

'TRADER' SERVICE SHEET

226

K-B 630

3-BAND A.C. SUPERHET

TWO I.F. stages are employed in the Kolster-Brandes 630 5-valve (plus rectifier) A.C. 3-band superhet, the short-wave range of which is 16.5-52 metres. The receiver is suitable for mains of 200-250 V, 40-60 C/S, and has provision for both a gramophone pick-up and an extension speaker, while the internal speaker can be cut out of circuit, if desired. The "Alphadex" tuning scale is fitted.

CIRCUIT DESCRIPTION

Aerial input via S.W. coupling coil **L1**, high impedance circuit **L2, L3** (M.W. and L.W.), **C1** (M.W. and L.W.) and **C2** (L.W.) to band-pass filter primary (M.W. and L.W.) **L5, L6**, tuned by **C26**; secondary coils **L7, L8** are tuned by **C29**. On S.W. a single tuned circuit is used comprising **L4, C29**.

First valve (**V1, Mullard metalised TH4A**) is a triode-hexode operating as frequency changer. Oscillator grid coils **L9** (S.W.), **L11** (M.W.) and **L13** (L.W.) are tuned by **C30**; parallel trimming by **C31** (S.W.), **C32** (M.W.) and **C7, C33** (L.W.); series tracking by **C34** (M.W.) and **C35** (L.W.). Anode reaction coils **L10** (S.W.), **L12** (M.W.) and **L14** (L.W.).

Two variable-mu R.F. pentode intermediate frequency amplifiers (**V2, V3, Brimar 9D2's**) operate with tuned-primary tuned-secondary transformer couplings **C36, L15, L16, C37**; **C38,**

L17, L18, C39 and **C40, L19, L20, C41**. Intermediate frequency **464 KC/S**.

Diode second detector is part of separate double diode valve (**V4, Brimar 10D1**). Audio frequency component in rectified output is developed across load resistance **R12** and passed via coupling condenser **C14**, manual volume control **R11** and I.F. stopper **R15** to C.G. of pentode output valve (**V5, Brimar 7D8**). Provision for connection of low impedance external speaker across secondary of output transformer **T1**. A plug and socket arrangement here also enable the internal speaker speech coil circuit to be broken if required. Variable tone control by R.C. filter **R17, C18** and fixed correction by **C19** in anode circuit.

Special arrangements are made for operating a gramophone pick-up; **V3** becomes an A.F. amplifier, the screen grid acting as the anode. One pick-up connection is taken to chassis and the other via **S25, C12** to the low potential end of **L18** and thus to C.G. of **V3**; the screen grid of **V3** is in turn connected via **C11, S24, R11** and **R15** to C.G. of **V5**. On radio **S22, S23, S26** and **S27** are closed; on switching over to gramophone these switches open and **S24** and **S25** close. On radio **R7, R8, C11** become **V2, V3** S.G. potentiometer and R.F. by-pass and **C12** the A.V.C. line decoupling condenser; on gramophone **R7, C11, R11** become R.C. coupling between **V3** and

