ERROR SIGNAL AMPLIFIERS AM3/501 SERIES

Introduction

The AM3/501 and AM3/501A are used as sampling units in feedback clamps[1,2]. The units differ only in the connections to switch S1 in the input circuit. Both units accept a video signal and feeds of sampling pulses[3] and produce an error correction signal which is used to clamp the video signal in an associated unit[4,5,6]. The clamping time-constant can be varied by means of a switch labelled *Long/Med/Short/Auto*. When this switch is set to *Auto* the time constant is automatically controlled by a unit which measures the amount of noise on the back porch of the video signal and lengthens the time-constant if the noise increases; it thus reduces the amount of streaking produced when noisy signals are clamped.

Both units are mounted on a CH1/12A chassis with index peg positions 1 and 12. Power supplies at +12 volts, +4 volts and −4 volts are required.

General Specification

Video Input	2 V p-p max
Error Signal Output	6 V p-p max
Input Impedance	more than 1·5 kilohms
Output Impedance	less than 20 ohms
Maximum Ambient Temperature	40 °C
Power Consumption	40 mA at +12 V 0·5 mA at +4 V 10 mA at −4 V If the automatic time-constant circuits are not used, the currents at +12 V and −4 V are each about 8 mA less.
Weight	1 lb.

Circuit Description

The circuit diagram of the AM3/501 is given in Fig. 1; the AM3/501A variations are shown on Fig. 1 in an inset sketch.

The video input signal is applied via the *Normal* position of S1 and a colour subcarrier trap to a sampling bridge consisting of RV1 and diodes D2 to D5. The bridge is driven into conduction during the back porch period by signals which are applied to the wide sampling-pulse input and amplified by transformer T1. These signals consist of pairs of pulses, one pulse positive-going and one negative-going, which recur at line frequency. The positive-going pulse is removed by the action of diode D1 and the negative-going pulse is used to derive two pulses which are balanced about earth and these are fed to the sampling bridge. Variable resistor RV1 is adjusted to compensate for variations in the forward resistances of the diodes and RV2 is adjusted on test (with S1 in the *OV* position) to obtain zero output from the bridge for zero input. The differential trimming capacitor C18 is adjusted to minimise transients.

The error signal pulses produced by the sampling bridge are fed to an amplifier comprising transistors TR1 to TR3 and the amplified and inverted pulses developed at the emitter of TR3 are fed via transformer TR2 to a demodulating bridge. The output of the amplifier is applied also to the automatic time-constant controller unit[7].

The demodulating bridge functions in the same manner as the sampling bridge described previously, but it is driven by narrower pulses. When the bridge conducts, the error signal charges or discharges capacitors C15 and C16. The rate of charge, and hence the clamping time-constant, is dependent on the position of switch S2. The integrated error signal produced at the junction of the sampling bridge and capacitors C15 and C16 is fed via emitter-followers TR4 and TR5 to the error-signal output. Variable resistor RV3 is adjusted on test (with switch S1 in the *OV* position) to bring the blanking level of the clamped video signal on the associated unit[4,5,6] to zero volts.

When *Auto* working is selected, the clamp time-constant is determined by a circuit comprising transistors TR6 and TR7, and thermistor TH1. The thermistor forms the common collector load of the two transistors and these are driven by externally-derived control signals[7] in such a way that the current through TH1 is reduced when a

noisy video signal is being clamped. Thus the thermistor increases in resistance and the clamp operates with a long time-constant. When a comparatively noise-free signal is being handled the control current increases, as a result the resistance of the thermistor falls and the clamp operates with a short time constant.

