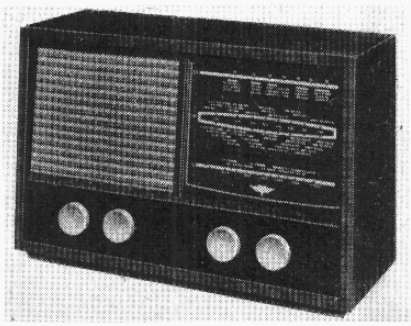
"TRADER" SERVICE SHEET 1176

KOLSTER-BRANDES LR10

3-band A.C. Transportable Superhet



EMPLOYING 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*)

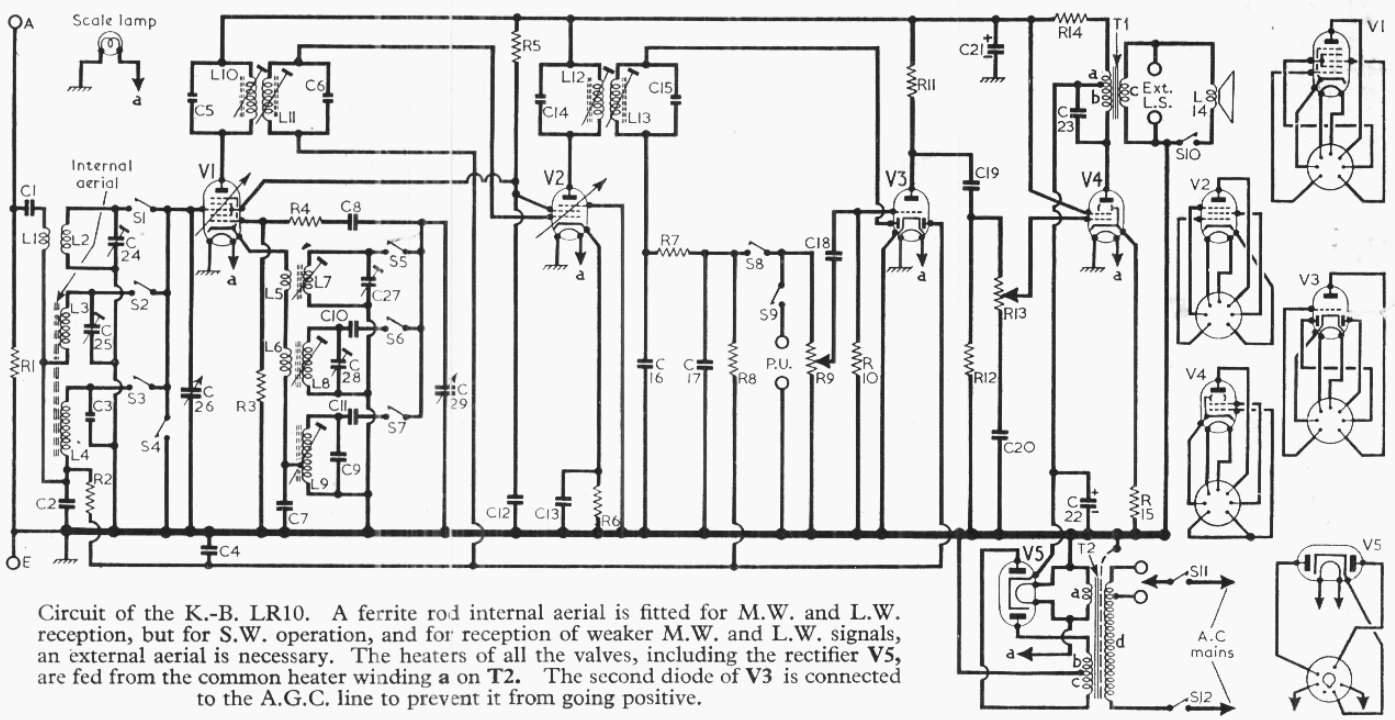
RESISTORS		Values	Locations
R1	Mod. hum shunt ...	10kΩ	G4
R2	A.G.C. decoupling	100kΩ	G4
R3	V1 osc. C.G. ...	22kΩ	F3
R4	Osc. stabilizer ...	47Ω	F3
R5	S.G. H.T. feed ...	18kΩ	E3
R6	V2 G.B.	47Ω	E3
R7	I.F. stopper ...	100kΩ	E3
R8	A.G.C. decoupling	2·2MΩ	E4
R9	Volume control ...	500kΩ	E3
R10	V3 C.G.	10MΩ	E3
R11	V3 anode load ...	470kΩ	E4
R12	V4 C.G.	220kΩ	D3
R13	Tone control ...	250kΩ	D3
R14	H.T. smoothing ...	820Ω	D4
R15	V4 G.B.	270Ω	E4

