

MICROPHONE AMPLIFIER AM9/4

General Description

The AM9/4 is a portable transistor microphone amplifier with a gain switchable in 10-dB steps to a maximum depending on the input and output arrangements. The power supply may be taken from an internal battery or from an external source. The amplifier is essentially a portable version of the AM9/5 with the addition of an output transformer and provision for bass cut.

Input and output connections are made by means of plugs and sockets. The input impedance is normally 600 ohms, but can be switched to 60 ohms for operation from a 30-ohm microphone; the maximum voltage gain in the latter condition is about 10 dB greater than the 45 dB obtained when the 600-ohm input impedance is used with a 300-ohm microphone. The output impedance is 600 ohms.

A fall in the response below 1 kHz, amounting to about 3.5 dB at 400 Hz and about 20 dB at 60 Hz, can be inserted by means of a switch.

The dimensions of the amplifier are approximately 5 in by 3½ in by 4 in.

Switch SE enables the amplifier to be supplied either from an internal battery or from an external source.

General Data

Power Requirements

Supply voltage, 24 volts d.c.

Total current, 16 mA.

Impedances

Input impedance, 600 ohms ±5% at 1 kHz.

Output impedance, 600 ohms ±5% at 1 kHz.

Low impedance input, 60 ohms.

Load impedance, 600 ohms.

Gain

With a 300-ohm source, and the 600-ohm input and a 600-ohm load, the maximum voltage gain at 1 kHz at an output level of 0 dB should be 45 ±1 dB with the Bass Cut switch at Out. With this same input level, operation of the gain control should reduce the gain to within ±1 dB of the marked values.

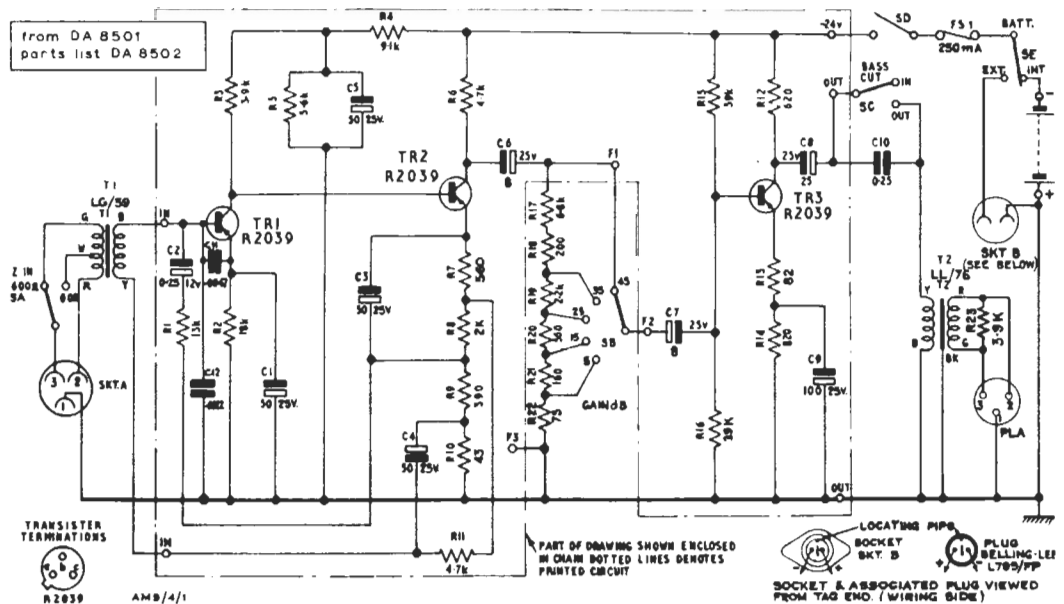


Fig. 1. Circuit of the AM9/4

Circuit Description (Fig. 1)

The basic circuit is as described subsequently for the AM9/5, but a one-to-one output transformer is fitted to give a balanced 600-ohm output. The potential divider across the output of the second stage enables the gain of the amplifier to be adjusted in 10-dB steps from 5 dB to a maximum of 45 dB by means of switch SB.

Bass cut, provided by C10 in series with the output transformer primary, can be switched in or out by switch SC to give an attenuation of about 3.5 dB at 400 Hz and about 20 dB at 60 Hz.

With a 30-ohm source and the 60-ohm input, the maximum voltage gain should be 9.7 ±0.2 dB greater than the gain measured as above.

Frequency Response

With the same input and output conditions as for measuring maximum gain, the output level with constant input e.m.f. should be as follows relative to that at 1 kHz:—

Between 90 Hz and 10 kHz : within +0.2 and -0.5 dB

Between 60 Hz and 15 kHz : within +0.2 and
-1.0 dB

With the *Bass Cut* switch at *In*, the response should fall smoothly with frequency below 1 kHz, and should be within the following limits relative to 1 kHz:-

At 400 Hz : -3.5 ± 1 dB

At 60 Hz : -19.5 ± 2 dB

Nonlinearity

With the input and output conditions as for measuring maximum gain the total harmonic distortion at an output level of 0 dB should not exceed:

At 60 Hz 0.5%

At 1 kHz 0.4%

The onset of serious distortion at 1 kHz, judged from the waveshape shown on an oscilloscope connected at the output, should occur at an input voltage of not less than -38 dB at maximum gain, and of not less than -25 dB at minimum gain.

Noise

With the internal battery used for power supply the unweighted noise, indicated on a T.P.M. peaking to 6, should not be greater than -81 dB under normal input and output conditions. Similarly the weighted noise using an ASN/3 should be not less than 56.5 dB below a line-up level of -70 dB at 1 kHz across the 600-ohm amplifier input terminated with 300 ohms, and it should fluctuate over a range not greater than 1.5 dB.

Typical Voltages

The following are typical emitter/earth voltages, indicated on an Avometer Model 8 :

TR1	TR2	TR3
5.0 V	6.5 V	11.0 V

Revised GH 3/72