NUMBER 135 **'TRADER' SERVICE SHEETS**

AERODYNE 50

4-VALVE BATTERY SUPERHET

FOR battery operation, the Aerodyne 50 is fitted with a 4-valve superhet chassis. It has a Q.P.P. output stage, and incorporates provision for a gramophone pick-up.

CIRCUIT DESCRIPTION

Aerial input via **A1** or **A2** (with fixed series condenser **C1**) and coupling coil **L1, L2** to capacity-coupled band-pass filter. Primary **L3, L4** tuned by **C20**; secondary **L5, L6** tuned by **C22**; coupling by **C3** and small top end capacity **C2.**

First valve (**V1, Mullard metallised FC2**) is an octode operating as frequency changer with electron coupling. Oscillator grid coils **L7, L8** tuned by **C24**; tracking by **C7, C32** (M.W.) and **C27** (L.W.); anode reaction coils **L9, L10.**

Second valve, a variable-mu H.F. pentode (**V2, Mullard metallised VP2**), operates as intermediate frequency amplifier with tuned-primary tuned-secondary transformer couplings **C28, L11, L12, C29** and **C30, L13, L14, C31.**

Intermediate frequency, 125 KC/S.

Diode second detector forms part of double diode triode valve (**V3, Mullard metallised TDD2A**). Audio-frequency component in rectified output is developed across manual volume control **R6** and passed via I.F. stopper **R7,** and coupling condenser **C11** to C.G. of triode section, which operates as L.F. amplifier. Provision for connection of pick-up.

Second diode of **V3,** fed from **V2** anode via **C13,** provides D.C. potential which is developed across **R10, R11** and fed back as G.B. to F.C. and I.F. valves giving automatic volume control.

Parallel fed transformer coupling by **R9, C14** and **T1** to quiescent push-pull output stage comprising double pentode valve (**V4, Osram QP21**). Resistance **R15** prevents parasitic oscillations. Fixed tone correction by condensers **C17, C18, C19.** Variable tone control by **R16, C16.** Coupling to speaker by special input transformer **T2.** Provision for connection of low-impedance external speaker across secondary winding.

Potentials for **V3** and **V4** G.B., and for A.V.C. delay are obtained from potential divider **R12, R13, R14,** which also forms G.B. battery load.

CONDENSERS		Values (μF)
C1	Aerial series condenser	0·00005
C2	Band-pass top coupling	Very low
C3	Band-pass main coupling	0·05
C4	V1 A.V.C. line decoupling	0·01
C5	V1 S.G.'s by-pass	0·1
C6	V1 osc. C.G. condenser	0·0001
C7	Osc. M.W. tracker, fixed	0·00015
C8	Blocking condenser	0·1
C9	V2 C.G. decoupling	0·05
C10	I.F. by-pass	0·0001
C11	L.F. coupling to V3	0·01
C12	I.F. by-pass	0·0001
C13	Coupling to V3 A.V.C. diode	0·00005
C14	L.F. coupling to T1	0·05
C15	H.T. supply reservoir	0·25
C16	Part variable T.C. filter	0·01
C17	Fixed tone compensators	0·001
C18	Fixed tone compensators	0·001
C19	Fixed tone compensators	0·001
C20†	Band-pass primary tuning	0·0005
C21‡	Band-pass primary trimmer	—
C22†	Band-pass secondary tuning	0·0005
C23‡	Band-pass secondary trimmer	—
C24†	Oscillator tuning	0·0005
C25‡	Oscillator main trimmer	0·00003
C26‡	Oscillator L.W. trimmer	0·000025
C27‡	Oscillator L.W. tracker	0·0008
C28‡	1st I.F. trans. pri. tuning	0·00014
C29‡	1st I.F. trans. sec. tuning	0·00007
C30‡	2nd I.F. trans. pri. tuning	0·00007
C31‡	2nd I.F. trans. sec. tuning	0·00014
C32	Oscillator M.W. tracker, fixed	0·01

