

# 'TRADER' SERVICE SHEETS

NUMBER THIRTY - TWO  
(VOLUME TWO)

## AERODYNE "MERLIN"

### 3-VALVE BATTERY RECEIVER

THE Aerodyne Merlin receiver is a 3-valve battery-operated model, with a variable-mu H.F. pentode, triode detector and pentode output valve. A band-pass circuit precedes the H.F. pentode, and both volume and reaction controls are fitted. The receiver has a "clock-face" tuning dial, a neat waveband and "off" indicator, and it is fitted with a spring-driven clock to match the tuning dial. Naturally, there is a P.M. M.C. speaker, with provision for an extension speaker.

#### CIRCUIT DESCRIPTION

Aerial input to coils L1, L2 which are coupled to primary of 2-stage capacity coupled band-pass filter. Primary L3, L4 tuned by C10; secondary L5, L6 tuned by C12; normal coupling by C2 and "top" coupling by small condenser C1. First valve (V1, Mullard metallised VP2) is a variable-mu pentode functioning as a H.F. amplifier. Gain controlled by variable potentiometer R2, which varies G.B. applied through decoupling resistance R1 and grid coils.

Tuned-anode coupling by L7, L8 and C14 to triode detector (V2, Mullard metallised PM1HL) which operates on grid leak system with C4 and R4. Anode and S.G. of V1 are decoupled together by condenser C3 and resistance R3. Reaction is applied from anode of V2 to coils L7, L8 by means of single coil L9 and control is effected by variable condenser C16. Anode H.F. filtering by L10, C5 and C6.

Transformer coupling to pentode output valve (V3, Mullard PM22A) by T1, which works in a parallel feed circuit with R5 and C7. Tone correction by R.C. filter R7, C9 across primary of speaker input transformer T2 in anode circuit of V3. Provision for connection of low-resistance external speaker across secondary of T2.

#### DISMANTLING THE SET

**Removing Chassis.**  
—Pull off the four knobs at the front, taking care not to lose the spring plates inside them. When replacing, the upper and lower centre knobs are plain, while that on the left is marked "Volume," and that on the right, "Reaction."

For convenience it is best next to remove the battery platform (2 wood screws). Unsolder the two L.S. leads at the speaker input transformer. Remove the clock control rods. The winder unscrews clock-wise, while the hand setting control pulls off. Now remove the rectangular stirrup holding

tuning dial in position (2 nuts). Behind the stirrup are two further nuts on the screwed rods. Remove these also. Remove four screws from underside of cabinet. Now withdraw the chassis carefully, the back frame of the tuning dial assembly sliding off the two screwed rods. The clock, of course, remains in position. Do not forget to re-connect speaker temporarily before testing.

**Removing Speaker.**—This is held by four metal clamps, each with a nut and lock-nut, and by two wood screws passing through brackets on the speaker transformer into the top of the cabinet.

**Removing Clock.**—This is held against a wooden framework by its back-plate. To remove it, take off the back-plate, which is held by three knurled nuts on screwed rods.

#### COMPONENTS AND VALUES

Condensers		Values ( $\mu F$ )
C1	Band-pass top coupling	Very low
C2	Band-pass coupling	0.02
C3	V1 anode and S.G. decoupling	0.1
C4	V2 grid condenser	0.00005
C5	V2 anode H.F. by-passes	0.0003
C6		0.0003
C7	L.F. coupling to T1	0.0005
C8	V2 anode decoupling	0.05
C9	Part of V3 anode filter	1.0
C10	Band-pass primary tuning	0.01
C11	Band-pass pri. trimmer, pre-set	0.0005
C12	Band-pass secondary tuning	—
C13	Band-pass sec. trimmer, pre-set	0.0005
C14	V1 anode circuit tuning	0.0005
C15	V1 anode circuit trimmer, pre-set	—
C16	Reaction condenser	0.0005

