iConverter® XG and XG+

Protocol-Transparent Fiber Converter/Transponder

The iConverter XG and XG+ are protocol-transparent fiber converters/transponders providing data-agnostic operation over a continuous range of data rates from 9.8 to 11.35 Gbps. They feature pluggable transceiver ports, and can be used as fiber mode converters, CWDM or DWDM transponders, or fiber repeaters supporting the three Rs (regeneration, retiming and reshaping).

Typical data rates are shown in the table below:

SFP+ Models and Associated Applications	
9.8304 Gbps	Common Public Radio Interface (CPRI)
9.95 Gbps	SONET OC-192, SDH STM-64, 10 Gbps Ethernet WAN PHY
10.31 Gbps	10 Gbps Ethernet LAN PHY
10.52 Gbps	10 Gbps Fibre Channel (10 GFC)
10.70 Gbps	OTN OTU-2 (G.709)
11.09 Gbps	10 Gbps Ethernet LAN PHY with 255/237 FEC coding
11.32 Gbps	10 Gbps Fibre Channel with 255/237 FEC coding
XFP Models and Associated Applications	
Data rates depend on the type and make of the XFP transceivers	

They support 100% traffic throughput and have no packet size restrictions. Ultra-low packet latency (< 50nsec) enables high-performance connectivity for data centers and financial networks.

The iConverter XG+ supports high-power (power level 3 and 4) XFP transceivers and the latest generation of wavelength tunable DWDM XFP transceivers. Utilizing management, the wavelength of a tunable transceiver can be programmed and saved.

Both models have built-in loopback functions, on-board status LEDs and link fault propagation modes facilitate easy setup and quick troubleshooting.

The iConverter XG and XG+ are available as compact, unmanaged standalone units, or chassis plug-in modules that can be managed with a Management Module (NMM2) or Network Interface Device (NID) installed in the chassis. The management module provides access to the advanced features available on the module.

The XG and XG+ standalone units are available with an external AC to DC power adapter or with a 2-pin terminal connector for direct connection to DC power. The standalone modules can be DIN-Rail mounted using the optional DIN-Rail mounting bracket (8250-0).

SFP+/XFPs not included

KEY FEATURES

iConverter XG+

- Supports MSA power level 3 and 4 XFP transceivers
- Provides management of wavelength tunable XFP transceivers
- Supports wide (-40 to 60°C) and extended (-40 to 75°C) temperature ranges

iConverter XG and iConverter XG+

- Protocol-transparent 9.8 Gbps to 11.32 Gbps fiber converter and transponder with ultra-low latency
- Compatible with 10G Ethernet, 10G SONET/SDH, 10G Fibre Channel, 10G OTN (G.709) and 9.8 Gbps CPRI
- Compliant with MSA SFF-8472 and INF-8077i standards
- Functions as a fiber mode converter, a CWDM or DWDM transponder, or a fiber repeater supporting the three Rs
- Automatic Speed Selection detects the data rate of the installed transceiver and the connected device
- Built-in loopback mode for installation verification and troubleshooting
- Self-Diagnostic Circuit Test for validating link connectivity
- Link fault detection modes facilitate quick fault detection, isolation and reporting
- Automatic Link Recovery
- Management of the plug-in module is available with the addition of a management module to the chassis
- SNMP management via NetOutlook® provides monitoring, configuration and fault notification
- TAA, BAA and NDAA compliant, and Made in the USA
- Lifetime Warranty and free 24/7 Technical Support

APPLICATIONS

Converter XG+ and Tunable Transceivers

Tunable XFP transceivers are configurable to support a specific channel in a DWDM optical network. Tunable XFPs allow network operators to remotely change wavelengths (channel paths) when they need to redistribute bandwidth, or reconfigure/upgrade traffic patterns and services.

The iConverter XG+ management system supports the configuration of these tunable XFPs. When the XG+ is used in conjunction with an iConverter management module, it provides a user interface that allows the network operator to change the DWDM channel of the transceiver, eliminating the need to be physically on-site with external programming equipment.

