



Fiber Optic Video/Data Transmission System

Installation Instructions

Part Numbers:

NT-1U1G/1G-x Series

(Video transmitter w/bi-directional data)

NR-1U1G/1G-x Series

(Video receiver w/bi-directional data)

Part Number Variations:

NT/NR-1U1D/1D-x, NT/NR-1U1F/1F-x
NT/NR-1U1J/1J-x, NT/NR-1U1K/1K-x
NT/NR-1W1D/1D-x, NT/NR-1W1F/1F-x
NT/NR-1W1J/1J-x, NT/NR-1W1K/1K-x
NT/NR-1W1G/1G-x, NT/NR-1U2D/2D-x

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NT/NR-1U1G/1G-x Series

Fiber Optic Video/Data Transmission System

Installation Instructions

1.0 Product Description

Meridian's NT/NR-1U1G/1G-x products are fiber optic modems that transmit one channel of uni-directional 10-bit video and one bi-directional, user-selectable RS-232, RS-422 and RS-485 (2 & 4 wire) data signals over one optical fiber using digital transmission technologies. NT/NR-1U2D/2D-x product transmit only two channel of bi-directional RS-232 data. This series is the stand-alone model. This product is powered by internal switching power supply and will accept 12-24VAC or DC. For the NT/NR-1U1G/1G-x-A the power supply is 5VDC. This power input is optional for this module and it's available only if it is specified in the order by "A" on the end of the part number.

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

The NT/NR-1U1G/1G-x is a shelf mount module and can be mounted in either a horizontal or vertical configuration. There are two mounting holes for # 8 (maximum) hardware. A 2-pin plug-in connector is located on the side of the module for power. For proper operation of this module Meridian recommends the WP-24 power supply for 12-24VAC/DC or WP-5 power supply for 5VDC (optional) power input.

3.0 Product Part Number Description

The NT/NR-1W1G/1G-x series products are available in one fiber version. In addition, both singlemode and multimode fiber are supported. The table below lists the various part numbers and their optical transmission characteristics:

Module Part #		# Fibers	Fiber Type	Optical Connector
NT-1U1G/1G-2	NR-1U1G/1G-2	1	Multimode	ST
NT-1U1G/1G-5	NR-1U1G/1G-5	1	Singlemode	FC
NT-1U1G/1G-5/ST	NR-1U1G/1G-5/ST	1	Singlemode	ST

For the 5VDC power option add "A" on the end of the part number.

4.0 Product Signal Format & Specifications

The NT/NR-1U1G/1G-x series products transmit and receive the following signals:

Signal Type	Channels	Transmit	Receive
NTSC/PAL video	1	NT-1U1G/1G-X	NR-1U1G/1G-X
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 tables below identify the specifications for the various signals that these modems transmit/receive.

Video	
Format	NTSC, PAL, SECAM
Voltage/Impedance	1Vp-p, 75 Ohm, 1.5Vp-p (max.)
Bandwidth	5Hz to 10MHz @ -3dB
Differential Gain	<0.6%
Differential Phase	<0.3°
SNR	>67dB (weighted)
Return Loss	>30dB
Field Tilt	<0.5%

Data	
Formats	RS-232
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	
Video	75 Ohm BNC w/gold center pin
Data	5 pin terminal strip
Power	2 pin terminal strip
Optical	Singlemode – ST or FC Multimode - ST

4.1 Optical Specifications

The table below lists the optical specifications for both single-mode 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)
Multimode (FP Laser) 62.5 / 125	-5	-28	23	1300/850	ST	24
Singlemode (FP Laser) 9 / 125	-5	-28	23	1310/1550	ST, FC	24



