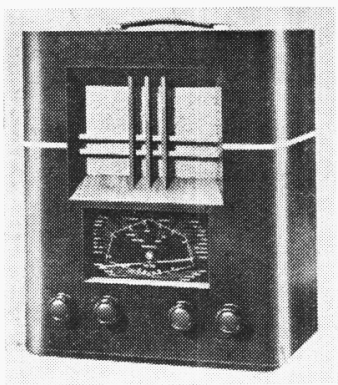
Supplement to The Wireless & Electrical Trader, December 17, 1938

"TRADER" SERVICE SHEET

371

PYE 810

BATTERY TRANSPORTABLE



A FRAME aerial is included in the Pye 810 4-valve battery 2-band superhet transportable, in which refinements are provision for an extension speaker and an external aerial and earth.

Release date. June, 1938.

CIRCUIT DESCRIPTION

Tuned frame aerial input **L1, C27** (MW) or, on LW, **L2, C28** via second channel filter **L3, C25** and loading circuit **L4, C2** to an octode valve (**V1, Mullard metallised FC2A**). Provision for connection of an external aerial via **C3,** and an earth.

Oscillator grid coils **L5** (MW) and **L6** (LW) are tuned by **C29**; parallel trimming by **C30** (MW); series tracking by **C8** (MW) and **C7, C31** (LW). Reaction by anode coils **L7, L8.**

Second valve (**V2, Mullard metallised VP2B**) is a variable-mu hexode with second and third grids strapped to operate as pentode intermediate frequency amplifier with tuned-primary tuned-secondary iron-cored transformer couplings **C4, L9, L10, C5** and **C12, L11, L12, C13,** none of which components is adjustable except by the special method outlined in "Circuit Alignment."

Intermediate frequency 465 KC/S.

Diode second detector is part of double diode triode valve (**V3, Mullard metallised TDD2A**). Audio frequency component in rectified output is developed across load resistances **R5, R6,** that tapped off at their junction being fed via AF coupling condenser **C17** and manual volume control **R8** to CG of triode section, which operates as AF amplifier. IF filtering by **C15, C16.** Bass compensation is obtained by **R7, C18** in association with **R8.**

Second diode of **V3,** fed from **V2** anode via **C14,** provides DC potentials which are developed across load resistances **R10, R11** and fed back through decoupling circuits as GB to FC and IF valves, giving automatic volume control.

Parallel-fed transformer coupling by **R9, C19** and **T1,** via grid stopper **R12,** between **V3** triode and pentode output valve (**V4, Mullard PM22A** or **Ever Ready K70B**). Three-position tone control by condensers **C22, C23** and switches **S5, S6** in anode circuit; with it is gauged **S4** to short-circuit **C18** on two positions of the control. Internal speaker speech coil is connected by socketed plugs to the secondary of the output transformer, to which a low impedance external speaker may be connected instead. If both internal and external speakers are required to operate together, the external speaker leads may be plugged into the sockets in the internal speaker plugs.

