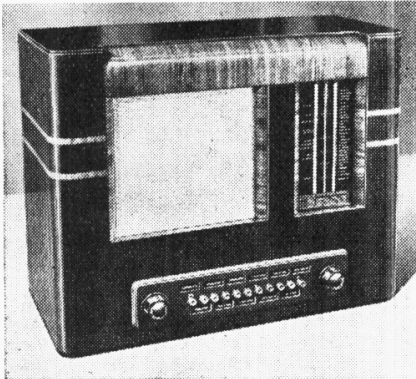


"TRADER" SERVICE SHEET

# 409

# PYE PP/AC

## AC MAINS TRANSPORTABLE



**T**HE Pye PP/AC is a 4-valve (plus rectifier) 3-band AC transportable superhet with self-contained frame aerials. Eleven press-buttons are provided, five for pre-set stations, three for wavechanging, two for tone control, and one for "off" switching.

The receiver is for 200-250 V, 40-100 C/S AC mains, and the SW range is 15-52 m.

There is provision for a pick-up and for an extension speaker, while aerial and earth sockets are fitted for use if required.

Release date : March, 1939.

### CIRCUIT DESCRIPTION

All the switches in this receiver have

been numbered and lettered in such a manner as to indicate their functions: all switches bearing the same number (they are mostly in groups of three) are operated by the same press-button; of the lettered suffixes, an **a** or **b** indicates that the switch to which it is attached closes, while an **x** or **y** indicates that its switch opens, when its button is pressed; when the button is released, by pressing another button, the **a** and **b** switches open and the **x** and **y** switches close.

Input on SW and MW is from independent frame aerial windings **L1** (SW) and **L3** (MW) which are tuned by **C44** for manual operation. For LW reception a loading coil **L2** is connected in series with **L3** and the whole is manually tuned by **C44**; the LW trimmer **C43** is then connected via **S1x**, **S1y**, **S2x** and **S3a** across the tuned circuit. On MW, **L2** is short-circuited via **S1x**, **S1y** and **S2a**.

For automatic operation, tuning is effected by pre-set condensers **C40**, **C41** and **C42** (MW) or **C38** or **C39** (LW). When any of the MW automatic buttons is depressed one of the switches **S4a**, **S5a**, **S6a** is closed to short-circuit **L2**. Provision is made for connection of an external aerial (via **C2**) and an earth.

First valve (**V1**, Mullard metallised **TH4B**) is a triode-pentode operating as frequency changer with internal coupling. For manual operation, triode oscillator

