'TRADER' SERVICE SHEETS NUMBER THIRTY-FOUR (VOLUME TWO)

PYE SE/AC SUPERHET

FOR A.C. MAINS

THE Pye SE/AC receiver is a 4-valve (plus Westinghouse H.T. rectifier) A.C. superhet, which is available in table, console and radiogram forms. We deal here with the table receiver, but most of the information applies also to the other models. An interesting feature is that all the controls are beneath a lid at the top of the receiver.

CIRCUIT DESCRIPTION

Aerial input by way of capacity potential divider **C1, C2,** M.W. and L.W. choke coils **L1, L2** and switches **S1** (M.W.) and **S2** (L.W.) to aerial tuning circuit **L4, L5, C33. L1** and **L2** are series inductances which have the effect of levelling up the sensitivity of the receiver over both wavebands, while **L2** also prevents M.W. break-through on the L.W. band.

First valve (**V1, Mazda metallised AC/VP1**) is a variable-mu pentode operating as initial radio-frequency amplifier. Coil **L3** in cathode circuit is coupled to **L1** and **L2,** and functions as a suppressor of second channel interference. Moving-iron tuning indicator meter in anode H.T. feed circuit.

Choke-fed tuned-grid coupling by **L6, C7** and **L7, L8, C36** to triode-pentode frequency-changer valve (**V2, Mazda metallised AC/TP**) working with cathode coupling. Variable-mu pentode section operates as first detector while triode forms separate oscillator with anode coils **L9, L10** tuned by **C39,** and reaction coil **L11** in common cathode circuit.

One variable-mu pentode intermediate frequency amplifier (**V3, Mazda metallised AC/VP1**) with tuned-primary tuned-secondary transformer couplings **L12, L13** and **L14, L15.**

Intermediate frequency 127 KC/S.

Diode second detector forming part of double diode output pentode (**V4, Mazda AC2/Pen DD**) Second diode, fed from anode of **V3** by way of coupling condenser **C28,** provides steady potential which is fed back as G.B. to **V1, V2** and **V3,** thus giving A.V.C. Potential is developed across load resistances **R28, R29** and delay voltage is obtained from **R26, R27.** Rectifier diode has a small negative bias so that rectification does not occur until the input signal reaches a certain predetermined value. Thus, a degree of inter-station noise suppression is obtained. I.F. filtering by **L16, C22, C23.**

Audio-frequency voltage is developed across **R21** and passed by way of condenser **C24** and manual volume control **R22** to pentode control grid of **V4.** Tone control by variable R.C. circuit **R24, R25, C25** in anode circuit across primary of **T1.**

When a gramophone pick-up is used the triode section of the frequency-changer valve **V1** is employed as an L.F. amplifier, and is R.C. coupled to the pentode output valve. Switch **S6** is closed to connect the pick-up in circuit, while at the same time negative G.B. is introduced. Switch **S8** connects the anode of the triode to **V4** by way of **C15,** and **S5** closes and incapacitates the oscillator by means of **C11.**

H.T. current is supplied by Westinghouse metal rectifier working on voltage-doubler system with electrolytic condensers **C30** and **C31.** Smoothing by speaker field winding **L19** and electrolytic condensers **C29, C32.**

