

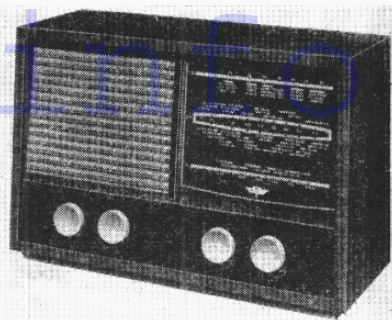
"TRADER" SERVICE SHEET
1196

K.-B. LR15

A.C./D.C. Transportable Superhet

EMPLOYING a ferrite rod internal aerial for M.W. and L.W. reception, the K.-B. LR15 is a 4-valve plus rectifier 3-band table superhet designed to operate from A.C. or D.C. mains of 200-250 V, 50-100 c/s in the case of A.C. The waveband ranges covered are 16.3-51 m, 187-570 m, 880-2,100 m.

Release date and original price: December 1954, £15 10s. Purchase tax extra.



CIRCUIT DESCRIPTION

The M.W. and L.W. aerial coils L4 and L5 are mounted at opposite ends of a length of ferrite rod to form the internal aerial and are tuned by C29. An external aerial is neces-

sary for S.W. reception, and is coupled via C1, C3 and L2 to aerial tuning coil L3. Provision is also made for the use of an external aerial on M.W. and L.W., when it is coupled via C4, C1, C2 across the common impedance of C4. C1, C2 isolate the A and E sockets from chassis. R1 prevents the build-up of static charges on the aerial, and choke L1 shunts the aerial input to prevent modulation hum.

First valve (V1, Brimar 12BE6) is a heptode operating as frequency changer with electron coupling. Oscillator grid coils L8 (S.W.), L9 (M.W.) and L10 (L.W.) are tuned by C32. Parallel trimming by C30 (S.W.), C31 (M.W.) and C10 (L.W.); series tracking by C12 (M.W.) and C13 (L.W.). Oscillator stabilization by R4. Second valve (V2, Brimar 12BA6) is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings C6, L11, L12, C7 and C15, L13, L14, C16.

Intermediate frequency 422 kc/s. Diode signal detector is part of double diode triode valve (V3, Brimar 12AT6). Audio frequency component in rectified output is developed across volume control R9 and passed via C20 to grid of triode section.

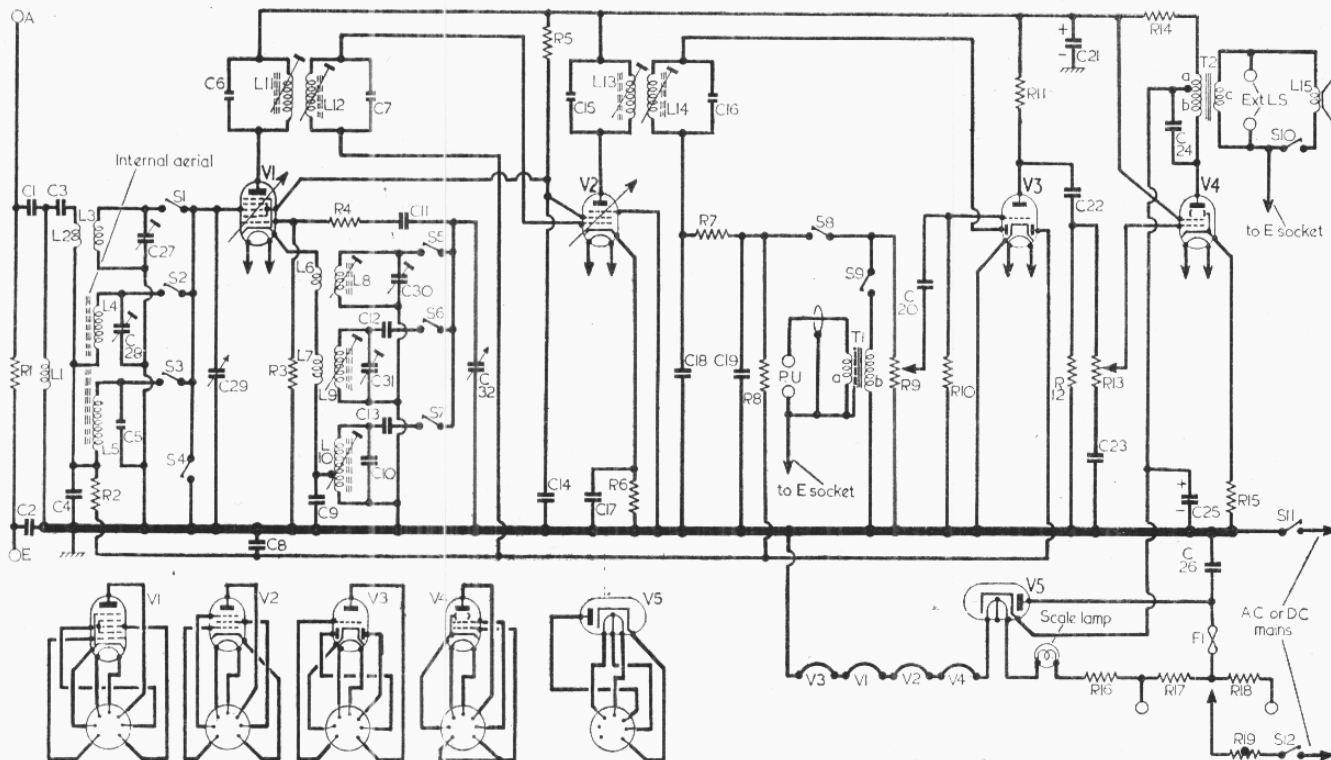
D.C. potential developed across R9 is fed back as bias to V1 and V2 giving automatic gain control. Provision is made for the connection of a gramophone pick-up via isolating transformer T1 and switch S9 which closes in the gram position of the waveband control. S4

