'TRADER' SERVICE SHEET

255

ALBA 815, 615, 650 AND 910 (A.C.)

A SHORT-WAVE range of 16·5-50 metres is covered by the Alba 815 (A.C.) 4-valve (plus rectifier) A.C. 3-band superhet, which is suitable for operation on mains of 190-250 V, 40-100 C/S. The receiver has provision for using the mains as an aerial and for connecting a gramophone pick-up and an extension speaker.

An identical chassis is fitted in the 615 (A.C.) armchair console and the 650 (A.C.) console receiver, while the chassis in the 910 (A.C.) radiogram is modified in certain respects, which are mentioned in "General Notes." This *Service Sheet* was prepared on an 815 (A.C.) table model.

It should be noted that there are A.C./D.C. models bearing the numbers 815, 615, 650 and 910, but these are not covered in this *Service Sheet*, although the general design is similar.

CIRCUIT DESCRIPTION

Aerial input on M.W. and L.W. is via S.W. coupling coil **L11** to coupling coils **L1, L2** and inductively coupled band-pass filter. Primary coils **L3, L4** are tuned by **C19**; secondaries **L9, L10** by **C22**; coupling coils **L5, L6, L7** and **L8**. On S.W. band aerial input is via coupling coil **L11** to single-tuned circuit **L12, C22.**

First valve (**V1, Mullard metallised TH4**) is a triode-hexode operating as frequency changer with internal coupling. Triode oscillator grid coils **L13** (S.W.), **L15** (M.W.) and **L17** (L.W.) are tuned by **C23**; parallel trimming by **C24** (S.W.), **C25** (M.W.) and **C26** (L.W.); series tracking by **C5** (M.W.) and **C27** (L.W.); oscillator anode reaction coils **L14** (S.W.), **L16** (M.W.) and **L18** (L.W.).

Single variable-mu R.F. pentode intermediate frequency amplifier (**V2, Mullard metallised VP4B**) operates with tuned-primary tuned-secondary transformer couplings **C28, L19, L20, C29** and **C30, L21, L22, C31.**

Intermediate frequency 117·5 KC/S.

Diode second detector is part of separate double diode valve (**V3, Mullard metallised 2D4A**). Audio-frequency component in rectified output is developed across load resistance **R10** and passed via stopper **R9, C11** and manual volume control **R13** to C.G. of pentode output valve (**V4, Mullard PenA4**). Fixed tone correction in anode circuit by **C13.** Provision for connection of high impedance external speaker across primary of **T1.** Provision for connection of gramophone pick-up across **R13.**

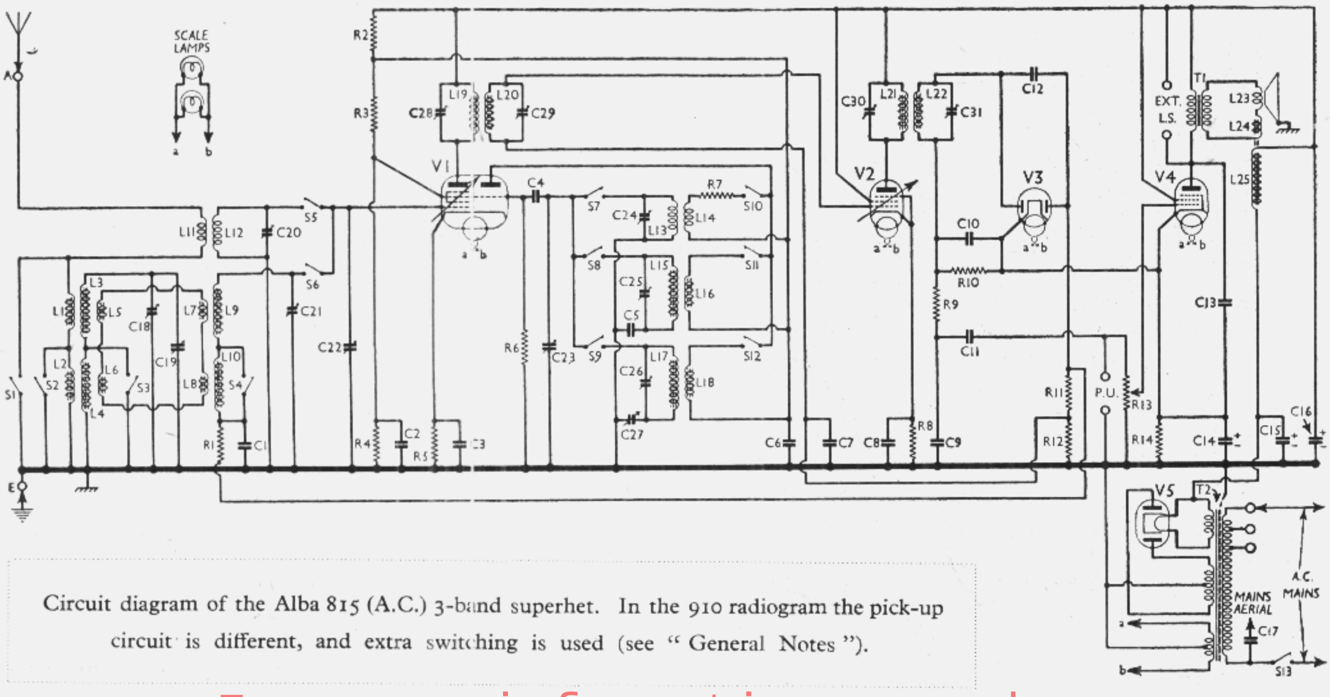
Second diode of **V3**, fed via **C12**, provides D.C. potentials which are developed across load resistances **R11, R12** and fed back through decoupling circuits as G.B. to F.C. and I.F. valves, giving automatic volume control. Delay voltage is obtained from drop along **V4** cathode resistance **R14.**

