



Fiber Optic Data Transmission System

Installation Instructions



FXA-1G/1G-SFP
FXB-1G/1G-SFP

1 Bi-directional channel Multiprotocol Data Tx/Rx

Document Version 1.2
08/24/2023

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1.0 Product Description

Meridian's product series FXA/FXB-1G/1G-SFP are fiber optic modems that transmit one channel of bi-directional user selectable RS-232, RS-422 and RS-485 (2 & 4 wire) data signals using the industry standard Small Form Pluggable (SFP) optical device. This product series uses Meridian's standard 1- slot wide chassis mount card assembly and plugs into the following Meridian chassis: SR500/S, 1002/S, SR-1600/S and SR-2001 & SR-2000 series 19" equipment chassis.

SFP optical modules are supported.

Optional conformal coating provides an additional level of protection from environments with high humidity. Refer to Appendix 1 at the back of this manual for the module part numbers applicable in this manual.

2.0 Installation

Series FXA/FXB-1G/1G-SFP products are one-slot wide cards and 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" sub-rack 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 FXA/FXB-1G/1G-SFP cards are transmit and receive the following signals:

Signal Type	Channels	Transmit	Receive
RS-232 (Tx & Rx data)	1	Yes	Yes
RS-422 (Tx & Rx data)	1	Yes	Yes
RS-485 (2 & 4-wire)	1	Yes	Yes

The specifications for the signals transmitted and received are:

Data	
Formats	RS-232, RS-422, RS-485 (2 or 4 wire)
Data Rate (RS-232)	DC to 125 Kb/s
Data Rate (RS-422 & RS-485)	DC to 250 Kb/s
Bit Error Rate (BER)	Better than 10^{-9}

Connectors	
Data	14-pin Screw Terminal (5 pin connector for Multiprotocol data)
Optical	single-mode – ST or FC; multimode - ST

3.1 Optical Specifications

The SFP series products are available for both single-mode and multimode fiber applications and either one or two fiber versions. Recommended optical speed for this product 155Mbps. Refer to optical SFP table for complete part and ordering information on a SFP optical devices refer to “SFP Optical Modules” under “Products” menu on Meridian Technologies website or just use following link:

http://www.meridian-tech.com/downloads/datasheets/datasheet_SFP_optical_devices-x.pdf



Compliant with Class 1 Laser Safety Rating.

4.0 Data Connector Pin Assignment

The 14-pin Screw Terminal Block connector on the front of the module is used for Data interface. This module is supporting the following data formats:

RS-232 One channel with Handshake (Tx/Rx)
RS-422 One channel
RS-485 One channel (2-wire or 4-wire)

The RS-232 channel is used for transmitting/receiving two channels of RS-232 w/Handshake (Tx/Rx). In addition to the RS-232, this module supports both, RS-422 and RS-485 (2-wire or 4-wire) signals. User-settable switches on the module’s motherboard are used to select the appropriate data format as required.

Port 3 Data Connector - Pinout Assignment				
Pin #	RS-232	RS-422	RS-485 (2-wire)	RS-485 (4-wire)
1	Ch 1 IN (RD)	Ch 1 IN (+)	Ch 1 IN/OUT (+-)	Ch 1 IN (+)
2	Ch 1 IN (DTR)	Ch 1 IN (-)	Ch 1 IN/OUT (-)	Ch 1 IN (-)
3	Ch 1 OUT (TD)	Ch 1 OUT (+)		Ch 1 OUT (+)
4	Ch 1 OUT (DSR)	Ch 1 OUT (-)		Ch 1 OUT (-)
5	GND	GND	GND	GND

5.0 Front Panel Indicator Lights and Pinout Diagrams

There are 18 LED indicator lights mounted on the left side of the module’s front panel. (see Figures 5.1 & 5.2 below). These indicators show the operation status of the module’s power, optical carriers and the data channels. These indicators can be used for troubleshooting the module, electrical and optical connections.

FXA-1G/1G-SFP

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 - N/A

VID - N/A

1 - N/A

2 - N/A

3 - N/A

4 - N/A

5 - N/A

6 - N/A

7 - N/A

8 - N/A

9 - (CH.1) DATA INPUT

10 - N/A

11 - (CH.1) DATA OUTPUT

12 - N/A

SFP OPTICAL PORT

PORT 3 MULTI-PROTOCOL DATA

PIN #	RS-232	RS-422	RS-485 2 WIRE	RS-485 4 WIRE
1	CH1 IN (RD)	CH1 IN+	CH1 IN/OUT+	CH1 IN+
2	CH1 IN (DTR)	CH1 IN-	CH1 IN/OUT-	CH1 IN-
3	CH1 OUT (TD)	CH1 OUT+		CH1 OUT+
4	CH1 OUT (DSR)	CH1 OUT-		CH1 OUT-
5	GND	GND	GND	GND