DISMANTLING THE SET

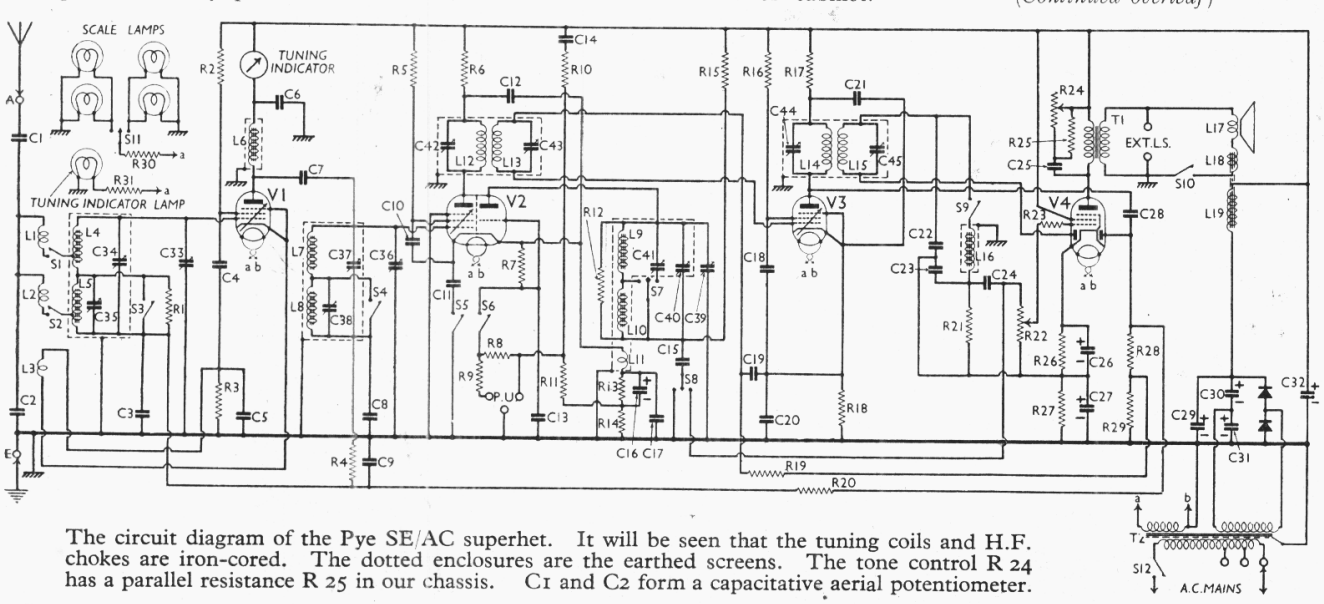
Removing Chassis.—First of all, remove the four hexagon or cheese-headed screws from the underside of cabinet. Now remove the three wood screws at the back of the cabinet, in the strip just below the lid hinge. The lid stays must now be released. Wedge open the two "V" retaining springs with small blocks of wood. Pull both springs towards the back of the cabinet, and then carefully lift the lid. A slight upward pressure at the end of its normal travel will release the stays.

Remove the four control knobs (pull off). *When replacing* remember that the rear left-hand knob is the tone control; front left, volume; rear right, selector switch and front right, tuning.

Remove the seven wood-screws round the edges of the escutcheon board, and lift off the board with the lid. The chassis, with speaker, can now be lifted out of the cabinet, with the tuning scale end foremost. *When replacing* escutcheon board, see that the four metal pegs on the underside fit into the rubber bushed holes in the two bridge pieces on the chassis through which the control spindles pass.

Removing Speaker.—This is held to the chassis by two nuts and bolts which are not very accessible, but a bent spanner and a box spanner will reach the nuts under the chassis without disturbing any wiring. Since the dust bag cannot be removed until the speaker has been released from the chassis, the speaker leads will have to be unsoldered at their receiver ends. The leads should be marked to facilitate correct replacement. When replacing the speaker, do not forget the rubber pad between speaker and chassis.

(*Continued overleaf*)



The circuit diagram of the Pye SE/AC superhet. It will be seen that the tuning coils and H.F. chokes are iron-cored. The dotted enclosures are the earthed screens. The tone control R 24 has a parallel resistance R 25 in our chassis. C1 and C2 form a capacitative aerial potentiometer.

PYE SE/AC SUPERHET (continued)

