RESPONSE SELECTION AMPLIFIER AM22/2

General Description

The AM22/2 is one of the units designed for Type-D studio sound equipment. It contains two identical amplifiers, each having adjustable frequency response characteristics (Figs. 1 and 2) closely resembling those of the amplifier AM1/4. The controls on the front panel comprise a pair each of continuously-variable treble cut and lift potentiometers, bass cut and lift potentiometers, three-position presence-amplitude switches, five-position presence-frequency switches and keys by which each amplifier may be bypassed. Apart from the controls, both amplifiers are assembled on a common printed circuit board. The chassis is based on the CH1/37A and overall is 7 inches long, $2\frac{1}{4}$ inches wide and $10\frac{1}{4}$ inches deep.

The amplifiers give 0 dB insertion loss when operated between the values of impedance existing at the R.S.A. insertion points on the studio equipment, and the normal input programme volume is −20 dB.

Circuit Description (Fig. 3)

The input and output pins of the amplifier are taken to the input and output transformers over the break contacts of the *In/Out* key. In the *Out* position the input is connected directly to the output. Following the input transformer is the stage incorporating the treble and bass network which is based on the Baxandall tone control circuit. The network varies the negative feedback over an emitter-follower complementary pair of transistors TR1, TR2. This circuit is fully described in the AM1/4 Instruction. The extreme ranges of the variations in response produced by the treble and bass controls are shown on Fig. 1.

