

'TRADER' SERVICE SHEET

169

ALBA 230 AND 450

5-VALVE BATTERY SUPERHET

A 5-VALVE superhet chassis with a variable-mu pentode signal frequency amplifier is fitted in the Alba 230 battery-operated receiver.

An identical chassis is fitted in the 450 radio-gramophone. This *Service Sheet* was prepared on the table model.

CIRCUIT DESCRIPTION

Aerial input via coupling coils **L1, L2** to single tuned circuit **L3, L4, C20** which precedes variable-mu signal frequency amplifier (**V1, Mullard metallised VP2**).

Tuned-secondary transformer coupling by **L5, L6, L7, C22** between **V1** and octode frequency changer valve (**V2, Mullard metallised FC2**). Oscillator grid coils **L8, L9** are tuned by **C25**; parallel trimming by **C24** (M.W.) and **C26** (L.W.); tracking by shaped condenser plates and series condensers **C6, C27**; oscillator anode reaction coils **L10, L11**.

Single variable-mu pentode intermediate frequency amplifier (**V3, Mullard metallised VP2**) operates with fixed G.B. and tuned-primary tuned-secondary transformer couplings **C28, L12, L13, C29** and **C30, L14, L15, C31**.

Intermediate frequency 117.5 KC/S.

Second detector is part of special I.H.C. double diode valve (**V4, Mullard metallised 2D2**). Audio-frequency component in rectified output is developed across load resistance **R7** and passed via I.F. stopper **R6**, coupling condenser **C14** and manual volume control **R11** to high-efficiency pentode output valve (**V5, Mullard PM22D**). Variable tone control by **R12, C17**; fixed tone correction by **C18**. Provision for high-impedance external speaker across primary of **T1**.

Second diode of **V4** is coupled by condenser **C13** and provides D.C. potential which is developed across load resistance

R8 and fed back through decoupling circuits **R1, C1** and **R2, C3** as G.B. to H.F. and F.C. valves, giving automatic volume control. Delay voltage is obtained from potentiometer **R9, R10**.

G.B. for **V3** and **V5** is obtained automatically from drop along resistances **R13, R14** in H.T. negative line.

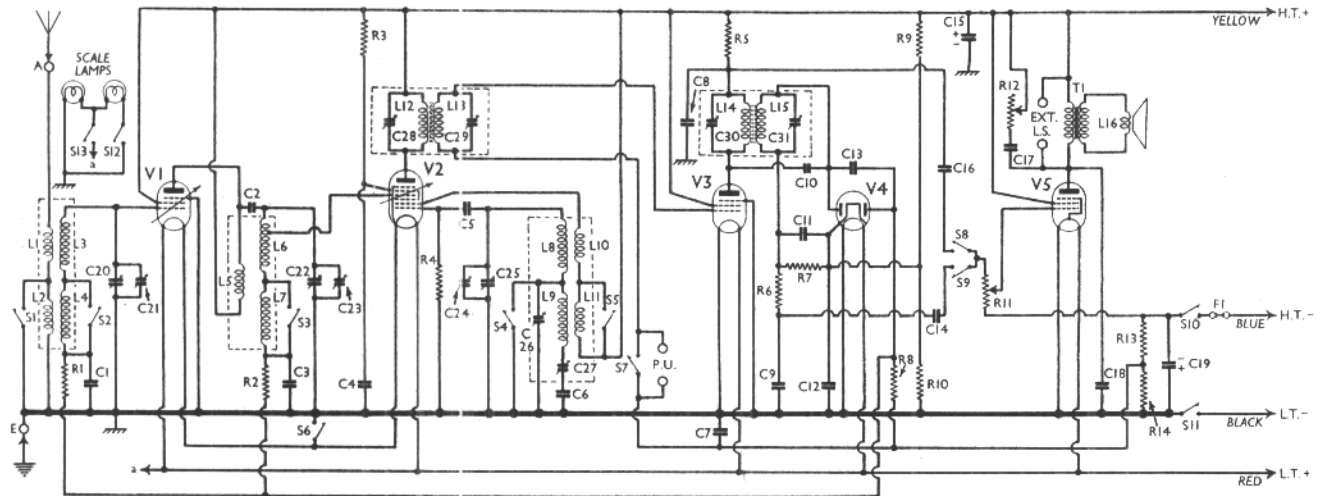
When a gramophone pick-up is used with the receiver its output is fed into the C.G. circuit of the I.F. valve **V3**, which then operates as L.F. amplifier. Radio decoupling resistance **R5** becomes the anode load, and condenser **C16** forms coupling to output valve.

