# SECTION 14

## PROCESSING AMPLIFIER AM18/514

### Introduction

The AM18/514 forms part of a stabilising amplifier[1,2]. It accepts a composite video signal, clamps it at blanking-level (in conjunction with an error signal amplifier[3]) and provides a composite video output signal in which the original sync pulses have been replaced by sync pulses of the correct shape and amplitude. The unit also contains a white-level clipper.

Subsidiary inputs to the unit are:

reconstituted sync pulses[4]
a d.c. correction signal[3]
feeds of gating pulses[5]

There is a subsidiary output from the unit in the form of a feedback signal[3] (from which the d.c. correction input signal is derived).

The AM18/514 is multi-standard and colour-compatible; when colour signals are handled the action of the white-level clipper is modified to prevent colour distortion on high-luminance pictures.

The unit is constructed on a CH1/12A chassis with index peg positions 4 and 23. Input and output monitor sockets are provided on the front panel. Power supplies of +12 volts, +4 volts and −4 volts are obtained from a stabilised power supplier[6]. A feed of 50 volts for relay operation is also required.

### General Specification

The specification is given, in conjunction with associated units, under AM18/513[1].

### Circuit Description

A circuit diagram is shown in Fig. 14.1.

The video input signal is applied, via emitter-follower TR1, to the base of TR2. The base of TR2 is also fed with a correction signal derived from the associated error signal amplifier; thus the signal produced at the emitter of TR2 consists of the video signal plus the correction signal. This signal is fed to the base of TR3. Transistors TR3 and TR4 form an emitter-coupled pair and an amplified version of the signal applied to the base of TR3 is developed at the collector of TR4 and applied via emitter-follower TR5, to the base of TR6. Zener diode ZD1 provides a working base-collector voltage for TR4 and capacitor C5 ensures that the coupling between TR5 and TR6 is constant and noise-free at all frequencies. Negative feedback is applied from the emitter of TR6 to the base of TR4. The pre-set control RV1 is used to adjust the signal amplitude at TR6 emitter to 3 volts.

The voltage at the emitter of TR6 is sampled during the back-porch period by an AM3/503 error signal amplifier. This unit develops a d.c. correction signal from any error present in the blanking level of the signal and this correction signal is fed back to the base of TR2 in the processing amplifier. The overall action of the error signal amplifier and stages TR2 to TR6 results in the blanking level of the signal at the emitter of TR6 being clamped at earth potential.

Diode D3, in conjunction with TR6, TR7, D1 and D2, forms a dynamic white-level clipper which uses limited positive feedback to obtain the clipping action. RV2 is a clipping-level control and is adjusted so that the potential at the emitter of TR7 is about 2 volts. All the clipper elements are capable of speedy operation so that even pulses with very fast rise-times, such as are produced by fine-detail captions, are effectively dealt with.

L4, R18 and C6 form a heavily-damped resonant circuit tuned to 4·43 MHz. For monochrome operation it is short-circuited by relay contact RLA-1 and so does not affect the clipping circuit but, for colour operation, the short circuit is removed and the resonant circuit modifies the action of the white-level clipper.

The signal appearing at the emitter of TR6 is applied, via shunt diode D4, to the sync gating stages. Diode D4 is not a conventional black-level clipper, its function is to prevent transient excursions of the waveform into the region between blanking level and the bottom of syncs on those occasions when the signal amplitude changes very rapidly, such as during a cut from a black scene to a white one. For colour operation D4 is removed from circuit by the operation of RLA-2.

The original sync pulses are removed from the signal in two similar gating stages, connected in cascade, and each stage reduces the sync-pulse amplitude by about 23 dB. Capacitor C8, in the second gating stage, is adjusted on test to reduce to a minimum any spikes caused by the gating process.

