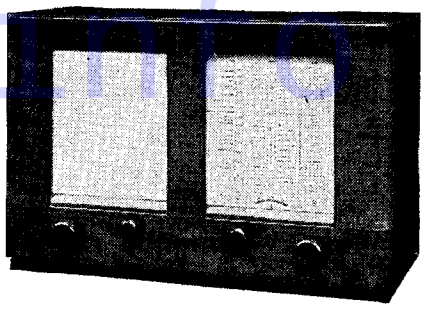
KOLSTER-BRANDES 730 A.C. THREE-BAND



A giant "Peerless" tuning scale is a distinctive feature of the model 730, four-valve, plus rectifier, three-band superhet by Kolster-Brandes.

CIRCUIT.—Aerial input is via a condenser to the three pre-selector circuits tuneable by the first gang. There is an aerial-earth leak resistance. The frequency changer is a triode-hexode arranged in the conventional manner.

The I.F. valve anode circuit contains the second I.F. transformer which works into the diode section of the double diode triode V3. This demodulates the signal and also supplies A.V.C. bias to the hexode portion of V1 and to V2.

The triode section is resistance coupled to an output pentode, V4, which feeds the speaker through an ordinary transformer. The speech coil can be switched out by a screw switch on the extension speaker socket plate.

Tone is controlled by a variable filter circuit consisting of a fixed condenser, C12, and a variable resistance across the input of the triode portion of V3. Volume is controlled on the grid in the ordinary manner. The radio output of the demodulator is taken via a plug to one of the sockets at the back of the cabinet. This plug has to be removed for pick-up working.

The H.T. supply is derived from V5, a full-wave rectifier with a conventional smoothing circuit using the speaker field.

Chassis Removal.—Remove the four control knobs from the front and release the chassis by withdrawing the chassis holding bolts from the base and the two wood screws which retain the top of the tuning scale to the front of the cabinet.

If it is necessary to remove the speaker, this can be released by undoing four clamping bolts on the baffle. The speaker, however, is provided with leads to an extension socket and switch on a bracket at the back of the cabinet. If complete removal is necessary, this must be unscrewed.

For minor adjustments there is a removable cover plate on the bottom of the chassis.

Special Notes.—The receiver may be fitted with an Osram X41 as a frequency changer or a Brimar 20A1.

When testing this receiver it should be remembered that the radio side is apparently dead unless the plug at the back of the chassis is connected to the appropriate socket.

C15, the cathode bias shunt for V4,

CONDENSERS

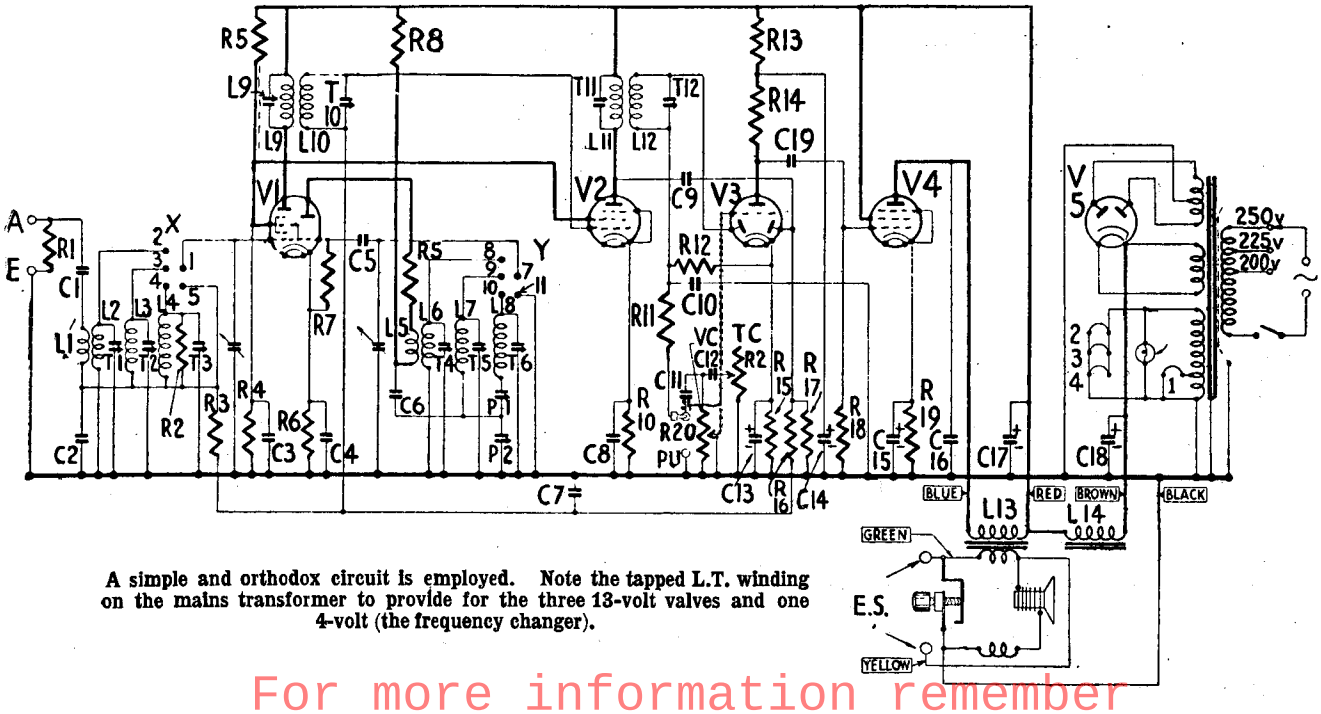
C.	Purpose.	Mfd.
1	Aerial coupling	.0005
2	A.V.C. decoupling	.005
3	V1 screen decoupling	.1
4	V1 cathode bias shunt	.1
5	Osc. grid condenser	.00005
6	Osc. feed	.005
7	V2 A.V.C. decoupling	.1
8	V2 cathode bias shunt	.1
9	A.V.C. coupling	.00005
10	H.F. filter	.005
11	L.F. coupling	.02
12	Tone control	.003
13	V3 cathode bias shunt	25
14	V3 anode decoupling	2
15	V4 cathode bias	25
16	V4 anode shunt	.001
17	H.T. smoothing	16
18	H.T. smoothing	8
19	V4 grid decoupling	.02

