

AERODYNE 284

4-BAND BATTERY RECEIVER

TWO short-wave bands of 13-49 and 48-170 metres are covered by the Aerodyne 284 3-valve battery 4-band receiver. Its valve arrangement comprises a variable- μ pentode R.F. amplifier, a triode detector and a pentode output valve, and provision is made for the connection of an extension speaker.

CIRCUIT DESCRIPTION

Aerial input from **A1** on M.W. and L.W. via coupling coils **L1** (M.W.) and **L2** (L.W.) to capacity coupled band-pass filter. Primary coils **L3** (M.W.) and **L4** (L.W.) are tuned by **C17**; secondaries **L9** (M.W.), **L10** (L.W.) by **C20**; coupling by condensers **C3** and **C4**. On S.W. input is via **C2** and coupling coil **L5** (S.W.1), or **L6** (S.W.2) to single tuned circuits **L7**, **C20** (S.W.1) and **L8**, **C20** (S.W.2). From **A2** socket aerial input is fed to **A1** via series condenser **C1**.

First valve (**V1**, Mullard metallised **VP2**), is a variable- μ pentode operating as R.F. amplifier with gain control by potentiometer **R3** which varies G.B. applied.

Tuned-anode coupling by **L15**, **C23** (S.W.1), **L16**, **C23** (S.W.2), **L17**, **C23** (M.W.) and **L18**, **C23** (L.W.), between **V1** and triode detector valve (**V2**, Mullard metallised **PM2HL**) which operates on leaky grid system with **C8** and **R7**. Reaction is applied from anode by coils **L11** (S.W.1), **L12** (S.W.2), **L13** (M.W.) and **L14** (L.W.) and controlled by variable condenser **C21**. R.F. filtering in anode circuit by **R10**, **C10** and **L19**. Fixed tone correction by **C11**. Provision for connection of gramophone pick-up in grid circuit.

Parallel-fed auto-transformer coupling by **R9**, **C12** and **T1** between **V2** and pentode

output valve (**V3**, Mullard **PM22A**). G.B. is obtained automatically from drop along potentiometer **R12**, **R13** in H.T. negative lead to chassis. Fixed tone correction by R.C. filter **C13**, **R11** in anode circuit. Provision for connection of low impedance external speaker across secondary of output transformer **T2**.

DISMANTLING THE SET

A detachable bottom is fitted to the cabinet and upon removal (four round-head wood screws) gives access to most of the components beneath the chassis.

Removing Chassis.—If it should be desired to remove the chassis from the cabinet, remove the detachable bottom (four round-head wood screws) and the four screws (with washers) holding the chassis to the bottom of the cabinet. Now remove the battery platform (pull out) and release the switch indicator control cord from the cleat holding it to the sub-baffle and unclip it from the indicator.

Next unhook and free from the drum on the tuning condenser the pointer drive cord, and free the scale lamp leads from the two staples holding them to the side of the cabinet. The chassis can now be withdrawn to the extent of the leads.

