



Fiber Optic Data Transmission System

Installation Instructions

Part Number:

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

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

(Bi-Directional High-Speed RS-422 Data Transceiver)

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HX & HXA/HXB-1F-x
Fiber Optic RS-422 Data Transmission System
Installation Instructions

1.0 Product Description

Meridian's HX & HXA/HXB-1F-x products are fiber optic modems that transmit one channel of bi-directional high-speed RS-422 data signals over one optical fiber (HXA/HXB) or two optical fibers (HX) using digital transmission technologies. 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. The FC optical interface is available only for singlemode products. Optional conformal coating provides an additional level of protection from environments with high humidity.

2.0 Installation

Series HXA/HXB-1F-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-1F-x series products transmit and receive the following signals:

Signal Type	Channels	Transmit	Receive
RS-422 (Tx & Rx data)	1	Yes	Yes

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

Data	
Formats	RS-422
Data Rate	DC to 4 Mb/s
Bit Error Rate (BER)	Better than 10^{-9}
PWD	10%

Connectors	
Data	DB9 Female
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 7.0 for CWDM wavelength selections.

4.0 Data Connector Pin Assignment

The DB9 female connector on the front of the module is used for Data interfaces. Refer to the table below for the signal pinouts associated with the appropriate module part number found in Appendix 1.

This module supports the following data formats:

RS-422 One channel high-speed.

The RS-422 channel is used for transmitting/receiving one channel of RS-422 signals.

The HX & HXA/HXB-1F-x Data channels connector pinouts are shown in the table below.

Pin #	DB-9F Data Connector Pinout Assignment
1	Ch 1 INPUT-
2	Ch 1 INPUT+
3	Ch 1 OUTPUT-
4	Ch 1 OUTPUT+
5	GROUND
6	NA
7	NA
8	NA
9	NA

Pin #	Screw Terminal Type Connector Pinout Assignment
1	Ch 1 INPUT-
2	Ch 1 INPUT+
3	Ch 1 OUTPUT-
4	Ch 1 OUTPUT+
5	GROUND

PORT 1

4.1 Front Panel Indicator Lights

There are 5 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. These indicators can be used for troubleshooting the module, 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
Tx Carrier	Optical output (Green – OK, Red – Error)
Rx Carrier	Optical Carrier input (Green – OK, Red – Error)
TX Data 1	Data input - Green
RX Data 1	Data output - Green

HXA/HXB-1F-X

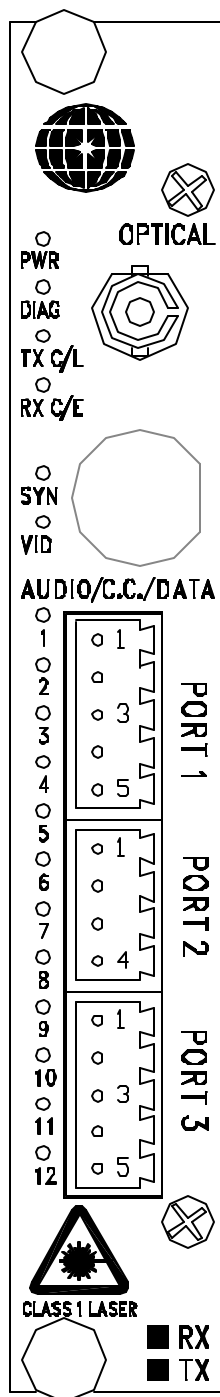
PINOUT DIAGRAM

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)

AUDIO/DATA INPUT/OUTPUT

1. (CH.1) DATA INPUT-
 2. (CH.1) DATA INPUT+
 3. (CH.1) DATA OUTPUT-
 4. (CH.1) DATA OUTPUT+
 5. GROUND

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

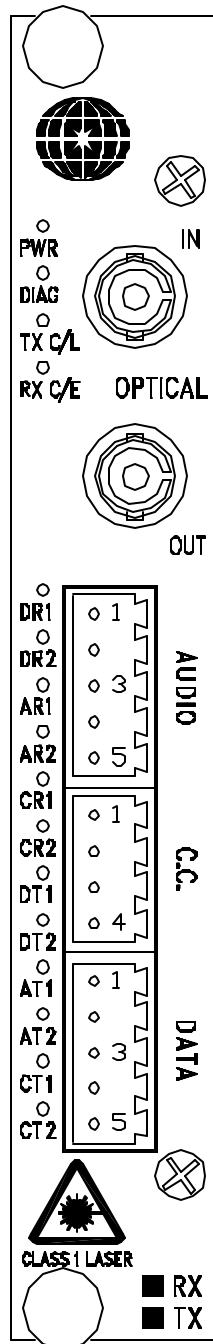
HX-1F-X (2 FIBER) PINOUT DIAGRAM

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. (CH.1) DATA INPUT-
2. (CH.1) DATA INPUT+
3. (CH.1) DATA OUTPUT-
4. (CH.1) DATA OUTPUT+
5. GROUND

