



## XG2 Series Overview

XG2 Series are high-performance 10G media converters for connecting different 10G devices and link. XG2 Series functions as a copper-to-fiber converter, a fiber mode converter, or a fiber repeater. Five interface of XG2 series are available and supported: RJ45 to SFP+, SFP+ to SFP+, SFP+ to XFP, RJ45 to XFP, and CX4 to SFP+.

All XG2 Series are equipped with real-time LEDs which display the status of each port. The built-in loopback functions make XG2 Series ideal for troubleshooting by sending packets like BERT patterns to network equipment.

For example, as a media converter, XG2 provides a bi-directionally conversion between 10GBASE-R (fiber) and 10GBASE-T (copper). If the ISP administrator would like to deploy FTTX services from central office to the user's street or large organization building by fiber as the last mile connection, XG2 could convert the media type from fiber to copper wire, and then distribute to any nearby location with 10Gbps Ethernet switch, or to xDSL modem via DSLAM.

XG2 could also act as an auxiliary device for testing 10GBASE-T/ 10GBASE-R equipments by connecting NuStreams 10Gbps Ethernet fiber modules such as XM-28L1 and XM-28L1CX4.

With various interfaces, XG2 Series provide different conversions between fibers and copper wires in 10Gbps Ethernet.



## KEY FEATURES

- Real-Time conversion between 10GBASE-T, 10GBASE-R, and 10GBASE-CX4
  - Interface of 10GBASE-T based on IEEE 802.3an
  - Interface of 10GBASE-R based on IEEE802.3ae
  - Interface of 10GBASE-CX4 based on IEEE 802.3ak
- Conversion of media type between fiber (SFP+, XFP) and twisted pair copper wire (RJ-45, CX4)
- Real-time LEDs that display running status
  - SFP+ status: Indicate the SFP+ fiber connector is connected or not
  - LR status: Indicate the LR Transceiver or SR transceiver is plugged or not
  - Link/Rx status: Display the Network linked/Receive status
  - SFP+/Rx status: Display the Network linked/Receive status (For XG2-1 only)
  - Loopback status: Indicate the Loopback test status of A and B ports
  - SYS status: Indicate system operation status
- Console for updating firmware and configuring loopback functions
- Both SFP+ and RJ-45 port can connect to other 10Gbps Ethernet switch for expansion.
- Subsidiary device for test on 10Gbps Ethernet switch with 10GBASE-T and/or 10GBASE-R ports

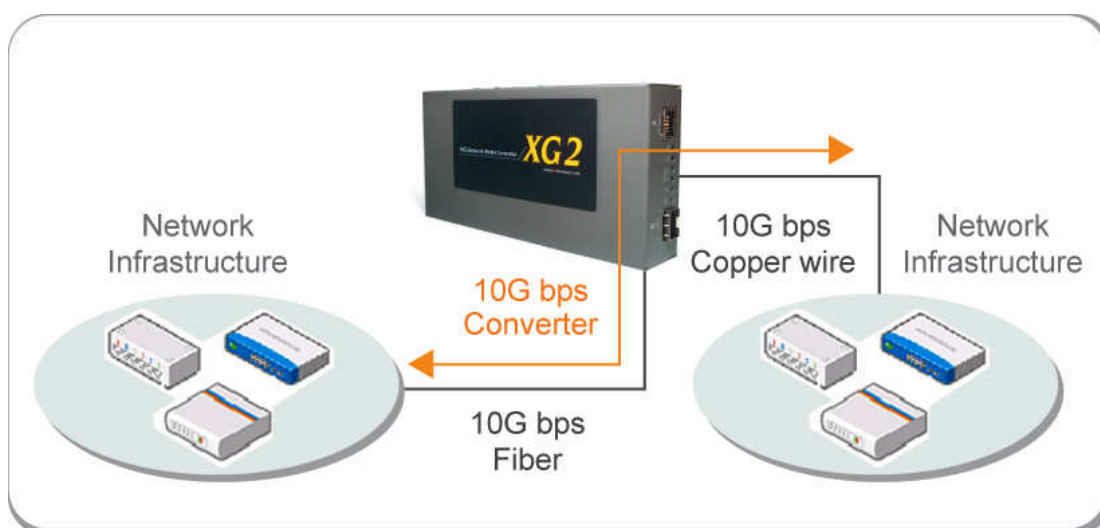


## KEY ADVANTAGES

- Fast connection with multi-function
- Provide reliable long-distance connection
- Wirespeed forwarding without bottleneck
- Simple and cost-effective conversion between 10Gbps Ethernet fiber and copper
- Optimized for testing 10Gbps fiber network
- Port supported: SFP+, RJ-45, XFP, and CX4 connector
- Small portable size case
- Plug and play without extra configuration
- Full IEEE 802.3ae compliant






## MAIN APPLICATIONS

- Media converter for network backbone
- Connection between fiber to copper or fiber to fiber 10Gbps Ethernet equipment
- Can be applied in Telecommunication room, R&D laboratory, Data center, and etc.