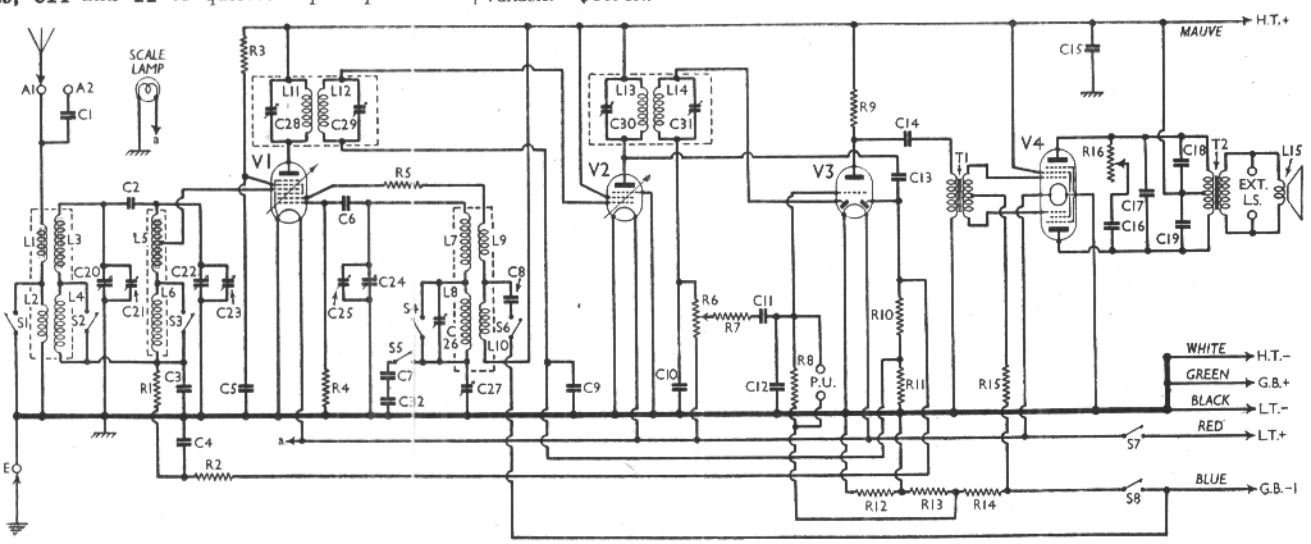
† Variable. ‡ Pre-set.

RESISTANCES		Values (Ohms)
R1	V1 pentode C.G. decoupling	500,000
R2	V1 A.V.C. line decoupling	2,000,000
R3	V1 S.G.'s H.T. feed	50,000
R4	V1 osc. C.G. resistance	60,000
R5	V1 osc. anode stabiliser	500
R6	Manual volume control	500,000
R7	I.F. stopper	250,000
R8	V3 triode C.G. resistance	2,000,000
R9	V3 triode anode load	50,000
R10	V3 A.V.C. diode load	2,000,000
R11	V3 A.V.C. diode load	2,000,000
R12	G.B. battery load and potential divider.	200
R13	G.B. battery load and potential divider.	200
R14	G.B. battery load and potential divider.	1,500
R15	V4 C.G. circuits stabiliser	100,000
R16	Variable tone control	50,000

