"TRADER" SERVICE SHEET

658

PYE G/B

BATTERY RECEIVER

TWO pentodes working in QPP provide the output in the Pye G/B. The receiver has altogether four valves, and covers MW and LW bands. It is battery operated, and has provision for a gramophone pick-up and an external speaker.

Release date and original price: December, 1932; £14 14s. complete.

CIRCUIT DESCRIPTION

Aerial input via tapping on primary windings to inductively coupled band-pass filter. Primary coils **L1, L2** are tuned by **C11;** secondaries **L3, L4** by **C14.** Coupling by mutual inductance of windings.

First valve **(V1, Mazda metallised S215VM)** is a variable-mu RF tetrode operating as signal frequency amplifier, with gain control by variable potentiometer **R9** in GB circuit. A variable resistor **R1,** which shunts the aerial input circuit, is ganged with **R9,** the dual unit forming the volume control.

Tuned-anode coupling by **L6, L7, C16** between **V1** and triode detector valve **(V2, Mazda metallised HL2)** which operates on the grid leak system with **C4, R3.** Reaction is applied from anode via coupling coil **L5** and controlled by differential condenser **C18,** one side of which goes to chassis. Sockets are provided in the control grid circuit for the connection of a gramophone pick-up, and **S9** disconnects them when the receiver is switched to radio. RF filtering by **C6, L8** and **C7** in anode circuit.

Parallel-fed transformer coupling by **R5, C8** and **T1** between **V1** and double-pentode quiescent push-pull output stage **(V3, V4, Mazda Pen220's).** Fixed tone correction by **C9, R7** between anodes. Provision for connection of low impedance external speaker across secondary of output transformer **T2,** while **S10** permits the internal speaker to be muted.

GB potential for **V1,** and for **V2** on gram, are obtained from a potential divider comprising **R8, R9** across part of the GB section of the HT battery, which is isolated from the HT section. When the receiver is switched to gram, **S7** closes, so that **V1** control grid is connected directly to GB—1 tapping to mute radio. GB for the output valves is obtained from a separate tapping, GB—2. It should be noted that all battery circuits are isolated from chassis.