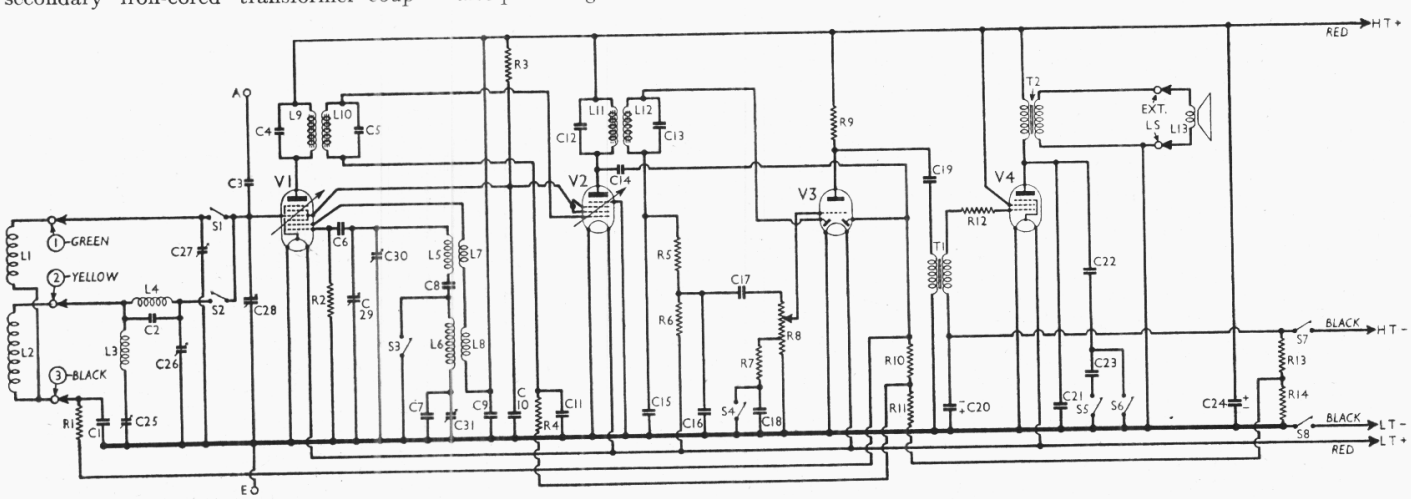
Grid bias and AVC delay potentials are automatically obtained from voltage drop across resistances **R13, R14** in HT negative lead to chassis, the AVC delay also providing minimum GB for **V1** and **V2.**

COMPONENTS AND VALUES

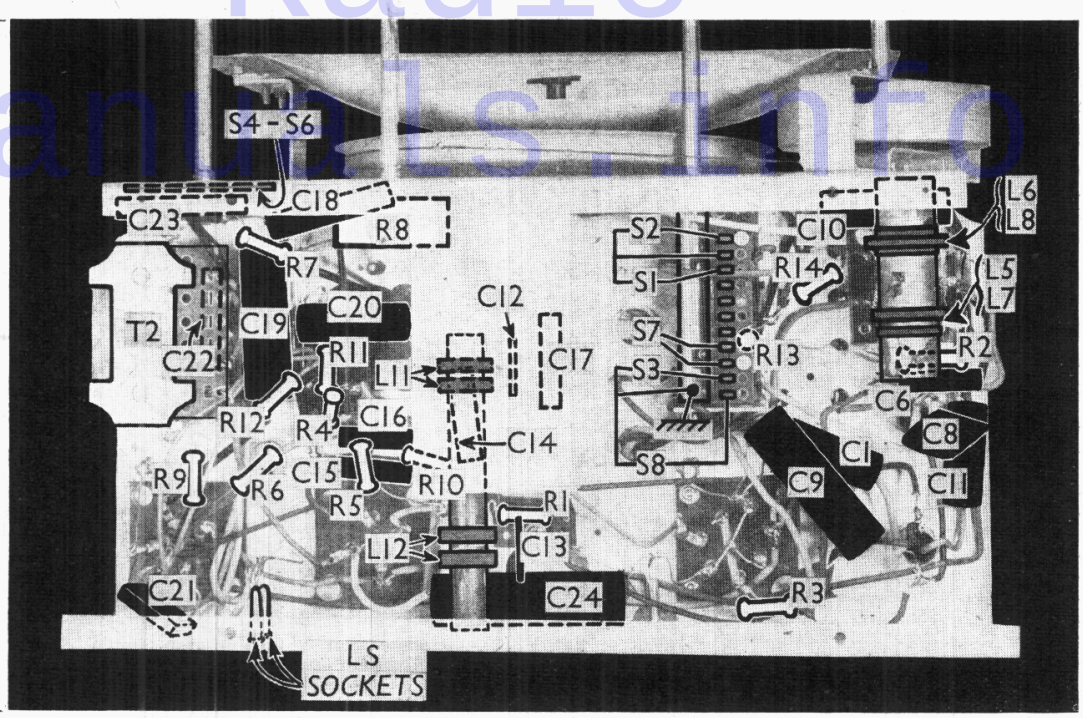
	RESISTANCES	Values (ohms)
R1	V1 pentode CG decoupling	1,100,000
R2	V1 osc. CG resistance	110,000
R3	V1, V2 SG's HT feed	50,000
R4	V2 CG decoupling	1,100,000
R5	V3 signal diode load resistances	110,000
R6		510,000
R7	Part of tone compensator	50,000
R8	Manual volume control	1,100,000
R9	V3 triode anode load	25,000
R10	V3 AVC diode load resistances	510,000
R11		510,000
R12	V4 grid stopper	110,000
R13	Automatic GB potential divider	350
R14		50