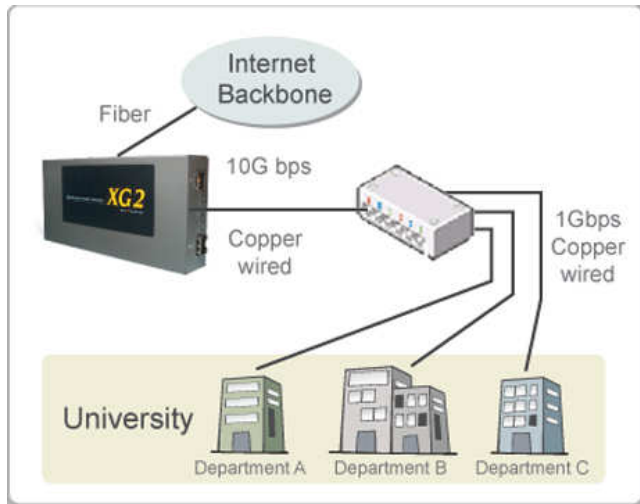
## XG2 SERIES SPECIFICATION

Models		XG2	XG2-1	XG2-2	XG2-3	XG2-4
10G Media Converter						
Type		Converter				
Interface		RJ45 to/from SFP+	SFP+ to/from SFP+	SFP+ to/from XFP	RJ45 to/from XFP	CX4 to/from SFP+
Data Transfer Rate		10Gbps				
Connectivity		Wired				
Platform		PC				
Protocol	Port A	IEEE802.3an (10GBase-T)	IEEE802.3ae (10GBase-R)	IEEE802.3ae (10GBase-R)	IEEE802.3an (10GBase-T)	IEEE802.3ae (10GBase-CX4)
	Port B	IEEE802.3ae (10GBase-R)	IEEE802.3ae (10GBase-R)	IEEE802.3ae (10GBase-R)	IEEE802.3ae (10GBase-R)	IEEE802.3ae (10GBase-R)
Fixed Port		One 10Gbps UTP Port	Two 10Gbps SFP+ Port	One 10Gbps SFP+ Port	One 10Gbps UTP Port	One 10Gbps SFP+ Port
		One 10Gbps SFP+ Port		One 10Gbps XFP Port	One 10Gbps XFP Port	One 10Gbps CX4 Port
		One RS-232 Console Port	One RS-232 Console Port	One RS-232 Console Port	One RS-232 Console Port	One RS-232 Console Port
		One Power Jack	One Power Jack	One Power Jack	One Power Jack	One Power Jack
Maximum Packet Forwarding Rate (packet per second)		14,880,950				
Management Port		Serial Port				
LED Display		<ul style="list-style-type: none"> <li>• SFP+</li> <li>• Link/Rx A</li> <li>• Link/Rx B</li> </ul>	<ul style="list-style-type: none"> <li>• LR</li> <li>• Loopback</li> <li>• SYS</li> </ul>	<ul style="list-style-type: none"> <li>• LR A</li> <li>• LR B</li> <li>• SYS</li> </ul>	<ul style="list-style-type: none"> <li>• SFP+/Rx A</li> <li>• SFP+/Rx B</li> <li>• Loopback</li> </ul>	<ul style="list-style-type: none"> <li>• Link/Rx A</li> <li>• Link/Rx B</li> <li>• Loopback</li> <li>• SYS</li> </ul>
Plug & Play		Yes				
Standalone		Yes				
Connector Types	Port A	RJ-45	SFP+	SFP+	RJ-45	CX4
	Port B	SFP+	SFP+	XFP	XFP	SFP+
Dimensions		175 x85.9x32.6mm (L x W x H)				
Additional Features		Layer 1 loopback				
		UTP cable length detection			UTP cable length detection	

