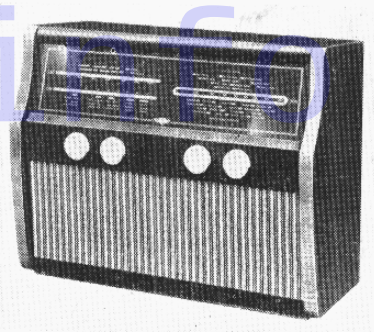
"TRADER" SERVICE SHEET

1159

K.-B. KR20

and KR20/1 Table Superhets



Appearance of the K.-B. KR20/1.

THE Kolster-Brandes KR20/1 is a 4-valve (plus metal rectifier) 3-band table superhet, designed to operate from A.C. mains of 200-250 V, 50 c/s. The wave band ranges are 18.4-51 m, 187-570 m and 880-2,100 m.

Model KR20 is an earlier version of the KR20/1, the differences between the two models being covered in "General Notes" overleaf. This *Service Sheet* was prepared from a model KR20/1.

Release dates: KR20, January, 1954; KR20/1, April, 1954. Original price, both models, £17 9s 9d. Purchase tax extra.

CIRCUIT DESCRIPTION

Aerial input via **L2** (S.W.) and common impedance coupler **C4** (M.W. and L.W.) to single-tuned circuits **L3, C29** (S.W.), **L4, C29** (M.W.) and **L5, C29** (L.W.), which precede heptode valve **(V1, Brimar 6BE6)** operating as frequency changer with electron coupling. Modulation hum filtering in aerial circuit by **L1**. The aerial and earth sockets are isolated by **C1** and **C2** from chassis, which is "live" to the mains.

Oscillator grid coils **L8, L9** and **L10** are tuned by **C32**. Parallel trimming by **C30** (S.W.), **C31** (M.W.) and **C9** (L.W.); series tracking by **C10** (M.W.) and **C11** (L.W.). Reaction coupling from cathode by **L6** (S.W.), **L7** (M.W.) and via a tap on **L10** (L.W.).

Second valve **(V2, Brimar 6BA6)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **C6, L11, L12, C7** and **C16, L13, L14, C17.**

Intermediate frequency 422 kc/s.

Diode signal detector is part of double diode triode valve **(V3, Brimar 6AT6).** Audio frequency component in rectified output is developed across volume control **R11**, which acts as diode load, and is passed via **C20** to grid of triode section.

A proportion of the D.C. potential developed across **R11** is tapped off via potential divider **R9, R10** and fed back as bias to **V1** and **V2**, giving automatic gain control. Second diode of **V3** is connected to the A.G.C. line and prevents it from going positive.

Provision is made for the connection of a gramophone pick-up across **R11**, via isolating transformer **T1** and switch **S9** which closes in the gram position of the waveband control. **S4** and **S6** close and **S8** opens in this position to prevent radio break-through.

Resistance-capacitance coupling by **R13, C21** and **R14** between **V3** and pentode output valve **(V4, Brimar 6AQ5).** Variable tone control by **R16, C22** in **V4** control grid circuit. Fixed tone correction by **C24**, and by negative feed-back introduced by the omission of the normal cathode by-pass capacitor. Provision is made for the connection of a low-impedance external speaker.

H.T. current is supplied by half-wave metal rectifier **(MR1, Westinghouse 15B35).** Smoothing by **R17** and electrolytic capacitors **C23, C25.** Residual hum is neutralized by passing the H.T. current through section **a** of **T2** primary.

GENERAL NOTES

Switches.—**S1-S9** are the waveband switches, ganged in a single rotary unit beneath the chassis. The unit is indicated in our underside view of the chassis, and shown in detail in the diagram beside it, where it is drawn as

