

COLOUR-SIGNAL DECODER LUMINANCE UNIT UN19/503

Introduction

The UN19/503 accepts a composite video signal at about 0.2 volts p-p together with two inputs of colour-difference video signals (R-Y and B-Y) each at a level of 1.4 volts p-p (for 100 per cent saturation). The outputs from the unit are three colour-separation video signals, R, G and B, at standard level. A subsidiary input to the unit consists of a feed of line-rate pulses which are used to operate a luminance-signal clamping circuit.

The unit normally forms part of a colour video-signal decoder^{1,2,3}. In addition to the luminance-signal clamp, it contains a luminance amplifier, a colour-difference video amplifier (for the G-Y difference signal) and three colour-separation signal amplifiers. Two matrix circuits are also included in the unit; one is used to derive the G-Y signal from the B-Y and R-Y inputs; the other combines the luminance signal with the three colour-difference signals to produce the R, G and B signals.

The unit is constructed on a CH1/12A chassis with index pegs at positions 2 and 36. It requires d.c. supplied of +6 volts and -6 volts.⁴

General Specification

<i>Input Level</i> (R-Y, B-Y at 100 percent saturation)	1.4 volts p-p
<i>Output Level</i> (R, G and B signals)	1 volt p-p
<i>Output Impedances</i> (R, G and B amplifiers)	75 ohms
<i>Luminance-signal Gain</i> (terminated)	15 dB
<i>Amplitude/Frequency Response</i> (Luminance signals)	Flat to 5.5 MHz
<i>Power Supply</i>	+6, -6 volts, 200 mA

Circuit Description

Fig. 1 shows the complete circuit diagram for the UN19/503.

Luminance Amplifier and Clamp

Composite video signals at a level of 180 mV p-p are applied to common-emitter stages TR1 and TR2 through C1. Emitter-follower TR3 feeds signals from TR2 collector to the compound emitter-follower TR5 and TR6 via the clamping circuit of TR4. Negative feedback is applied to TR1 from the emitter of TR3. In early models of the UN19/503, variable resistor RV1 replaces R74; when present, RV1 should be adjusted for maximum luminance-amplifier gain.

Positive-going clamp pulses developed elsewhere in the decoder⁴ drive TR4 into conduction for 4 μ s during the back-porch period, and the input signal to TR5 is thereby clamped at such times to a potential determined by zener diode D1.

The luminance signal from the low-impedance output circuit of TR6 is passed to the video matrix for combination with the three colour-difference signals.

Colour-difference Signal Matrix and G-Y Amplifier

The two colour-difference signals R-Y and B-Y, obtained from synchronous demodulation of the colour-coded video signal in the decoder chrominance unit, are applied to a matrix comprising R17 and R18. The values of these resistors are determined from the basic colour-signal equation ($Y=0.3R + 0.59G + 0.11B$); the resultant signal fed to TR7 is $-(G-Y)$. TR7 in the common-emitter mode, and TR8 connected as an emitter-follower, form the G-Y amplifier which inverts the signal before feeding it to a second matrix for combination with the luminance signal. The amount of negative feedback between TR8 and TR7 can be adjusted by RV2 which therefore acts as the G-Y amplifier gain control.

Combining Matrix and Colour-separation Signal Output Amplifiers

Resistors R24 to R29, together with the input impedances of the R, G and B amplifiers, form the video matrix for combining the luminance and colour-difference signals.

The three direct-coupled R, G and B amplifiers are identical in most respects, and therefore only one, that producing the Green output signal, is described.

TR12 and TR13' are two common-emitter stages feeding the amplified Green signal from the video matrix to an emitter-follower, TR14. The Green sig-

nal from TR14 is the amplifier output and is taken via series resistor R56 to give the required output impedance of 75 ohms. Negative feedback is applied between TR14 and TR12; variable resistor RV6 is included in the feedback path and is used to set the gain of the amplifier so that a standard-level output signal is obtained.

The amplifier frequency response is modified by the Miller-integrating action of C19 and by the frequency-conscious negative feedback effected by components in the emitter circuit of TR13.

The d.c. level of the R, G and B outputs are controlled by the luminance amplifier clamp, with pre-set adjustment of individual levels by means of variable resistors RV3, RV5 and RV7 for the Red, Green and Blue signal amplifiers, respectively.

Alignment and Maintenance

The UN19/503 is normally aligned and maintained as part of a complete decoder^{1,2,3}. In the Instruction for the parent equipment, some notes on typical faults in this unit are also given.

References to Typical Associated Equipment

1. PAL 625-line Colour-signal Decoder GE1/528.
2. PAL/NTSC 625/525-line Colour-signal Decoder GE1/529.
3. NTSC 525-line Colour-signal Decoder GE1/527.
4. Sync Separator Unit UN1/540.