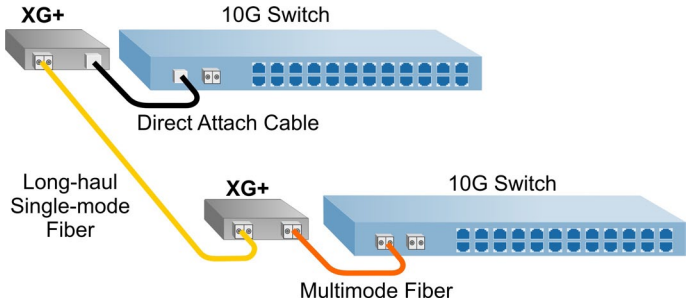
In addition to changing the DWDM channel by specifying the wavelength or the transceiver-specific channel ID, the DWDM channel can be selected by inputting the industry-accepted ITU channel number.

Using tunable transceivers not only ensures quick responses to changes in network topology, it also lowers OpEx and CapEx by reducing truck rolls and eliminating up to hundreds of fixed-wavelength DWDM XFP transceivers from spares inventory.

Direct Connect/Fiber Conversion Application

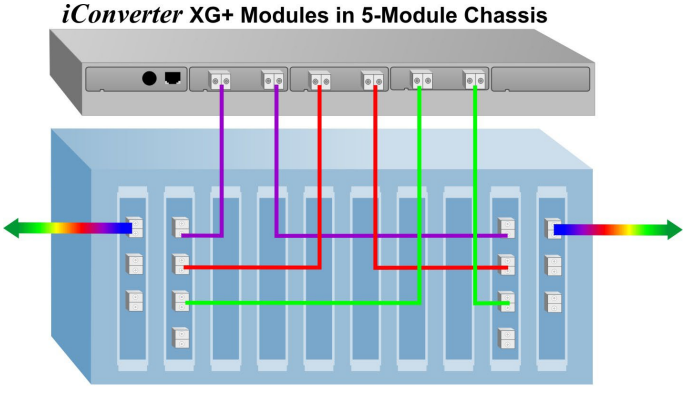
This application shows two 10G switches with SFP+ ports in two different locations. The switches are connected via long-haul, single-mode fiber (>80km) with a pair of iConverter XG 8599R-01 (SFP+to XFP) media converters. In the top location, a low-cost SFP+ Direct Attach Cable is used to connect the 10G switch port to the media converter because the distance is within the 10 meter limit of the Direct Attach Cable. In the bottom location, a pair of multimode SFP+ transceivers provide the connectivity between the media converters and the switches.

The key benefit of using XG and XG+ fiber media converters in this application is that they cost much less than proprietary transceivers required in many fiber switches. In addition, the external fiber media converters do not invalidate fiber switch manufacturer's warranty.



OTN Long-Haul DWDM Application

This application shows three 10G DWDM connections across an OTN network. Three iConverter XG modules with high-power XFPs are installed in a 5-Module Chassis and connected with fiber patch cables to DWDM Multiplexer. The iConverter XG modules function as fiber repeaters and wavelength transponders. The high-power XFPs perform Forward Error Correction on the incoming signal, then amplify and re-encapsulate the outbound OTN signal.



SPECIFICATIONS

Description	***iConverter* XG and XG+** Protocol-Transparent Media Converter/Transponder	
Standard Compliances	IEEE 802.3ae (10G Ethernet), SONET OC-192, SDH STM-64, INCITS T11.2 (10G Fibre Channel), ITU-T G.709 OTN, 9.8 Gbps CPRI	
Regulatory Compliances	Safety: EMI: ACT:	UL, cUL, CE, NEBS 3 Compliant, UKCA FCC Class A TAA, BAA, NDAA
Environmental	RoHS, WEEE, REACH	
Frame Size	Unlimited	
Port Types	Fiber:	10GBASE-SR (SFP+, XFP) 10GBASE-LR (SFP+, XFP) 10GBASE-ER (SFP+, XFP) 10GBASE-ZX (XFP) 10GBASE-BR (Single-fiber: SFP+, XFP)
Cable Types	Fiber:	Multimode: 50/125µm, 62.5/125µm Single-mode: 9/125µm
Dimensions W x D x H	Plug-in: Standalone: Standalone: (Wall-mount)	0.85" x 4.5" x 2.8" (21.6 mm x 114.3 mm x 71.1 mm) 3.1" x 4.8" x 1.0" (78.7 mm x 121.9 mm x 25.4 mm) 3.8" x 4.8" x 1.0" (96.5 mm x 121.9 mm x 25.4 mm)
Weight	Plug-in: Standalone w/o Adapter: Standalone w Adapter:	8 oz. (226.8 grams) 1.0 lb. (453.6 grams) 1.5 lbs. (680.4 grams)
Humidity	5 to 95% (non-condensing)	
Altitude	-100m to 4,000m	
Warranty	Lifetime warranty with 24/7/365 free Technical Support	

