A.G.C. DETECTOR AM3/510

Introduction

The AM3/510 accepts composite or non-composite video signals on either the 405-line or the 625-line standard. It compares the peak amplitude of the input signal with a d.c. reference voltage which may be varied to provide a gain control. Difference signals are amplified and limited before appearing at the output as a d.c. error voltage which can be used for controlling the gain of a telecine machine[1]. The circuit reacts very quickly to an increase of signal but more slowly to a decrease.

The unit is mounted on a CH1/12A chassis and requires an external power supply.

General Specification

Video Input	
Composite	1 V p-p
Non-composite	0·7 V p-p
Input Impedance	greater than 5 kilohms
Mixed Sync Input	2 V ±0·5 V p-p
Sync Input Impedance	greater than 10 kilohms
Reference Voltage Input	0 to −12 V
Output Control Voltage (with increasing video input)	−12 to 0 V into more than 5 kilohms
Frequency Response (*video section*)	−3 dB at 1·5 MHz
Reaction Time	
Input 3 dB high	20 ms approx
Input 3 dB low	0·5 sec approx
Weight	1 lb
Power Consumption	85mA at −24 V
Index Pegs	3 and 21

Description

The circuit diagram of the AM3/510 is given in Fig. 1 on page 3. The input signal is amplified and band-restricted by C2,L1,C3 to be 3 dB down at 1·5 MHz with respect to 50 kHz. This is to prevent response to signals from very small picture areas.

A parallel LC circuit in the emitter circuit of TR2 suppresses the colour subcarrier if colour signals are being handled. The signal is then clamped by pulses derived from an input of mixed syncs. The clamping pulses and the clamped signal may be monitored at the test points provided.

After clamping, a voltage proportional to the peak of the video signal is developed across C9 by TR10. The integration is repeated by TR12 and TR14 to equalise the response to small and large area picture signals; the final voltage appears across C11, which is charged negatively with increasing signal. The forward time constant of the integrators is short; thus the voltage on C11 changes rapidly with increasing signal. With decreasing signal the change of voltage on C11 is slower because D3 becomes non-conductive and C11 discharges through R31.

The voltage across C11 is passed via two emitter followers and an inverter to a long-tailed pair stage, comprising TR25 and TR26, where it is compared with a reference voltage. The capacitor and inductor, which are connected in series between the base of TR25 and earth, act as a low-frequency trap to reduce the gain of the circuit at field rate and so prevent instability.

The output from the comparator stage, the level of which depends on the potential on C11 and on the reference voltage as set by R42, is amplified and is then limited by diode D10. It finally appears at the emitter of TR28 as an error signal which increases positively with increase of input signal. D10 prevents the base of TR27 from being driven more negative than the voltage on the wiper of R70 which can be set so that the circuit is insensitive to any reduction of input signal beyond 3 dB. However, in this application maximum range is required (because of varying film densities) and R70 is set at the upper limit of its travel.

C12 and R32 provide a feedback path from TR28 to TR15 to maintain stability. If a sudden overload occurs, C11 is charged rapidly negative to the peak value of the signal and consequently a large positive-going error signal appears at the

output of the unit and therefore across the series combination of C12 and R32. The input to the unit falls (because of increased attenuation[1]), C11 discharges through R31 and the error signal falls also. The input to the unit now rises again and the system would become unstable but for the feedback loop.

When the potential on C11 rises due to an overload, C12 charges through R32. This charging action constitutes negative feedback which stabilises the potential on the base of TR15 for the duration of the overload. When the overload is removed the input signal falls to an abnormally low level because the high-output error signal maintains the light valve in the associated telecine machine in the closed condition (maximum attenuation). Diode D3 is now reverse-biased and the potential at the base of TR15 falls at a rate which is determined primarily by C12 and R31. Thus the error signal reduces slowly and the system stabilises at the normal working point. If R32 is too high in value the system oscillates, if it is too low in value the time taken to return to normal is too long and becomes obvious at the output of the system[1] of which the AM3/510 forms a part.

The clamping pulses are formed from mixed syncs. After amplification and differentiation the leading edges of the line-sync pulses are used to trigger into oscillation a tuned LC circuit which operates at a few hundred kHz. A diode across the tuned circuit limits the resulting oscillations to one half cycle per trigger pulse. The pulses so derived are amplified, clipped and applied via transformer T1 to the clamping transistors TR23 and TR24. Zener diode D7 determines the clamping potential.