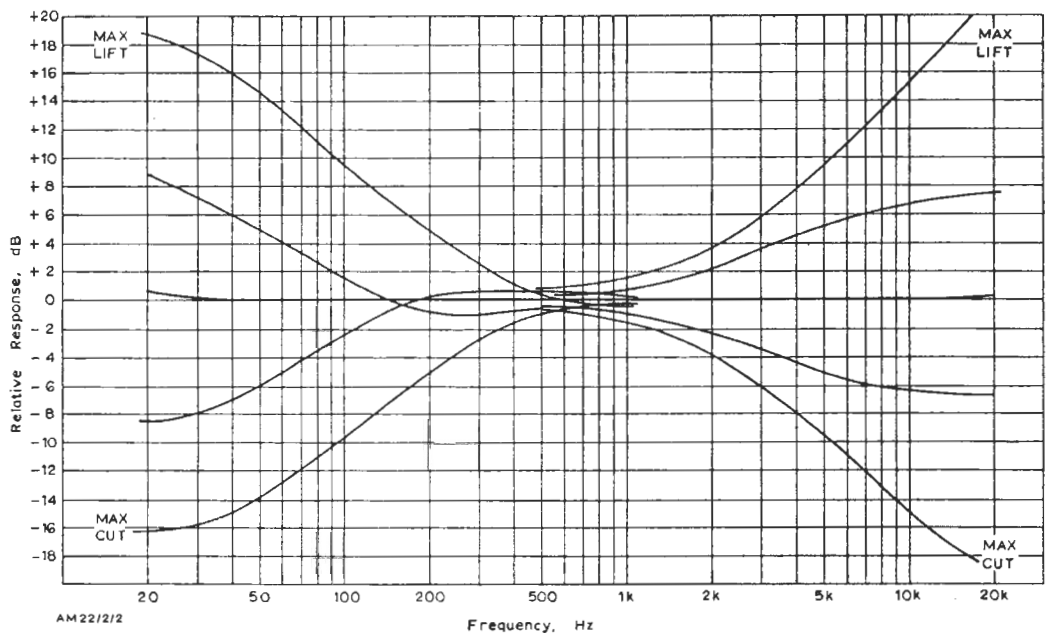


Fig. 1. AM22/2 Response: Treble and Bass Controls

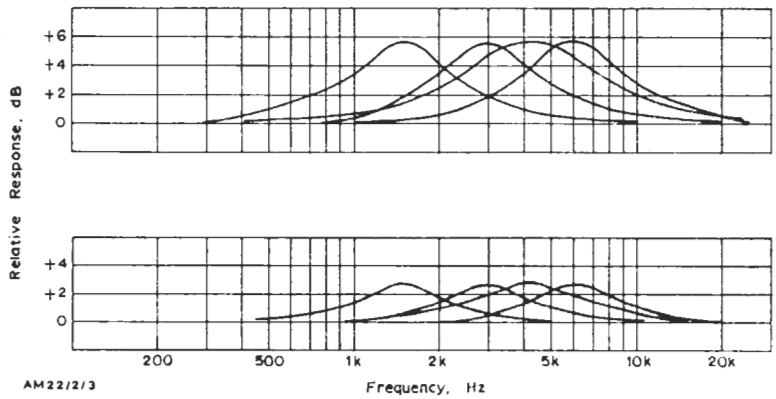


Fig. 2. AM22/2 Response: Presence Controls

The second part of the amplifier consists of three d.c.-coupled transistor stages, TR3 to TR5, having an emitter-follower output. Overall negative feedback via R21 and network R14-15-17-18 may be modified to give the rising presence characteristic (Fig. 2) with peaks of either 3 dB or 6 dB at one of the four frequencies, 1·4 kHz, 2·8 kHz, 4 kHz and 5·6 kHz. To do this a series tuned circuit made from combinations of the tapped choke L1 and capacitors C10 and C11 is connected either across R18 or across R17 and R18 in series.

Test Specification

Power Supply

D.C. supply	—24 volts
Current consumption	47 ±2 mA

Test Conditions

Source impedance	100 ohms
Load impedance	2·5 kilohms
Input level	—20 dB
Treble and bass control settings	'0'
Presence amplitude control setting	'0'

Apparatus Required

Audio-frequency tone source
Test meter ATM/1
Oscilloscope
Harmonic distortion test set
24-volt power supply
Low-noise amplifier, e.g. AM9/5

Adjustment of Treble and Bass Controls

With the *In/Out* key at the *In* position and the presence amplitude control at 0 dB, the flat position of the treble and bass controls is set as follows.

TREBLE:—The knob indicates '0' when the amplifier has the same gain at 1 kHz and 8 kHz.

BASS:— The knob indicates '0' when the amplifier has the same gain at 40 Hz and 1 kHz.

Insertion Gain

Gain at 1 kHz measured by operating bypass key	0 ±0·5 dB

Frequency Response

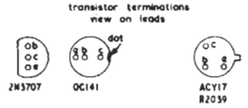
The amplifier should be adjusted to have the same gain at 40 Hz, 1 kHz and 8 kHz. The response relative to 1 kHz when measured with a constant source e.m.f. should then be within ±0·5 dB from 20 Hz to 20 kHz.

At the extreme settings of the treble and bass controls the frequency response should be as shown in Fig. 1, within ±1 dB.

