Installation/Operation Instructions

Fiber Optic Video Transmission System

Part Numbers:

ST/SR-1HD-x (ST/FC)
(1-Channel HD-SDI Multi-rate Video Transmitter/Receiver)

ST/SR-1HG-x (ST/FC)
(1-Channel 3G-SDI Multi-rate Video Transmitter/Receiver)

Meridian Technologies, Inc.
700 Elmont Road, Elmont NY 11003
Telephone: 516. 285. 1000 Fax: 516. 285. 6300
E-mail: sales@meridian-tech.com
Web: www.meridian-tech.com
Document Version 1.0
07/29/2014

Table of Contents

1.0 Product Description

Meridian's product series ST/SR-1HD-x and ST/SR-1HG-x are fiber optic modems that transmit or receive one channel of independent real-time video SDI/HD-SDI for series ST/SR-1HD and 3G-SDI for ST/SR-1HG series with Re-clocker, over two optical fibers. These are Meridian's standard 1-slot wide chassis mount card assembly and housed in the following Meridian chassis: SR-500/S, SR-1002/S, SR-1600/S, and SR-2001 & SR-2000 series 19" equipment chassis.

Both ST and FC optical connectors are supported. An ST optical interface is available for both multimode and single-mode fiber applications wile the FC optical interface is available only for single-mode products. Optional conformal coating provides an additional level of protection from environments with high moisture and humidity.

2.0 Installation

Series ST/SR-1HD-x and ST/SR-1HG-x products are one-slot wide cards and occupy one slot in Meridian's standard 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 and 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 build-up 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 ST/SR-1HD-x and ST/SR-1HG-x series products transmit and receive the following signals:

Signal Type	Channels	Transmit	Receive
HD/3G-SDI video	1	ST-1HD(HG)	SR-1HD(HG)

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

Video		
	HD-SDI (HD)	**3G-SDI (HG)**
Formats	19.4 Mbps (SMPTE 310M) 143 To 540 Mbps SMPTE 259M/344M 1.485 Gbps SMPTE 292M HDTV DVB-ASI at 270 Mbps SMPTE 305M SDTI Rates	19.4 Mbps (SMPTE 310M) 143 To 540 Mbps SMPTE 259M/344M 1.485 Gbps SMPTE 292M HDTV DVB-ASI at 270 Mbps 2.97 Gbps SMPTE 424M SMPTE 305M SDTI Rates
Nominal Level	0.8 Vp-p, 1.0 Vp-p (max)	0.8 Vp-p, 1.0 Vp-p (max)
Data Rate	19Mb/s - 1.5Gb/s per channel	19Mb/s - 3Gb/s per channel
Impedance	75 Ohm	75 Ohm
Gain	Unity	Unity
Input Coupling	AC	AC
Return Loss	>15dB	>15dB
Jitter (Pathological Data Pattern)	<0.2UI	<0.2UI
Cable Equalization	Automatic 0-200m @ 1.5Gb/s	Automatic 0-70m @ 3Gb/s
Bit-Error Rate (0 to –20dBm)	10^{-12}	10^{-12}

Connectors	
Video	75 Ohm BNC w/gold center pin
Optical	Single-mode – ST or FC Multimode – ST

Optical Specifications							
Meridian Optical Code	Fiber Type/Size (um	Optical Output (dBm)	Rx Sensitivity (dBm)	Optical Budget (dB)	Wavelength (nm)	Optical connector	Optical Dynamic Range (Db)
1	Multimode (FP Laser) 62.5 / 125	-3	-19	16	1300	ST	20
3	Single-mode (FP Laser) 9 / 125	-3	-19	16	1310	ST, FC	20
7, 9, CWDM	Single-mode(DFB Laser) 9 / 125	+1	-20	21	1310, 1550, 1270-1610	ST, FC	20

Refer to section 7.0 for CWDM wavelength selections.

4.0 Front Panel Pinout Assignment Diagram

In addition, the transmitter also has a loop-thru video output to allow the user to locally monitor the signal being transmitted over the fiber link. Likewise, the receiver has an additional buffered output for local monitoring or recording of the received signal.

