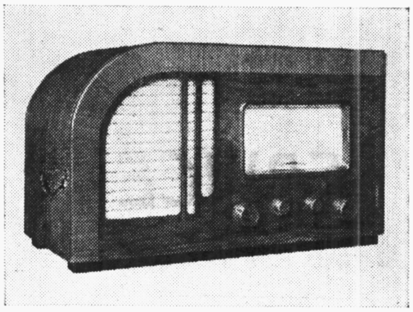
'TRADER' SERVICE SHEET

343

K-B 710

3-BAND BATTERY RECEIVER



COVERING a short-wave range of 18-52 m, the Kolster-Brandes 710 is a 3-valve battery 3-band receiver with provision for both a gramophone pick-up and an extension speaker. The cabinet is of horizontal design.

CIRCUIT DESCRIPTION

Two alternative aerial input sockets, **A1** direct, or **A2** via series resistance **R1**, to coupling coils **L4**, **L1** connected in series. On MW and LW, input is via **L1** to mixed coupled band-pass filter. Primary coils **L2** (MW) and **L3** (LW) are tuned by **C9**; secondaries **L6**, **L7** by **C11**. Coupling by mutual inductance and condensers **C1**, **C2**. On SW, input is via **L4** to single-tuned circuit **L5**, **C11**.

First valve (**V1**, **Mullard metallised VP2**) is a variable-mu pentode operating as RF amplifier with gain control by potentiometer **R4** which varies GB applied, except on SW, when **R4** is inoperative.

Tuned-anode coupling by **L10**, **C14** (SW), **L11**, **C14** (MW) and **L12**, **C14** (LW) between **V1** and triode detector valve (**V2**, **Mullard metallised PM2HL**) which operates on grid leak system with **C5** and **R5**. Reaction is applied from anode by coils **L8** (SW) and **L9** (MW and LW) and controlled by variable condenser **C13**. RF filtering in anode circuit by **C4**, except on SW, and RF choke **L13**.

Parallel-fed auto-transformer coupling by **R6**, **C6** and **T1**, via RF stopper **R7**, between **V2** and pentode output valve (**V3**, **Mullard PM22A**). Fixed tone correction in anode circuit by **C8**. Provision for connection of low impedance external speaker across secondary of internal speaker input transformer **T2**, while internal speaker may be muted by withdrawing muting plug, interrupting the speech coil circuit.

A fuse **F1** is included in the HT+2 lead as protection against accidental short circuits and condensers **C3**, **C7** provide a low RF and AF impedance across the HT circuit.

