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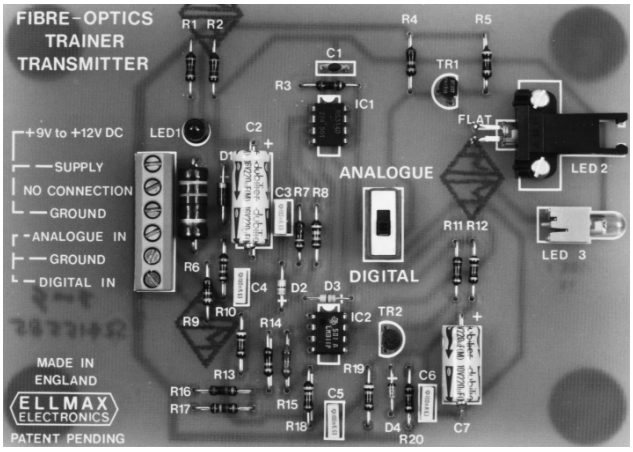
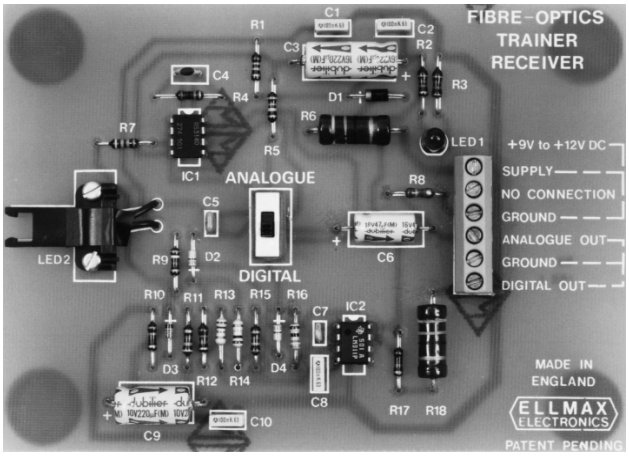
FIBRE-OPTICS TRAINER HIGHER BANDWIDTH OPTION





A unique product for assessing optical communications links

The Fibre-Optics Trainer Higher Bandwidth Option is a low-cost, single power supply, unhoused PCB-based product that has been designed for trying out low-speed analog (up to 300kHz) and/or digital (DC up to 500kBit/s) fiber-optics communications links and short-distance optical free-space communications links in order to assess the advantages of optical communications. The Trainer consists of an optical transmitter and receiver unit (both switchable between **analog** and **digital),** 5 metres of 1mm core diameter plastic optical cable terminated with AMP DNP connectors, a comprehensive manual, a carrying case, and two battery clips.

Two visible **red** LED light sources have been incorporated into the transmitter, one contained in an AMP DNP connector housing for fibre-optics links, and the other unhoused for short-distance free-space optical transmission links. A detailed and easy to follow explanation of the principles and applications of fibre-optics is given in the instruction manual.

