'TRADER' SERVICE SHEETS *RECEIVER SERIES (NUMBER TWENTY-FIVE)*

ATLAS "7-5-8" SUPERHET

4-VALVE (plus rectifier) A.C. MODEL

THE chassis embodied in the 1934-5 Clarke's "Atlas" 7-5-8 A.C. superhet receiver is quite conventional in so far as general circuit design is concerned, but on the constructional side there is one feature of particular importance. This is the special hinged tuning scale which gives "Spectrum Tuning" and enables the user to read station names and wavelengths from any height.

CIRCUIT DESCRIPTION

Aerial input by way of coupling coils **L1, L2** to inductively coupled band-pass filter. Primary **L3, L4,** tuned by **C18**; secondary **L7, L8,** tuned by **C20**; coupling coils **L5, L6.** First valve (**V1, Mullard metallised FC4**) is an octode functioning as frequency-changer with electron coupling. Oscillator grid coils **L9, L10** tuned by **C22**; anode reaction coils **L11, L12**; L.W. padding by condenser **C4.**

One variable-mu pentode intermediate frequency amplifier (**V2, Mullard metallised VP4**) with tuned-primary, tuned-secondary transformer couplings, **L13, L14** and **L15, L16. I.F.117·5KC/S.**

Diode second detector forming part of double diode triode (**V3, Mullard metallised TDD4**). Second diode provides steady potential which is developed across **R14** and fed back as G.B. to frequency-changer and I.F. valve, thus giving automatic volume control. Delay voltage obtained by drop along resistances **R10** and **R11.** L.F. component developed across manual volume control **R18** is tapped off and passed on to triode section of V3 by way of coupling condenser **C8.** Provision for connection of gramophone pick-up in V3 grid circuit.

Resistance-capacity coupling to directly heated filament output triode (**V4, Mullard AC044**). R.C. tone-control filter **R19, R20, C14** in anode circuit. Provision for connection of H.R. external speaker across primary of internal speaker input transformer **T1.**

H.T. current supplied by I.H.C. full-wave rectifying valve (**V5, Mullard I.W.3**). Smoothing by speaker field winding **L18** and dry electrolytic condensers **C15, C16.**

DISMANTLING THE SET

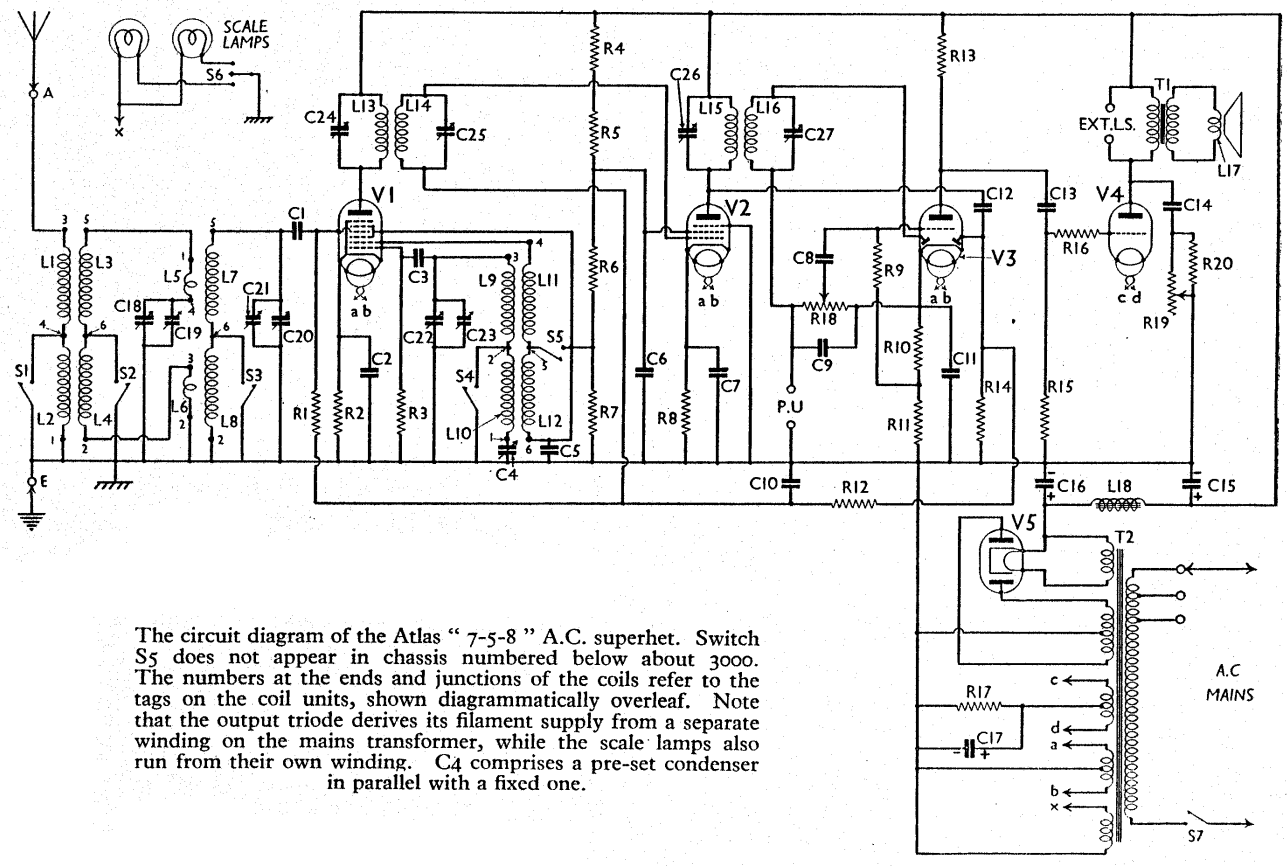
Removing Chassis.—Remove the four knobs (grub-screws). Remove back of set (2 screws). Remove input plugs from sockets on speaker transformer. Remove earthing lead and tag bolted to chassis. Untie loose cord holding lead in position. Remove speaker field plugs from sockets on panel just above mains transformer on chassis.

