

## SECTION 3

### BAR DETECTOR UN20/503

#### Introduction

The UN20/503, as used in an Automatic Monitor Major MN2M/506 (see Instruction V.11), detects a gated test-line-signal bar waveform and compares its amplitude with a reference voltage. If the amplitude of the bar differs by more than 1.5 dB from its normal level a relay operates.

The UN20/503 is constructed on a CH1/12A chassis with index peg positions 19 and 28.

#### Circuit Description

The circuit of the UN20/503 is given in Fig. 3.1. Transistors TR1 to TR3 form part of a negative-feedback amplifier with a voltage gain of 30 dB. The output of this amplifier is fed to a white-level rectifier D2 which gives a d.c. potential proportional to the peak value of the bar waveform at the base of transistor TR4. Diode D1 protects transistor TR3 against a reverse base-emitter voltage from capacitor C6. Transistors TR4 to TR6 form a three-stage emitter follower. The pnp transistor TR6 and diode D3 compensate for the base-emitter voltage drop in transistors TR4 and TR5, reducing the effect of changes in ambient temperature.

The output of transistor TR6 is fed via the *Set Operating Point* resistor RV1 to the base of transistor TR7, part of a long-tailed pair. The base of the other transistor of the pair TR8 is fed from a

zener reference voltage. The output of the long-tailed pair is taken from the more positive collector via one of the diodes D4 or D5. This output, set to be a minimum with the correct amplitude of input bar waveform, is fed via an emitter follower TR9 to a Schmitt trigger circuit<sup>1,2,3</sup>. The gain of the long-tailed pair is chosen so that the state of the Schmitt circuit is changed if the amplitude of the input bar waveform varies by more than 1.5 dB from its normal level.

The Schmitt circuit feeds a two-stage amplifier TR12 and TR13; this amplifier contains a relay which operates if the level of the input bar waveform is outside limits.

#### Test Procedure

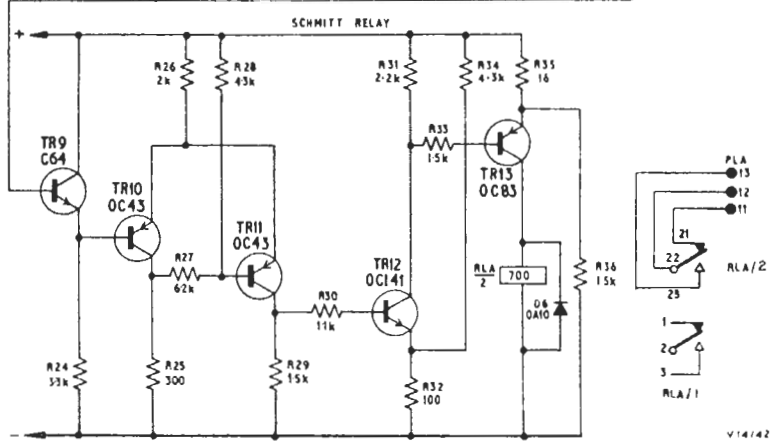
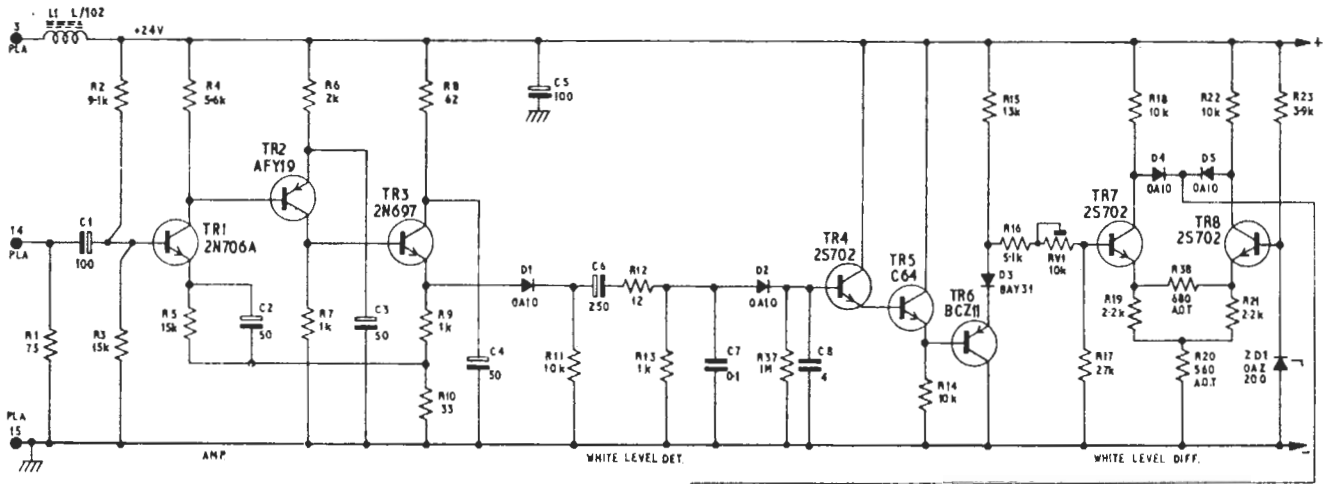
The UN20/503 is tested as part of an Automatic Monitor Major.

#### Bibliography

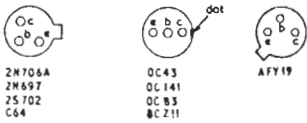
1. Television Engineering, Vol. 3 (2nd edition): Iliffe.
2. Towers, T. D.; *Pumps and Schmitts*: Wireless World, August 1964.
3. Newell, A. F. and Tourtel, P. A.; *Transistor Backlash Circuits*: Mullard Technical Communications, Vol. 6, No. 51.

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*See overleaf for Fig. 3.1.*



TRANSISTOR TERMINATIONS  
VIEW ON LEADS.



2N706A  
2N697  
25702  
C64

OC43  
OC141  
OC83  
BCZ11

AFY19

parts list D17216A4

V14/42

Fig. 3.1 Circuit of the UN20/503