



Fiber Optic 10/100 Base-T Ethernet Transmission System

Installation Instructions

Part Numbers:

SX-1R-x (two fiber)

And

SXA/SXB-1R-x (one fiber)

(10/100 Base-T Ethernet Extender)

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SX-1R-x & SXA/SXB-1R-x **10/100 Base-T Ethernet Data Transmission System** **Installation Instructions**

1.0 Product Description

Meridian's **SX-1R-x & SXA/SXB-1R-x** products are 10/100 Base-T fiber optic Ethernet extender modems that transmit & receive one channel of bi-directional 10/100 Base-T Ethernet data over either one (SXA/SXB-1R-x) or two (SX-1R-x) optical fibers 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 while the FC optical interface are available only on singlemode products. Optional conformal coating provides an additional level of protection from environments with high humidity.

2.0 Installation

Series SX-1R-x & SXA/SXB-1R-x products are one-slot wide cards and, as such, occupy one slots 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 Part Number Description

The SX-1R-x & SXA/SXB-1R-x series products are available in either one or two fiber versions. In addition, both singlemode and multimode fiber are supported. The table below lists the various part numbers and their optical transmission characteristics:

Product Part Numbers		Wavelength	# Fibers	Fiber Type	Optical Connector(s)
SX-1R-1		1300nm	2	Multimode	ST
SX-1R-3		1310nm	2	Singlemode	FC
SX-1R-3/ST		1310nm	2	Singlemode	ST
SX-1R-3/SC		1310nm	2	Singlemode	SC
SX-1R-6		1310nm	2	Singlemode	FC
SX-1R-6/SC		1310nm	2	Singlemode	SC
SXA-1R-2	SXB-1R-2	850/1300nm	1	Multimode	ST
SXA-1R-5	SXB-1R-5	1310/1550nm	1	Singlemode	FC
SXA-1R-5/ST	SXB-1R-5/ST	1310/1550nm	1	Singlemode	ST
SXA-1R-5/SC	SXB-1R-5/SC	1310/1550nm	1	Singlemode	SC

(Note: add "D" suffix for SpectraSmart diagnostic option)

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

Data	
Formats	IEEE 802.3 CSMA/CD IEEE 802.3i 10Base-T IEEE 802.3u 100Base-T
Date Rate	10/1 00 Mb/s, Auto select
Bit Error Rate (BER)	Better than 10^{-9}
Connectors	
Data	RJ-45
Optical	Singlemode – FC, ST or SC Multimode - ST

4.0 Data Connector Pin Assignment & MDI/MDI-X Configuration

This product series utilizes an RJ-45 Ethernet data connector with standard pin assignments. In addition, these Meridian modems can be configured for both MDI & MDI-X (cross-connect) configurations. The table below shows these pin assignments for both MDI and MDI-X configurations.

Pin #	MDI Configuration	MDI-X Configuration
1	Transmit (+)	Receive (+)
2	Transmit (-)	Receive (-)
3	Receive (+)	Transmit (+)
4	N/A	N/A
5	N/A	N/A
6	Receive (-)	Transmit (-)
7	N/A	N/A
8	N/A	N/A

SXA-2R-x module come pre-configured for MDI connection that connects to LAN. And SXB-2R-x module come pre-configured for MDI-X connection that connects to Computer.

Changing to an MDI or MDI-X configuration is simple. See the picture below in Figure 4.1 for the jumper location that is used to convert the module from an MDI to and MDI-X configuration.