The non-composite video signal is applied, via

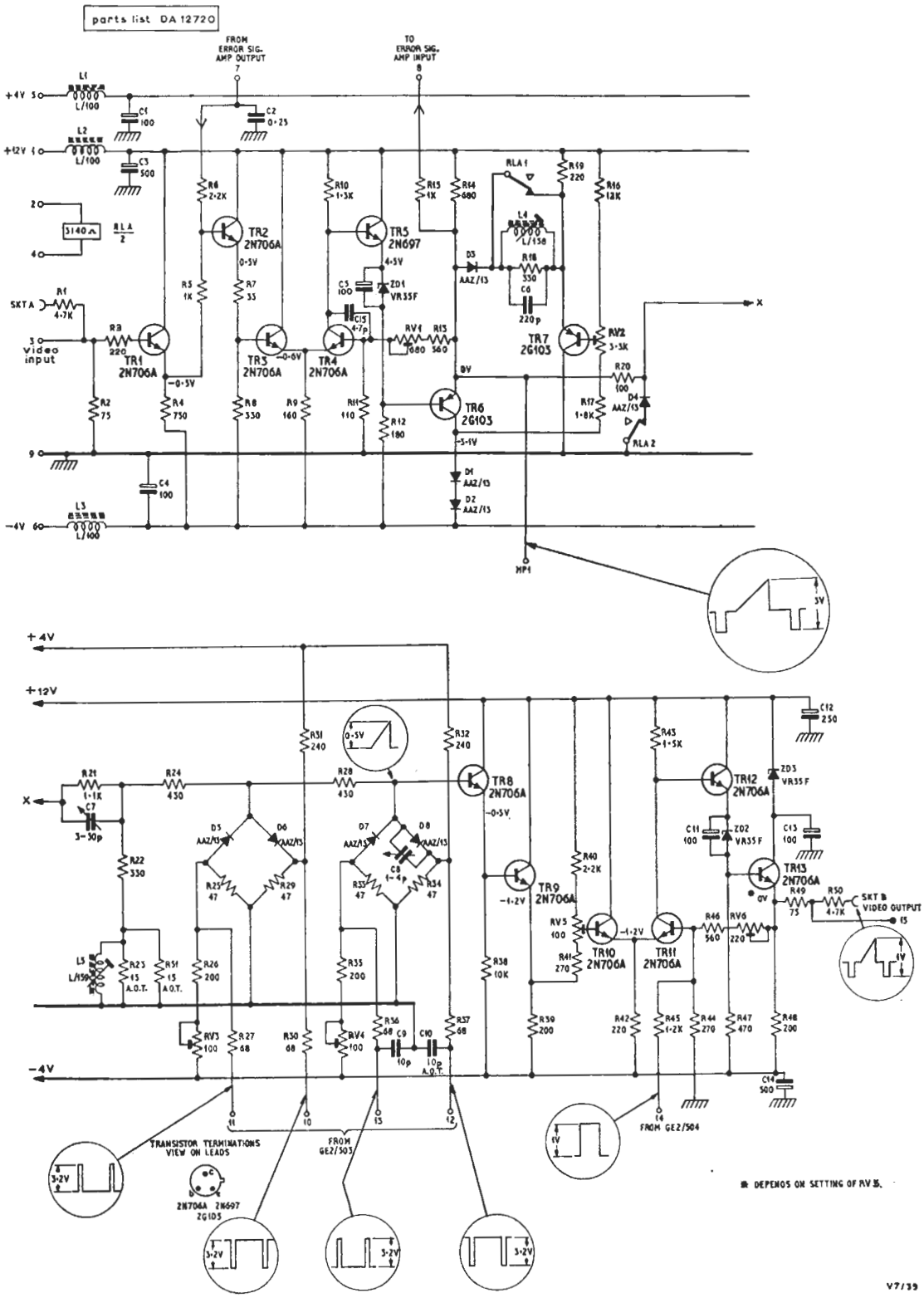


*Fig. 14.1 Circuit of the AM18/514*

cascaded emitter-follower TR8-TR9, to the base of TR10. The preset control RV5 enables the d.c. level of the output signal to be set to zero; when adjusted it causes a slight change in signal gain but this can be counteracted by adjustment of the output gain control RV6.

Transistors TR10 to TR13 form a feedback amplifier. Mixed sync pulses are added to the video signal at the base of TR11. Negative feedback is applied from the emitter of TR13 to the base of TR11 via RV6 and R46; the pre-set RV6 is the output gain control and is adjusted to bring the output signal level to 1 volt when the output is terminated in 75 ohms. Because of the feedback the impedance at the emitter of TR13 is very low; thus the output impedance of the amplifier is the resistance of R49, 75 ohms.

**Maintenance**

This unit is aligned and maintained as part of a stabilising amplifier AM18/513. The waveforms shown in Fig. 14.1 are for 405-line operation and represent conditions when the unit is functioning as part of a stabilising amplifier.

**References to Typical Associated Equipment**

1. Sync Pulse Stabilising Amplifier AM18/513.
2. Instruction V.2, Section 9, Appendix B.
3. Error Signal Amplifier AM3/503.
4. Sync Pulse Generator GE2/504, Instruction V.10.
5. Gating Pulse Generator GE2/503, Instruction V.10.
6. Stabilised Power Supplier PS2/10A, Instruction G.2.

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