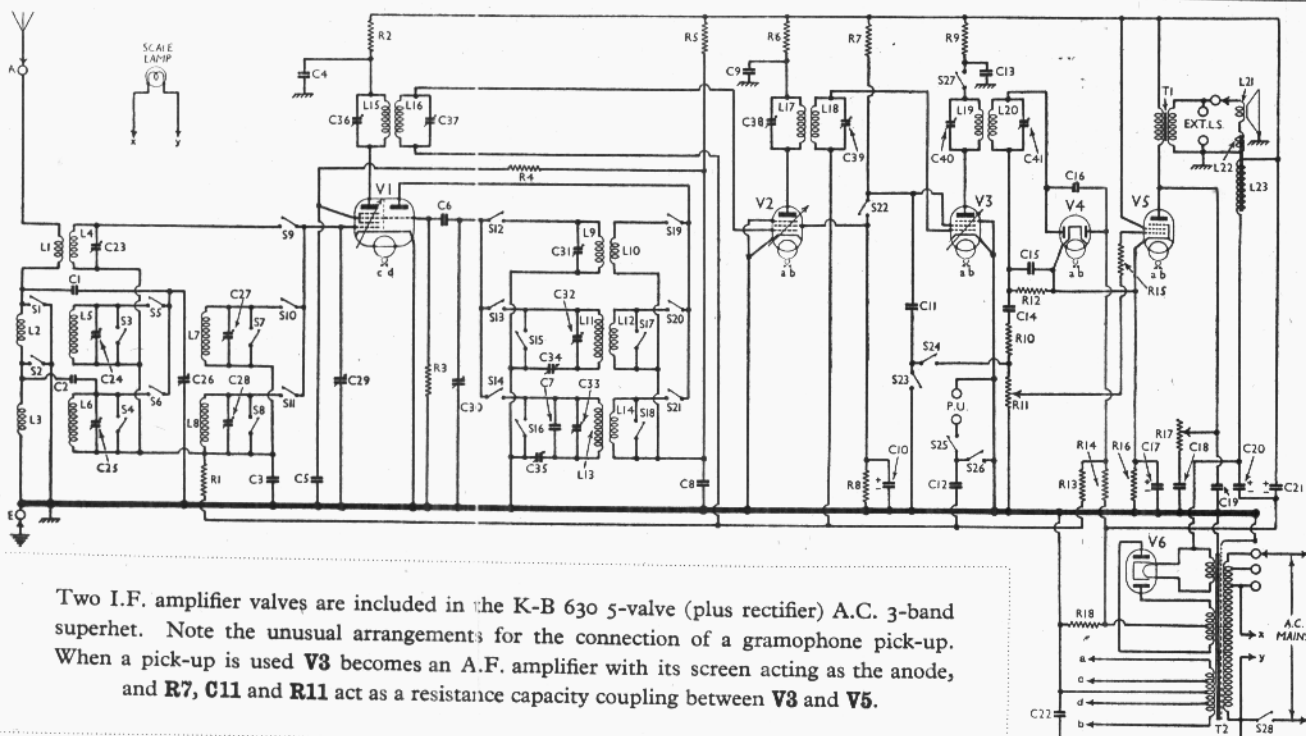
V5 and **C12** becomes A.F. coupling to **V3** C.G.

Second diode of **V4** fed via small coupling condenser **C16** provides D.C. potential which is developed across load resistance **R14** and fed back through decoupling circuits as G.B. to F.C. and both I.F. valves giving automatic volume control. Delay voltage is obtained from drop across **R18** in H.T. negative lead.

H.T. current is supplied by I.H.C. full wave rectifying valve (**V6, Brimar R2**). Smoothing by speaker field coil **L23** and dry electrolytic condensers **C20, C21**.