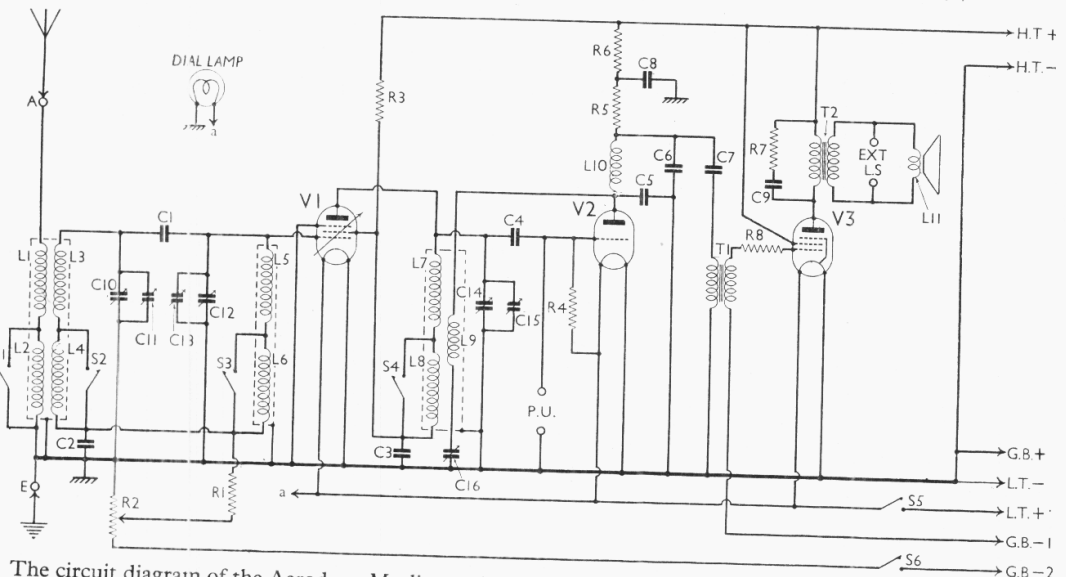
Resistances		Values (ohms)
R1	V1 cont. grid decoupling	20,000
R2	V1 gain control, variable	8,000
R3	V1 anode and S.G. decoupling	8,000
R4	V2 grid leak	500,000
R5	V2 anode resistance	30,000
R6	V2 anode decoupling	10,000
R7	Part of V3 anode filter	30,000
R8	V3 grid H.F. stopper	250,000

Other Components		Values (ohms)
L1	Aerial coupling coils	0.75
L2		14.25
L3	Band-pass primary coils	3.75
L4		13.5
L5	Band-pass secondary coils	3.75
L6		15.5
L7	V1 anode coils	3.75
L8		14.5
L9	Reaction coil	6.5
L10	V2 anode H.F. choke	260
L11	Speaker speech coil	2.0
T1	Interval transformer	Pri. 1,350
		Sec. 4,000
T2	Speaker input trans.	Pri. 1,000
		Sec. 0.2
S1-S4	Waveband switches, ganged	—
S5	Filament switch	—
S6	G.B. switch	—

#### VALVE ANALYSIS

The voltage and current readings listed in the table overleaf were obtained from an

(Continued overleaf.)



The circuit diagram of the Aerodyne Merlin receiver. C1 is a very small condenser formed of twisted wires. Although separate H.T. - and G.B. + leads are shown, the battery cable only contains a single lead, since a combined H.T. and G.B. battery is employed.



**AERODYNE "MERLIN"**  
(continued)

average chassis with a new combined H.T. and G.B. battery in use, and the correct voltages applied (see General Notes). No aerial or earth connections were made and the volume control was at maximum while the reaction control was fully retarded. Voltages were measured on the 1,200 V scale of an Avometer with the chassis as negative, and the anode current of **V1** was taken with a milliammeter inserted in the low H.F. potential end of the circuit.

Valve	Anode Volts	Anode Current (mA)	Screen Volts	Screen Current (mA)
V1 VP2	115	1.85	115	0.75
V2 PM1HL	65	1.75	—	—
V3 PM22A	130	7.0	140	1.7

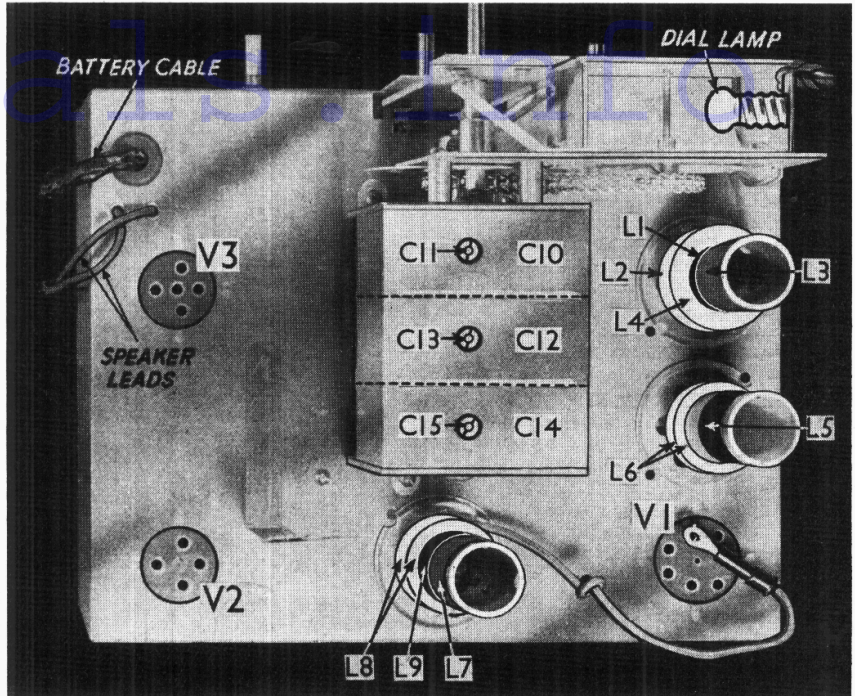
**GENERAL NOTES**

**Switches.**—The switches **S1-S6** are all in one assembly, seen in the under-chassis view. **S1-S4** are the waveband switches, **S5** is the L.T. switch, while **S6** is the G.B. switch which prevents the G.B. battery discharging through the potentiometer volume control **R2** when the set is not in use.