* IF APPLICABLE

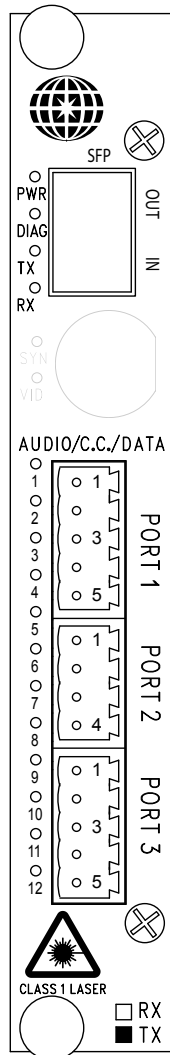


Figure 5.1

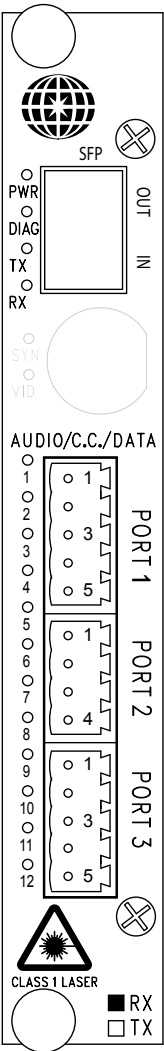
FXB-1G/1G-SFP

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 - N/A
VID - N/A

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



SFP OPTICAL PORT

PORT 3 MULTI-PROTOCOL DATA

PIN #	RS-232	RS-422	RS-485 2 WIRE	RS-485 4 WIRE
1	CH1 IN (RD)	CH1 IN+	CH1 IN/OUT+	CH1 IN+
2	CH1 IN (DTR)	CH1 IN-	CH1 IN/OUT-	CH1 IN-
3	CH1 OUT (TD)	CH1 OUT+		CH1 OUT+
4	CH1 OUT (DSR)	CH1 OUT-		CH1 OUT-
5	GND	GND	GND	GND

* IF APPLICABLE

Figure 5.2

6.0 Signal Conditioning Switch/Jumper Settings

The sections below illustrate how to change the various data format and contact mapping conditions. User-settable switches on the module's motherboard are used to select the appropriate data format as required.

6.1 Data Format Selection

A group of 10 switches is located on the bottom center of the module's circuit card (see figure below). The left two (2) of these switches control the transmitted/received data format. 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 illustrate 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-232 data (Switch #1-2 OFF (up) position).

Data Format Selection Switch Settings		
Channel 1	Switch #1	Switch #2
RS-232	OFF (up)	OFF (up)
RS-422	ON (down)	ON (down)
RS-485 (2-wire)	ON (down)	OFF (up)
RS-485 (4-wire)	OFF (up)	ON (down)

Note: The remaining Switches 3 through 10 should be in the OFF (up) position.

SWITCH SETTING FOR FXA/FXB-1G/1G-SFP CARDS

DATA FORMAT SELECTION SWITCH SETTINGS					
	RS-232	RS-422	RS-485 (2-wire)	RS-485 (4-wire)	DATA
Switch #1	OFF (up)	ON (down)	ON (down)	OFF (up)	CH.1
Switch #2	OFF (up)	ON (down)	OFF (up)	ON (down)	

