



an Optical Ethernet Company

FiberLinX

End-to-End Remote Fiber Management



————— Fiber to the Premises —————

Media Conversion

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Optical Access

November 2004

Secure and flexible solution

- ◆ Preserves complete end-to-end fiber connection and data integrity via SNMP
- ◆ All management traffic remains isolated from the remote LAN
- ◆ IEEE 802.1Q VLAN and 802.1p compliant

Features and functionality

- ◆ Transparency feature allows VLAN/ non-VLAN traffic on same port
- ◆ Provides differential priority
- ◆ Set bi-directional bandwidth
- ◆ Remotely configure settings
- ◆ *FiberAlert* and loopback functionality for troubleshooting

Minimizes costs of building and operating networks

- ◆ Avoid unnecessary service calls
- ◆ When using *FiberLinX* in pairs, deploy less expensive copper switches at both ends

End-to-End Solution

- ◆ *FiberLinX* (as Host) for Central Office applications and *FiberLinX* (as Remote or Standalone) for Customer Premises

Easy to configure and manage with GUI-based iView²

- ◆ Up and running in less than 5 minutes
- ◆ Manage/monitor fiber traffic between switches or routers
- ◆ Includes RMON statistics
- ◆ Includes SNMP V1 and V2c
- ◆ Receive vital health information and notification

FiberLinX: Optical Demarcation Unit Enables Delivery of Transparent LAN Services and Provides Carrier-Grade Management and Line Provisioning Capabilities

Service providers who provide customers with Transparent LAN services must be able to remotely manage their customer premises equipment while keeping management and customer data traffic completely separated. Designed to meet the needs of service providers and administrators of enterprise campus networks, *FiberLinX* provisions point-to-point fiber optic connections and provides a unique management tool to monitor the entire link between two locations.

Field-proven worldwide since 1999, the *FiberLinX* system is ideal for Optical Ethernet, FTTx and campus area network applications.

The *FiberLinX* solution connects two remote networks over fiber optics and allows administrators to observe both the end-points, and the fiber link between them, as a single management entity and not as separate elements. Host management traffic is not visible to the remote or customer network nor is access to the customer network required, guaranteeing end-to-end data integrity. *FiberLinX* allows for remote configuration and alerts administrators to any potential problems on the long-haul fiber run, provides vital information on link condition and reports data traffic statistics. In addition, it reduces the total cost of network equipment by functioning as a copper-to-fiber media converter, allowing deployment of lower cost copper switches at both ends of the fiber connection.

Offering unparalleled flexibility, the *FiberLinX* series is now available in two models (10/100 and 10/100/1000) that each support multiple fiber types including multi-mode and single-mode as well as single-strand fiber which can effectively double the capacity of installed fiber.

iMcV-FiberLinX — 10/100 Ethernet

- One 100 Mbps fiber data port
- One 10/100 twisted pair data port
- One additional 10/100 twisted pair port (TX EXT) for management
- TX EXT port also functions as serial port

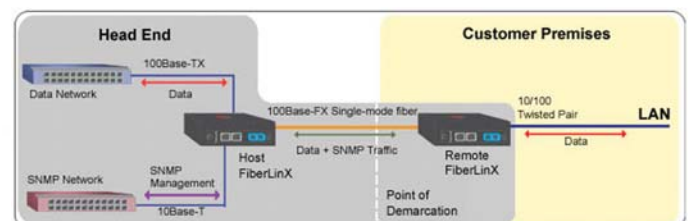
iMcV-Giga-FiberLinX — 10/100/1000 Ethernet

- One 1000 Mbps fiber data port
- One 10/100/1000 twisted pair data port
- One additional 10/100/1000 twisted pair port (TX EXT) for management
- Includes serial port with DB-9 connector

Twisted pair ports auto-negotiate or you can manually set the speed and duplex. Ports also feature Flow Control in FDX and Back Pressure Flow control.

