

I.T.S. CHROMA DETECTOR UNIT UN20/510

Introduction

The UN20/510 accepts a one-volt p-p colour-video signal and Insertion Test Signal (I.T.S.) and a test-line trigger pulse; it produces a d.c. signal related to the amplitude of the chrominance component of the chrominance bar in the I.T.S. If the I.T.S. is absent the output is switched to a preset d.c. level

The detector is built on a CH1/12A chassis with index pegs in positions 11 and 37. Supplies of both positive and negative 12-volt d.c. are required at about 100 mA each.

General Description (Fig. 1)

Fig. 1 is a block diagram of the unit. Negative-going trigger pulses are applied to a monostable

multivibrator. The output from this multivibrator is used to trigger a second monostable multivibrator which produces a 12- $\mu$ s gating pulse centred on the chrominance bar in the I.T.S. which occurs on lines 20 and 333 of a television signal.

A video input is passed via a chrominance-bandpass filter and an amplifier to an envelope detector. The detected chrominance signal is fed through a lowpass filter to another amplifier and then to a sampling gate. A d.c. signal proportional to the amplitude of the required chrominance signal is derived, amplified and applied to a switching circuit. If the amplitude of the sampled chrominance signal falls by more than 13 dB from its nominal value the switching circuit operates to transfer the output of the unit to the preset d.c. level.

