

AMPLIFIER AM9/5

General Description

The AM9/5 is a microphone transistor amplifier similar electrically to the AM9/4, but it is constructed on a CH1/19 chassis for plugging into a PN3/25 panel for use inside studio desks, and the gain control is mounted externally.

Provision is made for a 60-ohm input impedance as well as one of 600 ohms, so that the amplifier can be used with 30-ohm microphones in addition to those with an impedance of 300 ohms. With the 60-ohm input impedance and a 30-ohm microphone the maximum gain is increased from 46 dB to about 56 dB. The AM9/5, unlike the AM9/4, has no output transformer and no provision for bass cut. The output impedance is 600 ohms.

The amplifier is approximately 1 in wide, 3¼ in high and 4½ in deep and 16 amplifiers can be accommodated on a PN3/25 panel.

The d.c. conditions are well stabilised by the d.c. feedback, from R8 via R11.

The output from the second stage is fed to the output stage, TR3, via a potential divider which is mounted externally to the amplifier and enables the gain to be controlled in steps of 3 dB.

The output stage is an orthodox arrangement with current feedback and a collector load giving the required output impedance of 600 ohms.

General Data

Power Requirements

Supply voltage, 24 volts d.c.

Total current, 15 mA.

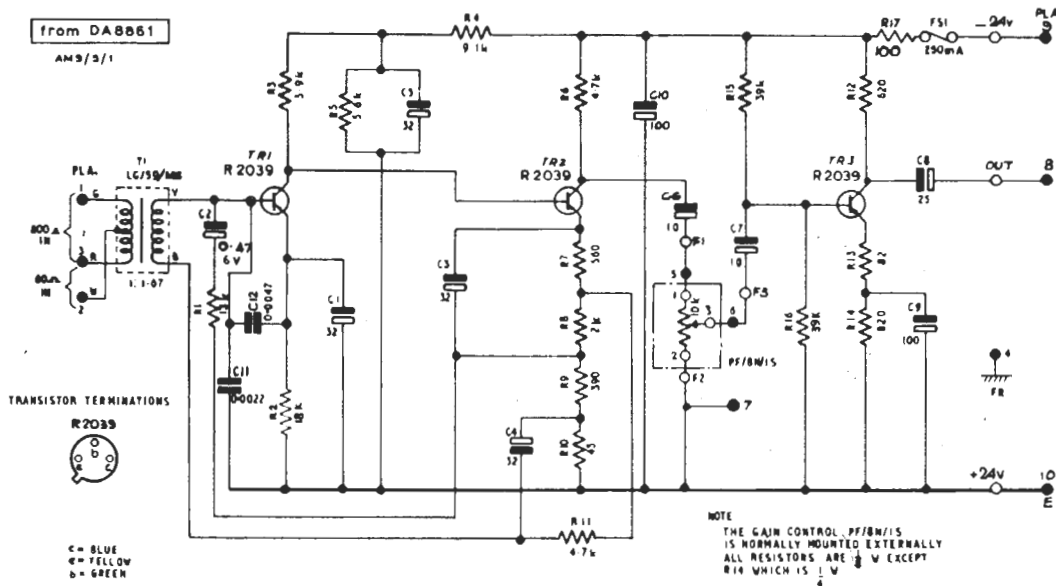


Fig. 1. Circuit of the AM9/5

Circuit Description (Fig. 1)

The first-stage transistor, TR1, is a low-noise type. The first two stages, TR1 and TR2, form a feedback pair with both series and shunt a.c. feedback and also d.c. feedback taken from a resistor in the emitter circuit of TR2.

The relative magnitudes of the series a.c. feedback (from R10 via C4 and the input transformer secondary) and the shunt a.c. feedback (from R9 via R1 and C2) are adjusted to give the required amplifier input impedance with the input transformer ratio required for minimum noise conditions. The total of a.c. feedback is 24 dB.

Impedances

Input impedance, 600 ohms $\pm 5\%$

Output impedance, 600 ohms $\pm 5\%$

Low-impedance input, 60 ohms.

Load impedance, 600 ohms to infinity.

Gain

The maximum voltage gain, with the 600-ohm input and a 300-ohm source, should be 46 ± 1.0 dB at 1 kHz with a 600-ohm load and an output level of 0 dB.

The maximum voltage gain with the 60-ohm input and a 30-ohm source should be 9.7 ± 0.2 dB greater

than the gain measured as above.

The gain control should operate in steps of 3 ± 0.5 dB.

Frequency Response

With the same input and output conditions as used for measuring gain, the output level for constant input e.m.f. should be between +0.2 and -0.8 dB relative to 1 kHz between 40 Hz and 10 kHz.

Non-linearity

With the input and output conditions used for measuring gain, the total harmonic distortion should not exceed 0.5% at 60 Hz or 0.5% at 1 kHz.

The onset of serious distortion at 1 kHz, as judged from the waveshape shown on an oscilloscope connected at the output, should occur at an input of not

less than -38 dB at maximum gain, and of not less than -25 dB at minimum gain.

Noise

With a PS2/9 or similar power supply unit in use, the unweighted noise indicated on a T.P.M. peaking to 6 should not be greater than -80 dB. Similarly, the weighted noise measured using an ASN/3 should not be less than 56.5 dB below the line-up level of -70 dB at 1 kHz across the 600-ohm amplifier input terminated with 300 ohms.

Typical Voltages

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

TR1	TR2	TR3
5.0 V	6.5 V	10.5 V

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