CAPACITORS		Values	Locations
C1	Aerial couplers	500pF	G4
C2	Aerial couplers	0·003μF	G4
C3	L.W. aerial trim.	40pF	G3
C4	A.G.C. decoupling	0·02μF	E3
C5	1st I.F. trans.	88pF	B1
C6	1st I.F. trans. tuning ...	88pF	B1
C7	Osc. reaction coup.	0·001μF	F3
C8	Osc. C.G. ...	100pF	F3
C9	L.W. osc. trim. ...	100pF	F3
C10	M.W. osc. tracker	410pF	G3
C11	L.W. osc. tracker	180pF	F3
C12	S.G. decoupling ...	0·1μF	F3
C13	V2 cath. by-pass	0·04μF	E3
C14	2nd I.F. trans.	88pF	C1
C15	2nd I.F. trans. tuning ...	88pF	C1
C16	I.F. by-passes	330pF	E3
C17	I.F. by-passes	100pF	E4
C18	A.F. couplings ...	0·01μF	E3
C19	A.F. couplings ...	0·02μF	D3
C20	Part tone control	0·0015μF	E3
C21*	H.T. smoothing ...	32μF	C2
C22*	H.T. smoothing ...	32μF	C2
C23	Tone corrector ...	0·01μF	D4
C24‡	S.W. aerial trim.	40pF	A2
C25‡	M.W. aerial trim.	40pF	A2
C26†	Aerial tuning ...	—	A1
C27‡	S.W. osc. trim. ...	40pF	B2
C28‡	M.W. osc. trim. ...	40pF	A2
C29†	Oscillator tuning	—	A1

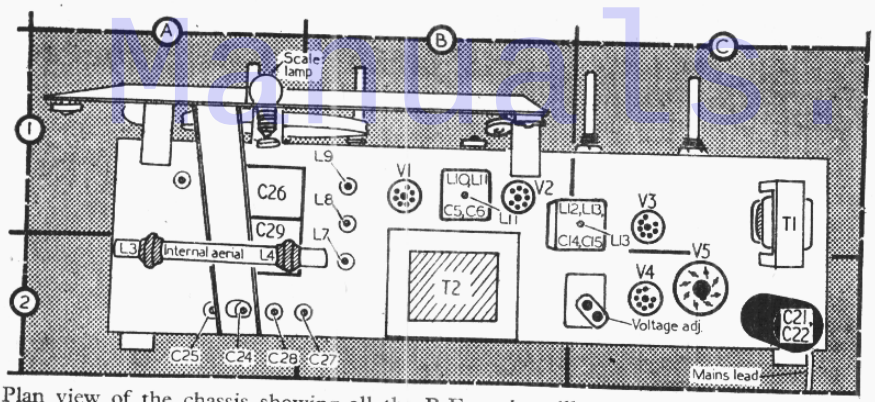
* Electrolytic. † Variable. ‡ Pre-set.

