

NUMBER FIFTY-SEVEN

'TRADER' SERVICE SHEETS

BLUE SPOT MODEL AC5

A.C. SUPERHET

THE Blue Spot Model AC5 is a table superhet for A.C. mains, employing four valves (plus valve rectifier). The AC5G is a radiogram model, with a similar chassis. The circuit arrangements are conventional.

CIRCUIT DESCRIPTION

Aerial input via pre-set series condenser **C23** and switch **S1** to tappings on primary of inductively coupled band-pass filter. Primary **L2, L3** tuned by **C24**; secondary **L6, L7**, tuned by **C26**; coupling coils **L4, L5**. Choke coil **L1** prevents break-through on L.W.

First valve (**V1, Mullard metallised FC4**), is an octode operating as frequency changer with electron coupling. Oscillator grid tuning coils **L8, L9** tuned by **C28**; anode reaction coils **L10, L11**; L.W. tracking by pre-set condenser **C30**.

Second valve, a variable-mu H.F. pentode (**V2, Mullard metallised VP4**), operates as intermediate frequency amplifier with tuned-primary tuned-secondary transformer couplings **L12, L13** and **L14, L15**.

Intermediate frequency 110 KC/S.

Diode second detector forms part of double diode triode (**V3, Osram metallised MHD4**), and also provides D.C. potential which is fed back through decoupling circuit **R7, C6** as G.B. to I.F. valve, giving automatic volume control. Second diode, fed from secondary of I.F. transformer by **C14**, provides D.C. potential used for A.V.C. of F.C. valve. Delay voltage in this case is obtained from voltage drop along cathode resistance **R15**.

Audio frequency output from rectifier

diode is passed by way of I.F. stopper **R12**, coupling condenser **C11**, switch **S6**, manual volume control **R14**, and I.F. stopper **R13** to grid of **V3** triode which operates as L.F. amplifier. Provision for connection of gramophone pick-up across volume control.

Resistance-capacity coupling to output pentode (**V4, Mullard Pen 4VA**). Fixed tone compensation in anode circuit by **C17**; variable tone control by filter **R20, C18**. Provision for connection of low-resistance external speaker across secondary of **T2**. Switch **S8** cuts out internal speaker.

H.T. current is supplied by full-wave rectifying valve (**V5, Mullard IW3**). Smoothing by speaker field winding **L18** and electrolytic condensers **C20, C21**. Mains aerial condenser **C22** consists of an extra wire in mains lead.

DISMANTLING THE SET

Normal repairs can be carried out without removing chassis from cabinet as cabinet bottom is detachable.