Chassis is held in cabinet by three large hexagon headed bolts. Remove these, and chassis can be withdrawn. *When replacing,* see that tuning dial enters large hole in front of cabinet correctly.

When testing chassis out of cabinet, do not forget to re-connect speaker input and field coil.

Removing Speaker.—This is mounted on a sub-baffle board, held in position by wooden strips. The upper strips are screwed and glued into position and cannot be removed. The lower strip is merely screwed, and on removing it by taking out the two screws, the speaker on its baffle can be withdrawn, pulling out the bottom of the baffle first so that the top comes away from the fixed strips of wood.

(*Continued overleaf*)



The circuit diagram of the Atlas "7-5-8" A.C. superhet. Switch S5 does not appear in chassis numbered below about 3000. The numbers at the ends and junctions of the coils refer to the tags on the coil units, shown diagrammatically overleaf. Note that the output triode derives its filament supply from a separate winding on the mains transformer, while the scale lamps also run from their own winding. C4 comprises a pre-set condenser in parallel with a fixed one.

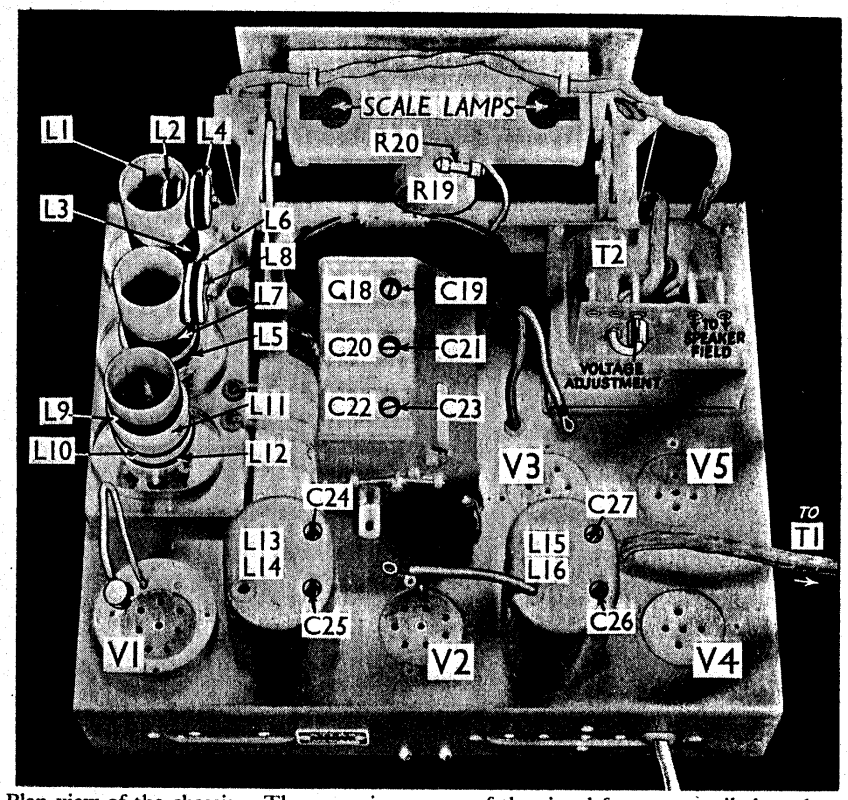
ATLAS "7-5-8" A.C. SUPERHET (contd.)