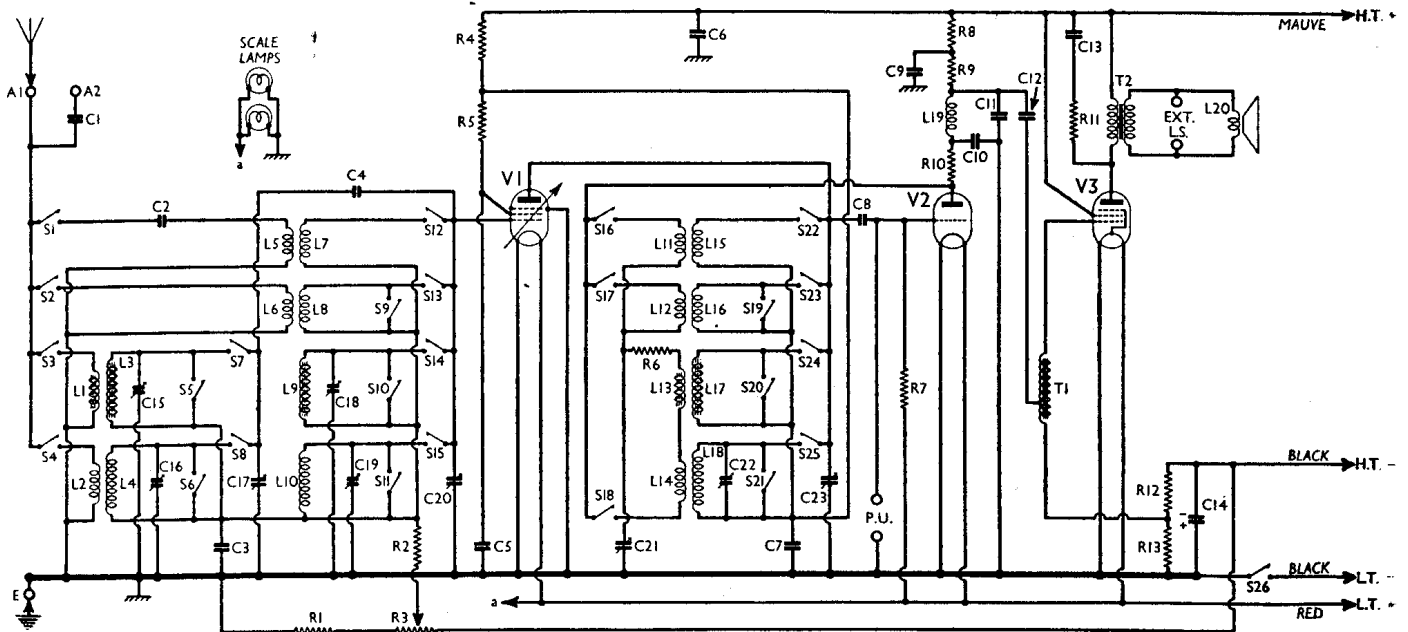
To free the chassis entirely, unsolder the leads to the scale lamps, speaker and extension speaker panel.

Removing Speaker.—To remove the speaker from the cabinet, slacken the three clamps (nuts and lock nuts) and remove the two round-head wood screws holding it to the sub-baffle. *When replacing*, see that the terminal panel points to the top right-hand corner of the cabinet.