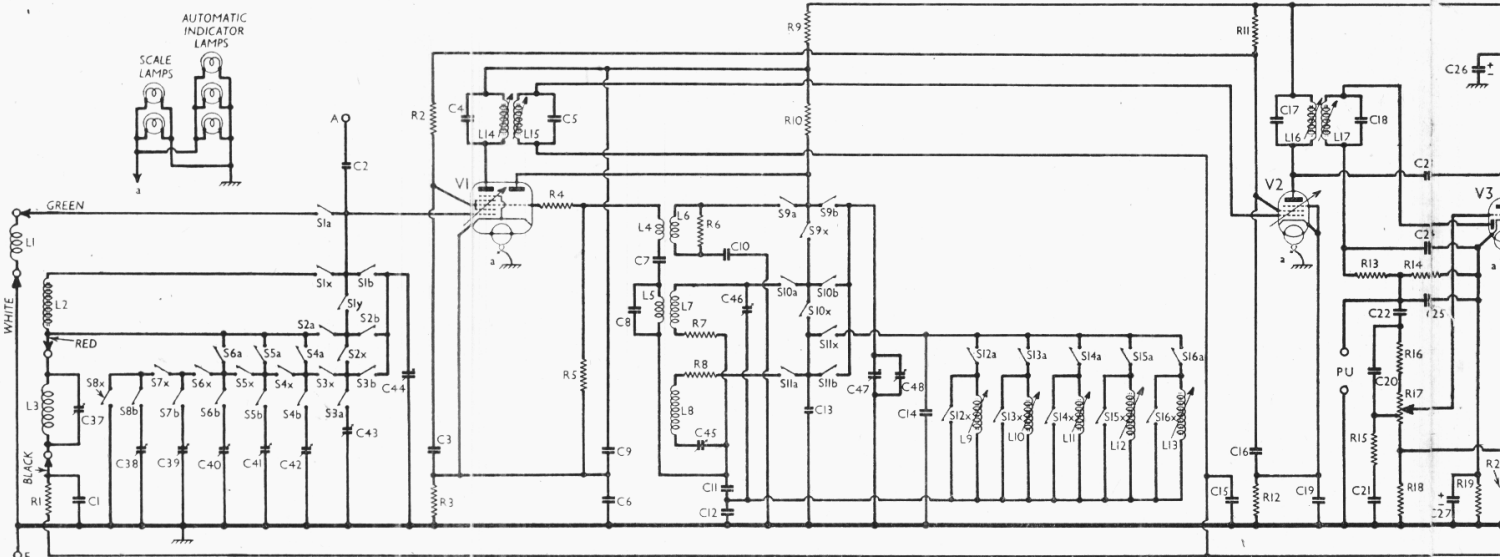
anode coils **L6** (SW), **L7** (MW) and **L8** (LW) are tuned by **C47**; parallel trimming by **C48** (SW), **C46** (MW) and **C13** (LW); series tracking by **C10** (SW), **C11** (MW) and **C45** (LW). Reaction by coils **L4** (SW), **L5** (MW) and direct coupling to **L8** (LW).

For automatic operation, **S9x**, **S10x** and **S11x** are closed, so that the oscillator anode is connected to one side of the switches numbered **S12a** to **S16a**, to the other sides of which are connected the independent oscillator circuit automatic tuning coils. When an automatic button is pressed, one of these switches closes, while its associated **x** counterpart opens. The low potential ends of the coils are returned to chassis via the reaction coupling condenser **C12**, which is common to them and the grid circuit. Tuning capacity is provided by fixed condensers **C13** and **C14**.

Second valve (**V2**, Mullard metallised **VP4B**) is a variable- $\mu$  RF pentode operating as intermediate frequency amplifier with tuned-primary tuned-secondary transformer couplings **C4**, **L14**, **L15**, **C5** and **C17**, **L16**, **L17**, **C18**. Tuning is effected by adjustment of the iron cores.

### Intermediate frequency 465KC/S.

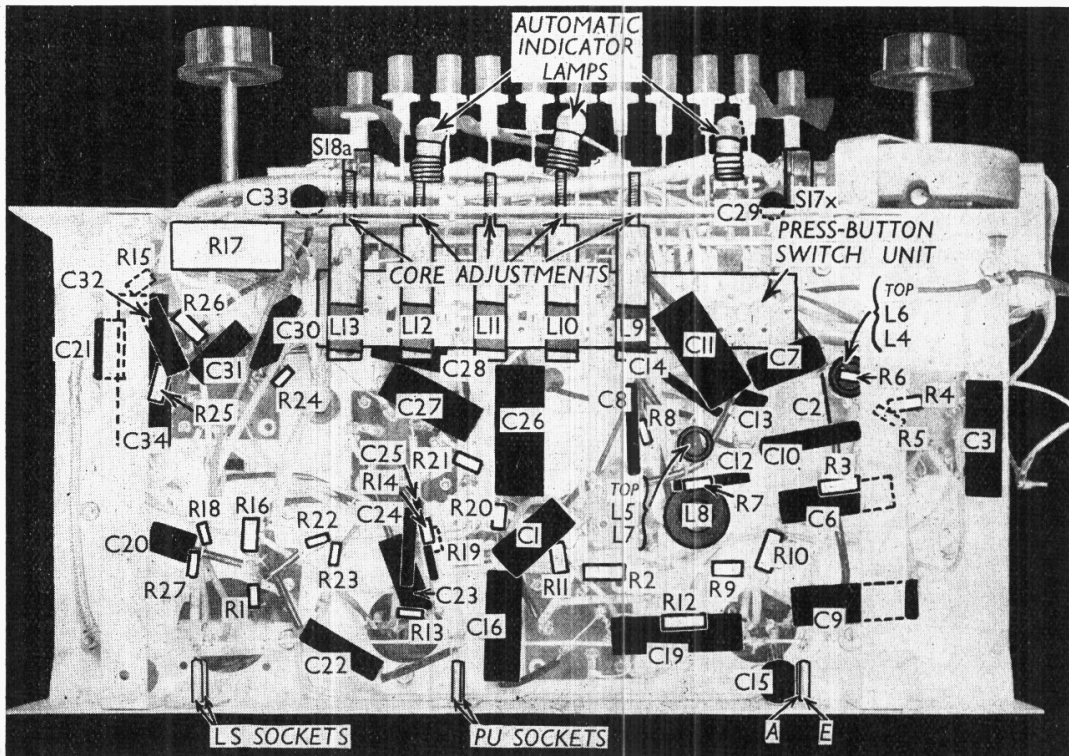
Diode second detector is part of double diode triode valve (**V3**, Mullard metallised **TDD4** or **Hivac AC/DDT**). Audio frequency component in rectified



