

# Sensus High-Density Panels for Aggregation and Breakout



Introducing Sensus by Fiber Mountain, an intelligent 2RU high-density patching solution to aggregate and break out fiber connectivity from duplex LC cables to high density 8-fiber, 12-fiber and 24-fiber MPO trunks.

## Introduction

A Sensus chassis consists of three (3) modules: a management module with an integrated touchscreen display, and two (2) interchangeable patching modules. Patching modules are available with front-to-rear and front access-only fiber connections for Single Mode (OS2) and Multimode (OM4) fiber. Accessing the management module is performed via the touchscreen display or remotely via an Ethernet connection, with User Interface (UI) software that supports applications such as Bit Error Ratio Test (BERT), work order and alarm management, including diagnostic tool sets.

Sensus LC and MPO ports can detect cable presence and read cable information directly from any cable enabled with Fiber Mountain ICID (Intelligent Connection IDentification) technology. Fiber Mountain's orchestration software, AllPath Director (APD), can correlate cables to panel ports and create a live graphical representation of the physical layer topology. Per-port tri-colored LEDs can be controlled remotely from APD or from an API. Fiber Mountain ICID cables contain NFC ID tags, which when held over the NFC symbol on the management module, display detailed cable information locally.

When integrated with Fiber Mountain's APD, cable information can be correlated with port reservations or existing work orders. Built-in AC input power redundancy protects the Sensus management functionality from a failure of a power source.

**An alternative power source for Sensus Management Module is the PoE+ (Power Over Ethernet, Plus) via the Management Interface Port. While power is needed for configuration, LED functionality and management, all connections are passive and pass traffic without power.**

# Management Modules

The Sensus management module contains Near-Field Communications (NFC) technology to read product information from ICID-enabled cables. The management module features an integrated four-inch (4") LCD touchscreen, which displays cable information read by the NFC reader. It may also provide technician work order details related to moves, adds, or changes.

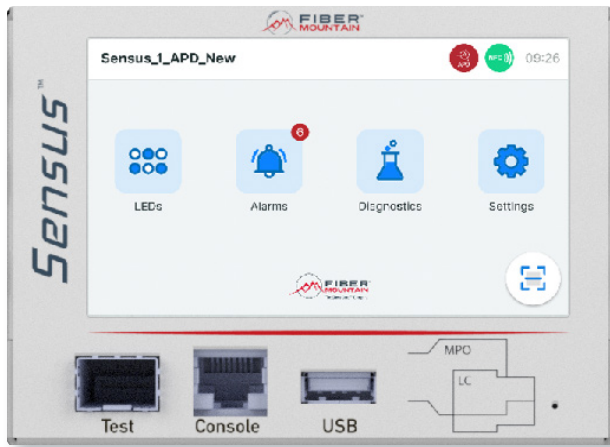


Figure 1: Sensus Management Module

## Sensus Specifications

Chassis Specifications	
Weight	4.15 lbs
Rack Mounting	Fits 19", 21" and 23" racks
Slots	3 (2 patching modules, 1 management module)
Dimensions (H/W/D)	3.45" x 17.44" x 8.67" (8.67 cm x 44.30 cm x 22.02 cm)
Management Module Specifications	
Weight	3.2 lbs
Dimensions	3.23" x 4.31" x 8.77" (8.20 cm x 10.95 cm x 22.28 cm)
Patching Module Specifications	
Weight	3.6 lbs
Dimensions	3.23" x 6.35" x 8.87" (8.20 cm x 16.13 cm x 22.53 cm)
Technical Specifications	
Operating Temperature	0 - 70 C
Voltage	100-240 VAC @ 0.25A, 50/60 Hz
Fuse Rating	1.6A, 250V Time Lag
Power Consumption	<25 Watts

# Patching Modules

Sensus' patching modules are hot-swappable and can break out or aggregate Duplex LC, 24-fiber MPO, 12-fiber MPO or 8-fiber MPO interfaces to LC or MPO connectivity. Several fiber mapping options allows for versatile cable configurations while simplifying compliance with TIA-5683-D.3 2016 standards for fiber polarity. Patching modules are available in Single Mode OS2 fiber or Multimode OM4 fiber options.

