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"TRADER" SERVICE SHEET

561

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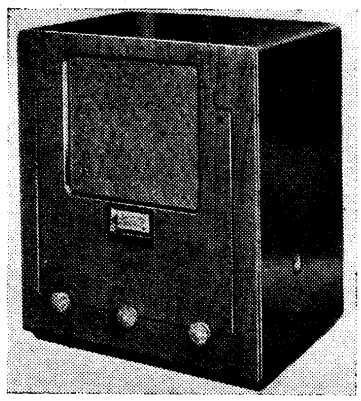
PORTADYNE B72

BATTERY SUPERHET



A TETRODE combined first detector and oscillator and a class B output stage are employed in the Portadyne B72, a 5-valve 2-band battery superhet. Oscillator reaction coupling is established between the anode and cathode (filament) circuits for frequency changing, and the oscillator tuning circuits and the IF transformer primary are connected in series. Provision is made for the connection of a gramophone pick-up and an external speaker.

Release date: January, 1934.

CIRCUIT DESCRIPTION

Aerial input via **C1,** image suppressor coil **L4** (MW) or series coil **L1** (LW) and tappings on **L2, L3** to inductively coupled band-pass filter. Primary coils **L2, L3** are tuned by **C13;** secondaries **L5, L6** by **C15.** Provision for local/distant switching by **R1, S1,** which shunts the aerial circuit for local reception when **S1** is closed.

First valve **(V1, Mullard unmetallised PM12M)** is a tetrode operating as oscillator and first detector. Oscillator coils **L11** (MW) and **L12** (LW) in anode circuit are tuned by **C20.** Parallel trimming by **C17** (MW) and **C18** (LW); series tracking by **C19** (LW). Reaction coupling by **L7, L8** and **L9, L10** in filament leads.

Second valve **(V2, Mazda metallised S215VM** or **Mullard PM12M)** is a variable-mu RF tetrode operating as intermediate frequency amplifier with tuned-primary, tuned-secondary transformer couplings. Gain control by **R12,** which varies GB potential applied to **V2.**

Intermediate frequency 112 KC/S.

Diode second detector is part of double diode triode valve **(V3, Mazda metallised L2/DD)** in which the two diodes are connected in parallel. Audio frequency component in rectified output is developed across load resistance **R4** and passed via IF filter **C6, R6, C10** and AF coupling condenser **C8** to CG of triode section. Provision for connection of gramophone pick-up in control grid circuit.

Resistance-capacity coupling by **R5, C9, R8** between **V3** triode and triode driver valve **(V4, Mullard metallised PM2DX),** which is, in turn, transformer coupled to class B output stage comprising double triode valve **(V5, Mazda PD220A** or **Osram B21),** fixed tone corrector **C12** and speaker input transformer **T2.**