OTHER COMPONENTS		Approx. Values (Ohms)	Locations
L1	S.W. aerial coup....	—	G3
L2	S.W. aerial tuning	—	G3
L3	Internal aerial coils ...	0·6	A2
L4	Internal aerial coils ...	12·7	A2
L5	Osc. reaction coupling ...	—	F4
L6	Osc. reaction coupling ...	0·4	F3
L7	Oscillator tuning coils	—	F3
L8	Oscillator tuning coils	4·5	F3
L9*	Oscillator tuning coils	7·5	F3
L10	1st I.F. trans. Pri.	21·0	B1
L11	1st I.F. trans. Sec.	21·0	B1
L12	2nd I.F. trans. Pri.	21·0	C1
L13	2nd I.F. trans. Sec.	21·0	C1
L14	Speech coil ...	2·5	—
T1	O.P. trans. a	9·6	
	O.P. trans. b	650·0	C1
	O.P. trans. c	0·5	
T2	Mains trans. a	0·5	
	Mains trans. b	200·0	B2
	Mains trans. c	200·0	
	Mains trans. d	45·0	
S1-S9	Waveband/gram sw.	—	G3
S10	Speaker switch ...	—	D4
S11, S12	Mains sw., g'd R13	—	D3

* Tapped at 0·7Ω from chassis.



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 **a** 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*

quency 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 6AQ5).** 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.

Switch Table

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	—	—	—

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 (710.8m) 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 backing 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.

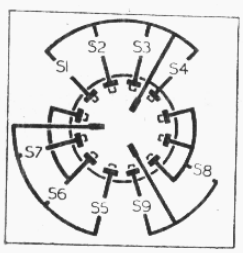


Diagram of the waveband switch unit as seen from the rear of an inverted chassis.

GENERAL NOTES

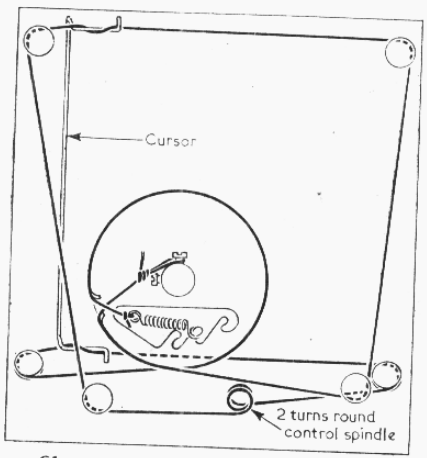
Switches.—**S1-S9** are the waveband and radio/gram change-over switches, ganged in a single rotary unit beneath the chassis. This unit is indicated in the under-chassis illustration and shown in detail (above), where it is drawn as seen from the rear of an inverted chassis. The associated switch table shows the switch operations in the four control settings, starting with the control fully anti-clockwise. A dash indicates open, and **C**, closed.

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 6½ft 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.

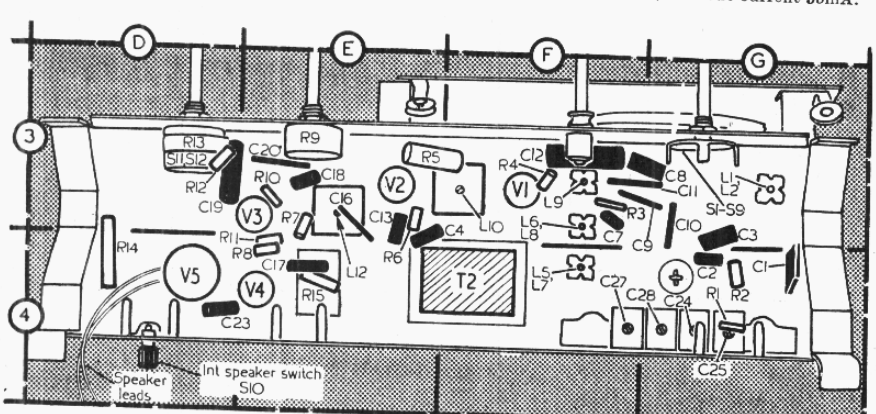
VALVE ANALYSIS

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 V	Anode mA	Screen V	Screen mA	Cath. V
V1 6BE6 ...	217	1·6	85	5·5	—
V2 6BA6 ...	217	5·4	85	2·2	0·4
V3 6AT6 ...	71	0·25	—	—	—
V4 6AQ5 ...	217	3·2	217	37	10·0
V5 6X5GT ...	200*	—	—	—	230·0†

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



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

Printed in England by Cornwall Press Ltd., Paris Garden, London, S.E.1.