

VIDEO AMPLIFIERS AM5/513, 516

### General Description

The AM5/513 is a general purpose video amplifier with a gain of 15 dB. It has a 75-ohm input impedance and provides a single output at standard level into 75 ohms. Input and output monitor points are provided on the front panel of the unit. A low-level output monitor point is available on a multi-way connector on the rear of the chassis.

The AM5/516 is a high input impedance version of the AM5/513; the only difference is the omission of the input termination R1. It is designed specifically for use in the dual video amplifier type AM5/517.

The units, complete with stabilised power supplier, are built on CH1/12A chassis with index-peg positions 19 and 42 for the AM5/513 and positions 25 and 39 for the AM5/516.

### Circuit Description

The circuit diagram and component location of the amplifiers are shown in Fig. 1. The value and type of certain components vary depending on the serial number of the amplifier. The value of these components are given in a table on Fig. 1. The signal chain comprises two common emitter stages, which are separated by an emitter follower, and an output stage. An inter-stage coupling network comprising C11, C12, C21, R20, R21 and R22 is provided to shape the frequency response above the video band. This network gives a slight phase lead to counteract the lag inherent in the amplifier and helps to maintain stability. Transistor TR11 is a constant current generator which ensures that all variations in current through TR10 develop power in the load.

Two negative feedback chains are provided. One chain, from the emitter of TR10 to the emitter of TR7, deals with both low and high frequencies. The other chain, from the collector of TR10 to the base of TR7, is concerned with very low frequencies and provides extra d.c. stability to help maintain the operating point of the amplifier constant.

The networks at the output of TR10 maintain the output impedance at a constant value for all frequencies within the video band.

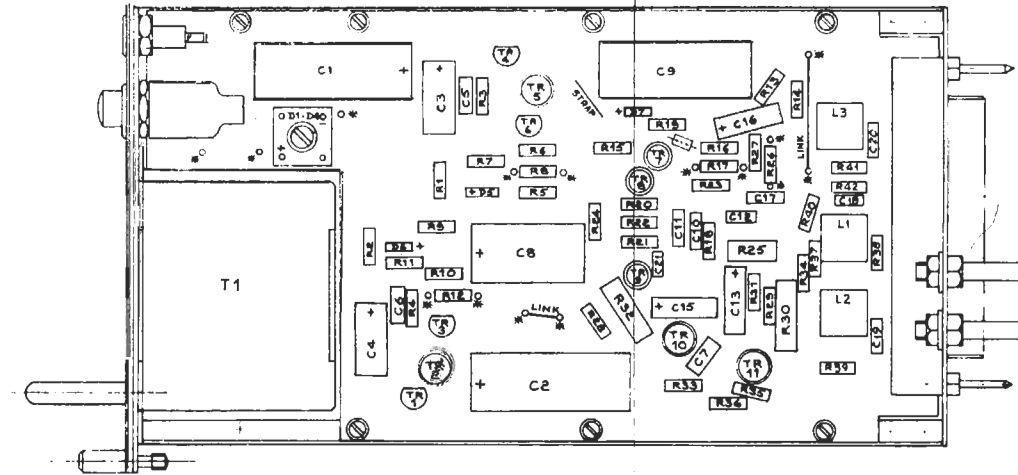
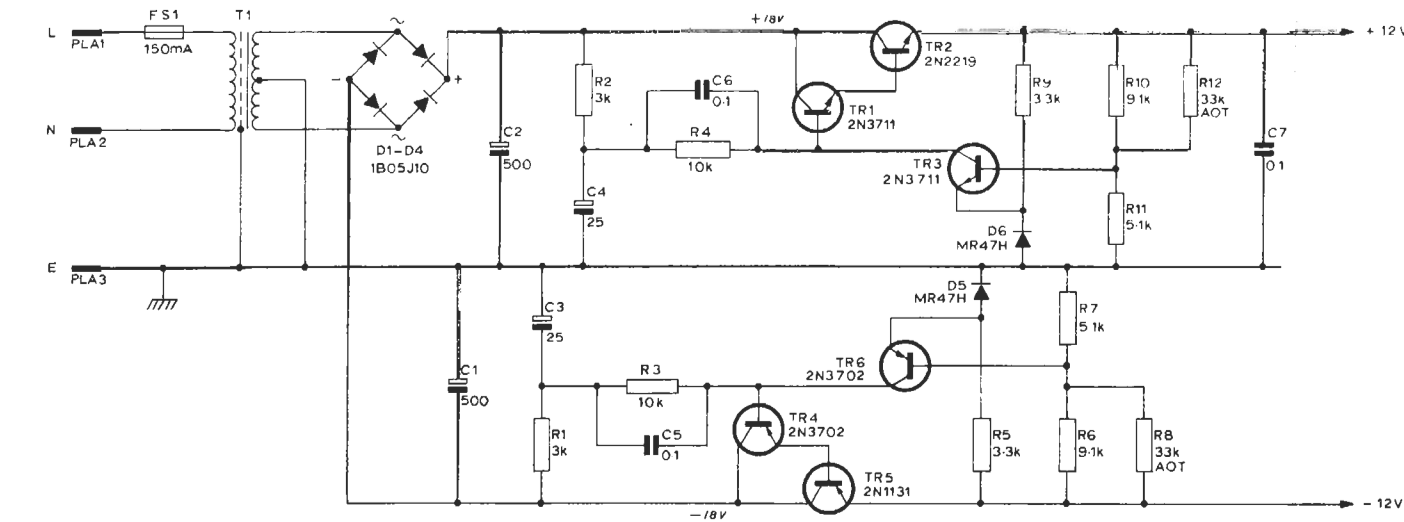
A low-level output provides a signal at -15 dB for monitoring purposes.

