

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 tapings 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 simul-

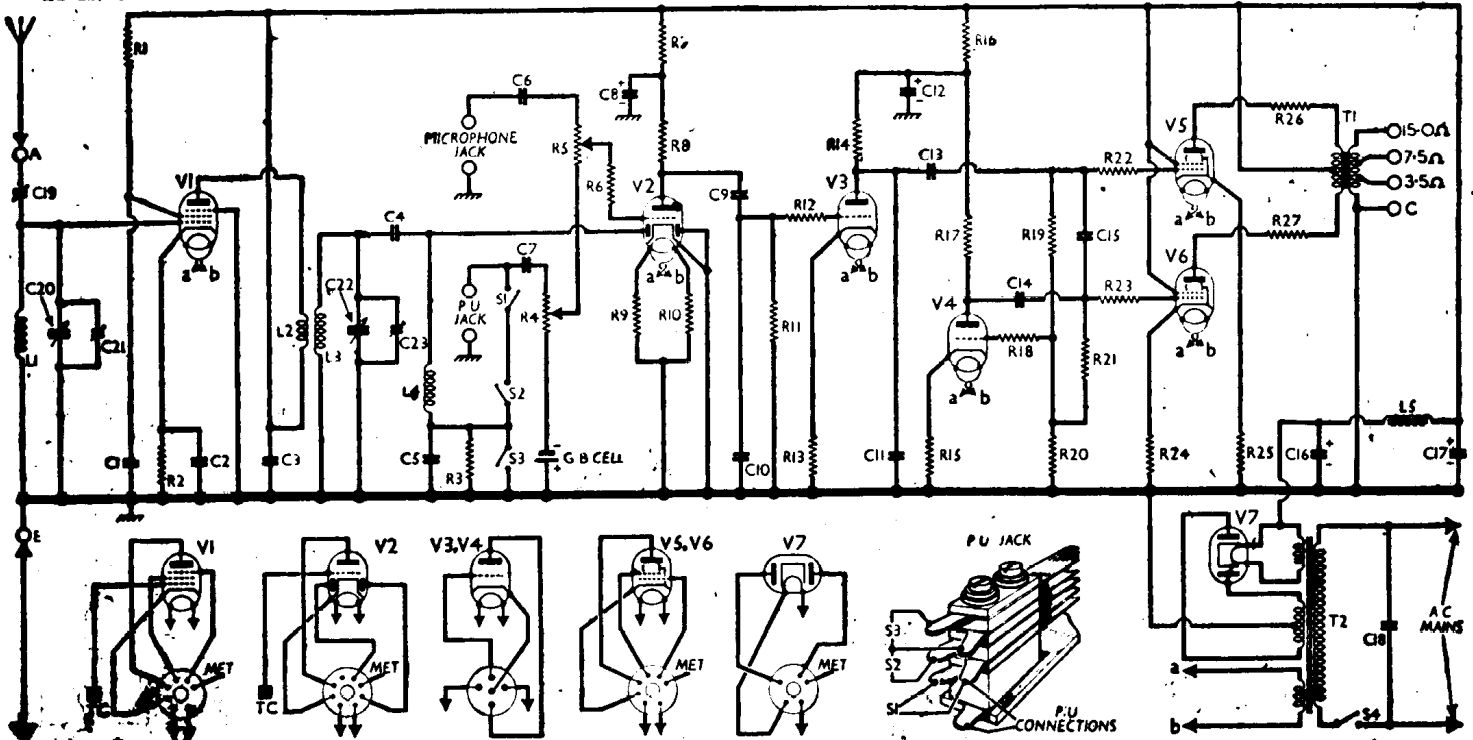
taneously, the fading effect could be obtained by manipulating R4 and R5 appropriately. Radio would be muted. Similarly, if the pick-up plug were withdrawn fading could be operated between radio and microphone by the same method.

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.

