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"TRADER" SERVICE SHEET
1050

CHAMPION 750

DESIGNED to operate from A.C. or D.C. mains of 100-120 V or 200-250 V, the Champion 750B is a 4-valve (plus rectifier) 3-band superhet housed in a small plastic cabinet. The waveband ranges are 16-49 m, 200-550 m, 800-2,000 m. Model 750A is an export version, with S.S.M. wavebands.

On the S.W. and L.W. bands, an external aerial is required, and its terminal is a spring clip on the back of the receiver. On M.W. the receiver operates from its own frame aerial, and no external connection is provided.

Release date and original price: December, 1951 £13 15s. Purchase tax extra.

CIRCUIT DESCRIPTION

Tuned frame aerial input **L1, C26** on M.W. to triode hexode valve **(V1, Brimar 12K8GT)** operating as frequency changer with electron coupling. On S.W. and L.W. connection of an external aerial is required, and input is via **C1** and coupling coils **L2, L3** to single tuned circuits **L4, C26** (S.W.) and **L5, C26** (L.W.)

Oscillator anode coils **L9** (S.W.), **L10** (M.W. and **L11** (L.W.) are tuned by **C30**. Series tracking by **C7** (S.W.), **C8** (M.W.) and **C9** (L.W.) parallel trimming by **C27** (S.W.), **C28** (M.W.) and **C29** (L.W.). Reaction coupling from grid across the common impedance of the trackers with additional inductive coupling.

Second valve **(V2, Brimar 12K7GT)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings.

Intermediate frequency 465 kc/s.

Diode signal detector is part of double diode triode valve **(V3, Brimar 12Q7GT)**. Audio frequency component in rectified output is developed across volume control **R7**, which acts as diode load, and passed via **C16** to grid of triode section. D.C. potential developed across **R7** is fed back as bias via decoupling circuit **R6, C4** to **V1** and **V2** (except on M.W.) giving automatic gain control.

Resistance-capacitance coupling via **R9, C17** and **R10** between **V3** triode anode and beam tetrode output valve **(V4, Brimar 35L6GT)**. Tone correction in anode circuit by **C18.**

H.T. current is supplied by half-wave I.H.C. rectifying valve **(V5, Brimar 35Z4)**. Smoothing by **R12** and electrolytic capacitors **C20** and **C21.** Valve heaters, together with scale lamp, thermistors **(R13, Brimistor, CZ3), (R14, Brimistor, CZ2)** and ballast resistors **R15, R16** (the latter being a line cord type), are connected in series across the mains input. Thermistor **R13** shunts the scale lamp to maintain the heater circuit if the scale lamp blows, and thermistor **R14** protects the heater circuit from current surges. In the 110 V position of the voltage adjustment link, **R16** and **R15** are by-passed in the heater circuit, **R15** acting only as surge limiter to **V5.**