Designed and Manufactured in the UK

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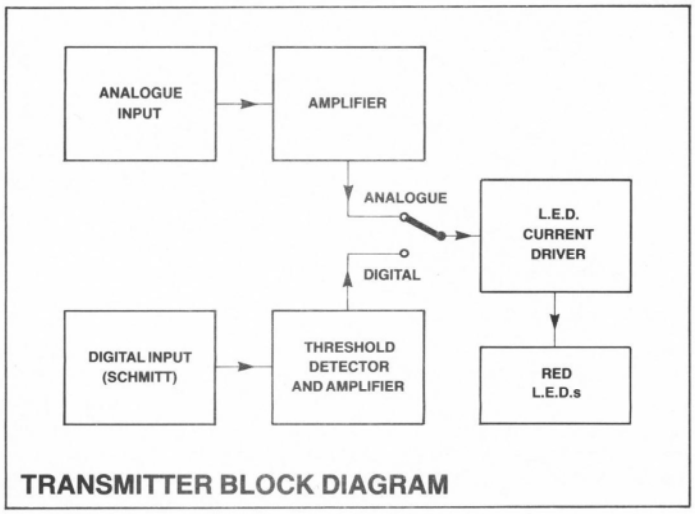
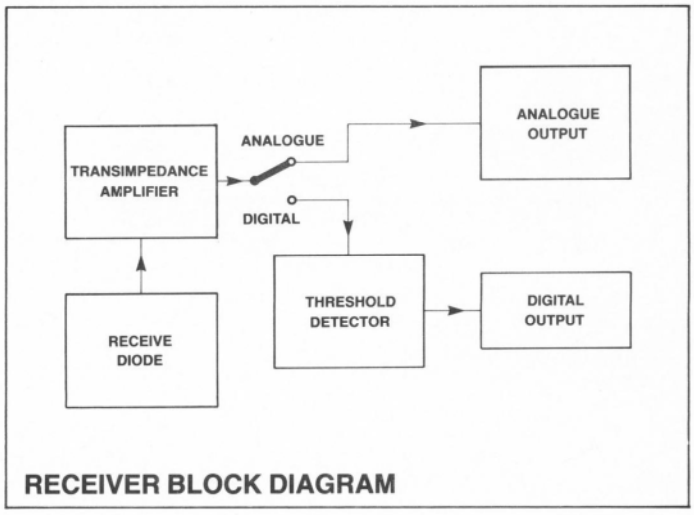
The following diagrams show the functions of the transmitter and receiver units in simplified form:





Specifications of the transmitter and receiver units:

a) Transmitter/Receiver Combination

Bandwidth:

Analogue: 20Hz to 300kHz
Digital: DC to 500kBit/s

Range for analogue transmission (better than 20dB S.N.R.): 19dB

Range for digital transmission (better than 1 in 10^9 error rate): 6dB

(The above transmission ranges are for 1mm diameter polymer fibre. As an example of transmission distance, low-cost plastic fibre with a loss of 0.2dB/m allows a transmission distance of over 25m.)

b) Transmitter

Typical power launched into 1mm plastic fibre: 20µW peak at 10V supply

Peak Output Wavelength: 650nm

Schmitt threshold levels: 1.15V and 1.6V

Digital Input Impedance: 10kΩ to ground

Phase of Digital Signal:
Input 'mark' (1) gives **no** light at output
Input 'space' (0) gives light at output

Maximum Transmitted Date Rate for less than 15% pulse width distortion: 500kBit/s

Input impedance at analogue socket: 40kΩ

Analogue frequency response: 7Hz to 500kHz

Phase of Analogue Signal: optical output inverted relative to input

c) Receiver

Photodiode type: Silicon p-i-n, sensitive area 1 x 1mm square

Digital Bandwidth for less than 30% pulse width distortion: DC to 500kBit/s

Minimum power for better than 1 in 10^9 error rate: 5µW peak at 650nm

Digital Output:
'space' = zero Volts
'mark' = Supply Voltage minus 1.5V

Output impedance:
'space': 47Ω
'mark': 470Ω

Phase of Digital signal:
Light at input gives 'space' at output
No light at input gives 'mark' at output

Maximum Pulse Width Distortion: 600nS

Analogue Frequency Response: 15Hz to 350kHz

Minimum Power for 20dB S.N.R: 250nW pp at 650nm

Typical analogue signal response: 0.037V per µW at 650nm

Analogue output impedance: 100Ω typical, AC coupled

Phase of Analogue Signal: inverted relative to optical input

Maximum signal at analogue output: 3V pp

Optical overload at 650nm:
a.c. overload on analogue: 200µW pp
d.c. overload on analogue: 100µW

d) Power supply

1. Transmitter +9V to +12V DC (current is 25mA typical at 9V)
2. Receiver +9V to +12V DC (current is 15mA typical at 9V)

e) Physical Characteristics

Dimensions: 14cm x 10cm for each unit

Operating Temperature Range: 0°C to 50°C

Optical Connectors: AMP DNP

Optical Cable: 5 metres of 1 mm core plastic fibre

While the information is true at the time of printing, small production changes in the course of the company's policy of improvement through research and design might not be indicated in these specifications

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