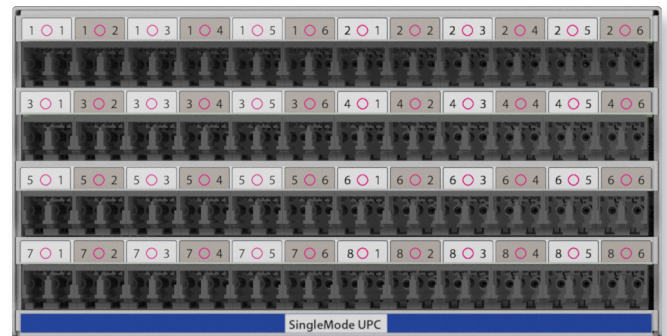


Figure 2: Sensus Patching Module

## Configurable LEDs

Each patching module port (front and rear) has an associated tri-color LED (red, amber or green). Applications for remotely-controlled LEDs may include technician guidance, alarming for unauthorized connections, flagging for maintenance or IEC recommended cleaning, reserving ports, marking for pending connection verification, replication of an associated network device's port status for port extender functionality, or any other user-defined criteria.



Figure 3a: Port Mapping: Duplex LC (Front view)

# User Application Examples

## Work Order Management

The Sensus Work Order Application allows users to remotely deliver and track orders for tasks such as cable maintenance or moves, adds and changes. Work orders can be downloaded to a particular device from the APD client. Technicians can then access those work orders from the device's LCD touchscreen. Sensus tracks the progression of the work order from receipt to completion and communicates the current status to AllPath Director.

## Bit Error Ratio Test (BERT)

Sensus supports an integral Bit Error Ratio Test (BERT) that uses the SFP port on the management module as the signal source. The BERT test port can be connected to an LC port of the patching module to test an end-to-end path for continuity or impairments. The far end of the path under test can either be looped back or connected to the test port of the remote panel. Configuration can be completed by a technician working locally, or a remote user may execute a test provided a LC transceiver is installed and cabled appropriately. Test results are displayed locally and stored on the APD server for future reference.

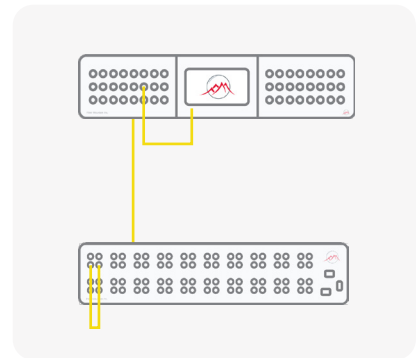


Figure 4: Single Sensus BERT

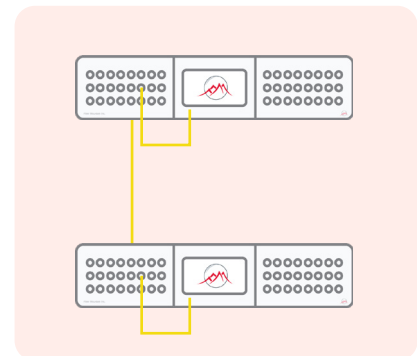


Figure 5: Dual Sensus BERT

# Fiber Mountain’s Glass Core Orchestration - Layer 1 SDN

AllPath Director (APD) SDN orchestration software provides network-wide visibility. Applications are designed to take advantage of the total network view, so tasks such as provisioning end-to-end connectivity are easily performed via point & click workflows. APD also provides documentation management with port labeling, reservation, asset management and more. Security is improved with audit trails providing historical records of provisioning and monitoring changes. A graphical rendering of the layer 1 topology provides a network-wide view of the physical layer, with enhanced features such as Path Finder, which draws out the connection path from a selected port to the destination.



Figure 6: AllPath Director (APD) Software provides full control of all Sensus functions

## Sensus Patching Modules with Front-to-Front Mapping

Catalog No.	Fiber Type	Port Configuration		Fiber Mapping	Color	Example Use Cases
		Front A	Front B			
Single Mode						
		Front A	Front B			
DX-2674-002	SM OS2	36xDuplex LC	3xMPO-24	Type HD-C	White	LC Aggregation to Single Mode 24-Fiber Cable
DX-2672-002	SM OS2	36xDuplex LC	6xMPO-12	Type A	White	LC Aggregation to Single Mode 12-Fiber Cable
DX-2646-002	SM OS2	24xDuplex LC	6xMPO-8	Type A	White	LC Aggregation to Single Mode 8-Fiber Cable
DX-2884-002	SM OS2	12xMPO-08	4xMPO-24	Type HD-A	White	Breakout for MPO-24 to MPO-8
Multimode						
		Front A	Front B			
DX-2774-002	MM OM4	36xDuplex LC	3xMPO-24	Type HD-C	White	LC Aggregation to Multimode 24-Fiber Cable
DX-2772-002	MM OM4	36xDuplex LC	6xMPO-12	Type A	White	LC Aggregation to Multimode 12-Fiber Cable
DX-2746-002	MM OM4	24xDuplex LC	6xMPO-8	Type A	White	LC Aggregation to Multimode 8-Fiber Cable
DX-2984-002	MM OM4	12xMPO-8	4xMPO-24	Type HD-A	White	Breakout for AP-4240, MPO-24 to MPO-8

