

BENCHMARK

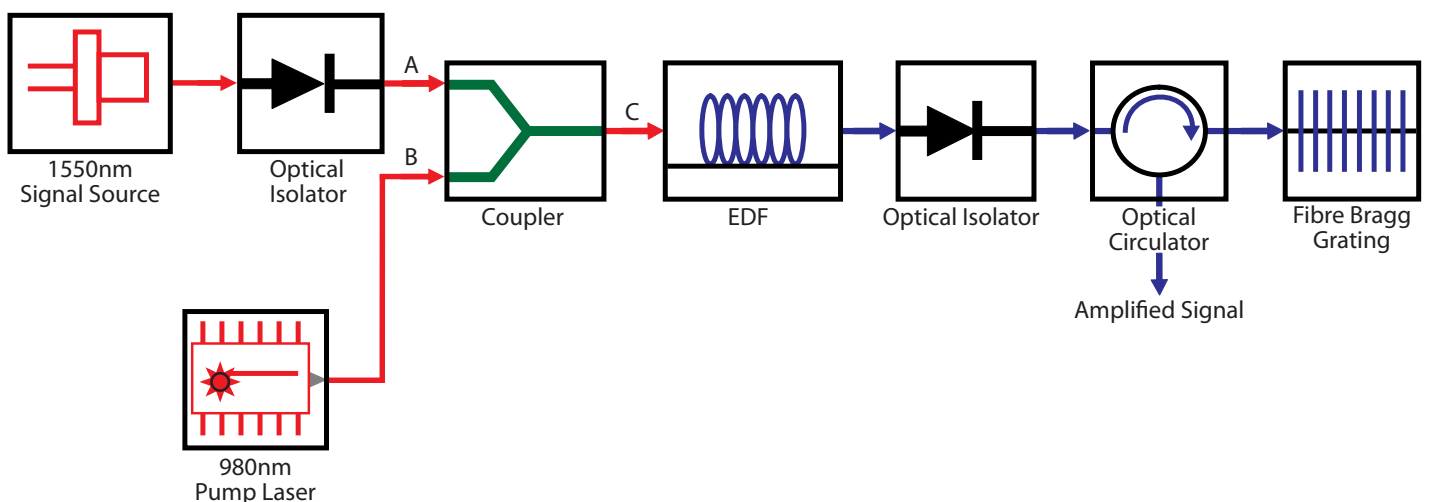


EDFA TRAINING SYSTEM



The **Erbium Doped Fibre Amplifier (EDFA)** is an optical amplifier that amplifies optical signals sufficiently enough to cover several tens of kilometers without any need for conventional repeaters. Moreover, as it works in the same optical domain, it avoids the need for several stages of signal conversion with their associated problems. Consequently, the EDFA finds extensive use in the fibre backbone.

The Benchmark ETS – EDFA Training System – addresses the need for a training setup that shows the building blocks of a typical EDFA as well as the characteristics of such blocks. All the blocks are given with proper input and output connections such that they can be configured in different modes of operation, such as co-directional and counter-directional operations. This modular approach also facilitates study of individual block characteristics wherever possible.



EXPERIMENTS

- **Understanding the operating principles of EDFA**
 - Working of EDFA in Co-Directional, Counter-Directional Pumping
 - Gain
 - Power Conversion Efficiency
 - Quantum Conversion Efficiency
 - ASE-ASE noise, Signal-ASE Beat Noise
- **Understanding the EDFA Building blocks**
 - Wavelength Selective couplers – 980nm/1550nm
 - Tap coupler for 980nm – 99:1
 - Optical Isolators – 1550nm
 - Optical Circulators
 - Fibre Bragg Grating (FBG)
 - Optical attenuator – 1550nm
- **Characteristics of EDFA**
 - Measurement of absorption coefficient
 - Mode field diameter mismatch in EDF
- **Characteristics study of Pump Laser 980nm**
 - I-P Curve
 - Knee Current
- **Characteristics study of Signal DFB Laser 1550nm (Module 001 required)**
 - I-P Curve
 - Knee Current
 - Spectrum [Optical Spectrum Analyser (OSA) also required]
- **Factors contributing to EDFA Gain – Pump Laser power, length of Erbium Doped Fibre (Module 001 required)**
 - Large and small I/P signal Vs Gain
 - Pump laser power Vs Gain
 - EDF length Vs Gain
 - Pump saturation
 - Signal saturation
- **Setting up a Fibre Optic link with EDFA**
 - 1550nm, 34Mbps Data rate (Module 001 required)
 - Setting up a digital link (using the Benchmark OFT)
- **Fibre Ring laser (OSA required)**
- **Noise Figure measurement (OSA required)**

LIST OF ITEMS

Erbium Doped Fibre (spliced)	3 different lengths
(unspliced)	1
Pump Laser 980nm, 100mW	1
Optical Isolator – 1550nm	2
Wavelength selective coupler (WDM), 980nm/1550nm	1
Tap Coupler, 980nm, 99:1	1
Single mode patch cords	8
FOSM-U1000e 1550nm DFB LD unit	1
Fibre Bragg Grating	1
Optical Circulator	1
Optical Attenuator 1550nm, 980nm	1 each
O/E converter for EDFA	1

SPECIFICATIONS

- **Pump Laser**
 - Wavelength 980nm
 - Output power 100mW (typ)
 - Output power adjustable 1μW to 100mW
- **DFB Signal Laser**
 - Wavelength 1550nm
 - Output power 1mW (typ)
 - SMSR >30dB
- **EDF**
 - C-Band single mode fibre
 - Peak absorption near 1530nm 6.0 ±1dB/m
 - Peak absorption near 980nm ≥3.0dB/m
 - Second mode cuto 920nm ±50nm
- **Optical isolator**
 - Operating wavelength 1550nm ±15nm
 - Isolation 30dB (typ)
 - Insertion loss 1dB (typ)
- **Wavelength selective coupler (WDM)**
 - Operating wavelength 980nm/1550nm (±10nm)
 - Insertion loss 1dB (typ)
 - Isolation 19dB (typ)
- **Optical Circulator**
 - No. of ports 3
 - Operating wavelength 1530-1570nm
 - Insertion loss 1dB (typ)
 - Isolation 35dB (typ)
- **Fibre Bragg Grating**
 - Bandwidth 20nm
 - Reflectivity 90%–95% (typ)

ORDERING INFORMATION

- **ETS – EDFA Training System**
 - Option A – with FOPM-102 handheld Fibre Optic Power Meter -Ge
 - Option B – with Series 2000-PM2002ST desktop Fibre Optic Power Meter -Ge
- **Module 001**
 - FOSM-D600 LD Driver, FOTX-610 LD Modulator, FORX-500 Optical Receiver

Specifications subject to change without notice