"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 10*s*. *Purchase tax extra.*

CAPACITORS		Values	Locations
C1	Aerial and earth isolators	0·001μF	G4
C2	Aerial and earth isolators	0·01μF	G4
C3	Aerial couplings	500pF	G3
C4	Aerial couplings	0·003μF	G3
C5	L.W. aerial trim.	40pF	G3
C6	1st I.F. trans. tuning	88pF	B1
C7	1st I.F. trans. 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. tuning	88pF	C1
C16	2nd I.F. trans. tuning	88pF	C1
C17	V2 cath-by-pass	0·04μF	E3
C18	I.F. by-passes	330pF	E3
C19	I.F. by-passes	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

* Electrolytic. † Variable. ‡ Pre-set.

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	Heater ballast and voltage adj.	80Ω	B2
R18	Heater ballast and voltage adj.	80Ω	B2
R19	Thermistor CZ2	—	F4

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 necessary 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 **C1, C3, L2** 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**.

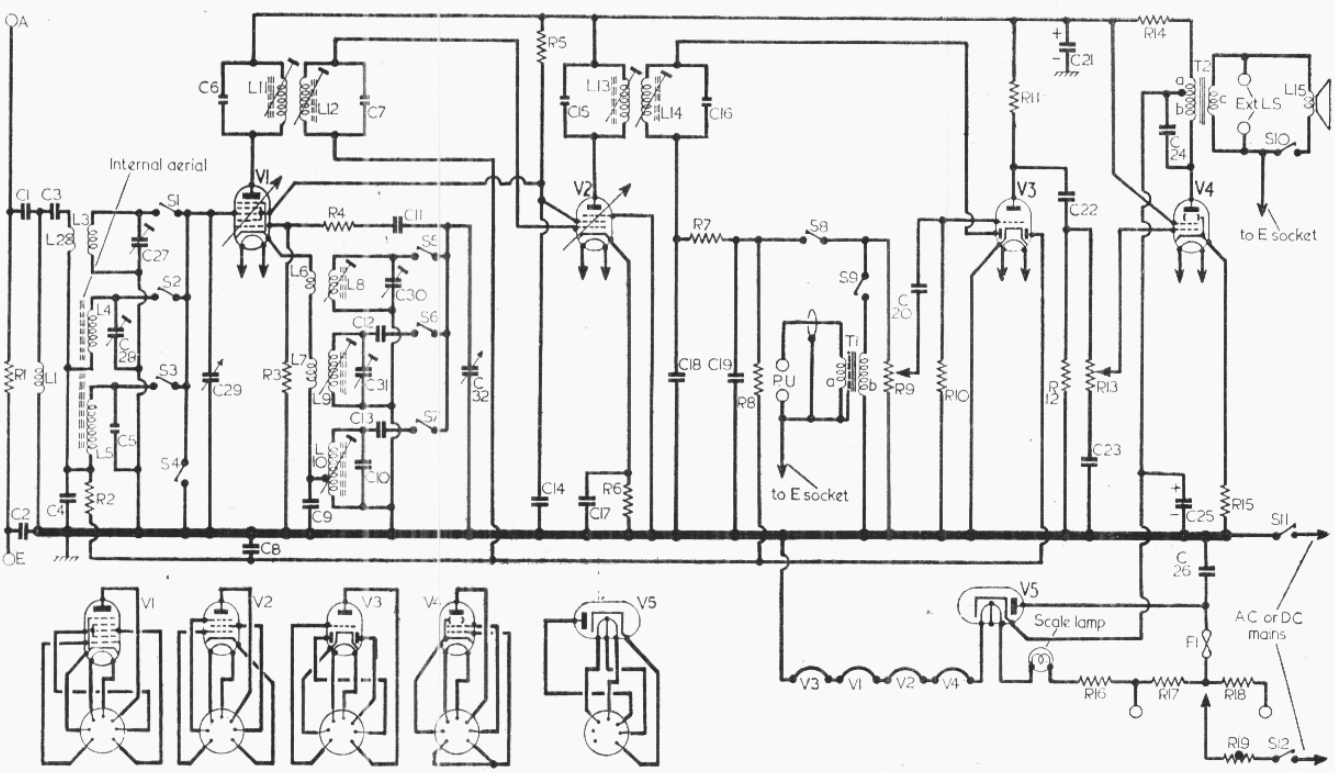
Second valve **(V2, Brimar 12BA6)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **C6, L11, L12, C7** and **C15, L13, L14, C16.**

Intermediate frequency 422 kc/s.