RESISTANCES		Values (ohms)
R1	V1 C.G. decoupling ..	500,000
R2	V2 pent. C.G. decoupling ..	500,000
R3	V2 S.G.'s H.T. feed ..	50,000
R4	V2 osc. C.G. resistance ..	50,000
R5	V3 anode decoupling ..	2,000
R6	I.F. stopper ..	50,000
R7	V4 signal diode load ..	500,000
R8	V4 A.V.C. diode load ..	500,000
R9	A.V.C. delay voltage potentiometer	1,000,000
R10	..	100,000
R11	Manual volume control ..	500,000
R12	Variable tone control ..	50,000
R13	V3 and V5 automatic G.B. resistances	100
R14	..	150

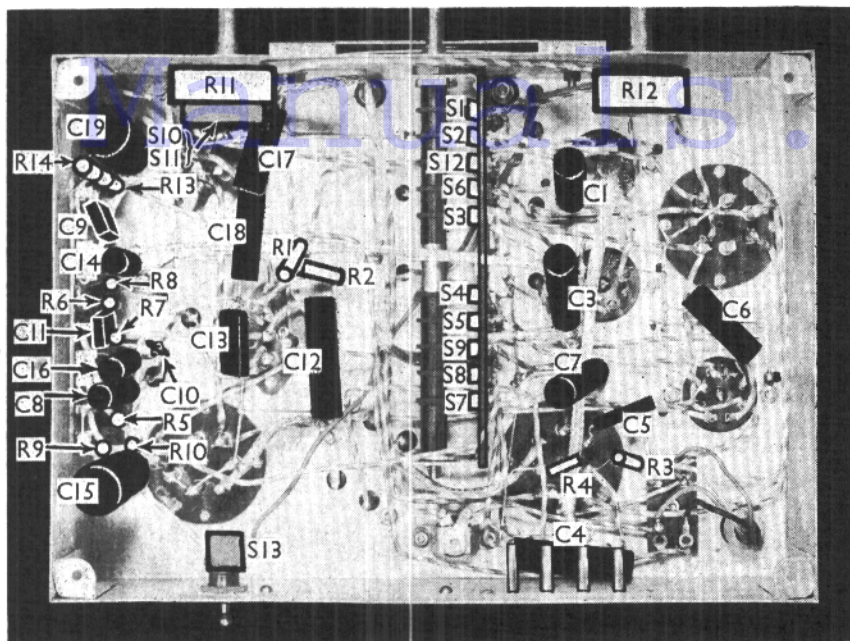
CONDENSERS		Values (μF)
C1	V1 C.G. decoupling ..	0.1
C2	H.F. trans. top coupling ..	0.00005
C3	V2 pent. C.G. decoupling ..	0.1
C4	V2 S.G.'s by-pass ..	0.1
C5	V2 osc. C.G. condenser ..	0.0001
C6	Osc. L.W. tracker ..	0.005
C7	V3 C.G. decoupling ..	0.1
C8	V3 anode decoupling ..	0.002
C9	I.F. by-pass ..	0.0001
C10	Coupling to V4 signal diode ..	0.000025
C11	I.F. by-pass ..	0.0001
C12	V4 cathode by-pass ..	0.1
C13	Coupling to V4 A.V.C. diode ..	0.0001
C14	Radio coupling to V5 ..	0.002
C15*	H.T. supply reservoir ..	8.0
C16	Gram. coupling to V5 ..	0.01
C17	Part of T.C. filter ..	0.02
C18*	Fixed tone corrector ..	0.005
C19*	Auto. G.B. circuit by-pass ..	50.0
C20†	Aerial circuit tuning ..	—
C21†	Aerial circuit trimmer ..	—
C22†	H.F. trans. sec. tuning ..	—
C23†	H.F. trans. sec. trimmer ..	—
C24†	Osc. circuit M.W. trimmer ..	—
C25†	Osc. circuit tuning ..	—
C26†	Osc. circuit L.W. trimmer ..	0.000075
C27†	Osc. L.W. tracker ..	0.0011
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 ..	—

OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial coupling coils ..	12.0
L2	..	40.0
L3	Aerial tuning coils ..	3.5
L4	..	12.0
L5	H.F. trans. primary ..	125.0
L6	..	3.5
L7	H.F. trans. secondary ..	12.0
L8	..	3.0
L9	Oscillator tuning coils ..	7.0
L10	..	125.0
L11	Oscillator reaction coils ..	490.0
L12	1st I.F. trans. { Pri. ..	150.0
L13	{ Sec. ..	150.0
L14	2nd I.F. trans. { Pri. ..	50.0
L15	{ Sec. ..	50.0
L16	Speaker speech coil ..	2.6
T1	Speaker input trans. { Pri. ..	700.0
	{ Sec. ..	0.4
Sr-S5	Waveband switches ..	—
S6	V1, V2 L.T. circuit switch ..	—
S7-S9	Radio-gram changeover switches ..	—
S10	H.T. circuit switch ..	—
S11	Main L.T. circuit switch ..	—
S12	Scale lamp switches ..	—
S13	..	—
F1	H.T. circuit fuse ..	—

Removing Chassis.—If it should prove necessary to remove the chassis from the cabinet, first remove the four control



An indirectly heated double diode is used in the Alba 230 battery superhet, and although the I.F. valve is a variable-mu type, it operates with fixed bias. A.V.C. delay voltage is obtained from the potentiometer formed by **R9** and **R10**.



The wavechange, gramophone and one of the scale lamp switches are ganged in a single unit, and the individual switches are clearly marked in this under-chassis view.

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, by tilting the back upwards slightly.

