



2-Channel Fiber Protection Switch

SX-2FX-x



Installation & Operating Instructions

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1.0 Product Description

The SX-2FX , 2 channel fiber protection switch is part of Meridian's continuing expansion of fiber transport products to provide improved fiber network security and reliability. This card is designed to provide fiber-path protection with either automatic or manual switching between two redundant single-mode fiber paths. When a loss of the fiber's optical signal is detected, the switch will automatically switch from its primary fiber to the alternate or redundant path in less than 10 msec. In addition, the user can override the switch to manually select one of the fiber paths. The optical switch is typically used at the receiving or head-end side to automatically switch the transmission path to the redundant fiber in the event a main fiber break. Upon detecting a loss of the optical signal, the switch will automatically switch to the redundant fiber carrying the same live traffic. The switching threshold can be set by the user to maximize the optical power budget available in the network. This card has indicators on its front panel to indicate the status of each of the input fibers and the position of the switch. The switch is latching so it will retain its state during a loss of electrical power. An internal microcontroller ensures that the switch maintains its last position when power is restored. This card can also be used with bi-directional information such as camera PTZ control and video conferencing systems.

The front panel "Auto/Manual" switch allows the user to force the optical switch to either the A or B position or allow it to operate automatically by monitoring the status of the input fibers. A Form-C relay provides a contact output indicating the status of the switch. An alarm contact output will also close when the switch has changed positions due to a fiber fault.

The functionality of this card is enhanced by its compatibility with Meridian's PC based SpectraSmart network Management and remote diagnostic software system. SpectraSmart monitors the operating parameters of the card and allows the user to remotely select the optical transmission path as well as change the switching threshold. See SpectraSmart brochure for additional details.

Optional conformal coating provides an additional level of protection from environments with high humidity and condensation.

2.0 Installation

The SX-2FX-x series products are Meridian's standard one-slot wide, 3RU cards and, as such, occupy one slot in Meridian's standard chassis (SR-500/S, SR-1002/S, SR-1600/R and SR2001 & SR-2000 series 19" equipment chassis). To install in the 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 populated subrack should have forced-air cooling to avoid excessive heat buildup inside the chassis. A fan assembly tray (P/N FA-2000/1) with three (3) fans is available from Meridian and should be installed under the 19" SR-2000/1 whenever possible.

2.1 Fiber connections

These cards are designed for use with single-mode fiber and are available with either FC or ST optical connectors. See part # selection guide in appendix for ordering details.

3.0 Signal Format

The card has two optical input ports (Port A and Port B) with a bi-color (Red, Green) LED associated with each port. The green LED, associated with each port, shows which port is currently active (A or B). The red LED illuminates only when the signal drops below the predetermined (user-set) threshold in either channel, but active channel will be flashing red. When either one or both channels input changes to red, this is considered an Alarm condition and the alarm relay (N.O.) will close and the diagnostic LED is Red.

The third port is the optical output. This port also has a bi-color LED.

Green LED	–	Unit is in Auto Mode
Red LED	–	Unit is in Manual Mode
Orange LED	–	Unit is being controlled by remote PC

Located directly below the front panel mounted optical output connector is the "Status Set", two position dip switch. The top switch selects the switch operating mode: Auto (left) or Manual (right). In the Auto mode, the Primary fiber path is chosen by the bottom switch ("A" or "B"). In the event a fiber alarm occurs, the unit will switch to the redundant path.

As mentioned, the bottom switch, selects the Primary fiber path. Primary A is on the left, Primary B is on the right. This switch selects the Primary fiber path. In Manual mode it will reflect the path chosen. This manual mode allows the user to perform routine testing or maintenance on either fiber while keeping the switch in a fixed position.

The card has two independent dry contact closures. The first is a N.O. Alarm Relay. In the event that any Alarm is detected, this contact will close. The second is for remote monitoring of optical input port currently being used. This relay is a form C relay (SPDT).

