

# Fiber Optic Communications Interface

3-FIBMB2, SMXLO2, SMXHI2, MMXVR

## Overview

EST3 networks easily configure to single or multi mode fiber optic or combination fiber optic / copper networks using the 3-FIBMB2 Fiber Optic Communications Interface and the appropriate fiber optic transceivers.

The 3-FIBMB2 electronics card plugs right into the CPU. A ribbon cable connects the 3-CPU directly to the 3-FIBMB2 fiber interface card. The interface card mounts in the ½ footprint space in a 3-CHAS7 chassis or 3-CAB5 enclosure.

The 3-FIBMB2 supports from one to four single or multi mode transceivers that plug into the interface card. Each transceiver provides the transmission and reception capability for the network data or digital audio data to/from a 3-FIBMB2 located in the next network node using single and/or multi mode fiber optic cables.

The 3-FIBMB2 also supports copper wire connections, permitting network data and audio communications format changes from copper to single mode fiber, copper to multi-mode fiber, and single to multi-mode fiber, as job conditions require. All copper and fiber circuits can be configured as supervised Class B, Class A, or Class X circuits.

The 3-FIBMB2 has a constant output test signal that simplifies installing and testing multi-mode fiber circuits only, reducing setup and troubleshooting time. Secondary power input terminals and an external 24 Vdc source can be used to provide continuous network and audio data to flow through the 3-FIBMB2, when the panel is powered down for servicing.

## Standard Features

- Class B or Class A or Class X network data connections
- Class B or Class A or Class X audio data connections
- Node to node distances:
  - Multi-mode: Up to 8,000 ft. (2.4 km) using multi-mode fiber
  - Single-mode high power: Up to 24.85 mi (40 km) using single mode fiber driver - model SMXHI2
  - Single-mode low power: Up to 8.7mi (14km) using single mode fiber driver- model SMXLO2
- Built-in test signal
- Secondary power input
- Transition from copper to fiber on same network
- Transition from single to multi-mode fiber on same network

## Application

Fiber optics communication links provide a high level of immunity from electrical noise. The circuits are power limited and suitable for use through hazardous atmospheres. Fiber optic circuits also provide a high level of security and are resistant to the effects of moisture. The choice of either single mode or multi mode fiber links is one of cost vs the distances between nodes. System performance is identical with either single or multi mode fiber. **NOTE:** The 3-FIBMB2/MMXVR is compatible with 3-FIB(A) multi mode fiber modules.

The SMXLO2 standard output single mode transceiver is suitable for distances up to approximately 8.7 miles (14km). The SMXHI2 high output single mode transceiver is available to span distances up to approximately 24 miles (40km).

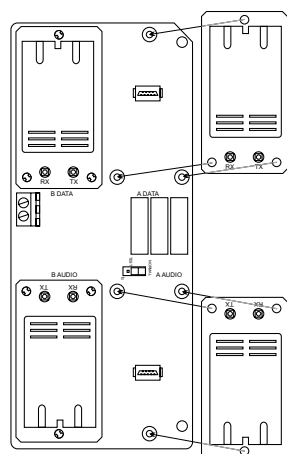
For multi mode applications, the MMXVR transceiver is suitable for distances up to approximately 8,000ft (2,400m). Actual distances are dependent on the losses in each fiber optic circuit, and should be calculated for each installation. One transceiver is required for

each fiber side of both network and audio links. Simply order the required type and number and type of transceiver(s) for your application.

