Fibre Optic Communications

Educator Kit ED-COM

COMPREHENSIVE LABORATORY BASED EDUCATIONAL PACKAGE IN OPTICAL FIBRE COMMUNICATION SYSTEMS

N.B. Oscilloscope not included

MAIN FEATURES AND BENEFITS:

- All fibre optic and optoelectronic hardware required to perform the experimental investigation
- Extensive literature support including: student and instructor's manuals with exercises, solutions & sample results
- Detailed lecture notes, tutorial examples and solutions to assist with the development of courses
- Saves significant course, literature and hardware development effort

THE EXPERIMENTAL INVESTIGATION* ADDRESSES:

- Transmitter (LED & Laser) characteristics
- Fibre attenuation & connector losses
- Step, impulse & frequency response of components and system
- Fibre dispersion (material & modal)
- Receiver noise & sensitivity
- System performance:
  - Attenuation limits
  - Bit rate / Bandwidth limits
  - Bit rate.Length Products
- System design studies

***Full details of the experiments and equipment specifications are provided overleaf**

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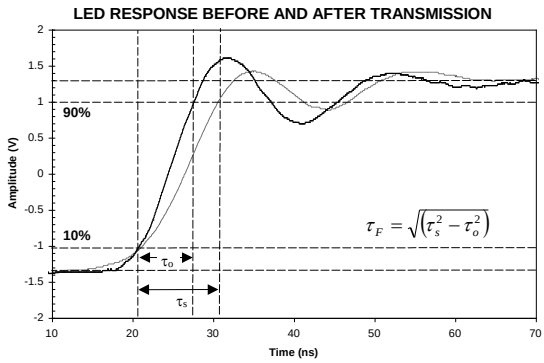
Laboratory Exercises

The ED-COM educator kit enables students to experimentally characterise all major components in a fibre optic communications link (i.e. LED and laser diode transmitter, the optical fibre and the receiver) and then investigate and compare the limits imposed on overall LED and laser system performance by attenuation and dispersion. A full list of the available laboratory exercises is as follows:

- Measurement of the characteristics of a LED and laser diode transmitter source including power versus drive current, bias points, and fibre launched power.
- Construction and investigation of a 1, 2 & 3km long point to point fibre optic communications link.
- Measurement of connector loss, fibre link length and examination of fibre attenuation coefficient at different source wavelengths.
- Determination of receiver noise and sensitivity.
- Calculation and comparison of attenuation limited link lengths for LED and laser systems.
- Time domain measurement of the LED and laser system bandwidth-distance product and bit rate-distance product using step function responses over 1, 2 & 3 km optical fibre links (see sample results below).



- Comparison and analysis of the LED and laser system bandwidth results.
- Frequency domain measurement of LED system bit rate / bandwidth.distance products and comparison with time domain results.
- Differentiation between the effects of inter-modal and intra-modal dispersion on LED and laser systems to calculate material and intermodal optical fibre dispersion coefficients.
- Assessment of the differences in system performance resulting from the use of either a LED or laser transmitter addressing such issues as launched power, source linewidth, source wavelength and their implications in terms of the observed fibre dispersion, bandwidth, bit rate-distance product, and attenuation limited link length.

Product Description

The OPTOSCI Fibre Optic Communications educator kit consists of the following hardware elements:

- 850nm ST connectorised LED transmitter with adjustable drive current (current reading displayed on an integral panel meter) and modulation signal input.
- 790nm ST connectorised laser diode transmitter with adjustable drive current (current reading displayed on an integral panel meter) and modulation signal input.
- 1km reel of ST connectorised graded index multi-mode optical fibre.
- 2km reel of ST connectorised graded index multi-mode optical fibre.
- Two 1m lengths of ST connectorised optical fibre patchcord.
- An ST bulkhead connector
- An ST connectorised Si photodiode receiver with BNC signal output and detected power displayed on an integral panel meter
- A waveform generator which can be switched between a 4MHz square wave pulse generator and a variable frequency (1 to 25 MHz) sine wave generator.
- An integrated power supply and all required electrical interconnects and RF cables.

In addition, a comprehensive literature package is supplied as follows:

- Student laboratory manual, describing the background theory and experimental procedure, with associated exercises to encourage the student to discuss the implications of their results.
- Instructor's manual dealing with all aspects of using the kit and providing sample results for the experiments and exercises.
- Extensive lecture notes on fibre optic communication systems covering the principles of all the issues dealt with in the laboratory exercises.
- A comprehensive set of tutorial examples and solutions.

Additional required equipment:

- A two channel laboratory oscilloscope with a minimum bandwidth of 50MHz.

Extension Modules

- BER(COM) is an add-on module to ED-COM allowing investigation of Eye Diagrams and BER in optical communication systems (see separate datasheet for full details).

Ordering Information

ED-COM	Fibre Optic Communications
BER(COM)	BER in Optical Communications

Since OPTOSCI are committed to continuously improving the design and performance characteristics of our products, these specifications are subject to change without notice.

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