



Fiber Optic Data Transmission System

Installation Instructions

Part Numbers:

HXA/HXB-1L-x (ST/FC) 1 Fiber

HX-1L-x (ST/FC) 2 Fiber

***(Bi-Directional High-Speed TTL Data Transceiver
on Screw Terminal Type Connector)***

HXA/HXB-1L-xB (ST/FC) 1 Fiber

HX-1L-xB (ST/FC) 2 Fiber

***(Bi-Directional High-Speed TTL Data Transceiver
on 50 Ohm BNC Type Connector)***

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HX & HXA/HXB-1L-x **Fiber Optic TTL Data Transmission System** **Installation Instructions**

1.0 Product Description

Meridian's HX & HXA/HXB-1L-x products are fiber optic modems that transmit one channel of bi-directional high-speed TTL data signals over one optical fiber (HXA/HXB) or two optical fibers (HX). This product series uses Meridian's standard 1-slot wide chassis mount card assembly and plugs into the following Meridian chassis: SR-500/S, SR-1002/S, SR-1600/S and SR-2001 & SR-2000 series equipment chassis.

Both ST and FC optical connectors are supported, depending on the part number. An ST optical interface is available for both multimode and singlemode fiber applications while the FC optical interface are available only for singlemode products. Conformal coating provides an additional level of protection from environments with high humidity.

2.0 Installation

Series HX & HXA/HXB-1L-x products are one-slot wide cards and, as such, occupy one slot in Meridian's standard chassis. To install in these chassis, orient the card with the Meridian logo at the top of the module and slide onto the top and bottom card guides in the chassis. Press securely on the top and bottom of the module to ensure that it is fully seated in the chassis so that the electrical connector mates with the chassis-mounted motherboard. Once installed, manually tighten the two thumbscrews located at the top and bottom of the card. Do not use tools to secure these and do not over tighten.

Note: A fully loaded 19" subrack should have forced-air cooling to avoid excessive heat generation inside the chassis. A fan assembly tray (P/N FA-2000) with three (3) fans is available and should be installed under the 19" SR-2000/1 whenever possible.

3.0 Product Signal Format & Specifications

The HX & HXA/HXB-1L-x series products transmit and receive the following signals:

Signal Type	Channels	Transmit	Receive
TTL (Tx & Rx data)	1	Yes	Yes

The tables below identify the specifications for the various signals that these modems transmit/receive.

Data	
Formats	TTL Data
Data Rate	DC to 4 Mb/s*
Bit Error Rate (BER)	Better than 10^{-9}
Jitter	20ns max.
TX/RX Latency	200ns max.

* Mesurered @ max. optical budget

Connectors	
Data	Screw Terminal or 50 Ohm BNC
Optical	Singlemode – ST or FC Multimode - ST

3.1 Optical Specifications

The table below lists the optical specifications for both singlemode and multimode fiber applications.

Optical Specifications						
Fiber Type/Size (um)	Optical Output (dBm)	Rx Sensitivity (dBm)	Optical Budget (dB)	Wavelength (nm)	Optical connector	Optical Dynamic Range (Db)
One Fiber Units						
Multimode (Laser) 62.5 / 125	-5	-25	20	850/1300	ST	25
Singlemode (FP Laser) 9 / 125	-5	-25	20	1310/1550	ST, FC	25
Two Fiber Units						
Multimode (Laser) 62.5 / 125	-5	-27	22	1300	ST	27
Singlemode (FP Laser) 9 / 125	-5	-27	22	1310	ST, FC	27
Singlemode (CWDM DFB Laser) 9 / 125	+1	-27	28	1270-1610	ST, FC	27

Refer to section 6.0 for CWDM wavelength selections.

4.0 Data Connector Pin Assignment

The 14 pin terminal block connector on the front of the module is used for Data interface. Refer to the table below for the signal pinouts associated with the appropriate module part number found in Appendix 1.

The HX & HXA/HXB-1L-x Data channels in Port 1 and shown in the table below.

Pin #	PORT 1 Data Connector Pinout Assignment
1	Ch 1 DATA INPUT
2	NA
3	Ch 1 DATA OUTPUT
4	NA
5	GROUND

In HX & HXA/HXB-1L-xB The BNC connector on the front of the module is used for Data interface. BNC Port 2 – TTL Data Input, BNC Port 3 – TTL Data Output.

4.1 Front Panel Indicator Lights

There are 6 LED indicator lights mounted on the left side of the module's front panel (see Figure 4.1 below). These indicators show the operation status of the module's power, optical carriers and data channels. *Card Diagnostic only if applicable. These indicators can be used for troubleshooting the module as well as the, electrical and optical connections.

Not all of the LEDs apply to all versions of these modules. Please refer to the module's part number for the appropriate signals, description.

