

**GENERAL PURPOSE AMPLIFIER AM5/9**

**Introduction**

The AM5/9 is used as a microphone, isolating, or loudspeaker amplifier in talkback and intercom systems (but not in programme circuits).

The unit comprises only a printed circuit board, with associated fitted components, designed to plug into an 8-way edge connector. Holes at the corners of the board facilitate rigid mounting if required. The amplifier may be mounted with various other circuit assemblies, or two of the amplifiers can be mounted together in a CIII/18C chassis.

The performance of the amplifier is to a great extent determined by the value of a negative feedback control resistor, which may be variable, connected externally to the board. A 24-volt d.c. supply from an external source must be provided, and normally this should have its positive rail earthed.

**General Specification**

The performance of the AM5/9 is not required to conform to close limits and the electrical data that follow are approximate.

Gain	68 dB maximum with 1000-ohm load, varying with external feedback resistance as shown in Table 1.
Power Output	2 watts in 15-ohm load. (This cannot be obtained with low distortion using less than 2.7 kilohms external feedback resistance and -24 dB input level.)
Input Impedance	15 kilohms at 1 kHz.
Output Impedance	Not greater than 2 ohms.
Distortion	2 per cent total harmonic distortion at 2 watts 1 kHz output, with 3.3 kilohms external feedback resistance.
Frequency Response	-3 dB at 50 Hz and 18 kHz with respect to 1 kHz
Noise Output	1. In the maximum gain state (0 ohms external feedback resistance), with 75 ohms at the input, 600 ohms output load, the output noise volume is about -58 dB.

2. In the 2-watts capability state (2.7 kilohms external feedback resistance), with 75 ohms at the input and 15 ohms output load, the noise output volume is about -68 dB.

D.C. Supply Input	-24 volts. 3 mA to 15 mA under quiescent conditions; 150 mA for 2 watts output.
Dimensions	Board: 3.25 by 2 in. Over components: 1.5 in.
Connector	The unit plugs into an R.S. Components 8-way gold edge connector (0.15-in pitch).

TABLE 1

<i>External Feedback Resistance at Contacts 7 and 8 (ohms)</i>	<i>Gain with 1000-ohm Load (dB)</i>
0	68
130	65
240	60
470	55
910	50
1,600	45
3,000	40
6,200	35
13,000	30

*Continued overleaf*

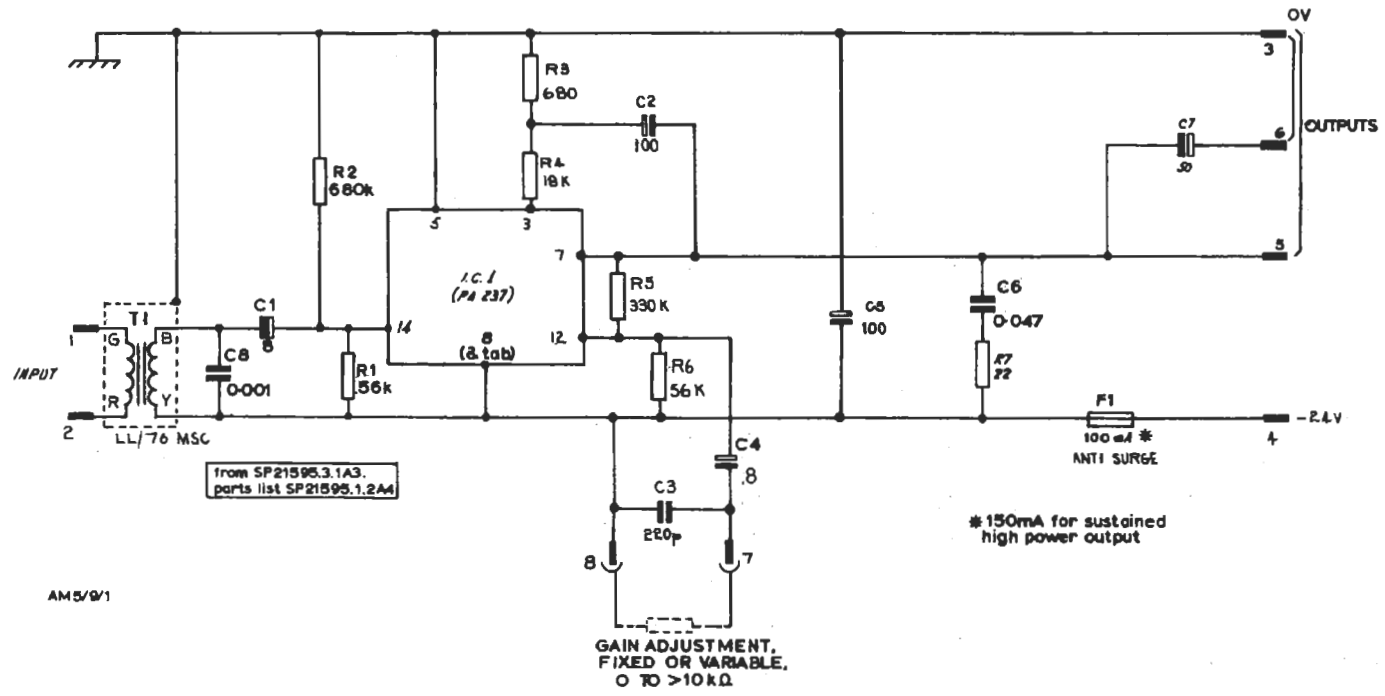


Fig. 1. Circuit of the AMS/9

### Circuit (Fig. 1)

The amplifier consists of a General Electric (U.S.) PA237 integrated circuit with auxiliary input, output, feedback and bias components.

Transformer T1 allows a balanced input to be applied to the unit. C8 in the input circuit and C6 with R7 across the output limit the bandwidth of the amplifier to that required for normal use, and reduce the possibility of instability.

A resistor, fixed or variable, normally in the range up to 10 kilohms, should be connected to the unit via edge contacts 7 and 8 so that it is in series with C4 and determines the negative feedback developing across R6. This controls the gain and distortion of the amplifier. The integrated circuit includes a push-pull output section, and the use of negative feedback helps to minimise distortion in the output at low levels.

### Installation

When the unit is used as a voltage amplifier, the impedance of the load is usually sufficiently high, relative to that of C7, to permit the load to be connected directly to contacts 3 and 6. But when the load is low, say 15 ohms, connect it via an external

capacitor of larger value than C7 to contact 5 instead of 6. Note that contact 5 is d.c. connected to the integrated circuit (and has a potential of about -12.5 volts under quiescent conditions). A capacitor is therefore required in series with contact 5 to block d.c.

As a power amplifier the unit will give 2 watts in 15 ohms satisfactorily, but will not feed lower loads so well. With a load of 8 ohms, for example, clipping is likely to occur as the output approaches 2 watts.

If the amplifier is used in circumstances where sustained outputs at or near maximum power may occur, replace the normal 100-mA fuse by a 150-mA one. Antisurge fuses are necessary because of the switching-on charge taken by C5. A fuse of more than 150-mA rating must not be fitted because it does not protect the integrated circuit against excessive dissipation.

Instability may occur with long power-supply leads to the unit. This may be cured by decoupling both power-supply connections (to contacts 3 and 4) through 1,000-pF capacitors to a programme earth. Alternatively, a 39-ohm resistor in series with contact 4 may be used to cure instability, but this restricts the output power capability of the amplifier.

DPEB 10/72