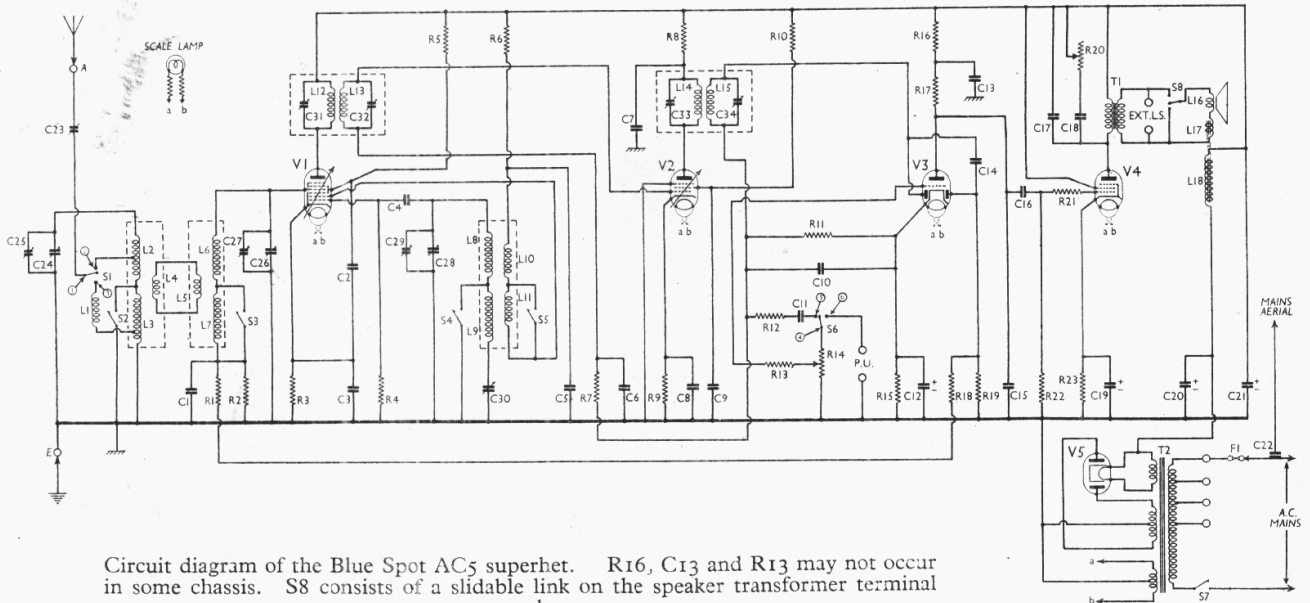
Removing Chassis.—Should it be necessary to remove the chassis, remove the four control knobs (recessed grub screws) and remove nuts and washers underneath cabinet from the two long bolts holding chassis. Chassis can now be withdrawn to extent of speaker leads, which is sufficient for most service needs. To remove chassis entirely, unsolder leads to speaker. *When replacing*, leads should be connected as follows (with the transformer on the left):—Top tag on transformer panel, yellow-black; bottom tag, two blue-yellow; top tag on right-hand panel, red; bottom tag, blue-yellow.

Removing Speaker.—If it is necessary to remove speaker, free it from sub-baffle, to which it is held by three bolts. The nuts to remove are those without washers, as the others are to do with the speaker assembly.

COMPONENTS AND VALUES

Resistances		Values (ohms)
R1	V1 pent. cont. grid decoupling	2,000,000
R2		500,000
R3	V1 fixed G.B. resistance	250
R4	V1 osc. grid resistance	19,000
R5	V1 S.G.'s H.T. feed	40,000
R6	V1 osc. anode decoupling	40,000
R7	V2 cont. grid decoupling	2,000,000
R8	V2 anode decoupling	10,000
R9	V2 fixed G.B. resistance	300
R10	V2 S.G. H.T. feed	50,000
R11	V3 rect. diode load	500,000
R12	I.F. stopper	250,000
R13	V3 triode grid I.F. stopper	500,000
R14	Manual volume control	500,000
R15	V3 auto. G.B. resistance	1,000
R16	V3 triode anode decoupling	30,000
R17	V3 triode anode resistance	33,000
R18	A.V.C. circuit decoupling	250,000
R19	V3 A.V.C. diode load	1,000,000
R20	Variable tone control	50,000
R21	V4 grid I.F. stopper	100,000
R22	V4 grid resistance	250,000
R23	V4 auto. G.B. resistance	500

Condensers		Values (μF)
C1	V1 pent. cont. grid decoupling	0.25
C2	V1 S.G.'s by-pass	0.1
C3	V1 cathode by-pass	0.1
C4	V1 osc. grid condenser	0.001
C5	V1 osc. anode decoupling	0.1
C6	V2 cont. grid decoupling	0.1
C7	V2 anode decoupling	0.1
C8	V2 cathode by-pass	0.1
C9	V2 S.G. by-pass	0.1
C10	I.F. by-pass	0.0001
C11	L.F. coupling to V3 triode	0.01
C12*	V3 cathode by-pass	12.0
C13	V3 anode decoupling	0.25
C14	Coupling to V3 A.V.C. diode	0.0001
C15	V3 anode I.F. by-pass	0.0001
C16	L.F. coupling to V4	0.01
C17	Fixed tone compensator	0.005
C18	Part of variable T.C. circuit	0.05