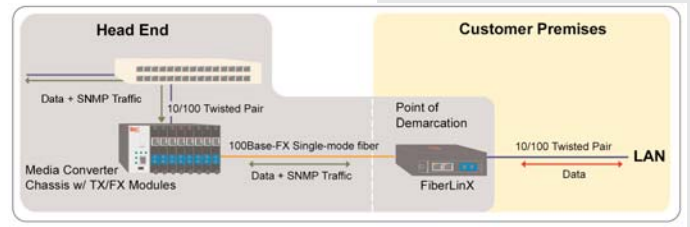
Typical Application— Dual FiberLinX Solution

When used in pairs, a *FiberLinX* configured as a Host resides at the head-end while another *FiberLinX*, configured as a Remote, installs at the remote customer location, typically on the network edge where the customer network meets the service provider infrastructure. Via SNMP, the *FiberLinX* solution monitors the entire link and ensures data integrity while remaining isolated and completely transparent to the customer LAN.



Typical Application— Single FiberLinX Solution

You can also use one *FiberLinX* for a single-solution (CPE) application. Install the sole *FiberLinX* at the customer's network edge and configure the device as a Standalone. Connect the *FiberLinX* to a media converter at the central office or directly to a fiber switch. Manage the *FiberLinX* from your central office.



Full-Featured FiberLinX

From a central location, network operators are able to receive real-time device and traffic statistics on the remote CPE, allocate bandwidth, turn services on or off, initiate loopback testing, change customer VLAN settings and adjust QoS policies assigned to different traffic types.

- **Management Port and VLAN Functionality**— Having a separate (optional use) management port as well as VLAN compliance keeps customer data and your SNMP traffic separated.
- **Bandwidth Control**— Fine granularity allows you to offer **custom levels** of service; easily change bandwidth allocation, remotely, in seconds via SNMP.
- **Troubleshooting Features**— *FiberAlert* and *LinkLoss* along with LEDs assist in diagnosing potential problems on fiber optic networks
- **Loopback Testing** functionality loops back all frames arriving on the fiber port (except for the device's management traffic). When in Loopback mode, *FiberLinX* drops the link on the twisted pair port.

Using the VLAN Functionality on FiberLinX

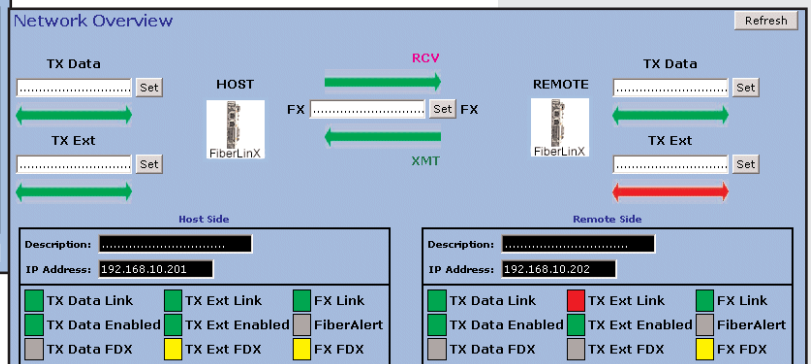
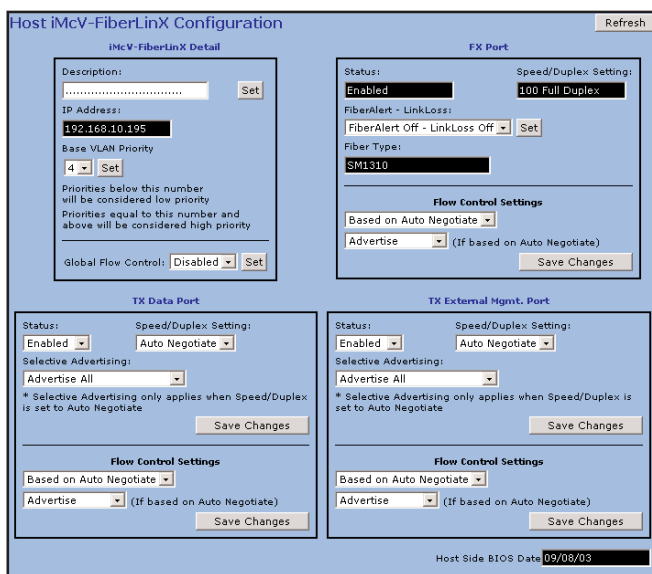
Service providers routinely use IEEE 802.1Q Virtual Local Area Network (VLAN) tagging to secure, separate and differentiate customer traffic. *FiberLinX* enables service providers to support multiple VLAN-based applications.

