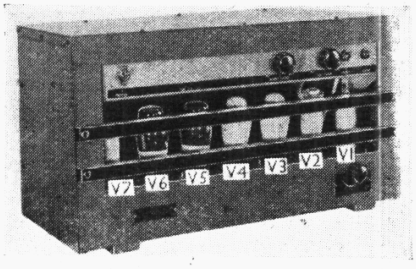
"TRADER" SERVICE SHEET 637

AMBASSADOR PA143

PA AMPLIFIER WITH RADIO UNIT



The appearance of the latest model of the PA143. The valves are numbered, and the control panel is seen above them. Resistor **R6** is inside the top cap connector of **V2**. Access to the valves is obtained by removing the wooden bars.

DESIGNED for "Music While You Work" entertainment in factories, the Ambassador PA143 is a 6-valve (plus rectifier) AC-operated amplifier unit with a rated output of 10-12 watts from a class A stage.

A self-contained RF unit provides for radio reception, and fader controls perform microphone/radio or microphone/pick-up change-over. The mains voltage range is 200-250 V AC only and no adjustment tappings are provided on the mains transformer.

Release date and price (latest model): May 1, 1943; £26 10s., *plus purchase tax* £1 5s. 6d.

CIRCUIT DESCRIPTION

Radio input from aerial is via series condenser **C19** to single-tuned circuit **L1, C20,** which covers the MW band only and precedes RF pentode valve **(V1, Mazda metallised VP41).**

Tuned-secondary RF transformer coupling by **L2, L3, C22** between **V1** and diode detector, which is part of double diode triode valve **(V2, Mazda metallised HL41DD).** Audio frequency component in rectified output is developed across load resistance **R3** and passed via switches **S2, S1,** which are closed, coupling condenser **C7,** gain control **R4** (radio fader), microphone fader **R5,** which is turned to minimum, and grid stopper **R6,** to CG of triode section which operates as AF amplifier. RF filtering by **L4** and **C5.** GB for **V2** triode is provided by a dry cell between **R4** and chassis, while the heater is tied via a potentiometer **R9, R10** to chassis.

A switched jack incorporating switches **S1, S2, S3** is provided for pick-up connection. When the plug is inserted, **S1, S2** open, and **S3** closes to mute radio. Input is fed via **C7, R4, R5** and **R6** to **V2** triode control grid. **R5** would normally be at minimum.