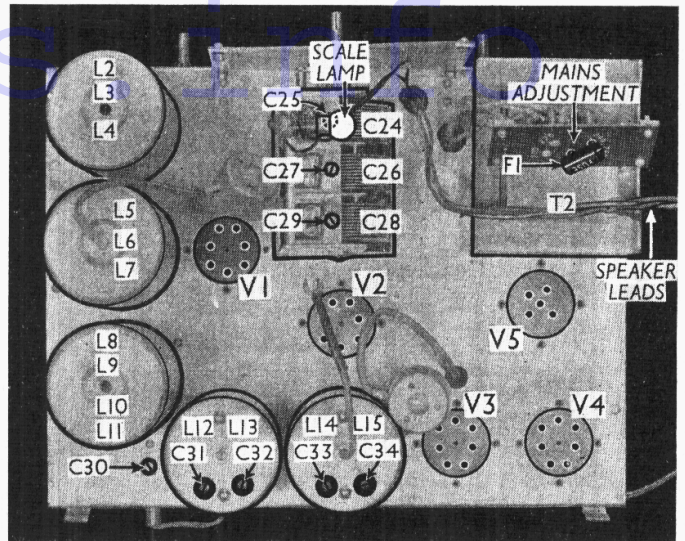
Circuit diagram of the Blue Spot AC5 superhet. R16, C13 and R13 may not occur in some chassis. S8 consists of a slidable link on the speaker transformer terminal panel.

Condensers (Contd.)		Values (μF)
C19*	V ₄ cathode by-pass	30.0
C20*	H.T. smoothing	4.0
C21*		8.0
C22†	Mains aerial condenser	—
C23†	Aerial series condenser	0.0003
C24	Band-pass primary tuning	0.0005
C25†	Band-pass primary trimmer	—
C26	Band-pass secondary tuning	0.0005
C27†	Band-pass secondary trimmer	—
C28	Oscillator tuning	—
C29†	Oscillator main trimmer	—
C30†	Oscillator L.W. tracker	0.001
C31†	1st I.F. trans. pri. tuning	—
C32†	1st I.F. trans. sec. tuning	—
C33†	2nd I.F. trans. pri. tuning	—
C34†	2nd I.F. trans. sec. tuning	—

† Formed by extra wire in mains lead.
* Electrolytic. † Pre-set condenser.

Other Components		Values (ohms)
L1	Aerial L.W. choke coil	22.0
L2	Band-pass primary coils	2.2
L3		33.0
L4		0.25
L5	Band-pass coupling coils	0.25
L6		3.2
L7	Band-pass secondary coils	33.0
L8		2.6
L9	Oscillator tuning coils	25.0
L10		3.0
L11	Oscillator anode coils	7.0
L12		90.0
L13	1st I.F. trans. { Pri. Sec.	90.0
L14		90.0
L15	2nd I.F. trans. { Pri. Sec.	90.0
L16		90.0
L17	Speaker speech coil	2.3
L18	Hum neutralising coil	0.1
	Speaker field winding	2000.0
T1	Speaker input trans. { Pri. Sec.	390.0
		0.35
		30.0
	Heater sec.	0.05
T2	Mains trans. { Rect. heat. sec. H.T. sec.	0.1
		550.0
		—
S1-S5	Waveband switches	—
S6	Radio-gram switch	—
S7	Mains switch, ganged R14	—
S8	Internal speaker switch	—
R1	Mains circuit fuse	—

Plan view of the chassis. The fuse is incorporated in the mains adjustment plug.



VALVE ANALYSIS

Valve voltage and current readings given in the following table were taken with no aerial and earth connected and the volume control at minimum. All voltages were measured on the 1,200 V scale of an Avometer, with the chassis as negative.