(Continued col. 1 overleaf)

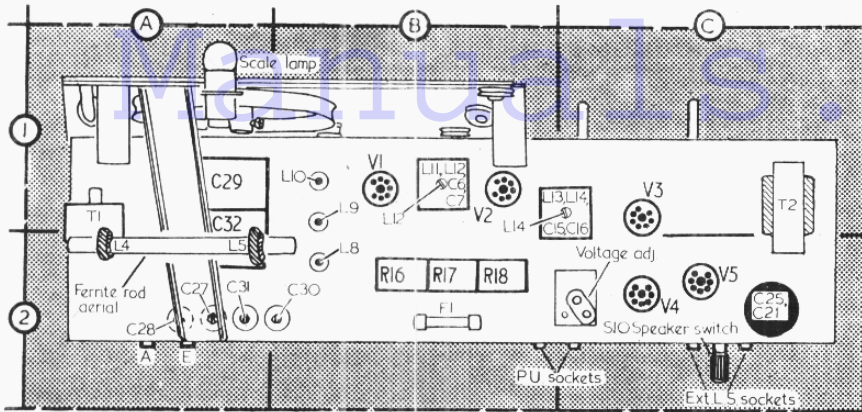
CAPACITORS		Values	Locations
C1	Aerial and earth isolators ...	0.001μF	G4
C2	...	0.01μF	G4
C3	Aerial couplings ...	500pF	G3
C4	...	0.003μF	G3
C5	L.W. aerial trim ...	40pF	G3
C6	1st I.F. trans. ...	88pF	B1
C7	tuning ...	88pF	B1
C8	A.G.C. decoupling	0.02μF	F3
C9	L.W. reaction shunt	0.002μF	F3
C10	L.W. osc. trim. ...	100pF	F3
C11	V1 osc. C.G. ...	100pF	G3
C12	M.W. osc. tracker	410pF	G3
C13	L.W. osc. tracker ...	180pF	F3
C14	S.G. decoupling ...	0.1μF	F3
C15	2nd I.F. trans. ...	88pF	C1
C16	tuning ...	88pF	C1
C17	V2 cath-by-pass ...	0.04μF	E3
C18	I.F. by-passes ...	330pF	E3
C19	...	100pF	E4
C20	A.F. coupling ...	0.01μF	E3
C21*	H.T. smoothing ...	32μF	C2
C22	A.F. coupling ...	0.02μF	D3
C23	Part tone control ...	1,500pF	E3
C24	Tone corrector ...	0.01μF	D4
C25*	H.T. smoothing ...	32μF	C2
C26	Mains R.F. by-pass	0.05μF	E4
C27†	S.W. aerial trim. ...	40pF	A2
C28†	M.W. aerial trim. ...	40pF	A2
C29†	Aerial tuning ...	—	A1
C30†	S.W. osc. trim. ...	40pF	B2
C31†	M.W. osc. trim. ...	40pF	A2
C32†	Oscillator tuning ...	—	A1