H.T. current is supplied by I.H.C. full-wave rectifying valve (**V5, Mullard IW4/350**). Smoothing by speaker field **L25** and dry electroltyic condensers **C15, C16.** Mains aerial coupling by **C17.**

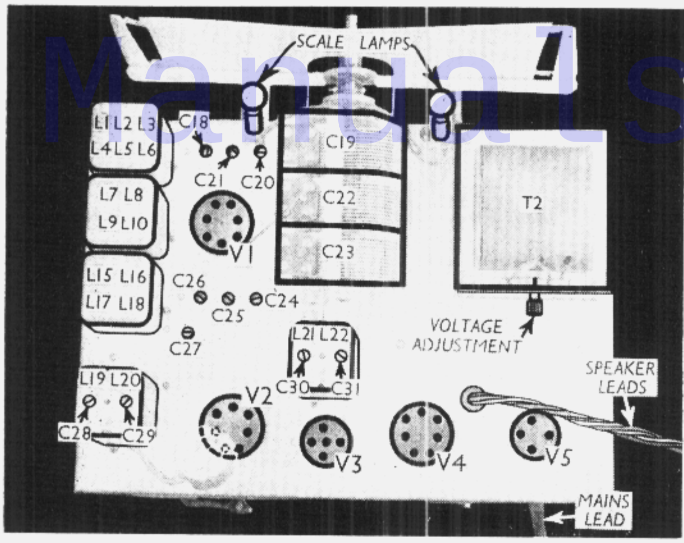
COMPONENTS AND VALUES

	RESISTANCES	Values (ohms)
R1	V1 hexode C.G. decoupling ..	1,000,000
R2	V1 S.G. and osc. anode H.T. potential divider ..	13,000
R3		10,000
R4		25,000
R5	V1 fixed G.B. resistance ..	200
R6	V1 osc. C.G. resistance ..	25,000
R7	V1 osc. anode S.W. stabiliser	100
R8	V2 fixed G.B. resistance ..	150
R9	I.F. stopper	50,000
R10	V3 signal diode load	500,000
R11	V3 A.V.C. diode load resistances	500,000
R12		500,000
R13	Manual volume control ..	500,000
R14	V4 G.B. resistance	150

	CONDENSERS	Values (μF)
C1	V1 hexode C.G. decoupling ..	0·1
C2	V1 hexode S.G. by-pass ..	0·1
C3	V1 cathode by-pass	0·1
C4	V1 osc. C.G. condenser ..	0·0001
C5	Osc. circuit M.W. tracker ..	0·002
C6	V1 osc. anode decoupling ..	0·1
C7	V2 C.G. decoupling	0·1
C8	V2 cathode by-pass ..	0·1
C9	I.F. by-passes	0·0002
C10		0·0002
C11	A.F. coupling to V4	0·005
C12	V3 A.V.C. diode feed	0·0002
C13	Fixed tone corrector	0·005
C14*	V4 cathode by-pass	25·0
C15*	H.T. smoothing ..	6·0
C16*		6·0
C17	Mains aerial coupling	0·00015
C18‡	Band-pass pri. M.W. trimmer	0·00003
C19†	Band-pass pri. tuning	—
C20‡	Aerial S.W. trimmer	0·00003
C21‡	Band-pass sec. M.W. trimmer	0·00003
C22†	Band-pass sec. and S.W. tuning	—
C23†	Oscillator circuit tuning ..	—
C24‡	Oscillator S.W. trimmer ..	0·00003



Circuit diagram of the Alba 815 (A.C.) 3-band superhet. In the 910 radiogram the pick-up circuit is different, and extra switching is used (see "General Notes").