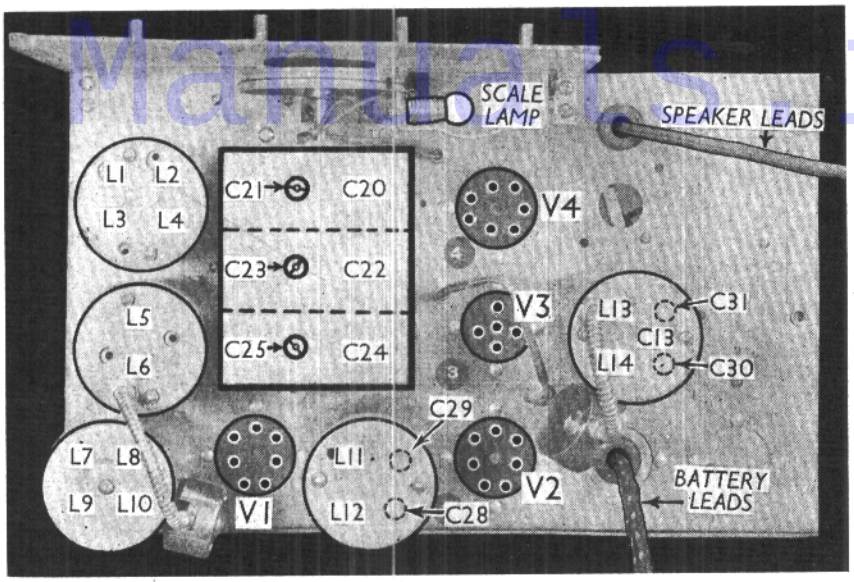
OTHER COMPONENTS			Approx. Values (Ohms)
L1	Aerial coupling coils		0·3
L2	Aerial coupling coils		39·0
L3	Band-pass primary coils		1·2
L4	Band-pass primary coils		13·0
L5	Band-pass secondary coils		1·2
L6	Band-pass secondary coils		13·0
L7	Oscillator tuning coils		4·2
L8	Oscillator tuning coils		9·0
L9	Oscillator reaction coils		8·5
L10	Oscillator reaction coils		6·0
L11	1st I.F. trans.	Pri.	70·0
L12	1st I.F. trans.	Sec.	100·0
L13	2nd I.F. trans.	Pri.	100·0
L14	2nd I.F. trans.	Sec.	70·0
L15	Speaker speech coil		2·5
T1	Intervalve trans.	Pri.	1,250·0
T1	Intervalve trans.	Sec. total	3,750·0
T2	Speaker input trans.	Pri. total	550·0
T2	Speaker input trans.	Sec.	0·2
S1-S6	Waveband switches		—
S7	L.T. switch		—
S8	G.B. switch		—

DISMANTLING THE SET

Removing Chassis.—First remove the back and the batteries, then the four control knobs (pull off), and next the four bolts (with washers and rubber washers) holding the chassis to the bottom of the cabinet. Now remove the two small round-head wood screws holding the top of the tuning scale to the front of the cabinet, when the chassis can be with-



Circuit diagram of the Aerodyne 50 battery superhet. C32 may not occur in some chassis.



Plan view of the chassis. Note that the second I.F. unit also contains the fixed condenser C13.

drawn to the extent of the speaker leads, which is sufficient for normal purposes

When replacing, note that the knobs are marked with their purpose so that they must be placed on the correct spindles, also that two of the washers for the chassis bolts are cut away. These should be placed on the bolts at the front of the cabinet.

To free the chassis entirely, unsolder the speaker leads. *When replacing*, connect as follow, numbering the tags from bottom to top :—1, yellow ; 2, white ; 3, green.

Removing Speaker.—Disconnect the leads and remove the two round-head wood screws (with washers) and slacken the four clamps (with nuts and lock nuts). *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 battery reading 130 V. The set was tuned to the lowest wavelength on the medium band and the volume control was at maximum. There was no signal input.

Voltages were measured on the 1,200 V scale of an Avometer, with chassis as negative.

VALVE	Anode Volts	Anode Current (mA)	Screen Volts	Screen Current (mA)
V1 FC2*	130	0·2	60	1·2
V2 VP2	130	1·2	130	0·3
V3 TDD2A	90	0·6	—	—
V4 QP21	125†	0·8†	130	0·5

* Osc. anode (G2) 128 V, 0·7 mA.
† Each anode.

GENERAL NOTES

Switches.—All the switches are in a single unit beneath the chassis, and are indicated in our under-chassis view. Note that in several cases one contact is common to two switches. The table (col. 2) gives the switch positions for the M.W. and L.W. control settings, O indicating open, and C, closed. In the two "off" positions, all switches are open.

SWITCH	M.W.	L.W.
S1	C	O
S2	C	O
S3	C	O
S4	C	O
S5	C	O
S6	C	O
S7	C	C
S8	C	C

Coils.—All the tuning coils and I.F. transformers are in five screened units on the chassis deck, and are indicated in our plan chassis view. It should be noted that the second I.F. unit also contains the fixed condenser **C13.**

Scale Lamp.—This is an Osram M.E.S. type, rated at 3.5 V, 0.15 A.