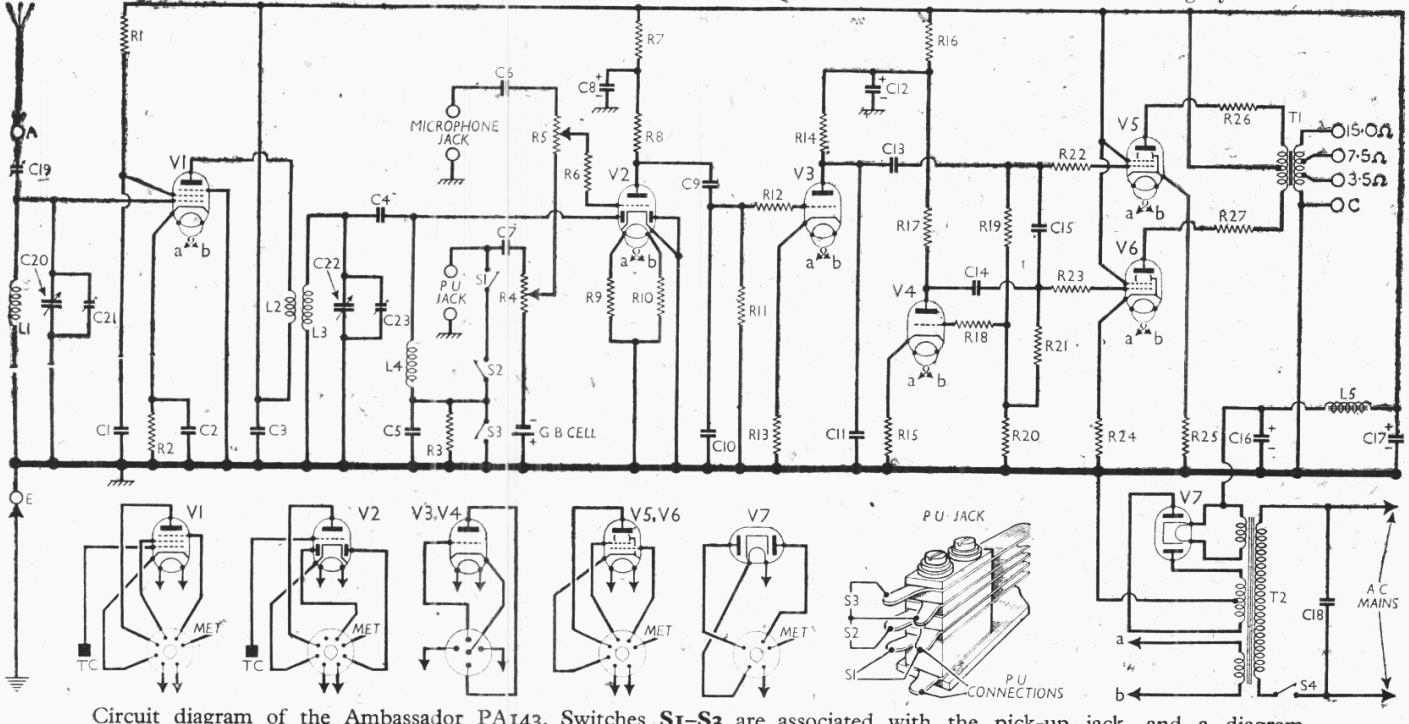
Microphone input is via a second jack, coupling condenser **C6,** microphone fader **R5** and grid stopper **R6,** to **V2** triode control grid. **R5** is returned to chassis via **R4,** which would normally be turned to minimum. If input were being fed to the pick-up and microphone sockets simultaneously, the fading effect could be obtained by manipulating **R4** and **R5** appropriately. Radio would be muted. Similarly, if the pick-up plug were withdrawn fading could be operated between radio and microphone by the same method.

Resistance-capacity coupling by **R8, C9** and **R11** between **V2** triode and triode AF amplifier **(V3, Mazda metallised AC/HL),** whose output is in turn resistance-capacity coupled by **R14, C13** and **R19, R20** to one side **(V5)** of Class A push-pull output stage comprising two beam tetrodes **(V5, V6, Mazda Pen45's).**

Signal potential at the junction of **R19** and **R20,** which form a step-down coupling device, is applied via a coupling resistor **R18** to triode phase-reversing valve **(V4, Mazda metallised AC/HL),** whose output is fed via **R17, C14** and **R21** to the second output valve **(V6).** RF filtering by **C10** and **R12** in **V3** CG circuit, **C11** in **V3** anode circuit, **R18** in **V4** CG circuit and **C15, R22, R23** in the push-pull input circuit.

Output transformer **T1** secondary is tapped to provide suitable coupling ratios for 3.5Ω, 7.5Ω and 15Ω impedance speech coils. Where several speakers are used, series and parallel methods of connection to approximately the same total impedance are used.

HT current is supplied by IHC full-wave rectifying valve **(V7, Mazda metallised UU6).** Smoothing by iron-cored choke **L5** and electrolytic condensers **C16, C17.** Mains RF filtering by **C18.**



Circuit diagram of the Ambassador PA143. Switches **S1–S3** are associated with the pick-up jack, and a diagram of their connections appears beneath the circuit.