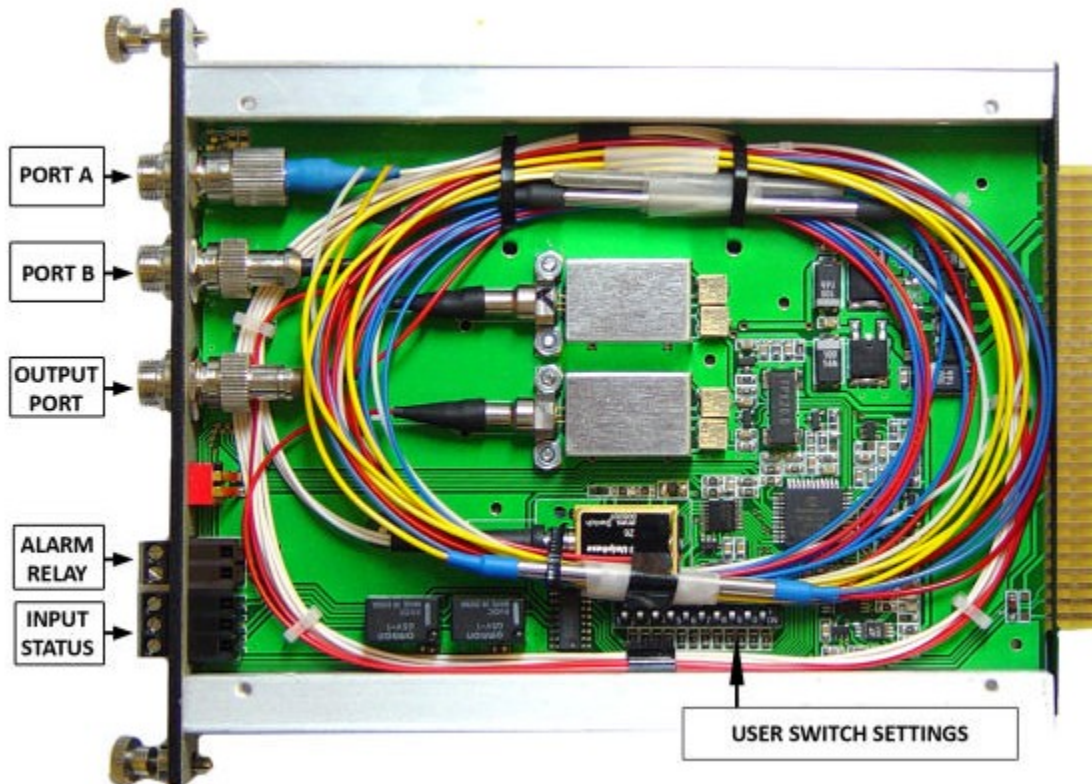
Inside the unit there is 10 position DIP switch for selecting threshold levels, alarm switch delays and SpectraSmart control enable. The tables below indicate the various DIP switch settings.

Table 1 Dip Switch Setting for Auto-Switch Power Threshold						
Threshold Setting	Sw1	Sw2	Sw3	Sw4	Sw8	Sw9
-5dBm	OFF	OFF	OFF	OFF	ON	OFF
-10dBm	OFF	OFF	OFF	OFF	OFF	ON
-15dBm	ON	OFF	OFF	OFF	OFF	OFF
-20dBm	OFF	ON	OFF	OFF	OFF	OFF
-25dBm	OFF	OFF	ON	OFF	OFF	OFF
-30dBm	OFF	OFF	OFF	ON	OFF	OFF

Table 2 Dip Switch Setting for Alarm Notification Delay				
Delay	Sw1-4	Sw5	Sw6	Sw7-10
0 sec (no delay)	NA	OFF	OFF	NA
100msec	NA	ON	OFF	NA
500msec	NA	OFF	ON	NA
1 sec	NA	ON	ON	NA

Switch #7 is used to enable the card to be controlled via Meridian's SpectraSmart software. Normally in the OFF position, SpectraSmart is enabled by moving Sw7 to the ON position.