The receiver channel also has an LED received power meter. These LEDs will light when the appropriate amount of optical input power is detected. There are four LEDs that monitor and display the input power range (0 to -5dBm, -5 to -10dBm, -10 to -15dBm and -15 to -20dBm. Figures 4.1 & 4.2 below show the front panel layout, connector location and pinout assignment for both the ST-1HD(HG)-x and SR-1HD(HG)-x cards.

ST-1HD-X

ST-1HG-X

PINOUT DIAGRAM

STATUS INDICATORS

PWR - POWER (GREEN)

DIAG - CARD DIAGNOSTIC (GREEN-OK/RED-ALARM)

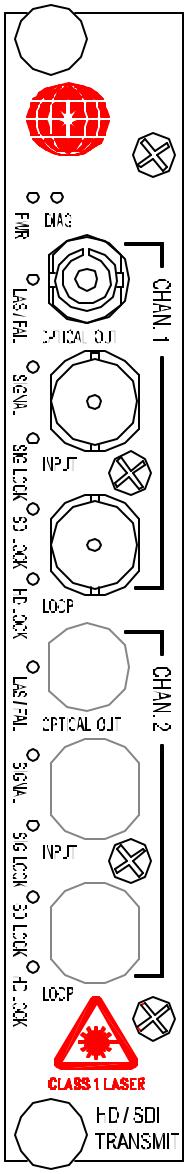
LAS/FAIL - (CH.1) LASER (GREEN)/ FAIL (RED)

SIGNAL - (CH.1) SIGNAL PRESENT (GREEN)

SIG LOCK - (CH.1) SIGNAL LOCK (GREEN)

SD LOCK - (CH.1) SDI PRESENT (GREEN)

HD LOCK - (CH.1) HDSDI PRESENT (GREEN)



OPTICAL PORT FC,ST (CH.1)

VIDEO INPUT (CH.1)

LOOP-THRU VIDEO OUTPUT (CH.1)

Figure 4.1
ST-1HD(HG)-x Front Panel Layout Diagram

SR-1HD-X
SR-1HG-X
PINOUT DIAGRAM

STATUS INDICATORS

PWR - POWER (GREEN)

DIAG - CARD DIAGNOSTIC (GREEN-OK/RED-ALARM)

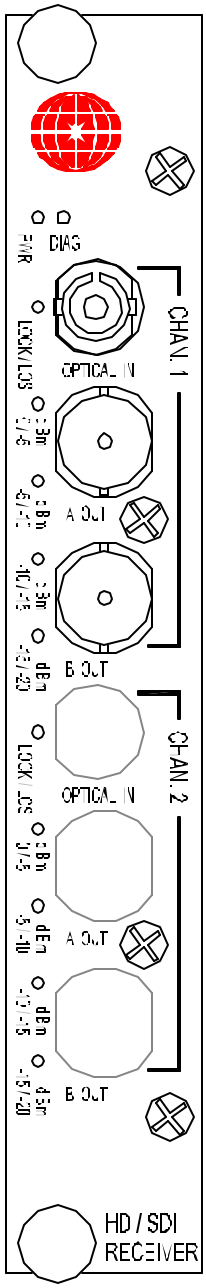
LOCK/LOSS - (CH.1) LOSS (RED)/ LOCK (GREEN)

0/-5dBm - (CH.1) LEVEL 0/-5dBm (GREEN)

-5/-10dBm - (CH.1) LEVEL -5/-10dBm (GREEN)

-10/-15dBm - (CH.1) LEVEL -10/-15dBm (GREEN)

-15/-20dBm - (CH.1) LEVEL -15/-20dBm (GREEN)



OPTICAL PORT FC,ST (CH.1)

VIDEO OUTPUT #1 (CH.1)

VIDEO OUTPUT #2 (CH.1)

Figure 4.2
SR-1HD(HG)-x Front Panel Layout Diagram

4.1 Operation/Front Panel LED Indicators

The front panel diagram is shown Figure 4.1 & 4.2 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 - Card Diagnostic Green OK, Red alarm
LAS/FAIL - Green TX Laser, Red Fail
SIG LOCK - Green TX Signal Lock
SD LOCK - Green TX SDI present
HD LOCK - Green TX HDSDI present
SIG LOCK - Green TX Signal Lock
LOCK/LOSS - Green RX Lock, Red Loss
0/-5dBm - Green RX Level 0/-5dBm
-5/-10dBm - Green RX Level -5/-10dBm
-10/-15dBm - Green RX Level -10/-15dBm
-15/-20dBm - Green RX Level -15/-20dBm

5.0 Signal Conditioning Switch Settings

A group of 10 switches is located on the bottom center of the module's circuit card (see figure 5.1 & 5.2 below). The figure and table below illustrates these switch locations on the board and how they are configured for the proper SDI format options.
Switches #1-10 factory-supplied default settings are OFF (up).