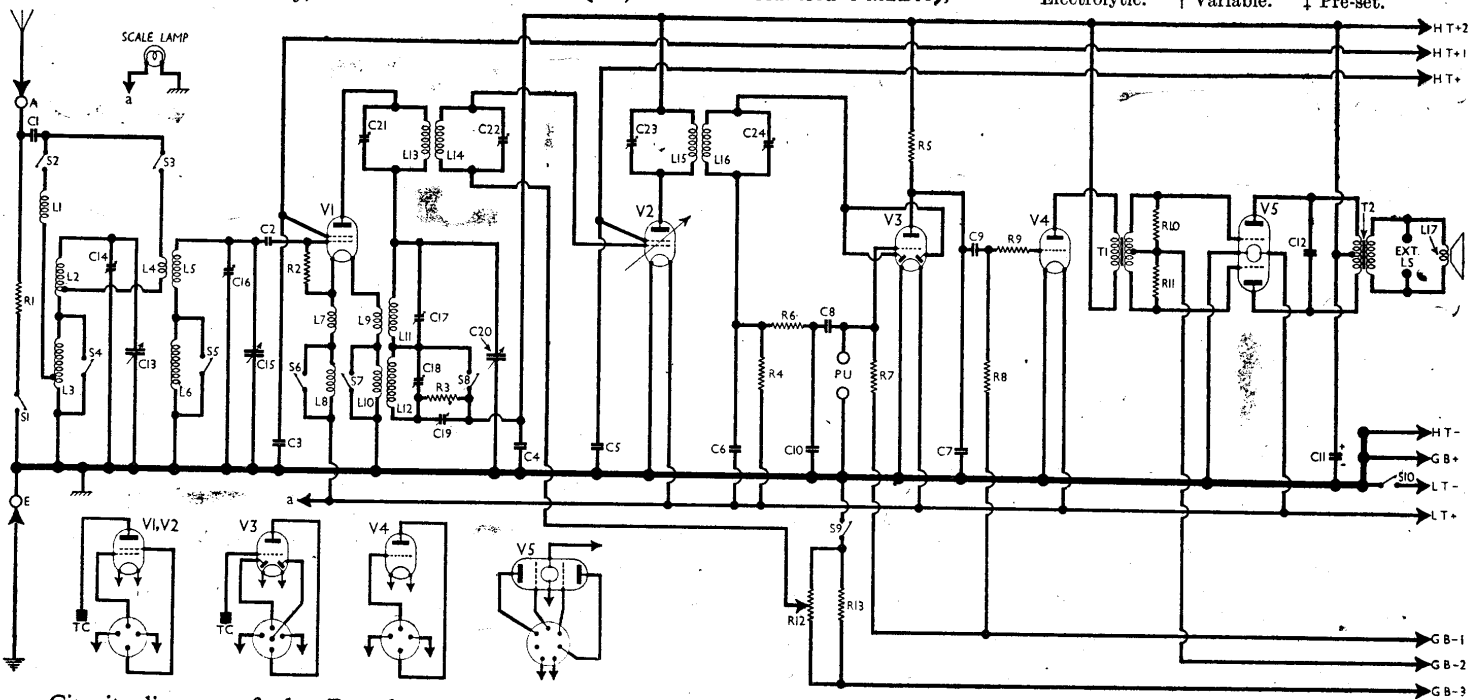
COMPONENTS AND VALUES

	RESISTANCES	Values (ohms)
R1	Local/distant attenuator	35
R2	V1 CG resistance	250,000
R3	V1 osc. anode HT feed ...	10,000
R4	V3 diode load	1,000,000
R5	V3 triode anode load ...	30,000
R6	IF stopper	50,000
R7	V3 triode CG resistance ...	500,000
R8	V4 CG resistance	1,000,000
R9	V4 grid stopper	250,000
R10	T1 secondary shunt resistances	10,000
R11		10,000
R12	V2 gain control resistances	5,000
R13		1,200

	CONDENSERS	Values (μF)
C1	Aerial series condenser ...	0·0005
C2	V1 CG condenser ...	0·00005
C3	V1 SG decoupling ...	0·1
C4	HT circuit RF by-pass ...	0·1
C5	V2 SG decoupling ...	0·1
C6	IF by-pass condensers ...	0·0002
C7		0·002
C8	AF coupling to V3 triode	0·005
C9	V3 triode to V4 coupling	0·005
C10	IF by-pass	0·0001
C11*	HT reservoir condenser ...	4·0
C12	Fixed tone corrector ...	0·002
C13†	Band-pass pri. tuning ...	—
C14‡	B-P sec. MW trimmer ...	—
C15†	Band-pass sec. tuning ...	—
C16‡	B-P sec. MW trimmer ...	—

(*Continued overleaf.*)

* Electrolytic. † Variable. ‡ Pre-set.



Circuit diagram of the Portadyne B72 5-valve battery superhet. **R12** is the gain control, and varies the GB applied to **V2.** It is shunted by **R13.** **V4** is the class B driver.

	CONDENSERS (*Continued.*)	Values (μF)
C17‡	Osc. circ. MW trimmer ...	—
C18‡	Osc. circ. LW trimmer ...	—
C19‡	Osc. circ. LW tracker ...	0·003
C20†	Oscillator circuit tuning...	—
C21‡	1st IF trans. pri. tuning...	—
C22‡	1st IF trans. sec. tuning...	—
C23‡	2nd IF trans. pri. tuning	—
C24‡	2nd IF trans. sec. tuning	—

† Variable. ‡ Pre-set.