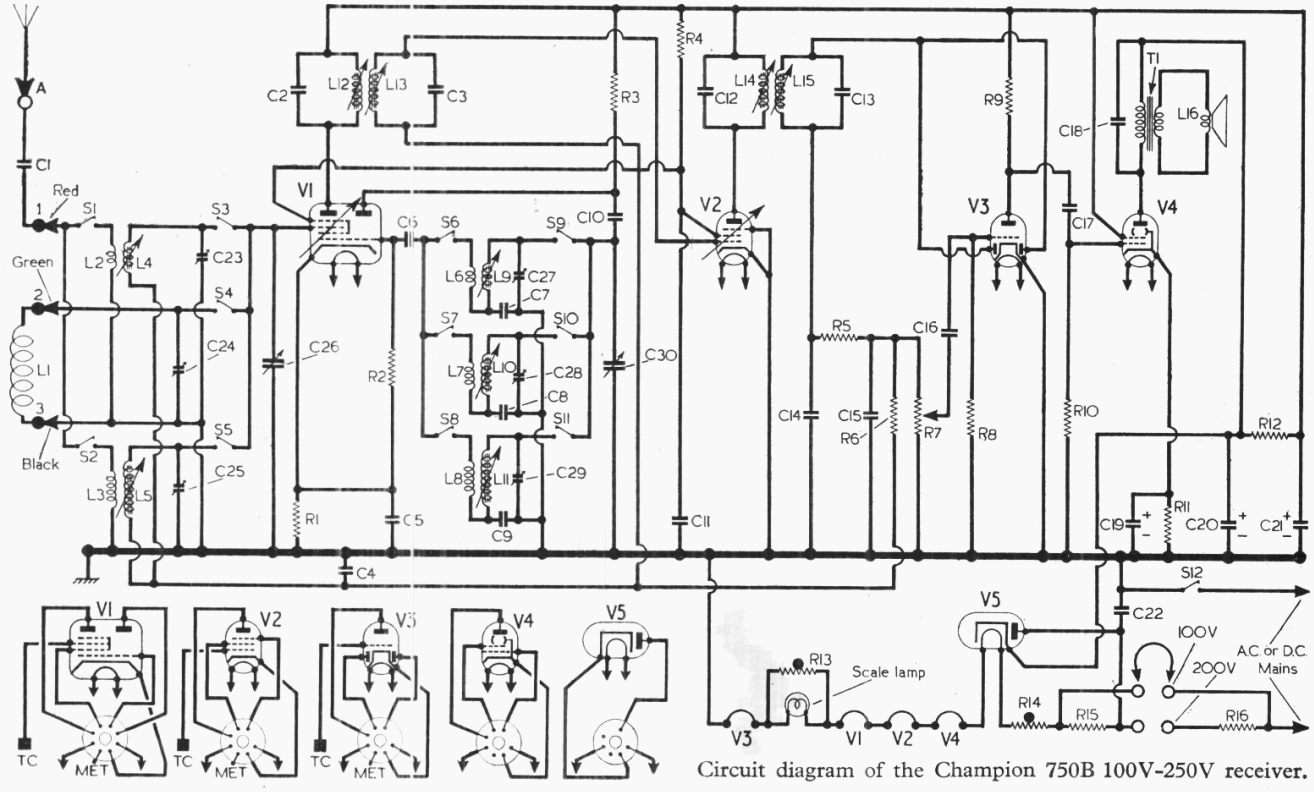
COMPONENTS AND VALUES

	RESISTORS	Values	Locations
R1	V1 G.B.	220Ω	F4
R2	V1 osc. C.G. ...	47kΩ	F4
R3	Osc. anode load ...	6·8kΩ	F4
R4	S.G. feed	2·2kΩ	E4
R5	I.F. stopper ...	47kΩ	E3
R6	A.G.C. decoupling	1MΩ	E3
R7	Volume control ...	500kΩ	E3
R8	V3 C.G.	4·7MΩ	B1
R9	V3 anode load ...	100kΩ	E3
R10	V4 C.G.	220kΩ	D3
R11	V4 G.B.	180Ω	D4
R12	H.T. smoothing ...	2kΩ	D3
R13	Thermistor CZ3 ...	—	A1
R14	Thermistor CZ2 ...	—	D4
R15	Heater ballast ...	200Ω	C2
R16*	Heater ballast ...	380Ω	D4

* Line cord.

	CAPACITORS	Values	Locations
C1	Aerial isolator ...	0·001μF	B2
C2	1st I.F. trans.	100pF	B2
C3	tuning	100pF	B2
C4	A.G.C. decoupling	0·05μF	E4
C5	Cath. by-pass ...	0·1μF	F4
C6	V1 osc. C.G. ...	100pF	F3
C7	S.W. osc. tracker...	0·005μF	F3
C8	M.W. osc. tracker	550pF	F3
C9	L.W. osc. tracker	150pF	F4
C10	Osc. anode coup.	100pF	F3
C11	S.G. decoupling ...	0·1μF	F4
C12	2nd I.F. trans.	100pF	B2
C13	tuning	100pF	B2
C14	I.F. by-passes ...	100pF	E3
C15		100pF	E3
C16	A.F. couplings ...	0·01μF	E3
C17		0·01μF	D3
C18	Tone corrector ...	0·01μF	C1
C19*	V4 cath. by-pass	25μF	D3
C20*	H.T. smoothing ...	32μF	C2
C21*		32μF	C2
C22	Mains R.F. filter ...	0·05μF	D4
C23‡	S.W. aerial trim.	—	F3
C24‡	M.W. aerial trim.	—	F3
C25‡	L.W. aerial trim.	—	F4
C26†	Aerial tuning ...	—	B2
C27‡	S.W. osc. trim. ...	—	F4
C28‡	M.W. osc. trim. ...	—	F3
C29‡	L.W. osc. trim. ...	—	F4
C30†	Oscillator tuning	—	B1

* Electrolytic. †Variable. ‡ Pre-set.



Circuit diagram of the Champion 750B 100V-250V receiver.