Circuit diagram of the Pye PP/AC receiver. Note that **L3** is the MW frame winding and that **L2** is the LW loading coil, which is in series with **L3** for LW operation. All the switches are of the press-button type, and with the exception of **S17x** and **S18a** are

single unit.

Under-chassis view. The press-button unit is indicated here and shown in diagrammatic form in cols. 5 and 6 overleaf. The pre-tuned oscillator circuit coils are indicated, with their adjusting screws, in a row above the unit.



output is developed across load resistances **R13, R14**, that across **R14** being passed via **C22** to the manual volume control, which consists of two resistances, one of which, **R17**, is of the usual potentiometer type, and the other a fixed resistance **R16** which limits the range covered by the slider of the other. The signal then passes via the slider to the CG of the triode section of **V3**, which

operates as AF amplifier. Tone compensation by **C20, R15** and **C21** in association with **R17**. Provision for connection of gramophone pick-up between the junction of **R13** and **R14**, and chassis. IF filtering by **C24** and **C25**.

Second diode of **V3**, fed from **V2** anode via **C23**, provides DC potential which is developed across load resistance **R23** and fed back through decoupling circuits as GB to FC (except on SW) and IF valves, giving automatic volume control. Delay voltage, together with GB for triode section, is obtained from drop along **R19** in cathode lead to chassis.

Resistance-capacity coupling by **R21, C28** and **R24**, via **S17x**, between **V3** triode and pentode output valve (**V4, Mullard Pen A4**). Fixed tone correction by **C30** in grid circuit and **C31, R26** and **C32** in anode circuit. Tone control by **C33** and **S18a** in anode circuit: when **S18a** button (Less Top) is depressed, **S18a** is closed to increase high-note attenuation. Alternative tone control in **V3** to **V4** coupling circuit by **S17x, C29**; when **S17x** button (Less Bass) is depressed, **S17x** is open to attenuate bass notes.

Provision for connection of low impedance external speaker by sockets in the plugs which connect the internal speaker speech coil, via the chassis, to the secondary of the output transformer **T1**, in which case both speakers will be operated. If it is desired to mute the internal speaker, one of its plugs may be removed from its socket and replaced by one of the external speaker plugs.

