

"TRADER" SERVICE SHEET

1176

# KOLSTER-BRANDES LR10

3-band A.C. Transportable Superhet

**E**MPLYING ferrite rod internal aerials for M.W. and L.W. reception, the K.-B. LR10 is a 4-valve (plus rectifier) 3-band superhet designed to operate from A.C. mains of 200-250V, 50 c/s. The waveband ranges are 16.3-51m, 187-570m and 880-2,100m.

Release date and original price: September 1954, £15 2s 1d. Purchase tax extra.

### CIRCUIT DESCRIPTION

The M.W. and L.W. aerial coils **L3** and **L4** are mounted at opposite ends of a length of ferrite rod to form the internal aerial and are tuned by **C26**. An external aerial is necessary for S.W. reception and is coupled via **C1** and **L1** to aerial tuning coil **L2**. Provision is also made for the use of an external aerial on M.W. and L.W., when it is coupled via **C1**, **L1** across the common impedance of **C2**.

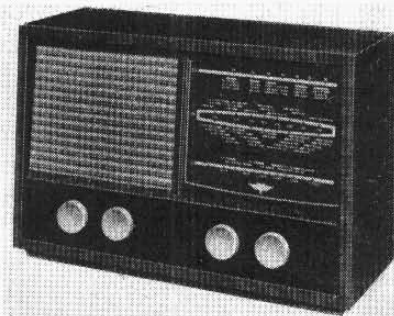
First valve (**V1**, **Brimar 6BE6**) is a heptode operating as frequency changer with electron

coupling. Oscillator grid coils **L7** (S.W.), **L8** (M.W.) and **L9** (L.W.) are tuned by **C29**. Parallel trimming by **C27** (S.W.), **C28** (M.W.) and **C9** (L.W.); series tracking by **C10** (M.W.) and **C11** (L.W.). Reaction coupling from cathode circuit via **L5** (S.W.), **L6** (M.W.) and a tapping on **L9** (L.W.). Oscillator stabilization by **R4**. Second valve (**V2**, **Brimar 6BA6**) is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **C5**, **L10**, **L11**, **C6** and **C14**, **L12**, **L13**, **C15**.

Intermediate frequency 422 kc/s.

Diode signal detector is part of double diode triode valve (**V3**, **Brimar 6AT6**). Audio fre-

(Continued col. 1 overleaf)



### CAPACITORS

	Values	Locations.
C1	500pF	G4
C2	0.003μF	G4
C3	40pF	G3
C4	0.02μF	E3
C5	88pF	B1
C6	88pF	B1
C7	0.001μF	F3
C8	100pF	F3
C9	100pF	F3
C10	410pF	G3
C11	180pF	F3
C12	0.1μF	F3
C13	0.04μF	E3
C14	88pF	C1
C15	88pF	C1
C16	330pF	E3
C17	100pF	E4
C18	0.01μF	E3
C19	0.02μF	D3
C20	0.0015μF	E3
C21*	32μF	C2
C22*	32μF	C2
C23	0.01μF	D4
C24†	40pF	A2
C25†	40pF	A2
C26†	40pF	A1
C27†	40pF	B2
C28†	40pF	A2
C29†	40pF	A1

\* Electrolytic. † Variable. ‡ Pre-set.

