
S1-S4	Waveband switches ...	—
S5	Tone control switch ...	—
S6	Mains switch ...	—
F1	Mains circuit fuse ...	—

DISMANTLING THE SET

Removing Chassis.—Remove the two control knobs by slipping a thin spanner (1/16 in. across flats) over the hexagon sleeve round the spindle, and turning knob, pull off; remove the four bolts (with metal and rubber washers and metal distance-pieces) holding chassis to bottom of cabinet; free the speaker leads from the three cleats on side of cabinet, when chassis may be withdrawn to the extent of speaker leads, which is sufficient for normal purposes. To free chassis entirely, first remove from the speaker transformer the moulded cover (small

Plan view of the chassis. The waveband switches are partly hidden by the tuning condensers. Note that C39 is at HT positive potential above chassis.



set-screw and washer); code, then unsolder from the tags on the transformer, the three connecting leads. If they are not first coded, they will have to be traced afterwards, as they are all of the same colour.

When replacing, fit a rubber washer either side of base of cabinet, with a distance-piece between them, to each chassis bolt, and see that the earthing strips from the metal corner-pieces go on the two rear bolts.

Connect speaker leads to tags 2, 4 and 5 on the transformer, numbering from top to bottom.

Removing Speaker.—Remove the three fixing nuts (with washers and lock-washers).

When replacing, the transformer should point to the top right-hand corner.

VALVE ANALYSIS

Valve voltages and currents given in the table below are average values of those quoted by the makers. Measurements should be made with a high resistance voltmeter, the negative lead of which should be connected to chassis. Currents should be measured at points of low RF potential.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 S4VB	175	3-0	95	0-5
V2 S4VB	175	3-5	95	0-5
V3 244V	60	3-0	—	—
V4 244V	100	2-5	—	—
V5 PM24A	195	17-0	170	3-0
V6 1821†	—	—	—	—

† Heater to chassis, 190V, DC.

GENERAL NOTES

Switches.—S1-S4 are the waveband switches, operated by a push-pull movement of the tuning control which runs along the length of the

chassis. S1-S3 are located each in its appropriate screened compartment, beneath the tuning condenser units. S4 is in a separate compartment at one end. S1-S3 close on MW and open on LW; S4 opens on MW and closes on LW.

S5 is a QMB toggle switch, for tone control, mounted at the rear of the chassis deck. S6 is the QMB mains switch, ganged with, but not attached to, the gain control R5.

Coils.—L1-L6 are special Philips "Super-inductance" tuning coils, in three large sealed screening cans, which should not be disturbed unless it is essential. They are fairly robust, and do not usually give much trouble. They are mounted on the chassis deck behind their associated tuning condensers.

L7 is an RF choke beneath the chassis. In our under-chassis view it is almost completely obscured by the panel on which C14 and R12 are mounted.

Condenser Blocks.—Many of the fixed condensers are contained in three multiple blocks beneath the chassis. As seen in our under-chassis view, S15, S16, S21, S24, S28 and S29 are in the left-hand block, and their connections are indicated, as are also S26 and S27 in the right-hand block; C4, C5, C6, C10, C11 and C12 are contained in the middle block, marked "Condenser Block B", and their connections are shown in the sketch beneath the circuit diagram overleaf, where the tags are shown as seen from the rear of the underside of the chassis.

Scale Lamp.—This is a Philips type 8046 or No. 8, with a small bayonet cap and a centre contact, rated at 6V, 3W. It is fitted in a plug which in turn plugs into the special holder. The lamp and plug can be withdrawn from the rear of the chassis if the scale drum is suitably positioned.

External Speaker.—Two sockets are provided at the rear of the chassis for a high impedance (about 10,000Ω) external speaker.

Internal Speaker.—In our sample, this was type 2055, with an orange-shaped magnet, and a speech coil impedance of 50Ω. In later models, however, another type, N4611, was fitted, with a normal speech coil of low impedance.

Fuse F1.—This consists of a spring-loaded loop mounted on the mains transformer. If the fuse melts, the spring opens the gap rapidly, ensuring a sudden break without arcing.

Mains Voltage Adjustment.—The primary winding of T2 is wound in several sections and brought out to tappings on the adjustment panel at the rear of the chassis. For full details see *Service Sheet 540, 584 or 613.*

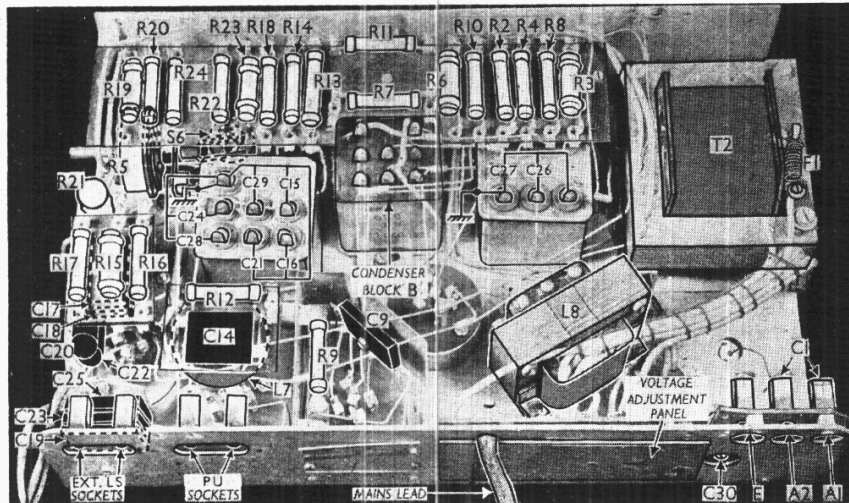
Chassis Divergencies.—In addition to the different speaker that may be used, C9 may be 0.000064 μF, C7 may be 0.064 μF, and C25 may be 0.002 μF or 0.0025 μF. Several HT feed and CG decoupling resistors may also suffer modifications of the same order: 10,000 Ω to 12,500 Ω; 500,000 Ω to 64,000 Ω; 1,000,000 Ω to 1,250,000 Ω, etc.

CIRCUIT ALIGNMENT

MW.—Connect signal generator via a suitable dummy aerial to A1 and E sockets, turn the gain control to maximum, and switch set to MW (knob out). If the signal cannot be detected, transfer signal generator lead to A2 socket. Tune to 225 m on scale feed in a 225 m (1,333 kc/s) signal, and adjust C38, C35 and C32 for maximum output.

LW.—Switch set to LW, leaving everything set as before. Tune to 900 m on scale, feed in a 900 m (333.3 kc/s) signal, and adjust C37, C34 and C31 for maximum output.

Finally, adjust C30 on a broadcast signal.



Under-chassis view. The connections of condenser Block B are shown beneath the circuit overleaf.