

SECTION 5

GENERAL PURPOSE AMPLIFIERS: AM5 SERIES

AMPLIFIERS AM5/505 AND AM5/505A

General Description

Amplifiers AM5/505 and AM5/505A are mains-operated video-frequency transistor amplifiers designed for general purposes. They are electrically the same but the AM5/505 is constructed on a CH1/11 plug-in chassis and the AM5/505A is constructed on a CH1/12A plug-in chassis. Both have printed wiring. The gain is 15 dB and there is one output at zero level into 75 ohms from a source impedance of 75 ohms. The input impedance is high.

The AM5/505 is normally mounted on a PN3/17 bay-mounting panel and the AM5/505A on a PN3/21 bay-mounting panel.

Input and output monitoring sockets and mains fuses are provided on the front of the amplifier; signal input and output connections, and mains supply, are made through the 15-way plug connector at the rear of the chassis.

Circuit Description (Fig. 6)*General*

The circuit utilises two transistors, VT1 and VT2, an OC171 and a 2G103 respectively, which operate as a common-emitter amplifier and are connected to form a feedback pair. The input signal is applied to the base of VT1 and the output is taken from the collector of VT2. The feedback is taken from a potential divider across the output collector load and is applied to the emitter of VT1 thus increasing the input impedance. At low frequencies the feedback is of the order of 26 dB. The feedback reduces the output impedance of VT2 to the order of 13 ohms which is then built out by the resistor R9 to give a 75-ohm output impedance. The control RV1 is adjusted on initial test to give a gain of 15 dB and the variable capacitor C9 is also adjusted on initial test to give a flat frequency response up to 5 Mc/s.

Power Supply

The incoming a.c. mains supply of 200–250 volts is applied to the untapped primary winding of the mains transformer T1, and the secondary voltage produced is about 12 volts. This secondary voltage is rectified and voltage doubled by the

rectifiers MR1 and MR2, the outputs being smoothed by capacitors C5 and C6. Transistors VT3, VT4 and VT5 form a complete stabiliser in conjunction with the Zener diode ZD1. The output of this stabiliser is adjusted by the control RV2 to be 18 volts.

General Data

Gain	15 dB.
Output level	1 volt peak-to-peak in 75 Ω .
Number of outputs	1.
Output impedance	75 Ω at 100 kc/s.
Return loss	36 dB at 10 kc/s, 34 dB at 3 Mc/s.
Input impedance	8 k Ω at 100 kc/s.
Frequency response	± 0.05 dB to 5 Mc/s.
Overload point	2.5 volts peak-to-peak with sine-wave input.
Hum level	–74 dB on 1 volt peak-to-peak.
Low frequency bump	17% overshoot for 1 volt d.c. step signal fed through any time constant.
Low frequency response	1% slope on 50-c/s square wave.
Mains bump	Not visible on the output when the standard bump of 5% is applied.
Differential linearity	1% on any signal.
Differential phase	0.5° at 2.65 Mc/s.
Power requirements	20 mA at 240 V a.c.
Weight	1½ lb.

Instruction V.7
Section 5

Test Procedure

Gain and Frequency Response Checks

The gain and frequency response can be checked using a video-frequency oscillator and crystal meter with a high-frequency double-pole change-over box. The following test apparatus is needed:

- H.F. double-pole change-over box,
- 15-dB pad with accuracy ± 0.02 dB up to 5 Mc/s,
- Video oscillator, range 10 kc/s to 5 Mc/s, with variable output level and 75-ohm output impedance,
- Crystal meter B.P.L. Type E.3233 (P.O. decibel meter Type 25A).

5. Switch the change-over box to route the signal through the 15-dB pad and the amplifier, and note whether the output meter shows any change in level.
6. If the level falls or rises by more than 0.05 dB, adjust the setting of RV1.

(b) *Frequency Response Check*

1. Assuming that the gain check has already been carried out, repeat operations (3) to (5) with the oscillator set to 5 Mc/s.
2. If there is any noticeable alteration in level when the change-over switch is operated,

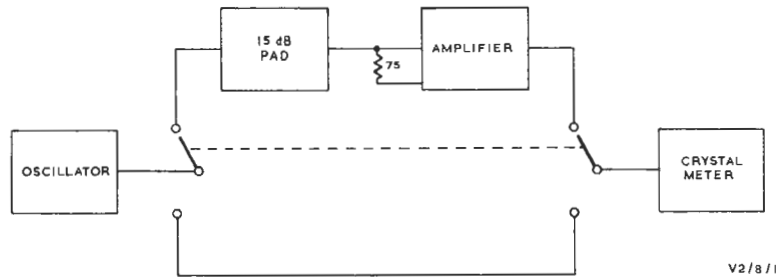


Fig. 5.1. AM5/505 and AM5/505A: Test Circuit

(a) *Gain Check*

1. Connect the amplifier as shown in Fig. 5.1, with its input and output terminated in 75 ohms. With the mains supply connected adjust the d.c. supply voltage of VT1 and VT2 to be 18V by means of RV2.
2. Allow 5 minutes for thermal conditions to stabilise.
3. Set the change-over box to the straight-through position.
4. Apply a 1-volt peak-to-peak sine wave at 100 kc/s and note the output meter reading.

- adjust C9 until the alteration disappears.
3. Repeat operations (3) to (5) of the gain check with the oscillator at 1 Mc/s and at 3 Mc/s. The level should not rise or fall by more than ± 0.03 dB at 1 Mc/s and ± 0.05 dB at 3 Mc/s.