To free the chassis entirely, unsolder the speaker leads. When replacing, connect the black and white leads to the tags on the terminal strip and take the blue lead to the speaker frame by inserting it between one of the transformer mounting feet and the flange on the speaker to which it is secured.

Removing Speaker.—To remove the speaker from the cabinet, remove the nuts from the four bolts and the two countersunk-head wood screws holding the sub-baffle to the front of the cabinet, then remove the nuts and washers holding the speaker to the sub-baffle. When replacing, see that the transformer is on the right.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating from a new H.T. battery reading 142 V. 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 scale of an Avometer, chassis being negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 VP2	140	1.0	140	0.3
V2 FC2*	140	0.8	70	1.2
V3 VP2	130	0.8	140	0.2
V4 2D2	—	—	—	—
V5 PM22D	135	4.3	140	0.7

* Oscillator anode (G2) 140 V, 0.9 mA.

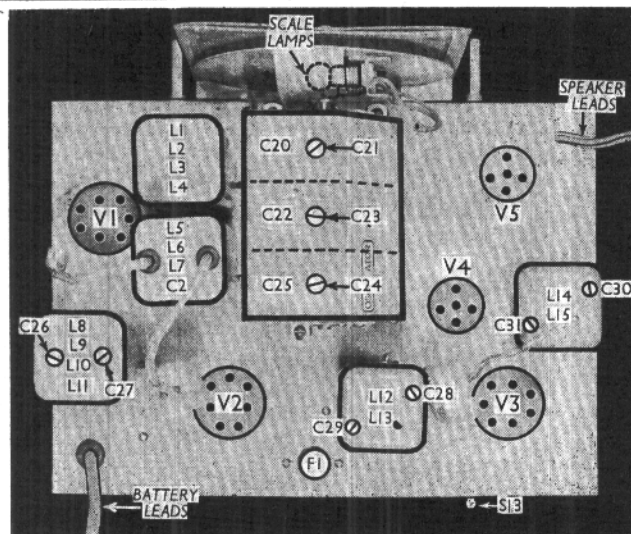
GENERAL NOTES

Switches.—S1-S9 are the wavechange and radio-gram. switches, and S12 the scale lamp switch which controls one of the lamps. These switches are ganged together in a single unit beneath the chassis, and indicated in our under-chassis view. The table below gives the switch positions for the various control settings, O indicating open and C, closed.

S10 and S11 are the H.T. and L.T.

Switch	M.W.	L.W.	Gram.
S1	C	O	O
S2	C	O	O
S3	C	O	C
S4	C	O	O
S5	C	O	O
S6	C	C	O
S7	C	C	O
S8	O	C	C
S9	C	C	O
S12	C	O	C

The plan view of the chassis shows a clean lay-out. Note that C2 is included in the H.F. transformer (L5, L6, L7) can. The fuse is a flash-lamp type screwed into a holder on the chassis deck and S13 at the rear of the chassis is the master switch for the scale lamps.



supply switches, of the Q.M.B. type, ganged with the volume control R11. Looking at the underside of the chassis, the top and bottom right hand tags belong to S11, and the top and bottom left-hand tags to S10.

S13 is the Q.M.B. scale lamp master switch, at the rear of the chassis. It is closed when the knob is down.

Coils.—L1-L4, L5-L7, L8-L11 and the two I.F. transformers, L12, L13 and L14, L15 are in five screened units on the chassis deck. The L5-L7 unit also contains C2, while the L8-L11 unit also contains the L.W. trimmer and tracker C26 and C27. The I.F. transformers contain their associated trimmers.

Scale Lamps.—These are two Osram M.E.S. types rated at 2.5 V, 0.2 A.

Fuse F1.—This is a Competa M.E.S. type, screwing into a holder on the chassis deck. It is rated at 0.15 A.

Batteries.—L.T., Three Star Type S.G.F. 3, 2 V 36 AH glass cell. H.T., Drydex 135 V, Type S55. Automatic grid bias is employed.

Battery Leads and Voltages.—Black lead, spade tag, L.T. negative; red lead, spade tag, L.T. positive 2 V; blue lead, black plug, H.T. negative; yellow lead, red plug, H.T. positive 135 V.

External Speaker.—Two terminals are provided on the internal speaker terminal strip for the connection of a high impedance (20,000 O) external speaker.

CIRCUIT ALIGNMENT

I.F. Stages.—Connect signal generator between top cap of V2 and chassis, switch set to M.W. and feed in a 117.5 KC/S signal. Adjust C31, C30, C29 and C28 in that order for maximum output, keeping the input low.

H.F. and Oscillator Stages.—Adjust pointer to coincide with horizontal lines at top end of scale when gang is at maximum. Connect signal generator to A and E sockets, switch set to M.W., adjust pointer to 250 m. on scale, and feed in a 250 m. signal. Adjust C24, C23 and C21, in that order, for maximum output.

Switch set to L.W., tune to 1,000 m. on scale, feed in a 1,000 m. signal, and adjust C26 for maximum output. Feed in a 1,900 m. signal, tune receiver to it, and adjust C27 while rocking gang.