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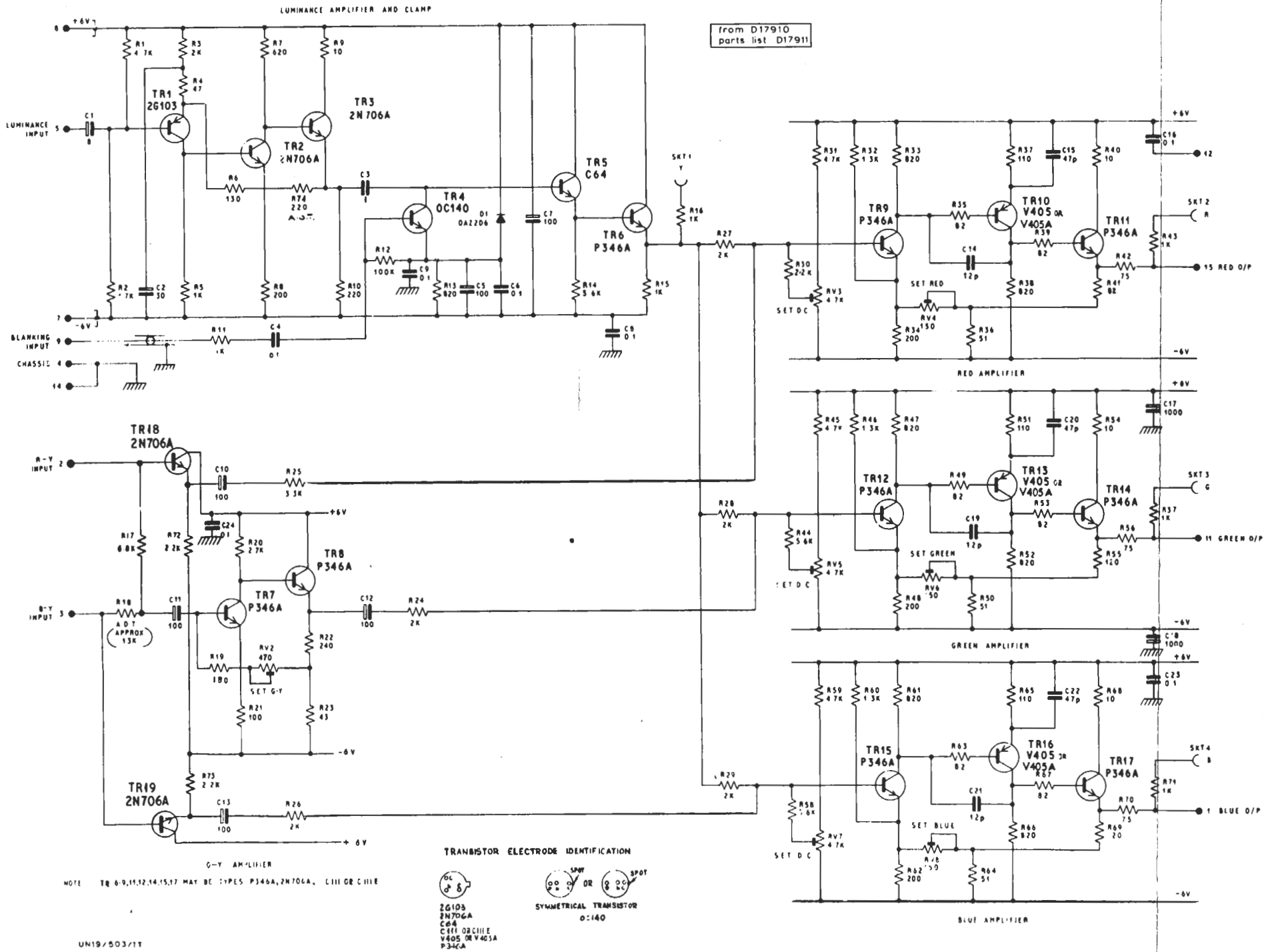


Fig.1. Circuit of the Colour-signal Decoder Luminance Unit UN19/503

MODIFIED COLOUR-SIGNAL DECODER LUMINANCE UNIT UN19/503 (217)**Introduction**

The modified UN19/503 accepts a non-composite video signal at a level of approximately 0.2 volts p-p, and two colour-difference signals (R-Y and B-Y) each at a level of 1.4 volts p-p. The outputs from the unit are the three colour-separation non-composite video signals R, G and B at standard level. No other signal inputs are required.

The unit has been modified to form part of the output video-signal processing section of the Field-store Standards Converter C06/506, where it receives the timing-corrected feeds of colour-difference and luminance signals derived from the line-store; from these inputs the unit produces the R, G, B and luminance signals for application to the PAL output signal encoder.

This version of the UN19/503 differs from the unmodified unit mainly in respect of the exclusion of the luminance-signal clamping circuit (hence the absence of a feed of line-rate pulses which represent a subsidiary input to the unmodified unit).

In the C06/506 equipment, the modified UN19/503 has the address 7/5/4 (see Block Diagram F).

General Specification

The details given for an unmodified UN19/503 are applicable to the modified unit.

Circuit Modifications

For details of the circuit, refer to Fig. 1 of the Instruction describing the unmodified UN19/503 (for the C06/506, key ref. 74).

All the modifications to this unit are concerned with the luminance amplifier circuit comprising transistors TR1 to TR6. The clamp operating on the luminance signal fed to TR5 has been disabled by removing transistor TR4 and replacing it with a 2.2-kilohm resistor (R12A) so that the correct d.c. conditions are maintained. In the output section of the C06/506, clamping is not necessary at this point because the signal has already been clamped (in addition to being re-blanked) in the Processing Amplifier (key ref. 10; address 7/6/3). A further reason for this modification was that correctly-timed pulses for operating the clamp were not readily available, and it was thought unnecessary to arrange for their generation.

Because the luminance signal is not clamped in this amplifier, it was found necessary to improve the low-frequency response. This has been accomplished by increasing the values of capacitors C1 and C2. In the modified UN19/503 capacitor C1 is 50 μF (instead of 8 μF) and capacitor C2 is 500 μF (instead of 30 μF).

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