AMPLIFIER AM5/7

See also AM9/8

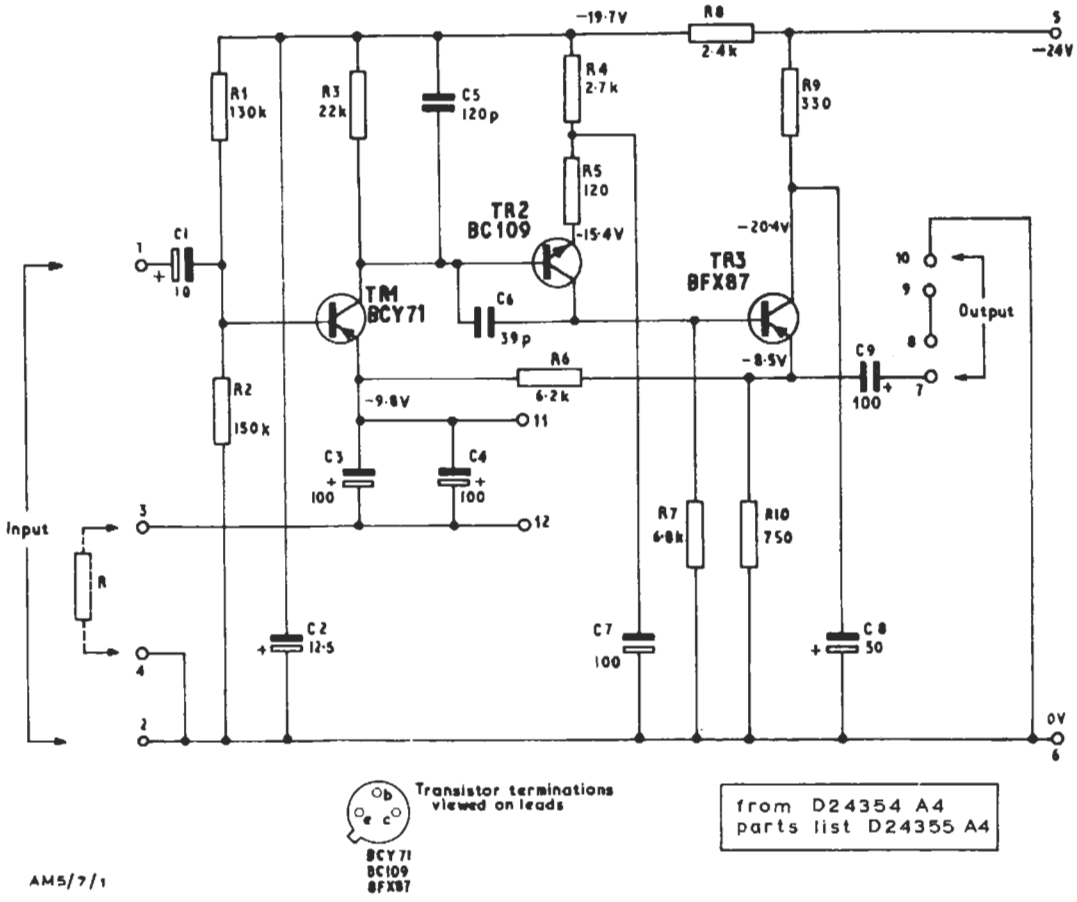

Fig. 1. Circuit of the AM5/7

General Description

The AM5/7 is a general-purpose amplifier first used in Type-D sound-control equipment to raise the level at a number of points in the chain. For this application it supersedes the AM9/8, although it is not a direct replacement.

The amplifier consists of an unmounted printed circuit board 2½ by 1⅝ inches in size, fixed in position as required by two 6-BA screws; the external connections are soldered to tag-posts riveted to the board. The input and output circuits are unbalanced as there are no transformers fitted to the board. The voltage gain is adjustable to any value between 10 and 40 dB by selecting the value of a resistor mounted between two tag-posts on the board.

Circuit Description (Fig. 1)

The circuit is generally similar to that of the AM9/8, but uses transistors having better characteristics, thereby eliminating the need for selection. As in the AM9/8, the gain is set by inserting a resistor between tags 3 and 4, and the value may vary from 2 kilohms for a gain of 10 dB to 62 ohms for a gain of 40 dB. At gains above 24 dB an external capacitor must be fitted between tags 11 and 12 to maintain a good low-frequency response. The capacitor value required for the test gain of 34·3 dB is 250 μF.

External Connections

The special requirements mentioned in the AM9/8 Instruction also apply to the AM5/7.

