SECTION 8

LOUDSPEAKER AMPLIFIERS: AM8 SERIES

AMPLIFIER AM8/8

General Description

The AM8/8 amplifier is designed primarily for use in studio communication systems and has a restricted frequency response appropriate to the intended purpose of dealing with speech only. This amplifier and two AM1/7 amplifiers already form the active parts of the Intercommunication Desk Panel, Type PA8/197A, at regional studio centres where sound and television services are integrated.

The smaller components are assembled on a printed-wiring board which is mounted on a chassis of aluminium alloy. All external connections are made via a 15-way connector plug.

General Specification

Supply voltage	50 volts d.c.
Total current	100 milliamperes.
Voltage gain	With 12-ohm load: 41 dB (± 2 dB). With 3-ohm load: 35 dB (± 2 dB).
Input impedance	Not less than 25 kilohms between 200 c/s and 8 kc/s; below 200 c/s the impedance is mainly controlled by the shunt inductance of the input transformer.
Load impedance	Either 3 or 12 ohms.
Output power	1 watt in 3 or 12 ohms; obtained with an input signal of 1 kc/s at −28 dB (31 mV).
Frequency response	Within ±2 dB from 200 c/s to 8 kc/s relative to 1 kc/s. Below 200 c/s the response falls rapidly and is at least 20 dB down at 50 c/s. Above 8 kc/s the response falls gradually and is about 6 dB down at 15 kc/s.
Non-linearity	Total harmonic distortion at an output of 1 watt is approximately 1 per cent each of 2nd and 3rd harmonic at 1 kc/s.
Noise	Noise voltage measured across a 12-ohm load should be approximately 75 dB below the maximum output, or 62 dB below zero level.

Circuit Description (Fig. 12)

The circuit diagram of Fig. 12 shows TR1 connected as an emitter follower. The input impedance is relatively high, greater than 25 kilohms, and is therefore suitable for feeding from a balanced bridging arrangement; alternatively an unbalanced control of 5 to 15 kilohms may be connected to the secondary of the input transformer. Sketch A of Fig. 12 illustrates both modes of operation; note that tags 5 and 6 are strapped in the balanced input condition.

TR1 is followed by three directly-coupled stages in the ring-of-three configuration which provides feedback from the last stage to the first of these three. The main path for a.c. feedback is from the collector of TR4 to the emitter of TR2. By d.c. feedback from TR4 emitter to the TR2 base the d.c. voltages on the three transistors are stabilised and thus made independent of temperature changes.

The amplifier has no pre-set adjustments because the substantial degree of feedback ensures that the performance of the amplifier is maintained within agreed tolerances.

The secondary windings of output transformer T2 can be connected in parallel and series for nominal loads of 3 and 12 ohms respectively; see Sketch B. An additional output connection for feeding headphones at high level is taken from capacitor C6 (tag 14), the optimum load in this instance being 500 ohms.

Voltage stabilising is effected with two zener diodes. MR1 determines voltage at the junction of R4 and R3 and so holds the TR1 collector at about 12 volts. MR2 is similarly used with R7 to determine the voltage on TR3 collector.

D.C. Measurements

The following are typical voltages as measured by a Model 8 Avometer with respect to the positive side of the supply.

Stage	*Volts*		
	Emitter	*Base*	*Collector*
TR1	7·6	7·7	12
TR2	2·1	2·3	1·4
TR3	3·0	3·1	4·75
TR4	2·9	3·0	36