COMPONENTS AND VALUES

	Resistances	Values (ohms)
R1	L5 artificial damping	25,000
R2	V1 S.G. H.T. feed	25,000
R3	V1 fixed G.B. resistance	1,000
R4	V2 pent. cont. grid decoupling	500,000
R5	V2 pent. S.G. H.T. feed	25,000
R6	V2 pent. anode decoupling	2,000
R7	V2 osc. grid resistances	100,000
R8	Gram. pick-up shunt	50,000
R9	Gram. pick-up series resistance	50,000
R10	Parts of gram. pick-up circuit	500,000
R11	Parts of gram. pick-up circuit	8,500
R12	L9, L10 artificial damping	40,000
R13	V2 cathode resistances	250
R14	V2 cathode resistances	750
R15	V2 osc. anode decoupling	100,000
R16	V3 S.G. H.T. feed	50,000
R17	V3 anode decoupling	2,000
R18	V3 fixed G.B. resistance	500
R19	V3 cont. grid decoupling	500,000
R20	V1 and V2 A.V.C. decoupling	500,000
R21	V4 rectifier diode load	250,000
R22	Manual volume control	250,000
R23	V4 grid H.F. stopper	25,000
R24	Variable tone control resistance	25,000
R25	Tone control fixed shunt	10,000
R26	V4 G.B. and A.V.C. delay voltage resistances	150
R27	V4 G.B. and A.V.C. delay voltage resistances	750
R28	V4 A.V.C. diode load	500,000
R29	V4 A.V.C. diode load	250,000
R30	Scale lamps ballast resistor	3
R31	Tuning ind. lamp resistor	6

	Condensers	Values (μF)
C1	Aerial potr. condensers	0·0001
C2	Aerial potr. condensers	0·0001
C3	V1 cont. grid decoupling	0·025
C4	V1 S.G. by-pass	0·1
C5	V1 cathode by-pass	0·1
C6	V1 anode decoupling	0·1
C7	H.F. coupling to L7, L8	0·000025
C8	V2 pent. cont. grid decoupling	0·25
C9	V1 and V2 A.V.C. decoupling	0·25
C10	V2 pent. S.G. by-pass	0·1
C11	V2 cathode by-pass (gram.)	0·01
C12	V2 pent. anode decoupling	0·1
C13	V2 osc. grid condenser	0·0002
C14	Part of gram. pick-up circuit	0·1

	Condensers (contd.)	Values (μF)
C15	V2 osc. anode decoupling	0·1
C16	V2 cathode by-passes	25·0
C17	V2 cathode by-passes	0·1
C18	V3 S.G. by-pass	0·1
C19	V3 cont. grid decoupling	0·25
C20	V3 cathode by-pass	0·1
C21	V3 anode decoupling	0·1
C22	I.F. by-passes	0·0001
C23	I.F. by-passes	0·0001
C24	L.F. coupling to V4	0·01
C25	Tone control condenser	0·025
C26	V4 cathode by-passes, electrolytic	50·0
C27	V4 cathode by-passes, electrolytic	25·0
C28	Coupling to A.V.C. diode	0·0002
C29	H.T. smoothing, electrolytic	7·0
C30	Voltage-doubler reservoirs, electrolytic	4·0
C31	Voltage-doubler reservoirs, electrolytic	4·0
C32	H.T. smoothing, electrolytic	16·0
C33	Aerial circuit tuning	—
C34	Aerial circuit trimmer, pre-set	—
C35	Aerial circuit L.W. trimmer	—
C36	V2 grid tuning	—
C37	V2 grid trimmer, pre-set	—
C38	V2 grid L.W. trimmer	—
C39	Oscillator tuning	—
C40	Oscillator trimmer	—
C41	Oscillator L.W. trimmer	—
C42	1st I.F. trans. pri. tuning	—
C43	1st I.F. trans. sec. tuning	—
C44	2nd I.F. trans. pri. tuning	—
C45	2nd I.F. trans. sec. tuning	—

	Other Components		Values (ohms)
L1	M.W. aerial choke		95·0
L2	L.W. aerial choke		25·0
L3	Image suppressor coil		0·2
L4	Aerial tuning coils		1·4
L5	Aerial tuning coils		14·5
L6	V1 anode H.F. choke		660·0
L7	V2 pent. grid tuning coils		1·54
L8	V2 pent. grid tuning coils		4·46
L9	Oscillator tuning coils		1·3
L10	Oscillator tuning coils		4·7
L11	Oscillator reaction coil		0·7
L12	1st I.F. transformer	Pri.	42·0
L13	1st I.F. transformer	Sec.	42·0
L14	2nd I.F. transformer	Pri.	42·0
L15	2nd I.F. transformer	Sec.	42·0
L16	I.F. filter choke		660·0
L17	Speaker speech coil		1·23
L18	Hum balancing coil		0·2
L19	Speaker field winding		1,650·0
T1	Output transformer	Pri.	740·0
T1	Output transformer	Sec.	0·31

