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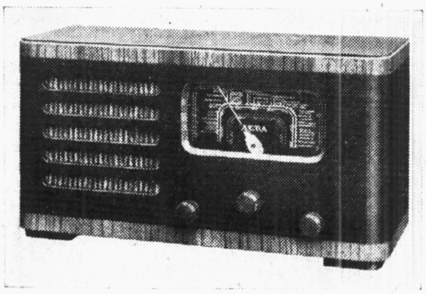
"TRADER" SERVICE SHEET 507

ALBA "CLIPPER"

AC/DC MIDGET



The Alba "Clipper" midget superhet receiver.

THREE wavebands are provided in the Alba "Clipper" receiver, a 4-valve (plus valve rectifier) AC/DC midget superhet. The receiver is designed to operate from mains of 200-250 volts, 40-100 C/S in the case of AC, but an additional resistance must be used if the supply voltage exceeds 240 V. The SW range is 16.5-50 m.

Octal-based Mullard "E" valves are used throughout, and a sheet of asbestos inside the top of the cabinet protects the wood from damage by heat. The heater circuit ballast resistance is housed in the mains lead. A length of aerial wire is permanently attached to the receiver.

Release date: March, 1940.

CIRCUIT DESCRIPTION

Input from attached aerial is via series isolating condenser **C1** and coupling coils, **L1** (SW) and **L2** (MW and LW), to single tuned circuits **L3, C29** (SW), **L4, C29** (MW) and **L5, C29** (LW). Coupling is modified on MW by the inclusion of the small coupling condenser **C2.** No provision is made for the connection of an external earth connection, and none may be made except via a large capacity tubular condenser, since the chassis is "live" to the mains. The receiver is earthed automatically via the mains.

First valve **(V1, Mullard CCH35** or **ECH33)** is a triode-heptode operating as frequency changer with internal coupling. Triode oscillator grid coils **L6** (SW), **L7** (MW) and **L8** (LW) are tuned by **C30.** Parallel trimming by **C31** (SW), **C32** (MW) and **C33** (LW); series tracking by **C34** (MW) and **C35** (LW).

Reaction coupling from anode by coils **L9** (SW) via stabilising resistance **R6, L10** (MW) and **L11** (LW).

Second valve **(V2, Mullard EF39)** is a variable-mu RF pentode operating as intermediate frequency amplifier with tuned-primary, tuned-secondary, iron-cored transformer couplings **C36, L12, L13, C37** and **C38, L14, L15, C39.**