RESISTANCES

R.	Purpose.	Ohms.
1	Aerial shunt	10,000
2	L.W. aerial shunt	250,000
3	V1 A.V.C.	500,000
4	V1 screen potr. (part)	15,000
5	V1 screen potr. (part)	20,000
6	V1 cathode bias	200
7	V1 osc. grid leak	50,000
8	V1 osc. anode feed	50,000
9	Osc. anode suppressor	100
10	V2 cathode bias	500
11	H.F. filter	100,000
12	Demodulating diode load	500,000
13	V3 anode decoupling	100,000
14	V3 anode load	250,000
15	V3 cathode bias	5,000
16	A.V.C. decoupling	500,000
17	A.V.C. diode load	500,000
18	V4 grid leak	250,000
19	V4 cathode bias	400
20	Volume control	500,000
21	Tone control	500,000

VALVE READINGS

V.	Type.	Electrode.	Volts.	Ma.
1	X41 (Osram)	Osc.anode	90	2
		Screen	80	2.5
		Anode	260	3.5
2	9D2 (Brimar)	Anode	260	4
		Screen	80	1.1
3	11D3 (Brimar)	Anode	140	0.3
4	7D5 (Brimar)	Anode	245	55
5	R2	Heater	340	—
Pilot lamp	—	—	13–16	300



A simple and orthodox circuit is employed. Note the tapped L.T. winding on the mains transformer to provide for the three 13-volt valves and one 4-volt (the frequency changer).

is in the same case as C17 and C18, the main dry electrolytic smoothing condensers.

All the coils are exposed with the exception of L3 and L4, the medium and long wave input coils, which are in a circular can mounted under the chassis.

The padding condensers for medium and long waves are accessible from the side of the chassis. To check the padding it is only necessary to remove the back of the cabinet.

Switch Details.—The switches for the aerial and oscillator circuits are contained in a single wafer carrying a wipe and four contacts for each of the two circuits.

The signal grid wipe is numbered 1 and the oscillator grid is numbered 7 on the second half of the wafer. Contact 1—that is, the signal grid wipe—is the left-hand contact under the trimmer bank. Contact 7. the oscillator grid wipe, is diametrically opposite and can be identified by the wire that goes through the clearance hole to the condenser gang.

The switch has shorting contacts and the contact positions are as follow :—

SHORT WAVES : 1 to 2; 3 to 4 and 5; 7 to 8; 9 to 10 and 11.

MEDIUM WAVES : 1 to 3; 4 to 5; 7 to 9; 10 to 11.

LONG WAVES : 1 to 4; 7 to 1.

QUICK TESTS

Voltages between the chassis and the three tags on the speaker are :—

Chassis brown, 340 volts, unsmoothed H.T.
Chassis red, 260 volts, smoothed H.T.
Chassis blue, 245 volts, output anode.