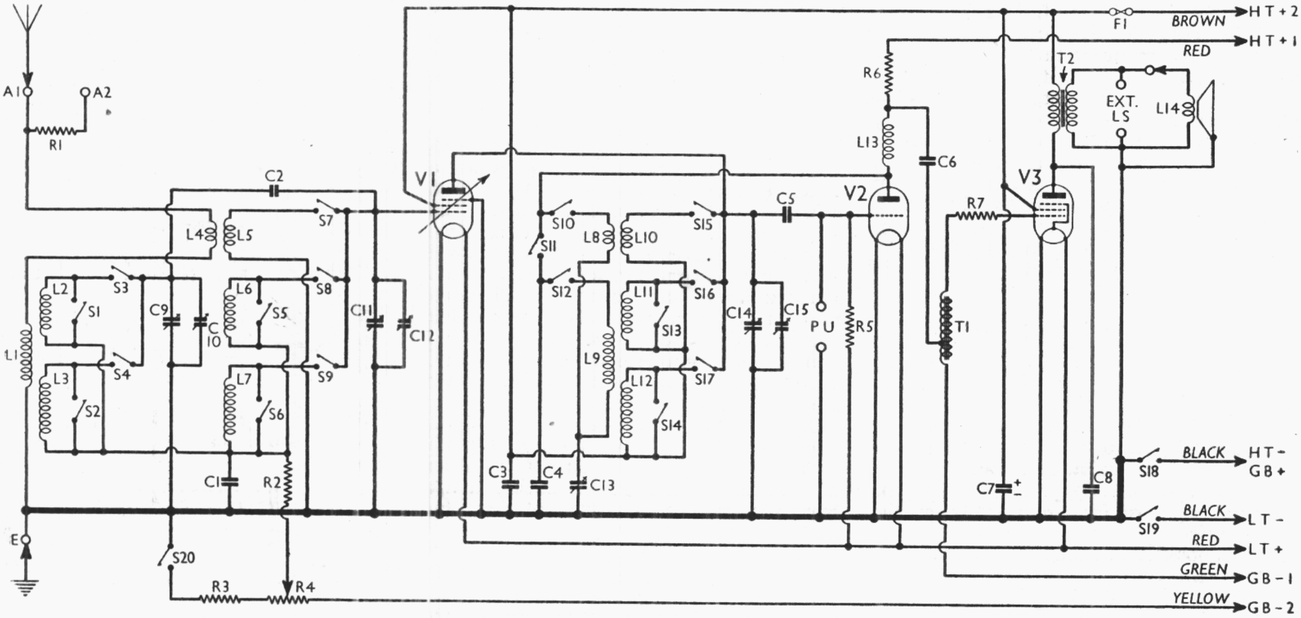
COMPONENTS AND VALUES

	RESISTANCES	Values (ohms)
R1	A2 series resistance	100,000
R2	V1 CG decoupling	250,000
R3	V1 fixed GB resistance ..	1,000
R4	V1 gain control	10,000
R5	V2 grid leak	2,000,000
R6	V2 anode load	25,000
R7	V3 CG RF stopper	500,000

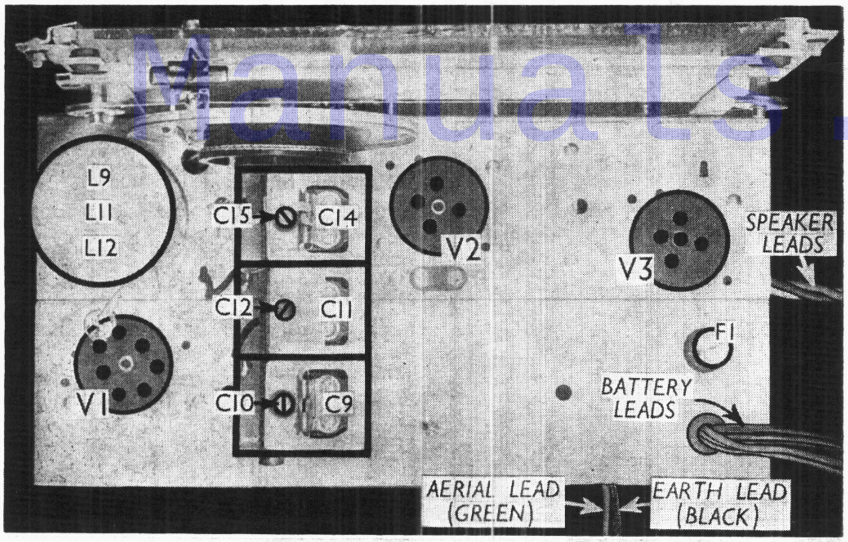
	CONDENSERS	Values (μF)
C1	Band-pass bottom coupling ..	0·02
C2	Band-pass top coupling ..	Very low
C3	HT circuit RF by-pass ..	0·1
C4	V2 anode RF by-pass (MW and LW only)	0·0005
C5	V2 CG condenser	0·0001
C6	AF coupling to T1	0·02
C7*	HT circuit reservoir	2·0
C8	Fixed tone corrector	0·003
C9†	Band-pass primary tuning ..	0·0005
C10‡	Band-pass pri. MW trimmer..	—
C11†	SW aerial and band-pass secondary tuning	0·0005
C12‡	Band-pass sec. MW trimmer..	—
C13†	Reaction control	—
C14†	V1 anode circuit tuning ..	0·0005
C15‡	V1 anode circuit MW trimmer	—

* Electrolytic. † Variable. ‡ Pre-set.