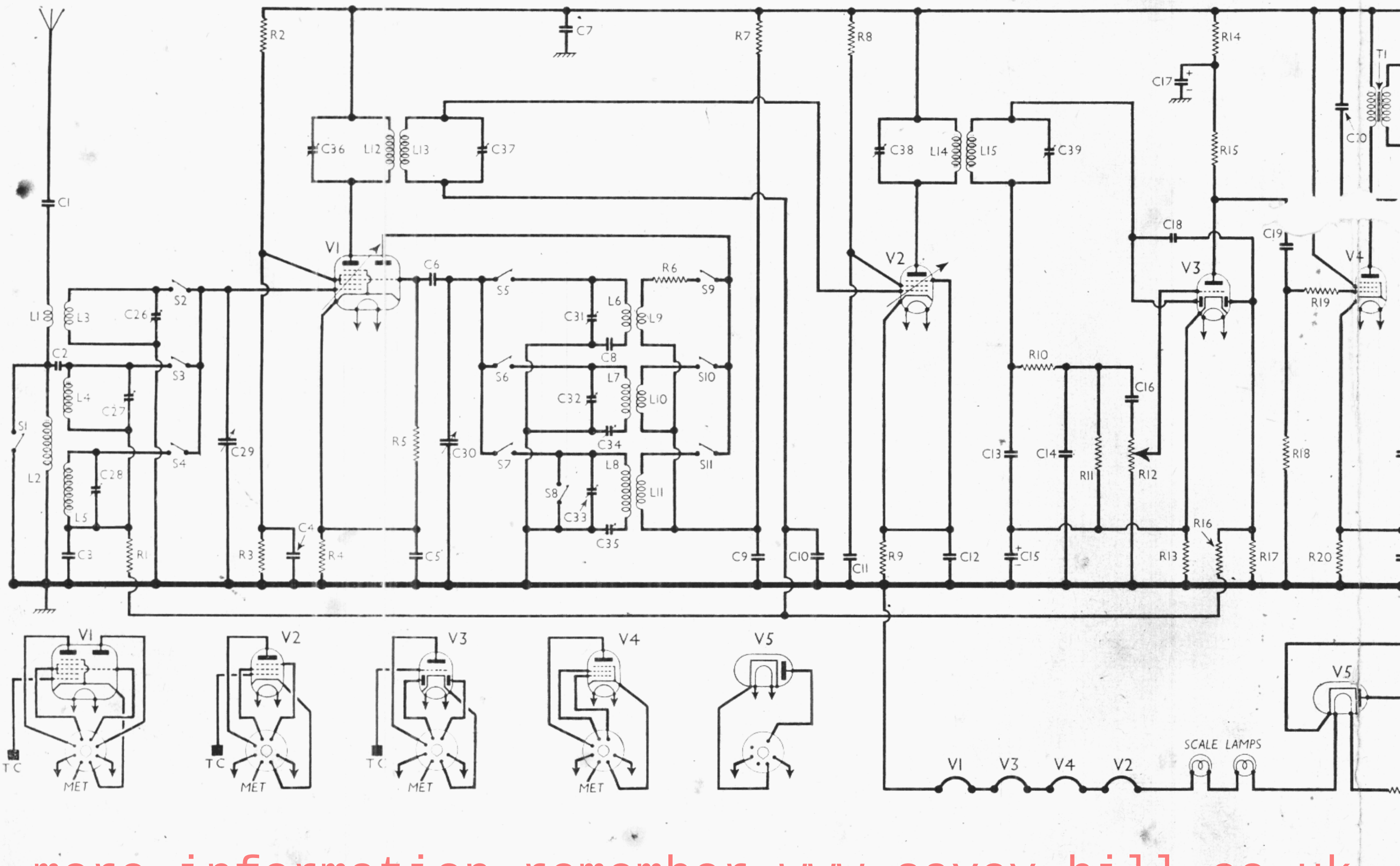
The transformer coil cores are fixed, and pre-set trimmers are used in the normal manner for alignment adjustments.

Intermediate frequency 470 KC/S.

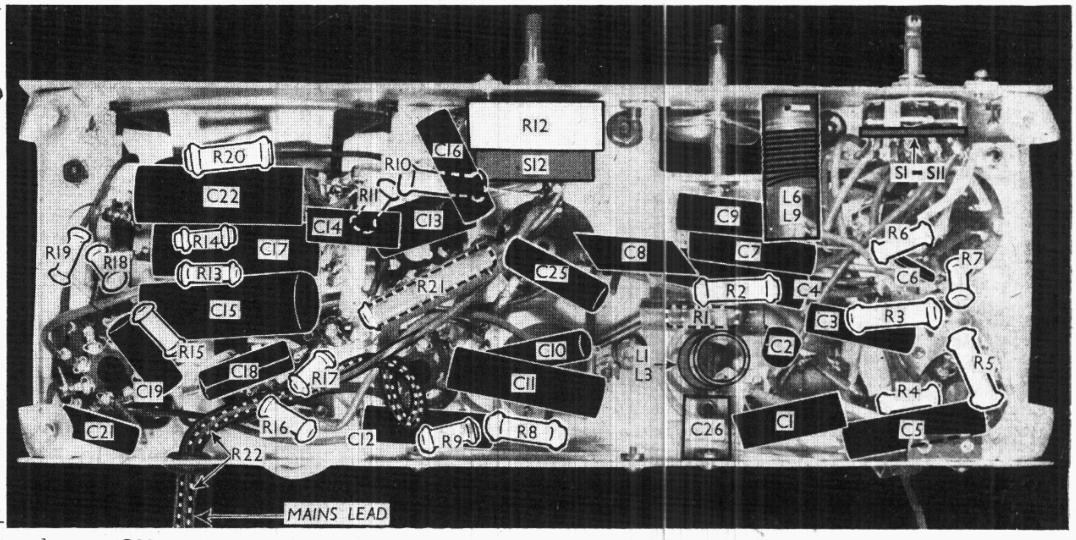
Diode second detector is part of double diode triode valve **(V3, Mullard EBC33).** Audio frequency component in rectified output is developed across load resistance **R11** and passed via AF coupling condenser **C16** and manual volume control **R12** to CG of triode section, which operates as AF amplifier. IF filtering by **C13, R10** and **C14** in diode circuit.