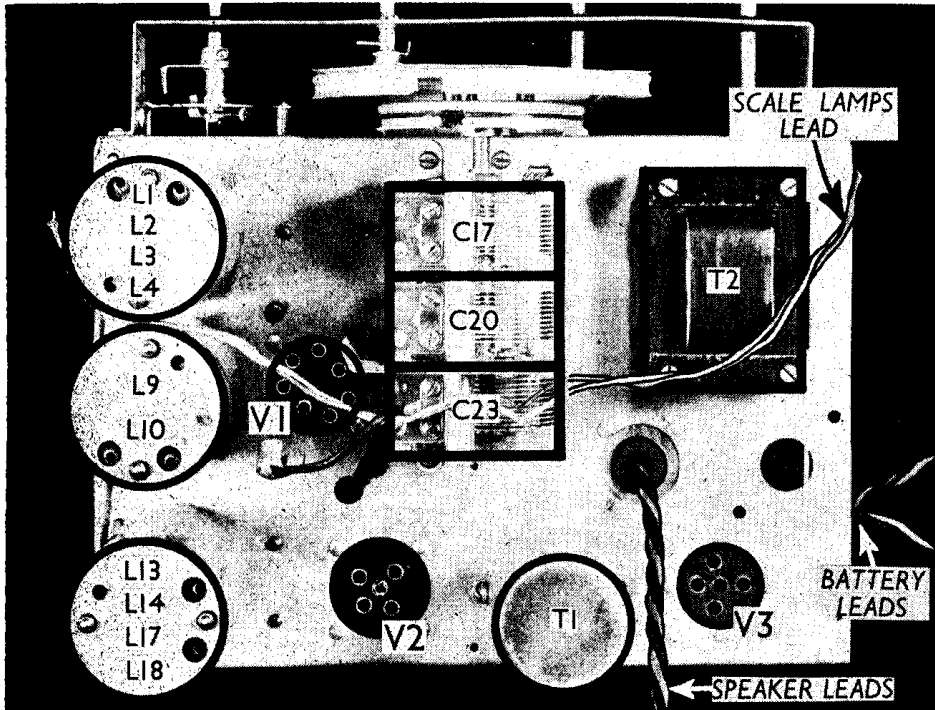
COMPONENTS AND VALUES

RESISTANCES		Values (ohms)
R1	V1 fixed G.B. resistance ..	200
R2	V1 C.G. decoupling ..	30,000
R3	V1 gain control ..	10,000
R4	V1 anode and S.G. H.T. feed ..	2,000
R5	V1 S.G. H.T. feed ..	2,000
R6	M.W. and L.W. reaction damping ..	1,000
R7	V2 grid leak ..	2,000,000
R8	V2 anode decoupling ..	10,000
R9	V2 anode load ..	30,000
R10	V2 anode R.F. stopper ..	5,000
R11	Part of fixed T.C. filter ..	20,000
R12	V3 automatic G.B. ..	1,000
R13	V3 potential divider ..	380

CONDENSERS		Values (μ F)
C1	A2 aerial series condenser ..	0.001
C2	Aerial S.W. series condenser ..	0.00003
C3	Band-pass bottom coupling ..	0.05
C4	Band-pass top coupling ..	0.000003
C5	V1 S.G. decoupling ..	0.1
C6	H.T. circuit by-pass ..	1.0
C7	V1 anode decoupling ..	0.1
C8	V2 C.G. condenser ..	0.00003
C9	V2 anode decoupling ..	1.0
C10	V2 anode R.F. by-pass ..	0.0003
C11	Fixed tone corrector ..	0.001
C12	V2 to V3 A.F. coupling ..	0.1
C13	Part of fixed T.C. filter ..	0.01
C14	Automatic G.B. decoupling ..	25.0
C15	Band-pass pri. M.W. trimmer ..	0.00003
C16	Band-pass pri. L.W. trimmer ..	0.00003
C17	Band-pass primary tuning ..	0.00044
C18	Band-pass sec. M.W. trimmer ..	0.00003
C19	Band-pass sec. L.W. trimmer ..	0.00003
C20	Band-pass sec. and S.W.1, S.W.2 aerial tuning ..	0.00044
C21	Reaction control ..	0.00075
C22	V1 anode circ. L.W. trimmer ..	0.00003
C23	V1 anode circuit tuning ..	0.00044



Circuit diagram of the Aerodyne 284 4-band battery receiver.



Plan view of the chassis. All the trimmers are beneath the chassis.

are on four tubular formers beneath the chassis; and are unscreened. The choke L19 is also beneath the chassis.

The auto-transformer T1 is in a screened unit on the chassis deck.

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

External Speaker.—Two sockets are provided on a panel at the right of the back of the cabinet for a low impedance (2-3 Ω) external speaker.

Condenser C4.—This is a small capacity coupling between the top of C17 and the top of C20 in our chassis. In the makers' diagram it is from the top of L3 to the top of L9, and so is only in circuit on M.W.

The coupling is shown on our diagram as a single condenser, but it actually consists of a tinned copper wire, with a few turns at each end taken round the insulated leads from C17 and C20 respectively. It is marked in our under chassis view.

Condensers C6, C9.—These are two 1 μF paper types in a rectangular metal case beneath the chassis. The tag nearest the front of the chassis is common to both condensers. Of the others, that going to R9 and R8 belongs to C9, and that connected to R8 and R4 belongs to C6.

Batteries.—L.T., 2 V accumulator cell. H.T., 130 V dry H.T. battery. G.B. is automatic.

Battery Leads and Voltages.—Black lead, spade tag, L.T. negative; red lead, spade tag, L.T. positive 2 V; black lead and plug, H.T. negative; mauve lead, red plug, H.T. positive 130 V.