OTHER COMPONENTS			Approx. Values (ohms)	Locations
L1	Frame aerial ...		1·3	C2
L2	Aerial coupling coils		10·0	E3
L3			95·0	E4
L4	Aerial tuning coils		—	E3
L5			21·0	E4
L6	Oscillator reaction coils		8·0	F4
L7			1·2	F3
L8			2·3	F4
L9	Oscillator tuning coils		—	F4
L10			3·3	F3
L11			9·0	F4
L12	1st I.F. trans.	Pri. ...	6·5	B2
L13		Sec. ...	6·5	B2
L14	2nd I.F. trans.	Pri. ...	6·5	B2
L15		Sec. ...	6·5	B2
L16	Speech coil ...		2·6	—
T1	O.P. trans.	Pri.	220·0	C1
		Sec.	0·4	
S1-S11	Waveband sw. ...		—	F3
S12	Mains sw., g'd R7		—	E3

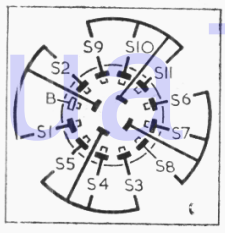
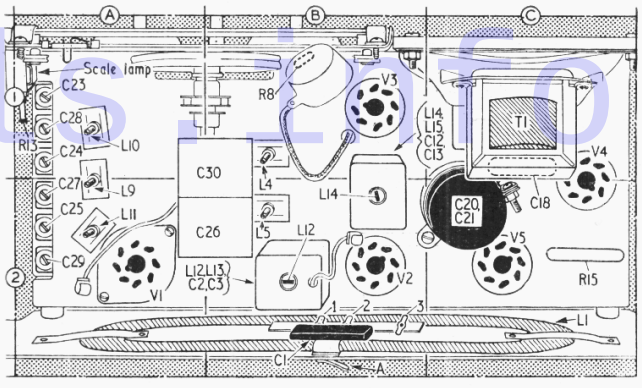


Diagram of the waveband switch unit, drawn as seen from the rear of an inverted chassis. Below is the associated switch table.



Plan view drawing of the chassis.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating from A.C. mains of 230 V. The receiver was tuned to the highest wavelength end of M.W. but there was no signal input.

Voltage readings were measured with an Avo Electronic TestMeter, which draws no appreciable current, and allowance should be made for the current drawn by other types of meter. Chassis was the negative connection in every case.

Valve		Anode V	Anode mA	Screen V	Screen mA	Cath. V
V1	12K8GT	98	1·5	85	5·2	2·0
		Oscillator 85	2·3			
V2	12K7GT	98	8·0	85	2·2	—
V3	12Q7GT	58	0·4	—	—	—
V4	35L6GT	135	32·0	98	2·0	6·0
V5	35Z4GT	132†	—	—	—	139·0

† A.C. reading.

Switches	L.W.	M.W.	S.W.
S1 ...	—	—	C
S2 ...	C	—	—
S3 ...	—	—	C
S4 ...	—	C	—
S5 ...	C	—	—
S6 ...	—	—	C
S7 ...	—	C	—
S8 ...	C	—	—
S9 ...	—	—	C
S10 ...	—	C	—
S11 ...	C	—	—

GENERAL NOTES

Switches.—**S1-S11** are the waveband switches, ganged in a single rotary unit beneath the chassis. The unit is indicated in our underside view of the receiver, and shown in detail in the diagram inset beside the plan view, 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.

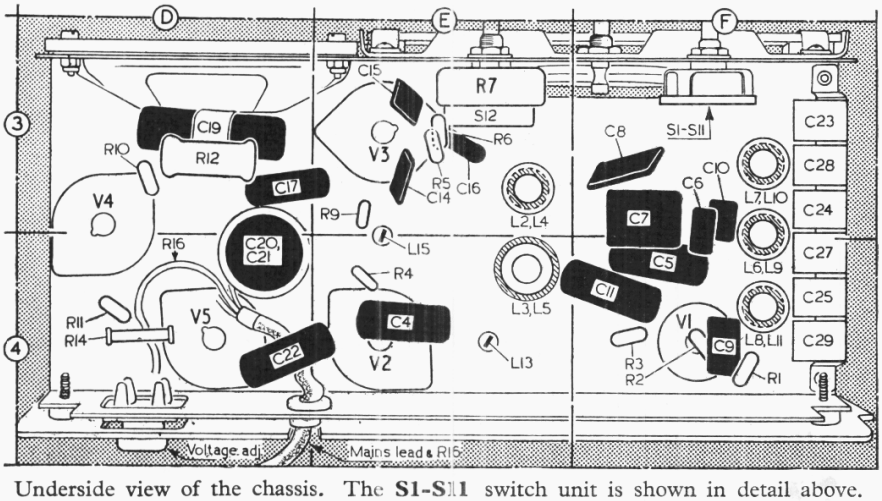
S12 is the Q.M.B. mains switch, ganged with the volume control **R7**.