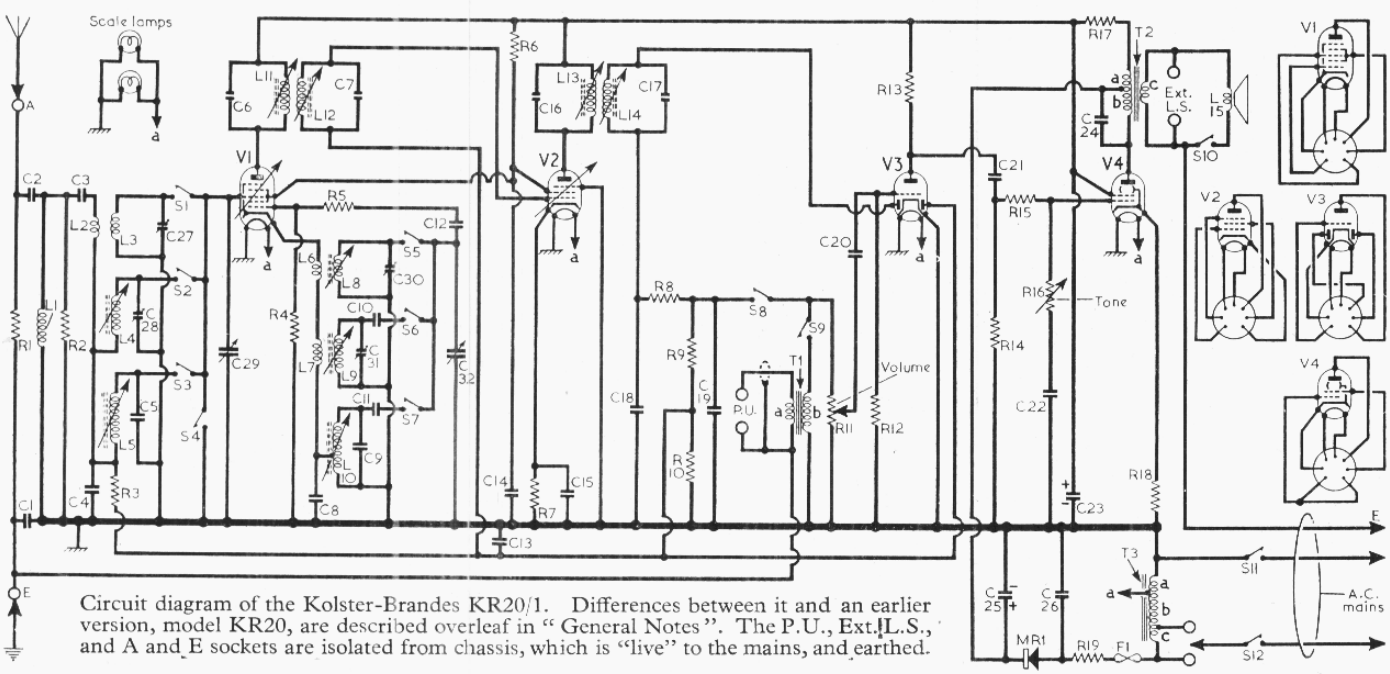
(*Continued col. 1 overleaf*)

COMPONENTS AND VALUES

	RESISTORS	Values	Locations
R1	Anti-static shunt...	1MΩ	H4
R2	Part mod. hum coil	100kΩ	H4
R3	A.G.C. decoupling	100kΩ	H3
R4	V1 osc. C.G. ...	22kΩ	G3
R5	Osc. stabilizer ...	47Ω	G3
R6	S.G. H.T. feed ...	18kΩ	F3
R7	V2 G.B.	47Ω	F3
R8	I.F. stopper ...	100kΩ	F4
R9	A.G.C. pot. divider	1MΩ	F4
R10		2·2MΩ	G4
R11	Volume control ...	500kΩ	F3
R12	V3 C.G.	10MΩ	F3
R13	V3 Anode load ...	470kΩ	F4
R14	V4 C.G.	220kΩ	F3
R15	V4 C.G. stopper ...	220kΩ	F3
R16	Tone control ...	250kΩ	E3
R17	H.T. smoothing ...	820Ω	E4
R18	V4 G.B.	270Ω	F4
R19	MR1 surge limiter	150Ω	G4