Typical d.c. voltages are shown on Fig. 1. These were measured with a very high impedance digital voltmeter; voltages measured with an AVO model 8 were within 10% of stated values. Under fault conditions it is advisable to break the connection between TR10 emitter and R18 before measuring these voltages.

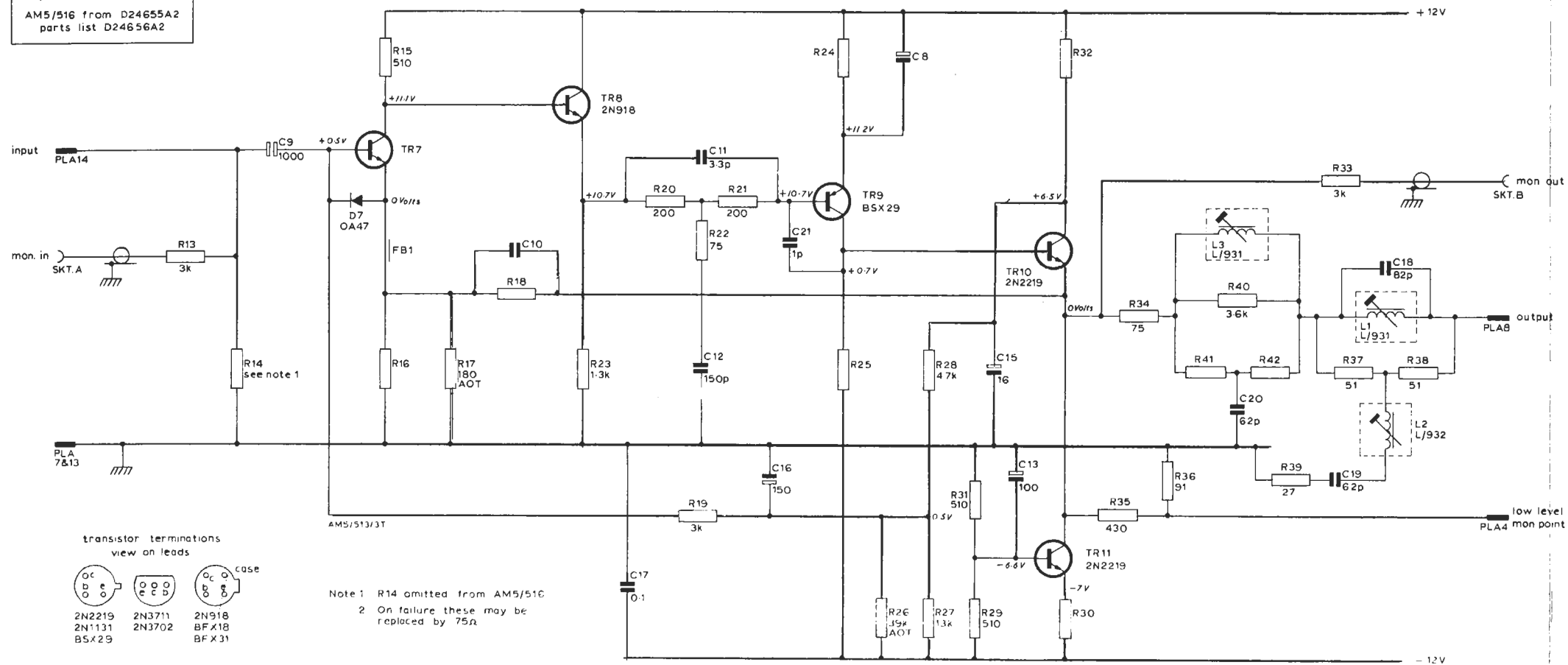
Positive and negative 12-volt supplies are derived from a bridge rectifier. Each supply is separately regulated by means of similar stabilising circuits.