# Sensus Patching Modules with Front-to-Rear Mapping

Catalog No.	Fiber Type	Port Configuration		Fiber Mapping	Color	Example Use Cases
		Front	Rear			
<b>Single Mode</b>						
DX-2484-002	SM OS2	48xDuplex LC	4xMPO-24	Type HD-C	White	LC Aggregation to Single Mode 24-Fiber Cable
DX-2444-002	SM OS2	24xDuplex LC	2xMPO-24	Type HD-C	White	LC Aggregation to Single Mode 24-Fiber Cable
DX-2482-002	SM OS2	48xDuplex LC	8xMPO-12	Type A	White	LC Aggregation to Single Mode 12-Fiber Cable
DX-2442-002	SM OS2	24xDuplex LC	4xMPO-12	Type A	White	LC Aggregation to Single Mode 12-Fiber Cable
DX-2488-002	SM OS2	48xDuplex LC	12xMPO-8	Type A	White	LC Aggregation to Single Mode 8-Fiber Cable
DX-2446-002	SM OS2	24xDuplex LC	6xMPO-8	Type A	White	LC Aggregation to Single Mode 8-Fiber Cable
DX-2864-002	SM OS2	12xMPO-8	4xMPO-24	Type HD-A	White	Breakout for MPO-24 to MPO-8
DX-2834-002	SM OS2	6xMPO-8	2xMPO-24	Type HD-A	White	Breakout for MPO-24 to MPO-8
DX-2655-002	SM OS2	36xDuplex LC	36xDuplex LC	Type A-A	White	Breakout for LC-to-LC
DX-2852-002	SM OS2	12xMPO-12	12xMPO-12	Type A	White	Breakout for MPO-12 to MPO-12
DX-2854-002	SM OS2	12xMPO-24	12xMPO-24	Type A	White	Breakout for MPO-24 to MPO-24
<b>Multimode</b>						
DX-2584-002	MM OM4	48xDuplex LC	4xMPO-24	Type HD-C	White	LC Aggregation to Multimode 24-Fiber Cable
DX-2544-002	MM OM4	24xDuplex LC	2xMPO-24	Type HD-C	White	LC Aggregation to Multimode 24-Fiber Cable
DX-2582-003	MM OM4	48xDuplex LC	8xMPO-12	Type C	White	LC Aggregation to Multimode 12-Fiber Cable
DX-2542-002	MM OM4	24xDuplex LC	4xMPO-12	Type A	White	LC Aggregation to Multimode 12-Fiber Cable
DX-2588-002	MM OM4	48xDuplex LC	12xMPO-8	Type A	White	LC Aggregation to Multimode 8-Fiber Cable
DX-2546-002	MM OM4	24xDuplex LC	6xMPO-8	Type A	White	LC Aggregation to Multimode 8-Fiber Cable
DX-2964-002	MM OM4	12xMPO-8	4xMPO-24	Type HD-A	White	Breakout for AP-4240, MPO-24 to MPO-8
DX-2934-002	MM OM4	6xMPO-8	2xMPO-24	Type HD-A	White	Breakout for AP-4240, MPO-24 to MPO-8
DX-2755-002	MM OM4	36xDuplex LC	36xDuplex LC	Type A-A	White	Breakout for LC-to-LC
DX-2952-002	MM OM4	12xMPO-12	12xMPO-12	Type A	White	Breakout for MPO-12 to MPO-12
DX-2954-002	MM OM4	12xMPO-24	12xMPO-24	Type A	White	Breakout for MPO-24 to MPO-24