Scale Lamp.—This has a small clear spherical bulb and an M.E.S. base. The makers give its rating as 6.2 V, 0.2 A, but our sample was actually rated at 2.5 V, 0.2 A. It is fitted at a point of fairly low potential in the heater chain, and is shunted by a thermistor.

Mains Voltage Adjustment.—The receiver is permitted a fairly wide mains voltage tolerance, but a 2-position adjustment plug is provided for high voltage (200-250 V) and low voltage (100-120 V) mains. A transparent plastic disc fitted to the pins of the plug covers the unused pair of sockets, which are "live," and prevents contact with the hands of the user.

Drive Cord Replacement.—About 30 inches of high-grade flax fishing line, plaited and waxed, is required for a new drive cord, which should be run as shown in the accompanying sketch. This is drawn as seen when viewed from the rear, neglecting obstructions, when the gang is at maximum capacitance.

Chassis Divergencies.—In the makers' diagram, the bottom of the S.W. reaction coil goes directly to chassis, but in our sample receiver it was connected as shown in our diagram. In their diagram also is shown an H.T. circuit R.F. by-pass capacitor of 0.1 μF, which is probably fitted or omitted according to requirements.

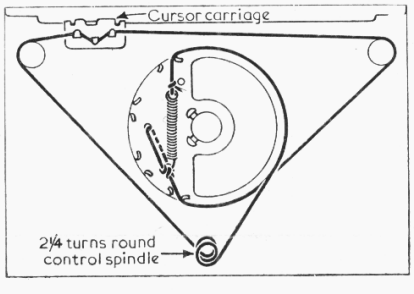


Underside view of the chassis. The **S1-S11** switch unit is shown in detail above.

CIRCUIT ALIGNMENT

Remove chassis, complete with frame aerial, from cabinet and stand it on the bench resting on its loudspeaker end.

I.F. Stages.—Switch receiver to M.W. and tune to low wavelength end. Connect output of signal generator, via a 0.01 μF isolating capacitor in each lead, to control grid (top cap) of **V1** and chassis. Feed in a 465 kc/s (645.16 m) signal and adjust the cores of **L15, L14, L13** and **L12** (location references E4, B2) for maximum output. Repeat these adjustments until no further improvement results.



Sketch showing the course taken by the tuning drive cord, drawn as seen from the rear with the gang at maximum.

R.F. and Oscillator Stages, Home Model.—Transfer "live" signal generator output lead to aerial connector via a dummy aerial. Check that with gang at maximum capacitance the cursor coincides with the vertical lines at the high wavelength end of the tuning scale.

S.W.—Switch receiver to S.W., tune to 16 m, feed in a 16 m (18.75 Mc/s) signal and adjust **C27** (A2) and **C23** (A1) for maximum output. Tune receiver to 49 m, feed in a 49 m (6.12 Mc/s) signal and adjust the cores of **L9** (A2) and **L4** (B1) for maximum output. Repeat these adjustments.

L.W.—Switch receiver to L.W., tune to 1,000 m, feed in a 1,000 m (300 kc/s) signal and adjust **C29** (A2) and **C25** (A2) for maximum output. Tune receiver to 2,000 m, feed in a 2,000 m (150 kc/s) signal and adjust the cores of **L11** (A2) and **L5** (B2) for maximum output. Repeat these adjustments.

M.W.—Switch receiver to M.W., tune to 200 m, and couple output of signal generator via a loop of wire to the frame aerial. Feed in a 200 m (1,500 kc/s) signal and adjust **C28** (A1) and **C24** (A1) for maximum output. Tune receiver to 550 m, feed in a 550 m (545 kc/s) signal and adjust the core of **L10** (A1) for maximum output. Repeat these adjustments.

Export Model.—The input conditions and alignment instructions for the I.F. stages, and the M.W. band in R.F. and Oscillator stages, are the same as in the Home model.

S.W.1.—Trim both circuits at 13 m (23 Mc/s) and adjust the cores at 35 m (8.57 Mc/s).

S.W.2.—Trim both circuits at 35 m (8.57 Mc/s) and adjust the cores at 100 m (3 Mc/s).

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