### General Specification

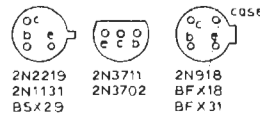
<i>Voltage Gain</i>	15 dB $\pm 0.1$ dB
<i>Output Level</i>	1 V p-p
<i>Overload Point (sine wave)</i>	
50 Hz to 6 MHz	3.4 V p-p
<i>Input Impedance</i>	
AM5/513	75 ohms
AM5/516	2.2 kilohms $\pm 400$ ohms
<i>Output Impedance</i>	75 ohms
<i>Return-loss Figure</i>	
25 Hz to 6 MHz	greater than 30 dB
<i>Amplitude-frequency Response</i>	
50 Hz to 6 MHz	$\pm 0.1$ dB
45 MHz	not less than -3 dB
<i>Differential-phase Distortion at 4.43 MHz</i>	
Standard level output	less than 0.1 degree
+3 dB output	less than 0.1 degree
<i>Differential-gain Distortion at 4.43 MHz</i>	
+3 dB output	less than 0.15 per cent
<i>Picture-signal Distortion Factor</i>	
+3 dB output	less than 0.1 per cent
<i>Step Response</i>	negligible low frequency overshoot for a d.c. step signal at the input
<i>Chrominance/Luminance Gain Inequality</i>	less than $\pm 0.1$ dB
<i>Chrominance/Luminance Delay Inequality</i>	less than 1 nsec
<i>625-line Pulse/bar Ratio</i>	
1T pulse	100 $\pm 1$ per cent
2T pulse	100 $\pm 0.5$ per cent
50-Hz square wave	less than 1 per cent tilt
<i>Maximum d.c. Component of Input Signal</i>	$\pm 6$ V



AM5/513 from D18036A2  
parts list D18037A4  
AM5/516 from D24655A2  
parts list D24656A2



transistor terminations  
view on leads



Note 1: R14 omitted from AM5/516  
2: On failure these may be replaced by 75Ω

component	AM5/513 serial nos except 790-800, up to 1100	AM5/516 serial nos 1101 and above	AM5/516 serial nos up to 144	AM5/516 serial nos 145 and above
R14	77Ω	76.8Ω		
R16	18Ω	5.1Ω		
R18	180Ω	51Ω		
R24	62Ω	47Ω		
R25	820Ω	680Ω		
R30	82Ω	51Ω		
R32	82Ω	51Ω		
R41	16Ω	see note 2	75Ω	
R42	16Ω	2	75Ω	
C8	500μF	1000μF		
C10	10p	12p		
TR7	BFX18	BFX31		

some amplifiers may have minor  
changes in component values

Fig. 1. Circuit  
of AM5/513, 516

<i>Maximum d.c. Output with Input Terminated</i>	$\pm 100$ mV within temperature range 0-50 degrees C.
<i>Maximum Hum at Output</i>	0.2 mV p-p
<i>Noise Factor</i>	less than 8 dB (see note 2)
<i>Maximum Operating Temperature</i>	50 degrees C
<i>Power Requirements</i>	185-270 V, 50 Hz
<i>Current Consumption</i>	38 mA at 240 V
<i>Weight</i>	0.91 kg (2 lb.)

**Notes**

1. Certain components are selected on test to give some parameters a precise value. They are:  
R8 and R12 are the nearest preferred value resistors to give outputs from the power supply of +12 V and -12 V  $\pm 0.5$  V.

R 17 to give a gain of 15 dB  $\pm 0.1$  dB.

R 26 to give a d.c. voltage between  $\pm 0.5$  V at the output.

TR9 to give differential phase distortion of less than 0.1 degree.

2. Noise measurements should be made on a non-gated noise meter, ME1/503 or an instrument with a similar gain, the controls being selected as follows: 10 kHz high-pass filter, 5 MHz low-pass filter, no weighting filter. An extra amplifier of 15 dB gain is needed to bring the noise level of the amplifier under test within the range of the noise meter. An attenuator reading of 76.5 dB corresponds to a noise factor of 8 dB. For amplifiers AM5/513 serial numbers below 1100 and AM5/516 serial numbers below 149, the noise factor specification is relaxed to 9 dB.
3. In certain applications, such as equalisation, the differential phase distortion figure of less than 0.1 degree may have to be strictly applied.
4. There should be a peak in the amplitude-frequency response of not more than 2 dB between 20 and 30 MHz and the gain at 40 MHz should be not greater than 15 dB.

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