Valve	Anode Volts	Anode Current (mA)	Screen Volts	Screen Current (mA)
V1 FC4*	230	0.95	80	3.8
V2 VP4	170	5.25	85	2.5
V3 MHD4	110	1.75	—	—
V4 Pen 4VA	215	33.0	225	2.85
V5 IW3	310†	—	—	—

* Osc. anode (G2) 80 V, 3.4 mA.
† Each anode, A.C.

GENERAL NOTES

Switches.—The waveband and radio gram switches, S1-S6, are in one unit, seen in the under-chassis view. The individual switches are clearly indicated, and it will be seen that in the case of S1 and S6, there are three contacts to each. These are numbered, both in the chassis view and in the circuit diagram. The table below gives the switch positions, O indicating open, and C closed. In the case of S1 and S6, the table shows the numbers of the contacts which are closed.

Position	S1	S2	S3	S4	S5	S6
M.W.	1, 2 C	C	C	C	C	4, 5 C
L.W.	1, 3 C	O	O	O	O	4, 5 C
Gram.	O	C	C	O	O	4, 6 C

S7 is the mains switch, ganged with the volume control R14.

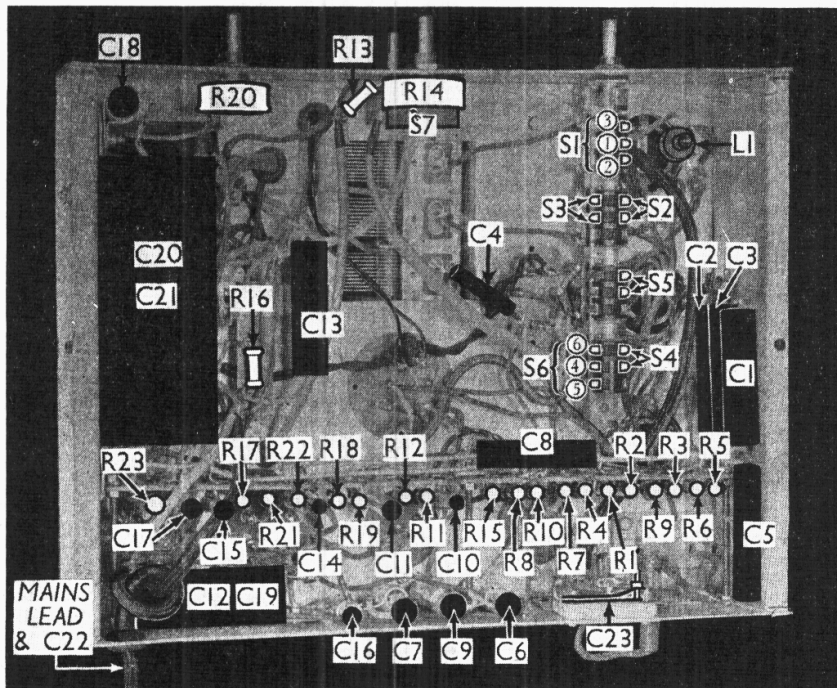
S8 is the internal speaker switch, comprising a sliding link held by screws, fitted to the speaker input transformer terminal panel. In one position, this connects the internal speaker, while in the other, it switches it out.

Coils.—These are in five screened units on top of the chassis, except for L1, which is unscreened, and beneath the chassis. In the case of the I.F. transformers, the lower coil is the primary in each case.

Scale Lamp.—This is an Osram M.E.S. type, rated at 4.5 V, 0.3 A. In our chassis, the leads to the holder are of resistance wire, the resistance of each lead being about 1.25 Ω. These resistances are shown in the circuit diagram, but are not given numbers, and do not appear in the resistance table.

External Speaker.—This should be of the low resistance type (2-3 Ω) and should be connected across the two outer of the three tags associated with the link switch (S8) on the speaker transformer. The extreme outer pair of tags carry two of the leads from the chassis.

Condensers C12, C19.—These are two electrolytics in one unit beneath the (Continued at foot of page IV)



Under-chassis view. The numbers of the S1 and S6 contacts correspond with those in the circuit diagram. C22, the mains aerial condenser, is formed by an extra wire running down the mains lead.