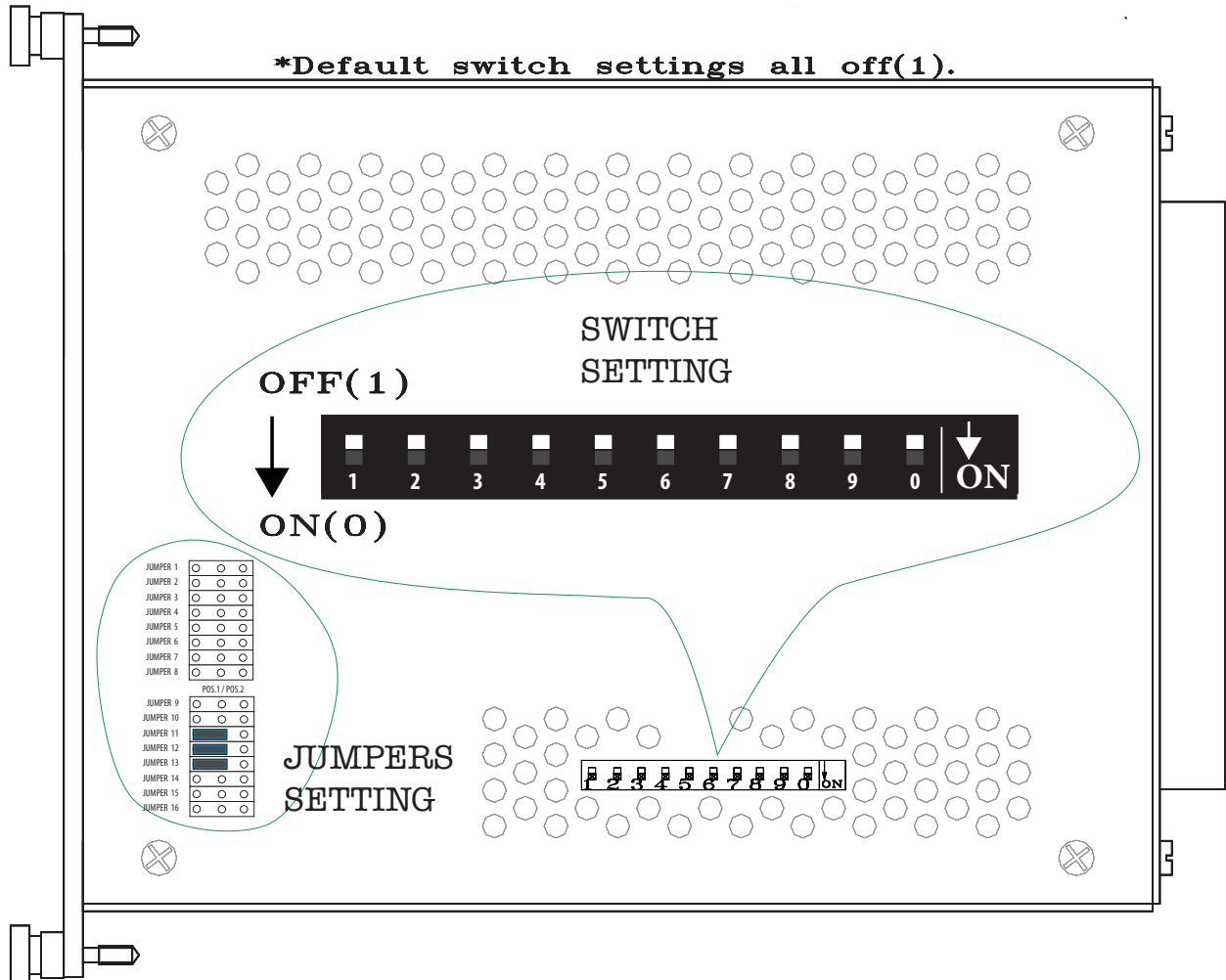


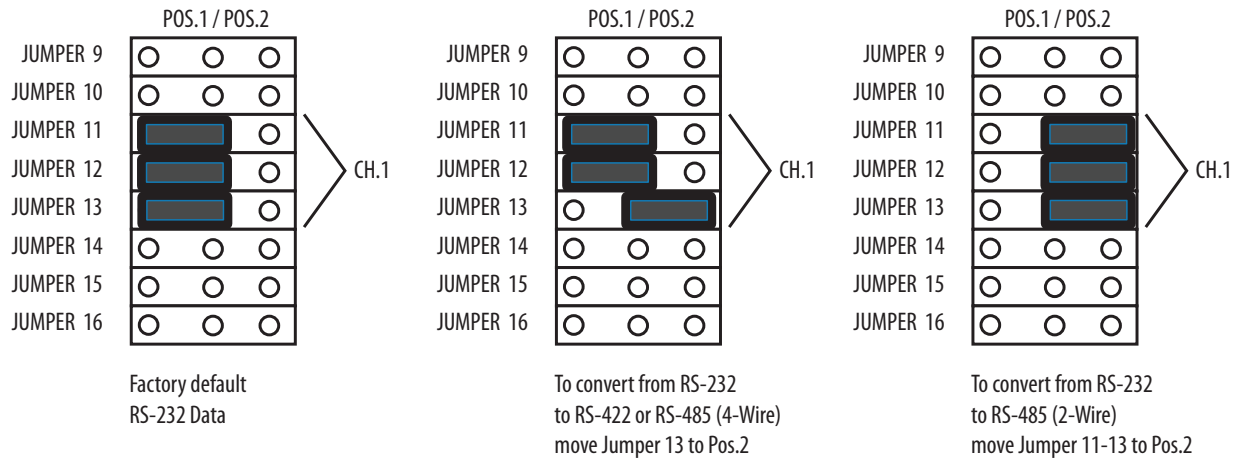
Figure 6.1

6.2 Data Selection jumpers

There are up-to sixteen (16) 3-pin jumpers located directly behind the 14-pin front-panel mounted connector. The jumpers 11, 12, 13 are used for 2 & 4-wire RS-485 selection and removing the default 120 Ohm load on the RS- 422 input channels.

The Figure 6.2 shows the Data jumpers settings.

