



## DESCRIPTION

The 10 GbE Small Form-Factor Pluggable Long Reach DWDM Extended Temperature XFP (LR-2 XFP) is a fully duplex serial electric, serial optic device with both transmit and receive functions contained in a single module that provides a high speed serial link at 10 Gb/s. The LR-2 XFP operates on Optical Channel 23 (1558.98 nm). Installed in the appropriate host module, the LR-2 XFP provides a 10 Gigabit interface to the supporting system.

The transmit side of the LR-2 XFP converts serial NRZ electrical data at the 10 Gb/s line rate to a standard compliant optical signal. The receive side converts the incoming DC balanced serial NRZ optical data at the 10 Gb/s line rate into serial electrical data.

## NOTE

To ensure compatibility, refer to the documentation provided with the host module.

The following features are supported on the LR-2 XFP:

- ◆ 1558.98 nm optical signals for up to 80 km reach
- ◆ Low power consumption (<3.5 W max)
- ◆ Bit error rate  $10^{-12}$

## CAUTION

Due to compliance certification requirements, use only SFPs/XFPs supplied by ADTRAN with the host module. ADTRAN cannot certify system integrity with other SFPs.

## OPERATIONAL SPECIFICATIONS

- ◆ Transmit Wavelength: 1558.98 nm (Channel 23)
- ◆ Receive Wavelength: 1270 to 1600 nm
- ◆ Data Rate: 9.95 Gb/s to 11.35 Gb/s
- ◆ Optical transmit levels: -1.0 to +3.0 dBm
- ◆ Optical receive level: -22.0 to -7.0 dBm
- ◆ Minimum Span Attenuation: 10 dB
- ◆ Optical distance: 80 km maximum
- ◆ Optical connectors: LC
- ◆ Extended Environmental Support:
  - ◇ Operational temperature range: -5°C to +60°C
  - ◇ Storage temperature range: -40°C to +85°C
  - ◇ Relative humidity to 85%, noncondensing

## INSTALLATION

To install the LR-2 XFP into an appropriate module, complete the following steps:

1. Inspect the LR-2 XFP. If damaged, file a claim with the carrier and then contact ADTRAN Customer Support.

## CAUTION

Do not remove the protective end cap from the XFP until the fiber optic cable is ready to be connected.

2. Insert the LR-2 XFP into the SFP cage on the module. Ensure that the manufacturer's label on the SFP is facing upward for correct installation.
3. Slide the LR-2 XFP all the way into the receptacle until there is an audible "click".

## NOTE

The latch on the LR-2 XFP is used to remove the XFP from the cage on the circuit card.

## SAFETY AND REGULATORY COMPLIANCE

### ⚠ CAUTION

Electrostatic Discharge (ESD) can damage electronic modules. When handling modules, wear an antistatic discharge wrist strap to prevent damage to electronic components. Place modules in antistatic packing material when transporting or storing. When working on modules, always place them on an approved antistatic mat that is electrically grounded.

The LR-2 XFP meets or exceeds all the applicable requirements of NEBS, Telcordia GR-63-CORE, GR-1089-CORE, and ETSI EN 300368. The LR-2 XFP is intended for deployment in Central Office type facilities, EECs, EECs, and locations where the NEC applies (for example, Customer Premises).

The LR-2 XFP is to be installed in ADTRAN products in Restricted Access Locations only, and installed by trained service personnel.

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference
2. This device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by ADTRAN could void the user's authority to operate this equipment.

### ⚠ CAUTION

- ◆ Per GR-1089-CORE the ADTRAN system that the LR-2 XFP is being deployed in is designed and intended for installation as part of a Common Bonding Network (CBN). The ADTRAN system that the LR-2 XFP is being deployed in is not designed nor intended for installation as part of an Isolated Bonding Network (IBN).
- ◆ Per GR-1089-CORE Section 9, the LR-2 XFP does not have an internal DC connection between battery return and frame ground. The LR-2 XFP can be installed in a DC-I (isolated) or DC-C (common) installation. For installations where other cards or the host system have internal connections between battery return and frame ground, the system would be intended for deployment only in a DC-C installation.
- ◆ The ADTRAN system chassis frame ground terminal must be connected to a reliable earth ground to ensure that the metal enclosure of the LR-2 XFP is properly grounded through the backplane connector.
- ◆ The 10 GgE LR-2 Channel 23 (1558.98 nm) DWDM 80 km Extended Temperature XFP is a Class 1 Laser Product and complies with the Laser Safety requirements of FDA 21 CFR 1040.11, EN60825-1, and EN60825-2. The LR-2 XFP is NRTL Listed and CB Certified to all applicable American and European safety standards.

### NOTE

- ◆ The Gigabit Ethernet port(s) are optical and therefore are not classified as any type of port as defined in Appendix B of GR-1089-CORE Issue 5.
- ◆ This LR-2 XFP is compliant with SFF-8472 "Digital Diagnostics Monitoring Interface for Optical Transceivers," Revision 9.3.
- ◆ This LR-2 XFP is compliant with the XFP Multi-Source Agreement (MSA).
- ◆ This LR-2 XFP is designed to be deployed in GR-3108-CORE environmental class 1 or 2 as defined in GR-3108-CORE Issue 2.

The LR-2 XFP is designed to meet the following environmental classes:

- ◆ ETSI EN 300 019-1-1 "Classification of environmental conditions; Storage," Class 1.2
- ◆ ETSI EN 300 019-1-2 "Classification of environmental conditions; Transportation," Class 2.3
- ◆ ETSI EN 300 019-1-3 "Classification of environmental conditions; Stationary use at weather-protected locations," Class 3.3

The equipment is designed to function without degradation during exposure to all test severities per Class 3.3.

The 10 GgE LR-2 Channel 23 (1558.98 nm) DWDM 80 km Extended Temperature XFP meets EU RoHS Directive 2002/95/EC and/or applicable exemptions. Refer to [www.adtran.com](http://www.adtran.com) for further information on RoHS/WEEE.

**Warranty:** ADTRAN will replace or repair this product within the warranty period if it does not meet its published specifications or fails while in service. Warranty information can be found online at [www.adtran.com/warranty](http://www.adtran.com/warranty).

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