## Engineering Specification

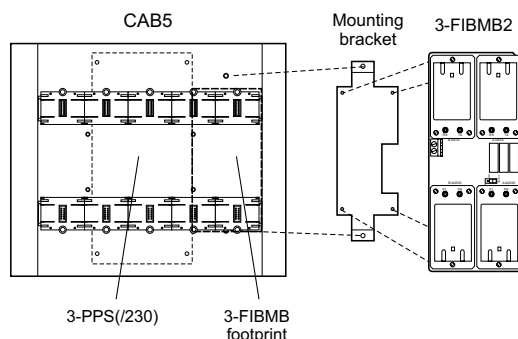
The intra-node communications links for network and digital audio data shall utilize copper and/or fiber optic connections. The fiber optics interface card shall provide Class B, Class A, or Class X connections. It shall be possible to convert from fiber optic cable to copper wiring or from copper wiring to fiber optic cable at any network panel node. The fiber optics interface card shall have provisions for an external power source input to permit continuous network and audio data to flow through a network node while primary node power is removed for servicing purposes. The fiber optics interface card shall provide a constant output test signal for maintenance and troubleshooting purposes. The fiber optics interface module shall utilize single/multi mode fiber with SC single mode or ST multi-mode connectors.

## Installation and Mounting

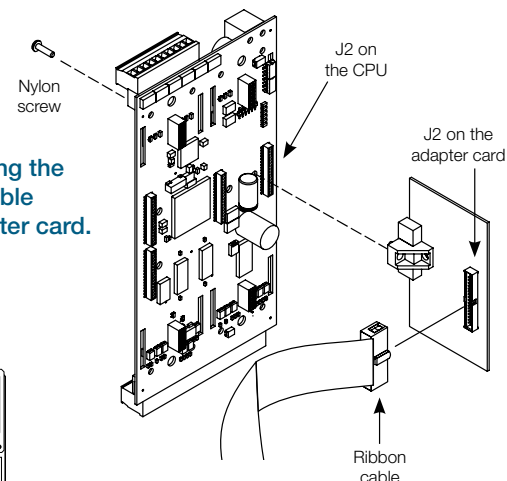


**Attaching the transceivers.**  
Any type of transceiver can be mounted in any of the four positions on the board.

**Mounting the bracket and the 3-FIBMB2 to a CAB5 enclosure**

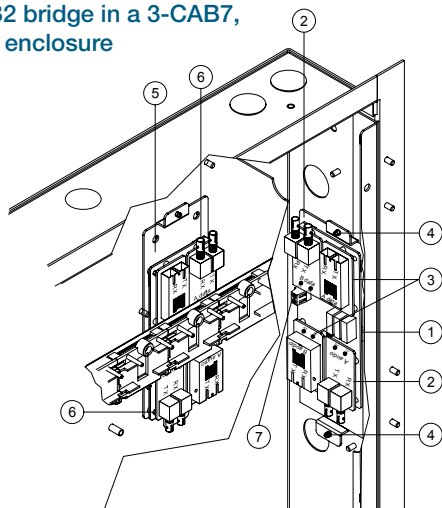


**Connecting the ribbon cable and adapter card.**

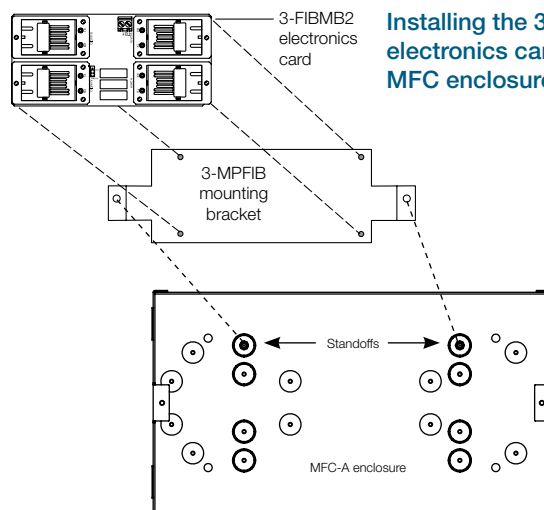


**Installing the 3-FIBMB2 bridge in a 3-CAB7, 3-CAB14, or 3-CAB21 enclosure**

1. 3-FIBMB2 electronics card on a 3-MPFIB mounting bracket
2. MMXVRs in the B data slot and A audio slot on the 3-FIBMB2
3. SMXLO2/SMXHI2 in the A data slot and B audio slot on the 3-FIBMB2
4. Mounting studs
5. Existing 3-FIBMB
6. MMXVR in the A data slot and B audio slot on the 3-FIBMB
7. 24 VDC