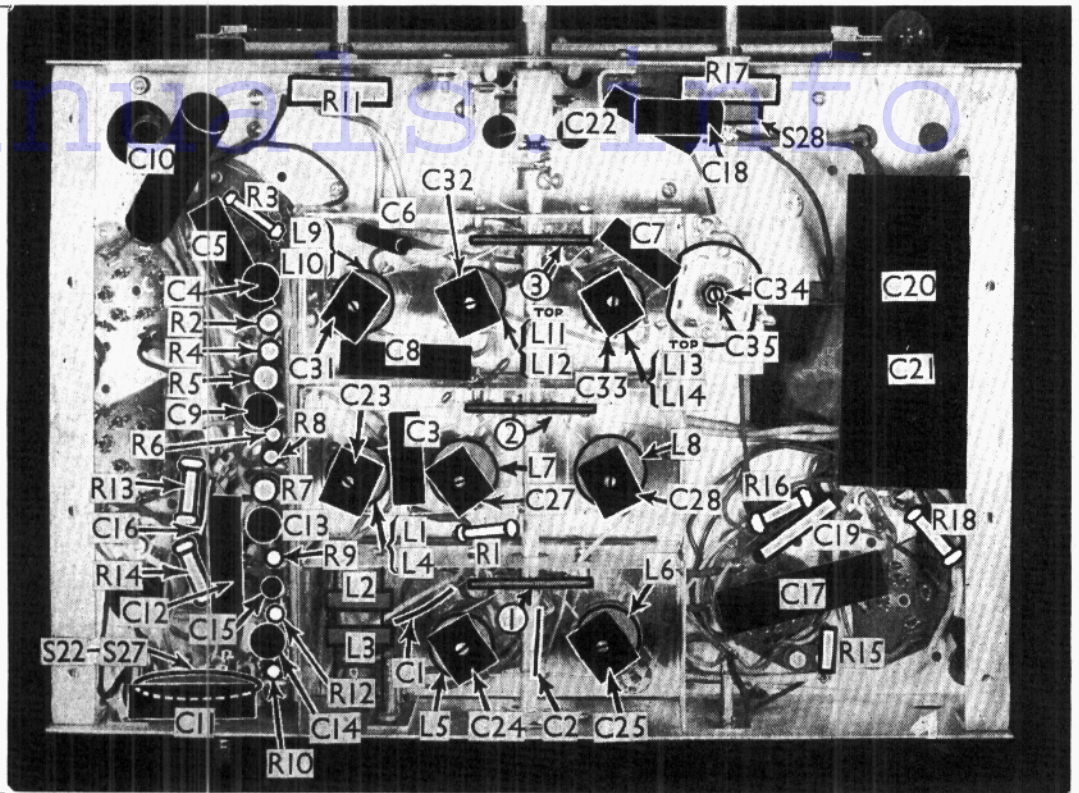
COMPONENTS AND VALUES

RESISTANCES		Values (ohms)
R1	V1 hexode C.G. decoupling ..	100,000
R2	V1 hexode anode decoupling ..	5,000
R3	V1 osc. C.G. resistance ..	50,000
R4	V1 S.G. decoupling ..	15,000
R5	V1 osc. anode and S.G. feed ..	10,000
R6	V2 anode decoupling ..	5,000
R7	Part V2, V3 S.G. pot. on radio: V3 anode load on gram. ..	20,000
R8	Part V2, V3 S.G. pot. ..	10,000
R9	V3 anode decoupling ..	5,000
R10	I.F. stopper ..	100,000
R11	Manual volume control ..	500,000
R12	V4 signal diode load ..	500,000
R13	A.V.C. line decoupling ..	500,000
R14	V4 A.V.C. diode load ..	500,000
R15	I.F. stopper ..	7,000
R16	V5 G.B. resistance ..	150
R17	Variable tone control ..	50,000
R18	A.V.C. delay resistance ..	40



Two I.F. amplifier valves are included in the K-B 630 5-valve (plus rectifier) A.C. 3-band superhet. Note the unusual arrangements for the connection of a gramophone pick-up. When a pick-up is used **V3** becomes an A.F. amplifier with its screen acting as the anode, and **R7, C11** and **R11** act as a resistance capacity coupling between **V3** and **V5**.

Separate diagrams of the three wave-change switch units seen in this under-chassis view are given on page VIII where they are drawn as seen looking in the direction of the arrows pointing from the numbers in circles, which indicate the respective units. Note that there is a separate unit (S22-S27) for gramophone switching. A diagram of this on page VIII.