COMPONENTS AND VALUES

	Resistances	Values (ohms)
R1	V1 grid resistance	2,000,000
R2	V1 fixed G.B. resistance	250
R3	V1 oscillator grid resistance	20,000
R4	H.T. potential divider supplying V1 osc. anode, V1 S.G.'s, and V2 S.G...	6,000
R5		7,000
R6		4,000
R7		30,000
R8	V2 fixed G.B. resistance	250
R9	V3 grid resistance	2,000,000
R10	V3 G.B. resistance and A.V.C. delay voltage droppers	2,000
R11		5,000
R12	A.V.C. circuit decoupling	2,000,000
R13	V3 anode resistance	75,000
R14	A.V.C. diode load	1,000,000
R15	V4 grid resistance	1,000,000
R16	V4 grid H.F. stopper	250,000
R17	V4 G.B. resistance	500
R18	Vol. control and rect. diode load	500,000
R19	Tone control resistance (variable	50,000
R20	Tone control shunt	5,000

	Condensers	Values (μF)
C1	V1 grid condenser	0·0001
C2	V1 cathode by-pass	0·1
C3	V1 oscillator grid condenser	0·001
C4	Osc. L.W. padder (Fixed)	0·0002
	Osc. L.W. padder (Pre-set)	—
C5	V1 osc. anode decoupling	0·25
C6	V2 S.G. by-pass	0·1
C7	V2 cathode by-pass	0·1
C8	L.F. coupling to V3	0·01
C9	Rectifier diode reservoir	0·0002
C10	A.V.C. circuit decoupling	0·05
C11	V3 cathode by-pass	0·5
C12	A.V.C. diode coupling	0·0002
C13	L.F. coupling to V4	0·01
C14	Tone control condenser	0·25
C15	H.T. smoothing, electrolytic	6·0
C16		10·0
C17	V4 G.B. resistance by-pass	25·0
C18	Band-pass pri. tuning	—
C19	Band-pass pri. trimmer, pre-set	—
C20	Band-pass sec. tuning	—
C21	Band-pass sec. trimmer, pre-set	—
C22	Oscillator tuning	—
C23	Oscillator trimmer, pre-set	—
C24	1st I.F. trans. pri. tuning, pre-set	—
C25	1st I.F. trans. sec. tuning, pre-set	—
C26	2nd I.F. trans. pri. tuning, pre-set	—
C27	2nd I.F. trans. sec. tuning pre-set	—

	Other Components	Values (ohms)
L1	Aerial coupling coils	10·0
L2		100·0
L3	Band-pass primary coils	3·75
L4		10·0
L5	Band-pass coupling coils	0·1
L6		1·8
L7	Band-pass secondary coils	3·75
L8		12·0
L9	Oscillator grid coils	5·25
L10		7·5
L11	Oscillator reaction coils	250·0
L12		360·0
L13	1st I.F. transformer Pri.	67·0
L14	1st I.F. transformer Sec.	67·0
L15	2nd I.F. transformer Pri.	67·0
L16	2nd I.F. transformer Sec.	67·0
L17	Speaker speech coil	2·5
L18	Speaker field	2500·0
T1	Speaker input trans. Pri.	120·0
	Speaker input trans. Sec.	0·3
T2	Mains trans. Pri. total	23·0
	Mains trans. Heater sec.	0·05
	Mains trans. V4 fil. sec.	0·1
	Mains trans. Lamp sec.	0·2
	Mains trans. Rect. fil. sec.	0·05
	Mains trans. H.T. sec.	440·0
S1-S5	Waveband switches, ganged	—
S6	Scale lamp switch	—
S7	Mains switch (ganged R18)	—



Plan view of the chassis. The screening covers of the signal frequency coils have been removed. The scale lamps are within a metal box-like enclosure, the top of which can be unclipped to gain access to the lamps. Note that R20 is shunted across the variable tone control R19. The speaker field is fed from two sockets on a panel above the mains transformer, while a separate twin lead carries the input to the primary of T1 on the speaker.

VALVE ANALYSIS

The voltage and current readings given in the table below were obtained from a representative chassis with no aerial or earth connected. All voltages were measured on the 1,200 V scale of an Avometer with the chassis as negative, and the anode and screen currents were measured, where necessary, with a milliammeter inserted in the low H.F. potential ends of the circuits to avoid instability.