Indicator	Function
Power	Green – ON
Diag*	Diagnostic (Green – OK, Red – Alarm)
Tx C/L	Optical Carrier Output (Green – OK, Red – Overload)
Rx C/E	Optical Carrier Input (Green – OK, Red – Error)
TX Data 1	Data input - Green
RX Data 1	Data output - Green

HXA/HXB-1L-X

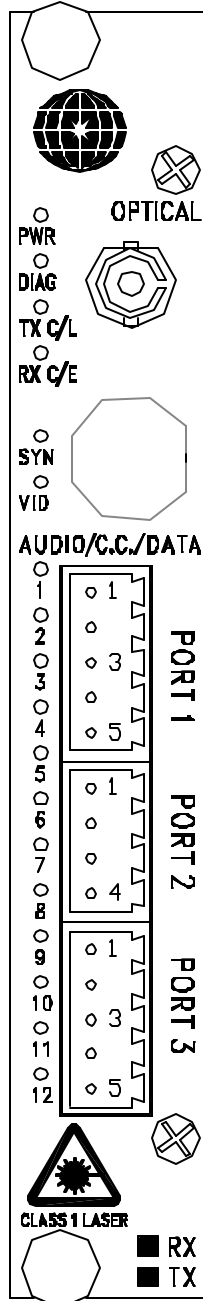
<1 FIBER> PINOUT DIAGRAM

STATUS INDICATORS

PWR - POWER (GREEN)
 DIAG - CARD DIAGNOSTIC*
 (GREEN-OK, RED-ALARM)
 TX C/L - TX CARRIER (GREEN)
 /OVERLOAD (RED)
 RX C/E - RX CARRIER (GREEN)
 /ERROR (RED)
 SYN - NA
 VID - NA

STATUS INDICATORS

1 - NA
 2 - NA
 3 - NA
 4 - NA
 5 - NA
 6 - NA
 7 - (CH.1) DATA INPUT (GREEN)
 8 - (CH.1) DATA OUTPUT (GREEN)
 9 - NA
 10 - NA
 11 - NA
 12 - NA



OPTICAL PORT (ST, FC)

PORT 1 DATA INPUT/OUTPUT

1. TTL DATA INPUT
 2. NA
 3. TTL DATA OUTPUT
 4. NA
 5. GROUND

Figure 4.1
HXA/HXB-1L-x Front Panel Layout Diagram For One
Optical Fiber and Screw Terminal Type Connector

HX-1L-X

(2 FIBER)

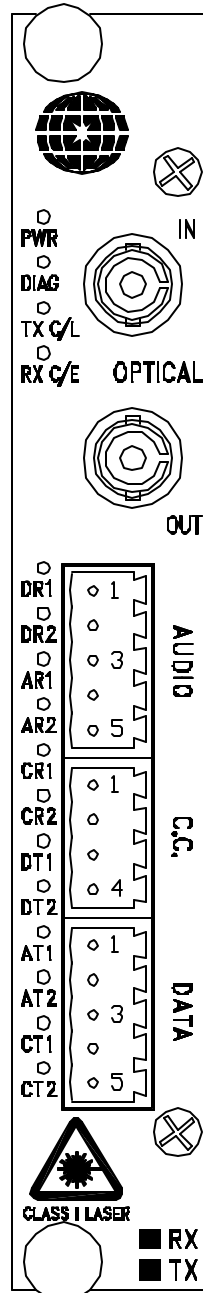
PINOUT DIAGRAM

STATUS INDICATORS

PWR - POWER (GREEN)
 DIAG - CARD DIAGNOSTIC*
 (GREEN-OK, RED-ALARM)
 TX C/L - TX CARRIER (GREEN)
 /OVERLOAD (RED)
 RX C/E - RX CARRIER (GREEN)
 /ERROR (RED)
 SYN - NA
 VID - NA

STATUS INDICATORS

DR1 - NA
 DR2 - NA
 AR1 - NA
 AR2 - NA
 CR1 - NA
 CR2 - NA
 DT1 - (CH.1) DATA INPUT (GREEN)
 DT2 - (CH.1) DATA OUTPUT (GREEN)
 AT1 - NA
 AT2 - NA
 CT1 - NA
 CT2 - NA



OPTICAL PORT INPUT (ST, FC)

OPTICAL PORT OUTPUT (ST,FC)

AUDIO/DATA INPUT/OUTPUT

1. TTL DATA INPUT
2. NA
3. TTL DATA OUTPUT
4. NA
5. GROUND

Figure 4.2
HX-1L-x Front Panel Layout Diagram For Two
Optical Fibers and Screw Terminal Type

HXA/HXB-1L-XB

PINOUT DIAGRAM

STATUS INDICATORS

PWR - POWER (GREEN)

TX - TX CARRIER (GREEN)/ ERROR (RED)

RX - RX CARRIER (GREEN)/ ERROR (RED)