CONDENSERS		Values (μF)
C1	Small aerial coupling (M.W., L.W.)	0.000018
C2	Small aerial coupling (L.W.)	0.000017
C3	V1 hexode C.G. decoupling	0.02
C4	V1 hexode anode decoupling	0.1
C5	V1 S.G. decoupling	0.1
C6	V1 osc. C.G. condenser	0.00005
C7	Oscillator L.W. trimmer	0.00007
C8	V2 anode decoupling	0.1
C9	V2, V3 S.G. decoupling	2.0
C10*	V3 S.G. decoupling on radio;	
C11	A.F. coupling on gram.	0.1
C12	A.V.C. line decoupling on radio;	
C13	pick-up coupling on gram.	0.1
C14	V3 anode decoupling	0.1
C15	A.F. coupling to V5	0.02
C16	I.F. by-pass	0.0005
C17*	V4 A.V.C. diode coupling	0.000015
C18	V5 cathode by-pass	25.0
C19	Part of T.C. circuit	0.01
C20*	Fixed tone corrector	0.0005
C21*	H.T. smoothing	8.0
C22		16.0
C23†	Mains R.F. filter	0.01
C24‡	Aerial circuit S.W. trimmer	—
C25‡	Band-pass primary M.W. trimmer	—
C26‡	Band-pass primary L.W. trimmer	—
C27‡	Band-pass primary tuning	0.0005
C28‡	Band-pass secondary M.W. trimmer	—
C29†	Band-pass secondary L.W. trimmer	—
C30†	Band-pass secondary tuning	0.0005
C31†	Oscillator circuit tuning	0.0005
C32†	Oscillator circuit S.W. trimmer	—
C33†	Oscillator circuit M.W. trimmer	—
C34†	Oscillator circuit L.W. trimmer	—
C35†	Oscillator circuit M.W. tracker	—
C36†	Oscillator circuit L.W. tracker	—
C37†	1st I.F. trans. pri. tuning	—
C38†	1st I.F. trans. sec. tuning	—
C39†	2nd I.F. trans. pri. tuning	—
C40†	2nd I.F. trans. sec. tuning	—
C41†	3rd I.F. trans. pri. tuning	—
C42†	3rd I.F. trans. sec. tuning	—

* Electrolytic. † Variable. ‡ Pre-set.

OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial circuit S.W. coupling	0.1
L2	High impedance aerial circuit coils	13.0
L3		35.0
L4	Aerial circuit S.W. tuning coil	Very low
L5	Band-pass primary coils	2.8
L6		25.0
L7	Band-pass secondary coils	3.2
L8		24.0
L9	Oscillator circuit S.W. tuning coil	Very low
L10	Oscillator circuit S.W. reaction	0.1
L11	Oscillator circuit M.W. tuning coil	3.25
L12	Oscillator circuit M.W. reaction	1.75
L13	Oscillator circuit L.W. tuning coil	6.8
L14	Oscillator circuit L.W. reaction	1.9
L15	1st I.F. trans. Pri.	17.5
L16	1st I.F. trans. Sec.	17.5
L17	2nd I.F. trans. Pri.	17.5
L18	2nd I.F. trans. Sec.	17.5
L19	3rd I.F. trans. Pri.	17.5
L20	3rd I.F. trans. Sec.	17.5
L21	Speaker speech coil	1.9
L22	Hum neutralising coil	0.1
L23	Speaker field coil	1,250.0
T1	Output transformers	450.0
	Pri. total	0.4
	Sec. total	29.0
T2	Mains trans.	0.5
	Heat. sec. total	0.25
	Rect. heat. sec.	200.0
	H.T. sec. total	—
Sr-S21	Waveband switches	—
S22-27	Radio-gram. switches	—
S28	Mains switch, ganged R11	—

DISMANTLING THE SET

A detachable bottom is fitted to the cabinet and upon removal (four countersunk-head wood screws) gives access to most of the under-chassis components. **Removing Chassis.**—If it is necessary to remove the chassis from the cabinet, remove the tuning knob (recessed grub screw) and the other three knobs (pull off), taking care not to lose the springs. Now remove the four bolts (with lock washers, metal washers, rubber washers

and distance pieces) holding the chassis to the bottom of the cabinet, when the chassis can be withdrawn to the extent of the speaker leads, which should be just sufficient for normal purposes.

When replacing, do not forget to replace the felt washer between the tuning and switch knobs.

To free the chassis entirely, unsolder the leads from the speaker and *when replacing,* connect them as follows, numbering the tags from bottom to top:—1, red; 2, brown; 3, green; 4, no external connection; 5, black.