	CONDENSERS	Values (μF)
C1	V1 pentode CG decoupling	0·05
C2	Harmonic LW aerial rejector tuning	0·000045
C3	External aerial coupling	0·000005
C4	1st IF trans. pri. tuning	0·00009
C5	1st IF trans. sec. tuning	0·00009
C6	V1 osc. CG condenser	0·0001
C7	Osc. circuit LW fixed tracker	0·00022
C8	Osc. circuit MW tracker	0·000622
C9	HT circuit RF by-pass	0·25
C10	V1, V2 SG's decoupling	0·1
C11	V2 CG decoupling	0·05
C12	2nd IF trans. pri. tuning	0·00012
C13	2nd IF trans. sec. tuning	0·00014
C14	Coupling to V3 AVC diode	0·00002
C15	IF by-pass condensers	0·0001
C16		0·0001
C17	AF coupling to V3 triode	0·01
C18	Part of tone compensator	0·01
C19	AF coupling to T1	0·25
C20*	Auto GB by-pass	20·0
C21	IF by-pass	0·0005
C22	Tone control condensers	0·01
C23		0·003
C24*	HT reservoir condenser	8·0
C25‡	LW aerial 2nd channel filter tuning	0·00008
C26‡	Frame aerial LW trimmer	—
C27‡	Frame aerial MW trimmer	—
C28†	Frame aerial tuning	—
C29†	Oscillator circuit tuning	—
C30‡	Osc. circuit MW trimmer	—
C31‡	Osc. circuit LW tracker	—

* Electrolytic. † Variable. ‡ Pre-set.



Circuit diagram of the Pye 810 battery transportable. The IF transformers are fixed-tuned and will not normally require adjustment.



Under-chassis view. The waveband-change and battery circuit switches are individually indicated. A diagram of the **S4-S6** switch unit is in column 6.

	OTHER COMPONENTS		Approx. Values (ohms)
L1, L2	Frame aerial windings		0·8, 21·0
L3	LW aerial 2nd channel filter coil		8·5
L4	LW aerial loading coil		2·75
L5	Osc. circuit MW tuning coil		1·66
L6	Osc. circuit LW tuning coil		5·0
L7, L8	Oscillator reaction coils, total		7·25
L9, L10	1st IF trans.	Pri.	4·5
		Sec.	4·5
L11, L12	2nd IF trans.	Pri.	4·5
		Sec.	4·5
L13	Speaker speech coil		5·0
T1	Intervalve trans.	Pri.	750·0
		Sec.	4,400·0
T2	Output transformer	Pri.	800·0
		Sec.	0·2
S1-S3	Waveband switches		—
S4-S6	Tone control switches		—
S7	HT circuit switch		—
S8	LT circuit switch		—

DISMANTLING THE SET

A detachable bottom is fitted to the cabinet and upon removal (four countersunk-head wood screws) gives access to some of the components beneath the chassis.

Removing Chassis.—If it is necessary to remove the chassis from the cabinet, remove the four control knobs (pull off), then lift up the battery platform and free the frame aerial leads from the panels on each side of the cabinet (screw terminals). Next disconnect the speaker speech coil leads from the sockets at the back of the chassis and remove the four bolts (with washers and cup washers) holding the chassis to the bottom of the cabinet.

The chassis can now be withdrawn from the cabinet and *when replacing*, connect the yellow frame aerial lead to the nearer terminal on the left-hand panel, two black leads to the further terminal, the remaining black lead to the nearer terminal on the right-hand panel, and the green lead to the further terminal.