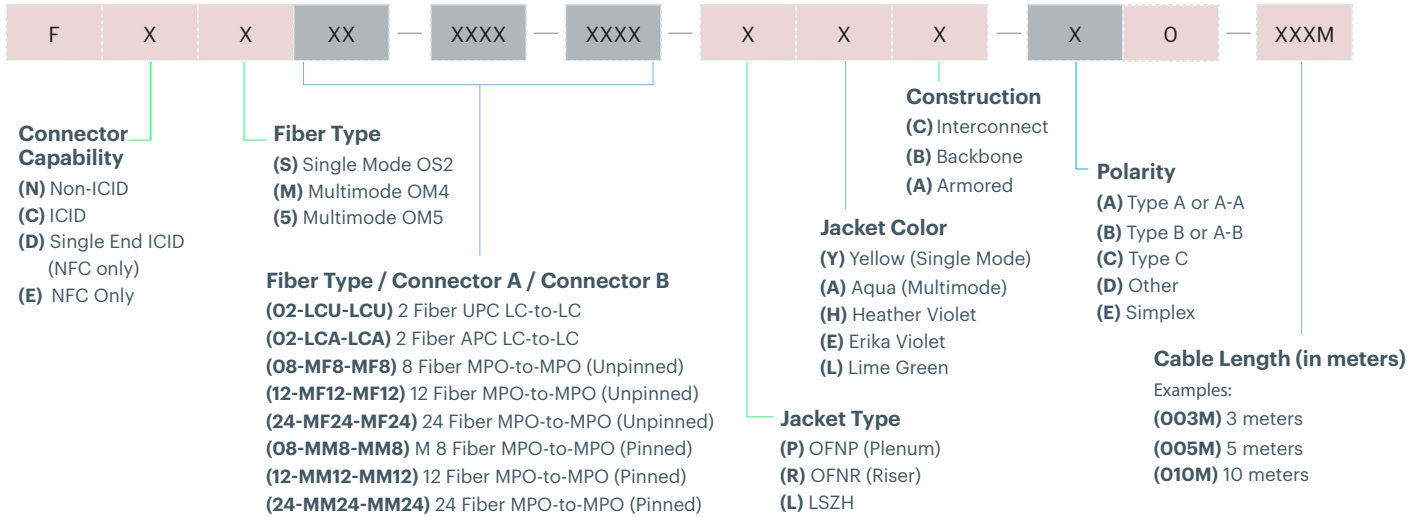
# ICID-Enabled Cables with NFC Capability

Fiber Mountain's pre-terminated multi-fiber Intelligent Connection IDentification (ICID) cables couple with Fiber Mountain products to provide a managed physical layer. ICID-enabled cables are programmed with data relevant to the cable, such as fiber type, manufacturing information, serial number, and a writable field used for tracking connector insertion counts. Connecting an ICID cable to a Fiber Mountain ICID-enabled product provides AllPath Director (APD) access to the details needed to document cable endpoint connections and track connection history. APD will retrieve information needed to create a real-time graphical topology of the physical layer.

While cables can be purchased with ICID pre-installed, ICID can also be field-installed on to Fiber Mountain non-ICID cables or other manufacturers cables.

Capable of handling high-speed 10G, 25G, 40G, or 100G applications, Fiber Mountain's high quality glass-core bend-insensitive cables ensure efficient and consistent data transmission, while robust LC or MPO connectors minimize insertion and return loss. All cables are available in Single Mode or Multimode with either A, B, or C polarity and UL-rated Plenum, Riser, or LSZH jackets.

## Fiber Cable Catalog Number Configuration



	Characteristic	MPO - APC	LC - UPC
<b>Single Mode</b>	Insertion Loss (single fiber max.)	0.35 dB	0.30 dB
	Internal fiber is Single Mode OS2. Both MPO and LC Adapters are black.	Insertion Loss (all fibers typ.)	0.10 dB
	Return Loss (min.)	> 55 dB	> 50 dB
<b>Multimode</b>	Insertion Loss (single fiber max.)	0.35 dB	0.30 dB
	Internal fiber is Multimode OM4. Both MPO and LC Adapters are black.	Insertion Loss (all fibers typ.)	0.10 dB
	Return Loss (min.)	> 20 dB	> 20 dB

## About Fiber Mountain

Glass Core represents a new way of thinking about data center infrastructure. With integrated software and hardware innovations, Glass Core infrastructure enables intelligent Layer 1 SDN switching with highdensity optical connectivity for a software-controlled physical layer and unprecedented network speed and agility.

## Services

Fiber Mountain provides a variety of value added services, including hands-on training, on-site installation, and 24x7 technical support. Contact Fiber Mountain for a schedule of available services.

## Warranty

Return to factory hardware repair or replacement for one year.

### Regulatory & Certifications

UL 60950

IEC 62368-1

CSA C22.2#62368-1

EN 55022 Class B

CENELAC EN 55032

CENELAC EN 55054

FCC 47 CFR Part 15 Subpart B

FCC Part 15 Subpart C 15.225

CISPR 32

ETSI EN 301 489-1

ETSI EN 301 489-3

## Sensus Chassis & Management Module

Catalog No.	Description
DX-2000-002	Sensus Chassis, White*
DX-2100-002	Sensus Management Module (SMM), White*

\*Both a Chassis and a Management Module are needed to make this work.

## Fiber Mountain also supplies

- Fiber management accessories
- 21" and 23" rack-mounting ears for all Sensus panels (19" are standard and included)
- Fiber Cables with ICID for LC and MPO applications