Valve	Anode Volts	Anode Current (mA)	Screen Volts	Screen Current (mA)
V1 FC4*	250	1·7	75	4·0
V2 VP4	250	4·8	105	2·1
V3 TDD4	120	1·6	—	—
V4 AC044	245	46·5	—	—
V5 IW3	330†	—	—	—

*Osc. anode (G2) 75 V 1·5 mA. † Each anode A.C.

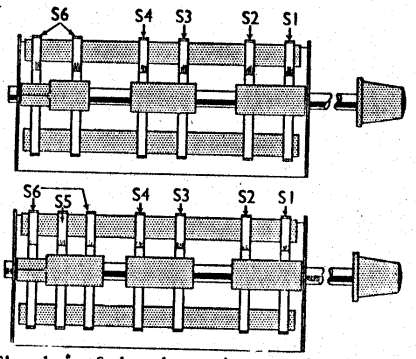
GENERAL NOTES

Switches.—In chassis up to No. 3000 approximately there are four wave-change switches in the switch assembly, **S1-S4,** but in later chassis **S5** has been added. This cuts out part of the oscillator reaction coil on the M.W. band. **S5** is shown in the circuit diagram. We give two sketches showing the alternative switch assemblies. All the waveband switches are *closed* on the M.W. band and *open* on the L.W. band.

S6 consists of two sets of contacts, forming a single pole changeover switch for the scale lamp switching. One side of each set of contacts is earthed, while the other sides are connected to flexible wires coded green and red. The section with the green wire is closed on M.W. and open on L.W., while that with the red wire is closed on L.W. and open on M.W. In this way the scale lamps in the green and red compartments of the "Spectrum" tuning scale are controlled.

The only other switch is **S7,** the Q.M.B. mains switch ganged with the volume control.

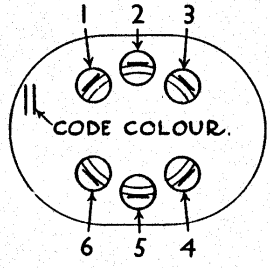
Coils.—The band-pass and oscillator coils are in three units, the covers of which



Sketches of the alternative waveband and scale lamp switch panels. That containing S5 occurs in chassis numbered above 3000. Earlier chassis only had the four waveband switches, S1-S4.

have been removed in our plan view of the chassis. The positions of the various coils (**L1-L12**) are indicated, and in addition we give a sketch of the underside of a coil unit, with the six tags numbered. These numbers correspond with those on the circuit diagram, enabling the coils to be quickly checked up. Note that since the tags are symmetrically arranged, the base of each coil is colour coded with paint. The mark is nearest tag No. 1 in each case.

In the case of the I.F. coils, **L13-L16,**



A sketch of the underside of a coil base, with the tags numbered to correspond with the numbers on the circuit diagram. Note that tag 1 is nearest the patch of coloured paint.

the tags are not numbered, but of **L13** and **L14, L13** is the upper coil, and of **L15** and **L16, L16** is the upper one.

Valve Connections.—The connections of **V1** (FC4) were given in Service Sheet No. 14, p. 79, 1st column; **V2** (VP4) connections are in S.S. No. 9, p. 161, 3rd col., R.H. diagram. **V3** (TDD4) connections are in S.S. No. 13, p. 35, 2nd col., R.H. diagram. **V4** and **V5** connections are obvious.

C15, C16.—These are dry electrolytic smoothing condensers, of 6 and 10 μF respectively. They are in one unit, seen in the under chassis view. Three leads emerge from the carton. The black lead is the common earth, the yellow one is the positive of **C15,** while the blue lead is the positive of **C16.**

C17.—This is an electrolytic with a capacity given as 25 μF by the makers, though that in our sample was a 20 μF type.

Tone Control.—This is made up of the variable resistance **R19,** with the fixed resistance **R20** shunted across the part of **R19** which is in use.

C4.—The L.W. padder **C4** comprises a pre-set condenser, in parallel with a ·0002 μF fixed condenser. These are shown as a single variable condenser in the circuit diagram.

Scale Lamps.—These are of the S.B.C. double contact type, and are rated at 6 V, 6 W. They plug into small bayonet holders, mounted on the inside of the cover of the box-like tuning device. To replace them, the cover must be unclipped. When replacing this, make certain that it fits tightly, otherwise it may buzz on loud passages of music.

Tuning Scale.—The box-like tuning scale is rotatable on two pivots, through which passes the cord carrying the vertical pointer. The pivots are held by spring clips. If the tuning scale should work loose, it is an easy matter to remove the clips and bend them so that when replaced they grip the pivots more tightly.

