



## DESCRIPTION

The Small Form-Factor Pluggable Long Reach 10 GigE LR-2 DWDM 80 km Extended Temperature XFP is a full duplex serial electric, serial optic device with both transmit and receive functions contained in a single module. It provides a high speed serial link at 10 Gbps. The LR-2 XFP operates on various optical channels. Refer to the table in the next column for the part numbers, channels and wave lengths supported by this Job Aid. 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 Gbps 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:

- 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 XFPs supplied by ADTRAN with the host module. ADTRAN cannot certify system integrity with other XFPs.

## SUPPORTED MODULES

Channel	Wave Length	Part Number	CLEI
Channel 17	1563.86 nm	1442982G8C	BVL3ARZD__
Channel 18	1563.05 nm	1442982G9C	BVL3AR0D__
Channel 19	1562.23 nm	1442983G1C	BVL3AR2D__
Channel 20	1561.42 nm	1442983G2C	BVL3AR3D__
Channel 21	1560.61 nm	1442981G1C	BVL3AJJD__
Channel 22	1559.79 nm	1442981G2C	BVL3AJLD__

Channel	Wave Length	Part Number	CLEI
Channel 23	1558.98 nm	1442981G3C	BVL3AJMD__
Channel 24	1558.17 nm	1442981G4C	BVL3AJND__
Channel 25	1557.36 nm	1442981G5C	BVL3AJPD__
Channel 26	1556.56 nm	1442981G6C	BVL3AJRD__
Channel 27	1555.75 nm	1442981G7C	BVL3AJSD__
Channel 28	1554.94 nm	1442981G8C	BVL3AJTD__
Channel 29	1554.13 nm	1442981G9C	BVL3AJUD__
Channel 30	1553.33 nm	1442982G1C	BVL3AJVD__
Channel 31	1552.52 nm	1442982G2C	BVL3AJWD__
Channel 32	1551.72 nm	1442982G3C	BVL3AJXD__
Channel 33	1550.92 nm	1442982G4C	BVL3AJYD__
Channel 34	1550.12 nm	1442982G5C	BVL3AJZD__
Channel 35	1549.32 nm	1442982G6C	BVL3AJ0D__
Channel 36	1548.52 nm	1442982G7C	BVL3AJ1D__
Channel 37	1547.72 nm	1442983G3C	BVL3AR4D__
Channel 38	1546.92 nm	1442983G4C	BVL3AR5D__
Channel 39	1546.12 nm	1442983G5C	BVL3AR6D__
Channel 40	1545.32 nm	1442983G6C	BVL3AR7D__
Channel 41	1544.53 nm	1442983G7C	BVL3AR8D__
Channel 42	1543.73 nm	1442983G8C	BVL3AR9D__
Channel 43	1542.94 nm	1442983G9C	BVL3ASAD__
Channel 44	1542.14 nm	1442986G1C	BVL3ASBD__
Channel 45	1541.35 nm	1442986G2C	BVL3ASCD__
Channel 46	1540.56 nm	1442986G3C	BVL3ASDD__
Channel 47	1539.77 nm	1442986G4C	BVL3ASED__
Channel 48	1538.98 nm	1442986G5C	BVL3ASFD__
Channel 49	1538.19 nm	1442986G6C	BVL3ASGD__
Channel 50	1537.40 nm	1442986G7C	BVL3ASHD__
Channel 51	1536.61 nm	1442986G8C	BVL3ASJD__
Channel 52	1535.82 nm	1442986G9C	BVL3ASKD__
Channel 53	1535.04 nm	1442987G1C	BVL3ASLD__
Channel 54	1534.25 nm	1442987G2C	BVL3ASMD__
Channel 55	1533.47 nm	1442987G3C	BVL3ASND__
Channel 56	1532.68 nm	1442987G4C	BVL3ASPD__
Channel 57	1531.90 nm	1442987G5C	BVL3ASRD__
Channel 58	1531.12 nm	1442987G6C	BVL3ASSD__
Channel 59	1530.33 nm	1442987G7C	BVL3ASTD__
Channel 60	1529.55 nm	1442987G8C	BVL3ASUD__

## 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 XFP cage on the module. Ensure that the manufacturer label on the XFP 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

Use the latch on the LR-2 XFP to remove the XFP from the XFP cage mounted on the printed circuit board.