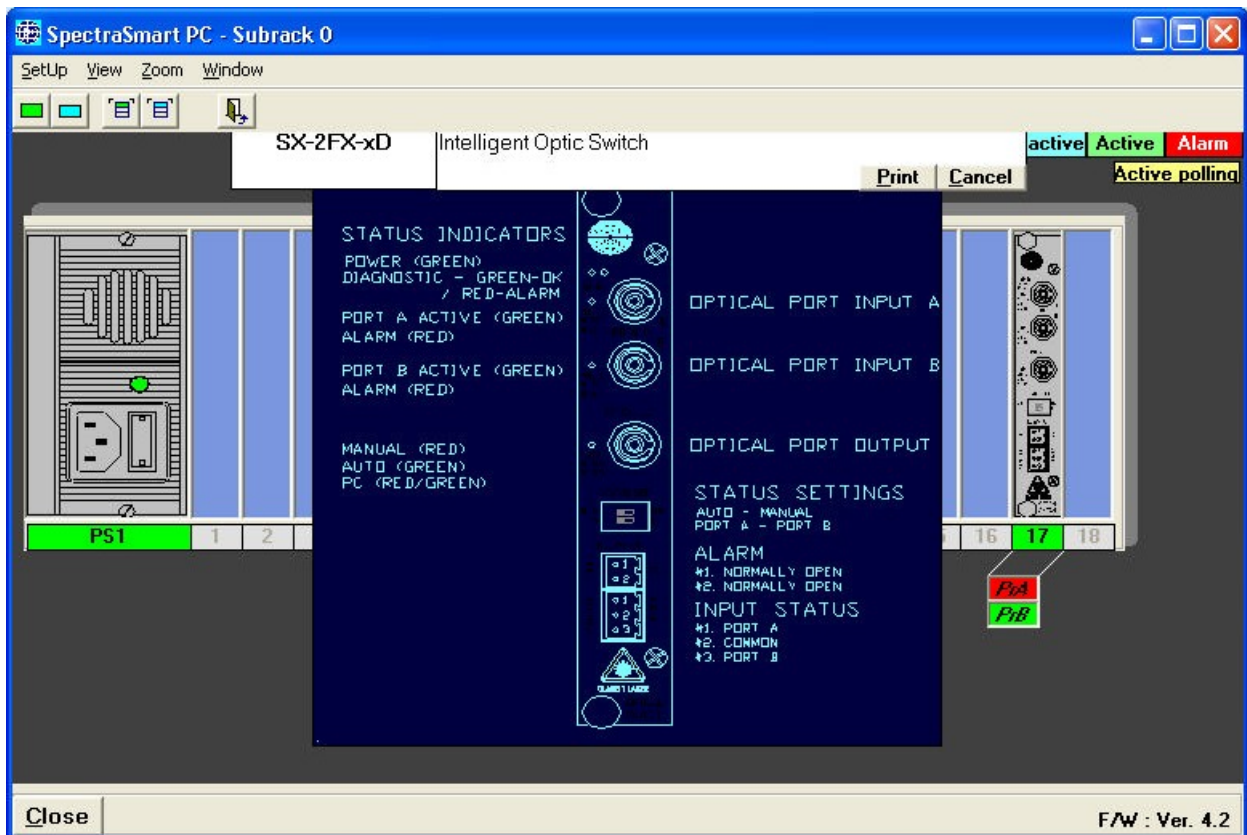
The photo below shows the location of the various front panel components as well as the 10 position DIP switch.

