

# FTBx-3500

## VARIABLE ATTENUATOR



EXFO | MULTILINK

40G

100G

400G

Feature(s) of this product is/are protected by one or more of: US design patent D798,171 and equivalent(s) in other countries; and US design patent D842,144.

Ideal for transceiver testing and system verification in demanding 24/7 production environments.

### KEY FEATURES

Outstanding spectral uniformity

Ideal for BER testing and system verification

Integrated power monitoring options (on both singlemode and multimode models), for easy power setting and improved stability

Designed for 24/7 production, with minimal maintenance

Fast settling time for optimized efficiency

### RELATED PRODUCTS



Rackmount platform  
ITR-8



Power meter  
FTBx-1250



MEMS optical switch  
FTBx-9160

EXFO

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## A FULLY PROGRAMMABLE SOLUTION

Network equipment manufacturers and transceiver manufacturers know that variable attenuators are essential components of their test systems. They look for performance, user-friendliness, complete control of test parameters and advanced programming capability. EXFO's FTBx-3500 variable attenuator combines innovative design techniques, high-quality components and meticulous calibration procedure.

### Option: Automatic power monitoring

The power monitoring option allows the attenuator output power level to be set directly. When enabled, this function ensures power stability, even if the source power fluctuates. This option also simplifies test setups, eliminating the need for an external power meter.

### Rugged and reliable

Flexible, fully programmable and built for both singlemode and multimode applications, the FTBx-3500 features an extremely rugged design allowing 24/7 operation for years without maintenance.

The attenuating filter technology used in the FTBx-3500 makes it ideal for multimode BER and transceiver testing.



Figure 1. With or without the power monitoring option, the FTBx-3500 module occupies just a single slot.

### RECEIVER SENSITIVITY TESTING

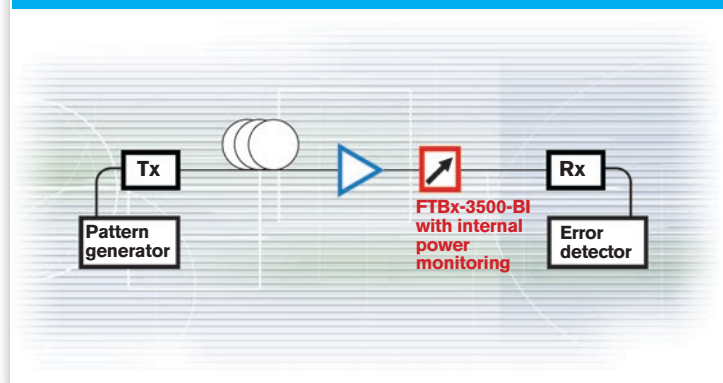


Figure 2. Typical receiver sensitivity setup

Featuring integrated power monitoring, the FTBx-3500-BI allows you to precisely control the amount of power your receiver (Rx) under test detects, thereby enabling you to achieve proper BER measurements. The FTBx-3500-CI or FTBx-3500-DI enable similar characterization for multimode applications.

When calibrating your system, you can choose between two offsets. The first is wavelength-independent and can be used to account for loss in the test setup, if applied to the attenuation or power setting. The second offset acts as a calibration factor, ensuring wavelength-specific correction levels and compensating for loss due to patchcords and connectors.

