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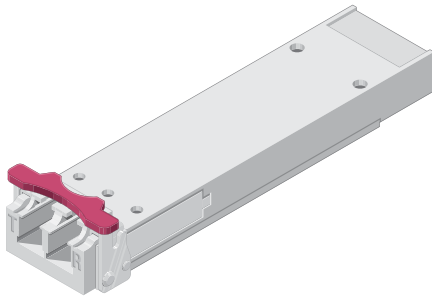
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ADTRAN offers training courses on our products, including customized training and courses taught at our facilities or at customer sites.

For inquiries, go to: <http://adtran.com/training>

The following documents provide additional information for this product:  
*SFP/XFP/SFP+ Compatibility Matrix and Engineering Guide*



## DESCRIPTION

The Small Form-Factor Pluggable Small Form-Factor Pluggable Long Reach 11.3 Gbps LR-2 DWDM 80 km XFP is a full duplex serial electric, serial optic device with both transmit and receive functions contained in a single module. These XFPs support operations over a wide temperature range, and are suitable for use in outside plant environments. They provide a high speed serial link of up to 11.3 Gbps to support SONET/SDH (OC192/STM64), Ethernet (10 GE), OTN (OTU2/OTU2e) and Fibre Channel (10 G FC). The LR-2 XFP operates on various optical channels. 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 Gbps 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.

Refer to the table on page 2 for the part numbers, channels and wave lengths supported by these XFPs.

### NOTE

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

## FEATURES

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

- Optical signals for up to 80 km reach
- Low power consumption (<3.5 W max)

### CAUTION

Due to compliance certification requirements, only SFP supplied by ADTRAN are to be used with the host module. ADTRAN cannot certify system integrity with other SFP.

## INSTALLATION

Before installation, inspect the LR-2 XFP. If damage has occurred during shipping, file a claim with the carrier, and then contact ADTRAN Customer Support. For more information, refer to "Warranty".

### Installation Guidelines

The following are guidelines for this installation.

- The latch on the LR-2 XFP is for removal only. When removing the LR-2 XFP, rotate the latch away from the LR-2 XFP. The LR-2 XFP should slide easily out of the cage.
- It is recommended that the connector plug remain on whenever the transceiver optical fiber connector is not inserted.

### Installation Steps

To install the LR-2 XFP, complete the following steps:

1. Insert the LR-2 XFP into the SFP cage on the circuit board of the host module with the latch handle facing outward. Slide the LR-2 XFP all the way into the cage.
2. Exert adequate pressure to ensure the LR-2 XFP is completely seated in the LR-2 XFP cage.
3. Do not remove the connector plug until the optical fiber connection is made.
4. Continue the installation and turn-up of the host module.

## SUPPORTED MODULES

This Job Aid supports the modules listed in the following table:

Channel Number	Wave Length	Part Number	CLEI
Channel 17	1563.86 nm	1442982G8	BVL3AUMD_ _
Channel 18	1563.05 nm	1442982G9	BVL3AUND_ _
Channel 19	1562.23 nm	1442983G1	BVL3AUPD_ _
Channel 20	1561.42 nm	1442983G2	BVL3AURD_ _
Channel 21	1560.61 nm	1442981G1	BVL3AT5D_ _
Channel 22	1559.79 nm	1442981G2	BVL3AT6D_ _
Channel 23	1558.98 nm	1442981G3	BVL3AT7D_ _
Channel 24	1558.17 nm	1442981G4	BVL3AT8D_ _
Channel 25	1557.36 nm	1442981G5	BVL3AT9D_ _
Channel 26	1556.55 nm	1442981G6	BVL3AUAD_ _
Channel 27	1555.75 nm	1442981G7	BVL3AUBD_ _
Channel 28	1554.94 nm	1442981G8	BVL3AUCD_ _
Channel 29	1554.13 nm	1442981G9	BVL3AUDD_ _
Channel 30	1553.33 nm	1442982G1	BVL3AUED_ _
Channel 31	1552.52 nm	1442982G2	BVL3AUFD_ _
Channel 32	1551.72 nm	1442982G3	BVL3AUGD_ _
Channel 33	1550.92 nm	1442982G4	BVL3AUHD_ _
Channel 34	1550.12 nm	1442982G5	BVL3AUJD_ _
Channel 35	1549.32 nm	1442982G6	BVL3AUKD_ _
Channel 36	1548.51 nm	1442982G7	BVL3AULD_ _
Channel 37	1547.72 nm	1442983G3	BVL3AUSD_ _
Channel 38	1546.92 nm	1442983G4	BVL3AUTD_ _
Channel 39	1546.12 nm	1442983G5	BVL3AUUD_ _
Channel 40	1545.32 nm	1442983G6	BVL3AUVD_ _
Channel 41	1544.53 nm	1442983G7	BVL3AUWD_ _
Channel 42	1543.73 nm	1442983G8	BVL3AUXD_ _
Channel 43	1542.94 nm	1442983G9	BVL3AUYD_ _
Channel 44	1542.14 nm	1442986G1	BVL3AUZD_ _
Channel 45	1541.35 nm	1442986G2	BVL3AU0D_ _
Channel 46	1540.56 nm	1442986G3	BVL3AU1D_ _
Channel 47	1539.77 nm	1442986G4	BVL3AU2D_ _
Channel 48	1538.98 nm	1442986G5	BVL3AU3D_ _
Channel 49	1538.19 nm	1442986G6	BVL3AU4D_ _
Channel 50	1537.40 nm	1442986G7	BVL3AU5D_ _
Channel 51	1536.61 nm	1442986G8	BVL3AU6D_ _
Channel 52	1535.82 nm	1442986G9	BVL3AU7D_ _
Channel 53	1535.04 nm	1442987G1	BVL3AU8D_ _
Channel 54	1534.25 nm	1442987G2	BVL3AU9D_ _
Channel 55	1533.47 nm	1442987G3	BVL3AVAD_ _
Channel 56	1532.68 nm	1442987G4	BVL3AVBD_ _
Channel 57	1531.90 nm	1442987G5	BVL3AVCD_ _
Channel 58	1531.12 nm	1442987G6	BVL3AVDD_ _
Channel 59	1530.33 nm	1442987G7	BVL3AVED_ _
Channel 60	1529.55 nm	1442987G8	BVL3AVFD_ _