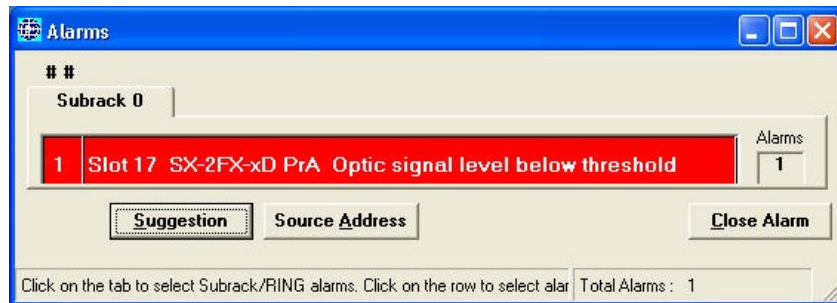


4.0 SpectraSmart Software Control

SpectraSmart PC is a Windows 2000/XP/Vista based Link Status Monitoring and Diagnostic System. The SpectraSmart scans card parameters in sequential order, checking for levels against factory/user set threshold values. If an error or out of range condition is detected, the PC will continue to scan through system components until the error condition has been detected 3 times before showing an Alarm message. This helps ensure that the detected condition is an actual occurrence and not simply an anomaly.

The screen shots below illustrate what the computer displays when the SpectraSmart software is operational. This first screen shows a display of the card's front panel layout and identifies the various indicators and associated input/output interfaces. When an valid alarm is generated and identified the 2nd alarm display will be shown on the screen indicating what card generated the alarm as well as the cause of the alarm. When triggered, the "Suggestion" button will suggest appropriate corrective action to be taken to correct the alarm.

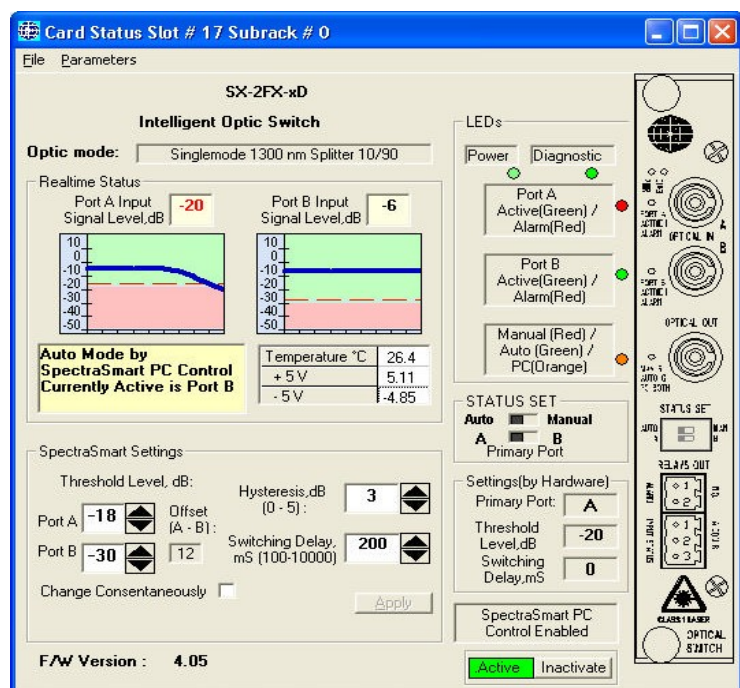




This card has additional features that can be monitored in a window displayed using SpectraSmart. See the Card Status screen display below.

