STABILISING AMPLIFIER AM18/519

Introduction

The AM18/519 is a variable-gain video amplifier. The output is controlled by a d.c. error-signal proportional to peak white level in the input signal. The level measured is normally that of the peak-white bar in the Insertion Test Signal (I.T.S.). If a peak-white level exceeds that of the I.T.S. bar then that level is measured. If the I.T.S. is removed, the previously measured white level is stored and used as a reference. The amplifier also produces outputs of mixed-sync pulses and the peak-white bar from the I.T.S.

The amplifier comprises the following units together with various additional components:

Variable Gain Amplifier AM1/552
Trigger Pulse Generator GE2/535B
Indicator Unit IN2/502
Power Supplier PS2/13F
Binary Store UN1/578
Error Signal Unit UN1/579
6 Bistable Units UN9/528 (in UN1/578)

The subunits are built on CH1/12A and CH1/26A chassis and are mounted on a modified PN3/19F panel.

General Specification

Input Level	1 volt p-p
Output Level	0·7 volt p-p ±0·1 dB, for variations in input level between −6 dB and +4 dB
Mixed Sync Pulses: Output Level	5 volts p-p
I.T.S. Peak-white Bar: Output Level	5 volts p-p
Input and Output Impedances	75 ohms
Return Loss	Greater than 30 dB at 5·5 MHz
625-line 2-T Pulse-and-bar: K Rating	Less than 0·5%
Squarewave Tilt 50 Hz	Less than 1%
Noise Figure over the controlled range	Less than 10 dB with respect to 37·5 ohms at the input
Hum level over the controlled range	Less than 0·5 mV p-p
Non-linear Distortion	Not more than 2%
Differential Phase	Not more than 0·1 degree
Differential Gain	Not more than 1%
Luminance/ Chrominance Delay Inequality	Less than 5 ns
Minimum Input Level for correct operation of sync converter	−9 dB relative to 1 volt p-p
Maximum Operating Temperature	40 degrees C
Power Requirement	240 volts 50 Hz 100 mA
Weight	6·8 kg (15 lb)

Continued overleaf

General Description (Fig. 1)

Fig. 1 is a block diagram of the AM18/519. The video input signal is fed via a fixed 19-dB attenuator to a variable-gain amplifier AM1/552. The gain of this amplifier can be varied over the range 15 dB to 25 dB. The normal output level is 1 volt p-p and the range of input levels is +4 dB to −6 dB.

An output from the amplifier is fed to an error-signal unit UN1/579. This unit comprises a peak-signal detector and an I.T.S. detector. The peak-signal detector measures the amplitude of a peak-white component of the video signal. This component is normally the peak-white bar in the I.T.S. If a peak-white signal in the picture information exceeds the peak-white bar in amplitude the larger signal is measured. The measured amplitude is compared with a fixed reference voltage and the difference, an error-signal, is processed and used to control the gain of the AM1/552. This is the main a.g.c. loop of the equipment.

AM1/552 is restored temporarily to the main a.g.c. loop. When the I.T.S. is restored, normal operation is resumed.

If the normal programme signal is replaced by a test waveform (such as a standard pulse-and-bar signal) containing only line frequency information the amplifier, which in this condition is being controlled by the stored error information, has a linear input/output relationship. This linear relationship is maintained up to the point where the bar amplitude in the input signal is equal to the amplitude of the peak-white bar in the last I.T.S. input. Any further increase in amplitude causes the main a.g.c. loop to come into operation.

If power is applied to the unit during a period when the I.T.S. is absent, the stored error-information is set to zero which is equivalent to an input signal level of −6 dB, If the input signal white-component is greater than this the main a.g.c. loop takes over.