SWITCH SETTINGS TRANSMITTER CARD

TX SDI Test Signal		
	Down Position(ON)	Up Position(OFF)
Switch #1	0-Bypass	1-Reclock
Switch #2	0-Reclock	1-Auto Bypass
Switch #3	0-Low BW	1-Hi PLL BW
Switch #4	0-SDI, 270MB/s	1-Auto Rate
Switch #5	0-HD SDI, 1.5GB/s	1-Auto Rate
Switch #6	0-3G SDI, 3.0GB/s*	1-Auto Rate
Switch #7	Reserved	Reserved
Switch #8	0-Disable	1-Flash Enable
Switch #9	0-Disable	1-Auto EQ
Switch #10	Reserved	Reserved

3G SDI, 3.0GB/s*- apply only for HG product
*Default switch settings all up-off(1).

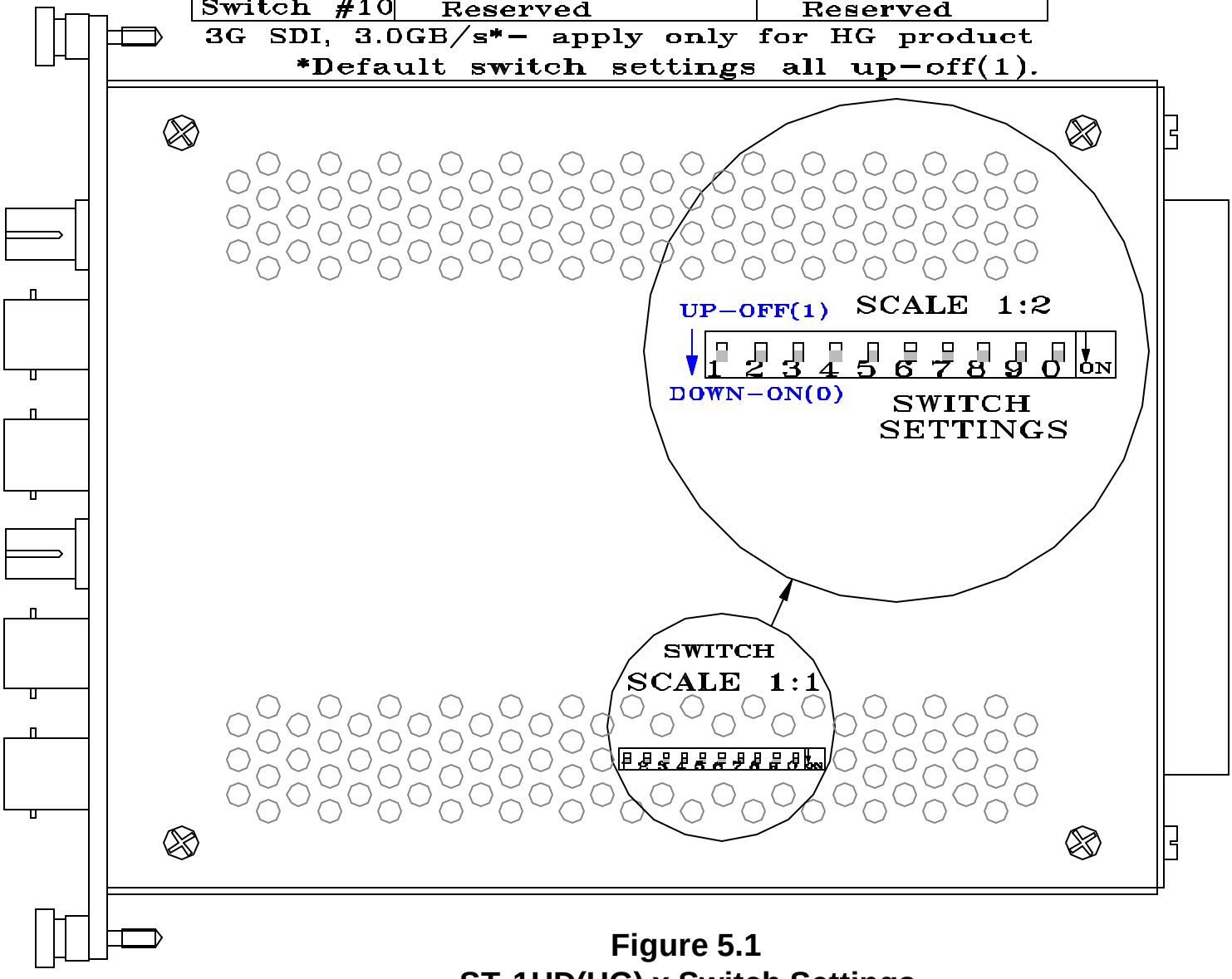


Figure 5.1
ST-1HD(HG)-x Switch Settings

SWITCH SETTINGS FOR RECIEVER CARD

RX SDI Test Signal		
	Down Position(ON)	Up Position(OFF)
Switch #1	0—Bypass	1—Reclock
Switch #2	0—Reclock	1—Auto Bypass
Switch #3	0—Low BW	1—Hi PLL BW
Switch #4	0—SDI, 270MB/s	1—Auto Rate
Switch #5	0—HD SDI, 1.5GB/s	1—Auto Rate
Switch #6	0—3G SDI, 3.0GB/s*	1—Auto Rate
Switch #7	0—CLK	1—Data Out
Switch #8	0—SD	1—HD Slew Rate
Switch #9	0—Auto Mute	1—Disable
Switch #10	Reserved	Reserved

3G SDI, 3.0GB/s*— apply only for HG product

*Default switch settings all up—off(1).

