DEGEM SYSTEMS

MDC-3231

Com & Telecom

Fiber Optics Training System

- Modern Communication
- Fiber Optic Communication
- Antennas
- Radar
- Cellular Communication
- Global Position Systems
- Satellite Communication
- Microwaves
- Telecommunication Networks

Fiber optic cables and components have revolutionized telephone and data communications systems all over the world. The OPCOM course has been specially designed to provide efficient, practical training exercises on reasonable cost training systems using state-of-the-art components, which help reinforce the student's comprehension of the related concepts. The student studies the important characteristics of fiber optic cables, digital and analog laser transmitters and receivers for 850nm multimode (MM), 1310nm and 1550nm single mode (SM) optical transmission, optical splitters and wave-division multiplexing devices.

The OPCOM training system consists of an active control board, a passive optics module and fiber optic cable module as well as a comprehensive instructional module designed to teach the fundamental concepts of fiber optic devices and data transmission systems to students in high schools, technical schools and colleges. The training system shows how analog and digital signals can be multiplexed and transmitted over a single wire or fiber optic link using WDM (wave division multiplexing).

Quick-connect optical connectors on all fiber optic cables and optical devices reduce set up time and protect these components from damage. Randomly inserted faults modify the circuits under test in the active module to provide valuable true-to-life troubleshooting exercises, which develop diagnostic skills.

Specifications

DESCRIPTION

The Fiber Optics training system consists of:

- EB-180 active control board
- Optical device module
- Fiber optic cables

The board dimensions are 234.5 x 220 mm and may be powered by either the PUZ-2000 base unit or an unregulated power supply. Connections to the various optical components and fiber optic cables are made by industry-standard, quick-connect SC or FC type connectors. The board is provided with plastic standoff protectors to protect the bottom side of the board, which is solder-masked. The printed circuit board can be stored in the supplied plastic binder for convenient storage.

EB-180 Active module

- Three digital transceivers: 850nm MM, 1310nm SM and 1550nm SM
- 1310nm analog laser diode
- Analog SM receiver
- FPGA controller
- Keyboard and LCD display

Passive optical module

- Optical splitter (50:50)
- Optical Splitter (80:20)
- Two WDM (1310nm, 1550nm)

Fiber optic cable module

- 1m multimode (MM) cable
- 1m single mode (SM) cable
- 100m MM cable
- 1000m SM cable

EXPERIMENTS

The following subjects are covered by the courseware:

- Scattering Measurement
- Attenuation Measurement
- Splitter Measurement – Loss, Splitting Ratio, Isolation
- WDM Measurement – Loss, Filtering, Isolation
- Dispersion Measurement
- Optical Sources and Transmitter Concept - Duty Cycle, Data Rate, Output
- Power, Rise/Fall Time,
- Digital Data Transmission: Ethernet, BER Measurement
- Optical Detector and Receiver Concepts - Photodiode Current Measurement
- WDM – Wavelength Division Multiplexing
- Data protection between 2 units
- Analog voice transmission

REQUIRED ACCESSORIES

- PUZ-2000 workstation
- Personal computer with MS Windows
- Digital multimeter
- Oscilloscope (100 MHz)

OPTIONAL ACCESSORIES

- Optical power meter
- Optical time domain reflectometer (OTDR)
- Microphone

INSTRUCTIONAL MATERIALS

The courseware and experiments were written by pedagogical experts who train technicians to diagnose multiplex systems in modern vehicles.