Alignment Notes

If the calibration of this receiver is found to be inaccurate or the sensitivity poor, it should be re-aligned strictly in accordance with the following instructions.

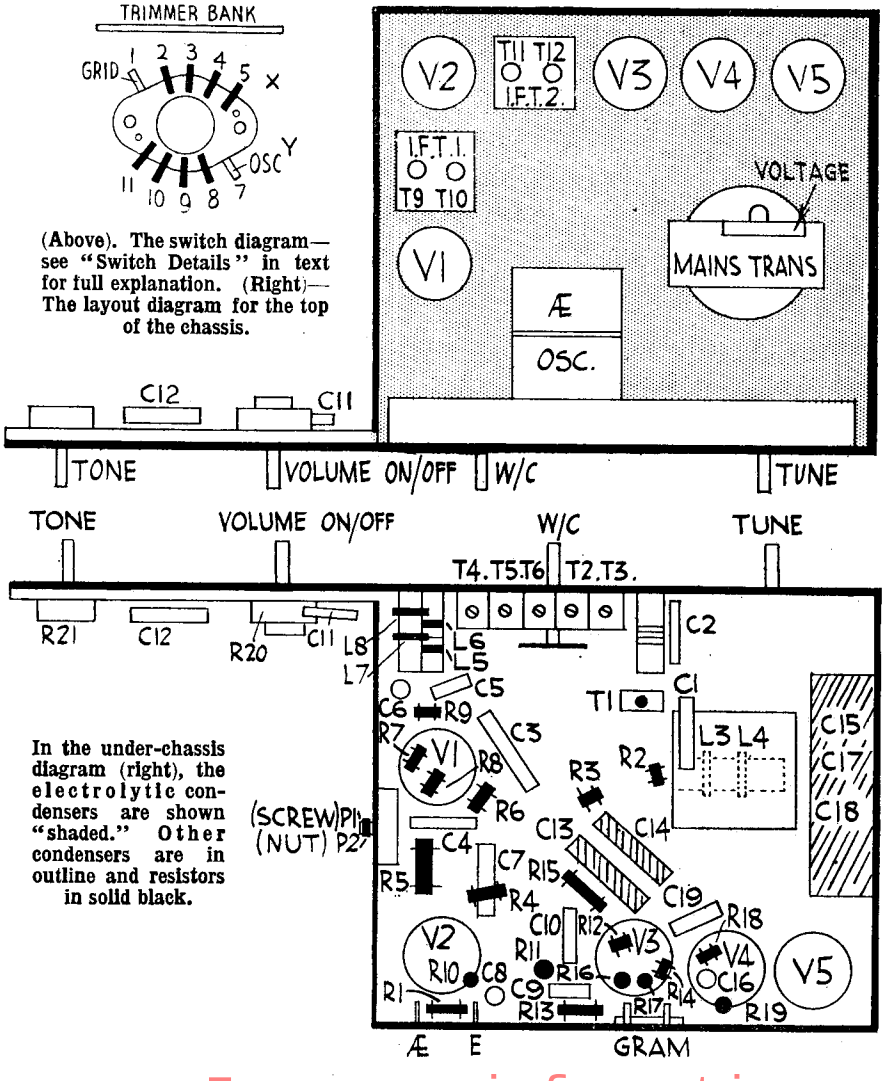
An output meter should be connected across the output transformer and care must be taken to ensure that the input from the signal generator is kept below the level at which the A.V.C. action commences.

I.F. Circuits.—Connect a signal generator, adjusted to 464 kcs., between the signal grid (top cap) of the 20A1 frequency changer valve and chassis. Adjust the I.F. trimmers (located in the tops of the I.F. coil cans), T9, T10, T11 and T12, to give maximum output.

Medium Waves.—First verify that the pointer coincides with the horizontal lines at the top end of the scale when the condenser vanes are fully in mesh.

Switch the receiver to the medium wave range and set the pointer to 1,400 kcs. (214 metres), where a small "dot" will be found on the medium wave scale. Adjust the signal generator to 1,400 kcs., and connect the output leads in series with a dummy aerial to the A and E sockets.

(*Continued on page 41.*)



(Above). The switch diagram—see "Switch Details" in text for full explanation. (Right)—The layout diagram for the top of the chassis.

In the under-chassis diagram (right), the electrolytic condensers are shown "shaded." Other condensers are in outline and resistors in solid black.

K.B. 730 on Test

MODEL 730.—For A.C. mains operation, 200-250 volts, 40-60 cycles. Price, 9½ gns.

DESCRIPTION. — Four-valve, plus rectifier, three-band table model.