COMPONENTS AND VALUES

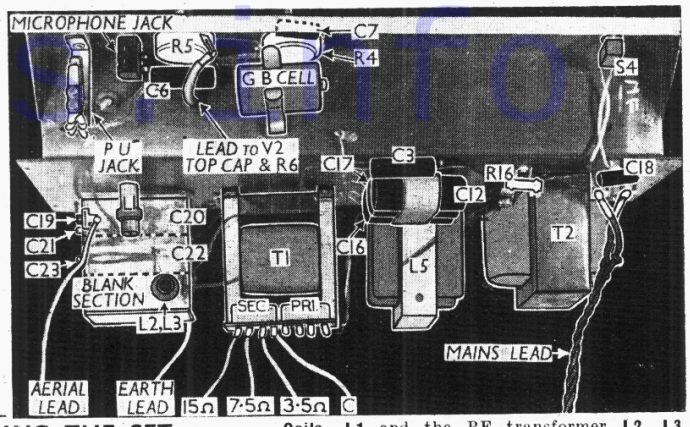
	CONDENSERS	Values (μF)
C1	V1 SG decoupling ...	0·1
C2	V1 cathode by-pass ...	0·01
C3	HT circuit RF by-pass ...	0·1
C4	V2 diode coupling ...	0·0001
C5	RF by-pass	0·0001
C6	Microphone coupling ...	0·1
C7	Radio and PU coupling ...	0·01
C8*	V2 anode decoupling ...	8·0
C9	AF coupling to V3 ...	0·1
C10	RF by-pass condensers ...	0·0006
C11		0·0001
C12*	V3, V4 anodes decoupling	8·0
C13	AF coupling to V5 ...	0·03
C14	AF coupling to V6 ...	0·03
C15	RF by-pass	0·0001
C16*	HT smoothing condensers	8·0
C17*		8·0
C18	Mains RF by-pass ...	0·01
C19‡	Aerial series condenser ...	—
C20†	Aerial circuit tuning ...	—
C21‡	Aerial circuit trimmer ...	—
C22†	RF trans. sec. tuning ...	—
C23‡	RF trans. sec. trimmer ...	—

* Electrolytic. † Variable. ‡ Pre-set.

	RESISTORS	Values (ohms)
R1	V1 SG HT feed	20,000
R2	V1 GB resistor	300
R3	V2 signal diode load ...	250,000
R4	Radio and PU gain control	500,000
R5	Microphone gain control	500,000
R6	V2 triode grid stopper ...	10,000
R7	V2 triode anode decoupling	50,000
R8	V2 triode anode load ...	50,000
R9	V2 heater circuit potential divider	25
R10		25
R11	V3 CG resistance ...	1,000,000
R12	V3 grid stopper	10,000
R13	V3 GB resistor	1,000
R14	V3 anode load	50,000
R15	V4 GB resistor	1,000
R16	V3, V4 anodes decoupling	20,000
R17	V4 anode load	50,000
R18	V4 CG resistor	20,000
R19	V3 output potential divider ...	250,000
R20		40,000
R21	V6 CG resistor	500,000
R22	V5 grid stopper	250,000
R23	V6 grid stopper	250,000
R24	V6 GB resistor	175
R25	V5 GB resistor	175
R26	V5 anode stopper ...	50
R27	V6 anode stopper ...	50

	OTHER COMPONENTS	Approx. Values (ohms)
L1	Aerial tuning coil ...	2·7
L2	RF trans Pri. ...	3·5
L3	RF trans Sec. ...	2·9
L4	Diode circuit choke ...	60·0
L5	HT smoothing choke ...	360·0
T1	Output trans. Pri., total ...	500·0
	Output trans. Sec., total	1·2
T2	Mains trans. Pri., ...	26·0
	Mains trans. Heater sec. ...	Very low
	Mains trans. Rect. heat. sec.	0·1
	Mains trans. HT sec., total	280·0
S1-S3	Radio/gram. change switches	—
S4	Mains switch	—

Plan view of the chassis, showing the components behind the control panel (above) and those mounted on the main chassis support (below). The GB cell is of the Ever Ready U2 type and is soldered in circuit.



DISMANTLING THE SET

Removing Chassis.—Remove six countersunk head wood screws holding pressboard back cover to case;
unsolder from sockets on back cover the six leads connecting them to chassis;
remove the four countersunk wood screws (two at each end) holding the main vertical chassis member to battens at ends of case;
with the left hand, grasp the top front edge of the case; and with the fingers under the control panel (just above the valves), lift the front of the chassis. Then, with the right hand, grip the core of **L5** and ease it over the rear batten, when the chassis may be withdrawn, one end foremost.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our chassis when it was operating with mains of 234 V.

The two faders were turned to maximum, both jack plugs were out, and the gang was turned to minimum, but there was no signal input.

Voltages were measured in the 400 V scale of a model 7 Ayometer, chassis being the negative connection in all cases.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 VP41	260	9·7	200	2·2
V2 HL41DD	70	1·7	—	—
V3 AC/HL	85	1·7	—	—
V4 AC/HL	85	1·7	—	—
V5 Pen45	244	43·5	258	8·5
V6 Pen45	244	43·5	258	8·5
V7 UU6	304†	—	—	—

† Each anode, AC.