Second diode of **V3,** fed from **L15** via the small coupling condenser **C18,** provides DC potential which is developed across load resistance **R17** and fed back through decoupling circuits as GB to FC and IF valves, giving automatic volume control. Delay voltage, together with GB for triode section, is obtained from drop along resistance **R13** in cathode lead to chassis.

Resistance-capacity coupling by **R15, C19** and **R18,** via grid stopper **R19,** between **V3** triode and pentode output valve **(V4, Mullard CL33).** Fixed tone correc-



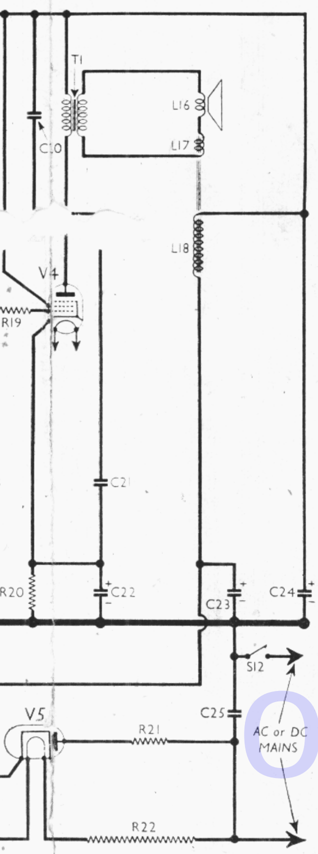
Under-chassis view. The SW coil units and trimmers are seen, although the trimmer screws are reached through holes in the chassis deck. The switch unit is indicated here, and shown in detail is the diagram in column 3 overleaf. **R22** (shown dotted) is wound in the same covering as the mains lead.



tion in anode circuit by condensers **C20** (between anode and HT positive line) and **C21** (between anode and cathode).

When the receiver is operating from AC mains, HT current is supplied by half-wave rectifying valve **(V5, Mullard CY31)** which, with DC mains, behaves as a low resistance. Smoothing is effected by speaker field **L18** in conjunction with the dry electrolytic condensers **C23, C24.** RF filtering in HT circuit by **C7** and in mains circuit by **C25.**

Valve heaters, together with scale lamps and the line cord ballast resistance **R22,** are connected in series across the mains input.



Circuit diagram of the Alba "Clipper" AC/DC midget receiver. Iron-dust cores are used in the aerial and IF coils, and delayed AVC is obtained from separate diode in **V3.** A short length of aerial wire is permanently attached to the receiver. The heater circuit ballast resistance **R22** forms part of the mains lead. Valve base diagrams appear beneath the circuit diagram.

COMPONENTS AND VALUES

	RESISTANCES	Values (ohms)
R1	V1 heptode CG decoupling	100,000
R2	V1 SG HT feed potential divider	25,000
R3		40,000
R4	V1 fixed GB resistance ...	220
R5	V1 osc. CG resistance ...	40,000
R6	Osc. SW reaction stabiliser	220
R7	V1 osc. anode HT feed ...	10,000
R8	V2 SG HT feed ...	90,000
R9	V2 fixed GB resistance ...	300
R10	IF stopper	40,000
R11	V3 signal diode load ...	500,000
R12	Manual volume control ...	500,000
R13	V3 triode GB; AVC delay	1,500
R14	V3 triode anode decoupling	5,000
R15	V3 SG HT feed ...	20,000
R16	AVC line decoupling ...	1,000,000
R17	V3 AVC diode load ...	1,000,000
R18	V4 CG resistance... ...	220,000
R19	V4 grid stopper	30,000
R20	V4 GB resistance... ...	170
R21	V5 and surge limiter ...	100
R22	Heater circuit ballast ...	700