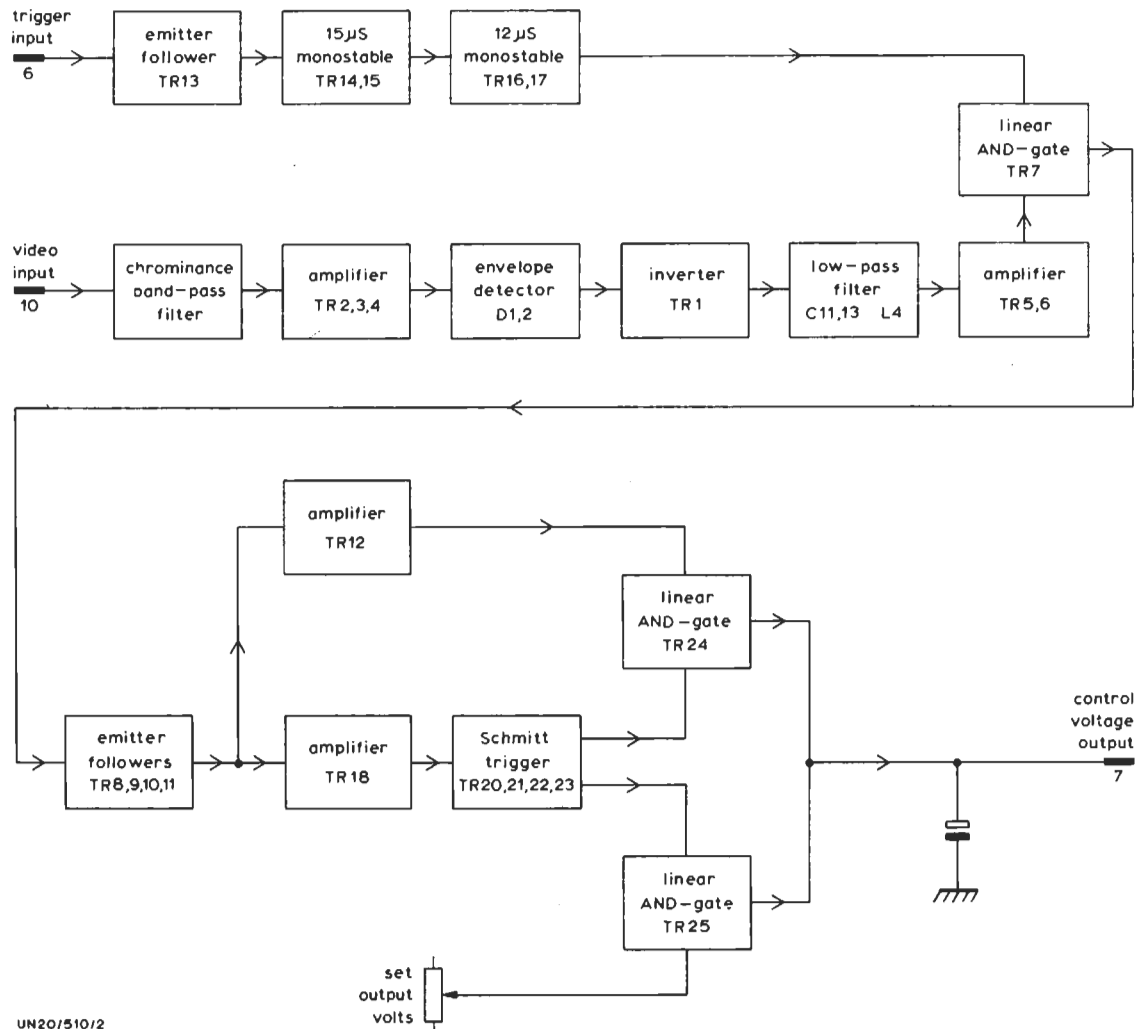


Fig. 1. Block Diagram of the UN20/510

### Circuit Description (Figs. 2 and 3)

Fig. 2 is a circuit diagram of the UN20/510 and diagrams of ideal waveforms are shown in Fig. 3. The video input is applied via PLA10 to a bandpass filter. The filtered chrominance signal is amplified by a three-stage negative feedback amplifier comprising transistors TR2, TR3 and TR4. The signal from the emitter of TR4 is applied to transformer T1 and envelope detector diodes D1 and D2. The d.c. level of the detected chrominance signal can be set by variable resistor R67. The signal is inverted by transistor TR1 and fed via a lowpass filter to a two-stage amplifier comprising transistors TR5 and TR6. The output from the collector of TR6 is applied to the source of f.e.t. TR7.

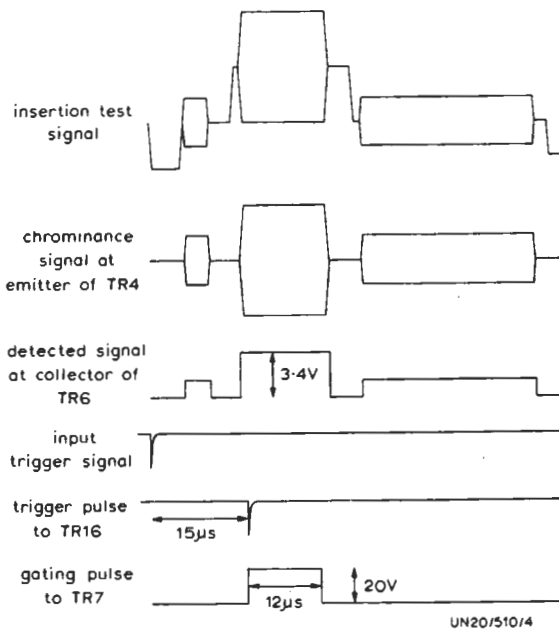


Fig. 3. Illustration of Ideal Waveforms in the UN20/510

Trigger pulses occurring at the beginning of lines 20 and 333 are applied via pin PLA6 to emitter-follower TR13. The pulses are used to trigger an emitter-coupled monostable multivibrator comprising transistors TR14 and TR15. Series-connected diodes D6 and D7 provide temperature compensation and diode D8 protects transistor TR15 against reverse voltages. The output from TR15 is differentiated by C19 and R41; the differentiated pulse is negative-going and occurs 15  $\mu$ s later than the input trigger pulse. The negative-going pulse is used to trigger a second monostable multivibrator, TR16 and TR17, the output of which is a positive pulse 12  $\mu$ s wide.

The 12- $\mu$ s pulse is applied to the gate of f.e.t. TR7, which is connected as a linear AND-gate. The detected chrominance signal is allowed through the gate only when the 12- $\mu$ s pulse is present. The output from the drain of TR7 charges capacitor C16. Transistors TR8, TR9, TR10 and TR11 are effectively emitter-followers. The output from TR11 is used to drive a common-emitter amplifier TR12. A second connection is made from the output of TR11 to transistor amplifier TR18.