Plan view of the chassis. Note the various trimmers, adjustable through holes in the chassis deck.

CONDENSERS (*Continued*)		Values (μF)
C25‡	Oscillator M.W. trimmer ..	0·00003
C26‡	Oscillator L.W. trimmer ..	0·00003
C27‡	Oscillator L.W. tracker ..	0·0007
C28‡	1st I.F. trans. pri. tuning ..	—
C29‡	1st I.F. trans. sec. tuning ..	—
C30‡	2nd I.F. trans. pri. tuning ..	—
C31‡	2nd I.F. trans. sec. tuning ..	—

* Electrolytic. † Variable. ‡ Pre-set.

OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial M.W. and L.W. coupling coils	70·0
L2		6·5
L3	Band-pass primary coils	1·6
L4		13·5
L5 L6	Band-pass coupling coils ..	22·0
L7 L8	Band-pass coupling coils ..	22·0
L9	Band-pass secondary coils	2·0
L10		14·0
L11	Aerial S.W. coupling coil ..	0·3
L12	Aerial S.W. tuning coil ..	Very low
L13	Oscillator S.W. tuning coil ..	Very low
L14	Oscillator S.W. reaction coil ..	35·0
L15	Oscillator M.W. tuning coil ..	1·6
L16	Oscillator M.W. reaction coil ..	50·0
L17	Oscillator L.W. tuning coil ..	9·5
L18	Oscillator L.W. reaction coil ..	2·5
L19	1st I.F. trans. Pri.	34·0
L20	1st I.F. trans. Sec.	34·0
L21	2nd I.F. trans. Pri.	34·0
L22	2nd I.F. trans. Sec.	34·0
L23	Speaker speech coil	1·9
L24	Hum neutralising coil	0·1
L25	Speaker field coil	1200·0
T1	Speaker input trans. Pri. ..	450·0
	Speaker input trans. Sec. ..	0·4
T2	Mains trans. Pri., total ..	53·0
	Mains trans. Heater sec. ..	0·1
	Mains trans. Rect. heat. sec.	0·1
	Mains trans. H.T. sec., total	430·0
S1-S12	Waveband switches	—
S13	Mains switch, ganged R13 ..	—

DISMANTLING THE SET

Removing Chassis.—If it is desired to remove the chassis from the cabinet, remove the three control knobs (recessed grub screws) and the four bolts (with washers) holding the chassis to the bottom of the cabinet. The chassis can now be withdrawn to the extent of the speaker leads, which is sufficient for normal purposes.

To free the chassis entire unsolder the speaker leads and *when replacing*, connect them as follows:—F, blue; 3, black; 1 and F joined together, red. The white lead goes to the earthing tag on one of the speaker fixing screws.

Removing Speaker.—Should it be necessary to remove the speaker from the cabinet, remove the nuts from the four screws holding it to the sub-baffle. *When replacing*, see that the transformer is on the right and do not forget to replace the soldering tag for the earthing lead on the bottom right-hand screw.

VALVE ANALYSIS

Valve voltages and currents given in the table (col. 3) are those measured in our receiver when it was operating on mains of 230 V, using the 220 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 400 V scale of a model 7 Universal Avometer, chassis being negative.

If **V2** should become unstable when measurements are made of its anode current, as in our case, it can be stabilised by connecting a non-inductive condenser of about 0·1 μF from that electrode to chassis.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 TH4* ..	257	3·0	58	3·5
V2 VP4B ..	257	12·0	257	4·6
V3 2D4A ..	—	—	—	—
V4 PenA4 ..	242	29·0	257	4·7
V5 IW4/350	312†	—	—	—

* Oscillator anode 115 V, 4·8 mA.
† Each anode, A.C.

GENERAL NOTES

Switches.—**S1-S12** are the wavechange switches, in two rotary units beneath the chassis. These are indicated in our under-chassis view, and are shown in detail in the diagram on page IV, where they are as seen looking from the front of the underside of the chassis.

The table (p. IV) gives the switch positions for the three control settings, starting from fully anti-clockwise. A dash indicates open, and **C** closed.

