EFFECTS RESPONSE SELECTION AMPLIFIER AM22/1

General Description

The AM22/1 forms part of the range of ancillary units for Type-D studio equipment. It contains two identical amplifiers each having switched high-pass and low-pass filters with characteristics (Fig. 1) closely resembling those of the effects unit EU/1. The assembly is based on the CH1/37A chassis.

The amplifiers have 0-dB insertion loss when operated between the values of impedance existing at the R.S.A. insertion points on the studio equipment. The filter sections may be bypassed by the operation of a panel-mounted switch and also remotely by means of an internally mounted relay. A lamp gives indication that the filters are in circuit.

A differential gain control is provided so that the relative levels of the outputs from the unit with the filters in and out of circuit may be adjusted to suit the requirements of the programme material, for example when the unit is remotely switched to simulate a two-way telephone conversation.

straight-through path are the two halves of the differential gain control.

This gain control is set so that when in its mid position, and with the bass and treble controls at '0', the gain of the amplifier is the same for both positions of the *In/Out* switch. The gain is adjusted to be 0 dB by selection of the feedback resistor R25 in the emitter circuit of TR1.

Full rotation of the differential gain control clockwise reduces the gain for the *Out* condition by 20 $\pm$2 dB and increases the gain for the *In* condition by 1 $\pm$0·5 dB. Similarly, rotation of the differential gain control anticlockwise reduces the gain for the *In* condition by 20 $\pm$2 dB and increases the gain for the *Out* condition by 1 $\pm$0·5 dB.

The amplifier section, including the output transformer, is assembled on a second printed board. The circuit of the amplifier is basically the same as that of the amplifier AM9/8.

The relay which switches the filter components into circuit is energised by a switching transistor,

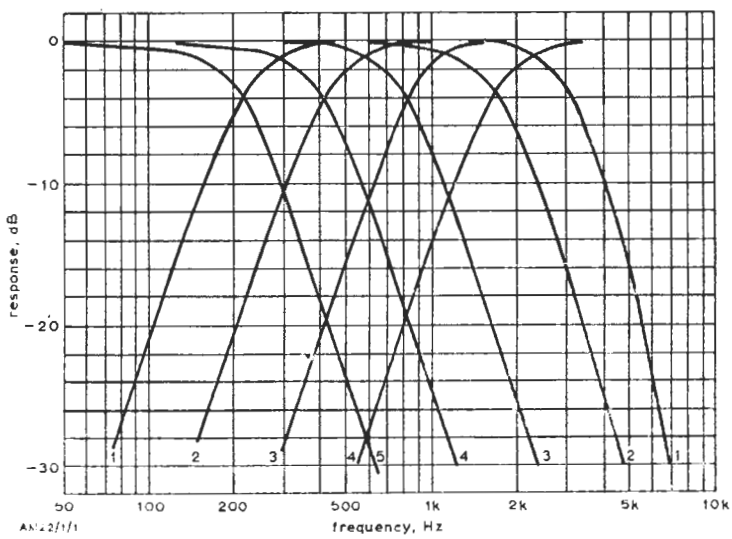

Fig. 1. AM22/1 Filter Characteristics

Circuit Description (Fig. 2)

An input section consisting of the input transformer and matching resistors assembled on a printed circuit board is followed by high-pass and low-pass filters which are of the symmetrical unbalanced prototype form with a design impedance of 3 kilohms. The connections to the filters are over the make contacts of the relay, the break contacts of which provide the straight-through path. Terminating the filter section and the TR4. This transistor circuit requires a separate 50-volt supply connected to PLA7 (negative) and PLA15 (positive). The transistor is made to conduct by connecting its base circuit to the positive line through a 7·5-kilohm resistor. This is achieved either by the operation of the panel switch or externally by a suitable circuit connected by a twisted pair to PLA15 and PLA16 or PLA8. A lamp is connected across the relay winding to indicate that the filters are in circuit.