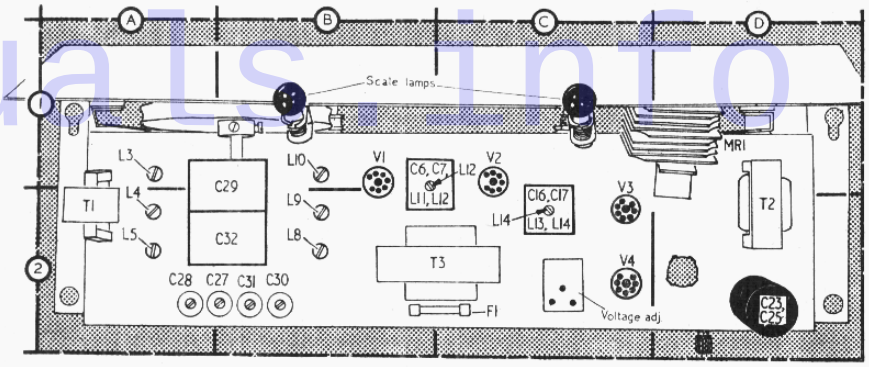
	CAPACITORS	Values	Locations
C1	Aerial and earth isolators ...	0·01μF	H4
C2		0·001μF	H4
C3	Aerial couplers ...	0·005μF	H4
C4		0·002μF	H4
C5	L.W. aerial trim....	48pF	H3
C6	1st I.F. trans. tuning ...	88pF	B1
C7		88pF	B1
C8	L.W. osc. shunt ...	0·001μF	G4
C9	L.W. osc. trim. ...	100pF	G3
C10	M.W. osc. tracker...	410pF	G4
C11	L.W. osc. tracker...	180pF	G3
C12	V1 osc. C.G. ...	100pF	G3
C13	A.G.C. decoupling	0.02μF	G4
C14	S.G. decoupling ...	0·1μF	G3
C15	V2 cath. by-pass...	0·04μF	F3
C16	2nd I.F. trans. tuning ...	88pF	C2
C17		88pF	C2
C18	I.F. by-passes ...	330pF	F3
C19		100pF	F4
C20	A.F. couplings ...	0·01μF	F3
C21		0·02μF	F4
C22	Part tone control...	1,500pF	F3
C23*	H.T. smoothing ...	32μF	D2
C24	Tone corrector ...	0·01μF	E4
C25*	H.T. smoothing ...	32μF	D2
C26	Mains R.F. by-pass	0·05μF	F4
C27‡	S.W. aerial trim....	40pF	H4
C28‡	M.W. aerial trim....	40pF	H4
C29†	Aerial tuning ...	—	B1
C30‡	S.W. osc. trim. ...	40pF	G4
C31‡	M.W. osc. trim. ...	40pF	G4
C32†	Oscillator tuning...	—	B2

* Electrolytic. † Variable. ‡ Pre-set.

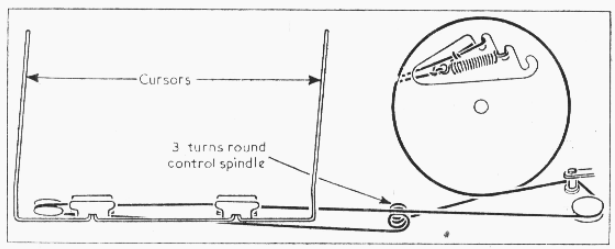


Circuit diagram of the Kolster-Brandes KR20/1. Differences between it and an earlier version, model KR20, are described overleaf in "General Notes". The P.U., Ext.L.S., and A and E sockets are isolated from chassis, which is "live" to the mains, and earthed.

OTHER COMPONENTS			Approx. Values (ohms)	Locations
L1	Mod. Hum filter ...		17·0	H4
L2	S.W. aerial coup. ...		—	H3
L3	Aerial tuning coils		—	H3
L4			3·4	H4
L5			18·0	H4
L6	Osc. reaction coils		—	G4
L7			—	G4
L8	Oscillator tuning coils		—	G4
L9			4·4	G4
L10			8·0	G3
L11	1st I.F. trans.	Pri.	20·0	B1
L12		Sec.	20·0	B1
L13	2nd I.F. trans.	Pri.	20·0	C2
L14		Sec.	20·0	C2
L15	Speech coil ...		2·5	—
T1	P.U. trans.	a ...	3,000·0	A2
		b ...	4,000·0	
T2	O.P. trans.	a ...	1·5	D2
		b ...	510·6	
		c ...	—	
T3	Mains auto-trans.	a ...	—	C2
		b ...	133·0	
		c ...	20·0	
S1-S9	Waveband switches		—	H3
S10	Speaker switch ...		—	E4
S11, S12	Mains switches ...		—	E3
F1	250mA fuse ...		—	C2
MR1	Westinghouse 15B35		—	D1



Above : Plan view of the chassis.



Right : Sketch of the drive cord system, viewed from front of chassis with gang at minimum. About 4ft. of cord is required.

General Notes—*continued*

seen from the rear of an inverted chassis. The table below gives the switch positions for the four control settings, starting from the fully anti-clockwise position of the control knob. A dash indicates open, and **C**, closed.

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	—	—	—

S10 is the screw-type speaker switch, mounted between the external speaker sockets on the rear of the chassis.

Scale lamps.—These are two M.E.S.-type lamps with large, clear spherical bulbs. They are rated at 6.5 V, 0.3 A.

Fuse F1.—This is a standard 1¼in glass cartridge fuse mounted on the chassis deck behind the mains transformer. It is rated at 250 mA.

Modification.—A Brimar **6X4** rectifying valve is used in place of **MR1** in some versions of the KR20/1.