Removing Speaker.—To remove the speaker from the cabinet, remove the nuts and lock washers from the four bolts holding it to the sub-baffle. *When replacing,* see that the terminal panel is on the left.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 TH4A*	250	1.0	75	2.9
V2 9D2	235	4.0	80	0.8
V3 9D2	235	3.9	80	1.0
V4 10D1	—	—	—	—
V5 7D8	245	32.0	260	7.9
V6 R2	305†	—	—	—

* Oscillator anode 120 V, 10.9 mA.
† Each anode, A.C.

our receiver when it was operating on mains of 235 V, using the 225 V tapping on the mains transformer. The receiver was tuned to the lowest wavelength on the medium band and the volume control was at maximum, but there was no signal input. Voltages were measured on the 1,200 V

Continued overleaf

K-B 630—Continued

scale of an Avometer, chassis being negative.

GENERAL NOTES

Switches.—S1-S21 are the waveband switches, ganged in three rotary units beneath the chassis. They are indicated in our under-chassis view and shown in detail in col. 3 where they are seen looking from the rear of the underside of the chassis.

The table (col. 2) gives the switch positions for the three control settings, starting from fully clockwise. O indicates open and C closed.

S22-S27 are the pick-up switches, in a single rotary unit beneath the chassis. This is indicated in our under-chassis view by the switch numbers and shown in detail in col. 3. The table for this unit (col. 2) gives the switch positions for the two control settings starting from anti-clockwise (radio). O indicates open and C closed.

S28 is the Q.M.B. mains switch, ganged with the volume control, R11.

Coils.—The R.F. and oscillator coils are mounted on nine tubular formers in three screened compartments beneath the chassis. Each former except that on which L2 and L3 are mounted carries a trimmer at its end. The I.F. transformers L15, L16; L17, L18, and L19, L20 are in three screened units on the chassis deck, with their associated trimmers.

Scale Lamp.—This is a special Osram tubular type with a double contact S.B. cap. It is rated at 230 V 15 W and is so connected across the primary of T2 that it always receives the same conservative voltage when the voltage adjustment of the receiver is correct for the mains in use. Upon insertion of a replacement it should be rotated until the scale is evenly illuminated.

External Speaker.—Two sockets are

TABLES AND DIAGRAMS OF SWITCH UNITS

Switch	S.W.	M.W.	L.W.
S1	C	O	O
S2	C	C	O
S3	C	C	O
S4	C	C	O
S5	C	C	O
S6	O	O	C
S7	O	O	C
S8	C	C	O
S9	C	C	O
S10	O	O	C
S11	O	O	C
S12	C	C	O
S13	C	C	O
S14	C	C	O
S15	C	C	O
S16	C	C	O
S17	C	C	O
S18	C	C	O
S19	O	O	C
S20	O	O	C
S21	O	O	C

Switch	Radio	Gram.
S22	C	O
S23	C	O
S24	O	C
S25	O	C
S26	C	O
S27	C	O

provided at the rear of the chassis for a low impedance (about 2 O) external speaker. A plug and socket device permits the internal speaker speech coil circuit to be broken, muting this speaker.