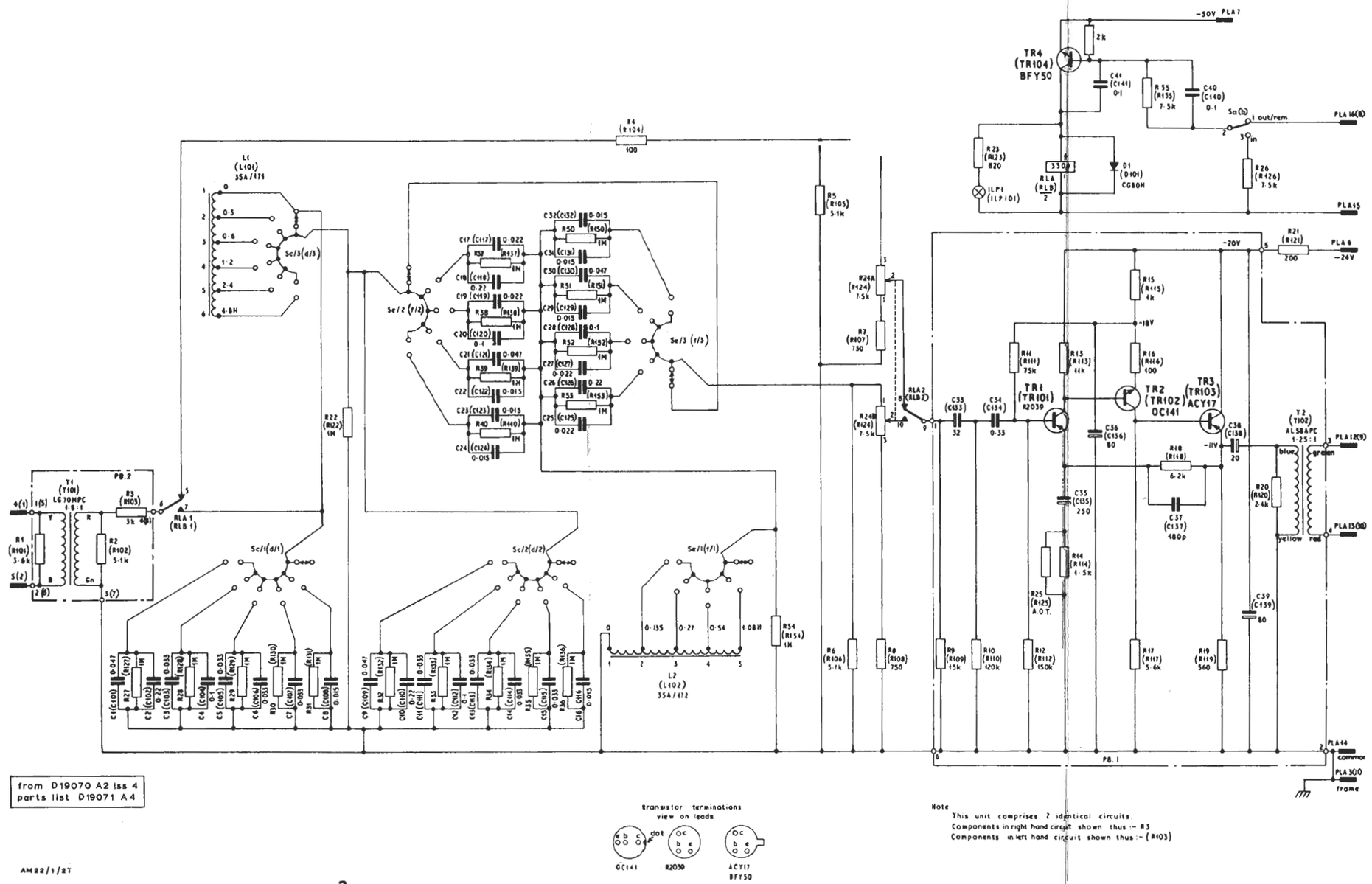

Fig. 2. Circuit of AM22/1

Test Specification

Power Supplies

Amplifier supply	24 volts d.c.
Current consumption	40 ±2 mA
Relay supply	50 volts d.c.

Test Conditions

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

Test Apparatus

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

Insertion Gain

0 ±0·5 dB with differential gain control central.

Frequency Response

Relative to 1 kHz, and measured with a constant e.m.f. from a source impedance of 100 ohms.

20 Hz to 20 kHz	±0·5 dB

Treble and Bass Controls

The frequency response at each setting of the treble and bass controls should be as shown in Fig. 1 within ±1 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%

Harmonic Distortion

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

Noise

With the input terminated in 600 ohms, using a T.P.M. preceded by an amplifier (e.g. an AM9/5) of known gain, the noise volume measured with the filters in or out of circuit should not exceed —98 dB.

Transient peaks produced by the operation of the *In/Out* switch, or the remote operation of the relay, should not exceed —90 dB.

With the filters in circuit, transient peaks produced by operation of the treble and bass controls should not exceed —95 dB.

Crosstalk

With an output of +12 dB at 10 kHz from the left-hand circuit, and with the input of the right-hand circuit terminated in 100 ohms, the output from the right-hand circuit should not exceed —65 dB.

The same condition should apply with the circuits interchanged.

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