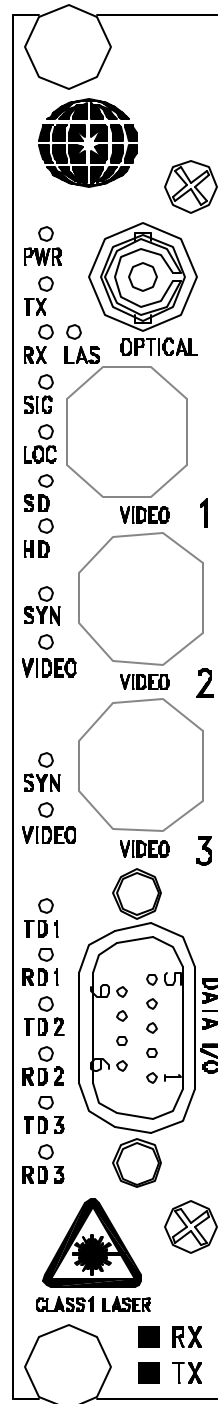
Figure 4.2
HX-1F-x Front Panel Layout Diagram For Two Optical
Fibers and Screw Terminal Type Connector

HXA/HXB-1F-XN

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)

DATA INPUT/OUTPUT
(DB-9 FEMALE)

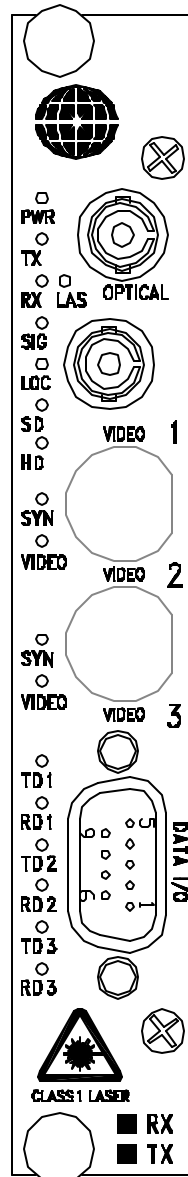
1. (CH.1) DATA INPUT-
2. (CH.1) DATA INPUT+
3. (CH.1) DATA OUTPUT-
4. (CH.1) DATA OUTPUT+
5. GROUND
6. NA
7. NA
8. NA
9. NA

Figure 4.3
HXA/HXB-1F-x Front Pane Layout Diagram For One
Optical Fiber and DB9F Type Connector

HX-1F-X/X (2 FIBER) 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 INPUT (ST, FC)

OPTICAL PORT OUTPUT (ST,FC)

DATA INPUT/OUTPUT
(DB-9 FEMALE)

1. (CH.1) DATA INPUT-
2. (CH.1) DATA INPUT+
3. (CH.1) DATA OUTPUT-
4. (CH.1) DATA OUTPUT+
5. GROUND
6. NA
7. NA
8. NA
9. NA

Figure 4.4
HXA/HXB-1F-x Front Pane Layout Diagram For Two Optical Fibers and DB9F Type Connector

5.0 Data Switch Settings

A group of 10 switches is located on the bottom center of the module's circuit card (see figure 5.1 below). The first six of these switches control the data format for ch.1 that is transmitted/received. These switches on both the transmitter and receiver must be set the same in order to have proper data communications format between them.

The figure and table below illustrates these switch locations on the board and how they are configured for the proper data format options. The factory-supplied default setting is for RS-422 data (Switch #1-2 ON (down) Switch #3-6 OFF (up)).

RS-422 Data Format Selection Switch Settings	
Switch #1	ON (down)
Switch #2	ON (down)
Switch #3	OFF (up)
Switch #4	OFF (up)
Switch #5	OFF (up)
Switch #6	OFF (up)

Switches #7-9 factory-supplied default settings are OFF (up). These switches are used to configure data load for TX and RX cards. The illustration below describes the function of each of these switches.

Data Load Format Selection Switch Settings		
	Load Disable	Load Enable
Switch #7	ON (down)	OFF (up)
Switch #8	NA	OFF (up)
Switch #9	NA	OFF (up)

Switch #10 preset by Meridian technician.

Test Signals	
Switch #1	0 - RS-422 DATA
Switch #2	0 - RS-422 DATA
Switch #3	1 - NA*
Switch #4	1 - NA*
Switch #5	1 - NA*
Switch #6	1 - NA*
Switch #7	1 - Load Enable / 0 - Load Disable
Switch #8	1 - NA*
Switch #9	1 - NA*
Switch #10	1 - DB-9 F.P. / 0 - Screw Terminal

*Default switch settings all off(1).