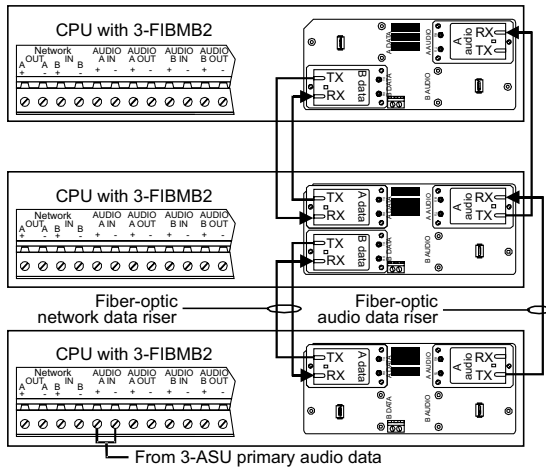


**Installing the 3-FIBMB2 electronics card in an MFC enclosure**

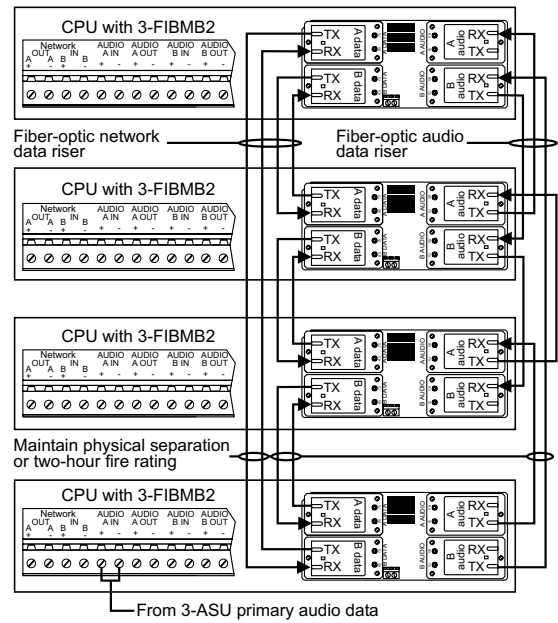


## Typical Wiring

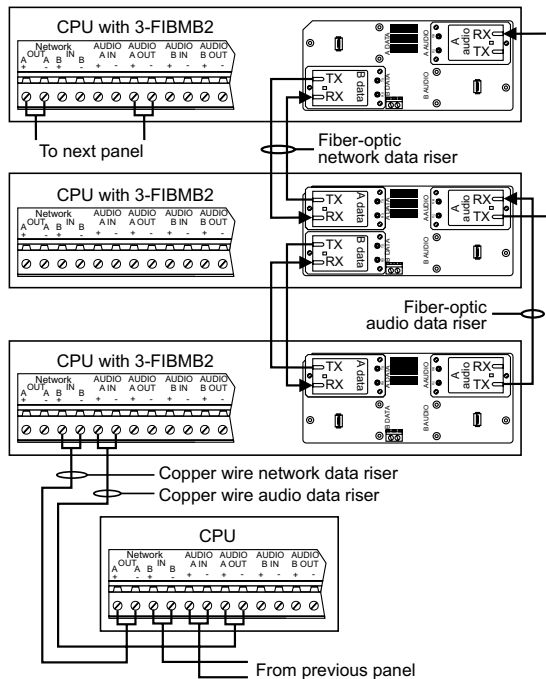
The following wiring diagrams can be used with single or multimode fiber. If using single mode use the SMXLO2 or SMXHI2 transceivers. If using multimode use the MMXVR transceivers.