## OPERATIONAL SPECIFICATIONS

### General

- Module type: XFP
- Fiber/Copper: SMF
- Signal data rate: 9.95 Gbps to 11.3 Gbps
- Optical Connector: LC
- Distance: 80 km maximum

### Optical

- Transmitter:
  - ◆ Channel Spacing: 100 GHz
  - ◆ Transmit Wavelength: See table
  - ◆ Spectral width: 1 nm maximum
  - ◆ Minimum Span Attenuation: 10 dB
  - ◆ Extinction Ratio: 8.2 dB
  - ◆ Dispersion Tolerance: 1450 ps/nm
  - ◆ Optical Path Penalty:
    - 2.5 dB (10.52 Gbps)
    - 3 dB (11.1 Gbps)
    - 3.5 dB (11.35 Gbps)
  - ◆ Optical Budget:
    - 20.5 dB (with 2.5 dB path penalty)
    - 19.5 dB (with 3.5 dB path penalty)
  - ◆ Power Dissipation: 2W maximum
  - ◆ Optical transmit level: 0 to +4.0 dBm
- Receiver:
  - ◆ Receive Wavelength: 1270 to 1600 nm
  - ◆ Optical receive level sensitivity: -7.0 dBm to -23.0 dBm
  - ◆ Receiver Damage Threshold: -7.0 dBm

### Environmental

- Controlled Protected Environment (Inside)
- Operational temperature range: -5°C to +55°C
- Storage temperature range: -40°C to +85°C
- Relative humidity 5 to 85%

## SAFETY AND REGULATORY

### 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, IEC 60825-2, EN 60825-1 and EN 60825-2. For continued compliance with the above standards, only approved Class 1 laser modules from an ADTRAN approved vendor list (located on the ADTRAN website) should be installed in this product. 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 battery return 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 battery return 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 front panel of the module 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 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 weather-protected locations," Class 3.2
- The equipment is designed to function without degradation during exposure to all test severities per Class 3.2.
- This product meets EU RoHS Directive. Refer to [www.adtran.com](http://www.adtran.com) for further information on RoHS/WEEE.

- Selon le document GR-1089-CORE, ce système est conçu et prévu pour une installation intégrée à un réseau de masse maillé. Ce système n'est pas conçu ni prévu pour une installation intégrée à un réseau de masse isolé (IBN).
- Selon le document GR-1089-CORE section 9, ce produit n'est pas équipé d'une connexion DC interne entre le retour de la batterie et la masse du châssis. Ce produit peut être installé dans une configuration DC-I (isolé) ou DC-C (commun). Pour les installations où les autres cartes ou le système hôte possèdent des connexions internes entre le retour de l'accumulateur et la mise à la terre de l'armature, le système est prévu pour le déploiement de configuration DC-M unique.
- La borne de mise à la terre du châssis doit être branchée à une prise de terre afin d'assurer que le boîtier métallique de la SFP est correctement mis à la terre grâce au connecteur de face arrière.

## REMARQUE

- Ce produit est conçu pour répondre aux classes environnementales suivantes :
  - ◆ ETSI EN 300 019-1-1 "Classification des conditions d'environnement; Entreposage," classe 1.2
  - ◆ ETSI EN 300 019-1-2 "Classification des conditions d'environnements; Transport," classe 2.3
  - ◆ ETSI EN 300 019-1-3 "Classification des conditions d'environnements; l'utilisation à poste fixe dans des endroits protégés contre les intempéries," classe 3.2
- L'équipement est conçu pour fonctionner sans dégradation lors des tests à tous les niveaux de sévérité, suivant les spécifications de la classe 3.2 de l'ETSI EN 300 019-1-3.
- Ce produit est conforme à la directive européenne RoHS. Reportez-vous à [www.adtran.com](http://www.adtran.com) pour de plus amples renseignements sur RoHS/WEEE.

## FRANÇAIS

### AVERTISSEMENT

Lisez tous les avertissements et mises en garde avant l'installation de cet équipement ou la réalisation de toute opération de maintenance.