- IEEE 802.1Q VLAN compatible.
- Valid VLAN IDs are 1 to 4,094.
- Port-based VLAN tagging.
- *Transparency Mode* passes all data and respects the VLAN tag or lack thereof, i.e. allows a mixture of VLAN Tagged and Untagged traffic.
- Configure to support VLAN trunking; *FiberLinX* can trunk up to 10 (10/100 version) or 32 (Gigabit version) VLAN IDs for data, plus an additional for SNMP (*Transparency Mode* disabled).
- IEEE 802.1p provides a 2-tier queue for differential prioritization of inbound and outbound traffic especially beneficial for traffic requiring high priority (e.g. VoIP; this traffic is serviced first).

SNMP Management Made Easy

FiberLinX features an SNMP management agent for monitoring the status and activity on copper and fiber ports at the remote end. Perform initial setup of the unit and modifications in the field via: *iView²* SNMP application, Telnet/TFTP, or local serial connection.

- Enable features and change configuration settings from central office.
- Remote upgrades via Telnet/TFTP, serial port or mgt. software.
- Monitor both units and the fiber in between.
- Receive real-time monitoring and statistics.
- Change bandwidth “on-the-fly” up to 100 Mbps or up to 1000 Mbps (depending on model).
- Create a secure management domain to isolate management domain broadcasts from TX Data ports on both units.
- User-definable unit/port descriptions and information.



GUI-Interface of *iView²* for *iMcV-FiberLinX*

Features and Specifications

- 100Base-FX OR 1000Base-LS/SX optical network interface, ST/SC connectors; and single-strand fiber
- 10/100 OR 10/100/1000 RJ-45 data port
- 10/100 OR 10/100/1000 RJ-45 port for out-of-band management
- Auto-negotiation & Selective Advertising for speed and duplex mode
- Automatic MDI-II/MDI-X
- Dynamic bandwidth control via GUI-based management software
- IEEE 802.1p traffic prioritization, two-tier queuing

- IEEE 802.1Q full range of VLAN IDs
- IEEE 802.3x Flow Control
- SNMP V1 and V2c
- Loopback testing feature
- FiberAlert troubleshooting feature
- Includes DHCP agent; supports Telnet and TFTP
- Real-time reporting of device and traffic statistics [IMC MIBs, MIB-II RFC 1213, RFC 1643** and RMON statistics]

IMC MIB:

- Traps (Cold Start, Warm Start, Authentication Failure, Link Up, Link Down, Remote Unit Lost, Remote Unit Back Online, Far End TX Link On and Far End TX Link Off)*
- Link Status of Ports
- Port Type
- Fiber Type
- SNMP Port (Host/Remote)
- SNMP Agent IP Address (Host/Remote/Single)
- Link Partner
- User-Definable Name of Product
- User-Definable ID/Name of Ports

• Enable/Disable Ports

- Enable/Disable FiberAlert*
- Enable/Disable loopback modes
- Set Duplex Mode for Twisted Pair Ports
- Set Auto-Negotiation/Speed for Twisted Pair Ports
- Specify the management port

MIB-II (RFC 1213):

- Packets Transmitted
- Packets Received
- Octets (bytes) Transmitted
- Octets (bytes) Received
- Plus All Standard MIB II Objects

Transmission Dot 3** (RFC1643):

- Alignment Errors
- Single Collision Frames
- Multiple Collision Frames
- SQE Test Errors
- Deferred Transmissions
- Late Collisions
- Excessive Collisions
- Carrier Sense Errors
- Frame Too Long
- Internal MAC Transmit Errors
- Internal MAC Receive Errors

RMON Statistics:

- Drop Events
- Total Bytes
- Total Packets
- Broadcast Packets
- Multicast Packets
- CRC Align Errors
- Undersize Packets
- Oversize Packets
- Fragments
- Jabbers
- Collisions
- Distribution of Frame Size

*Send traps to a virtually unlimited number of trap-host server destinations.
** RFC1643 statistics available on 10/100 model.