Model KR20.—This is the earlier version of the KR20/1 and differs from it in the following respects. A 1 kΩ resistor took the place of **L1, R2. R9, R10** were omitted, and the A.G.C. bias was tapped off from the junction of **C18, R8** via a 2.2 MΩ resister. A Brimar **6X4** rectifying valve was used in place of the metal rectifier **MR1.**

VALVE ANALYSIS

Valve voltages and currents given in the table below are those derived from the manufacturers' information, and were measured on a receiver when it was operating from A.C. mains of 240 V. The receiver was switched to M.W. and the gang turned to maximum capacitance. There was no signal input.

Voltages were measured with a Model 7 Avometer, chassis being the negative connection in every case. The A.C. reading at the anode of **MR1** was 221 V, and the D.C. reading across **C25** was 239 V. The total H.T. current was 58 mA.

Valve	Anode		Screen		Cath.
	V	mA	V	mA	V
V1 6BE6 ...	222	2·7	81	6·8	—
V2 6BA6 ...	222	6·6	81	3·0	0·4
V3 6AT6 ...	52	0·5	—	—	—
V4 6AQ5 ...	232	33·0	222	5·2	10·0

CIRCUIT ALIGNMENT

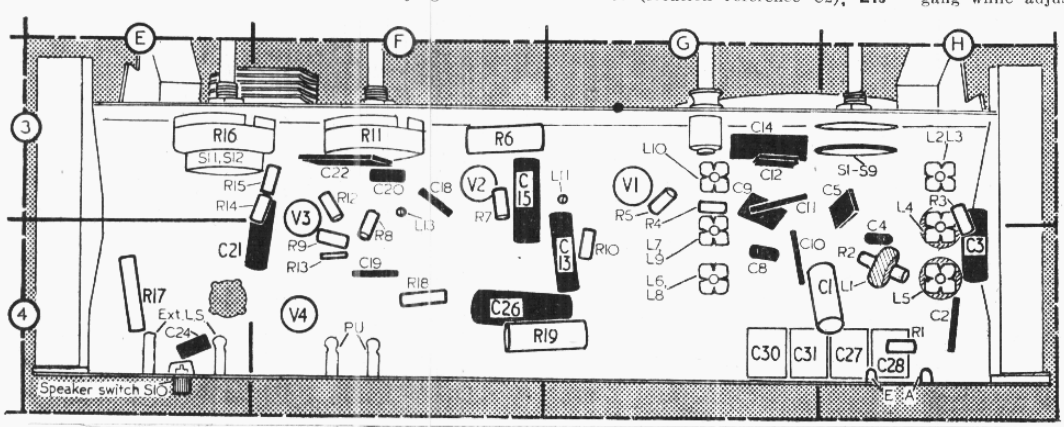
I.F. Stages.—Remove chassis from cabinet and place it in a convenient position on the bench. Connect signal generator output, via an 0.1 μF capacitor in each lead, to control grid (pin 7) of **V1** and chassis. Switch receiver to M.W. and turn gang to minimum capacitance. Feed in a 422 kc/s (710.8 m) signal and adjust the cores of **L14** (location reference C2), **L13** (F3), **L12** (B1) and **L11** (G3) for maximum output, reducing the input as the circuits come into line to avoid A.G.C. action. Repeat these adjustments.

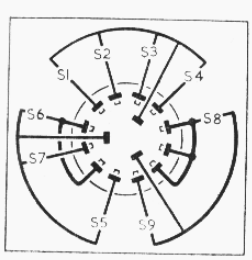
R.F. and Oscillator Stages.—As the tuning scale remains fixed in the cabinet when the chassis is withdrawn, reference should be made during the following alignment operations to the calibration marks on the scale backing plate. Check that with the gang at maximum capacitance the cursors coincide with the "D" calibration marks on the backing plate. Transfer signal generator leads, via a standard dummy aerial, to **A** and **E** sockets.

M.W.—Switch receiver to M.W. and tune right-hand cursor to M.W. calibration mark at right-hand end of backing plate. Feed in a 600 kc/s (500 m) signal and adjust the cores of **L9** (B2) and **L4** (A2) for maximum output. Tune right-hand cursor to M.W. calibration mark near centre of backing plate, feed in a 1,400 kc/s (214 m) signal and adjust **C31** (B2) and **C28** (A2) for maximum output. During the final adjustment of **C28** rock the gang for optimum results.

L.W.—Switch receiver to L.W., tune left-hand cursor to L.W. calibration mark, feed in a 225 kc/s (1,333 m) signal and adjust the cores of **L10** (B1) and **L5** (A2) for maximum output. Repeat these adjustments and then check the M.W. alignment, readjusting **L4, L9, C28** and **C31** if necessary, as previously described.

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





Above : Diagram of the waveband switch unit, drawn as seen on left in location reference H3.

Left : Under-side view of the chassis.

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