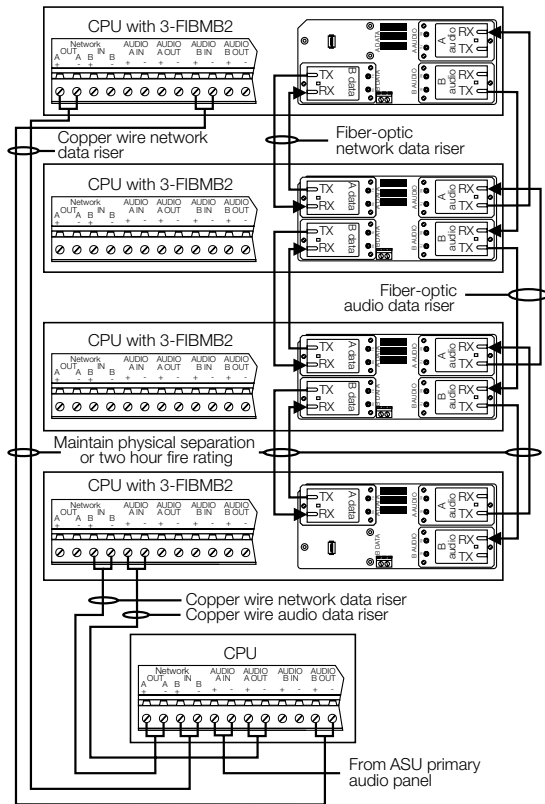
3-FIBMB2 Class B network and audio fiber-optic connections



3-CPU Class A or Class X network & audio fiber connections

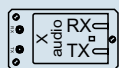


Class B hybrid fiber-optic and copper wire network and audio connections

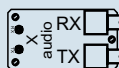


3-CPU hybrid fiber-optic and copper wire network and Class A or Class X fiber-optic and copper wire audio

### Legend



Single mode transceiver

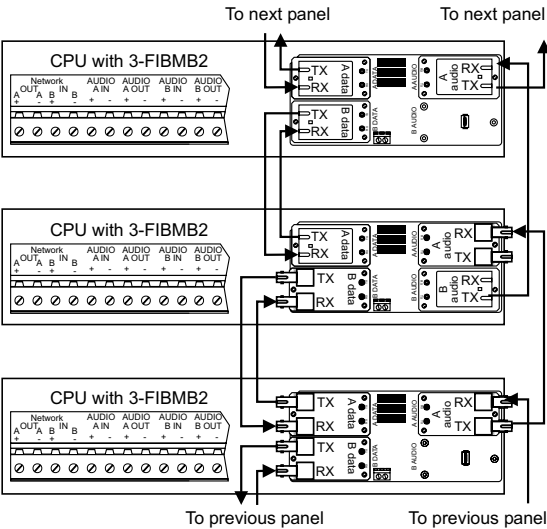
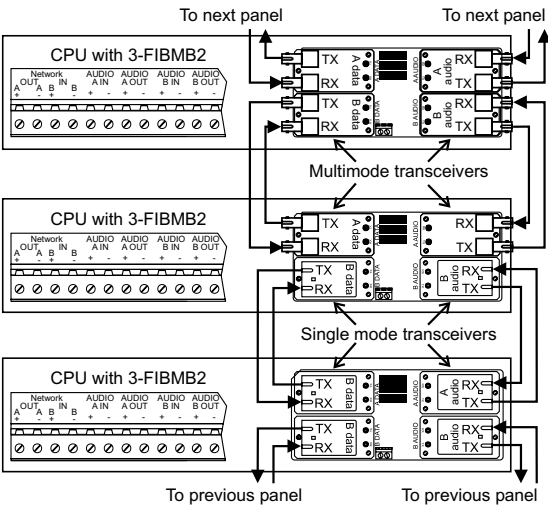


Multimode transceiver

**Note:** These diagrams are for general information only. For more wiring diagrams and installation details, please refer to 3-FIBMB2 Fiber Optic Interface, Installation Sheet 3101835.

Using single and multimode transceivers

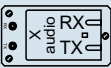
Transition from single mode fiber to multimode fiber requires special configuration for the audio circuit. The following wiring diagrams show how to wire audio circuits in Class B, Class A, or Class X using single mode and multimode fiber.