LAS - NA

SIG - NA

LOC - NA

SD - NA

HD - NA

SYN - NA

VIDEO - NA

SYN - NA

VIDEO - NA

TD1 - (CH.1) DATA INPUT (GREEN)

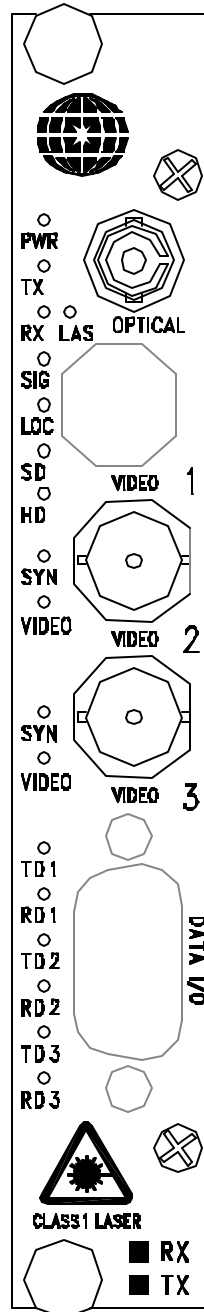
RD1 - (CH.1) DATA OUTPUT (GREEN)

TD2 - NA

RD2 - NA

TD3 - NA

RD3 - NA



OPTICAL PORT (ST, FC)

TTL DATA INPUT PORT 2

TTL DATA OUTPUT PORT 3

N/A

Figure 4.3
HXA/HXB-1L-xB Front Panel Layout Diagram For
One Optical Fiber and BNC Type Connector

HX-1L-XB

PINOUT DIAGRAM

STATUS INDICATORS

PWR - POWER (GREEN)

TX - TX CARRIER (GREEN)/ ERROR (RED)

RX - RX CARRIER (GREEN)/ ERROR (RED)

LAS - NA

SIG - NA

LOC - NA

SD - NA

HD - NA

SYN - NA

VIDEO - NA

SYN - NA

VIDEO - NA

TD1 - (CH.1) DATA INPUT (GREEN)

RD1 - (CH.1) DATA OUTPUT (GREEN)