RESISTORS		Values	Locations
R1	Anti-static shunt ...	1MΩ	G4
R2	A.G.C. decoupling	100kΩ	G4
R3	V1 osc. C.G. ...	22kΩ	F3
R4	Osc. stabilizer ...	47Ω	F3
R5	S.G. H.T. feed ...	18kΩ	E3
R6	V2 G.B. ...	47Ω	E3
R7	I.F. stopper ...	100kΩ	E3
R8	A.G.C. decoupling	2.2MΩ	E4
R9	Volume control ...	500kΩ	E3
R10	V3 C.G. ...	10MΩ	E3
R11	V3 anode load ...	470kΩ	E4
R12	V4 C.G. ...	220kΩ	E3
R13	Tone control ...	250kΩ	D3
R14	H.T. smoothing ...	820Ω	D4
R15	V4 G.B. ...	270Ω	E4
R16	Heater ballast and voltage adj. ...	640Ω	B2
R17		80Ω	B2
R18		80Ω	B2
R19	Thermistor CZ2 ...	—	F4

* Electrolytic. † Variable. ‡ Pre-set.



Circuit diagram of the Kolster-Brandes LR15. A ferrite rod internal aerial L4, L5 is fitted for M.W. and L.W. reception.



Plan view of the chassis showing all the R.F. and oscillator adjustments in A2 and B1.

OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	Mod. hum filter ...	17.5	G4
L2	Aerial coupling ...	—	G3
L3	—	—	G3
L4	Aerial tuning coils	0.6	A2
L5	—	12.3	A2
L6	Osc. reaction coupling coils ...	—	F4
L7	—	0.5	F3
L8	—	—	F4
L9	Osc. tuning coils...	4.6	F3
L10*	—	7.8	F3
L11	1st I.F. trans. { Pri. Sec.	21.0	B1
L12		21.0	B1
L13	2nd I.F. trans. { Pri. Sec.	21.0	C1
L14		21.0	C1
L15	Speech coil ...	2.8	—
T1	P.U. trans. { a b	2,900.0	A1
		4,000.0	—
		5.0	C1
T2	O.P. trans. { a b c	665.0	—
	—	0.3	—
S1-S9	Waveband switches	—	G3
S10	Speaker switch ...	—	D4
S11, S12	Mains sw., g'd R13	—	D3
F1	250 mA fuse ...	—	B2

* Tapped at 0.7Ω from chassis end.

Circuit Description—continued

closes and S8 opens in this position to prevent radio break-through.

Resistance-capacitance coupling by R11, C22, R12 between V3 and pentode output valve (V4, Brimar 19AQ5). Variable tone control by R13 and C23 in V4 grid circuit. Tone correction by C24 in V4 anode circuit and by the negative feedback voltage developed across R15.

CIRCUIT ALIGNMENT

I.F. Stages.—Switch receiver to M.W. and turn gang to maximum capacitance. Connect signal generator output, via an 0.1μF capacitor in the "live" lead, to control grid (pin 7) of V1 and chassis. Feed in a 422 kc/s (710.8 m) signal and adjust the cores of L14 (location reference C1), L13 (E3), L12 (B1) and L11 (F3) for maximum output.

R.F. and Oscillator Stages.—Transfer signal generator leads to A and E sockets. As the tuning scale remains fixed in the cabinet when the chassis is removed, reference is made, during the following alignment instructions, to calibration marks printed along the lower edge of the scale backing plate. Check that with the gang at maximum capacitance, the cursor coincides with calibration mark "D" on the scale backing plate.

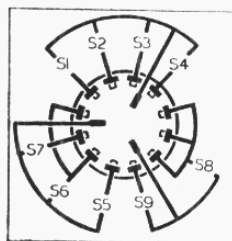
M.W.—Switch receiver to M.W. and tune to M.W. calibration mark at right end of backing plate. Feed in a 600 kc/s (500 m) signal and adjust the core of L9 (B1) for maximum output. Tune to M.W. calibration mark near the centre of the backing plate. Feed in a 1,400 kc/s (214 m) signal and adjust C31 (A2) and C28 (A2) for maximum output. During the final adjustments to C28, rock the gang for optimum results.