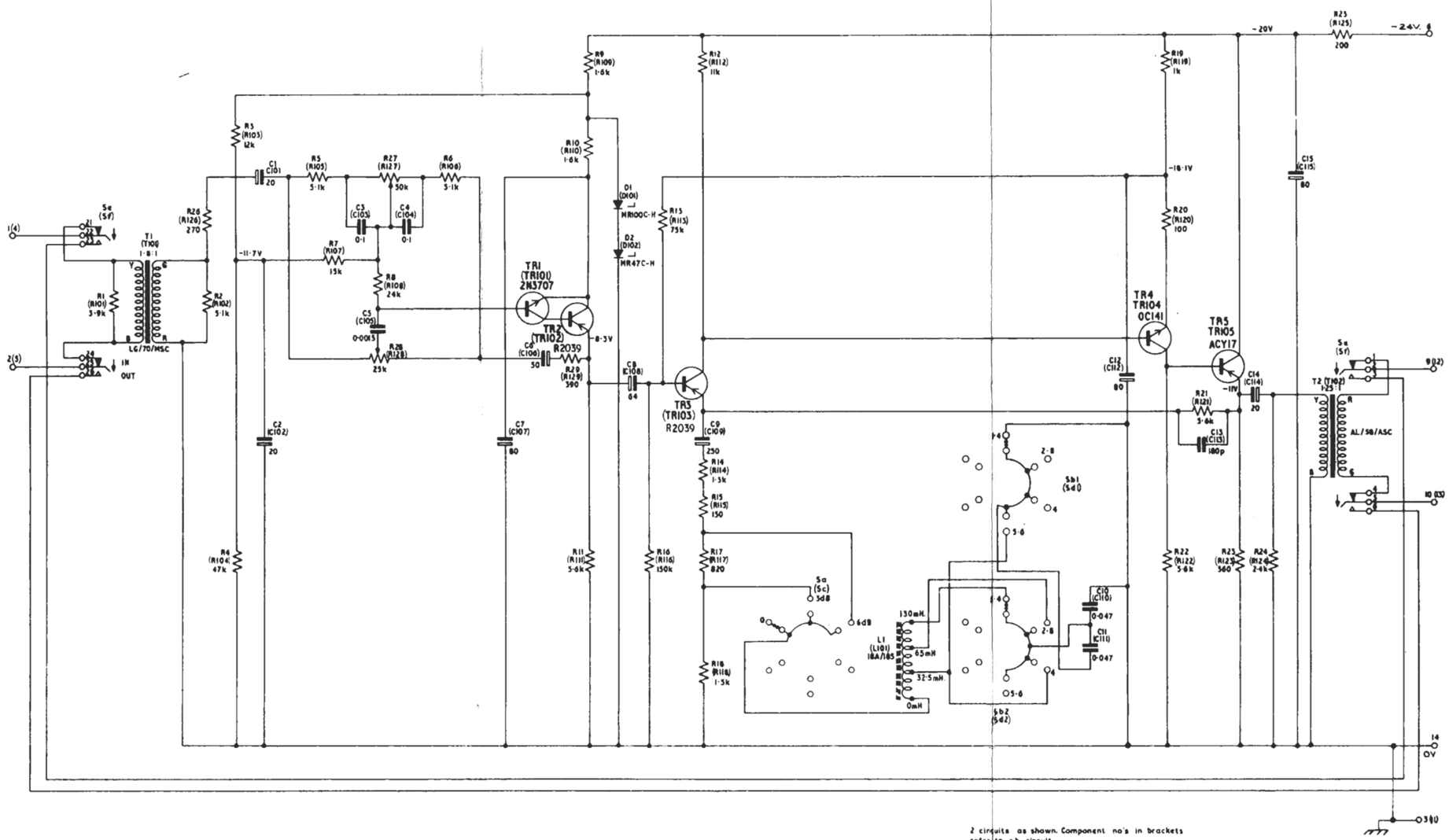
The response curves for the presence amplitude control settings should be as shown on Fig. 2, within ±0·5 dB for each frequency control setting.

Continued on page 5

transistor terminations
view on leads



from D19164A2 iss.4
parts list D19165A4



2 circuits as shown. Component no's in brackets refer to r.h. circuit.

AM22/2/1T

Fig. 3. Circuit of AM22/2

Harmonic Distortion

Total distortion at output voltage level of +10 dB	⩾ 0·3% at 60 Hz ⩾ 0·2% at 1 kHz
Output voltage level for visual distortion on an oscilloscope	⩽ +12 dB

Noise

With the output terminated in 100 ohms, using a T.P.M. preceded by an amplifier (e.g. AM9/5) of known gain, the measured noise volume should not be greater than −98 dB.

Input Impedance

At 20 Hz	2·2 kilohms ±10%
At 1 kHz	2·5 kilohms ±10%
At 20 kHz	2·5 kilohms ±10%

Output Impedance

At 20 Hz	165 ohms ±10%
At 1 kHz	89 ohms ±10%
At 20 kHz	171 ohms ±10%

Crosstalk

1. Set the treble control of both amplifiers to maximum lift.
2. Obtain an output of +12 dB from the left-hand amplifier.
3. Terminate the input of the right-hand amplifier in 100 ohms.
4. Place an earthed metal plate against the left-hand side of the unit.
5. Measure the output from the right-hand amplifier, which should be less than −75 dB.

The above procedure will also apply with the conditions for the amplifiers interchanged.

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