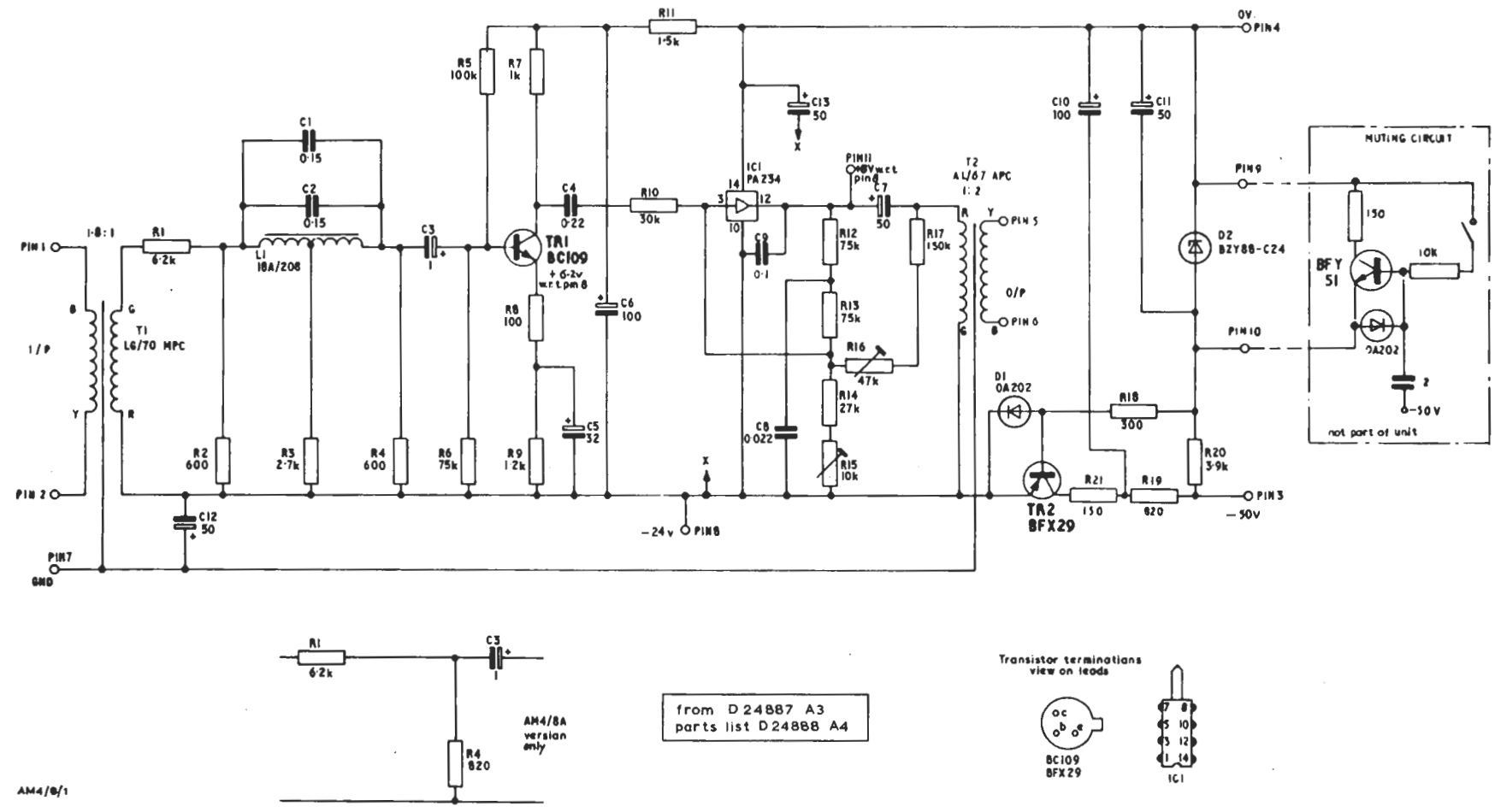


CUE PROGRAMME DISTRIBUTION AMPLIFIERS AM4/8 AND AM4/8A

Fig. 1. Circuit of the AM4/8 and AM4/8A



Introduction

The AM4/8 and AM4/8A amplifiers are used on panels in the Type-D range of sound-control equipment. They feed one or two cue/control lines at a volume of +4 dB. The AM4/8 contains a 500-Hz notch filter for use with control lines having P.O. voice-frequency ringing. The AM4/8 requires an input volume of 0 dB from a source impedance of not more than 2 kilohms and the AM4/8A requires an input volume of -10 dB from a similar source. Both amplifiers have connections for a muting circuit.

The amplifiers are constructed on a printed circuit board having dimensions of 5¹¹/₁₆ by 2¹/₈ inches.

Circuit Description (Fig. 1)

The input transformer, T1, giving an impedance step-down of 3:1, is followed in the AM4/8 by the 500-Hz notch filter and amplifier stage TR1. (In the AM4/8A the notch filter is omitted.) TR1 provides a 10:1 increase in gain and feeds the output stage, which is a monolithic integrated-circuit amplifier PA 234 using shunt feedback to the signal input for both a.c. and d.c. feedback. The d.c. working point, giving a total quiescent current of about 18 mA, is controlled by R15, and the gain can be adjusted over a range of about 2 dB by varying R16. C8 gives increased feedback at low frequencies, reducing the gain by about 6 dB at 100 Hz, and C9 is fitted to ensure stability against oscillation. The output transformer has an impedance step-up ratio of 1:4 and the amplifier normally works into a 300-ohm load.

The 24-volt supply for the amplifier is obtained from the 50-volt supply via the series voltage regulator TR2 which is controlled by the voltage across the zener diode D2. The amplifier works on a positive rail, and thus the supply regulator is situated in the earthy rail of the amplifier, but in the negative of the incoming supply. The earthy rail of the amplifier is decoupled from the ground plane and the transformer screens by C12.