S13 is the Q.M.B. mains switch, ganged with the volume control **R13**.

Coils.—**L1-L6, L7-L10** and **L15-L18** are in three screened units on the chassis deck. **L11, L12** and **L13, L14** are in two unscreened tubular units beneath the chassis. **L12** and **L13** respectively are the thick windings of tinned copper wire. The I.F. transformers **L19, L20**

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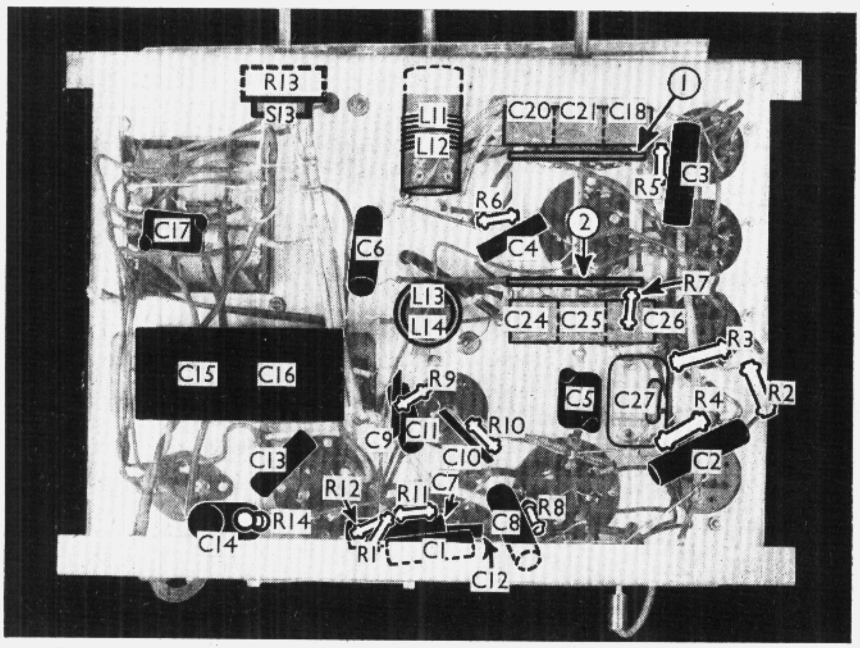


Under-chassis view. Diagrams of the two switch units are given overleaf.

ALBA 815—*Continued*

and **L21, L22** are in two other screened units on the chassis deck, with their associated trimmers.

Scale Lamps.—These are two Osram 6·2 V, 0·3 A M.E.S. types.

External Speaker.—Two terminals are provided on the internal speaker transformer for the connection of a high impedance external speaker.

Condensers C15, C16.—These are two 6 μF dry electrolytics in a single carton beneath the chassis, with a common negative (black) lead. The yellow lead is the positive of **C15**, and the red lead the positive of **C16**.

Trimmers.—All the trimmers, except those of the I.F. transformers, are adjustable through holes in the chassis deck.

Chassis Divergency.—**C17** in our chassis is 0·00015 μF, not 0·0001 μF as given in the makers' diagram.

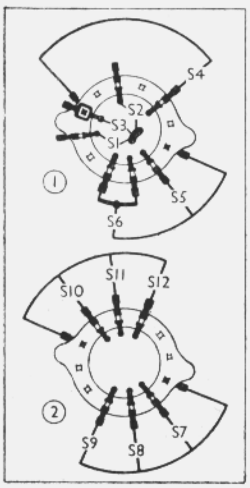
Radiogram Model 910.—Although the basic circuit of this is similar, there are certain differences, particularly in the pick-up circuit. There is a fourth position on the wavechange switch for "Gram," and the pick-up is switched into the grid circuit of the I.F. valve **V2**, instead of **V4**.

On "Gram," the bottom end of **L20** is disconnected from the A.V.C. line, and taken to one side of the pick-up, the other side of the pick-up going to chassis. An anode load resistance is included in series with the connection from H.T. line to the top of **L21**, and the bottom end of this resistance is connected via a coupling condenser and switch to the top of **R13**. On "Gram," this switch closes, and another switch, in series with the lead from **C11** to the top of **R13**, opens and mutes radio. **C15** and **C16** become 8 μF and 12 μF respectively.

The arrangement is very similar to that used in the models 870 and 970 (*Service Sheet* 193).