	OTHER COMPONENTS	Approx. Values (ohms)
L1	Aerial SW coupling coil ...	0·7
L2	Aerial MW and LW coupling coil	36·0
L3	Aerial SW tuning coil ...	0·1
L4	Aerial MW tuning coil ...	1·[illegible]
L5	Aerial LW tuning coil ...	14·0
L6	Osc. circ. SW tuning coil...	0·1
L7	Osc. circ. MW tuning coil...	3·0
L8	Osc. circ. LW tuning coil...	9·0
L9	Oscillator SW reaction ...	19·0
L10	Oscillator MW reaction ...	33·0
L11	Oscillator LW reaction ...	53·0
L12	1st IF trans. Pri. ...	5·5
L13	1st IF trans. Sec. ...	4·5
L14	2nd IF trans. Pri. ...	9·5
L15	2nd IF trans. Sec. ...	9·5
L16	Speaker speech coil ...	3·8
L17	Hum neutralising coil ...	0·05
L18	Speaker field coil	600·0
T1	Speaker input trans. Pri. ...	280·0
	Speaker input trans. Sec. ...	0·5
S1-S11	Waveband switches ...	—
S12	Mains switch, ganged R12	—

VALVE ANALYSIS

Valve voltages and currents given in the table (col. 6) are those measured in our receiver when it was operating on AC mains of 232 V. This is no voltage adjustment.

The receiver was tuned to the lowest wavelength on the medium wave band,

	CONDENSERS	Values (μF)
C1	Aerial isolating condenser	0·0002
C2	Aerial MW top coupling...	0·000005
C3	V1 heptode CG decoupling	0·05
C4	V1 SG decoupling ...	0·1
C5	V1 cathode by-pass ...	0·1
C6	V1 osc. CG condenser ...	0·0001
C7	HT circuit RF by-pass ...	0·1
C8	Osc. circuit SW tracker ...	0·0025
C9	V1 osc. anode decoupling	0·1
C10	V2 CG decoupling ...	0·05
C11	V2 SG decoupling ...	0·1
C12	V2 cathode by-pass ...	0·1
C13	IF by-pass condensers ...	0·0005
C14	IF by-pass condensers ...	0·0001
C15*	V3 cathode by-pass ...	25·0
C16	AF coupling to V3 triode	0·01
C17*	V3 triode anode decoupling	4·0
C18	Coupling to V3 AVC diode	0·00006
C19	V3 triode to V4 AF coupling	0·02
C20	Fixed tone correctors ...	0·005
C21	Fixed tone correctors ...	0·002
C22*	V4 cathode by-pass ...	25·0
C23*	HT smoothing condensers	16·0
C24*	HT smoothing condensers	16·0
C25	Mains RF by-pass ...	0·05
C26‡	Aerial circuit SW trimmer	—
C27‡	Aerial circuit MW trimmer	—
C28‡	Aerial circuit LW trimmer	—
C29†	Aerial circuit tuning ...	—
C30†	Oscillator circuit tuning...	—
C31‡	Osc. circuit SW trimmer	—
C32‡	Osc. circuit MW trimmer	—
C33‡	Osc. circuit LW trimmer	—
C34‡	Osc. circuit MW tracker...	0·0006
C35‡	Osc. circuit LW tracker...	0·0003
C36‡	1st IF trans. pri. tuning...	0·00025
C37‡	1st IF trans. sec. tuning...	0·00025
C38‡	2nd IF trans. pri. tuning...	0·0001
C39‡	2nd IF trans. sec. tuning...	0·0001

*Electrolytic. †Variable. ‡Pre-set.