Maintenance

See parent unit[1].

Reference

1. EP6/505 16-mm Colour Telecine Equipment.

TES 9/69

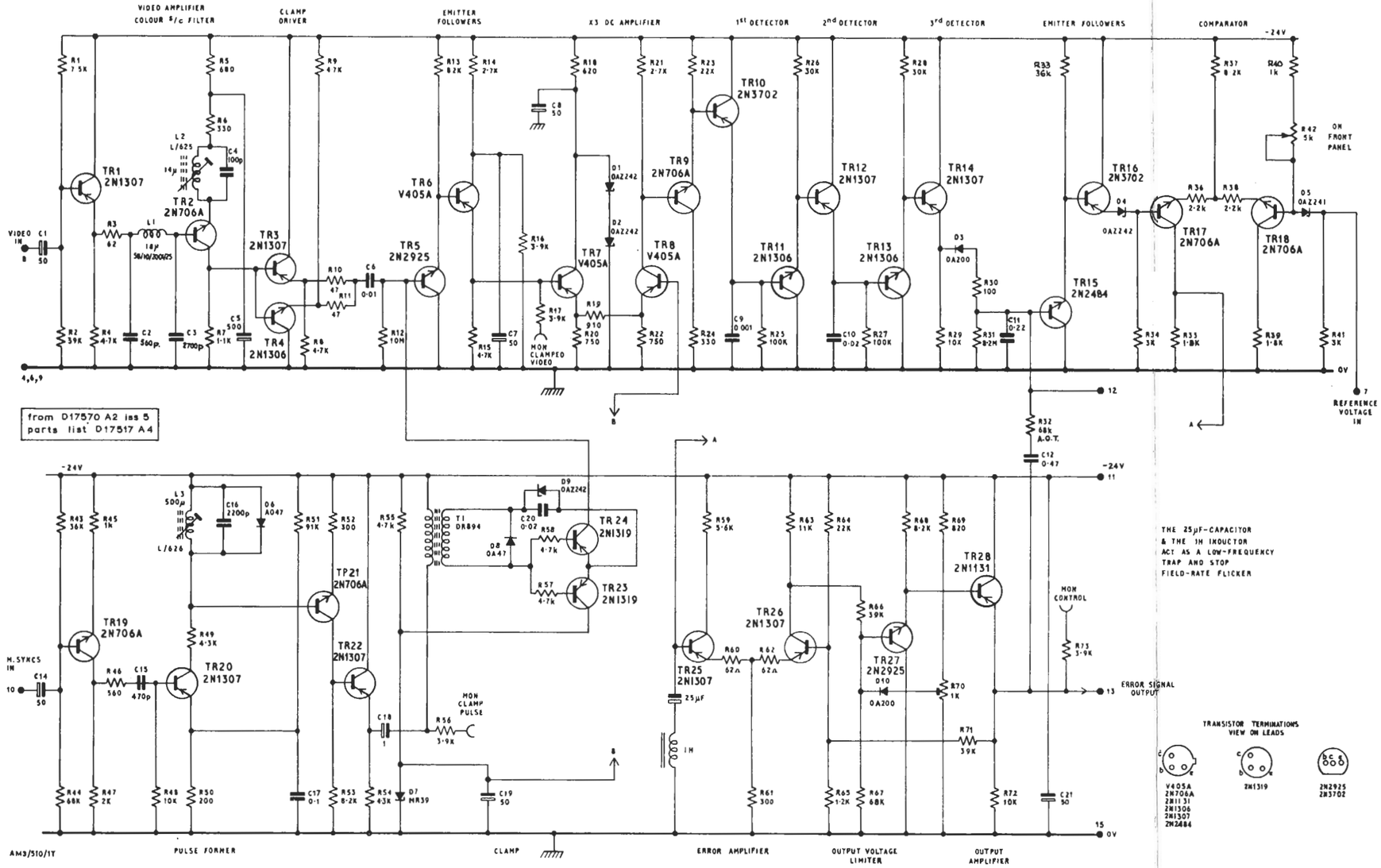

Fig.1 Circuit of the A.G.C. Detector AM3/510