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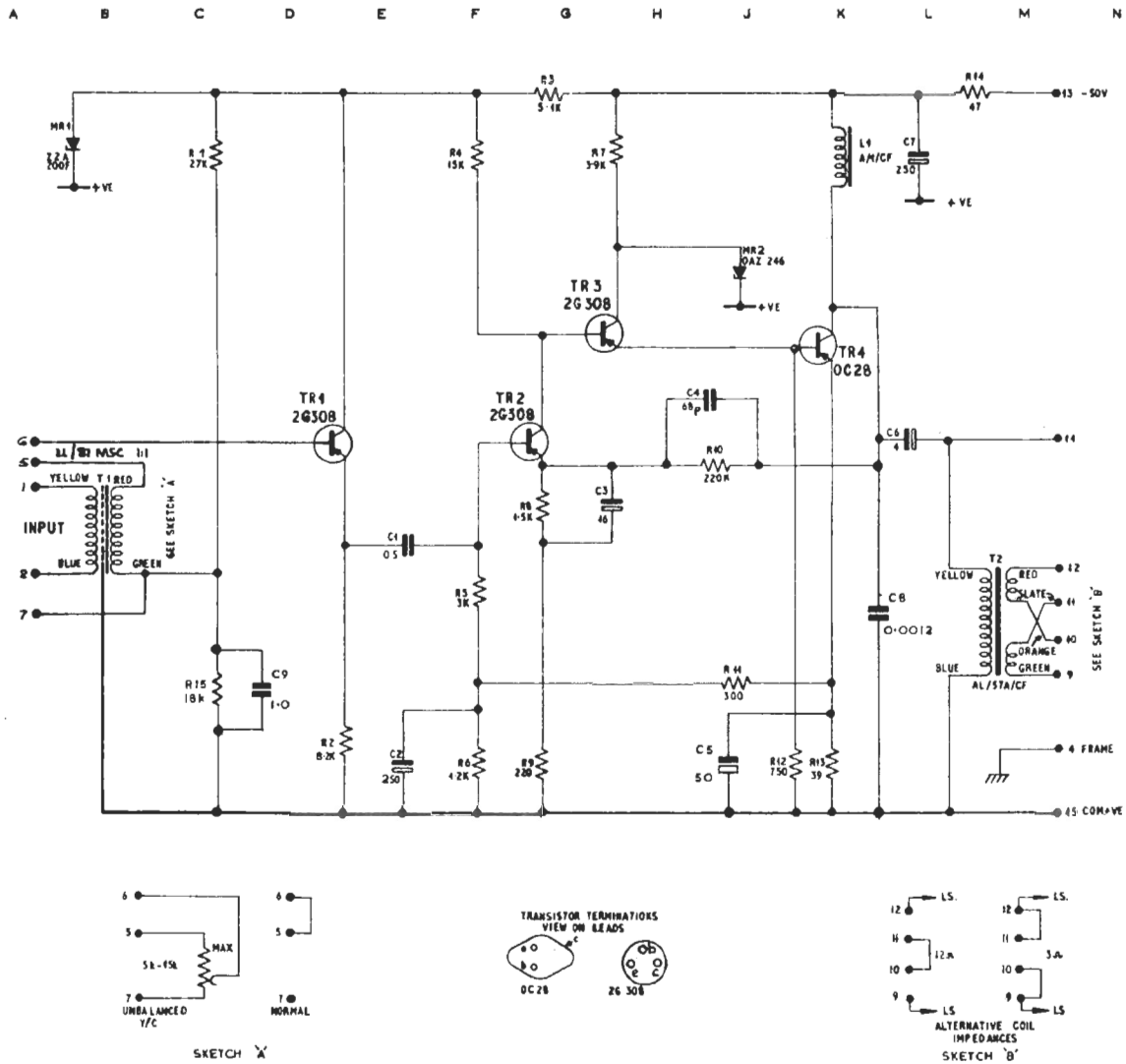
COMPONENT TABLE: FIG. 12

Comp.	Loc.	Type	Tolerance per cent	Comp.	Loc.	Type	Tolerance per cent
C1	E6	Hunt ML30 GB104 63V		R3	G1	Erie 109	2
C2	E8	U.C.C. SM51S 6V		R4	F2	Erie N1	2
C3	G5	U.C.C. SM62S 12V		R5	F6	Erie N1	2
C4	H4	Salford PF 125V		R6	F8	Erie N1	2
C5	K8	U.C.C. SM51S 6V		R7	G2	Erie N1	2
C6	L5	U.C.C. SM87S 25V		R8	G5	Erie N1	2
C7	L2	Hunt MEF45T 50V		R9	G8	Erie N1	2
C8	K7	Salford PF 125V		R10	J5	Erie N1	2
C9	D7	U.C.C. SM82S 25V		R11	J7	Erie N1	2
				R12	J8	Erie N1	2
				R13	K8	Erie 109	2
R1	C2	Erie N1	2	R14	L1	Painton MV1A	5
R2	E8	Erie N1	2	R15	D7	Erie N6	2



LOUDSPEAKER AMPLIFIER AM8/8: CIRCUIT