Removing Speaker.—To remove the speaker from the cabinet, unplug the speaker speech coil leads from the sockets at the back of the chassis and free them from the cleat on the sub-baffle. Then remove the two bottom screws (with spring washers and cleats) and the two top screws (with washers and spring washers) holding the speaker to the sub-baffle.

When replacing, see that the terminal panel is on the right and do not forget to replace the cleats for the frame aerial lead on the two bottom screws.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating with a new HT battery reading 125 V on load. 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 as the frame aerial connections were shorted.

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

If, as in our case, **V2** should become unstable when its anode current is being measured, it can be stabilised by connecting a non-inductive condenser of about 0·1 μF from grid (top cap) to chassis.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 FC2A	120	0·5	41	0·6
	Oscillator			
	120	1·7		
V2 VP2B	120	1·8	41	0·6
V3 TDD2A	74	1·6	—	—
V4 PM22A	117	3·4	120	0·6

GENERAL NOTES

Switches.—**S1-S3** and **S7, S8** are the waveband and battery circuit switches, in a single unit beneath the chassis. The individual switches are indicated in our under-chassis view. The table below gives the switch positions for the three control settings, starting from fully anti-clockwise. A dash indicates *open*, and **C** *closed*.

Switch	Off	MW	LW
S1	—	C	—
S2	—	—	C
S3	—	C	—
S7	—	C	C
S8	—	C	C

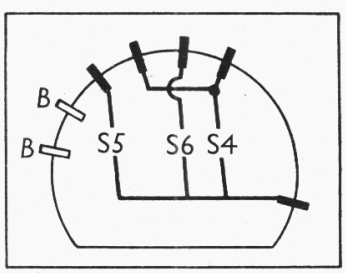


Diagram of the tone control switches, as seen from the rear of the underside of the chassis.

S4-S6 are the tone control switches, ganged in a rotary unit beneath the chassis, close to **T2**. The unit is indicated in our under-chassis view, and shown in detail in the diagram above, where it is drawn as seen looking from the rear of the underside of the chassis.

In the fully anti-clockwise position of the control **S4** and **S6** are *closed*. In the central position **S4** and **S5** are

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closed, while in the fully clockwise position all switches are *open*.

Coils.—**L1** and **L2** are the frame aerial windings, fitted inside the cabinet, and therefore not shown in our chassis illustrations. There are two screw terminals on each side of the interior of the cabinet, the two on the right belonging to **L1** (MW) and the two on the left to **L2** (LW). The yellow and black leads from the chassis go to the **L2** terminals, the green lead from the chassis goes to one of the **L1** terminals, the other **L1** terminal being connected by a separate black lead across to the **L2** terminal which already carries the black lead from the chassis.

L3 and **L4** are on two tubular formers on the chassis deck, while the first IF transformer coils, **L9, L10** are on another former close to that of **L3.**

L5-L8 and **L11, L12** are on two tubular formers beneath the chassis. All coils are unscreened.

External Speaker.—The internal speaker is provided with socketed plugs which fit into two sockets at the rear of the chassis. A low impedance (2-4 O) external speaker may be plugged into the socketed plugs of the internal speaker, or direct into the chassis sockets if the internal speaker is not required.

Pre-set Condensers.—Four trimmers and a tracker are used in this set, and all are above the chassis deck. **C25** is mounted above **L3,** and the remainder are in a row of four on a ceramic strip.