FEATURES. — Large "Peerless" illuminated panel with horizontal pointer moving over the three wave-range indications. Controls for volume combined with master switch, tone, wave switching and tuning. The tuning control is of the two-speed type and the wave switch has a coloured pointer working on the scale. Sockets for aerial and earth, pick-up and extension speaker. Speaker switch.

LOADING.—78 watts.

Sensitivity and Selectivity

SHORT WAVES (16.5-52 metres).—Excellent gain and selectivity, with well maintained sensitivity over the entire band. Easy handling.

MEDIUM WAVES (197-565 metres).—Good gain and selectivity with clean background. Gain well maintained and small local station spread.

LONG WAVES (740-2,050 metres).—Similar performance to medium waves, with main stations easily received and very little side splash on Deutschlandsender.

Acoustic Output

Ample volume for an ordinary room, with good high note response and a not too vigorous tone control. General balance on orchestral reproduction is very pleasing.

WINDINGS (D.C. RESISTANCES)

L	Ohms.	Range.	Where measured.
1	.07	—	C1 and C2.
2	.08	S.W.	Chassis and grid VI.
3	3	M.W.	Grid V1 and C2.
4	13.7	L.W.	Grid V1 and C2.
5	.08	—	R8 and R9.
6	.05	S.W.	Chassis and osc. gang.
7	3.6	M.W.	Osc. gang and Pl. bottom.
8	18	L.W.	Osc. gang and Pl. top.
9	11	—	Anode VI and HT +.
10	8	—	Grid V2 and (C7 and R3).
11	9	—	Anode V2 and H.T.
12	5.5	—	Demodulating diode (R12 and R11).
O.T. prim.	420	—	Blue and red.
M.T. prim.	23	—	Mains plug.
Field ..	1,230	—	Red and brown leads.

Ekco Push-button PB 179

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these an insulation-headed member is screwed.

The visual tuning indicator is a Mullard type TV4. Across the holder is connected the anode feed resistance R12.

Sockets at the rear of the chassis marked L.A. and S.A. are for connecting a long aerial or a short aerial, the L.A. socket bringing a series aerial condenser into circuit.

The single dial illuminating light is of the M.E.S. type and rated at 6.2 volts .3 amp.

C30 is enclosed in the push-button assembly screening can; R7, C21 and C22 in the oscillator coils can; C25 and C26 in I.F.T.1. and R9, C32, C33, C34 and C35 in I.F.T.2. A 140 mmfd. condenser may sometimes be found connected between the anode of V1 and chassis.

WINDINGS (D.C. Resistances)

Manual-tuning button depressed.

L.	Ohms.	Range.	Where measured.
1	14.3	—	Across tags.
3	8.5	—	Across C16.
5	25.8	L.W.	Aerial gang and C23.
6	2.8	M.W.	Aerial gang and C23.
7	24.4	L.W.	Top grid V1 and C23.
8	3	M.W.	Top grid V1 and C23.
9	.1	S.W.	Top grid V1 and C23.
10	.4	—	C52 and C53.
11	4	—	Anode V1 and R4.
12	7.6	—	Top grid V2 and C39.
13	4.4	—	Anode V2 and H.T. line.
14	—	—	Inaccessible.
15	.1	S.W.	C29 and C31.
16	.6	S.W.	R6 and C24.
17	—	—	Inaccessible.
18	—	—	Inaccessible.
19	—	—	Inaccessible.
20	—	—	Inaccessible.
21	1.6	A button depressed.	Osc. anode V1 and C24.
22	8.5	—	Across C30.
23	6	—	Across wires.
24	4.9	—	Across wires.
25	4	—	Across wires.
26	3.3	—	Across wires.
27	2.3	—	Across wires.
28	2	—	Across wires.
29	980	—	Yellow and red leads condenser block.
O.T. primary	330	—	Anode V3 and H.T. line.
M.T. primary (200v.)	28	—	Mains plug pins.
Total H.T. sec.	480	—	Anode pins V4.

Circuit Alignment Notes

I.F. Circuits.—Connect an output meter across the L.S. sockets or primary of the output transformer. Switch receiver to M.W. band, turn gang and volume to maximum, and tone to high.

Connect a service oscillator between the top cap of V1 (*via* a .02 mfd. condenser) and chassis, leaving the ordinary connection still made.

The main intermediate frequency is 480 kc., but receivers within a radius of 40 miles from the Washford Cross, Droitwhich, Westerglen and Burghead stations should be aligned at 465 kc. to avoid whistles.