	OTHER COMPONENTS	Approx. Values (ohms)
L1	Aerial LW series coil ...	35·0
L2, L3	Band-pass primary coils ...	6·8, 26·0
L4	Image suppressor coil ...	0·15
L5, L6	Band-pass secondary coils	6·8, 26·0
L7	V1 filament oscillator reaction coupling coils ...	0·15
L8		0·15
L9		0·15
L10		0·15
L11	Osc. MW tuning coil ...	3·0
L12	Osc. LW tuning coil ...	20·0
L13	1st IF trans. Pri. ...	85·0
L14	1st IF trans. Sec. ...	85·0
L15	2nd IF trans. Pri. ...	85·0
L16	2nd IF trans. Sec. ...	85·0
L17	Speaker speech coil ...	2·3
T1	Intervalve trans. Pri. ...	2,000·0
	Intervalve trans. Sec., total ...	260·0
T2	Speaker input trans. Pri., total	480·0
	Speaker input trans. Sec. ...	0·3
S1	Local/distant switch ...	—
S2-S8	Waveband switches ...	—
S9	GB circuit switch	—
S10	LT circuit switch	—

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 135 V on load. The receiver was operating with no signal input, and the volume control was at maximum.

Voltages were measured on the 1,200 V scale of an Avometer, chassis being the negative connection.

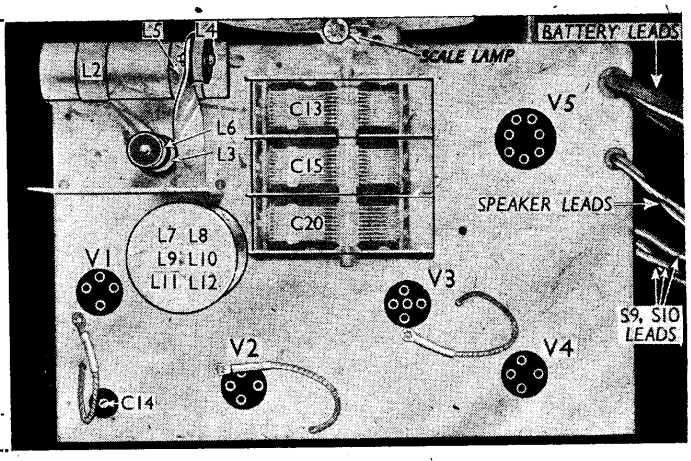
Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 PM12M	133	0·9	65	0·3
V2 S215VM	133	1·1	45	0·2
V3 L2/DD	95	1·1	—	—
V4 PM2DX	130	2·5	—	—
V5 PD220A	133*	1·6*	—	—

* Each anode, approx.

DISMANTLING THE SET

Removing Chassis.—Remove the three control knobs (*two* recessed grub screws each);
remove the battery switch fixing nut on the side of the cabinet;
unsolder the two leads from the local/distant switch at the bottom of the cabinet, and free the speaker lead from its cleat;
remove the four bolts (with large washers) holding the chassis to the bottom of the cabinet.
The chassis may now be withdrawn to the extent of the speaker leads, or, if these are unsoldered from the panel on the speaker, freed entirely.
When replacing, connect the speaker leads as follows, numbering the tags from top to bottom:
1, black;
2, red;
3, black;
4 and 5, no external connection.

Removing Speaker.—Unsolder the leads as indicated above and remove the two nuts from each of the four fixing screws.
When replacing, the transformer should be on the right, and the leads should be connected as previously indicated.



Plan view of the chassis. The image suppressor coil **L4** is mounted on an adjustable bracket, the position of which is critical and should not be unnecessarily disturbed. **C14** adjustment is indicated in the bottom left-hand corner.

GENERAL NOTES

Switches.—S1 is the local/distant switch, fitted at the front of the cabinet and attached to chassis by a flexible pair of leads. It is pushed inwards for normal use, but for strong local transmissions it may be pulled outwards to prevent overloading of **V1.**

S2-S8 are the waveband switches, in a single ganged assembly beneath the chassis. This is indicated in our under-chassis view, but the switches are obscured from view by a metal cover plate, which carries pre-set condensers **C16-C18.** The diagram (col. 3) shows the assembly in detail as it is seen when the plate is removed. All the switches, with the exception of **S2,** close on MW and open on LW; the action of **S2** is precisely opposite to this.