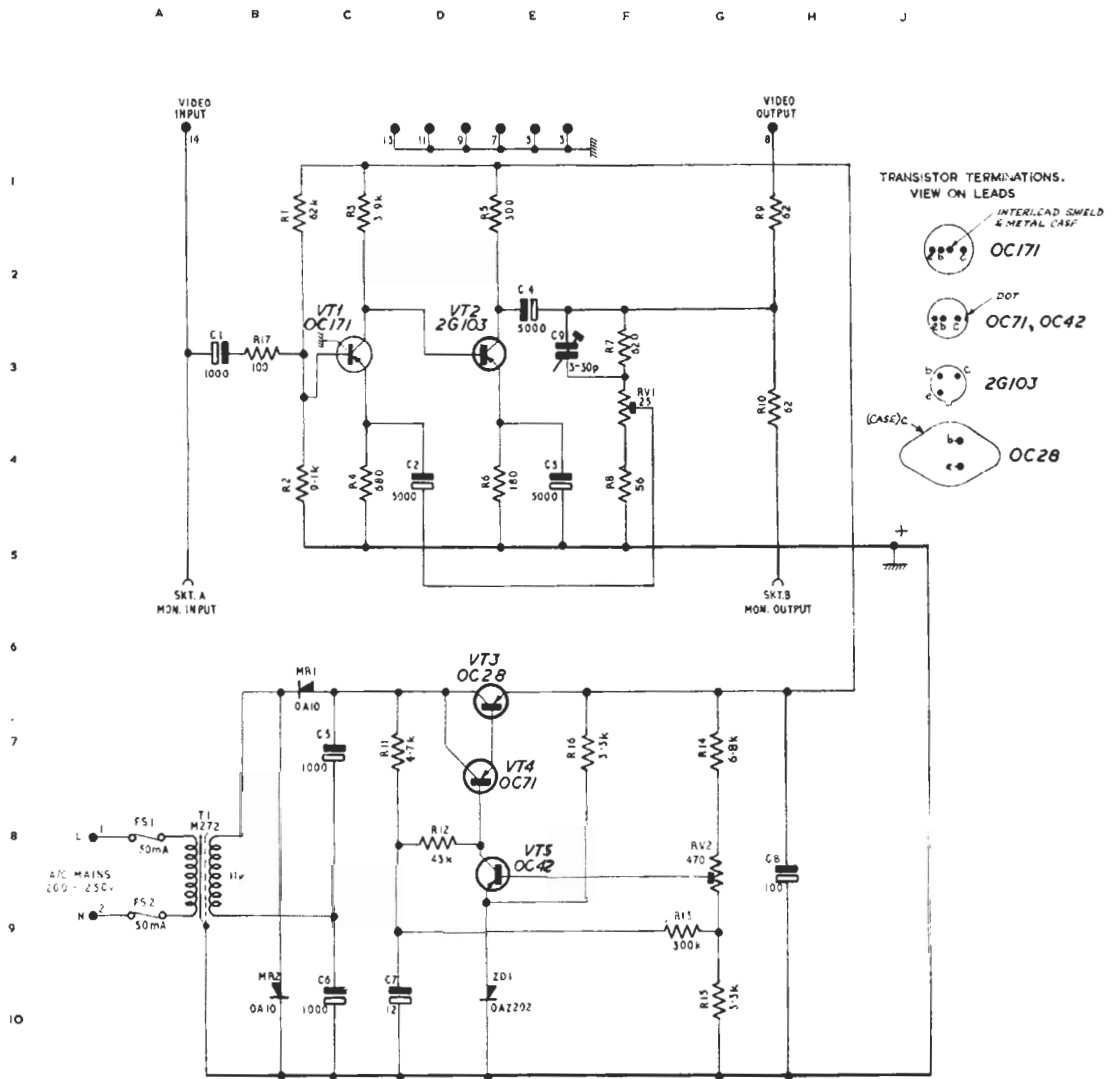
Maintenance

If it should become necessary to replace a transistor or other component the precautions described in Section 4 for amplifier AM4/505 should be observed.

COMPONENT TABLE: FIG. 6

Comp.	Loc.	Type	Tolerance per cent	Comp.	Loc.	Type	Tolerance per cent
C1	A3	U.C.C. SC555/8LS 6V		R8	F4	Erie 109	2
C2	D4	U.C.C. SC641/6LS 6V		R9	G1	Erie 109	2
C3	E4	U.C.C. SC641/6LS 6V		R10	G4	Erie 109	2
C4	E2	U.C.C. SC642/6LS 12V		R11	C7	Erie 109	2
C5	C7	U.C.C. SC604/6LS 25V		R12	D8	Erie 109	2
C6	C10	U.C.C. SC604/6LS 25V		R13	G9	Erie 109	2
C7	C10	U.C.C. SC678/6LS 50V		R14	G7	Erie 109	2
C8	G8	U.C.C. SC596/7LS 25V		R15	G10	Erie 109	2
C9	E3	Mullard E7876 variable		R16	F7	Erie 109	2
				R17	B3	Erie 109	2
R1	B1	Erie 109	2				
R2	B4	Erie 109	2				
R3	C1	Erie 109	2	RV1	F3	Plessey CPI61687/250/A	
R4	C4	Erie 109	2	RV2	G8	Plessey CPI61687/471/A	
R5	D1	Erie 109	2				
R6	D4	Erie 109	2				
R7	F3	Erie 109	2	T1	A8	M272	

FIG 6



GENERAL PURPOSE AMPLIFIERS AM5/505 & AM5/505A : CIRCUIT

This drawing is the property of the British Broadcasting Corporation and may not be reproduced or disclosed to a third party in any form without the written permission of the Corporation.