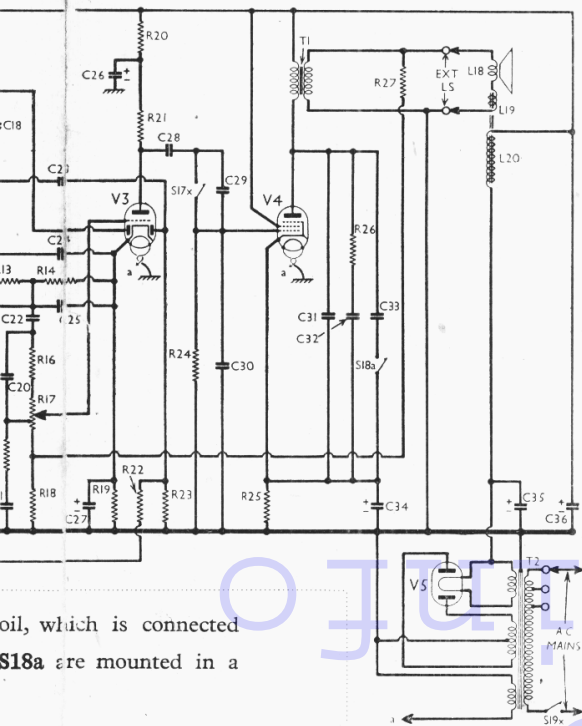
Part of the output from **T1** is developed across resistances **R27** and **R18**, the voltage so developed across **R18** being fed back via **R17** to **V3** triode grid circuit to provide negative feed-back.

HT current is supplied by full-wave rectifying valve (**V5, Mullard DW4/350** or **Hivac UU12/350A**). Smoothing by speaker field **L20** and dry electrolytic condensers **C35** and **C36**.

COMPONENTS AND VALUES

RESISTANCES		Values (ohms)
R1	V1 pentode CG decoupling ..	1,000,000
R2	V1 SG HT feed resistance ..	20,000
R3	V1 fixed GB resistance ..	150
R4	V1 osc. CG stabiliser ..	150
R5	V1 osc. CG resistance ..	47,000
R6	Osc. circuit SW damping ..	10,000
R7	Osc. circuit MW damping ..	22
R8	Osc. circuit LW damping ..	100
R9	V1 anodes decoupling ..	2,000
R10	V1 osc. anode HT feed ..	10,000
R11	V1, V2 SG HT feed ..	10,000
R12	V2 fixed GB resistance ..	150
R13	V3 signal diode load resistances ..	100,000
R14		470,000
R15	Part of tone compensator ..	30,000
R16	Volume control limiter ..	510,000
R17	Manual volume control ..	1,000,000*
R18	Negative feed-back coupling ..	22
R19	V3 GB resistance; AVC delay ..	1,500
R20	V3 triode anode decoupling ..	20,000
R21	V3 triode anode load ..	50,000
R22	AVC line decoupling ..	1,000,000
R23	V3 AVC diode load ..	1,000,000
R24	V4 CG resistance ..	100,000
R25	V4 GB resistance ..	150
R26	Part of fixed tone corrector ..	10,000
R27	Part of negative feed-back feed ..	100

\* Tapped at 400,000 O from R18.



CONDENSERS		Values ( $\mu$ f)
C1	V1 pentode CG decoupling ..	0.05
C2	External aerial coupling ..	0.000005
C3	V1 SG decoupling ..	0.1
C4	1st IF transformer fixed	0.00013
C5	tuning condensers ..	0.00014
C6	V1 cathode by-pass ..	0.1
C7	V1 osc. CG condenser ..	0.0002
C8	Osc. MW reaction shunt ..	0.0005
C9	V1 anodes decoupling ..	0.1
C10	Osc. circuit SW tracker ..	0.0005
C11	Osc. circuit MW tracker ..	0.00063
C12	Oscillator reaction coupling ..	0.002
C13	Oscillator circuit LW and auto fixed trimmer ..	0.00009
C14	Osc. circ. auto fixed tuning ..	0.00041
C15	V2 CG decoupling ..	0.05
C16	V2 SG decoupling ..	0.1
C17	2nd IF transformer fixed	0.00013
C18	tuning trimmers ..	0.00014
C19	V2 cathode by-pass ..	0.1
C20	Parts of tone compensator ..	0.0002
C21	AF coupling to V3 triode ..	0.005
C22	Coupling to V3 AVC diode ..	0.00002
C23	IF by-pass condensers ..	0.0001
C24	V3 triode anode decoupling ..	2.0
C25	V3 cathode by-pass ..	20.0
C26*	V3 triode to V4 AF coupling ..	0.05
C27*	Bass attenuator condenser ..	0.0025
C28	Parts of fixed tone corrector circuit ..	0.0005
C29	High-note attenuator ..	0.01
C30	V4 cathode by-pass ..	50.0
C31	HT smoothing condensers ..	16.0
C32	MW frame aerial trimmer ..	—
C33	Aerial circuit LW auto tuning trimmers ..	—
C34†	Aerial circuit MW auto tuning trimmers ..	—
C35†	Aerial circuit LW trimmer ..	—
C36*	Aerial circuit manual tuning ..	—
C37†	Osc. circuit LW tracker ..	—
C38†	Osc. circuit MW trimmer ..	—
C39†	Osc. circuit manual tuning ..	—
C40†	Osc. circuit SW trimmer ..	—