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.

Valve		Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1	CCH35	200	1·7	95	2·3
		Oscillator 135	Oscillator 6·4		
V2	EF39	200	4·3	72	1·4
V3	EBC33	132	2·1	—	—
V4	CL33	188	39·0	200	6·8
V5	CY31	245†	—	—	—

† Cathode to chassis, DC.

DISMANTLING THE SET

Removing Chassis.—Remove the three control knobs (recessed grub screws) from the front of the cabinet;

remove the two wooden blocks (each held by four countersunk-head wood screws) from the ends of the bottom of the cabinet;

remove the four cheese-head set screws (with metal washers) thus exposed, holding the chassis to the bottom of the cabinet.

The chassis, with the speaker, may now be withdrawn as a complete unit.

GENERAL NOTES

Switches.—**S1**—**S11** are the waveband switches, in a single rotary unit mounted on the front member beneath the chassis.

The position of the unit is indicated in our under-chassis view, and a diagram in column 3 shows the unit in detail. It is drawn as seen from the rear of the underside of the chassis. The table (below) gives the switch positions for the three control settings, starting from the fully anti-clockwise position of the control knob.

S12 is the QMB mains switch, ganged with the volume control **R12.**

Switch Table

Switch	SW	MW	LW
S1	C	—	—
S2	C	—	—
S3	—	C	—
S4	—	—	C
S5	C	—	—
S6	—	C	—
S7	—	—	C
S8	—	C	—
S9	C	—	—
S10	—	C	—
S11	—	—	C

Coils.—The short wave coils **L1, L3** and **L6, L9** are in two unscreened tubular units beneath the chassis deck. **L3** and **L6** are the thick wire windings respectively.

The remaining aerial and oscillator coils **L2, L4, L5** and **L7, L8, L10, L11** are mounted in two screened units on the chassis deck with their associated trimmers and trackers.

L12, L13 and **L14, L15** are the IF transformers, in two further screened units on the chassis deck. These units also contain their associated trimmers.

Condensers C15, C22.—These are respectively **V3** and **V4** cathode by-pass condensers. They are both Plessey dry electrolytics in tubular cardboard containers, rated at 25 μF, 25 V working, 35 V surge.

Condenser C17.—This is a TCC type FW electrolytic condenser, of similar appearance to those above. It is rated at 4 μF, 200 DC working, although in some chassis its capacity may be 2 μF.

Condensers C23, C24.—These are two 16 μF condensers, in a single tubular metal container, mounted vertically in a clip on the chassis deck. The can forms the common negative, and the two positive tags are connected directly to the two ends of the speaker field. The condensers are rated at 350 V working.

Scale Lamps.—Two MES type lamps with large-diameter bulbs are used. Their rating is 5.5 V, 0.3 A. The lampholders are of an insulated type, but since the lamps are in a part of the heater circuit which is about 25 V above chassis, care should be taken that the connecting tags are kept away from other metal parts on the chassis. The leads to the lamps should be tucked away, so that they do not foul the tuning condenser vanes.

Resistance R22.—This is the heater circuit ballast resistance, which takes the form of a line cord. It runs the whole length of the mains lead, which must, therefore, not be cut, and should normally be left uncoiled when the receiver is in use, so that the heat may be dissipated easily. The mains lead on our chassis was 3 feet long; its resistance was 700 O.

250 V Mains.—If the receiver is required to operate from mains whose voltage exceeds 240 V, an additional resistance is required. The makers supply a special additional length of line cord, which plugs into the mains socket at one end and accepts the original mains plug at the other, for this purpose. No other voltage adjustment is provided. The value of the additional resistance is 100 O.

Chassis Divergencies.—There were in our chassis several small divergencies as compared with the details in the makers' information. In our component tables, the values given are those found in our chassis, which were as follows: **R3, R5** and **R10,** were 40,000 O instead of 50,000 O; **R4** and **R6** were both 220 O instead of 200 O and 300 O respectively; **R18** was 220,000 O instead of 250,000 O; and **R19** was 30,000 O instead of 50,000 O.