SWITCH TABLE AND DIAGRAMS

Switch	S.W.	M.W.	L.W.
S1	C	—	—
S2	—	C	—
S3	—	C	—
S4	—	C	—
S5	C	—	—
S6	—	C	C
S7	C	—	—
S8	—	C	—
S9	—	—	C
S10	C	—	—
S11	—	C	—
S12	—	—	C



Switch diagrams as seen looking in the direction of the arrows in the under-chassis view.

CIRCUIT ALIGNMENT

I.F. Stages.—Feed in a 117·5 KC/S signal between the top cap of **V1** and chassis, with set switched to M.W.

Adjust **C31, C30, C28** and **C29** for maximum output, in that order, reducing input progressively as the circuits come into alignment.

R.F. and Oscillator Stages.—See that scale pointer is horizontal at maximum position of gang condenser. If not, adjust by means of the pointer clip on drive spindle.

Feed a 250 m. signal into **A** and **E** sockets, switch set to M.W., tune to 250 m. on the scale, and adjust **C25**, then **C21** and **C18** for maximum output.

Switch set to L.W., feed in a 1,200 m. signal, tune to 1,200 m. on the scale, and adjust **C26** for maximum output, rocking the gang slightly for optimum results, since there are no separate L.W. band-pass trimmers. Feed in a 1,900 m. signal, tune it in, and adjust **C27** for maximum output, rocking the gang meanwhile.

Switch set to S.W., feed in a 31 m. signal, tune to 31 m. on the scale, and adjust **C24** and **C20** for maximum output. If **C24** gives two peaks, choose that obtained with **C24** nearest its minimum position.

MAINTENANCE PROBLEMS

Vibrator Transformer Faulty

I HAD some trouble with an Ekco BV 67, where the H.T. is derived from a vibrator unit; the customer's complaint being that the set was very distorted after they had had the accumulators in the set only a relatively short while, though for at least seven hours the set was perfectly normal.

The charging of the L.T. batteries was carefully checked, but that made no difference. Then the H.T. current was checked and found to be quite normal.

Finally the total current taken from the accumulators was checked, and found to be of the order of 3.5 A instead of about 1 A. The fault was found to be in the transformer and a new one cured the trouble completely.—G. GRIFFITH, HORLEY.

C.R. Indicator Trouble

A NEW A.C. superhet received from the makers recently was found to be working normally with the exception of the cathode ray visual tuning indicator. The tube was glowing in the usual manner, but was not being controlled by the signals, the light being stationary.

The valve amplifier section of the tube came under suspicion and was investigated. The anode received its supply in the usual manner via a 1 MO resistor from the H.T. line. Tests at this point with a 1,000 O per V meter revealed the absence of H.T. at the anode, although the supply was O.K. on the H.T. side of the resistor. It was suspected that this component was o/c, but further tests showed it was not so. The fault became interesting at this point, as there were no other components or wires connected to this anode.

The resistor was disconnected at the anode end and a further test made. A reading was now obtainable at this end on switching on the set, and this the tube itself was therefore suspected. The tube was removed, but no reading was obtained at the anode on reconnecting the resistor.

As a last hope the leads from the resistor panel, passing through the chassis, to the valve holder carrying the tube, were examined. This inspection revealed that the grid and anode leads of the valve had been transposed on the resistor panel! The H.T. supply was connected through the resistor to the grid, and thence through the grid resistor network to chassis. On changing over the leads, the tube worked normally, and another mystery was cleared up.

Can any manufacturer explain how a receiver with a fault like this could ever pass through the maker's final inspection?—W. G. G.

Shorting Trimmer Again

AN A.C./D.C. superhet was in for repair under guarantee and no signals were obtainable. Preliminary tests revealed that the oscillator section of the first valve, a triode-pentode, was not working. Further tests revealed that no voltage was present at the oscillator anode.

The feed resistor was O.K., and continuing the tests it was seen that a dead short existed between this anode and chassis. The valve was O.K. and elimination tests showed that a dead short existed only on the anode side of the oscillator coils, tests from the H.T. side showing the coil resistance only.

From this information and a study of the circuit diagram it was possible to deduce that the fault must obviously lie, either in the wiring to the coils and tuning condenser (and the trimmer on the top of the coil unit), or in the condensers themselves.

Lifting the coil can had no effect, and no short being obvious, the lead to the condenser was removed. This action cleared the short and the oscillator section of the ganged condenser appeared to be O.K.

With the ohmmeter still connected the trimmer screw was removed and the fault cleared. A further inspection revealed that the mica dielectric was at fault. A new piece of mica was fitted, and on trimming the oscillator and R.F. circuits the set was normal once again.—W. G. GOUGH, WORCESTER.