	Other Components (contd.)		Values (ohms)
T2	Mains transformer	Pri. total	30·0
T2	Mains transformer	Heater sec.	0·1
T2	Mains transformer	H.T. sec.	33·5
S1-S4	Waveband switches, ganged		—
S7	Waveband switches, ganged		—
S5, S6	Radio-gramophone switches		—
S8	Radio-gramophone switches		—
S9	Radio-gramophone switches		—
S10	Internal speaker switch		—
S11	Scale lamp switch		—
S12	Mains switch		—

VALVE ANALYSIS

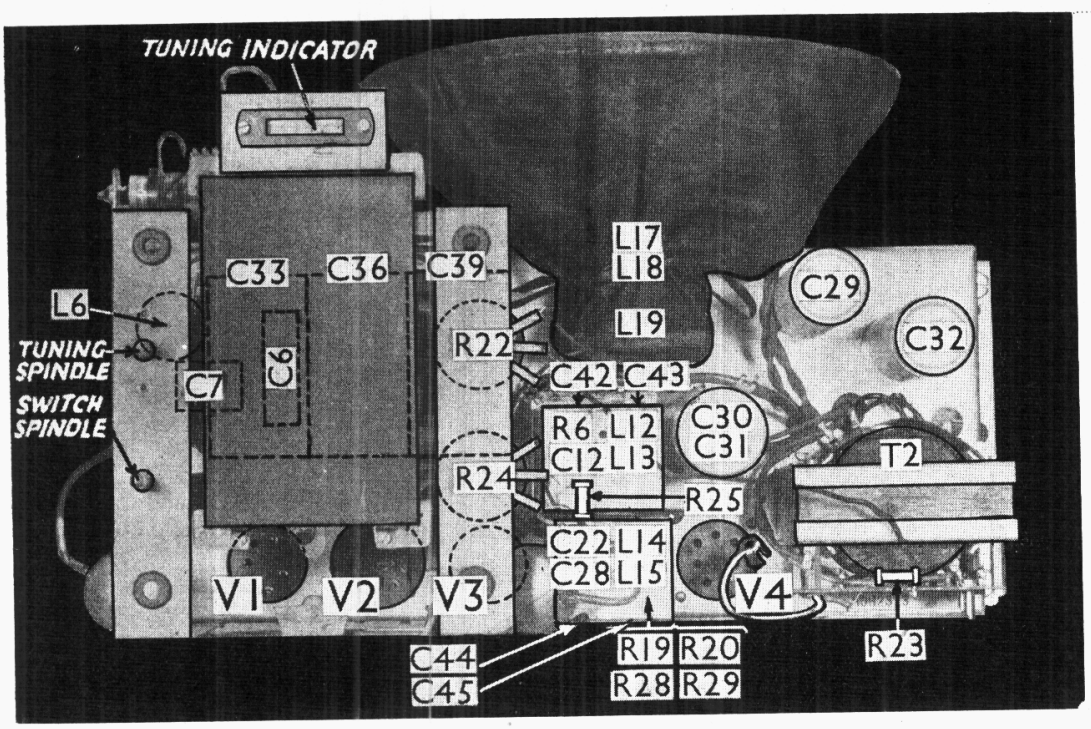
The voltage and current readings listed in the table below are those given by the makers for an average chassis working without aerial or earth connected. All voltages should be measured with a high-resistance voltmeter (e.g. an Avometer, 1,200 V scale) with chassis as negative, and for anode current readings on **V1, V2** and **V3** it is advisable to insert the milliammeter in the low H.F. potential ends of the circuits to avoid possible instability. Alternatively, a 0.25 μF or larger condenser can be connected from anode to chassis in the cases of **V1** and **V3** and from pentode control grid in **V2.**

Valve	Anode Volts	Anode Current (mA)	Screen Volts	Screen Current (mA)
V1 AC/VP1	270	3·6	230	1·0
V2 AC/TP*	270	4·0	220	2·2
V3 AC/VP1	270	6·3	205	1·4
V4 AC2/PenDD	235	35·0	260	4·0