OTHER COMPONENTS		Approx. Values (ohms)
L1	SW frame aerial winding	Very low
L2	Aerial LW loading coil ..	5.8
L3	MW frame aerial winding	0.7
L4	Oscillator SW reaction ..	9.0
L5	Oscillator MW reaction ..	0.3
L6	Osc. manual SW tuning coil	Very low
L7	Osc. manual MW tuning coil ..	2.25
L8	Osc. manual LW tuning coil ..	5.5
L9	Oscillator circuit MW auto tuning coils ..	0.6
L10		2.15
L11	Oscillator circuit LW auto tuning coils ..	2.15
L12		4.5
L13	1st IF trans. { Pri. ..	4.5
L14		7.5
L15	2nd IF trans. { Sec. ..	7.5
L16		7.5
L17	Speaker speech coil ..	7.5
L18		2.5
L19	Hum neutralising coil ..	0.15
L20	Speaker field coil ..	1,250.0
T1	Output trans. { Pri. ..	425.0
T2		0.24
	Mains { Pri., total ..	17.0
		Heater sec. ..
	trans. { Rect. heat. sec. ..	0.1
		HT sec., total ..
S1a, b, x, y	SW button switches ..	—
S9a, b, x	MW manual button switches ..	—
S2a, b, x		—
S10a, b, x	LW manual button switches ..	—
S3a, b, x		—
S11a, b, x	Aerial circuit auto tuning selector switches ..	—
S4 to S8		—
S12 to S16	Oscillator circuit auto tuning selector switches ..	—
a, b and x		—
S17x	"Less bass" control switch ..	—
S18a	"Less top" control switch ..	—
S19x	Mains switch ..	—

### DISMANTLING THE SET

**Removing Chassis.**—First remove the two control knobs (pull-off) and free the speaker leads from the cleat holding them to the speaker frame. Now disconnect the two leads from the two screw terminals by the trimmer condenser **C37** on the diagonal paxolin MW frame supports on the left-hand side of the cabinet, and two further leads from the screw terminals on the paxolin panel on the sub-baffle, which supports the SW frame aerial.

Next, remove the wood-screw (with washer and rubber grommet, accessible through a hole in the scale cover) holding

the scale assembly to the top of the cabinet, and the four bolts (with washers) holding the chassis to the bottom of the cabinet, when the chassis may be withdrawn to the extent of the speaker leads, which is sufficient for normal purposes.

To remove the chassis entirely, withdraw the speech coil plugs from the sockets at the rear of the chassis, unsolder three leads connecting the chassis to the output transformer and disconnect two further leads from the chassis from the screw terminals on the speaker panel.

When replacing, connect the black frame aerial lead to the upper and the red one to the lower of the MW frame terminals; the white lead to the upper and the green to the lower of the two terminals of the SW aerial on the sub-baffle; connect three speaker leads from the chassis to the connecting tags on the output transformer, as follows, numbering from bottom to top: 1, blue; 2, green; 3, yellow. The fourth tag should be connected by a red lead to the lower terminal on the speaker panel; to the same terminal connect a fourth lead (black) from the chassis; a fifth chassis lead (red) should be connected to the other terminal. Note that a felt washer is fitted over each press-button knob.