	OTHER COMPONENTS	Approx. Values (ohms)
L1	Aerial MW and LW coupling..	10·0
L2	Band-pass primary coils	3·2
L3	Band-pass primary coils	11·5
L4	Aerial SW coupling coil ..	0·1
L5	Aerial SW tuning coil.. ..	0·05
L6	Band-pass secondary coils	3·2
L7	Band-pass secondary coils	11·5
L8	SW reaction coil	0·15
L9	MW and LW reaction coil ..	3·4
L10	V1 anode SW tuning coil ..	0·05
L11	V1 anode MW tuning coil ..	3·2
L12	V1 anode LW tuning coil ..	11·5
L13	V2 anode RF choke	200·0
L14	Speaker speech coil	3·5
T1	Intervalve auto-trans., total..	7000·0
T2	Speaker input trans. Pri.	900·0
	Speaker input trans. Sec.	0·9
S1-S17	Waveband switches	—
S18	HT circuit switch (ganged R4)	—
S19	LT circuit switch (ganged R4)	—
S20	GB circuit switch (ganged R4)	—
F1	HT+2 circuit fuse	—



Circuit diagram of the K-B 710 battery receiver.



Plan view of the chassis. **F1** is a fuse bulb. The aerial and earth leads are connected to sockets at the back of the cabinet. The trimmers shown are the only ones in the receiver.

DISMANTLING THE SET

The cabinet is fitted with a detachable bottom which, when removed (two round-head wood screws), gives access to most of the components beneath the chassis.

Removing Chassis.—If it is desired to remove the chassis from the cabinet, first remove the four control knobs (recessed grub screws) and the four bolts (with claw and lock washers) holding the chassis to the bottom of the cabinet. Now remove the two round-head wood screws (with brass washers) holding the top of the scale assembly to the front of the cabinet, prise up the HT battery shelf (four brads), unsolder the two leads from the left-hand panel at the rear of the cabinet, free the speaker leads from the cleat holding them to the bottom of the cabinet (round-head wood screw) and the composition partition screening the speaker (three nuts and lock washers).

The chassis can now be withdrawn to the extent of the speaker leads, which is sufficient for normal purposes and *when replacing*, connect the green lead from the chassis to the outer left-hand socket on the panel and the black lead to the outer right-hand socket.

To free the chassis entirely, unsolder the speaker leads, and *when replacing*, connect them as follows, numbering the tags on the transformer terminal panel from bottom to top:—1, blue; 2, red; 3, no connection. The black lead goes to the bottom fixing screw of the transformer.

Removing Speaker.—To remove the speaker from the cabinet, unsolder the leads from the right-hand panel at the rear of the chassis and remove the muting plug from its lead. Then remove the nuts (with lock nuts and brass washers) from the four bolts holding the speaker to the sub-baffle.

When replacing, see that the transformer is on the left and connect the black lead to the left-hand socket on the panel and the yellow lead to the other sockets, which are joined. The green lead should be threaded through the hole to the right of the panel and the muting plug fitted to it.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating with an HT battery reading 125 V overall, on load. The receiver was tuned to the lowest wavelength on the medium band, and the volume control was at maximum, but the reaction control was at minimum. There was no signal input.

Voltages were measured on the 400 V scale of a model 7 Universal Avometer, chassis being negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 VP2 ..	115	1·3	115	0·4
V2 PM2HL	50	0·7	—	—
V3 PM22A	113	2·5	115	0·4

GENERAL NOTES

Switches.—**S1-S17** are the waveband switches, in two rotary units beneath the chassis. These are indicated in our under-chassis view, and shown in detail in the diagrams on page IV. The table (page IV) gives the switch positions for the three control settings, starting from fully anti-clockwise. A dash indicates *open*, and **C** *closed*.

S18-S20 are the QMB battery circuit switches, ganged with the gain control, **R4.** Their contacts are indicated in our under-chassis view.

Coils.—**L1-L3**; **L4, L5**; **L6, L7** and **L8, L10** are in four unscreened units beneath the chassis. In the case of the last unit, **L10** is the thick wire winding. **L9, L11, L12** are in a screened unit on the chassis deck. The RF choke **L13** is beneath the chassis.

Fuse F1.—This is an MES type, rated at 2·5 V. It screws into a holder mounted flush with the chassis deck.

External Speaker.—Two sockets are provided at the rear of the cabinet for a low impedance (2-5 O) external speaker. A plug and socket device permits the internal speaker speech coil to be disconnected, thus muting the internal speaker.

