INTERNAL SENDING AMPLIFIERS AM7/3 AND AM7/3A

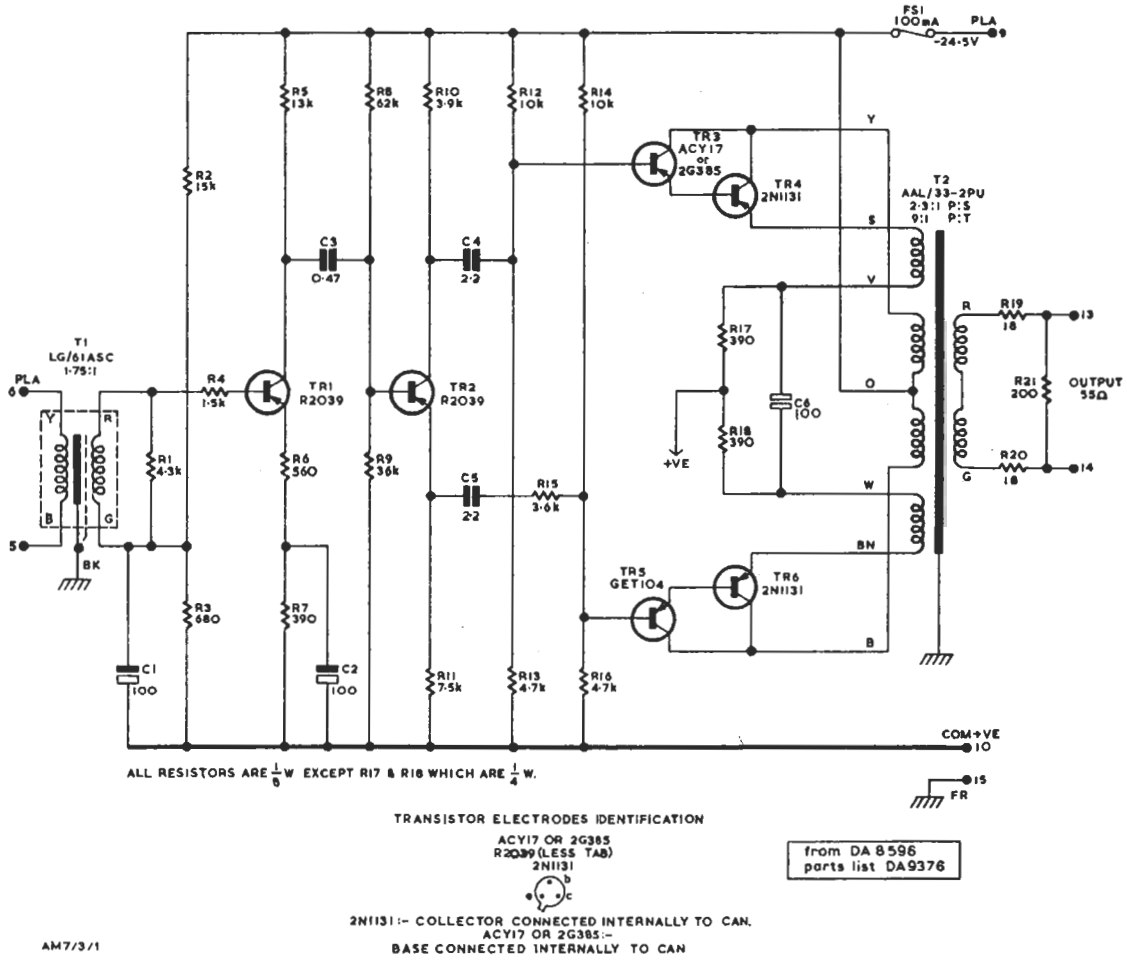

Fig. 1. Circuit of the AM7/3

General Description

Amplifier AM7/3 is an audio-frequency transistor amplifier with an output impedance of 55 ohms, a fixed gain of 25 dB, and a high input impedance. It is used primarily as an output amplifier for studio desks.

It is constructed on a CH1/18C chassis for plugging into panels of the PN3/23 series, for bay-mounting in a similar manner to other amplifiers, such as the AM7/2, constructed on this type of chassis. It uses index-peg positions 5 and 30.

With the installation of new control rooms using a large amount of switching equipment, it became evident that the capacitance of long runs of station wiring would cause an excessive loss at high frequencies if the usual sending impedance of 600 ohms were used. Further consideration of the conditions, together with a study of the characteristics of the new multi-pair plastic cables now being used, indicated that a much lower output impedance was required*. This amplifier has been designed with a suitable output impedance to work into such long runs of capacitive cable and therefore should not normally be terminated by a 600-ohm load.

Circuit Description (Fig. 1)

The amplifier employs a push-pull output stage using 'super-alpha' pairs similar to the arrangement adopted in amplifier AM7/2, and the additional amplification and phase reversal required are provided by the two preceding stages TR1 and TR2.

As the amplifier is not normally followed by a balanced line transformer as with the AM7/2, the output is transformer coupled instead of being choke coupled.

*An account of the investigation is given in Designs Department Technical Memorandum No. 3.59(62), 'The Use of Long Cable Runs in Association with Transistor Audio Amplifiers'.

General Data

Power Requirements

Supply voltage	24·5 V d.c.
Total current	45 mA.

Impedances

Input impedance	12 kΩ ±10% at 1 kHz
Output impedance	55 ±2·5 Ω at 1 kHz

Gain

Normal voltage gain 25 ±0·5 dB at 1 kHz measured with a source impedance of 300 Ω, a load impedance not less than 15 kΩ and at 0 dB output voltage level.

Frequency Response

The output level under the conditions as above for measuring gain with constant input voltage should be within the following limits relative to 1 kHz:

Between 40 Hz and 15 kHz: +0·1 −0·3 dB

Non-linearity

At an output voltage level of +8 dB, with source and load impedances as for measuring gain, the total harmonic distortion should not exceed

at 60 Hz	0·4%
at 1 kHz	0·3%

At +12 dB voltage output level distortion should not exceed

at 60 Hz	0·5%
at 1 kHz	0·5%

The onset of serious distortion at 1 kHz, judged from an oscilloscope trace, should not occur at a voltage output level of less than +16·5 dB.

Noise

The total noise volume, read on a T.P.M. peaking to 6, should be not greater than −74 dB.

Phase

With an asymmetric signal applied to the input terminals, a check should be made with an oscilloscope that pin 5 is in phase with pin 13.

Typical Voltages

The following typical voltages between emitter and common positive, indicated on an Avometer 8, are given to assist fault finding:

TR1	TR2	TR4	TR6
0·8 V	8·0 V	7·5 V	7·5 V

The voltages relating to TR4 and TR6 should differ by not more than 0·3 volt.

Amplifier AM7/3A

This amplifier is an AM7/3 with slight modifications to facilitate closer matching of gain in the A and B legs of stereo circuits.

The value of R6 is changed from 560 to 680 ohms, and across R6 is wired an extra resistor the value of which is selected on test to make the voltage gain 25·0 ±0·1 dB when the supply voltage is 24·0 ±0·25 volts, the load resistance is 50 kilohms and the ambient temperature is 20 to 30 degrees C.