CIRCUIT ALIGNMENT

S.W.1. and **S.W.2.**—There are no trimmers for the S.W.1 and S.W.2 ranges, alignment being effected at the works by the disposition of the anode coil wiring at the lower ends of the wavelength scales, and by moving the top turn of L15 and L16 at the higher ends of the wavelength

Continued overleaf

OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial M.W. coupling	0.3
L2	Aerial L.W. coupling	15.0
L3	Band-pass primary coils	1.3
L4		15.0
L5	Aerial S.W.1 coupling	0.3
L6	Aerial S.W.2 coupling	0.7
L7	Aerial S.W.1 tuning coil	0.05
L8	Aerial S.W.2 tuning coil	0.3
L9	Band-pass secondary coils	1.3
L10		15.0
L11	S.W.1 reaction coil	0.4
L12	S.W.2 reaction coil	0.7
L13	M.W. reaction coil	—
L14	L.W. reaction coil	3.5
L15	V1 anode S.W.1 tuning coil	0.05
L16	V1 anode S.W.2 tuning coil	0.25
L17	V1 anode M.W. tuning coil	1.3
L18	V1 anode L.W. tuning coil	15.0
L19	V2 anode R.F. choke	35.0
L20	Speaker speech coil	2.25
T1	Intervalve transformer, total	5,000.0
T2	Output trans. { Pri.	1,000.0
	{ Sec.	0.2
S1-S25	Waveband switches	—
S26	L.T. circuit switch	—

chassis. These are indicated in our under-chassis view, and shown in detail in the diagrams on page IV, where they are seen looking from the rear of the underside of the chassis.

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

S26 is the Q.M.B. L.T. circuit switch, ganged with gain control R3.

Coils.—L1-L4; L9, L10 and L13, L14, L17, L18 are in three screened units on the chassis deck. The S.W. coils L5, L7; L6, L8; L11, L15 and L12, L16

VALVE ANALYSIS

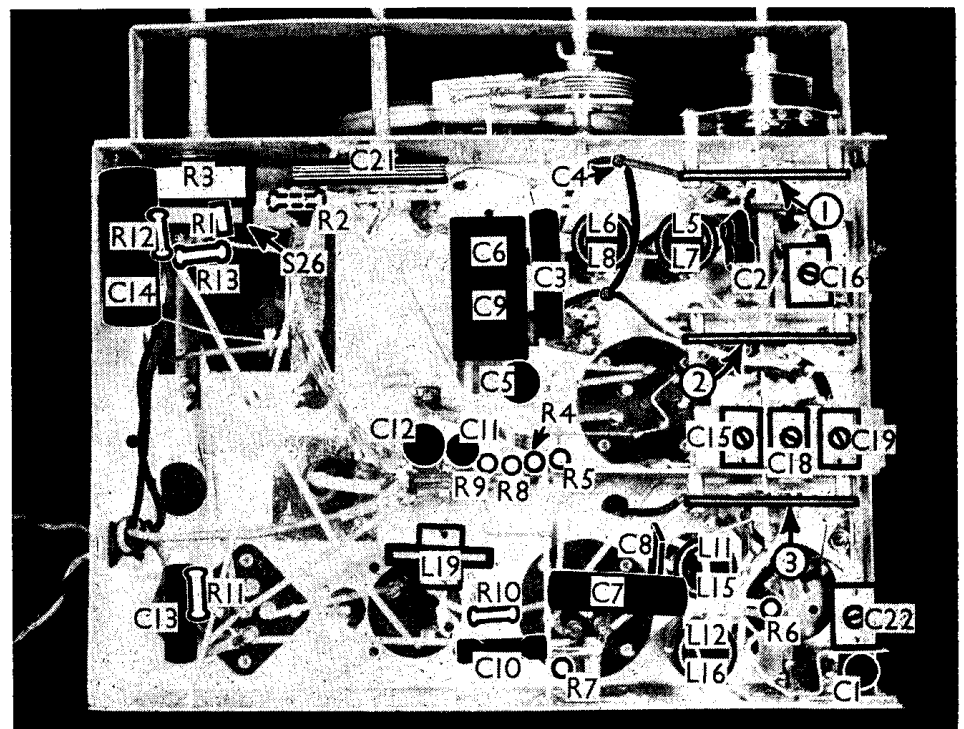
Valve voltages and currents given in the table below are those measured in our receiver when it was operating with an H.T. battery reading 130 V, on load. The receiver was tuned to the lowest wavelength on the medium band and the volume control was at maximum, but the reaction control was at minimum. 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	112	1.5	110	0.4
V2 PM2HL	62	1.0	—	—
V3 PM22A	111	5.4	117	1.0