Condenser C2.—This is a very small coupling, formed by one green rubber-covered wire looped round another. Its position is indicated in our under-chassis view.

Resistance R1.—This is connected across the **A1** and **A2** aerial sockets at the back of the cabinet, and is therefore not shown in our chassis pictures.

Batteries.—LT, 2 V LT cell, Exide OCG3C, Fuller MSGH, or Oldham OLG3. HT, 120 V dry battery, combined with a 9 V GB section, Drydex H1070, Ever Ready Portable 33, G.E.C. blue label BB338, Siemens Full o' Power 1193 or Fuller S851. If separate HT and GB batteries are used, a wire link must be connected between the negative of the HT battery and the positive of the GB battery.

Battery Leads and Voltages.—Black

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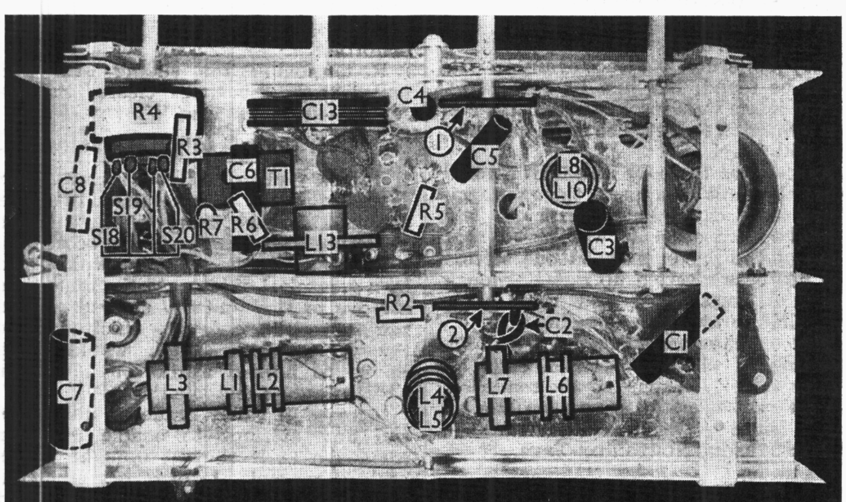


Under-chassis view. Note the battery circuit switches **S18-S20**. Diagrams of the wavechange switches are overleaf.

K-B 710—*Continued*

lead, spade tag, LT negative; red lead, spade tag, LT positive 2 V; black lead and plug, HT negative (and GB positive); red lead and plug, HT positive 1, +72 to 90 V; brown lead and plug, HT positive 2, +120 V; green lead and plug, GB negative 1, —4·5 V; yellow lead and plug, GB negative 2, —9 V.

CIRCUIT ALIGNMENT

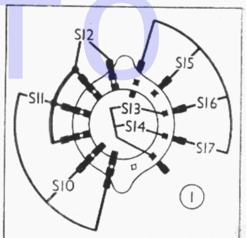
With gang at maximum, pointer should coincide with right hand vertical line on the scale.

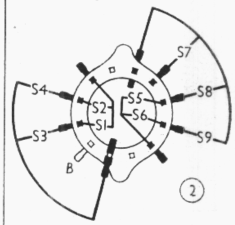
Switch set to MW, tune to 214 m (dot on scale), and turn gain control to maximum. Connect signal generator to **A1** and **E** sockets, feed in a 214 m (1,400 KC/S) signal, and adjust **C15**, **C12** and **C10** for maximum output. Keep reaction control advanced to a point just short of oscillation.

TABLE AND DIAGRAMS OF THE SWITCH UNITS

SWITCH	LW	MW	SW
S1	—	—	C
S2	—	C	C
S3	—	C	—
S4	C	—	—
S5	—	—	C
S6	—	C	C
S7	—	—	C
S8	—	C	—
S9	C	—	—
S10	—	—	C
S11	C	C	—
S12	C	C	—
S13	—	—	C
S14	—	C	C
S15	—	—	C
S16	—	C	—
S17	C	—	—

Diagrams of the switch units, as seen from the rear of the under-side of the chassis.