Batteries.—It is recommended that a 2 V 50 AH L.T. cell should be used. For H.T. supply, a medium power H.T. battery of 130 or 150 V is desirable. With a 130 V H.T. battery, use a 9 V grid bias battery, and with 150 V H.T., a 15 V grid bias battery.

Battery Leads and Voltages.—Black lead, spade tag, L.T. negative ; red lead, spade tag, L.T. positive 2 V ; white lead, black plug, H.T. negative ; mauve lead, mauve plug, H.T. positive (130 V or 150 V) ; green lead, red plug, G.B. positive ; blue lead, yellow plug, G.B. negative. With a 130 V H.T. battery, G.B. negative is −9 V when **V4** is marked V, and −7.5 V when **V4** is marked W or X. With a 150 V H.T. battery, G.B. negative is −10.5 V when **V4** is marked V, and −9 V when **V4** is marked W or X.

Condenser C32.—This occurs in our chassis, but not in the makers' diagram. It is in series with the tracker **C7.**

Condenser C1.—This is also omitted from the makers' diagram.

Condenser C2.—This is an extremely small condenser formed by one insulated wire looped round another.

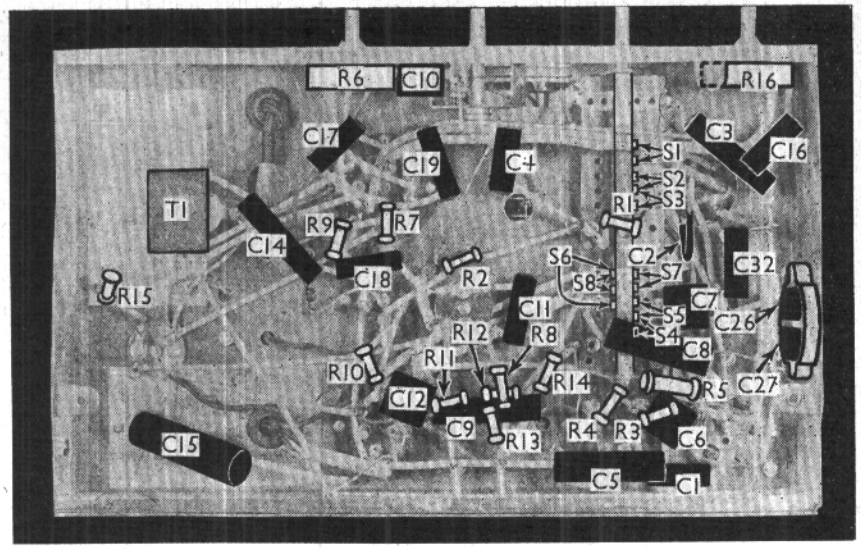
Chassis Divergencies.—In early models the oscillator coil may be slightly different and **R5, C8** and **S6** may not occur. **R3** may be 30,000 O and **R12** may be 100 O. In the first models **S7** was in the L.T. negative lead.

CIRCUIT ALIGNMENT

I.F. Stages.—Switch receiver to L.W., inject a 125 KC/S signal in the A and E sockets, adjust **C28, C29, C30, C31** for maximum output. The I.F. stages are now peaked, so attempt to produce a flat topped response curve by reducing **C28** and **C30** by 1/8th turn, and increasing **C29** and **C31** by 1/8th turn. This is carried out at the works on an oscilloscope.

H.F. and Oscillator Stages.—Switch set to M.W. and inject a 1,500 KC/S signal. Adjust **C21, C23** and **C25** for maximum output. In the case of **C25**, unscrew this fully, then screw up to the first peak.

Switch set to L.W., inject a 250 KC/S signal, and adjust **C26** for maximum output. Inject a 175 KC/S signal and adjust **C27** for maximum output. Finally check at 1,000 KC/S on M.W., re-adjusting **C21, C23** and **C25** if necessary.



Under-chassis view. C2 is merely a loop of insulated wire. C26 and C27 are adjusted through holes in the side of the chassis.