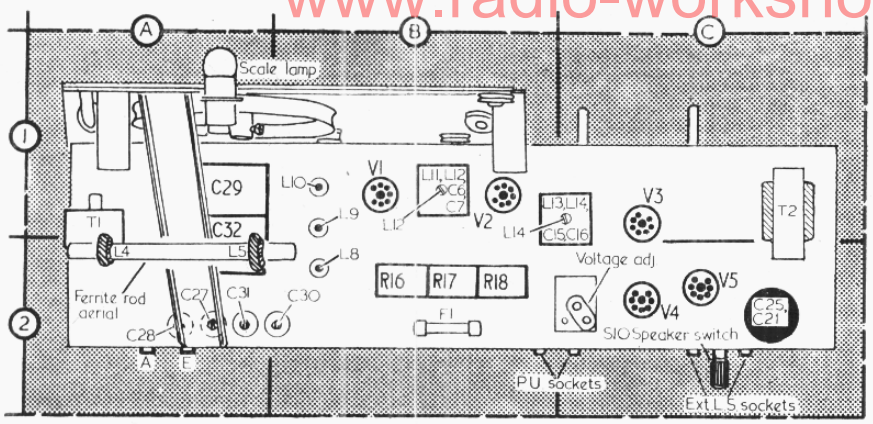
Diode signal detector is part of double diode triode valve **(V3, Brimar 12AT6).** Audio frequency component in rectified output is developed across volume control **R9** and passed via **C20** to grid of triode section.

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*)



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	Aerial tuning coils	—	G3
L4	Aerial tuning coils	0·6	A2
L5	Aerial tuning coils	12·8	A2
L6	Osc. reaction coupling coils ...	—	F4
L7	Osc. reaction coupling coils ...	0·5	F3
L8	Osc. tuning coils ...	—	F4
L9	Osc. tuning coils ...	4·6	F3
L10*	Osc. tuning coils ...	7·8	F3
L11	1st I.F. trans. Pri.	21·0	B1
L12	1st I.F. trans. Sec.	21·0	B1
L13	2nd I.F. trans. Pri.	21·0	C1
L14	2nd I.F. trans. Sec.	21·0	C1
L15	Speech coil ...	2·8	—
T1	P.U. trans. a ...	2,900·0	A1
	P.U. trans. b ...	4,000·0	
T2	O.P. trans. a ...	5·0	C1
	O.P. trans. b ...	665·0	
	O.P. trans. c ...	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 feed-back 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 0.1 μF 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.

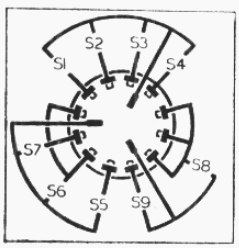
R.F. and Oscillator Stages.—Transfer signal generator leads to **A** and **E** sockets. As the tuning scale remains fixed in the cabinet when the chassis is removed, reference is made, during the following alignment instructions, to calibration marks printed along the lower edge of the scale backing 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 backing 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.

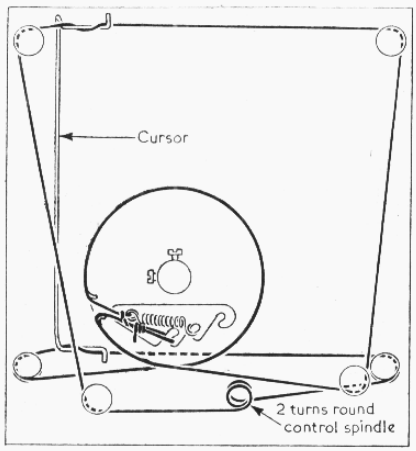
Left: Diagram of the waveband switch unit as seen from the rear of an inverted chassis.

GENERAL NOTES

Switches.—**S1-S9** are the waveband and radio/gram change-over switches, ganged in a single 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 6½ft 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.

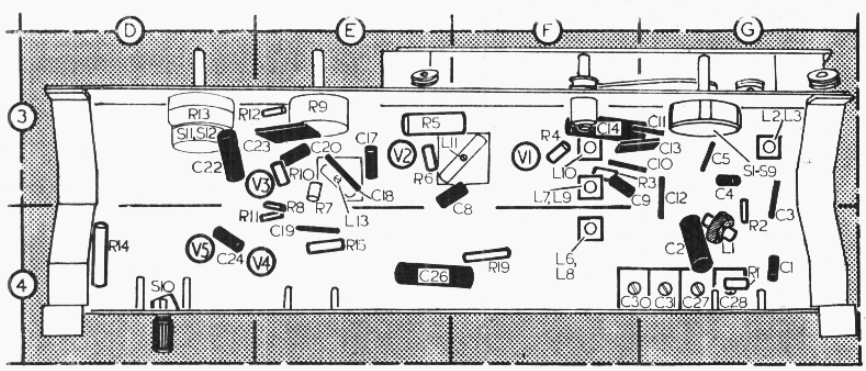
VALVE ANALYSIS

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 V	Anode mA	Screen V	Screen mA	Cath. 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.



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

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