

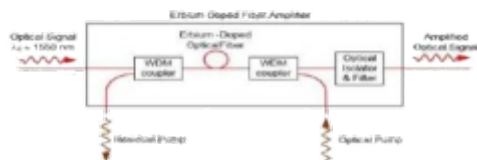


### Features

- EDFA System enables student to experimentally investigate the principles and characteristics of EDFA in C Band ( 1530nm – 1565 nm)
- Demonstrates amplification of 1550 nm wavelength along with the detection and measurement of amplified signal.
- Investigation and Analysis of Small and Large Signal Gain
- Facility to implement Forward and Backward Pumping and Study Gain Characteristics

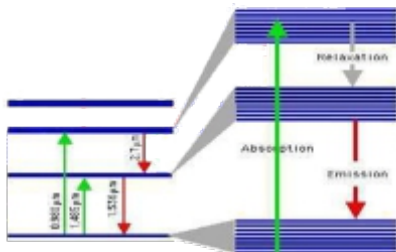
### Edfa block diagram

- 1550nm signal and 980nm pumped inside EDF
- 2:1 WDM system is used to combine pump and optical signal (1550nm)



- The Erbium atoms absorb 980nm pump signal and jump to higher energy state
- 1550nm strikes excited Er+3 ions and initiate Stimulated Emission
- 1550nm amplified by stimulated emission

### Amplification principle



- Figure above describe the energy level diagram for Er+3 ion
- 1480 nm pump excites Er+3 to quasi metastable stage
- Coincidentally, emits wavelengths in the range 1525- 1565nm range while returning back to ground state fromquasi-metastable stage
- This amplifies the signal by stimulated emission.

Note: Specifications are subject to change.

## Specifications

### Lasers @1550nm

- 1.25 Gbps Laser Diode Module at wavelength of 1550nm
- In Built Isolator
- Channel Spacing : 20 nm
- Threshold Current Ith : 10 mA Typical
- Output Power : @ Ith + 30 mA - > 0.7 mW @ ~ 58 mA-> 1.4 mW
- Operating Voltage : 1.1V Typical

### PUMP LASER@980nm

- Up to 100 / 150mW Uncooled 980nm Pump Module
- Maximum Operating Power : 100 / 150mW
- Maximum Operating Current : 340mA
- Center Wavelength : Min 970nm Max 980nm
- Optical Connector : SC/PC

### Optical Detector

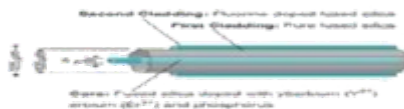
- 1.5 GHz InGaAs PIN Photodiode Module.
- Responsivity : Typical 0.9 A/Win 9/125 μm fiber
- Spectral Range : 1250nm to 1600nm
- Reverse Voltage : 30 V max.
- Optical Connector : SC/PC

### Wavelength Division Multiplexer

- Operating Wavelength(nm) : 980/1550
- Max. Insertion Loss (dB) : 0.20
- Isolation (dB) : >20
- Polarization Sensitivity(dB) : <0.05

### Erbium doped fiber

- The core of the fiber is doped with Erbium.
- In EDF fiber core acts as gain medium or Host



- MFD (Nominal) : 5.5 - 6.3um@1550nm
- Core NA : 0.21 - 0.24
- Cut - off Wavelength : 900 - 940nm
- C-Band Single Mode Fiber (1530 - 1565nm)
- Peak Absorption : 4.5-5.5 dB/m@980nm  
: 5.4-7.1 dB/m@1531nm

### Optical filter

- An optical filter is a device that selectively transmits light of different wavelengths, usually implemented as a glass plane or plastic device in the optical path, which are either dyed in the bulk or have interference coatings.



- Center Wavelength : 1550nm@ 2nm BW
- Pass bandwidth @0.5dB : 2.0nm
- Return Loss : ≥ 50dB

Note: Specifications are subject to change.

### Variable attenuator

- An optical attenuator, or fiber optic attenuator, is a device used to reduce the power level of an optical signal
- The power reduction is done by such means as absorption, reflection, diffusion, scattering, deflection, diffraction, and dispersion, etc. optical attenuators usually work by absorbing the light.



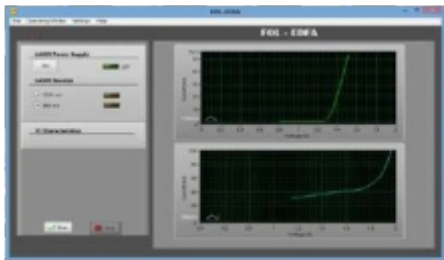
- Attenuation Range : 0.8 to 60dB
- Wavelength : 1550nm

### Software

- User friendly GUI for monitoring, controlling of EDFA system
- Operating modes like CW mode, VI characteristics mode, Internal & External Modulation
- LASER control like Supply ON/OFF, wavelength selection and driving current selection.
- Real time signal level monitoring of Photo-detector.
- Graphical representation : XY plot of VI characteristics and Internal Modulation
- COM Settings : USB 2.0

### Software interface

#### 1. Vi characterisation of pump and lasersource



- Above picture shows the VI characteristics of pump and source LASER.
- VI characteristics of both LASERs could be observed in the software by selecting VI characteristics in the Operating Mode option.

#### 2. Laser controls

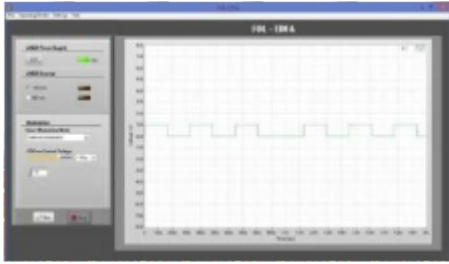


- Individual LASER voltage can be controlled using slider provided in software
- LASER voltage and corresponding LASER current is displayed on the screen

Note: Specifications are subject to change.

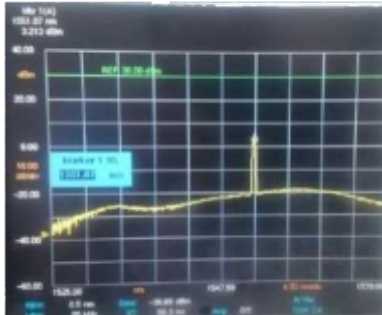


### 3. Modulation mode



- LASER voltage controls provided
- Select LASER on Left column
- Internal and External modulation options available
- 4 Modulation frequencies(100Hz, 200Hz,500Hz,1KHz) can be used
- Modulated signals displayed on graph in right column

### 4. Optical spectrum analyzer display



- Output Spectrum of EDF with Signal Source (1550nm)

### Accessories

- Shielded USB A-A cable : 01No
- Power Cable : 01No
- SC-SC Single Mode Fiber : 06No
- Optic Patch Chords
- BNC to BNC coaxial cable : 01No
- Software on CD : 01No
- FTDI Drivers
- Experimental Manual : 01No

Note: Specifications are subject to change.