Tune service oscillator to appropriate frequency and with a non-metallic tool adjust I.F.T.2 secondary (upper core), I.F.T.2 primary (lower core), I.F.T.1 secondary (upper core) and then I.F.T.1 primary (lower core) for maximum response. Reduce the input from the service oscillator as the circuits come into line. Then re-seal cores with wax.

It should be borne in mind that the I.F. transformers are of the driftless type, and they should not need re-aligning under normal circumstances.

Signal Circuits.—To obtain access to the oscillator trimmers and iron cores, it is necessary to remove the scale by gently levering on the four press-studs (one at each corner), and breaking the scale away at the point where it is glued. This should be effected by slipping a knife down the back of the scale and carefully prising so as not to injure the scale.

A calibrated scale for re-aligning can be obtained from the manufacturers, and this should be cut to shape, glued to a piece of cardboard and the black circles on the scale punched out to allow the trimming tool to pass through. It is most important that the holes are accurately made to the sizes and positions given, and that the large centre hole be concentric to the drive spindle. Otherwise calibration will be incorrect when the normal scale is replaced.

Connect the service oscillator to the aerial and earth sockets via a dummy aerial. Progressively reduce the input as the circuits come into line so as to obtain reliable peaks free from A.V.C. action.

The wavelength pointer should be horizontal to the right, with the gang at maximum capacity.

I.F. Filter.—With service oscillator still tuned to the intermediate frequency, unscrew core of L1 and then screw in to obtain *minimum* response in output meter. Ignoring the small dip in the central position as in general practice the correct position will be found when the core is distinctly off centre.

Short Waves.—Tune set and oscillator to 17.6 metres (17 mcs.) and adjust T1 and then T2 for maximum response.

Check calibration at 50 metres (6 mcs.).

Medium Waves.—Tune set and oscillator to 200 metres (1,500 kcs.) and adjust T3 for maximum.

Tune set and oscillator to 250 metres (1,200 kcs.) and adjust T4 then T5 for maximum.

Tune set and oscillator to 500 metres (600 kcs.) and adjust P1 (core) for maximum, simultaneously rocking the gang.

Repeat above operations.

Long Waves.—Tune set and oscillator to 1,300 metres (230 kcs.) and adjust T6, T7 and then T8 for maximum.

Tune set and oscillator to 1,700 metres (176.5 kcs.) and adjust P2 (core) for maximum, simultaneously rocking the gang.

Repeat both operations.

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(*Continued from page* 33.)

Trim T5 and T2 to give maximum output.

Reset generator and receiver to 600 kcs. (500 metres), and adjust the medium wave padding condenser, T8 (nut).

This completes the medium wave adjustments, but it is advisable to check the 1,400 kcs. trimmer settings after any adjustments made at 600 kcs.

Long Waves.—Switch the receiver to the long-wave range and set the pointer to 300 kcs. (1,000 metres). Adjust the signal generator to the same frequency and trim T6 and T3 for maximum output.

Reset the signal generator and receiver to 175 kcs. (1,714 metres), where another "dot" will be seen on the L.W. scale, and pad with T7 (screw).

Repeat the long wave adjustments until the calibration is correct over the complete range.

Short Waves.—Switch the receiver to the S.W. range and set the pointer to 17 mcs. (17.6 metres), where a "dot" will be seen. Adjust the generator to inject this frequency and trim with T4 for maximum signal.

It will be found that the signal can be tuned in at two positions as T4 is adjusted. It is important to use the higher frequency setting. This is obtained with the trimmer screw set towards its minimum capacity.

Finally, trim T1 for maximum output. While adjusting this trimmer the tuning control should be rocked a minute fraction. No padding is necessary on this range.

Brunswick 39E.H.

(*Continued from page* 35.)

grid leak had values slightly higher than those shown in the circuit.

To allow for slight drift the response of the second intermediate transformer is flattened by using a tightly coupled untuned secondary winding.

The switch button unit is of a non-standard type and the various buttons make provision for changing the input coils from medium to long. There is no switching of the oscillator coil.

Although the set has high inherent stability, it is definitely not stable with the screens removed from the valves. This point must be borne in mind in making any tests or adjustments.

Alignment Notes

I.F. Circuits.—Connect output meter to the extension speaker sockets and inject the I.F. of 120 kcs. between the grid of V2 and chassis. Adjust T4 for maximum response, but at the same time continuously reduce the input from the oscillator so that no A.V.C. action takes place.

Repeat the operation with the input applied between the grid of V1 and chassis, adjusting T3 and T2 in the normal manner.

The I.F. trap can be adjusted by injecting the intermediate frequency between chassis and, via an extremely small capacity, to the aerial. Adjust T1 until the output is at *minimum*.