Ordering Information

The *iMcV series FiberLinX* modules listed below install in any *iMediaChassis*, *iMediaCenter* or *MediaChassis/2*. Chassis range from the highest port density in the industry (20-slots) to 1-slot table-top units that can also be rack or wall mounted. For chassis ordering information, please refer to the website at: <http://www.imcnetworks.com/mc-managed.asp>.

10/100 Mbps iMcV-FiberLinX

- 56-14511** iMcV-FiberLinX, TX/FX-MM1300-ST [2 Km]
- 56-14512** iMcV-FiberLinX, TX/FX-MM1300-SC [2 Km]
- 56-14515** iMcV-FiberLinX, TX/FX-SM1310/PLUS-ST [40 Km]
- 56-14516** iMcV-FiberLinX, TX/FX-SM1310/PLUS-SC [40 Km]
- 56-14517** iMcV-FiberLinX, TX/FX-SM1310/LONG-ST [80 Km]
- 56-14518** iMcV-FiberLinX, TX/FX-SM1310/LONG-SC [80 Km]
- 56-14522** iMcV-FiberLinX, TX/FX-SM1550/LONG-SC [100k Km]

Single-Strand Fiber¹

- 56-14543** iMcV-FiberLinX, TX/SSFX-SM1310-SC [20 Km]
- 56-14544** iMcV-FiberLinX, TX/SSFX-SM1550-SC [20 Km]
- 56-14545** iMcV-FiberLinX, TX/SSFX-SM1310/PLUS-SC [40 Km]
- 56-14546** iMcV-FiberLinX, TX/SSFX-SM1550/PLUS-SC [40 Km]
- 56-14547** iMcV-FiberLinX, TX/SSFX-SM1310/LONG-SC [60 Km]
- 56-14548** iMcV-FiberLinX, TX/SSFX-SM1550/LONG-SC [60 Km]

Gigabit Ethernet iMcV-Giga-FiberLinX

- 56-14869** iMcV-Giga-FiberLinX, TX/SX-MM850-SC [300 m]
- 56-14870** iMcV-Giga-FiberLinX, TX/LX-SM1310-SC [10 Km]
- 56-14871** iMcV-Giga-FiberLinX, TX/LX-SM1310/PLUS-SC [40 Km]
- 56-14872** iMcV-Giga-FiberLinX, TX/LX-SM1550/LONG-SC [70 Km]
- Single-Strand Fiber¹**
- 56-14873** iMcV-Giga-FiberLinX, TX/SSLX-SM1310-SC [10 Km]
- 56-14874** iMcV-Giga-FiberLinX, TX/SSLX-SM1550-SC [10 Km]
- 56-14875** iMcV-Giga-FiberLinX, TX/SSLX-SM1310/PLUS-SC [40 Km]
- 56-14876** iMcV-Giga-FiberLinX, TX/SSLX-SM1550/PLUS-SC [40 Km]

NOTE: iMcV-Giga-FiberLinX modules are double-wide and require two slots in a chassis.

¹This product has single-strand fiber technology. Deploy in pairs, or connect to another compatible IMC Networks single-strand fiber product. Go to www.imcnetworks.com/products/orderSSFX.asp for more info.

About IMC Networks

Networking the world since 1988, IMC Networks is a leading ISO 9001 certified manufacturer of optical networking and LAN/WAN bandwidth management solutions for enterprise, telecommunications and service provider applications. The company provides the industry's widest variety of copper-to-fiber media converters and fiber mode converters, as well as optical repeaters and wavelength division multiplexers. In addition to physical layer products, IMC Networks offers remotely managed Customer Premises Equipment, Layer 3 and Layer 4 bandwidth control, and packet classification solutions. IMC Networks supports Ethernet, Fast Ethernet, Gigabit Ethernet, T1/E1/J1, DS3/ES/STS-1, FibreChannel and ATM networking technologies.



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