**Removing Speaker.**—Withdraw the speech coil plugs from the chassis, disconnect the three leads from the two screw terminals on the speaker panel and remove the four cheese-head bolts (with washers) holding the speaker to the sub-baffle. When replacing, the connecting panel should face the top left-hand corner of the sub-baffle. The leads are connected as outlined above.

**Removing Output Transformer.**—Unsolder the leads from the four tags to the connecting strip, and remove the two round-head wood-screws holding the transformer to the sub-baffle. When replacing, the connecting strip should be on the right, and the leads connected as indicated above.

### VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on mains of 227 V, using the 216-235 V tapping on the mains transformer. The receiver was tuned to the lowest wavelength on the medium band and the volume control was at maximum, but there was no signal input.

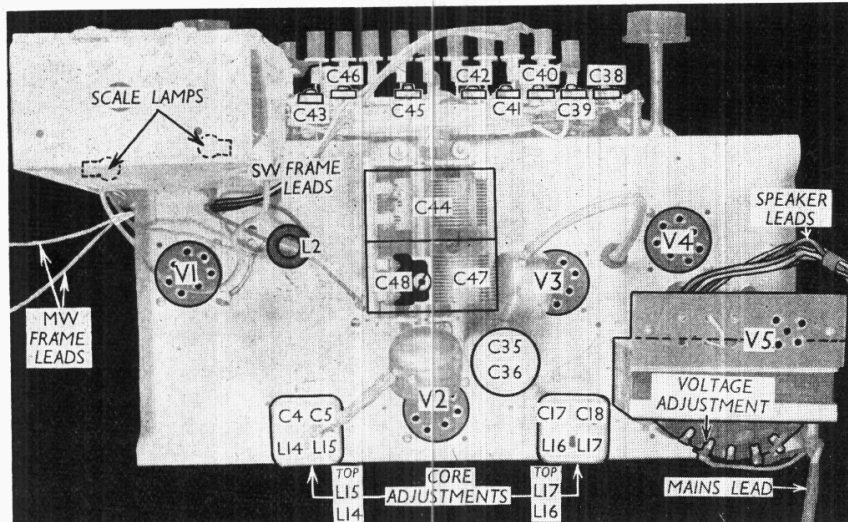
Voltages were measured on the 400 V scale of a model 7 Universal Avometer, chassis being negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 TH4B	{ 235 Oscil. lator 160	{ 2.2 7.5	80	4.5
V2 VP4B	260	9.3	173	3.3
V3 TDD4	95	2.2	—	—
V4 PenA4	240	35.0	260	5.6
V5 DW4/350	332†	—	—	—

† Each anode, AC.

### GENERAL NOTES

**Switches.**—S1a, b, x, y to S16a, x are the waveband and auto-tuning press-



Plan view of the chassis. All the trimmers and trackers except **C37** and **C48** are mounted in a row at the front of the chassis. **C37** is mounted on the frame aerial supports, and is not shown in the illustrations.

button switches, which, together with the mains switch **S19x**, are contained in a single two-sided press-button unit at the front of the underside of the chassis, having nine buttons. Two other buttons, one at each extremity of the unit, control **S17x** and **S18a**, the tone control switches. These two switches are indicated in the under-chassis view, while the main press-button unit is shown in detail in two diagrams in cols. 5 and 6. The upper diagram shows the unit as seen from the underside of the chassis, and the lower one shows the reverse side, as it would be seen if it were possible to look through the chassis deck.

The buttons, from left to right looking at the front of the cabinet, are: Less Top; Off; two LW stations; three MW stations; LW manual; MW manual; SW; Less Bass.