## SPECIFICATIONS

- Channel Spacing: 100 GHz
- Data Rate: 9.95 Gbps to 11.35 Gbps
- Optical distance: 80 km maximum
- Transmit Wavelength: See Supported Modules Table
- Receive Wavelength: 1270 to 1600 nm
- Optical transmit levels: -1.0 to +3.0 dBm
- Spectral width: 1 nm
- Extinction Ratio: 8.2 dB
- Max Optical receive level: -7.0 dBm
- Receiver Damage Threshold: -7.0 dBm
- Optical Path Penalty: 2 dB
- Receive Sensitivity:
  - ◆ -24 dBm @ 9.95 Gbps, 10e-12 BER
  - ◆ -28 dBm @ 10.7 Gbps, 10e-4 BER
  - ◆ -27 dBm @ 11.1 Gbps, 10e-4 BER
  - ◆ -26.5 dBm @ 11.35 Gbps, 10e-4 BER
- OSNR (Dispersion -360 to 1440 ps/nm)
  - ◆ -25.5 dB @ 9.95 Gbps, 10e-12BER
  - ◆ -20 dB @ 10.7 Gbps, 10e-4BER
  - ◆ -20 dB @ 11.1 Gbps, 10e-4BER
  - ◆ -21 dB @ 11.35 Gbps, 10e-4BER
- Minimum Span Attenuation: 10 dB
- Optical Budget
  - ◆ 21 dB @ 9.95 Gbps, 10e-12BER
  - ◆ 25 dB @ 10.7 Gbps, 10e-4BER
  - ◆ 24 dB @ 11.1 Gbps, 10e-4BER
  - ◆ 23.5 dB @ 11.35 Gbps, 10e-4BER
- Dispersion Tolerance: -360 to 1440 ps/nm
- Optical connectors: LC
- Extended Environmental Support:
  - ◆ Operational temperature range: -40°C to +85°C
  - ◆ Storage temperature range: -40°C to +85°C
- Relative humidity up to 85%, noncondensing

## SAFETY AND REGULATORY COMPLIANCE

### ⚠ WARNING

Read all warnings and cautions before installing or servicing this equipment.

### ⚠ CAUTION

This product uses a Class 1 Laser module that complies with 21 CFR 1040.10 and 1040.11 and IEC 60825-1 and -2. For continued compliance with the above standards, install only ADTRAN-approved Class 1 Laser Modules in this product. For a list of ADTRAN-approved SFPs and XFPs, see [adtran.com>support>support community>search SFP/XFP](http://adtran.com>support>support community>search SFP/XFP). ADTRAN cannot certify system integrity with other laser modules

### ⚠ 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.
- Per GR-1089-CORE this product is designed and intended for installation as part of a Common Bonding Network (CBN). This product is not designed nor intended for installation as part of an Isolated Bonding Network (IBN).
- Per GR-1089-CORE Section 9, this product does not have an internal DC connection between -48 VR and frame ground. This product 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 -48 VR and frame ground, the system would be intended for deployment only in a DC-C installation.
- The chassis frame ground terminal must be connected to an earth ground to ensure that the metal enclosure of the SFP/XFP is properly grounded via the backplane connector.

### 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.
- This product is compliant with SFF-8472 *Digital Diagnostics Monitoring Interface for Optical Transceivers*, Revision 9.3.
- This product is compliant with the XFP Multi-Source Agreement (MSA).
- This product is designed to be deployed in GR-3108-CORE environmental Class 1 and 2 as defined in GR-3108-CORE.

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

This product 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.

This product 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 weatherprotected locations", Class 3.3

This product is designed to function without degradation during exposure to all test severities per Class 3.3 of ETSI EN 300 019-1-3.

This product 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.



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**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).



**ADTRAN CUSTOMER CARE:**  
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