Muting of the amplifier is obtained externally by connecting a transistor switch across D2, thus removing the 24-volt supply from the amplifier.

Test Procedure

Apparatus Required

- Tone Source TS/10
- Test Meter ATM/1.
- Avometer Model 8.
- Frequency Counter.
- Harmonic distortion test set.
- Oscilloscope.
- D.C. supply, variable from 45 to 50 volts at 50 mA.

D.C. Adjustments

1. Connect the 50-volt d.c. supply to pins 3 (negative) and 4.
2. Check that with no input signal the total current does not exceed 20 mA.
3. Measure the stabilised rail voltage between pins 4 (positive) and 8. This should remain at 24 volts \pm 1

volt while the input supply voltage is varied from 45 to 55 volts.

After a 10-minute warming-up period, proceed with the following tests.

4. Connect the Avometer on its 25-volt range to pins 11 (positive) and 8.
5. Set R16 to the middle of its travel and adjust R15 until the meter reads 8 volts.
6. Lock R15 in position with tape.
7. Measure the voltage between TR1 emitter and pin 8, which should be about 6.2 volts.

A.C. Tests

The test conditions and amplifier impedances are set out in Table 1.

TABLE 1

Parameter	AM4/8	AM4/8A
Source impedance	300 ohms	300 ohms
Input level	0 dB	0 dB
Load impedance	300 ohms	300 ohms
Input impedance at 1 kHz	18 kilohms \pm 10 per cent	20 kilohms \pm 10 per cent
Output impedance at 1 kHz	36 ohms	36 ohms

1. Gain at 1 kHz

Gain of AM4/8 4 \pm 0.5 dB

Gain of AM4/8A 14 \pm 0.5 dB

The gain is adjustable over a range of about 2 dB by varying R16. When the gain has been set to within the above limits, R16 should be locked with tape.

2. Filter Alignment on AM4/8

Apply tone of 500 \pm 1 Hz at 0 dB to the input. Adjust the core of L1 for minimum output from the amplifier. If the output is greater than -44 dB with respect to that at 1 kHz, adjust R3 for minimum output at 500 Hz. The bandwidth of the notch should be such that at 30 \pm 1 Hz on either side of 500 Hz the response is -24 dB with respect to that at 1 kHz.

3. Frequency Response

The response of the AM4/8 when measured with constant source e.m.f. should be within ± 2 dB of curve A on Fig. 2.

The response of the AM4/8A when measured with constant source e.m.f. should be within ± 2 dB of curve B on Fig. 2.

4. Noise

With the input terminated in 300 ohms the noise volume measured on a T.P.M. peaked to '6' should not exceed -66 dB.

5. Harmonic Distortion

At an output level of $+12$ dB at 1 kHz, the total

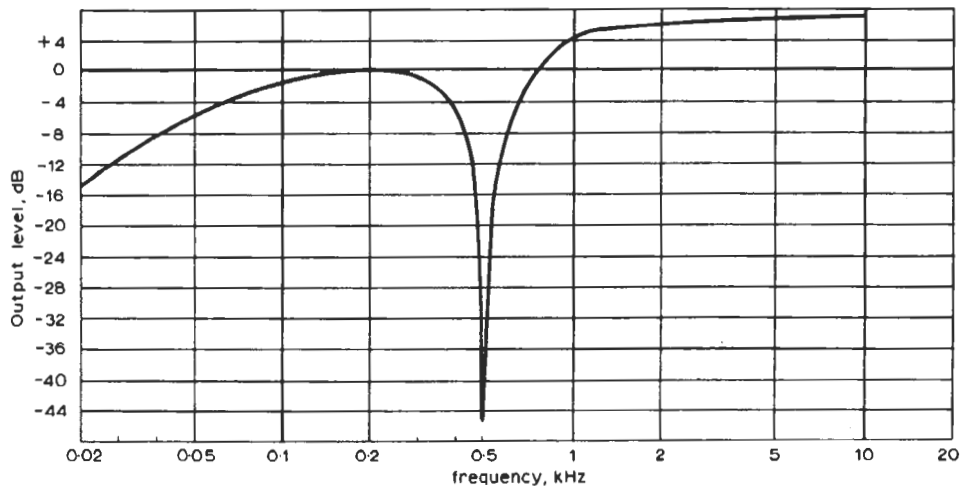
harmonic distortion should not exceed 0.5 per cent. Serious distortion as seen on an oscilloscope should not occur at an output level of less than $+16$ dB.

6. Stability

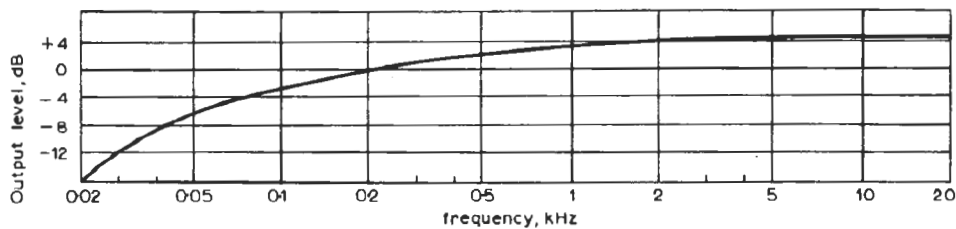
No tendency to instability should be visible on a wide-band oscilloscope connected across the output with any combination of resistive and capacitive load.

7. Muting

When pins 9 and 10 are shorted together, the amplifier should give no output. Check that the output returns when the short is removed.



(A) Response of AM4/B



AM4/8/2

(B) Response of AM4/8A

Fig. 2. Frequency Response of the AM4/8 and AM4/8A

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