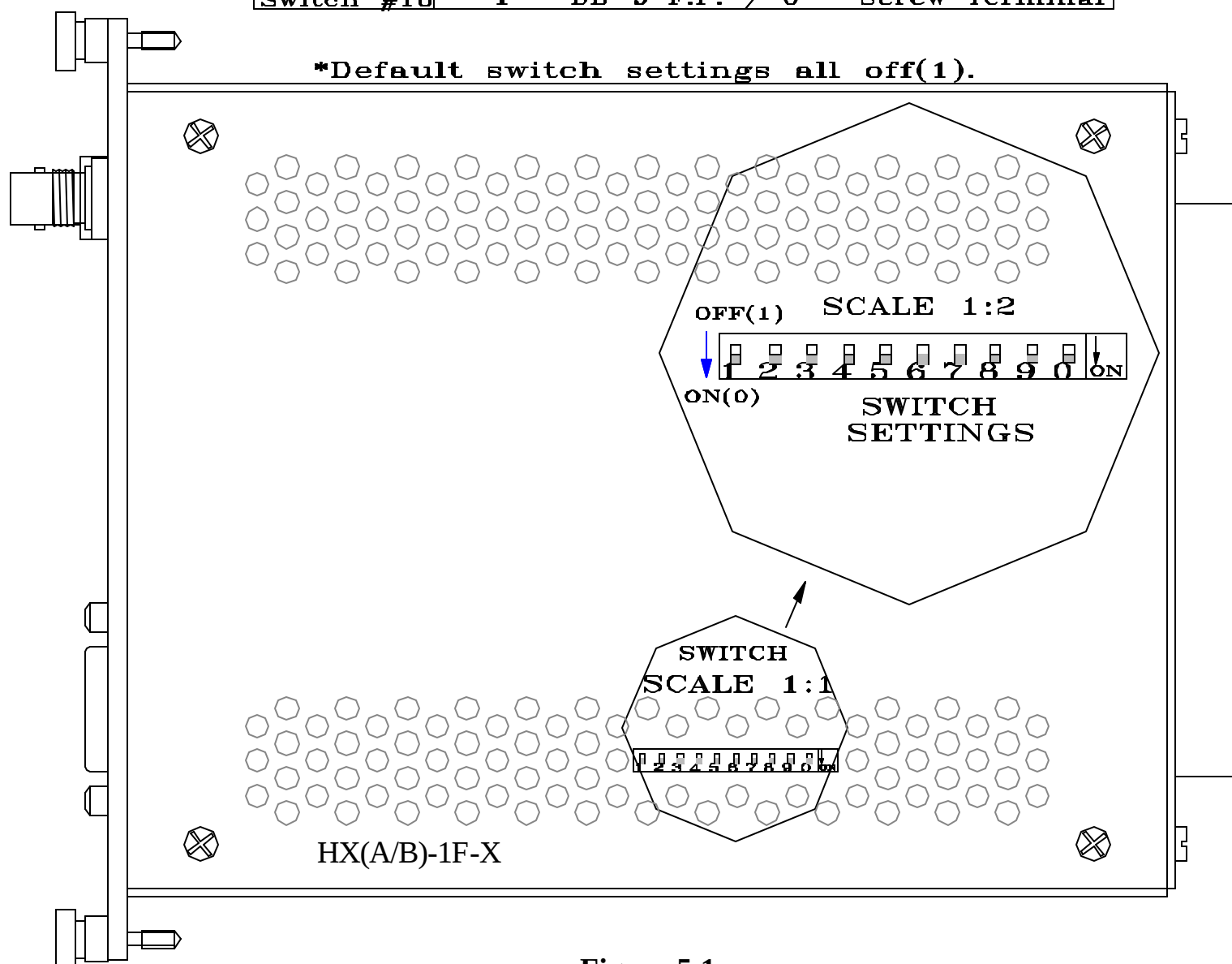


Figure 5.1

1-Slot Module Data Format Selection Switch Location

6.0 Product Part Number Variations

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

Product Part Number Guide			
Part Number	Matching Part #	Fiber Interface	Optical Connector
HXA-1F-2	HXB-1F-2	Multimode	ST
HXA-1F-5	HXB-1F-5	Singlemode	FC
HXA-1F-5ST	HXB-1F-5ST	Singlemode	ST

For DB-9F type connector add “N”

7.0 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-1F-27	1270nm
HX-1F-29	1290nm
HX-1F-31	1310nm
HX-1F-33	1330nm
HX-1F-35	1350nm
HX-1F-37	1370nm
HX-1F-39	1390nm
HX-1F-41	1410nm
HX-1F-47	1470nm
HX-1F-49	1490nm
HX-1F-51	1510nm
HX-1F-53	1530nm
HX-1F-55	1550nm
HX-1F-57	1570nm
HX-1F-59	1590nm
HX-1F-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.

8.0 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 Tx Carrier light*

Action: Optical module is defective, return to factory for repair.

Problem: *No Rx Carrier light*

Action: Received optical signal absent or low. Check fiber connection and optical power at receiver.

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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