Of the condensers, **C18** was 60 $\mu\mu$F (0.00006 μF) instead of 25 $\mu\mu$F (0.000025 μF), **C17** was a 4 μF instead of 2 μF, and **C20** was 0.005 μF instead of 0.002 μF, while the bottom end of **C14** was returned to chassis instead of to **V3** cathode.

In our chassis, also, the positions of **V2** and **V4** in the heater chain are transposed as compared with the makers' diagram.

None of these divergencies is serious, and no doubt the nearest available values, in the cases of components, were used to avoid production delays. Replacements should be made with components of similar values to those removed, where these are known.

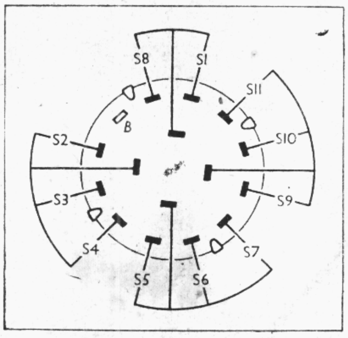


Diagram of the switch unit, as seen from the rear of the underside of the chassis.

CIRCUIT ALIGNMENT

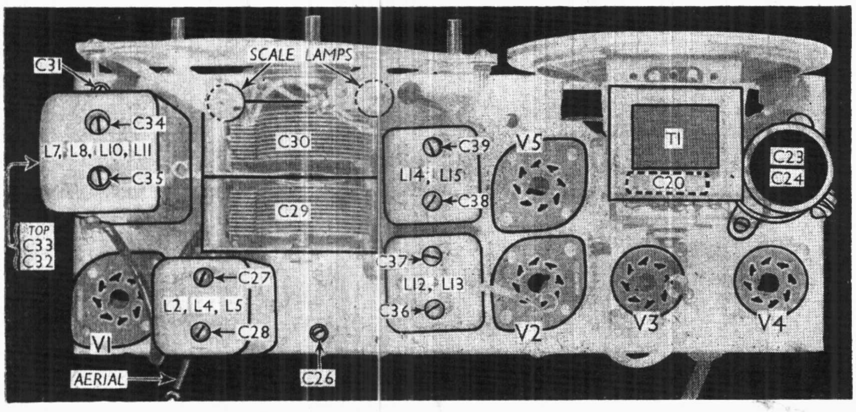
IF Stages.—Connect signal generator via a non-inductive condenser of about 0.1 μF to control grid (top cap) of **V1,** and via a second 0.1 μF condenser to chassis. Short-circuit **C30,** feed in a 470 KC/S (638.3 m) signal, and adjust **C39, C38, C37** and **C36** in turn for maximum output. Re-check these settings, and remove short-circuit from **C30.**

RF and Oscillator Stages.—With the gang at maximum, pointer should be horizontal. Connect signal generator via a suitable dummy aerial to the aerial side of **C1,** and via a 0.1 μF condenser to chassis.

MW.—Switch set to MW, tune to 250 m on scale, feed in a 250 m (1,200 KC/S) signal, and adjust **C32,** then **C27,** for maximum output. Feed in a 500 m (600 KC/S) signal, tune it in, and adjust **C34** for maximum output while rocking the gang for optimum results. Repeat the whole procedure until no improvement can be obtained.

LW.—Switch set to LW, tune to 1,300 m on scale, feed in a 1,300 m (233 KC/S) signal, and adjust **C33,** then **C28,** for maximum output. Feed in a 1,900 m (158 KC/S) signal, tune it in, and adjust **C35** for maximum output while rocking the gang for optimum results. Repeat the whole operation until no improvement results.

SW.—Switch set to SW, tune to 31 m on scale, feed in a 31 m (9.68MC/S) signal, and adjust **C31,** then **C26,** for maximum output. There are no tracking adjustments on the SW band.



Plan view of the chassis. All the trimmer and tracker adjustments are indicated in this view, although the chassis must be removed to give access to C32 and C33.