On the M.W. band all the switches are closed, while on the L.W. band **S1-S4** are open, and **S5** and **S6** are closed. In the "off" position, all the switches are open.

Note that **S2** and **S3** each have one common contact.

**Coils.**—These are in three screened units on top of the chassis. In our plan



Plan view of the chassis. The coil screens have been removed, and the individual coils are indicated. Note that **L6** and **L8** each comprise two similar windings.

chassis view, the screens have been removed. To do this, first remove the central bolt, and then take the nuts and washers off the two studs fitted to the bottom of each screen, and projecting beneath the chassis. In the case of the **L7-L9** unit, the top cap connector at the end of the flex must first be removed

to allow the flex to be drawn through the hole at the top of the screen.

All the coils are indicated in our plan chassis view. Note that **L6** and **L8** each comprise two honeycomb windings side by side.

**Dial Lamp.**—This is an Osram M.E.S. type, rated at 2.5 V, 0.2 A.

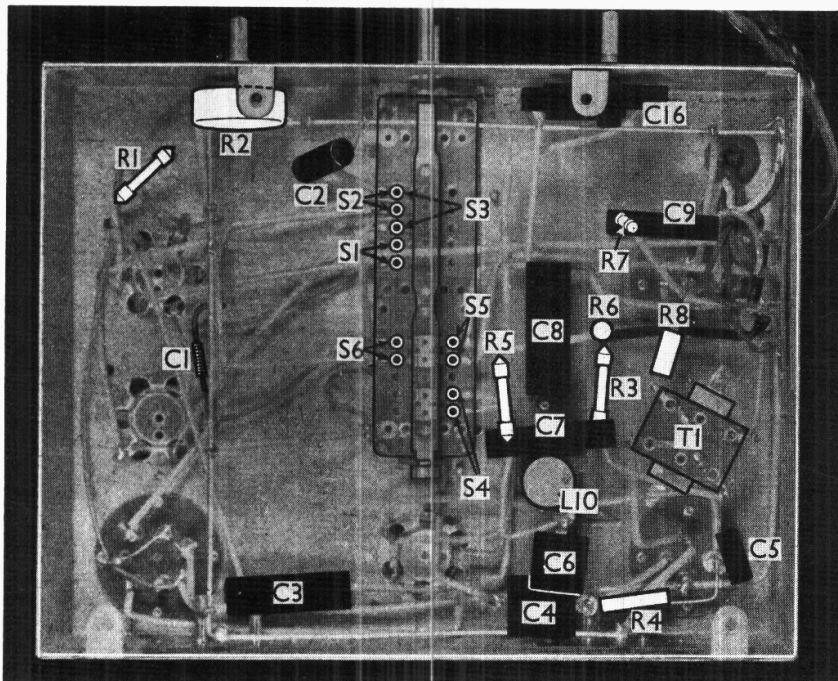
**Battery Cable and Voltages.**—The battery connections are indicated by marked plugs, and the leads are also colour coded as follows: LT-, Black; LT+ (2V), Red; HT-, White; HT+ (130 V), Maroon; GB-1 (4.5 V), Blue; GB-2 (9V), Green. Since a combined H.T. and G.B. battery is employed, there is no separate GB+ plug, GB+ being connected inside the battery to HT-.

**External Speaker.**—Two sockets for this are mounted on the panel fitted to the internal speaker input transformer (**T2**). These sockets are in parallel with the secondary of the transformer and the speaker speech coil, and a low resistance extension speaker should therefore be used, having a speech coil resistance of about 20.

**Condenser C1.**—This is a very small condenser for the band-pass top coupling, formed of a spiral of wire twisted over an insulated wire.

**H.T. and G.B. Battery.**—This is a G.E.C. 9V G.B. plus 130 V H.T. type, catalogue No. L 258.

**Pick-up.**—If a pick-up is employed, the receiver must be detuned, since there is no radio-gramophone switching. An external volume control for the pick-up must be used.



Under-chassis view. The contact tags of each of the switches are clearly indicated. Note that **S2** and **S3** each have one common contact. **C1** is a small fixed condenser of twisted wire. **L10** is the H.F. choke.