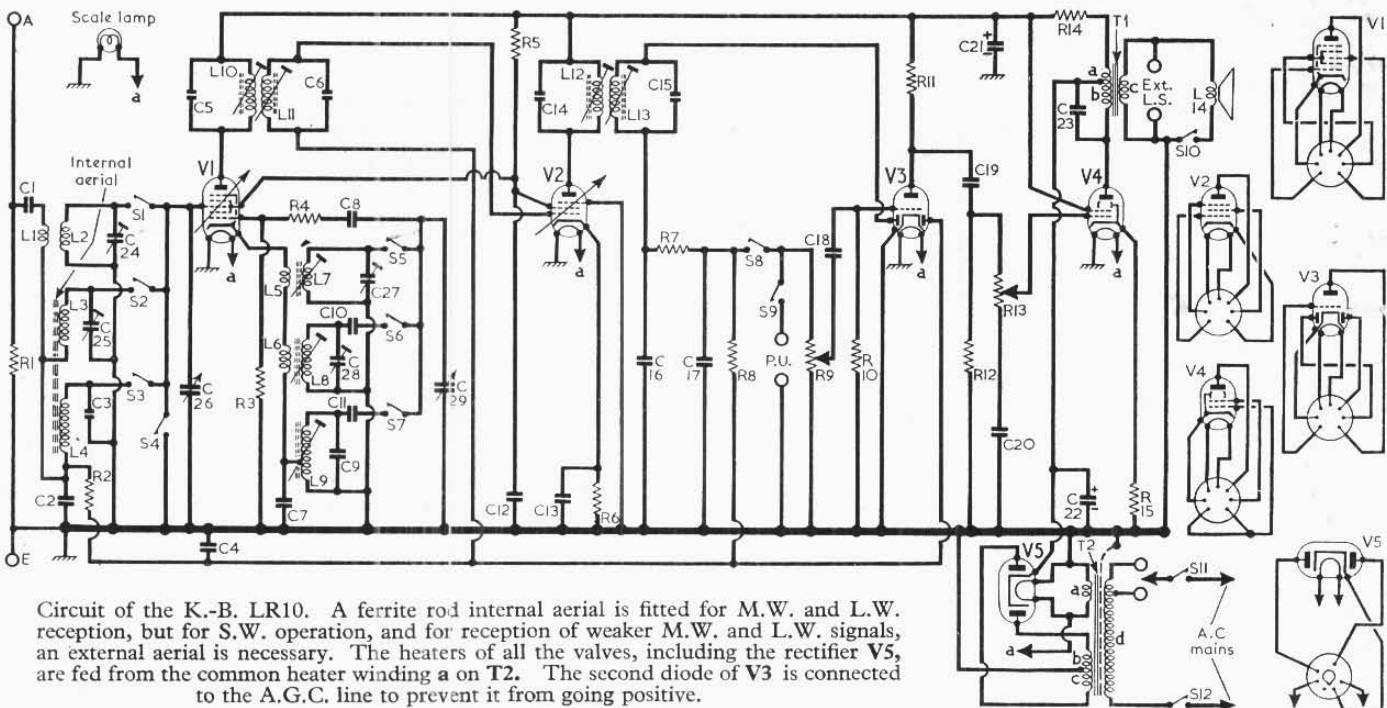
### OTHER COMPONENTS

	Approx. Values (Ohms)	Locations.
L1	—	G3
L2	—	G3
L3	0.6	A2
L4	12.7	A2
L5	—	F4
L6	0.4	F3
L7	—	F3
L8	4.5	F3
L9*	7.5	F3
L10	21.0	B1
L11	21.0	B1
L12	21.0	C1
L13	21.0	C1
L14	2.5	—
T1	9.6	C1
T2	650.0	C1
	0.5	
	0.5	
	200.0	B2
	200.0	
	45.0	
S1-S9	—	G3
S10	—	D4
S11,	—	
S12	—	D3

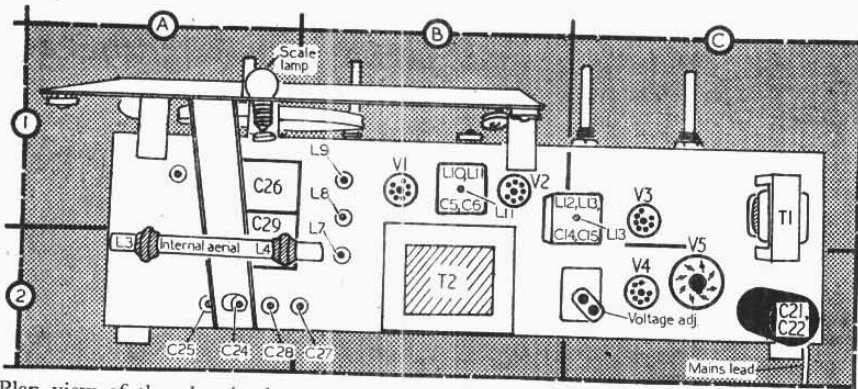
\* Tapped at 0.7Ω from chassis.

### RESISTORS

	Values	Locations.
R1	10kΩ	G4
R2	100kΩ	G4
R3	22kΩ	F3
R4	47Ω	F3
R5	18kΩ	E3
R6	47Ω	E3
R7	100kΩ	E3
R8	2.2MΩ	E4
R9	500kΩ	E3
R10	10MΩ	E3
R11	470kΩ	E4
R12	220kΩ	D3
R13	250kΩ	D3
R14	820Ω	D4
R15	270Ω	E4



Circuit of the K.-B. LR10. A ferrite rod internal aerial is fitted for M.W. and L.W. reception, but for S.W. operation, and for reception of weaker M.W. and L.W. signals, an external aerial is necessary. The heaters of all the valves, including the rectifier **V5**, are fed from the common heater winding on **T2**. The second diode of **V3** is connected to the A.G.C. line to prevent it from going positive.



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

**Circuit Description—continued**

frequency component in rectified output is developed across volume control R9, and is passed via C18 to grid of triode section. I.F. filtering by C16, R7, C17.

D.C. component developed across R9 is fed back as bias to V1 and V2 giving automatic gain control.

Resistance-capacitance coupling by R11, C19 and R12 between V3 and pentode output valve (V4, Brimar 6A05). Variable tone control in V4 control grid circuit by R13, C20. Fixed tone correction by C23 in V4 anode circuit, and via the negative feed-back voltage developed across R15 in V4 cathode circuit. Provision is made for the connection of a low impedance external speaker across T1 secondary winding.