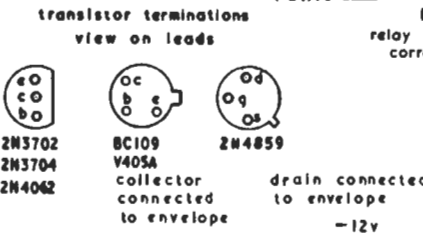
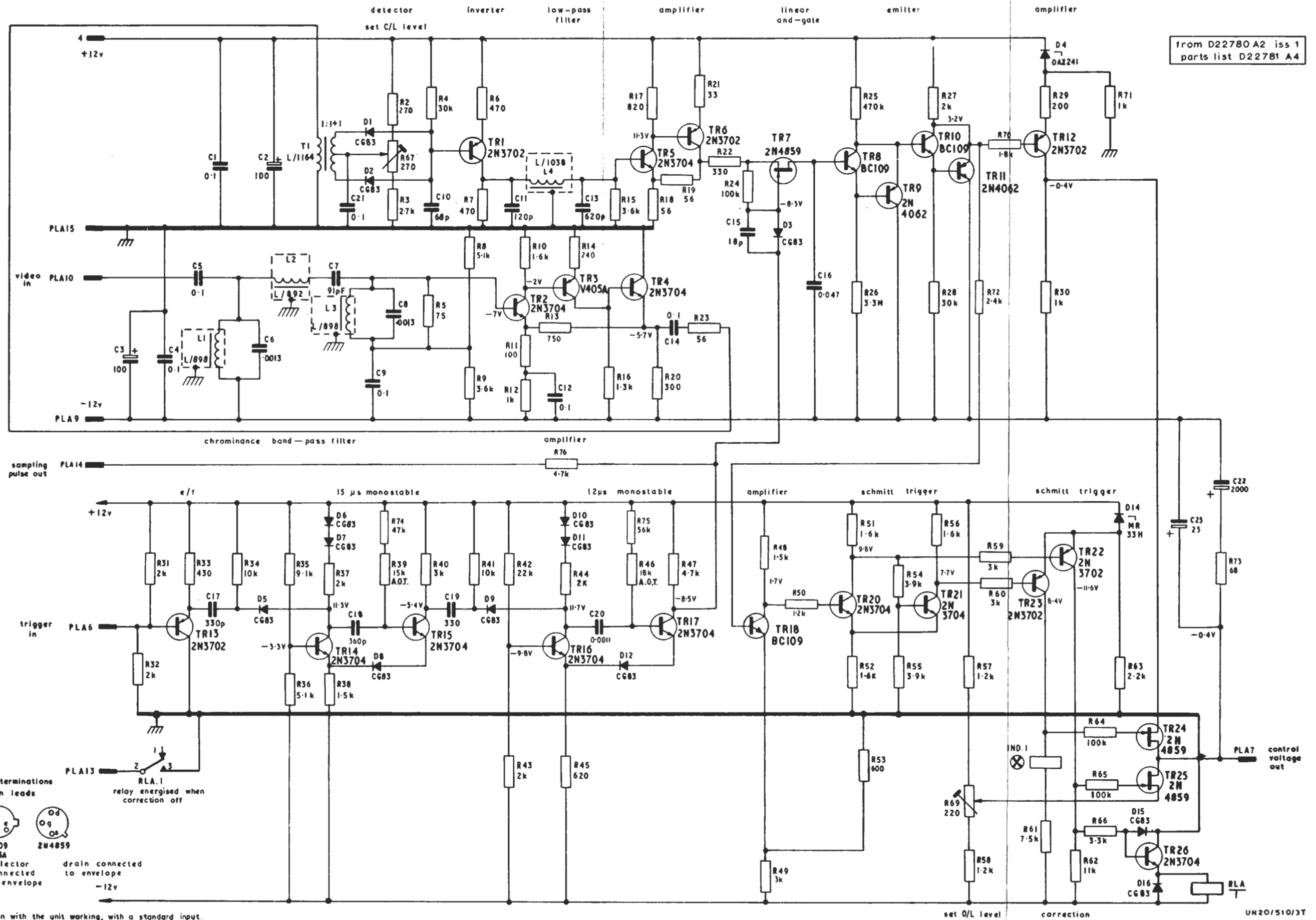
Transistors TR20 and TR21 form a Schmitt trigger circuit. Potentials at the collectors of TR20 and TR21 drive transistor switches TR22 and TR23 respectively.