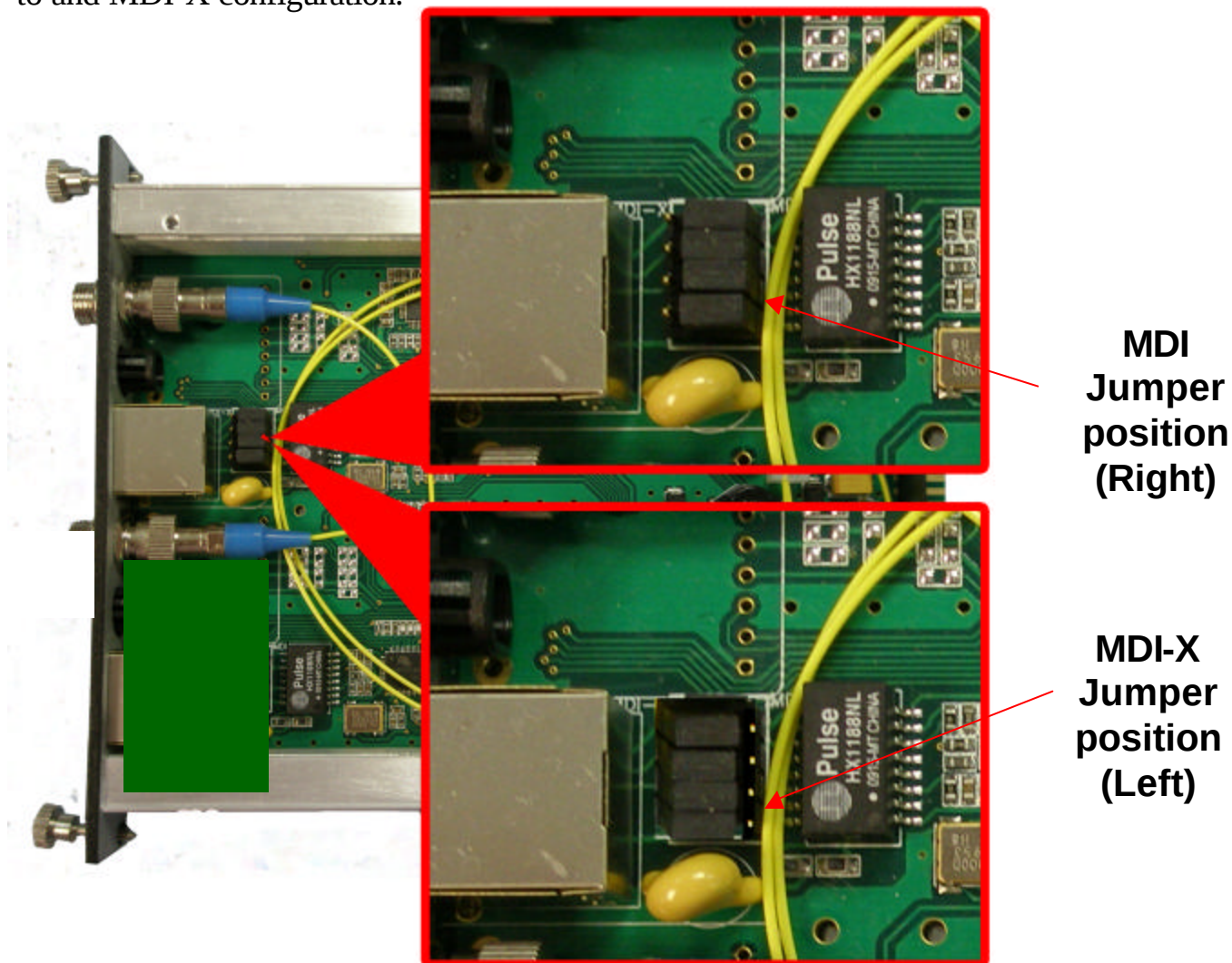


Figure 4.1
Ethernet Module MDI/MDI-X Jumper Locations

Figure 4.1 Ethernet Module MDI/MDI-X Jumper Locations

Directly behind the RJ-45 Ethernet connector is the jumper, that convert the module from its normal MDI configuration to the MDI-X (cross connect) configuration. Follow the steps below to change connection configuration

1. Position the module as shown in the above photograph and remove the side cover by removing the 4 screws in the corners of the side cover. (Flat cover w / perforated holes)
2. Locate the 4 Jumper (shunts) inline. This will be directly behind the RJ-45 connector. Lift all four shunts directly upward (away from the circuit board) being careful not to bend the pins on the circuit board.
3. Move the 4 jumpers to connect center pins to pins closest to RJ-45 connector and place back on the header, being careful not to bend the jumper leads on the circuit board. Seat firmly on the leads.
4. Replace side cover and secure with the 4 screws.
5. Repeat, as required, with the other unit.