H.T. current is supplied by full-wave I.H.C. rectifying valve (V5, Brimar 6X5GT). Smoothing by R14 and electrolytic capacitors C21, C22. Residual hum is neutralized by passing a proportion of the H.T. current through section A of the output transformer primary winding.

ing plate. Feed in a 225 kc/s (1,333m) signal and adjust the core of L9 (B1) for maximum output. Check the M.W. alignment, re-adjusting L8, C28 and C25, if necessary, as previously described.

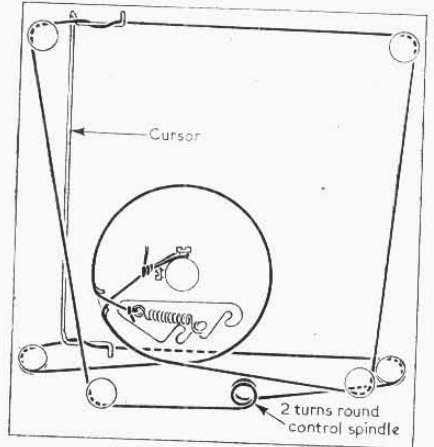
S.W.—Switch receiver to S.W. and tune to S.W. calibration mark at right-hand end of backing plate. Feed in a 6Mc/s (50m) signal and adjust the core of L7 (B2) for maximum output. Tune receiver to S.W. calibration mark near centre of backing plate. Feed in a 15 Mc/s (20m) signal and adjust C27 (B2) and C24 (A2) for maximum output, rocking the gang while adjusting C24 for optimum results. Repeat these adjustments until no further improvement results.

S10 is the internal speaker muting switch and is mounted between the external speaker sockets on the rear of the chassis.

S11, S12 are the Q.M.B. mains switches ganged with the tone control R13.

Scale Lamp.—This is a 6.5V, 0.3A 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 minimum capacitance, and, starting with one end of the cord tied to the top screw in the drive drum boss, 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.

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

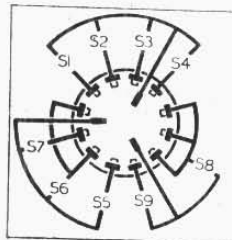


Diagram of the waveband switch unit as seen from the rear of an inverted chassis.

**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 230V. 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.

Valves	Anode		Screen		Cath.
	V	mA	V	mA	
V1 6BE6 ...	217	1.6	85	5.5	—
V2 6BA6 ...	217	5.4	85	2.2	0.4
V3 6AT6 ...	71	0.25	—	—	—
V4 6A05 ...	217	3.2	217	37	10.0
V5 6X5GT ...	200*	—	—	—	230.0†

\* A.C., each anode. † Cathode current 55mA.

**CIRCUIT ALIGNMENT**

In order to make all the following adjustments accessible, the chassis should be removed from its cabinet.

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 422kc/s (710.5m) signal and adjust the cores of L13 (location reference C1), L12 (E3), L11 (B1) and L10 (F3) for maximum output. Repeat these adjustments until no further improvement results.

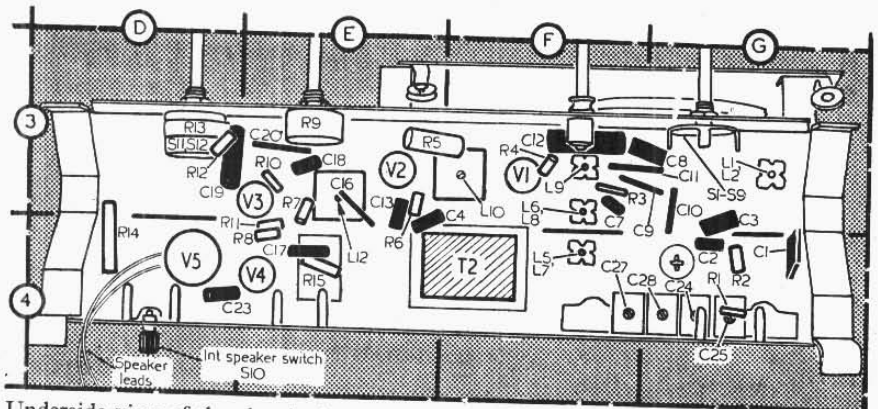
R.F. and Oscillator Stages.—Transfer signal generator leads to A and E sockets. As the tuning scale remains fixed in the cabinet when the chassis is removed, reference is made, during the following alignment instructions, to calibration marks printed along the lower edge of the scale backing plate. Check 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 near centre of backing plate. Feed in a 600kc/s (500m) signal and adjust the core of L8 (B1) for maximum output. Tune to M.W. calibration mark at right-hand end of backing plate. Feed in a 1,400kc/s (214m) signal and adjust C28 (A2) and C25 (A2) for maximum output. During the final adjustments to C25, rock the gang for optimum results. Repeat these adjustments until no further improvement results.

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

**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 (above), 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.



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