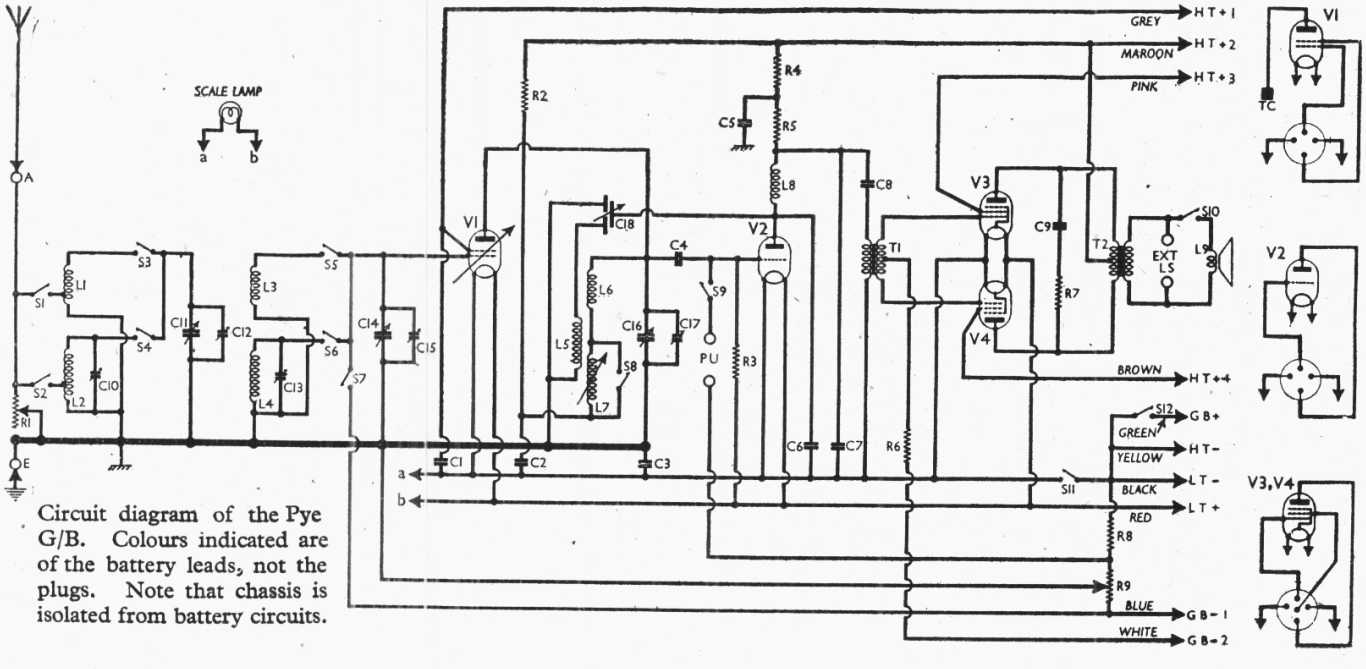
COMPONENTS AND VALUES

	CONDENSERS	Values (μF)
C1	V1 SG decoupling ...	0·25
C2	V1 anode decoupling ...	1·0
C3	V1 CG decoupling ...	0·25
C4	V2 CG condenser ...	0·0002
C5	V2 anode decoupling ...	0·5
C6	RF by-pass condensers ...	0·0001
C7		0·001
C8	AF coupling to T1 ...	0·5
C9	Part tone corrector ...	0·0025
C10‡	B-P pri. LW trimmer ...	—
C11†	Band-pass pri. tuning ...	—
C12‡	B-P pri. MW trimmer ...	—
C13‡	B-P sec. LW trimmer ...	—
C14†	Band-pass sec. tuning ...	—
C15‡	B-P sec. MW trimmer ...	—
C16†	V1 anode tuning ...	—
C17‡	V1 anode MW trimmer ...	—
C18†	Differential reaction control	—

† Variable. ‡ Pre-set.

	RESISTORS	Values (ohms)
R1	Aerial gain control ...	25,000
R2	V1 anode HT feed ...	10,000
R3	V2 grid leak	2,000,000
R4	V2 anode decoupling ...	10,000
R5	V2 anode load	40,000
R6	V3, V4 CG's decoupling	150,000
R7	Part tone corrector ...	25,000
R8	V2 GB resistor	150
R9	V1 gain control	800

	OTHER COMPONENTS	Approx. Values (ohms)
L1	Band-pass primary coils ...	3·75
L2		17·5
L3	Band-pass secondary coils	3·75
L4		17·5
L5	Reaction coupling coil ...	8·5
L6	V1 anode tuning coils ...	4·0
L7		42·0
L8	V2 anode RF choke ...	230·0
L9	Speaker speech coil ...	1·23
T1	Intervalve { Pri. ...	400·0
	trans. { Sec., total ...	12,000·0
T2	Output { Pri., total ...	800·0
	trans. { Sec.	0·75
S1-S6	Waveband switches ...	—
S8		—
S7	Radio muting switch ...	—
S9	Gram. PU switch ...	—
S10	Internal speaker switch ...	—
S11	LT circuit switch ...	—
S12	GB circuit switch ...	—



Circuit diagram of the Pye G/B. Colours indicated are of the battery leads, not the plugs. Note that chassis is isolated from battery circuits.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those quoted in the makers' manual for a set operating on MW with a new HT battery reading 150 V on load, with the volume control at maximum, but with no signal input. The negative lead of the voltmeter is connected to LT negative, not chassis.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 S215VM	138	1·4	60	0·2
V2 HL2	80	1·6	—	—
V3 Pen220	149	1·8	*	—
V4 Pen220	149	1·8	*	—

* See under "Battery Leads and Voltages."

DISMANTLING THE SET

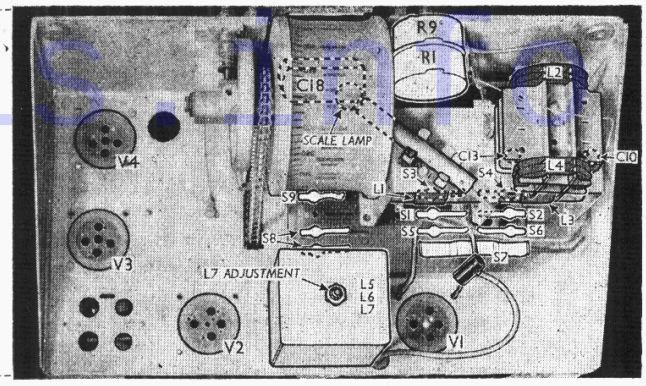
Removing Chassis.—Remove the control knobs (pull-off);
lay the receiver face-down on a cloth on the bench;
remove the two wood screws (with rubber grommets and metal bushes) holding the top of the chassis to the front of the cabinet;
remove the four cheese head bolts (with metal washers) holding the base of the chassis to battens on the sides of the cabinet. These bolts are reached through holes in the cabinet base;
lift out chassis, lay it face-down on the edges of the cabinet, and unsolder from the output transformer the two speaker leads.
When replacing, do not omit to slip the speaker leads under the clip at the base of the transformer.

Removing Speaker.—First remove the chassis, then free the external speaker panel (three wood screws) from the corner of the cabinet;
free the four-way bunch of leads from the two clips on the base of the cabinet;
remove the four nuts (with spring washers) holding the speaker to the sub-baffle.
When replacing, the leads should emerge from the left-hand side of the speaker.

GENERAL NOTES

Switches.—**S1-S6** and **S8** are the waveband switches, **S7** the radio muting switch, and **S8** the pick-up switch, all ganged in flat assembly mounted horizontally beneath **L1** and **L3.** The fixed contacts are indicated in our plan view of the chassis, and the table below gives the switch positions for the three control settings, commencing with the control on the left. A dash indicates open, and **C**, closed.

Switch	LW	Gram	MW
S1	—	—	C
S2	C	—	—
S3	—	—	C
S4	C	—	—
S5	—	—	C
S6	C	—	—
S7	—	C	—
S8	—	—	C
S9	—	C	—



Plan view of the chassis. A metal screening partition, which normally stands betwoen **V1** and the coils, has been removed for photographing. The fixed contacts of the waveband switches are numbered.

