ERROR INVERTER UN23/511

Introduction

The UN23/511 accepts Natlock colour-error signals of OV, –3V or –6V (nominal) from a Subcarrier Phase Comparator, and interchanges the –3V and –6V signals. Thus an input of –3V produces an output of –6V and an input of –6V produces an output of –3V.

The UN23/511, in conjunction with a subcarrier phase comparator [1] and a digital phase shifter [2], enables local subcarrier phase to be genlocked to that from a remote site (see Instruction P1).

The Unit has an integral mains-operated power supply and is constructed on a CH1/12A chassis with index-peg positions 26 and 33.

Specification

Input	
(from Phase Comparator)	OV, –3V or –6V.
Output	
(to Digital Phase Shifter)	OV, –6V or –3V.
Power Requirements	240 volts, 15 mA d.c. (fused at 50 mA)
Connector	15-pole Painton plug.
Weight	0·54 kg (1lb. 3oz.)

Circuit Description

The circuit of the UN23/511 is given in Fig.1. A *Colour-retard* signal (–3V) at the input turns TR1 on which turns TR3 off. TR4 base is therefore at about –7 volts and so TR4 emitter and the output of the unit are at about –6 volts. Current through R6 keeps zener diode D1 broken down, which holds the emitter of TR2 at –3·3 volts. TR2 base is at –3 volts and so TR2 does not conduct.

A *Colour-advance* signal (–6V) at the input keeps TR1 on, TR3 off and TR4 on, as before but also brings TR2 into conduction. With TR2 hard on its collector is at about –3·6 volts (3·3 volts across D1 plus the collector-emitter saturation voltage of TR2). About 0·4 volts is dropped across D2 and so the base of TR4 is held at about –4 volts. i.e. it cannot rise to –7 volts as before. Thus TR4 emitter and the output of the Unit are at about –3volts. The purpose of D2 is to raise the voltage to which the base of TR4 is held when TR2 conducts. Without D2 the base of TR4 would be held at –3·6 volts and the output voltage would therefore be lower than required.

R6 is returned to the emitter of TR4 rather than to the supply rail to provide some positive feedback to the emitter of TR2. This speeds up the output transitions from –6V to –3V as the input voltage increases, and from –3V to –6V as the input voltage decreases.

An input of OV holds TR1 and TR2 off, TR3 on and TR4 off and so the emitter of TR4 and the output of the Unit are at OV.

Testing the UN23/511

Apparatus Required

Two Model 8 AVO meters.

Stabilised d.c. power supply variable from 0 to 8 volts

Painton 15-pole socket.

Procedure

1. Connect a mains lead to the Painton socket with polarity as shown in the circuit diagram (Fig. 1). Plug the UN23/511 into the socket.
2. Switch on the mains and connect the variable d.c. supply to the input of the unit; negative to pin 12, positive to pin 3.
3. Connect one AVO meter across the input to the Unit (between pin 12 and pin 3) and the other across the output of the Unit (between pin 14 and pin 3).
4. Check that the output voltage is OV for input voltages of OV to –1V.
5. Check that the output voltage is more negative than –5·5V for input voltages of –1·5V to –3·5V.
6. Check that the output voltage is –3V ± 0·25V for an input voltage more negative than –4V.

References to Typical Associated Equipment.

1. Subcarrier Phase Comparators EP5/505 and EP5/506
2. Digital Phase Shifter EP1/509.

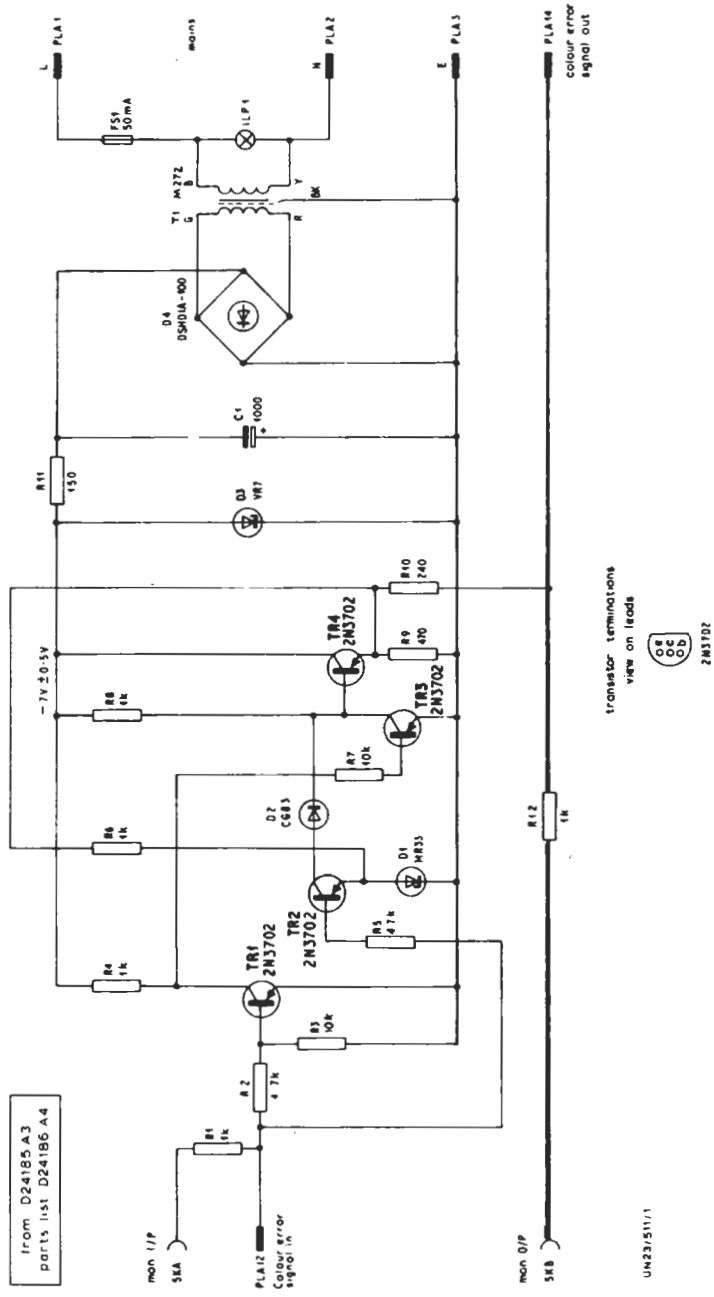

Fig. 1. Circuit of the Error Inverter UN23/511