Satellite TV
Polarisation Checker

This handy unit, designed and presented by Michael Dranfield, gives an instant check on the LNB supply voltage provided by a satellite receiver

This simple unit is a must for the satellite TV equipment installer/repairer. It enables the LNB supply provided by a satellite receiver to be checked within seconds – no fiddling about with a multimeter and bits of wire. The unit plugs into the receiver's LNB input socket. It employs three 5mm LEDs to give an instant, clear indication of the DC output voltage present, green for 13V (vertical polarisation), yellow for 17V (horizontal polarisation) and a third, red LED to indicate an output in excess of 22V. The latter can occur with some Amstrad receivers when there's a fault in the power supply: the last thing you want to do is to blow up your workshop LNB because a satellite receiver is defective.

The unit is small enough to be carried around in your pocket. In the event of signals of one polarisation not being available, you can decide instantly at the customer's home whether the cause of the fault is in the LNB or the receiver.

Circuit Description

The circuit used in the checker, which is self-powered from the receiver's LNB output, is shown in Fig. 1. When a channel with vertical polarisation has been selected, the receiver should provide a 13V output at its LNB F connector socket. In this condition ZD1 will conduct, Tr1 will switch on and LED1 will be illuminated. When a channel will horizontal polarisation has been selected, 17V should appear at the receiver's LNB socket. ZD2 will then conduct, switching Tr3 on to illuminate LED2. Tr2 will also switch on, connecting Tr1's base to chassis. As a result, Tr1 and LED1 cease to conduct. Thus what we have is a simple bistable circuit. Only one of these LEDs can light up at any time, giving a clear V or H indication.

If the LNB voltage is in excess of 22V, ZD3, Tr4 and LED3 will switch on. The red and yellow LEDs will then be illuminated. The red LED is designated O for an overload, and warns the user not to connect an LNB until the fault causing the excess voltage has been put right.

Construction and Testing

Construction is simplicity itself. I used a small piece of Veroboard, the fine track type, with 16 x 24 holes. A push-on F connector is used for connection with the LNB socket.

The unit should ideally be tested using a variable bench power supply. Increase its output voltage slowly. At 12·7V the green LED should light up. At 16·7V the yellow LED should light and the green LED should go out. At 22·7V the yellow LED should still be alight and the red LED should come on as well. If all is well, the unit is ready for service.

Parts required

Tr1-4	2SC1815
ZD1	12V, 400mW
ZD2	16V, 400mW
ZD3	22V, 400mW
LED1	5mm green LED (Farnell 178-310)
LED2	5mm yellow LED (Farnell 178-311)
LED3	5mm red LED (Farnell 472-293)
R1/3/5	1kΩ, 0·5W
R2/4/6	560Ω, 0·5W

Case, Farnell 645-680
0·15mm pitch Veroboard, 16 x 24 holes
Push-on F connector

The most expensive item in this project is the plastic case, which cost me 98p plus VAT. This gives an idea of the low cost of building the unit. I costed my prototype at just over £2.

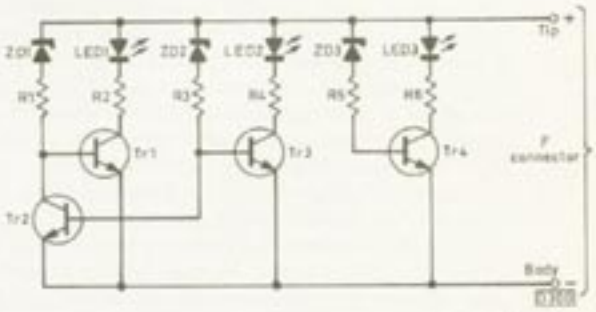

Fig. 1: Circuit diagram of the satellite TV polarisation checker.