Test Procedure

Apparatus Required

Low-distortion Tone Source
Amplifier/Test-meter ATM/1
Distortion Test Set
Oscilloscope
Avometer Model 8
Amplifiers AM7/2 and AM7/4
Filter FL1/14
Power Supplier PS2/49 (24 volts d.c.)
Precision Resistance Box (100 kilohms total)
Resistor, 5 ohms ±2 per cent
Resistor, 120 ohms ±0·1 per cent
Resistor, 600 ohms ±2 per cent
Resistor, 1200 ohms ±2 per cent
Capacitor, 250 μF 15-volt working

Test Circuit (Fig. 2)

Set up the test circuit as shown. The value of R is obtained using the resistance box, with the amplifier under test disconnected and S1 open and S2 closed. This value (about 250 ohms) is such that V_2/V_1 equals −34·3 dB.

D.C. Tests

The current measured by meter M with S3 open should be 13 mA ±1 mA.

The following typical d.c. voltages, measured with an Avometer Model 8 between the transistor emitters and the positive rail, are given to assist fault-finding.

TR1	TR2	TR3
−9·8	−15·4	−8·5

A.C. Tests

Close S3 for all tests. Make all gain and frequency-response measurements using the high-impedance input of the ATM/1.

Noise

1. Connect the noise-measuring circuit to the output of the AM5/7 amplifier.
2. Close S1 and S2.
3. Set the level across A-B to −45·7 dB. The level applied to the amplifier under test is thus −80 dB.
4. Switch the filter to the allpass position, and adjust the gain of the AM7/4 to give a level at the filter output of about 0 dB. The system gain (about 80 dB) between the input of the AM5/7 and the filter output is now known.
5. Disconnect the tone source and open S1 and S2.
6. With the filter set to the allpass position, adjust the TPM to give a noise reading peaking to 5. The TPM dial setting added to the system gain should be numerically greater than 118 dB, and the meter reading should be constant within 1 dB.
7. Observe the noise on the oscilloscope to check that it is free from hum.

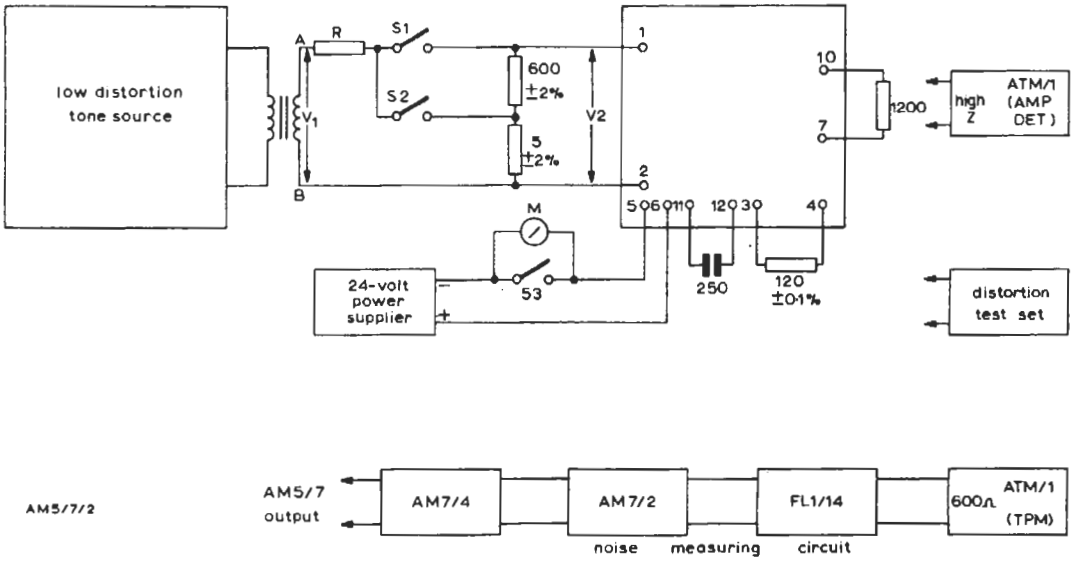

Fig. 2. Test Circuit for the AM5/7

Gain.

1. Close S1 and S2.
2. Set the level of 1-kHz tone across A-B to −34·3 dB.
3. Measure the level at the output of the AM5/7 amplifier, which should be −34·3 dB.

Frequency Response

1. Open S1 and close S2.
2. Apply tone at frequencies of 20 Hz, 50 Hz and 20 kHz, adjusted to be at a constant level across A-B.
3. Measure the level at the AM5/7 output, relative to the level at 1 kHz. It should be:
   ±0·2 dB at 20 Hz
   ±0·1 dB at 50 Hz
   ±0·1 dB at 20 kHz
8. With the filter set to the bandpass position, measure the noise as before. The TPM reading added to the system gain should be better than −124 dB.

Harmonic Distortion

With the level at the output of the amplifier adjusted to +10 dB, measure the total harmonic distortion for frequencies from 60 Hz to 5 kHz. It should not exceed 0·1 per cent.

Impedances

Input impedance at 1 kHz	70 kilohms ±20%
Output impedance at 1 kHz	1·8 ohms
Normal source impedance	600 ohms
Normal load impedance	1200 ohms