The switch groups are numbered with suffixes **a**, **b**, **x** or **y**, and when a button is pressed, all its **a** and **b** switches close, and its **x** and **y** switches open, and vice-versa. The same applies to the tone control and mains switches. See also the beginning of Circuit Description.

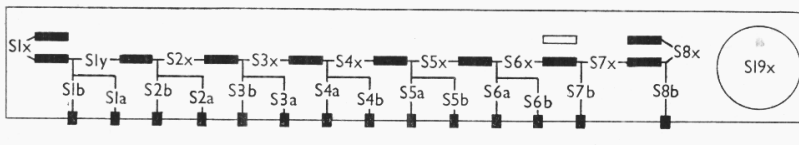
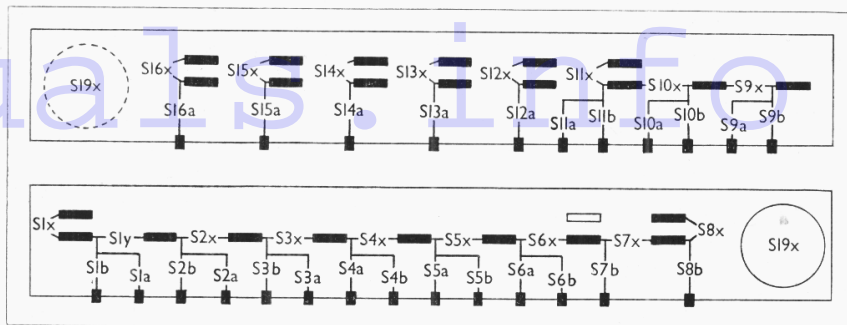
The tone control switches are not automatically released when another button is pressed, so that both may be in the "depressed" position if desired. To release, their buttons must be pressed towards the top of the cabinet.

**Coils.**—**L1** and **L3** are frame aerial windings inside the cabinet. **L1** is a single turn on the speaker baffle; **L3** is at the left of the cabinet, and with it is associated the trimmer **C37**. **L2** is an unscreened unit on the chassis deck, while **L14**, **L15** and **L16**, **L17** are in two screened units on the chassis deck, having their core adjustments at the sides of the cans facing the rear of the chassis.

**L4**, **L6**; **L5**, **L7**; **L8**; and the auto-tuning oscillator coils **L9-L13** are all in unscreened units beneath the chassis. **L9-L13** all have adjustable iron cores for station setting.

**Scale and Indicator Lamps.**—Three lamps are used behind the press-button panel, and two others for general illumination of the tuning scale. They are all Ever Ready MES types, rated at 6.0 V, 0.5 A.

**External Speaker.**—A low impedance



Diagrams of the press-button unit. Above, as seen from beneath the chassis; below, as would be seen looking through the chassis deck.

(2-4 O) external speaker can be plugged into the socketed plugs of the internal speaker, or can be used alone by first unplugging the internal speaker leads from the chassis.

**Condensers C35, C36.**—These are two 16  $\mu\text{F}$  (500 V working) dry electrolytics in a single tubular metal unit on the chassis deck, the can being the common negative connection. The tag to which **R20** is connected is the positive of **C36**; the other tag (coded red) is the positive of **C35**.

**Chassis Divergencies.**—**R16**, **C20**, **R26** and **C32** are not shown in the makers' diagram. **C31** is across **T1** primary in the makers' diagram, and has a value of 0.005  $\mu\text{F}$ . **C36** is given as 8  $\mu\text{F}$  by the makers. Several discrepancies in the coil resistances were found. The values we give are those measured in our chassis. Certain resistors may have values differing by up to 10 per cent. from those quoted by us.

### AUTO-TUNING ADJUSTMENT

The wavelength ranges of the auto-tuning buttons, starting with the third button from the left, looking at the front of the cabinet are: 900-2,000 m; 900-2,000 m; 280-560 m; 250-470 m; 190-330 m. The ranges can be changed, if necessary, by fitting new oscillator coils, and associated aerial trimmers.

Station setting is achieved by depressing the appropriate button and adjusting the associated aerial trimmer (**C38-C42**),

and the core of the corresponding oscillator coil (**L9-L13**).