TD2 - NA

RD2 - NA

TD3 - NA

RD3 - NA

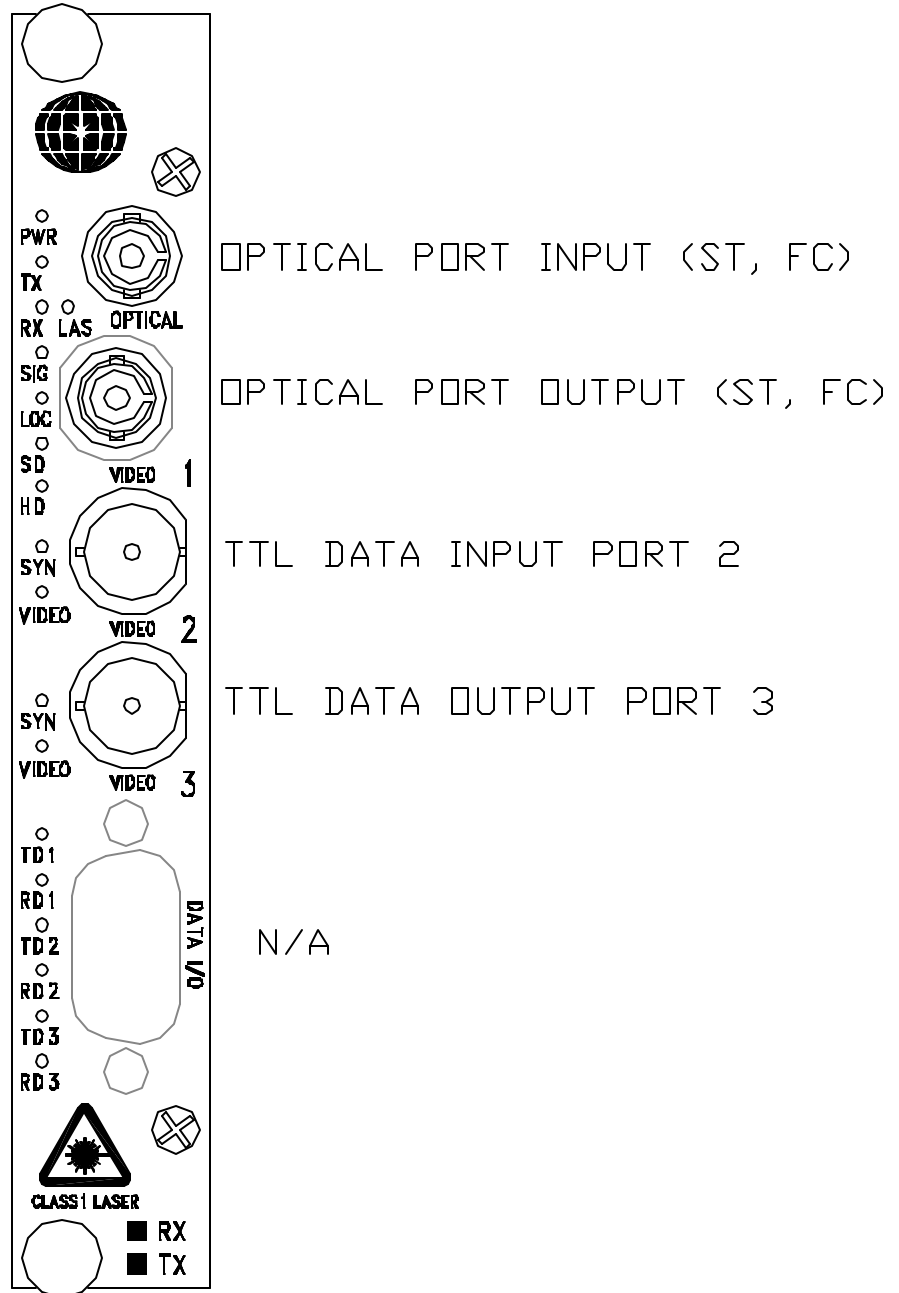


Figure 4.4

HX-1L-xB Front Panel Layout Diagram For Two Optical Fibers and BNC Type Connector

5.0 Product Part Number Variations

The table below lists the various part numbers and description that are available for one fiber series of product.

<u>Side “A”</u>	<u>Side “B”</u>	<u># Fibers & Type</u>	<u>Wavelength</u>	<u>Optical Connector</u>
HXA-1L-2	HXB-1L-2	1 (MM)	1300/850nm	ST
HXA-1L-5	HXB-1L-5	1 (SM)	1310/1550nm	FC
HXA-1L-5ST	HXB-1L-5ST	1 (SM)	1310/1550nm	ST

For BNC type connector add “B”

6.0 2 Fiber, CWDM Option

These cards are also available with a CWDM laser/wavelength. In this configuration, 1 fiber on each unit is used for transmission of the uni-directional signals. One of the 2-fiber HX cards will incorporate one of the CWDM wavelengths while the complementary HX card will use a different CWDM wavelength. Since the receiver portion of the card is wavelength agnostic, it is not necessary to specify the wavelength of the receive channel. This receive channel will receive any wavelength from 1270nm to 1625nm. The table below shows these various wavelength combinations for this particular unit. Please consult the part number label on the rear of the unit to properly identify the wavelengths for your specific cards.

Part #	Transmit Wavelength
HX-1L-27	1270nm
HX-1L-29	1290nm
HX-1L-31	1310nm
HX-1L-33	1330nm
HX-1L-35	1350nm
HX-1L-37	1370nm
HX-1L-39	1390nm
HX-1L-41	1410nm
HX-1L-47	1470nm
HX-1L-49	1490nm
HX-1L-51	1510nm
HX-1L-53	1530nm
HX-1L-55	1550nm
HX-1L-57	1570nm
HX-1L-59	1590nm
HX-1L-61	1610nm

When using in a system with a CWDM multiplexer/demultiplexer, it is essential that the specific wavelengths to and from these units be connected to the corresponding input/output wavelengths on the CWDM mux/demux units. Otherwise, the individual wavelengths will not pass through the CWMD mux/demux device.

When using higher power CWDM lasers, an external attenuator of 5dB minimum is required when performing short distance testing to eliminate optical overload at the Rx card.

7.0 Troubleshooting

Below is a listing of several problems that may arise during the installation & operation of the modules. If you are having difficulty installing or operating the modules please refer to this list below.

- Problem:** *Module does not fit in chassis slots*
Action: Check module orientation. Meridian “Globe” must be oriented on the top left hand side of the module. Make sure the card guides in the chassis are aligned with the extrusion on the module.
- Problem:** *Card power LED does not light when power to the module/subrack is applied or power indicator turns on and off*
Action: Check power supply to ensure that it is plugged in and turned on. If flashing continues, move module to another chassis or location in the same chassis, if available.
- Problem:** *No Data*
Action: Verify that the PWR, Tx and Rx lights on both modems are on GREEN. Confirm that the data pinouts/connections are correct (see section 4.0 for data pinout connections). Verify that the TD1 light flashes when transmitting data and that the corresponding RD1 light on the other modem is flashing. Confirm that the data connections are correct (Check to ensure that the data source is operating properly). The front panel lights located next to the DB9 connector should be flashing as data is being sent to the transmit side. Check to ensure that data is being transmitted to the unit.

If the problem still persists after reviewing the above items, please contact Meridian technical support (516-285-1000).

Notes:



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