GENERAL NOTES

Switches.—S1-S25 are the waveband switches, in three rotary units beneath the



Under-chassis view. The small condenser C4 is explained under General Notes.

AERODYNE 284—Continued

scales. The top turns of **L7** and **L8** are also adjusted at the higher ends of the wavelength scales, using critical reaction.

Normally these adjustments will not be necessary.

M.W.—Switch set to M.W., feed a 250 m. signal into **A1** and **E** sockets, tune to 250 m. on scale, and adjust **C15** and **C18** for maximum output.

L.W.—Switch set to L.W., feed in a 1,200 m. signal, tune to 1,200 m. on scale,

Switch Table

Switch	L.W.	M.W.	S.W.2	S.W.1
S1	—	—	—	C
S2	—	—	C	—
S3	—	C	—	—
S4	C	—	—	—
S5	—	—	C	—
S6	—	C	—	—
S7	—	C	—	—
S8	C	—	—	—
S9	—	—	—	C
S10	—	—	C	—
S11	—	C	—	—
S12	—	—	—	C
S13	—	—	C	—
S14	—	C	—	—
S15	C	—	—	—
S16	—	—	—	C
S17	—	—	C	—
S18	C	C	—	—
S19	—	—	—	C
S20	—	—	C	—
S21	—	C	—	—
S22	—	—	—	C
S23	—	—	C	—
S24	—	C	—	—
S25	C	—	—	—

and adjust **C22**, then **C19** and **C16** for maximum output.

For optimum results on M.W. and L.W., the receiver should be maintained just short of oscillation.

Switch Diagram

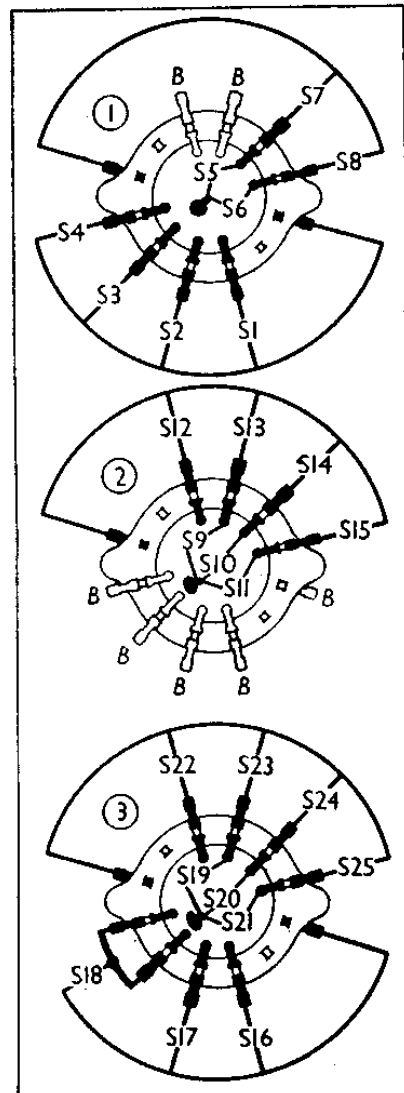


Diagram of the three switch units, as seen from the rear of the underside of the chassis. Tags marked **B** are blank.