During normal operation, TR20 is cut off and TR21 is conducting. The collector of TR23 is at a maximum positive potential, thus causing TR24, the linear AND-gate, to conduct and make the d.c. output signal available at pin PLA7.

If the Insertion Test Signal fails, TR22 conducts and switches on f.e.t. TR25. The potential at PLA7 is then determined by variable resistor R69. Transistor TR22 drives TR26 which in turn operates a relay RLA. A single make contact is connected between pin PLA13 and earth. A star-indicator is operated by TR23 when the unit is working normally.

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from D22780 A2 iss 1  
parts list D22781 A4



All voltages taken with the unit working, with a standard input.  
A model 8 AV0 meter was used on the 25V range.

Fig.2. Circuit  
of UN 20 /510

TABLE 1

Transistor	Normal Signal Input			No Signal Input		
	Emitter or Source	Base or Gate	Collector or Drain	Emitter or Source	Base or Gate	Collector or Drain
TR1	10.3	9.70	0.75	11.2	10.5	0.65
TR2	-7.60	-7.00	-2.00	-7.60	-7.00	-2.00
TR3	-1.30	-2.00	-5.10	-1.30	-2.00	-5.10
TR4	-5.70	-5.10	0	-5.70	-5.10	0
TR5	0.18	0.76	11.2	0.06	-0.65	11.3
TR6	11.8	11.3	0.30	11.9	11.3	0.1
TR7	0.30	-8.30	0.14	-3.00	-8.30	0
TR8	2.60	1.70	3.20	-0.17	0	0.17
TR9	3.20	2.60	-11.9	0.17	-0.17	-11.9
TR10	2.60	3.20	3.20	-0.40	0.17	0.20
TR11	3.20	2.60	-11.9	-0.20	-0.40	-11.9
TR12	2.90	3.20	-0.40	3.10	2.30	3.00
TR13	6.70	6.00	0	6.70	6.00	0
TR14	-3.80	-3.30	11.3	-3.80	-3.30	11.3
TR15	-3.40	-2.80	-3.40	-3.40	-2.80	-3.40
TR16	-8.80	-9.80	11.7	-8.80	-9.80	11.7
TR17	-8.50	-7.80	-8.50	-8.50	-7.80	-8.50
TR18	1.70	2.30	-0.43	-0.43	0.18	6.90
TR20	4.30	1.70	9.80	6.00	6.60	6.00
TR21	4.30	4.90	7.70	6.00	3.10	11.9
TR22	8.40	9.70	-11.6	8.30	7.60	8.30
TR23	8.40	7.80	8.40	8.30	10.8	-11.7
TR24	-0.40	0.24	-0.40	3.00	-9.70	-0.35
TR25	-0.37	-9.70	-0.40	-0.35	0.29	-0.35
TR26	-11.9	-11.6	0	-0.38	0.31	0

**Maintenance**

Table 1 is a list of transistor potentials for normal operating and also for no-signal input conditions. All measurements were taken with an Avometer Model 8. Readings under one volt were made on the 2.5-volt d.c. scale and the other readings were made on the 25-volt d.c. scale.

**Test Procedure**

The UN20/510 is tested as part of its parent unit.

**References to Typical Associated Equipment**

1. Trigger Pulse Generator GE2/535B.
2. Stabilising Amplifier AM18/519.
3. Automatic Chrominance Equaliser EQ12/501.
4. Colour Signal Stabiliser Equipment EP1/513.

MJR 6/69

LPB 2/72