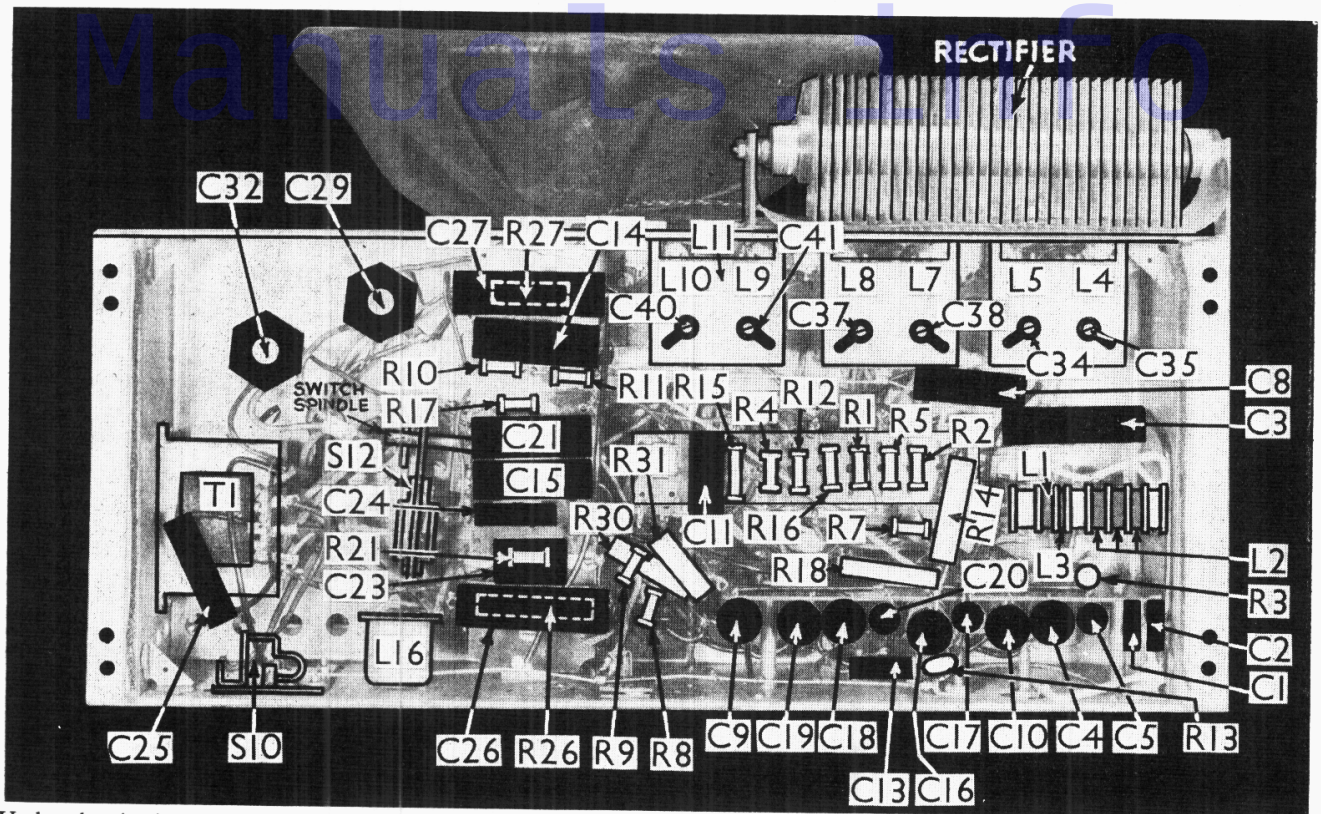
* Triode oscillator anode 60 V 1·6 mA.

GENERAL NOTES

Switches.—There are twelve switches in all, ten (**S1-S9** and **S11**) with flat spring contacts in a single unit, ganged with the Q.M.B. mains switch **S12,** and the



Plan view of the chassis. The tuning scale has been obliterated so that the tuning condensers and L 6, C 6 and C 7 can be more clearly indicated. These last three components are beneath the gang condenser. C 42—C 45 are the I.F. trimmers Actually C 42 and C 43 are at the opposite side of their screening box to that indicated on the diagram. The screening boxes also contain a number of condensers and resistances, indicated by their lettering.