	XG	XG+
AC Power Requirements	US and Universal AC Adapter: 100 - 240VAC/50 - 60Hz 0.20A @ 120VAC (max)	
DC Power Requirements	**DC Input Plug-in Models (3.3 VDC) max**	
	SFP/SFP: 1.5A @ 3.3VDC SFP/XFP: 2.1A @ 3.3VDC XFP/XFP: 2.5A @ 3.3VDC	All models: 3.75A @ 3.3VDC
	DC Input Standalone with Terminal Block (7 - 60VDC) 2-Pin Terminal (non-isolated)	
	1.2A @ 9VDC, 0.9A @ 12VDC	1.5A @ 9VDC, 1.1A @ 12VDC
	DC Input Standalone with AC Adapter (7 - 60 VDC) 2.5mm Barrel Connector	
	1.2A @ 9VDC, 0.9A @ 12VDC	1.5A @ 9VDC, 1.1A @ 12VDC
Temperature	Commercial: 0 to 50°C Storage: -40 to 80°C	Commercial: 0 to 50°C Wide: -40 to 60°C Extended: -40 to 75°C Storage: -40 to 80°C
MTBF (hrs)	Plug-in: 770,000 SA w/o Adapter: 918,000 SA w/ AC Adapter: 480,000	Plug-in: 770,000 SA w/o Adapter: 106,000 SA w/ AC Adapter: 96,000

TRANSCEIVER GUIDELINES

Typical SFP+ / XFP Power Levels		
SFP+	**XFP**	**Power Requirements**
Power Level 1		up to 1.0 watts
Power Level 2		up to 1.5 watts
	Power Level 1	up to 1.5 watts
	Power Level 2	1.5 to 2.5 watts
	Power Level 3	2.5 to 3.5 watts
	Power Level 4	3.5 to 5.5 watts

Power Levels for Omnitron Transceivers			
Omnitron Model Number	**Omnitron Description**	**Power Level**	**Power Required**
7406-0	10GBASE-SR SFP+ LC/MM/850nm (300m)	1	1.0W
7407-1	10GBASE-LR SFP+ LC/SM/1310nm (10km)	1	1.0W
7407-2	10GBASE-ER SFP+ LC/SM/1550nm (40km)	2	1.5W
7407-3	10GBASE-ZR SFP+ LC/SM/1550nm (80km)	2	1.5W
7426-0	10GBASE-SR XFP LC/MM/850nm (300m)	1	1.5W
7427-1	10GBASE-LR XFP LC/SM/1310nm (10km)	2	2.0W
7427-2	10GBASE-ER XFP LC/SM/1550nm (40km)	3	3.0W
7427-3	10GBASE-ZR XFP LC/SM/1550nm (80km)	3	3.5W

Contact Omnitron for Power Level 4 transceivers.

PRODUCT SELECTION GUIDELINES

Use the table below to select the correct iConverter XG/XG+ model number. The model number will depend on the Power Level of the optics installed in the module. The table shows the different Power Level SFP+ and XFP transceivers and the quantity supported by each model number.

Product Selection Table		
SFP+ / XFP per Port Power Level Requirements	**XG**	**XG+**
(Quantity 2) Power Level 1 SFP+	8599P-00	8599R-00
(Quantity 1) Power Level 1 SFP+ and (Quantity 1) Power Level 2 SFP+	-	8599R-00
(Quantity 1) Power Level 1 SFP+ and (Quantity 1) Power Level 1 XFP	8599P-01	8599R-01
(Quantity 1) Power Level 1 SFP+ and (Quantity 1) Power Level 2 XFP	8599P-01	8599R-01
(Quantity 1) Up to Power Level 2 SFP+ and (Quantity 1) up to Power Level 3 XFP	-	8599R-01
(Quantity 2) Power Level 1 or 2 XFP	8599P-11	8599R-11
(Quantity 2) Power Level 1, 2, 3, 4 or Tunable XFP	-	8599R-11
(Quantity 1) Up to Power Level 2 SFP+ and (Quantity 1) Tunable XFPs	-	8599R-01
XG supports a combination of transceivers up to 5 watts. XG+ supports a combination of transceivers up to 11 watts.		
The XG+ plug-in modules require specific chassis and installation configurations. For more information on XG+ chassis installation requirements, download the iConverter XG, XG+ and XGT+ Chassis Installation Guidelines for Airflow and Cooling Application Note.		