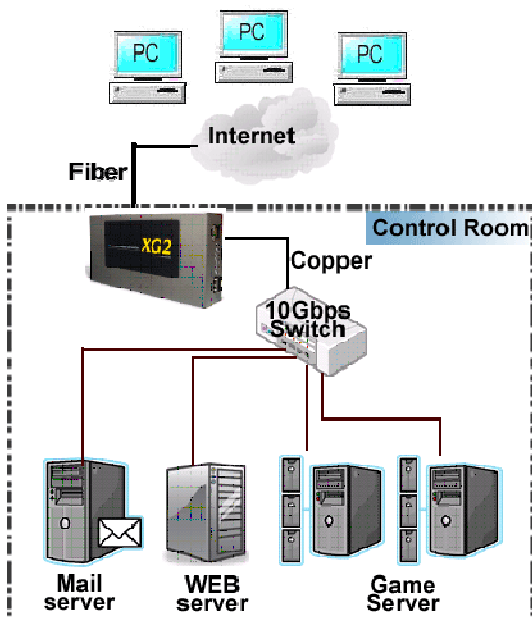


## Application for 10Gbps Switch

10Gbps speed Ethernet connection may not be common seen in the office, however, administrator may has Gigabit Ethernet in the control room of office already. Get a 10Gbps Ethernet connection from backbone and distribute it to different Gigabit Ethernet segment for different building or organization is practical and more cost-effective. Here is an example of possible plan.

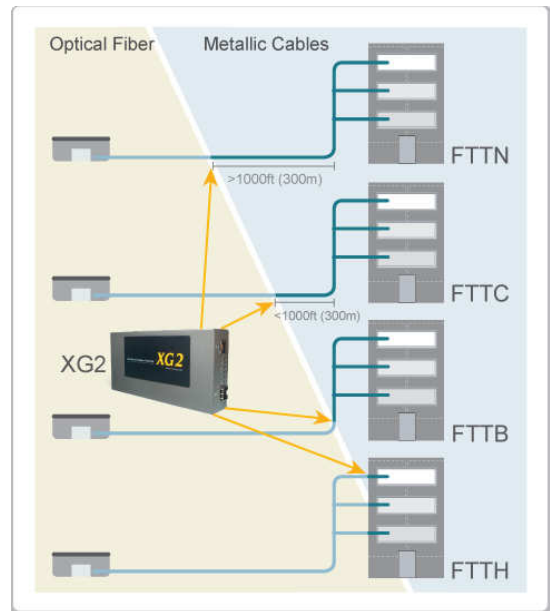


For ISP or online game company, **XG2** may also save lots of money for cabling your control room. ISP runs lots of customer's service such as e-mail server, web server or any co-located network service on the control room. These equipments may not have interface for the connection of fiber. For online game company, administrator may have lots of online game servers that need high speed connection to backbone in the control room.



## Application for FTTx

Down below is an illustration about how the FTTx architectures vary with regard to the distances between the optical fiber and the end-user. The building on the left is the central office; the building on the right is one of the buildings served by the central office. The dotted rectangles represent separate living or office spaces within the same building.



Fiber to the x (FTTx) is a generic term for any network architecture that uses optical fiber to replace all or part of the usual copper local loop used for telecommunications. The four technologies, in order of an increasingly longer fiber loop are:

- Fiber to the node / neighborhood (FTTN)
- Fiber to the curb (FTTC) / Fiber to the kerb (FTTK)
- Fiber to the building (FTTB)
- Fiber to the home (FTTH)

For the time before, if the client has requirement of lots bandwidth, ISP has to cabling several fibers with gigabit connection to the same location and distributes the connection by Gigabit switch or media converter to copper wired destination.

Depending on the bandwidth required for client. ISP configures a **XG2** media converter between the connection of light blue and dark blue line. With 10Gb Ethernet conversion between fiber and copper wire, ISP can provide heavy-weight bandwidth service that is closer to the client without spending too much cost.

The white line can be converted by **XG2** and then distributed by 10Gbps Switch as illustrated above. It also can be distributed by **DSLAM** with xDSL connection to client



## Test with NuStreams-2000i chassis

NuStreams-2000i and 600i are the test chassis for Ethernet network. For NuStreams -2000i, in addition to modules required for running this equipment, it can attach up to 16 test modules for Ethernet test on different transmission media or speed. It is perfect for test in lab or for examination of mass production.

There are varied kinds of module can be attached to the chassis. XM-28L1 and XM-28L1CX4 are two modules for 10Gbps Ethernet test.