CAUTION: All 4 jumpers (shunt) **MUST** be changed together.
Example: All 4 jumpers on the LEFT or all 4 jumpers on the RIGHT.

5.0 Operation/Front Panel LED Indicators

The front panel diagrams for two fibers (SX-1R-x) and one fiber (SXA/SXB-1R-x) are shown below. There are a number of indicator lights that provide visual operational status of the modules and link.

The function of these LED indicators is as follows:

- PWR - Green (normal) - when power is applied to the module
- DIAG - Green flash (normal)! Red (error) - to indicate that module is in self-diagnostic mode
- T 10 - Green – when transmitting 10 Base-T data
- T 100 - Green – when transmitting 100 Base-T data
- R 10 - Green – when receiving 10 Base-T data
- R 100 - Green – when receiving 100 Base-T data
- TX D - Green flashing (normal) when data is being transmitted out of module
- RX D - Green flashing (normal) when data is being received into module

(1-Fiber, side "A")

(1-Fiber, side "B")

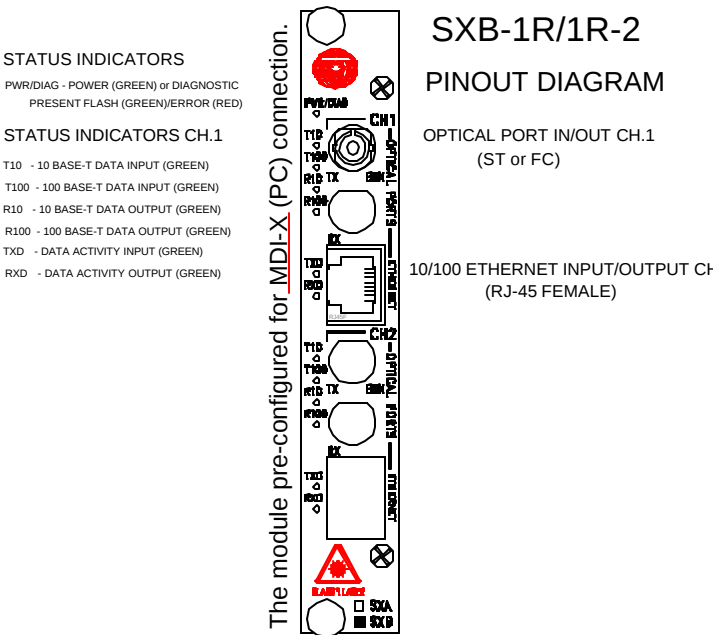
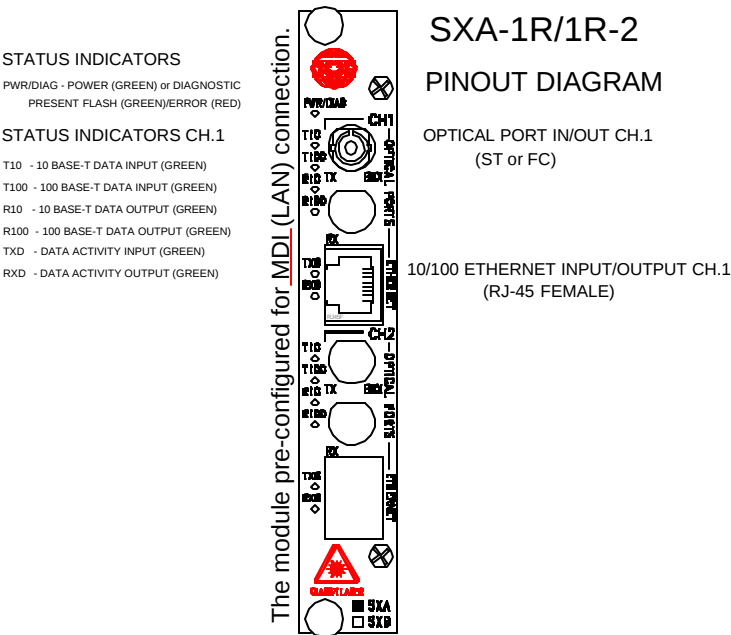