| SPECIFICATIONS <sup>a</sup> |   |                    | WITHOUT POWER MONITORING | WITH POWER MONITORING |
|-----------------------------|---|--------------------|--------------------------|-----------------------|
| Singlemode configurations   | FTBx-3500-B   |                    | FTBx-3500-BI             |                       |
|                             | Fiber type (μm)   |                    | 9/125                    | 9/125                 |
|                             | Wavelength range (nm)                                     |                    | 1250 to 1650             | 1250 to 1650          |
|                             | Maximum attenuation <sup>b</sup> (dB)                     |                    | ≥ 65                     | ≥ 65                  |
|                             | Insertion loss <sup>c,d</sup> (dB)                        | Typical<br>Maximum | 1.0<br>1.5               | 1.5<br>2.2            |
|                             | Attenuation setting resolution (dB), typical              |                    | 0.002                    | 0.002                 |
|                             | Attenuation linearity <sup>e</sup> (dB)                   |                    | ±0.1                     | ±0.1                  |
|                             | Attenuation repeatability <sup>f</sup> (dB), typical      |                    | ±0.01                    | ±0.01                 |
|                             | Spectral uniformity, 1510 nm to 1605 nm <sup>g</sup> (dB) |                    | ±0.05                    | ±0.05                 |
|                             | Spectral uniformity, 1450 nm to 1630nm <sup>g</sup> (dB)  |                    | ±0.09                    | ±0.09                 |
|                             | Power meter linearity <sup>h</sup> (dB)                   |                    | N/A                      | ±0.03                 |
|                             | Power setting repeatability <sup>f</sup> (dB), 2σ         |                    | N/A                      | ±0.035                |
|                             | PDL <sup>i</sup> (dB) peak-to-peak                        |                    | 0.15                     | 0.2                   |
|                             | Return loss <sup>c,j</sup> (dB), typical                  |                    | 60                       | 60                    |
|                             | Max. input power (dBm)                                    |                    | 23                       | 23                    |
|                             | Transition speed (ms), typical <sup>k</sup>               | 1 dB<br>10 dB      | ≤ 160<br>≤ 515           | ≤ 160<br>≤ 515        |
|                             | Shutter isolation (dB), typical                           |                    | ≥ 100                    | > 100                 |
| Multimode configurations    | FTBx-3500-C, D  |                    | FTBx-3500-CI, DI         |                       |
|                             | Fiber type (μm)   |                    | 50/125, 62.5/125         | 50/125, 62.5/125      |
|                             | Wavelength range (nm)                                     |                    | 700 to 1350              | 700 to 1350           |
|                             | Maximum attenuation (dB), typical                         |                    | ≥ 60                     | ≥ 60                  |
|                             | Insertion loss <sup>c,d</sup> (dB)                        | Typical<br>Maximum | 1.3<br>2.0               | 1.5<br>3.0            |
|                             | Attenuation setting resolution (dB), typical              |                    | 0.002                    | 0.002                 |
|                             | Attenuation linearity <sup>e</sup> (dB)                   |                    | ±0.1                     | ±0.1                  |
|                             | Attenuation repeatability <sup>f</sup> (dB), typical      |                    | ±0.01                    | ±0.01                 |
|                             | Power meter linearity <sup>l</sup> (dB)                   |                    | N/A                      | ±0.03                 |
|                             | Power setting repeatability <sup>f</sup> (dB), 2σ         |                    | N/A                      | ±0.035                |
|                             | Return loss <sup>c,j</sup> (dB), typical                  |                    | 40                       | 40                    |
|                             | Max. input power (dBm)                                    |                    | 20                       | 20                    |
|                             | Transition speed (ms), typical <sup>k</sup>               | 1 dB<br>10 dB      | ≤ 160<br>≤ 515           | ≤ 160<br>≤ 515        |
|                             | Shutter isolation (dB), typical                           |                    | > 100                    | > 100                 |

a. At 23 °C ± 1 °C.

b. At 1550 nm and below.

c. Measured at 1310 nm and 1550 nm for singlemode units, measured at 850 nm for multimode units.

d. Excluding connectors.

e. Measured at 1310 nm and 1550 nm (up to 40 dB) for singlemode units and at 850 nm and 1300 nm (up to 45 dB) for multimode units, with non-polarized light.

f. Up to 40 dB attenuation.

g. For 20 dB attenuation, relative to 0 dB attenuation.

h. At 1550 nm, after a 30-minute warm-up and an offset nulling, for an input power between 20 dBm and -40 dBm.

i. Up to 20 dB attenuation at 1550 nm.

j. For FC/APC connectors.

k. Including platform processing time.

l. At 1300 nm, after a 30-minute warm-up and an offset nulling, for an input power between 17 dBm and -40 dBm.

## GENERAL SPECIFICATIONS

|                      |   |
|----------------------|---|
| Size (H x W x D)     | 25 mm x 159 mm x 175 mm (1 in x 6 1/4 in x 6 7/8 in)                  |
| Weight               | 0.67 kg (1.47 lb)   |
| Temperature          | Operating<br>Storage  |
|                      | 0 °C to 40 °C (32 °F to 104 °F)<br>-40 °C to 70 °C (-40 °F to 158 °F) |
| Relative humidity    | 0 % to 80 % non-condensing  |
| Instrument drivers   | IVI drivers and SCPI commands   |
| Remote control       | With LTB-8: GPIB (IEEE 488.1, IEEE488.2) and Ethernet                 |
| Standard accessories | User guide, certificate of compliance and certificate of calibration  |

## ORDERING INFORMATION

## FTBx-3500-XX-XX

## Model

B = Singlemode 9/125 µm  
 BI = Singlemode 9/125 µm with power monitoring  
 C = Multimode 50/125 µm  
 CI = Multimode 50/125 µm with power monitoring  
 D = Multimode 62.5/125 µm  
 DI = Multimode 62.5/125 µm with power monitoring

Example: FTBx-3500-BI-EI-EUI-98

## Connector adapter

EI-EUI-28 = UPC/DIN 47256  
 EI-EUI-76 = UPC/HMS-10/AG  
 EI-EUI-89 = UPC/FC narrow key  
 EI-EUI-90 = UPC/ST  
 EI-EUI-91 = UPC/SC  
 EI-EUI-95 = UPC/E-2000  
 EI-EUI-98 = UPC/LC  
 EA-EUI-28 = APC/DIN 47256 <sup>a</sup>  
 EA-EUI-89 = APC/FC narrow key <sup>a</sup>  
 EA-EUI-91 = APC/SC <sup>a</sup>  
 EA-EUI-95 = APC/E-2000 <sup>a</sup>  
 EA-EUI-98 = APC/LC <sup>a</sup>

a. Available only for singlemode models.

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