

VIDEO ATTENUATOR AT3/505

Introduction

The AT3/505 attenuator provides continuously variable attenuation of an input video signal under the control of a direct voltage varying between 0 and -12 volts. It is suitable for monochrome working only.

The attenuator is built on a printed card and mounted in a CH1/12A chassis¹.

General Specification*Input*

composite video	1 V p-p maximum
non-composite video	0.7 V p-p maximum

Input Impedance 75 ohms

Output Impedance Return Loss

625-line bar	greater than 36 dB
2T pulse	greater than 30 dB

Control Voltage

maximum attenuation	0 V
minimum attenuation (9 dB)	-12 V

Frequency Response

(up to 6 MHz)	
9 dB loss	± 1.0 dB
15 dB loss	± 0.25 dB
35 dB loss	± 1.0 dB

Non-linearity Distortion

(measured with C.C.I.R. waveform bar and bar off, input level 0.7 V p-p)	
20 dB loss	less than 5%
35 dB loss	less than 10%

Temperature

At nominal 15 dB loss, variation of gain per °C	0.02 dB
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Description

The circuit diagram is given in Fig. 1. The input signal is attenuated by R3 and R4 to preserve linearity in the gain control stage, which consists of TR2 and TR3 coupled together by the diodes D2a and D2b. A feedback pair, TR7 and TR8, form the output stage, with a gain of 2.

The gain control action is obtained by varying the coupling between TR2 and TR3 by altering the conductivity of the two diodes. The control current for the diodes is supplied by TR5. The diode D3, normally reversed biased, prevents reduction of the attenuation beyond a predetermined value. If the control voltage becomes too negative, D3 conducts and clamps the potential of TR6 base to the potential at the junction of R20 and R21, thus prohibiting any further change.

Some adjustment of the operating conditions of the gain control stage is provided by R12, so that the best possible linearity can be obtained. R12 allows the d.c. bias on TR2 and TR3 to be balanced, thus equalising the current division between D2a and D2b.

The preset control R30, allows a small amount of d.c. feedback from the emitter of TR5 to the base of TR7 to minimise black-level shift as the control varies.

The signal at the input and at the output and the control voltage may be monitored at sockets on the front panel.

Maintenance

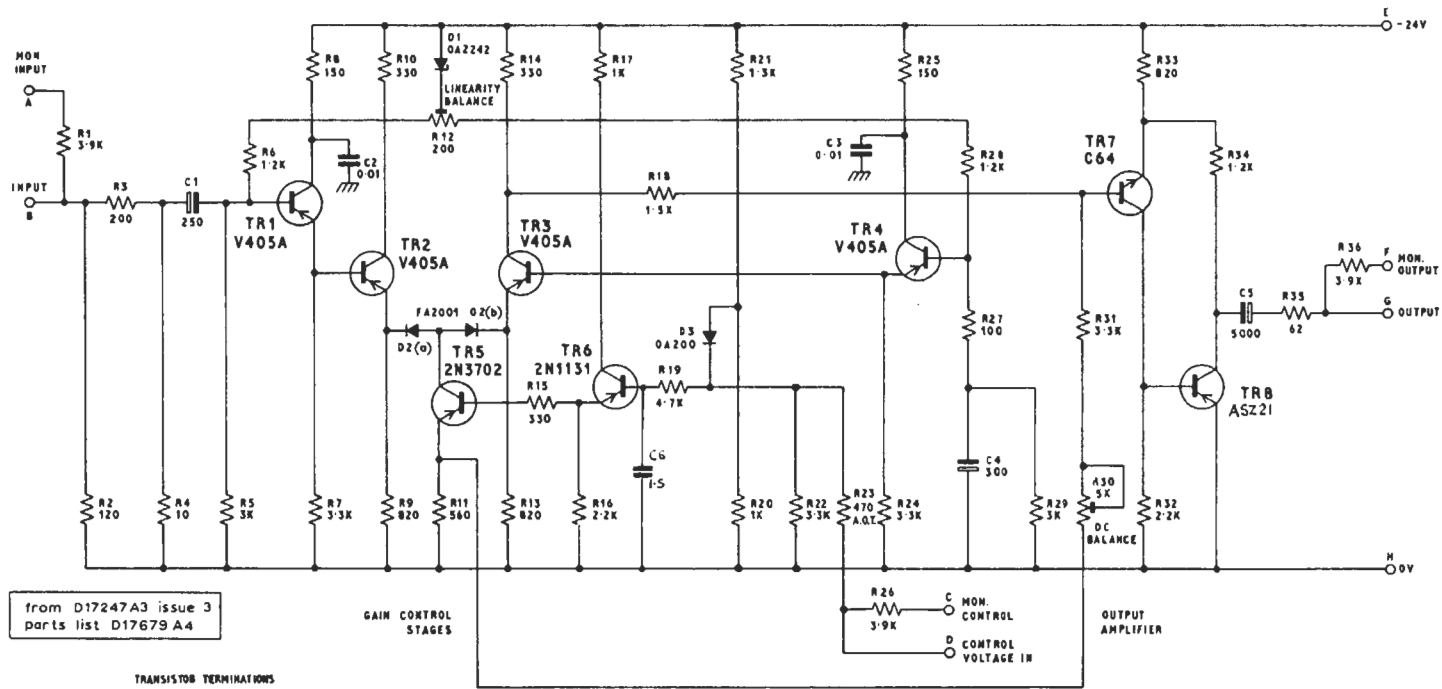
Routine maintenance work on the AT3/505 is not necessary. The setting of the linearity and d.c.-balance preset controls (R12 and R30) and the minimum loss setting may be checked as follows.

Apparatus required

Non-Linearity Test Waveform
Generator GE4/505A
Distortion Processing Amplifier AM1/505
Filter FL1/509A
Oscilloscope
75-ohm switched video attenuator
2-pole, 2-way change-over box
Model 8 Avometer
12 V, 50 mA power supply
500-ohm potentiometer 1 watt
15-way in-line socket wired as follows:
Pin 1 mains live
2 mains neutral
3 earth
11 video in
13 earth
14 video out
15 wiper of 500-ohm potentiometer

The two ends of the potentiometer are connected

Fig. 1 Circuit of the AT3/505



from D17247A3 issue 3 parts list D17679 A4

TRANSISTOR TERMINATIONS VIEW ON LEADS



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C64
2N1151
V405A
ASZ21

2N3702

across the 12-volt supply, the positive terminal of which is earthed.

Procedure

1. Attenuation Measurement

Set up the equipment using the normal change-over circuit.

Apply a 1 volt p-p signal from the GE4/505A.

Set the control voltage to -12 volts; the loss should be 9 dB.

To check the attenuation at low values of control voltage, it may be necessary to use an amplifier, such as an AM5/502, in the common path following the changeover switch.

2. Linearity (Adjustment of R12)

Connect the FL1/509A and the AM1/505 into

circuit following the change over switch. Set the control voltage to give a loss of 25 dB and adjust R12 to give the best linearity, comparing the test path signal with the direct path signal after each adjustment.

3. D.C. balance (Adjustment of R30)

With the oscilloscope connected to the negative side of C5, adjust R30 for minimum variation of blanking level with varying control voltage.

References

1. Technical Instruction AT3M/506 Video Attenuator Assembly.
2. Designs Department Specification No. 7. 126 (67).

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