### ATTENTION

Ce produit utilise un module laser de classe 1 qui conforme aux normes 21 CFR 1040.10, 1040.11 et IEC 60825-1 et -2. Pour assurer la conformité aux normes mentionnées plus haut, seuls des modules laser de classe 1 approuvés provenant d'une liste de fournisseurs certifiés par ADTRAN (disponible sur le site d'ADTRAN) doivent être installés sur ce produit. ADTRAN ne peut certifier l'intégrité d'un système doté d'autres modules laser.

### ATTENTION

- L'ESD (décharge électrostatique) peut endommager les modules électroniques. Lors de la manipulation des modules, portez un bracelet de décharge antistatique pour éviter d'endommager les composants électroniques. Placez les modules dans un emballage antistatique lors du transport ou du stockage. Lorsque vous travaillez sur les modules, placez-les toujours sur un tapis antistatique certifié muni d'un branchement de mise à la terre.

## DEUTSCH

### WARNUNG

Lesen Sie sich alle Warn- und Sicherheitshinweise durch, bevor Sie dieses Gerät installieren oder warten.

### VORSICHT

Dieses Produkt nutzt ein mit den Richtlinien 21 CFR 1040.10 und 1040.11 und IEC 60825-1 und -2 konformes Class 1 Lasermodul. Damit die obigen Richtlinien auch in Zukunft eingehalten werden können, dürfen ausschließlich Class 1 Lasermodule von einem von ADTRAN zugelassenen Anbieter in dem Produkt installiert werden (erhältlich auf der Website von ADTRAN). ADTRAN garantiert nicht für die Systemintegrität bei anderen Lasermodulen.

### VORSICHT

- Elektrostatische Entladungen können elektronische Module beschädigen. Tragen Sie beim Umgang mit Modulen ein Erdungsarmband, um Schäden an den elektronischen Komponenten zu vermeiden. Transportieren oder lagern Sie Module in antistatischem Verpackungsmaterial. Bei der

Arbeit an den Modulen, achten Sie darauf, diese stets auf antistatische, elektrisch geerdete Matten zu legen.

- Laut GR-1089-CORE dient dieses System zur Installation in einer gemeinsamen Potentialausgleichsanlage. Dieses System dient nicht zur Installation in einer isolierten Potentialausgleichsanlage.
- Laut GR-1089-CORE Abschnitt 9 verfügt dieses Produkt nicht über eine interne DC-Verbindung zwischen den Batterien und der Gehäusemasse. Dieses Produkt kann entweder in einer DC-I (isolierten) oder DC-C (gemeinsamen) Anlage installiert werden. Installationen, in denen für andere Karten oder das Host-System interne Verbindungen zwischen den Batterien und der Gehäusemasse bestehen, dienen ausschließlich für den Einsatz in DC-C-Anlagen.
- Die Erdungsschiene des Rahmens muss an eine Bodenstation angeschlossen werden, um sicherzustellen, dass das Metallgehäuse des SFP vorschriftsmäßig über den Rückwandanschluss geerdet ist.

## HINWEIS

- Dieses Produkt wurde entsprechend der folgenden Umweltklassen entwickelt:
  - ◆ ETSI EN 300 019-1-1 "Klassifikation von Umweltbedingungen, Lagerung," Klasse 1.2
  - ◆ ETSI EN 300 019-1-2 "Klassifikation von Umweltbedingungen, Transport," Klasse 2.3
  - ◆ ETSI EN 300 019-1-3 "Klassifikation von Umweltbedingungen, Stationärer Einsatz ohne Witterungseinflüsse," Klasse 3.2
- Dieses Gerät funktioniert ohne Leistungsabfall während aller für Klasse 3.2 von ETSI EN 300 019-1-3 vorgeschriebenen Belastungstests.
- Dieses Produkt erfüllt die EU RoHS Richtlinie. Bitte besuchen Sie [www.adtran.com](http://www.adtran.com) für ausführlichere Informationen zu 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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**CAUTION!**  
SUBJECT TO ELECTROSTATIC DAMAGE  
OR DECREASE IN RELIABILITY.  
HANDLING PRECAUTIONS REQUIRED.

**ADTRAN CUSTOMER CARE:**

From within the U.S. 1.800.726.8663  
From outside the U.S. +1 256.963.8716

**PRICING AND AVAILABILITY 1.800.827.0807**



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