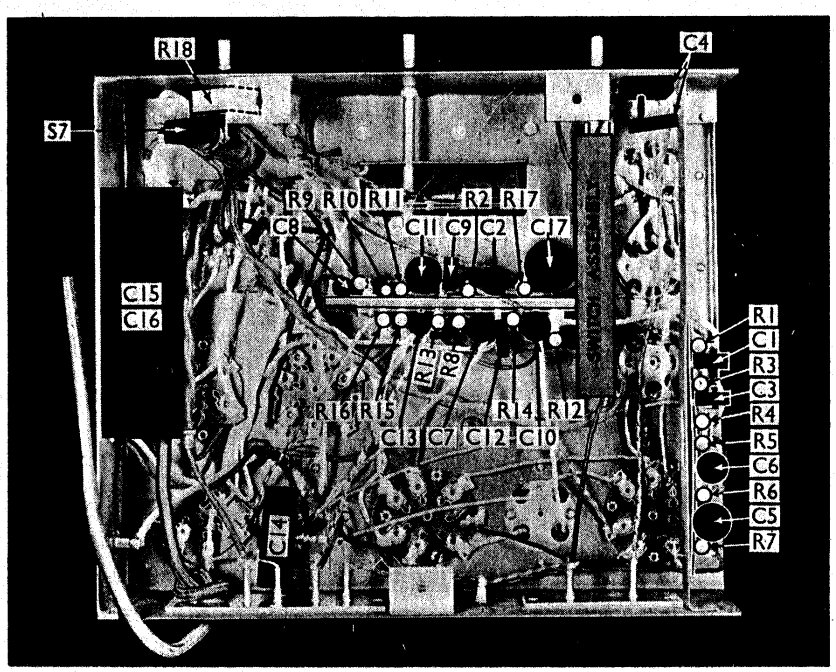
Coil and Switch Assembly.—The signal frequency and oscillator coil units are mounted on a small sub-chassis, together with the switch assembly. The whole can be removed by undoing four nuts and bolts holding it to the main chassis, after first disconnecting the associated wiring.

To facilitate the removal of the assembly, the hole through which the switch spindle projects at the front of the chassis is about an inch in diameter.

Condenser and Scale Indicator Drive.—A separate thin cord drive is provided for the variable condenser unit and the vertical scale indicator. Each is provided with a spring tensioner, but after considerable use it may be necessary to shorten the cord very slightly. After this operation it may be necessary to set the indicator to the correct wavelength of a station being received by tuning the station accurately, loosening the screws holding the large moulded grooved drive pulley, and turning the tuning knob until the correct wavelength (or station) is indicated, finally tightening up the pulley grub-screws.

Incidentally, it is possible for the whole scale assembly to slide horizontally about $\frac{1}{8}$ in. on its pivots, the indicator remaining stationary. This may be utilised for fine adjustments of the scale relative to the indicator, providing the moulded escutcheon on the front of the cabinet is not thereby fouled.

Adjustment of C4.—This necessitates removal of the chassis from the cabinet, since the adjusting screw is reached through a hole in the front of the chassis below and slightly to the right of the switch spindle. All the other trimming operations can be performed on removing the back of the cabinet. The alignment of the set is a straightforward matter, providing a calibrated modulated oscillator is available, and should present no difficulty.



Under-chassis view. Most of the small components are seen end-on, since they are mounted on vertical paxolin strips. The switch assembly is shown in detail in the diagrams on the opposite page. Note that C4 comprises two condensers, one fixed and one pre-set. C15 and C16 are dry electrolytic condensers in one unit.

DATA FOR THE SERVICE MAN

FUSE COLOUR CODE

For the convenience of service engineers we give below the standard colour coding for fuses used in radio receivers, as agreed by the Radio Component Manufacturers' Federation.

Current Rating	Colour
60 mA	Black
100 mA	Grey
150 mA	Red
250 mA	Brown
500 mA	Yellow
750 mA	Green
1 A	Dark Blue
1·5 A	Light Blue
2 A	Purple
3 A	White

At the moment there are three standard lengths, $\frac{5}{8}$ in. 1 in. and $1\frac{1}{4}$ ins. It is possible that the 1 in. size may be abandoned in the future. The end caps of the fuses are cylindrical, and $\frac{1}{4}$ in. in diameter. Screw-type fuses have the standard M.E.S. cap.

The ratings in the table above are the continuous current-carrying capacities. The fuses should blow with a brief 50 per cent. overload.