Data and audio circuit for Class A or Class X using single mode and multimode fiber

Data and audio circuit for Class B using single mode and multimode fiber

Legend



Single mode transceiver



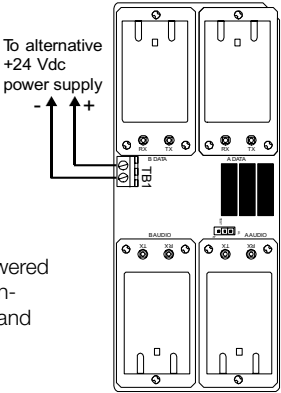
Multimode transceiver

**Note:** These diagrams are for general information only. For more wiring diagrams and installation details, please refer to *3-FIBMB2 Fiber Optic Interface*, Installation Sheet 3101835.

Wiring alternative power terminals

The 3-FIBMB2 provides a secondary power option, permitting communications to flow through the module, even with panel power disconnected.

**Note:** In the event a panel needs to be powered down for service; a 24 V battery can be connected to the module to maintain network and audio communications during servicing.



## Specifications

Agency Listings	UL, ULC
Installation	Connector J2 of 3-CPU1. Fiber card mounts on ½ footprint 3-CHAS7, 3-CAB5 enclosure, or an MFC-A cabinet.
Compatibility	3-CPU1 and later
Single Mode (network & audio)	Budget 15 dBm (approximately 8.7mi. [14km] max). SMXLO2 8.7mi. [14km] max). SMXHI2 25 dBm (approximately 24.85 mi. [40km] max). <sup>1</sup> Wavelength 1300nm Cable Type 8.3μ Single Mode Connector Duplex SC
Multi mode (network & audio)	MMXVR Budget 10 dBm (approximately 8,000 ft [2.4 km] max). Wavelength 820nm Cable Type 50/125μ , 62.5/125μ or 100/140μ Multi mode Connector ST
Network Data Circuit	Circuit Configuration Class B or Class A Data Rate 19.2K, or 38.4K Baud Isolation From "previous" 3-CPU using copper, total isolation using fiber optics
Digital Audio Data Circuit	Circuit Configuration Class B, Class A, or Class X Data Rate 327K Baud Isolation From "previous" 3-CPU using copper, total isolation using fiber optics
Copper Wired Network Data Circuit Segment	Circuit Length 5.000ft (1,524 m) max. between any three panels Circuit Resistance 90 Ohms, max. Circuit Capacitance 0.3μf max. Wire Type Twisted pair, 18 AWG (0.75 mm²) min
Copper Wired Audio Data Circuit Segment	Circuit Length 5.000 ft (1,524 m) max. between any three panels Circuit Resistance 90 Ohms, max. Circuit Capacitance 0.09 μf max. Wire Type Twisted pair, 18 AWG (0.75mm²) min
Eye Safety	Complies with: FDA CDRH 2 -CFR 1040 Class 1 and IEC 825 Issue 1.1 1993:11 Class 1; CENELEC EN60825 Class 1
Power Consumption Supervisory and/or Alarm	3-FIBMB2: 105 mA @ 24Vdc Add 79 mA for each SMXLO2 and SMXHI2 Add 20 mA for each MMSVR
Operating Environment	Temperature: 32° F - 120° F (0° C - 49° C) Humidity 93% RH, Non-condensing @ 90° F (32° C)

<sup>1</sup> A minimum fiber attenuation of -8dBm is required when using the SMXHI2 in order to prevent overloading the receiver.

## Ordering Information

Catalog Number	Description	Shipping Wt., lb (kg)
3-FIBMB2	Fiber Optic Communications Interface (requires one or more transceivers) c/w mounting bracket for 3-CHAS7 or 3-CAB5 enclosure mounting	1.0(.45)
*SMXLO2	Plug-In standard output single mode transceiver for 3-FIBMB2	0.5(.23)
*SMXHI2	Plug-In high output single mode transceiver for 3-FIBMB2	0.5(.23)
*MMXVR	Plug-In standard output multi mode transceiver for 3-FIBMB2	0.5(.23)

\* 1 to 4 transceivers required, depending on application.