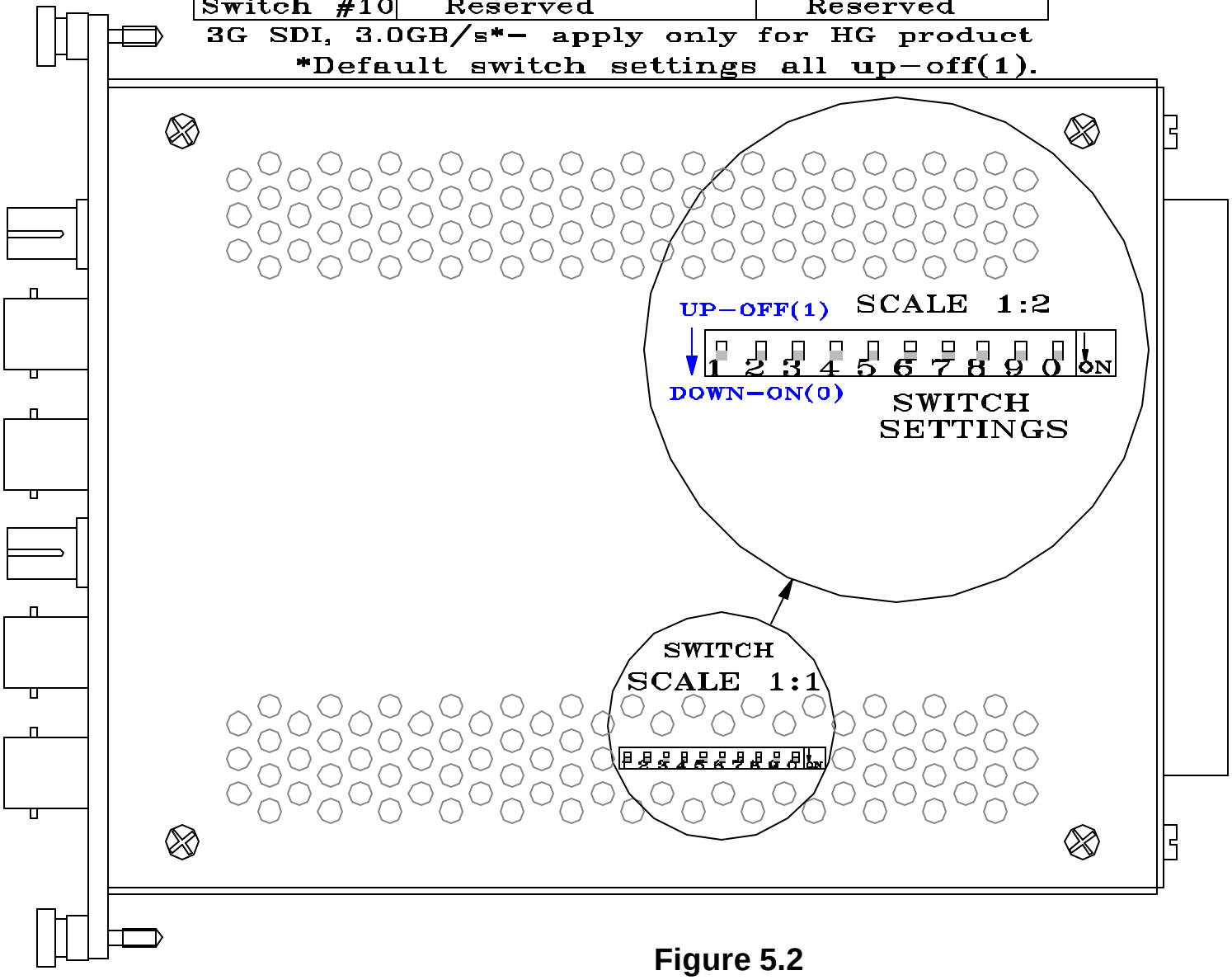


Figure 5.2
SR-1HD(HG)-x Switch Settings

6.0 Product Part Number Variations

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

Transmitter Part Number	Receiver Part Number	Fiber Interface	Video type	Wavelength	Optical Connector
ST-1HD-1	SR-1HD-1	Multimode	HD-SDI	1300nm	ST
ST-1HD-3	SR-1HD-3	Single-mode	HD-SDI	1310nm	FC
ST-1HD-3ST	SR-1HD-3ST	Single-mode	HD-SDI	1310nm	ST
ST-1HG-1	SR-1HG-1	Multimode	3G-SDI	1300nm	ST
ST-1HG-3	SR-1HG-3	Single-mode	3G-SDI	1310nm	FC
ST-1HG-3ST	SR-1HG-3ST	Single-mode	3G-SDI	1310nm	ST

7.0 CWDM Option

These cards are also available with a single-mode CWDM laser/wavelength for the transmit channel. In this configuration, 2 fibers on each unit are used for transmission of the uni-directional signals. One of the 2-fiber ST cards will incorporate one of the CWDM wavelengths while the complementary ST card will use a different CWDM wavelength in its transmit channel. 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 options available 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.

Reference number	Transmit Wavelength
27	1270nm
29	1290nm
31	1310nm
33	1330nm
35	1350nm
37	1370nm
39	1390nm
41	1410nm
47	1470nm
49	1490nm
51	1510nm
53	1530nm
55	1550nm
57	1570nm
59	1590nm
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.
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*
Action: Check power supply to ensure that it is plugged in and turned on. If symptom continues, move module to another chassis or location in the same chassis, if available.

Problem: *No video at output of module*
Action: Check to ensure that the monitor is ON and the video cable is connected to the correct video port on the Rx module. Check to ensure that video input to the channels is working and that you have the associated receive channel is being monitored. With an optical power meter, verify that the wavelength for the suspect optical channel is working properly at the input to the receiver unit.

Problem: *Tx Laser light Red*
Action: Optical module is defective, return to factory for repair.

Problem: *Rx Loss Red*
Action: Received optical signal absent or low. Check fiber connection and optical power at receiver.

Problem: *Tx signal light off*
Action: Check SDI input signal

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

Notes:

Meridian Technologies, Inc.
700 Elmont Road, Elmont NY 11003
Telephone: 516-285-1000 Fax: 516-285-6300
E-mail: support@meridian-tech.com Web: www.meridian-tech.com
Document Version 1.0
07/29/2014