### XM-28L1 module:

#### Interface

10 Gigabit Ethernet (10GBASE-R): XFP port x 1

#### 10 Gigabit Ethernet

XFP supports XFP MSA transceivers

#### Auto-negotiation

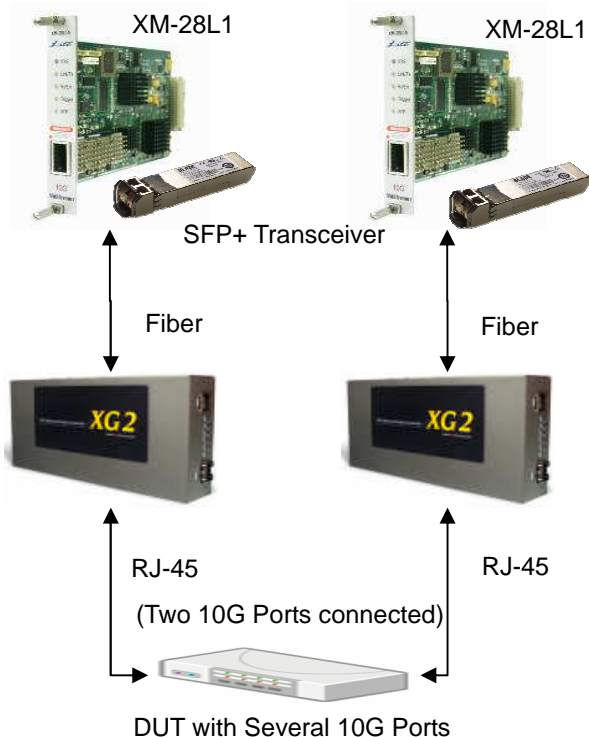
10GBASE Full Duplex Mode

#### LEDs

SYS, Link/Tx, Rx/Err, Trigger, XFP

With NuStreams-2000i plus XM-28L1 and **YG2**, operator can test the 10Gbps DUT between fiber and copper wire media, such as the illustration below.

Note: Although XM-28L1 is equipped with XFP transceiver, it can communicate with SFP+ transceiver of **YG2**. The size and specification of transceiver are independent from the Ethernet protocol transmit and receive inside fiber.

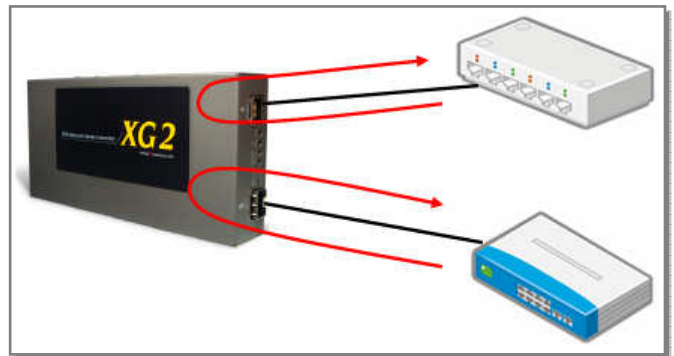


## Loopback test function of XG2

**YG2** has loopback function for the trouble shooting of network. Loopback test is the method to send out signal and quickly back to the same source entity to test the transmission and route problem of infrastructure. Test equipment with this troubleshooting technique sends specific patterns, and counts any errors that come back (BERT, Bit Error Rate Test).

From the operation of console port, user can active loopback test. When it is enabled, data stream from test equipment to the XG2 flows returns to their source entity.

Here illustrates how loopback works.



## Connection from fiber to XG2

Different from RJ-45 connector, the fiber can be removed from SFP+ transceiver easily. At two end of fiber, it has connector that can attach to SFP+ transceiver. There are two fibers for one SFP+ transceiver. One fiber is for receiving and one fiber is for transmission. Left connector below is called LC connector that can attach to SFP+ transceiver.



When SFP+ transceiver is plugged into the XG2, the LED of SFP+ is Amber. If the inserted SFP+ transceiver is attached by a fiber with LC connector with going on signaling, the LED becomes Green. The LED of LR is either Green for 10BASE-LR mode or Amber for 10BASE-SR mode.





## RELATED PRODUCTS

- **XM-28L1:**  
10Gbps Ethernet test module for NuStreams chassis



**XM-28L1**

- **XM-28L1CX4:**  
10Gbps Ethernet test module with CX4 connector for NuStreams chassis



**XM-28L1CX4**

## CONTACT INFORMATION

Website: <http://www.xtramus.com>

E-mail: [Sales@xtramus.com](mailto:Sales@xtramus.com) (for Product Inquiry)

[TS@xtramus.com](mailto:TS@xtramus.com) (for Technical Support)

TEL: +886-2-8227-6611

FAX: +886-2-8227-6622

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