### CIRCUIT ALIGNMENT

In all cases, the signal from the generator is fed into the set by coupling to the frame aerials. A single turn of wire round the cabinet, or even some distance away, should provide adequate coupling.

**IF Stages.**—Press MW button, and tune to higher wavelength end of scale. Feed in a 465 KC/S signal, and adjust cores of **L14**, **L15**, **L16** and **L17** for maximum output. Repeat these adjustments carefully.

**RF and Oscillator Stages.**—With gang at maximum, pointer should be at the tops of the clear glass strips on which the scales are printed.

**SW.**—Press SW button, tune to 20 m on scale, feed in a 20 m (15 MC/S) signal, and adjust **C48** (on gang) for maximum output.

**MW.**—Press MW button, tune to 200 m on scale, feed in a 200m (1,500 KC/S) signal and adjust **C46**, then **C37** (on MW frame), for maximum output. Repeat these adjustments.

**LW.**—Press LW button, tune to 1,800 m on scale, feed in an 1,800 m (166.7 KC/S) signal, and adjust **C45** for maximum output. Tune to 1,300 m on scale, feed in a 1,300m (230 KC/S) signal, and adjust **C43** for maximum output. Repeat the LW adjustments.

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**Model P.P.A.C.**

*The need has disappeared*

**I**n one way the outside aerial can be compared with the starting handle of a motor car. Once it was absolutely necessary—without it a set would not start. At that time the amount of "power" produced per valve in a receiver was only a fraction of what it is to-day and consequently every ounce of efficiency produced by the outside aerial was needed. But like the starting handle, the need for it has disappeared as design has been improved. For listening to Home and Continental stations and, under good broadcasting conditions, more distant stations, the earth and aerial are no longer necessary.

As far back as 1925, Pye were producing Portable receivers. Year after year design and construction have been improved until to-day Pye Portables compare favourably, tone for tone and volume for volume, with standard external aerial sets.

The new Portable range includes sets for Battery, A.C. and D.C. mains operation. Models at 14 gns. and 14½ gns. give an all-wave performance, and with press-buttons have the most advanced form of tuning. The 10½ gns. battery portable is designed so that even far distant European stations retain their volume without powerful nearby transmitters breaking through. An attractive economy in battery consumption is effected by the special circuit which varies the amount of current taken from the battery as the output of the set increases or decreases, and ensures that there is no waste. The New Baby (Q) has a superhet circuit so that it crowds a really big performance into a small space. Tone, range and volume will surprise you, coming from so small a set and priced at only 8½ gns.



**MODEL PPAC.** Price 14 gns. Now—Pye portables include illuminated press-button tuning in addition to that excellent performance that has been made possible by years of experience in this field. Five stations, tone, wave-change and mains switch are all controlled by neat buttons which operate swiftly and accurately. Ordinary tuning on all wavebands is flywheel regulated, and it is extremely easy to select stations on the clearly marked dial. This 5-valve (including rectifier) A.C. Superhet Portable is one of the most convenient Press-button sets you can buy. Wavelengths: 14.8-52.2, 192-565, 900-2,000 metres. Sockets for gramophone pick-up and external loud speaker. Output 3 wats.

**MODEL PPU.** Price 14½ gns. A.C. D.C. mains version of Model PPAC. Wavelengths: 14.8-52.2, 192-565, 900-2,000 metres. Sockets for extra loud speaker.

**MODEL PPB.** Price 14 gns. This 4-valve Superhet battery model has six pre-tuned stations selected by press-buttons. Wavelengths: 192-560, 850-2,000 metres. Sockets for extra loud speaker.

**H.P. TERMS:** Models PPAC and PPB. Deposit 17s. 10d. and 12 monthly instalments of 25s. 6d.

**H.P. TERMS:** Model PPU. Deposit 18s. 6d. and 12 monthly instalments of 26s. 5d.

**Dimensions:** 17" × 20" × 9½"