7 AMBASSADOR PA143

COMPONENTS AND VALUES

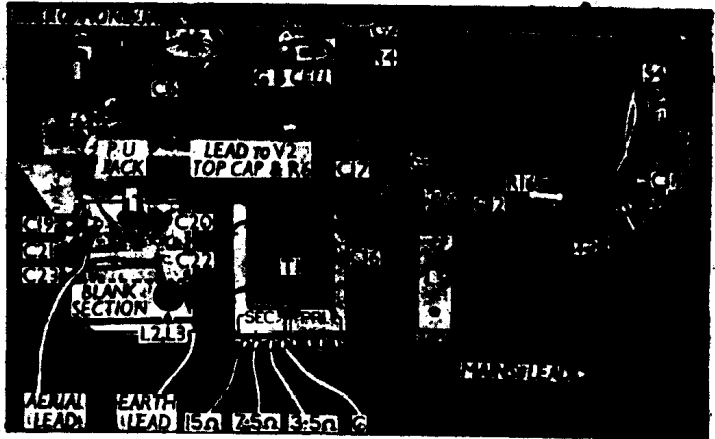
CONDENSERS		Value (μF)
C1	V1 SG decoupling ...	0.1
C2	V1 cathode by-pass ...	0.01
C3	HT circuit RF by-pass ...	0.1
C4	V2 diode coupling ...	0.0001
C5	RF by-pass ...	0.0001
C6	Microphone coupling ...	0.1
C7	Radio and PU coupling ...	0.01
C8	V2 anode decoupling ...	8.0
C9	AF coupling to V3 ...	0.1
C10	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	Main 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		Value (ohms)
R1	V1 SG HT feed ...	20,000
R2	V1 GB resistor ...	800
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	V2 triode grid stopper ...	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 GB resistor ...	20,000
R19	V5 output potential divider ...	250,000
R20	V5 grid stopper ...	40,000
R21	V5 CG resistor ...	500,000
R22	V5 grid stopper ...	250,000
R23	V5 grid stopper ...	250,000
R24	V5 GB resistor ...	175
R25	V5 GB resistor ...	175
R26	V5 anode stopper ...	50
R27	V6 anode stopper ...	50

OTHER COMPONENTS		Approx. Value (ohms)
L1	Aerial tuning coil ...	2.7
L2	RF trans. { Pri. ...	3.5
L3		Sec. ...
L4	Diode circuit choke ...	60.0
L5	HT smoothing choke ...	250.0
T1	Output trans. { Pri., total ...	500.0
	{ Sec., total ...	1.2
T2	Heater sec. ...	25.0
	Heater sec. ...	Very low
	Rept. heat. sec. ...	0.1
	HT sec., total ...	250.0
S1-S3	Radiogram. change switches ...	—
S4	Main 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 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 2-Avometer, 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 overhead, 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 C6 directly on 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 tapplings 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 marked against the tags are obtained between the respective tags and fourth (common) tag, marked "G." Tag G 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 G and 15Ω; where two are used, they should be connected in parallel to the G and 7.5Ω sockets; and where four are used, they should be connected in parallel to G and 3.8Ω sockets.

Where type FS/1(R) factory speaker is used (speech coil 2.6Ω), one should be connected to G and 3.8Ω; two (or three) in series to G and 7.5Ω or four, wired in series-parallel, to G and 3.8Ω sockets. In spite of close matching, 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. Care was of Ferranti manufacture.

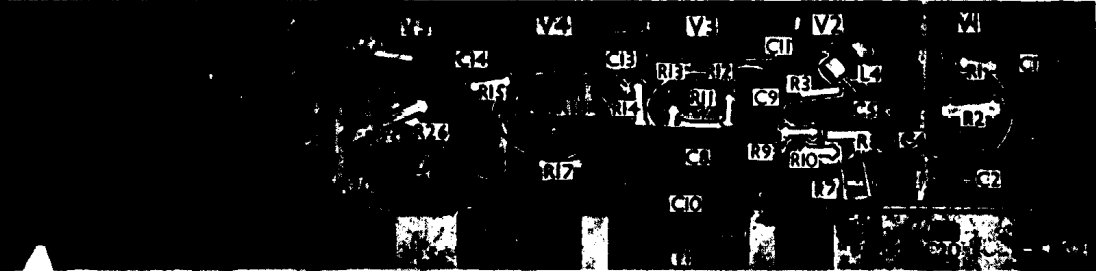
Chassis Divergence.—In models supplied prior to May 1, 1943, the following differences will, according to the makers' information, be found:

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.