S9, S10 are the battery switches, in a "three-point" QMB switch mounted on the side of the cabinet and attached to the chassis by a three-way flexible lead.

Scale Lamp.—This is an Osram MES type rated at 2.5 V, 0.15 A.

Condenser C2.—This consists of a few turns of wire, double wound and waxed.

Condenser C11.—This is a 4 μF dry electrolytic, rated at 200 V, DC.

Gramophone Pick-up. — Provision is made for connection of a pick-up, but an external volume control will be required when one is used.

External Speaker.—A low impedance (about 3-6 O) external speaker could be connected to the speech coil tags, which are the two bottom tags on the input transformer **T2.** The internal speaker is Celestion PPM9L, and the transformer is mounted on it.

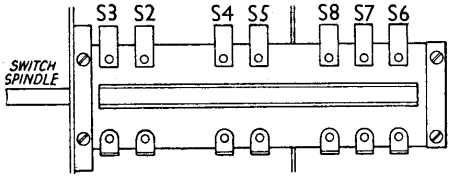


Diagram of the switch assembly. It is shown here in a horizontal position, but it is vertical in our under-chassis view, with the spindle at the top.

Batteries and Leads.—The original batteries were: LT, CAV SGM mass-type cell; HT, Pertrix Ultra Capacity 120 V HT plus 13.5 GB unit. The leads should be connected as follows: HT−, GB+ and LT leads as marked; HT+ lead, 40 V; HT+1, 60 V; HT+2, 120 V. GB−1, −3 V; GB−2, −4.5V; GB−3, −13.5V.

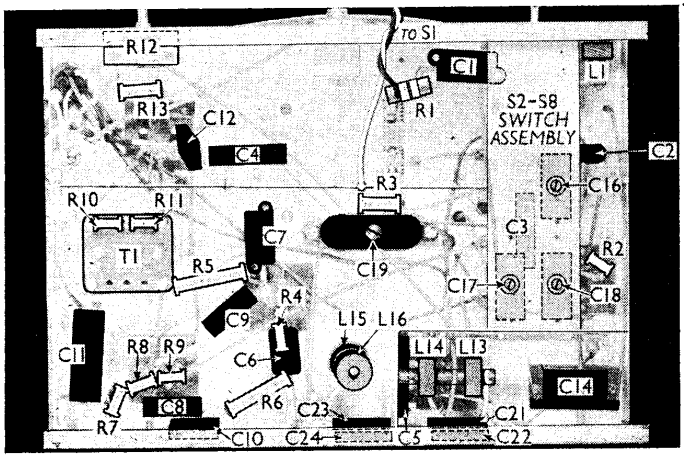
CIRCUIT ALIGNMENT

IF Stages.—Connect signal generator to insulated vanes of **C15** and chassis, feed in a 112 KC/S (2,678.6 m) signal, and adjust **C24, C23, C22, C21** for maximum output.

RF and Oscillator Stages.—Transfer signal generator leads to **A** and **E** sockets via a suitable dummy aerial.

MW.—Switch set to MW, tune to 205 m on scale, feed in a 205 m (1,460 KC/S) signal, and adjust **C17,** then **C14** and **C16** for maximum output. Check calibration at 400 m (750 KC/S), then 300 m (1,000 KC/S), adjusting the trimmers if necessary. Then repeat the 205 m adjustments, and re-check at 400 m and 300 m.

LW.—Switch set to LW, tune to 1,000 m on scale, feed in a 1,000 m (300 KC/S) signal and adjust **C18** for maximum output. Feed in an 1,800 m (166.6 KC/S) signal, and adjust **C19** for maximum output, while rocking the gang for optimum results.



Under-chassis view. The switch assembly is obscured from view by a cover plate, but a detailed diagram is given in col. 3. A metal screen has been removed for photographing purposes from the bottom right-hand corner, where it normally covers **L13, L14.**

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