DATA JUMPER POSITIONS



JUMP. #	DESCRIPTION
JUMPER 11	RS-485 - 4-wire (POS.1) / 2-wire(POS.2) – 4-wire default
JUMPER 12	RS-485 - 4-wire(POS.1) / 2-wire(POS.2) – 4-wire default
JUMPER 13	RS-422 Ch 1 (INPUT) – 120 Ohm LOAD – ON default

Figure 6.2

Data configuration selection – In addition to selecting the proper switch position for conversion from RS-232 to RS-422 or RS-485 (2-wire, 4-wire) (see Section 6.1), jumpers 11,12,13 must be moved to the positions as indicated on Figure 6.2. The default position of these jumpers is for RS-232.

7.0 SpectraView™ Network Monitoring

The table below lists the function of each of these switches (numbered from left to right) and identifies how to set the various diagnostic test modes.

Test Switch	Transmit Test	Receive Test	Spectra View Enabled	Extended Range Enable
SW5	OFF	OFF	OFF	OFF
SW6	OFF	OFF	OFF	OFF
SW7	ON	OFF	OFF	OFF
SW8	OFF	ON	OFF	OFF
SW9	OFF	OFF	ON	OFF
SW10	OFF	OFF	OFF	ON

Note: To turn a switch “ON”, move the switch in the down position. Likewise, to turn a switch “OFF”, move it in the up position.

In order to enter the test modes on the module, it is necessary to actuate one of the above switches as described below:

Data Transmit Test (SW7) – (applicable to both full-duplex transceiver modules (FXA-xxx & FXB-xxx) and one-way data transmission modules. The type and quantity of channels that can be tested are determined by the type of channels associated with the particular module under test.

In order to perform the transmit test, it is necessary to configure both the modules as follows:

The FXA & FXB modules must be connected together via fiber power applied in order to perform the Transmit tests.

When testing the data channels, it is necessary that the data formats for both modules be set the same (RS-232, RS-422, RS-485)

The Transmit Test switch (SW7) on the module initiating the test must be in ON (down) position

Test switches (SW5-10) on the local unit must be in the OFF (up) position

This test overrides any external data that may be at the input terminals of the unit under test.

This test will generate the Data test signals into the transmitter and will be sent over fiber to the associated receiver module. This test will perform diagnostic tests on all of the channels integrated in the module using the module’s own internal test signals. In addition, the internal frequency/data rate of the various internal tests is as follows:

Data - 1Hz square wave.

Once the Transmit test switch on the remote FXA or FXB module is switched ON, the above signals will be transmitted over fiber to the receiving unit. The outputs can be monitored by standard Data measurement/monitoring techniques.

LED indicator status – During the test, the Tx channel indicator lights for the data on the module initiating the test will flash at a 1Hz rate. This applies to each type and number of channels in the module. Likewise, each of the channel’s front panel Rx channel indicator lights for the data on the receiver module’s front panel will flash at a 1Hz rate to indicate proper reception of the test signals.

To disable the test, move SW7 on FXA, FXB switch to the OFF position.

Data Receive Test (SW8) - (applicable to both full-duplex transceiver modules (FXA-xxx & FXB-xxx) and one-way receiver modules. These tests will test data transmission channels installed on the module associated with the remote loopback test. Obviously, the channels that can be tested are determined by the type of channels associated with the particular module under test.

In order to perform the receive tests, it is necessary to configure both the modules as follows:

The FXA & FXB modules do not need to be connected together via fiber.

The type of data output will be as per the data format selection switches 1 to 4 (RS-232, RS-422, RS-485)
The Receive Test switch (SW8) on the module initiating the test must be in the ON (down) position.

The receive test will perform diagnostic tests on all of the channels integrated in the module using the module's own internal test signals. The internal frequency/data rate of the various internal tests is as follows:

Data - 1Hz square wave.

Once the Receive test switch on the FXA, FXB module is switched ON, the above signals sent to the appropriate electrical outputs on the same module. These signal outputs can be monitored by standard Data measurement/monitoring techniques.

LED indicator status – During the test, each of the channel's front panel Rx channel indicator lights for the data on the receiver module's front panel will flash at a 1Hz rate to indicate proper reception of the test signals. This applies to each type and number of channels in the module.

To disable the test, move SW7 on the FXA, FXB switch to the OFF position. This will return operation to default mode.

8.0 Product Part Number Variations

Product Part Number Guide		
Part Number	Matching Part #	Optical Connector
FXA-1G/1G-SFP	FXB-1G/1G-SFP	SFP dependent

9.0 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 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/sub-rack 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: Check that both the transmit and receive modules are set to transmit/receive the same data format (see section 6.0 for switch settings).

Verify that the PWR, Tx C/L and Rx C/L lights on both modems are lighting GREEN. Confirm that the data pinouts/connections are correct (see section 5.0 for data pinout connections).

Confirm the internal DIP switch and jumpers are set correctly for the data protocol. Verify that the Tx light flashes when transmitting data and that the corresponding Rx 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 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).