L.W.—Switch receiver to L.W. and tune to L.W. calibration mark at centre of scale back

ing plate. Feed in a 225 kc/s (1,333 m) signal and adjust the core of L10 (B1) for maximum output. Check the M.W. alignment, re-adjusting L9, C31, and C28, if necessary, as previously described.

S.W.—Switch receiver to S.W. and tune to S.W. calibration mark at right-hand end of backing plate. Feed in a 6 Mc/s (50 m) signal and adjust the core of L8 (B2) for maximum output. Tune receiver to S.W. calibration mark near centre of backing plate. Feed in a 15 Mc/s (20 m) signal and adjust C30 (B2) and C27 (A2) for maximum output, rocking the gang while adjusting C27 for optimum results.

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

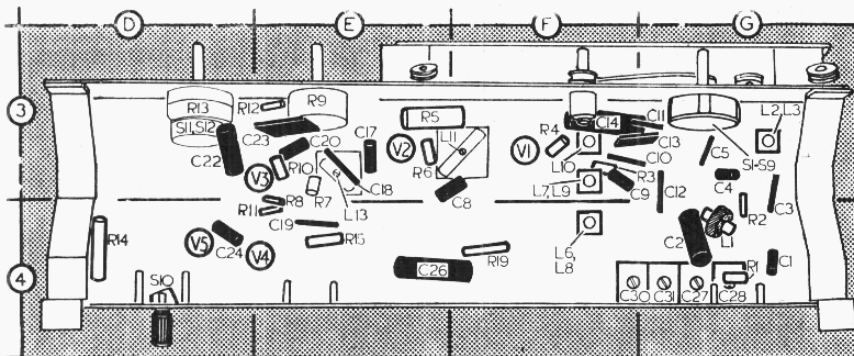


Above: Table of the waveband switch operations.

Left: Diagram of the waveband switch unit as seen from the rear of an inverted chassis.

GENERAL NOTES

Switches.—S1-S9 are the waveband and radio/gram change-over switches, ganged in a single

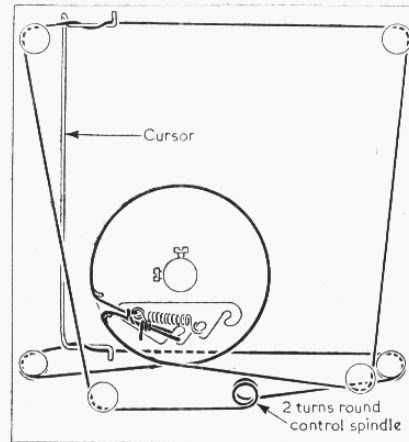


Underside view of the chassis showing the internal speaker switch S10 in location D4.

rotary unit beneath the chassis. This unit is indicated in the under-chassis illustration and shown in detail in col. 2, where it is drawn as seen from the rear of an inverted chassis. The associated switch table shows the switch operations in the four control settings, starting with the control fully anti-clockwise. A dash indicates open, and C, closed.

Scale Lamp.—This is a 6 V, 0.2 A lamp with a large, clear spherical bulb and an M.E.S. base.

Drive Cord Replacement.—About 6ft of high grade flax fishing-line, plaited and waxed, is required for a drive cord. The gang should be tuned to maximum capacitance, and, starting with one end of the cord tied to one of the lugs in the drive drum, the cord should be passed out through the gap in the drum and led off in an anti-clockwise direction, as indicated in the sketch of the tuning drive system.



Sketch of the tuning drive system as seen from the rear of an upright 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 switched to M.W. and tuned to a point at the high wavelength end of the band where there was no signal pick-up.

Voltages were measured with an Avo Electronic Test Meter, and as this instrument has a high internal resistance, allowance should be made for the current drawn by other types of meter. Chassis was the negative connection in each case.

Valve	Anode		Screen		Cath.
	V	mA	V	mA	V
V1 12BE6	207.0	1.5	70.0	5.0	—
V2 12BA6	207.0	0.55	70.0	1.6	0.4
V3 12AT6	56.5	0.3	—	—	—
V4 19AQ5	196.0	35.0	207.0	2.7	10.5
V5 35W4	185.0*	—	—	—	218.0†

* A.C. reading. † Cathode current 47 mA.