GENERAL NOTES

Switches.—With the exception of the QMB mains switch **S4**, the only switches are those associated with the pick-up jack, **S1-S3**. **S1, S2** are closed, and **S3** is open, when the pick-up plug is out, and the amplifier can operate on radio programmes. When the plug is inserted, **S1, S2** open, and **S3** closes, so that radio is muted. In both cases the microphone can be used, radio/microphone or pick-up/microphone changeover being accomplished by manipulation of the fader potentiometers **R4** and **R5**.

The connections to switches **S1-S3** are shown in the sketch beneath the circuit diagram overleaf, where the rear end of the pick-up jack is drawn as seen from the rear of the chassis.

Coils.—**L1** and the RF transformer **L2, L3** are in two small unscreened units mounted either side of a screening partition on the gang assembly. **L4** is an RF choke, in a small bobbin wound unit, mounted with **R3** and **C5** directly on to **V2** holder.

Chassis Construction.—The chassis comprises three sections: a valve panel, a control panel and a rigid metal plate on which the large components are mounted. The metal plate, which is of stout gauge and stands vertically in the centre of the assembly, forms the foundation on which the chassis is built, the two smaller panels, carrying small components, being mounted on the front of it, and the large heavy components being fixed directly to its rear surface.

Speaker Connections.—The secondary winding of the output transformer **T1** is provided with tappings for speaker-matching purposes. The four tags, which are clearly identified in our plan view, are taken via flexible leads to four sockets fitted to the back cover of the casing. The three impedance values maked against the tags are obtained between the respective tags and fourth (common) tag, marked "**C.**" Tag **C** is connected to chassis.

The amplifier is intended to supply up to four speakers, and the makers recommended an impedance of 15Ω per speaker. Where one speaker only is used, it should be connected to sockets **C** and **15Ω**; where two are used, they should be connected in parallel to the **C** and **7.5Ω** sockets; and where four are used, they should be connected in parallel to **C** and **3.5Ω** sockets.

Where type FS/1(R) factory speaker is used (speech coil 2.6Ω), one should be connected to **C** and **3.5Ω**; two (or three) in series to **C** and **7.5Ω** or four, wired in series-parallel, to **C** and **3.5Ω** sockets. In spite of some mismatching, results will be satisfactory.

Condensers C8, C12, C16, C17.—These are all tubular dry electrolytics of the same type, rated at 8 μF. 500V peak. Ours were of Ferranti manufacture.

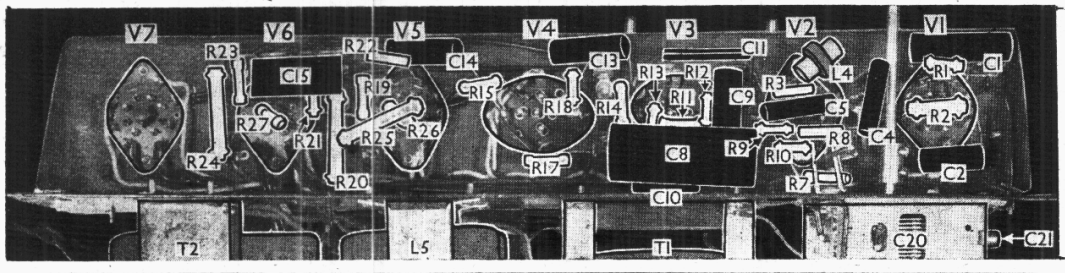
Chassis Divergencies.—In models supplied prior to May 1, 1943, the following differences will, according to the makers' information, be found:

The blank section of the tuning condenser gang will be used, and a band-pass RF circuit will be associated with it.

A microphone input transformer will be found built in the chassis.

A 50,000 Ω resistor will be found in place of the air-cored choke **L4.**

C18 may be found connected at the opposite side of **S4, C10** may be connected directly to **V2** triode anode, and **C15** may be connected to the other side of **C14.** Also, **C4** and **C5** may be 0.00015 μF.



Under-chassis view, showing the underside of the valve panel. A screened lead from the PU jack on the control panel passes through the valve compartment and emerges beside **V2** holder, near **C4.**

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