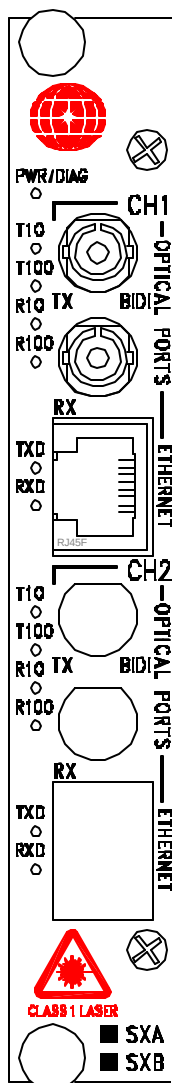
Figure 5.1
10/100 Ethernet Module Front Panel

STATUS INDICATORS

PWR/DIAG - POWER (GREEN) or DIAGNOSTIC
PRESENT FLASH (GREEN)/ERROR (RED)

STATUS INDICATORS CH.1

T10 - 10 BASE-T DATA INPUT (GREEN)
T100 - 100 BASE-T DATA INPUT (GREEN)
R10 - 10 BASE-T DATA OUTPUT (GREEN)
R100 - 100 BASE-T DATA OUTPUT (GREEN)
TXD - DATA ACTIVITY INPUT (GREEN)
RXD - DATA ACTIVITY OUTPUT (GREEN)



SX-1R-1 PINOUT DIAGRAM (2-Fiber)

OPTICAL PORT OUTPUT CH.1
(ST or FC)

OPTICAL PORT INPUT CH.1
(ST or FC)

10/100 ETHERNET INPUT/OUTPUT CH.1
(RJ-45 FEMALE)

Figure 5.2
10/100 Ethernet Module Front Panel

6.0 Optical Specifications

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

Optical Specifications for 1 fiber (SXA/SXB)						
Fiber Type/Size (um)	Optical Output (dBm)	Rx Sensitivity (dBm)	Optical Budget (dB)	Wavelength (nm)	Optical connector	Optical Dynamic Range (dB)
Multimode (FP Laser) 62.5/125	-6	-27	21	850/1300	ST	27
Singlemode (FP Laser) 9/125	-6	-27	21	1310/1550	ST, FC, SC	27

Optical Specifications for 2 fiber (SX)						
Fiber Type/Size (um)	Optical Output (dBm)	Rx Sensitivity (dBm)	Optical Budget (dB)	Wavelength (nm)	Optical connector	Optical Dynamic Range (dB)
Multimode (FP Laser) 62.5/125	-5	-26	21	850/1300	ST	26
Singlemode (FP Laser) 9/125	-5	-26	21	1310/1550	ST, FC, SC	26
Singlemode (Hi/out. FP Laser) 9/125	+2	-26	28	1310	ST, FC, SC	26
CWDM Singlemode (DFB Laser) 9 / 125	+2	-26	28	1270-1610	ST, FC	26

Refer to section 7.0 for CWDM wavelength selections.

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 SX cards will incorporate one of the CWDM wavelengths while the complementary SX 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	Receive Wavelength
SX-2R-27	1270nm	1270-1610nm
SX-2R-29	1290nm	
SX-2R-31	1310nm	
SX-2R-33	1330nm	
SX-2R-35	1350nm	
SX-2R-37	1370nm	
SX-2R-39	1390nm	
SX-2R-41	1410nm	
SX-2R-47	1470nm	
SX-2R-49	1490nm	
SX-2R-51	1510nm	
SX-2R-53	1530nm	
SX-2R-55	1550nm	
SX-2R-57	1570nm	
SX-2R-59	1590nm	
SX-2R-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 Data*
- Action:** 1 – One fiber units (SXA/SXB) – Check to ensure that an SXA unit is optically connected to an SXB unit. An SXA or an SXB will not communicate with a module of the same type SXA or SXB.
2 - Check that both of the modules have the MDI/MDI-X jumpers set correctly for the application.

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

Notes:



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