Under-chassis view. The switch assembly cannot be seen, but the end of the switch spindle is indicated, together with S 12, the mains switch. A sketch of the switch assembly in the same relative position is given below. R26 is below C26, and R27 below C 27. Most of the low value resistances are wire-wound. S10 is the internal speaker switch.

internal speaker switch **S10,** operated by the external speaker plug, and fitted behind the external speaker sockets.

S10 and **S12** are indicated in our under-chassis view, but the main switch assembly cannot be seen, except for the end of the spindle, since it is hidden by components mounted over it. A separate sketch of the unit is given, on which the various contacts are indicated.

M.W. Position.—Switches **S2, S5, S6** open ; **S1, S3, S4, S9** closed. Contacts b and c of **S7** closed ; contacts d and e of **S8** closed ; contacts j and k of **S11** closed.

L.W. Position.—Switches **S1, S3, S4, S5, S6** open ; **S2, S9** closed. Contacts a and b of **S7** closed ; contacts d and e of **S8** closed ; contacts h and j of **S11** closed.

Gram. Position.—Switches **S1, S2, S3, S4, S9** open ; **S5, S6** closed. Contacts a, b, c of **S7** all open. Contacts f and g of **S8** closed. Contacts h, j, k of **S11** all open.

It will be noted that on Gram. the dial lights are extinguished (**S11** open), but the tuning indicator lamp, controlled by the mains switch **S12,** remains alight.

Coils.—**L1, L2** and **L3** are on a waxed wooden former beneath the chassis, and are not screened. The H.F. and oscillator coils are in rectangular boxes, fixed beneath the chassis close to the H.T. rectifier. Their trimmers are reached through holes in the boxes. These coils include **L4, L5** and **L7-L11.** The I.F. transformers, **L12, L13** and **L14, L15,** are in screening boxes on top of the chassis, with trimmers reached through holes in the sides of the boxes towards the rear of the chassis. These screening boxes also contain a number of fixed resistances and condensers, which are indicated by lettering in our chassis view.

L6 and **L16** are screened H.F. chokes.

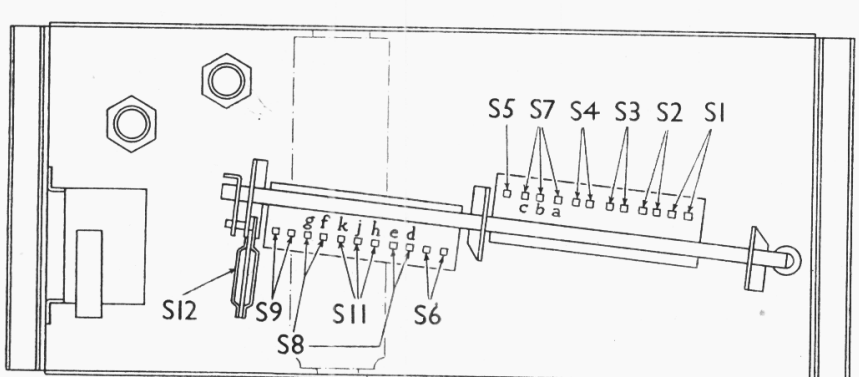
Scale Lamps.—There are four scale lamps, illuminated in pairs, and one tuning indicator lamp. All are of the Osram M.E.S. type, rated at 4 V, 0.3 A. The scale lamps are fed through **R30** from the 4 V heater supply, while the indicator lamp is fed through **R31.**

To replace a scale lamp, remove **V2** and unscrew the clamping nut holding the lamp carrier in position. Withdraw the holder and replace the faulty lamp.

Extension Speaker.—If this is employed, it should be of the low resistance type, with a speech coil resistance of 1.5-2.5 O. It can then be connected direct to the external speaker sockets by the plug provided. With this partially inserted, both speakers are in use. Complete insertion of the plug operates **S10** and switches off the internal speaker.

V2 and **V4 Connections.**—Diagrams of the base connections of **V2** and **V4** were given in Service Sheet No. 19.

Tone Control R24.—In our chassis this has a value of 25,000 O total, and is shunted by a fixed resistance, **R25,** of 10,000 O. Some chassis may not contain **R25,** in which case **R24** will have a total resistance of 10,000 O.



A sketch of the switch unit, with the contacts lettered where necessary to conform with the text above.