MAINTENANCE PROBLEMS

Contributed by Service Engineers

Fault in Gang Condenser

A THREE-VALVE battery set was brought in for service, the customer complaining that it was erratic, the signals dropping in volume and sometimes disappearing entirely.

When the set was put on test the fault showed up after a short run, and the valves were taken out and tested. They were found to be O.K., so the chassis was removed from the cabinet. I at first suspected that the 30 μF electrolytic bias by-pass condenser of the output valve was intermittently going O/C. Clipping a test condenser across this did not cure the trouble, so the set was tried on gram. with a pick-up.

The set now worked perfectly, so this narrowed the search down to the RF portion of the set. On moving a wire connected from the gang condenser to the grid coil, the fault was brought on, so the coil was taken out and carefully examined for dry joints, etc. No trace of any trouble could be found, but just to make sure, all the joints were resoldered and the coil was refitted in the set. The fault, however, was still there.

As this was the only wire which would cause the fault to appear, the gang condenser next came under suspicion. On careful examination it was found that some of the fixed vanes on one section had not been rivetted up tightly enough and had come loose and were going O/C, thus throwing the ganging out.

The condenser was taken out and all the rivetting of the fixed vanes carefully tightened up. On refitting the condenser the set worked perfectly and no trouble has since been experienced.—P. HENDERSON, NORTON-ON-TEES.

Distortion Due to Tone Control

A PYE SP/B receiver came in for service suffering from very bad distortion of an obscure origin. All voltages and currents registered normal, and substitutions of the valves and HT battery had no effect whatever. It was noticed, however, that the distortion was more defined when the tone control was set in certain positions, and that the control "misfired" at various settings.

The component was removed and examined, when it was found that the "button" which normally is held in position at the end of the rotating arm and presses on the carbon track, had dropped into the metal cover of the control, while the carbon track, which incidentally is formed on a thin card, relieved of all pressure from the "button," had bent up slightly, and was just—and only just—touching the slider of the component.

Consequently, audio frequency variations were making and breaking in a rather uncertain manner from the slider to the carbon track with consequent distortion.

Re-tensioning the sliding arm and replacing the "button" cleared the distortion.—R. A. COATES, WHITBY.

More Dry Joint Trouble

I HAVE had a KB610 receiver for service which has resulted in some considerable time being taken to locate the fault. The symptoms were occasional very weak signals on LW, accompanied by a great deal of hiss. At the same time a move to MW and SW showed normal working, and one or two quick flicks of the wave-change switch would bring things to normal again for a day or perhaps only a few minutes.

Changes of valves made no difference, and any attempt to couple a meter when the fault showed brought things back to normal. Leaving a meter continually in circuit merely showed that when the fault occurred the AVC action ceased and normal action obtained on MW.

All tuning coils, resistances, and condensers in any way connected with the tuning and oscillator circuits tested O.K.

After prolonged study of the working when the fault showed, I came to the conclusion that the trouble was instability in the frequency changer anode circuit, and since there are no decoupling arrangements here there was probably some artificial resistance present. Suspecting a dry joint, I resoldered the lead from HT to the first IF transformer. This cleared up the trouble.—J. W. TAYLOR, WIGAN.

Marconi 262 and 272 Hints

IF you receive for service any of these receivers with the complaint of instability on long waves, this is probably due to the MPT4 valve causing a form of feed-back, and can be cured by fitting a new type of MPT4.

Another common complaint with this receiver is distortion after two to three hours' use. It is first of all advisable to make sure that the trouble is not due to the 2μF bass compensation condenser leaking from the anode of the MH4 to the earthy end of the inter-valve transformer, putting positive bias on the MPT4.

If this is not the case, it will usually be found to be the speech coil rubbing, caused by working under the influence of the heat generated by the field coil. The only real remedy for this is to replace the coil and cone.

Noise on banging the chassis is very often found to be due to a noisy pilot bulb. These may not flicker when producing noise, but causes it by radiating static.

Another form of noise is sometimes due to the humdinger becoming faulty, and can often be cured by running a separate earth lead from the slider of this to the earth terminal, instead of relying, as originally, merely on the earthing of the fixing bolt.—P.G., LONDON