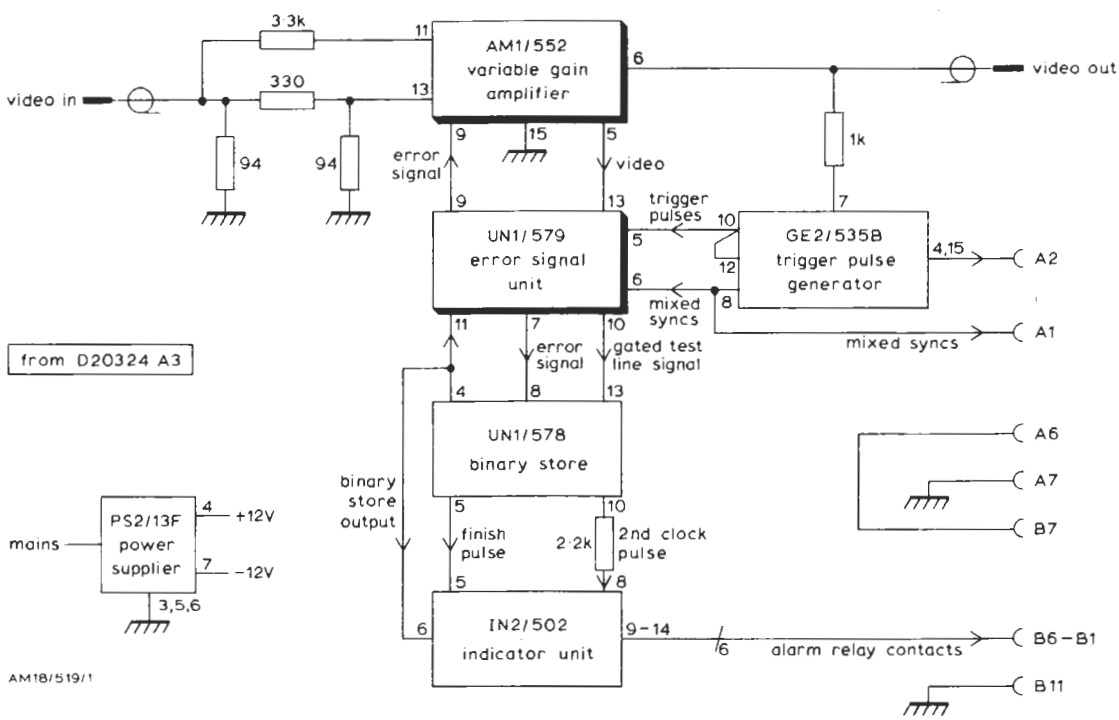

Fig. 1 Block Diagram of the AM18/519

The I.T.S. detector produces an output when the I.T.S. is present. This signal is used to start a 32-bit counter which is used to measure the value of the error-signal voltage. The measured value of the error signal is checked every field period.

If the I.T.S. is removed the stored error-signal voltage is used to control the gain of the AM1/552.

If the peak picture amplitude exceeds the equivalent amplitude of the stored error-signal, control of the

When the stored error-voltage is being used to control the AM1/552 the gain is not corrected for input signals smaller in amplitude than that equivalent to the stored voltage.

Lamps on the front panel of the indicator unit IN2/502 show the High, Normal and Low states of the I.T.S. peak-white bar. If the I.T.S. is absent the Low lamp is on. The gain of the AM1/552 over the normal range of input signals is shown by a meter on the unit.

Alignment

Apparatus Required

Avometer
Oscilloscope
Pulse and Bar Generator GE4/504
Chassis Extender CH1A/3
Source of 625-line colour-video signal complete with Insertion Test Signal

Procedure

1. Switch on and wait for at least five minutes.
2. Feed the video signal, at one volt p-p (0 dB), to the input. Plug in the UN1/579 using the chassis extender. Put switch SA, on the UN1/579 printed wiring board, to Open.
3. Adjust resistor R53, on the UN1/579, for a one-volt p-p (0-dB) video output signal when the amplifier is terminated in 75 ohms.
4. Check that the voltage at monitor point B, on the front panel of the UN1/579 is 2 ±1 volts.
5. Adjust resistor R39 on the UN1/579 so that the voltage at monitor point A is the same as that measured in 4.
6. Put switch SA to Close. Plug in the UN1/578 using the chassis extender. Reduce the video signal input level by 6 dB.
7. Adjust resistor R28 on the UN1/578 so that the top of the waveform at the Staircase W/F test-point is at zero volts.
8. Check that the Test-line Signal Low lamp on the IN2/502 is alight.
9. Adjust the Zero control on the AM1/552 so that the meter reads zero. Set the video input level to +4 dB.
10. Adjust resistor R44 on the UN1/578 so that the top of the staircase waveform is at +5 volts.
11. Check that the Test-line Signal High lamp on the IN2/502 is alight. Adjust the meter F.S.D. control on the AM1/552 so that the meter reads 100.
12. Check that for any input level below +4 dB and above −6 dB the indicator lamps are off and the video output level is maintained within ±0·1 dB. At 0 dB the meter should read about 50.

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