ORDERING INFORMATION

Step 1: Choose a Base Part Number (**xxxxx**-ss-pt)

iConverter XG Models	
Model Number	**Description**
8599P-ss-pt	iConverter XG with two pluggable transceivers
iConverter XG 8599 and XG+ 8599N model numbers are no longer available, and are replaced with iConverter XG 8599P and XG+ 8599R model numbers. For more information on XG+ feature differences and improvements, download the Product Replacement Application Note. Contact Omnitron for other configurations. Order the appropriate SFPs separately. Visit the Omnitron Optical Transceivers web page. For chassis options, see iConverter Chassis Overview web page.	

Step 2: Choose a Transceiver Option (xxxxx-**ss**-pt)

00 = Two SFP+ Transceiver Receptacles
01 = One SFP+ Transceiver and one XFP Transceiver Receptacles
11 = Two XFP Transceiver Receptacles

Step 3: Choose a Power Option (xxxxx-ss-**p**t)

<leave blank> = Plug-in module
A = Barrel Connector and AC/DC Power Adapter, 100-240VAC, 50-60Hz, with US power cord without integrated mounting brackets
B = Barrel Connector and Universal AC/DC Adapter, 100-240 VAC, 50-60Hz, No Power Cord, without integrated mounting brackets
C = Direct DC input, 2 pin terminal connector, no AC/DC power adapter, without integrated mounting brackets
D = Barrel Connector and AC/DC Power Adapter, 100-240VAC, 50-60Hz, with US power cord with integrated mounting brackets
E = Barrel Connector and Universal AC/DC Adapter, 100-240 VAC, 50-60Hz, No Power Cord, with integrated mounting brackets
F = Direct DC input, 2 pin terminal connector, no AC/DC power adapter, with integrated mounting brackets

Operating Temperature Range (xxxxx-ss-p**t**)

<leave blank> = Commercial temperature (0 to 50°C)

ORDERING INFORMATION

Step 1: Choose a Base Part Number (**xxxxx**-ss-pt)

iConverter XG+ Models	
Model Number	**Description**
8599R-ss-pt	iConverter XG+ with two pluggable transceiver receptacles, supporting power level 1, 2, 3 and 4 transceivers

iConverter XG 8599 and XG+ 8599N model numbers are no longer available, and are replaced with iConverter XG 8599P and XG+ 8599R model numbers. For more information on XG+ feature differences and improvements, download the Product Replacement Application Note.

The XG+ plug-in modules require specific chassis and installation configurations. For more information on XG+ chassis installation requirements, download the iConverter XG, XG+ and XGT+ Chassis Installation Guidelines for Airflow and Cooling Application Note.

Contact Omnitron for other configurations. Order the appropriate SFPs separately. Visit the Omnitron Optical Transceivers web page.

For chassis options, see iConverter Chassis Overview web page.

Step 2: Choose a Transceiver Option (xxxxx-**ss**-pt)

00 = Two SFP+ Transceiver Receptacles
01 = One SFP+ Transceiver and one XFP Transceiver Receptacles
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C = Direct DC input, 2 pin terminal connector, no AC/DC power adapter, without integrated mounting brackets
D = Barrel Connector and AC/DC Power Adapter, 100-240VAC, 50-60Hz, with US power cord with integrated mounting brackets
E = Barrel Connector and Universal AC/DC Adapter, 100-240 VAC, 50-60Hz, No Power Cord, with integrated mounting brackets
F = Direct DC input, 2 pin terminal connector, no AC/DC power adapter, with integrated mounting brackets

Step 4: Choose an Operating Temperature Range (xxxxx-ss-p**t**)

<leave blank> = Commercial temperature (0 to 50°C)
W = Wide temperature (-40 to 60°C)
Z = Extended temperature (-40 to 75°C)

ACCESSORIES

Model Number	Description
8250-0	DIN-Rail Mounting Bracket for Models without Integrated Mounting Brackets
8251-0	DIN-Rail Mounting Bracket for Models with Integrated Mounting Brackets
8260-0	19” 1U Rack Mount Shelf for Models with Integrated Mounting Brackets (up to 4 modules)
7499-DC-1	1 meter 10G SFP+ Direct Attach Cable (Twinax)
7499-DC-3	3 meter 10G SFP+ Direct Attach Cable (Twinax)