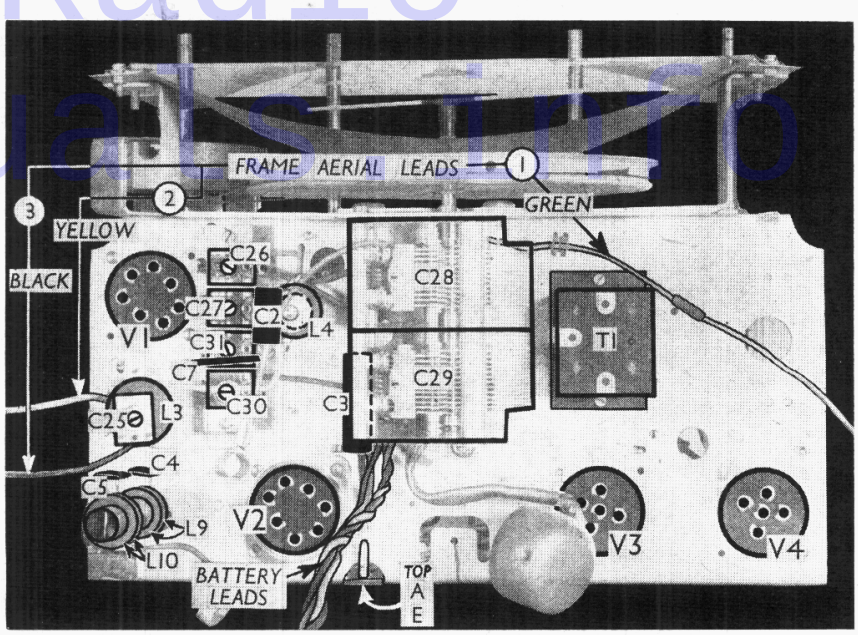
Chassis Divergencies.—The makers' diagram shows a 1·1 MO resistor connected across **L11,** but it was not present in our chassis. **C4** and **C5** are rated at 140 $\mu\mu$F in the makers' information, but were 90 $\mu\mu$F in our chassis. The makers show **C27** connected across **C28,** whereas in our chassis it is on the other side of **S1,** and so is only in circuit on MW. Some models may use a Mullard PM22D in the output stage.

Batteries.—LT, 2 V 30 AH celluloid-cased accumulator cell, Pye type LT2. HT, 120 V dry battery, Pye type K6. GB is automatic.

Battery Leads and Voltages.—Black lead, spade tag, LT negative; red lead, spade tag, LT positive 2 V; black lead and plug, HT negative; red lead and plug, HT positive 120 V.

CIRCUIT ALIGNMENT

General.—Normal alignment must be carried out with the chassis in the cabinet.



Plan view of the chassis. Note the various pre-set condensers. The frame aerial leads are numbered and colour-coded.

A hole is provided in the battery shelf to give access to the trimmers.

When adjusting the MW range the HT battery should be left in place, and the LT removed. When adjusting the LW range the LT should be in place, and the HT removed.

The volume control should be at maximum for all adjustments.

IF Stages.—These are actually fixed-tuned to 465 KC/S, and will normally not need adjustment, but in the case of replacement transformers the alignment is carried out by varying the coupling between the coils forming each pair.

Connect the signal generator to grid (top cap) of **V1,** via a 0·002 μF condenser, and chassis. The existing lead to the top cap is removed, and a 0·5 MO resistance is connected between top cap and AVC line (bottom end of **R1** in our circuit). A 0·25 μF condenser is connected between oscillator anode of **V1** and chassis to stop the oscillator working.

Feed in a 465 KC/S signal, and adjust the *outer* coils on each IF unit in turn for maximum output. Seal the coils to the former with Durofix or similar cellulose cement, and allow to dry before commencing RF alignment.

RF and Oscillator Stages.—With gang at maximum, pointer should cover the short horizontal lines at the ends of the yellow MW scale. Couple the signal generator loosely by one or two turns of wire round the cabinet.

MW.—Switch set to MW, tune to 210 m on scale, feed in a 210m (1,428 KC/S) signal, and adjust **C30,** then **C27,** for maximum output. Check calibration at 300 and 520 m.

LW.—Switch set to LW and tune to 1,800 m on scale. Unscrew **C26** fully, then feed in an 1,800 m (166·5 KC/S) signal, and adjust **C31** for maximum output.

Now feed in a strong 342 m (877 KC/S) signal, tune it in at about 1,450 on the LW band, and adjust **C25** for *minimum* output.

Tune receiver to 1,300 m on scale, feed in a 1,300 m (230 KC/S) signal, and adjust **C26** for maximum output.

Repeat all the LW adjustments.

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