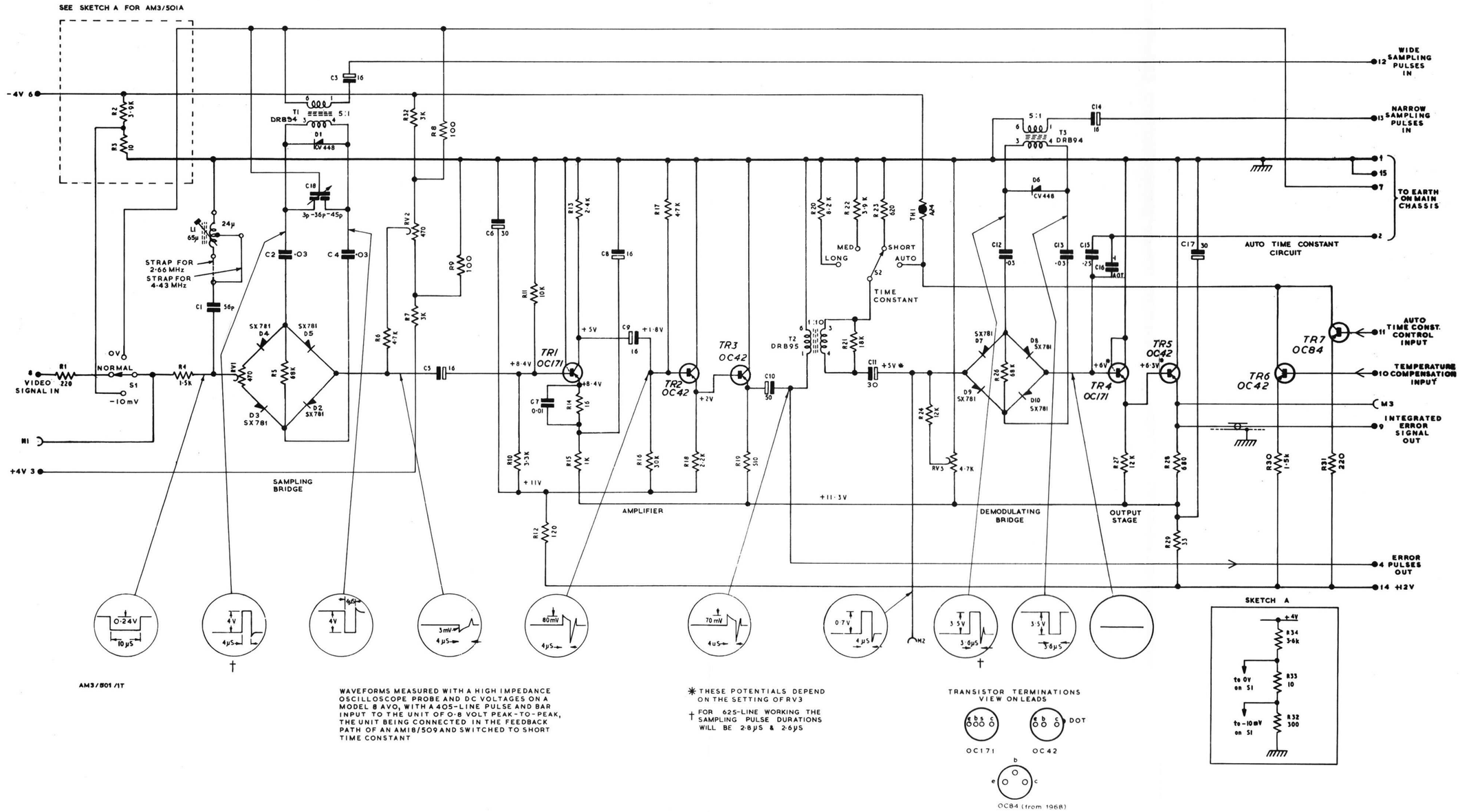
Maintenance

See parent unit[1,2].

References to Typical Associated Equipment

1. Sync Pulse Stabilising Amplifier AM18/503,A
2. Stabilising Amplifiers AM18/509 Series
3. Sync Pulse Separator UN1/510
4. Stabilising Amplifier AM18/520
5. Processing Amplifier AM18/507
6. Stabilising Amplifier AM18/508
7. Auto Time Constant Controller UN3/503

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AM3/501/1T

WAVEFORMS MEASURED WITH A HIGH IMPEDANCE OSCILLOSCOPE PROBE AND DC VOLTAGES ON A MODEL 8 AVO, WITH A 405-LINE PULSE AND BAR INPUT TO THE UNIT OF 0·8 VOLT PEAK-TO-PEAK, THE UNIT BEING CONNECTED IN THE FEEDBACK PATH OF AN AM18/509 AND SWITCHED TO SHORT TIME CONSTANT

✳ THESE POTENTIALS DEPEND ON THE SETTING OF RV3

† FOR 625-LINE WORKING THE SAMPLING PULSE DURATIONS WILL BE 2·8µS & 2·6µS

TRANSISTOR TERMINATIONS VIEW ON LEADS

OC171 OC42 DOT

OC84 (from 1968)

Fig.1. Circuit of the AM3/501