S10 is the internal speaker muting switch, described under "External Speaker." **S11, S12** are the battery circuit switches, ganged in a QMB unit at rear of chassis.

Coils.—The band-pass coils **L1-L4** are in a built-up assembly indicated in our plan view. **V1** anode and the reaction coils **L5-L7** are in a screened unit on the chassis deck. The adjustment of **L8,** indicated on the top of the can, controls a brass plunger suspended in the middle of the coil unit. The RF choke **R8** is mounted on a metal partition, just beneath **V2** holder.

Scale Lamp.—This is an Osram lamp, with an MES base, rated at 3.5 V, 0.15 A. It is mounted on a long tubular holder which is held in spring clips. As the LT circuit is isolated from chassis, the clips are mounted on a small panel insulated from chassis.

External Speaker.—Two sockets are provided on a panel at the side of the cabinet for a low impedance (2-5 Ω) external speaker. If the special plug provided is pushed right home in the sockets, **S10** opens and mutes the internal speaker. If the plug is inserted only half-way, both speakers operate.

Battery Leads and Voltages.—Special Pye products were originally specified for HT and LT supplies. The HT unit contained a 150 V HT battery and an isolated 9 V GB battery. The LT unit was a celluloid unspillable accumulator cell. The HT unit was marked 0—159 V. The leads should be connected as follows; red and black leads with spade tags, LT+ and LT− 2 V; yellow lead, black plug, HT− (O); grey lead, red plug, HT+1, 60 V; maroon lead, red plug, HT+2, 159 V; pink lead, red plug (HT+3) and brown lead, red plug (HT+4) according to required anode current in table below; green lead, red plug, GB+; blue lead, black plug, GB−1, −9 V; white lead, black plug, GB−2, −7.5 V.

If a single lead is used with a substitute battery for HT− and GB+ it should be the present GB+ lead, as otherwise the GB battery will remain in circuit when the set is switched off.

HT+3 and +4 plugs should be adjusted so that the anode current for **V3** and **V4** is correct for battery voltage at HT+2. The correct anode current for **each** valve, measured without a signal, for four different HT batteries is shown in the following table:

Battery voltage (HT + 2) ...	163	150	125	100
Anode current (mA)	2·2	1·8	1.3	0·9

Isolated Chassis.—As will be seen from the circuit diagram, the power supplies are isolated from the chassis. It is important, therefore, that the metallising of **V1** and **V2** should not be permitted to come into contact with the chassis. If it does, the GB circuit will be short-circuited. A rubber pad is fixed to the dividing screen to insulate it from **V1** metallising.

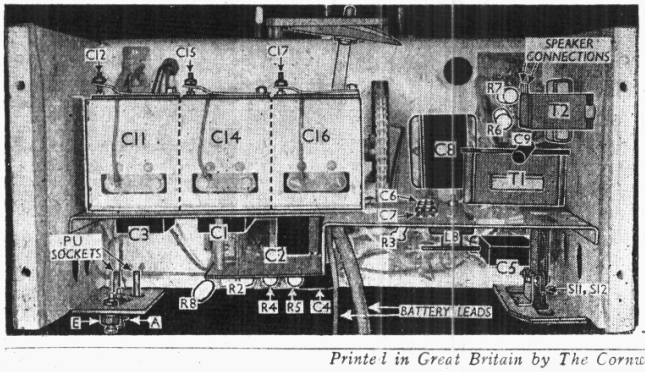
Chassis Divergencies.—In our chassis, **C2** was 1 μF, whereas the makers' manual gives it as 0.25 μF. **R4** and **C5** are not shown in the makers' manual, but were added after production was commenced to avoid feed-back coupling via partly run-down HT batteries.

CIRCUIT ALIGNMENT

With the gang at maximum, the horizontal line at the high wavelength end of the scale should correspond with the pointers on the escutcheon. Connect signal generator to **A** and **E** sockets via a suitable dummy aerial, turn the volume control to maximum and the reaction control to minimum.

MW.—Switch set to MW, tune to 200 m. on scale, feed in a 200 m (1,500 kc/s) signal, and adjust **C17** and the reaction control for maximum output. Tune to 250 m on scale, feed in a 250 m (1,200 kc/s) signal, and adjust **C12** and **C15** for maximum output, resetting the reaction control if necessary. Check performance at 500 m (600 kc/s).

LW.—Switch set to LW, tune to 1,000 m on scale, feed in a 1,000 m. (300 kc/s) signal, and adjust **C13** and **C10** for maximum output. Check calibration over the scale and, if necessary, reset the **L7** adjustment, but this should be avoided if possible. With each readjustment of **L7,** the reaction condenser should be reset and then, when the adjustment is at maximum, **C17** must be readjusted at 200 m, then **L8** at 1,000 m until no improvement can be obtained.



Under-chassis view. **C6** and **C7** are shown dotted through the screening partition, as they cannot be seen from this angle of view. They are actually mounted beside **L8.**

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