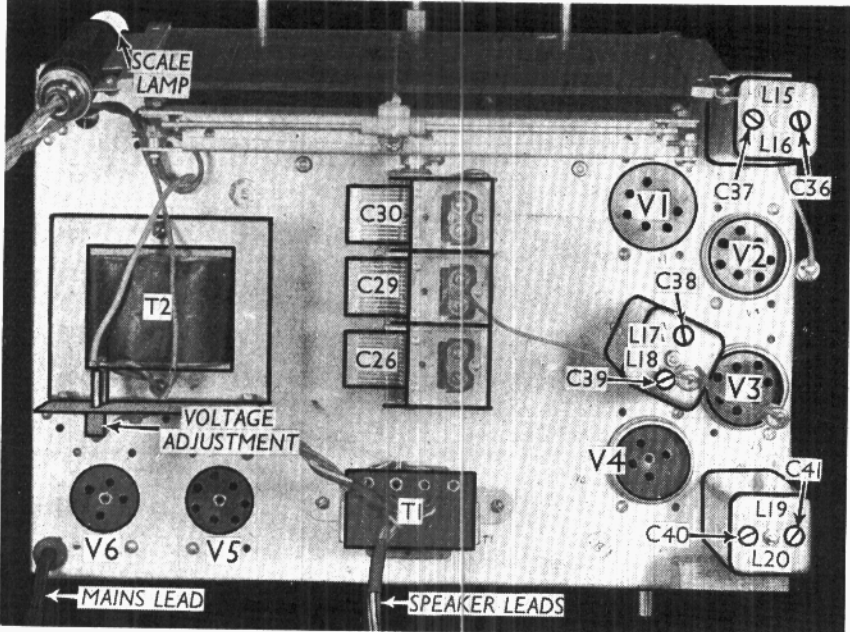
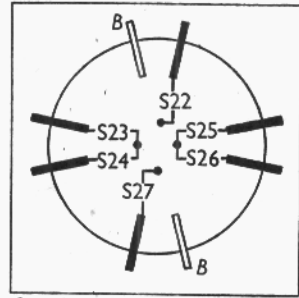
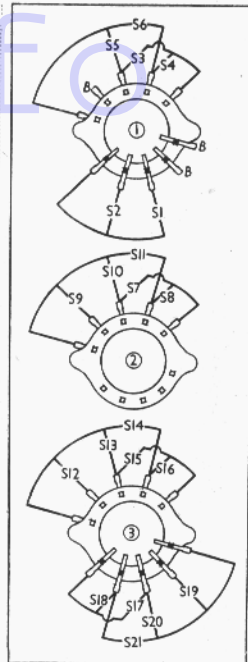
Condensers C20, C21.—These are two dry electrolytic condensers in a single carton mounted beneath the chassis. C20 (yellow lead) is 8 μ F; C21 (red lead) is 16 μ F. The black lead is a common negative.

Valve Heater Voltages.—The valve heaters have not all similar voltage ratings and for this reason the heater secondary of T2 has five connections; two outside connections provide 13 V for V2, V3, V4 and V5; two tappings near the centre provide 4 V for V1; the centre-tap is connected to chassis.

Condensers C1, C2, C16.—These are small condensers consisting of a spiral

of insulated wire wound over a thicker insulated wire.

On the right are diagrams of the waveband switches viewed in the direction of the arrows in the under-chassis illustration on the previous page. Below is a diagram of the separate gramophone switch unit, which is mounted at the rear of the chassis.



As shown in this plan view of the chassis, the speaker transformer is mounted on the chassis, not on the speaker.

of insulated wire wound over a thicker insulated wire.

Trackers C34, C35.—These form a dual unit, beneath the chassis beside the screened oscillator coil compartment. The nut adjusts C34 and the screw C35.

CIRCUIT ALIGNMENT

I.F. Stages.—Connect signal generator to control grid (top cap) of V1 and chassis. Feed in a 464 KC/S signal, and adjust C36, C37, C38, C39, C40 and C41 in order for maximum output, reducing the input as the circuits come into line.

R.F. and Oscillator Stages.—Connect signal generator to A and E sockets. Switch set to M.W., feed in a 214 m. (1,400 KC/S) signal, tune to 214 m. on scale, and adjust C32, then C27 and C24 for maximum output. Feed in a 500 m. (600 KC/S) signal, tune it in, and adjust C34 (nut) for maximum output, rocking the gang slightly for optimum results.

Switch set to L.W., feed in a 1,200 m. (250 KC/S) signal, tune to 1,200 m. on scale, and adjust C33, then C28 and C25, for maximum output. Feed in a 1,714 m. (175 KC/S) signal, tune it in, and adjust C35 (screw) for maximum output, rocking the gang slightly for optimum results.

Switch set to S.W., feed in a 20 m. (15 MC/S) signal, tune to 20 m. on scale, and adjust C31, then C32, for maximum output. Re-check these with a 50 m. (6 MC/S) input, tuning the set to 50 m.