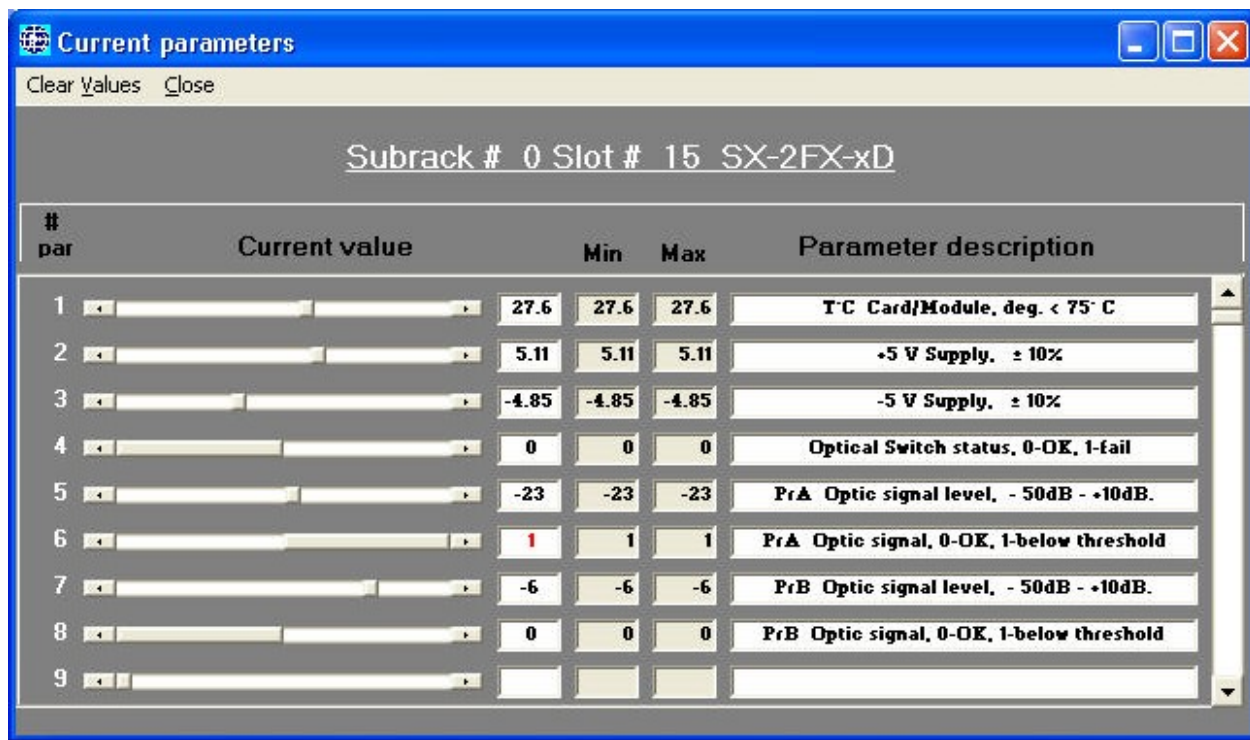
When the internal DIP Switch position 7 is ON (SpectraSmart control enable) the user can set differential offset levels between the two optical input ports in 1 dB increments as well as other operational parameters. This information will be sent to the card and stored in non-volatile memory. While set in the PC control mode, the card threshold parameters are active and will monitor the input signals based on these computer-generated settings.

The switching hysteresis and delay parameters keep the switch from oscillating between the inputs when the input signals are near the switching thresholds. While under software control, these values are user adjustable and may need to be adjusted to suit the specific installation and input optical power values of each input to the card. Under SpectraSmart control, the switching threshold (in dBm) of each input can individually adjusted to compensate for differences in the optical loss and subsequent received power of each fiber port,



To activate these functions, click the right mouse button on the front panel image of the card and choose "Parameters" from the dropdown menu. This will display these various card parameters for viewing and modification.

The “Current Parameters” screen below shows the various card signal and operating condition settings. The center numbers show the actual (real-time) value as well as min and max values that SpectraSmart has measured for each.



From the on-board EEPROM memory, the user can read the card's information including the part number, date of manufacture, working (operational) days, and maximum operating temperature the card.

The screenshot shows a window titled "Card Memory" with a blue header bar. Below the header is a toolbar with "ExtraInfo" and "Close" buttons. The main area displays "Card Information" with the following fields:

SR# 0 Slot# 15 Card SX-2FX-xD

* Part Number: SX-2FX-3

* Serial Number: 04152008

* Date of Manufacture: 04/14/2008

* Running time of Card/Module in days: 1

* Card/Module temperature /max/ °C: 0

* Duration of exceeded Card/Module temperature in days: 0

5.0 Front Panel Pinout Assignment Diagram

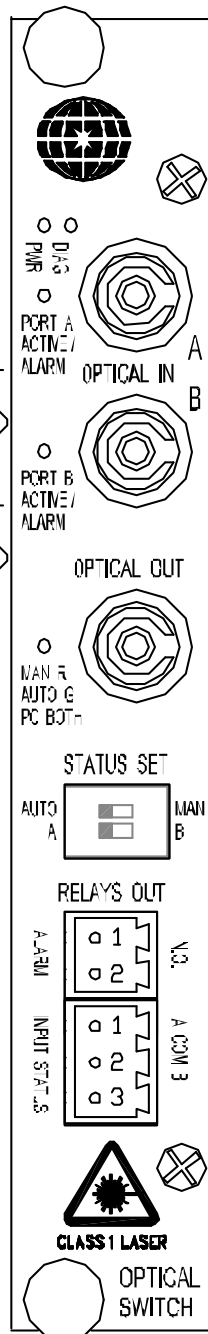
Figure below shows the front panel layout, connector location, indicator location and pinout assignment for the SF-2FX-x module.

SX-2FX-X PINOUT DIAGRAM

STATUS INDICATORS

POWER (GREEN)
DIAGNOSTIC - GREEN-OK
/ RED-ALARM
PORT A ACTIVE (GREEN)
ALARM (RED)/ACTIVE PORT
(FLASHING RED)
PORT B ACTIVE (GREEN)
ALARM (RED)/ACTIVE PORT
(FLASHING RED)

MANUAL (RED)
AUTO (GREEN)
PC (ORANGE)



OPTICAL PORT INPUT A

OPTICAL PORT INPUT B

OPTICAL PORT OUTPUT

STATUS SETTINGS

AUTO - MANUAL
PORT A - PORT B

ALARM

#1. NORMALLY OPEN
#2. NORMALLY OPEN

INPUT STATUS

#1. PORT A
#2. COMMON
#3. PORT B

6.0 Status Indicators

There are function status indicator lights associated these module. They are identified as follows:

Power:	Green (on)
Diagnostic:	Green (ok), Red (alarm)
Port A	Green (active), Red (alarm) Port
B	Green (active), Red (alarm)
Mode	Green (auto), Red (manual), Orange (PC)

7.0 Specifications

Optical:

Wavelength range	1260nm to 1610nm	Insertion loss
for 1310nm Optic.....	1.5dB (typical), 2.5dB (max)	
Insertion loss for 1310/1550nm Optic...	6.5dB (typical)	
Return loss	50dB	
Channel isolation	55dB	
Repeatability	+/- 0.02dB (typical)	
Polarization dependent loss (PDL)	0.1 dB	
Switching speed	5msec (typical), 10msec (max)	Switching
lifetime	10 million cycles	
Optical input range	-50dBm to +10dBm	

Connectors

Alarm	Screw Terminal
Input Status	Screw Terminal
Optical	FC or ST (three connectors) Power
.....	See SR Series Chassis for Details

Quality

MTBF	>120,000 hours @Ground Fix 35°C per MIL217F
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Physical

Dimensions (Card)	160mm (6.3") L, 127mm (5") H, 20mm(0.80")W	Weight (Card)
.....	450 gms (16 Oz)	
No. of Slots	1	
Module	See SR-500 Brochure	

Enviromental

Operating Temperature	-34°C to +74°C	Storage
Temperature	-55°C to +85°C	
Relative Humidity	0 to 95%	Non-condensing

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 module please refer to this list below.

Problem: *Module does not fit in chasses 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 chasses 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 chasses or location in the same chasses, if available.

If the problem still persists after reviewing the above items, please contact Meridian technical support (+1-516-285-0570).

Appendix1 Product Part Numbers

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

Product Part Number Guide			
Part Number	Fiber Interface	Optical Connector	Wavelength
SX-2FX-2	Multimode	ST	850/1300nm
SX-2FX-5	Single-mode	FC, ST	1310/1550nm

Notes:



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