Compliant with Class 1 Laser Safety Rating

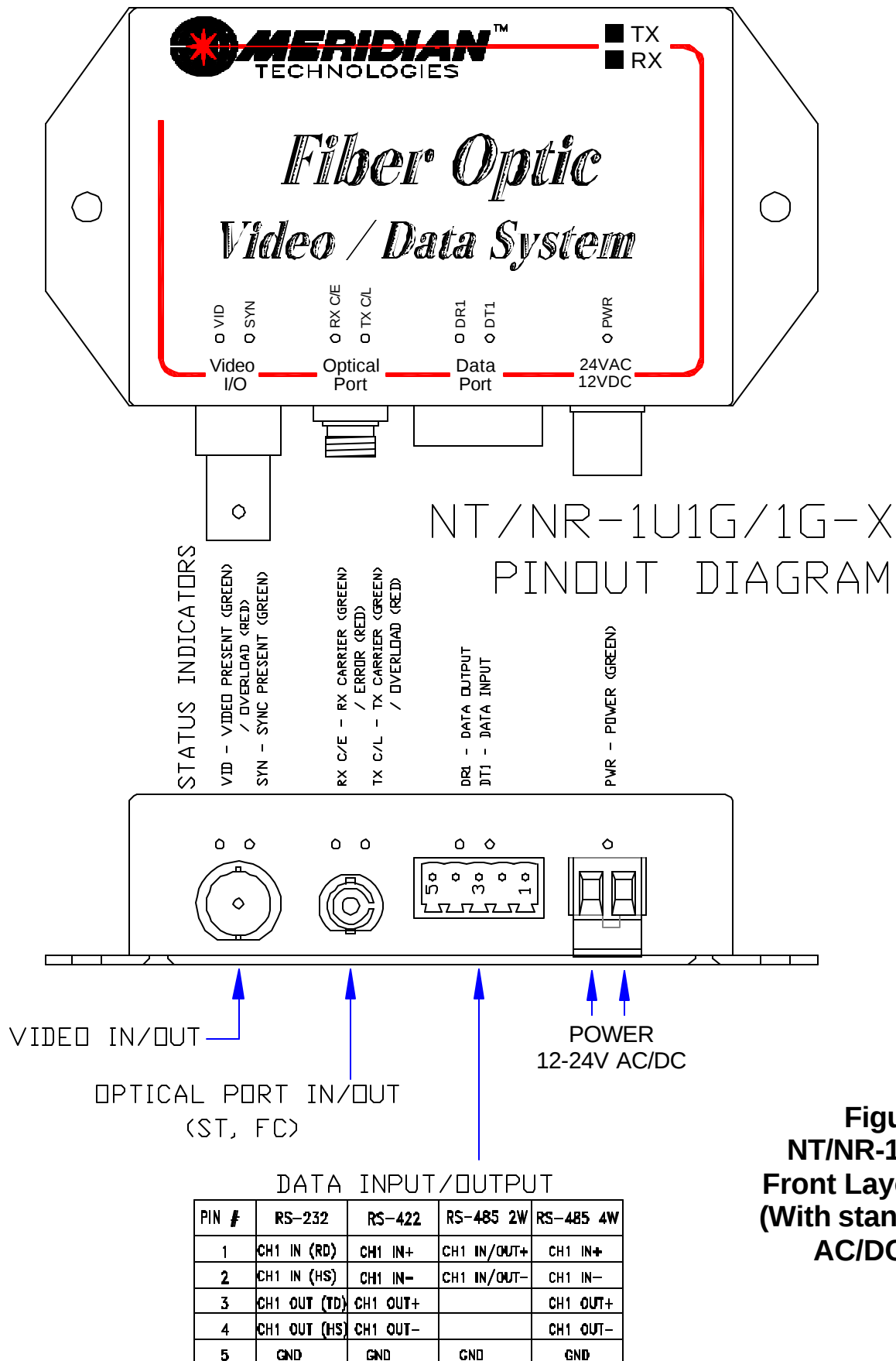
5.0 Data Connector Pin Assignment

The 5 pin terminal block connector on the front of the module is used for all data interfaces. This module supports the following data formats:

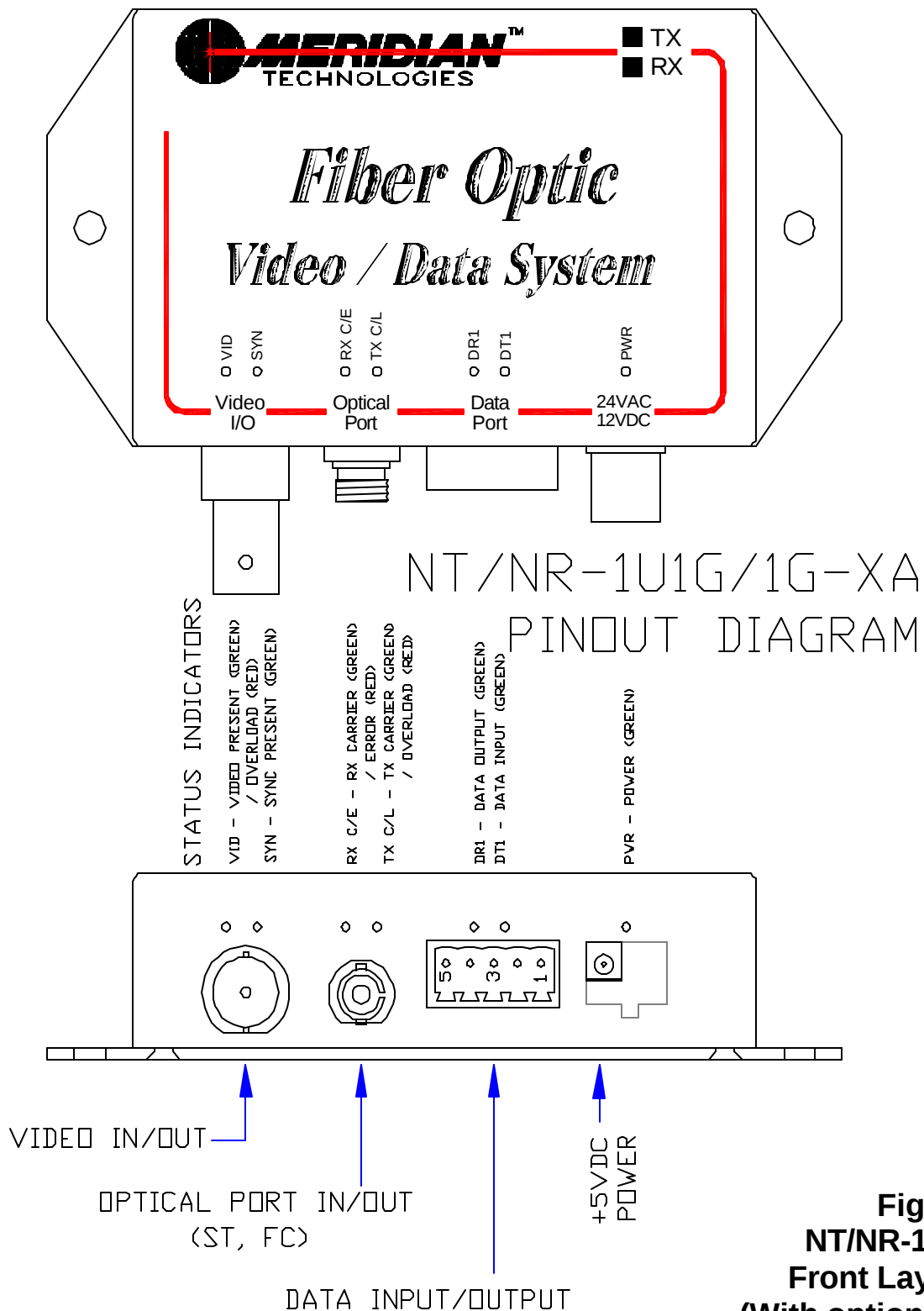
RS-232	One full speed (Tx/Rx)
RS-422	One channel (bi-directional)
RS-485	One channel (either 2 or 4 wire)

The RS-232 channel is used for transmitting/receiving one channel of RS-232 (Tx/Rx) with one bi-directional handshake (e.g., RTS & CTS) for NT/NR-1U2D/2D-x systems. In addition to the RS-232, this module independently supports both RS-422 and 2 or 4-wire RS-485 signals. User-settable switches on the module's motherboard are used to select the appropriate data format as required.

Data Connector Pin Assignment				
	1D/1D & 2D/2D	1F/1F	1J/1J	1K/1K
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 2 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 2 OUT (DSR)	Ch 1 OUT (-)		Ch 1 OUT (-)
5	GND	GND	GND	GND



**Figure 5.1
NT/NR-1U1G-1G-x
Front Layout Diagram
(With standard 12-24V
AC/DC Power)**



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

Figure 5.2
NT/NR-1U1G-1G-xA
Front Layout Diagram
(With optional 5V DC Power)

5.1 Operation LED Indicators

There are a number of indicator lights that provide visual operational status of the modules and link (see Figure 5.1)

The function of these LED indicators is as follows:

VID	- Video present	- Green (OK), Red (Overload)
SYN	- SYNC present	- Green (OK)
RX C/E	- Rx Carrier present	- Green (OK), Red (Error)
TX C/L	- Tx Carrier present	- Green (OK), Red (Alarm)
DR1	- Data output	- Green
DT1	- Data input	- Green
PWR	- Power	- Green (ON)

6.0 Data Format Selection

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

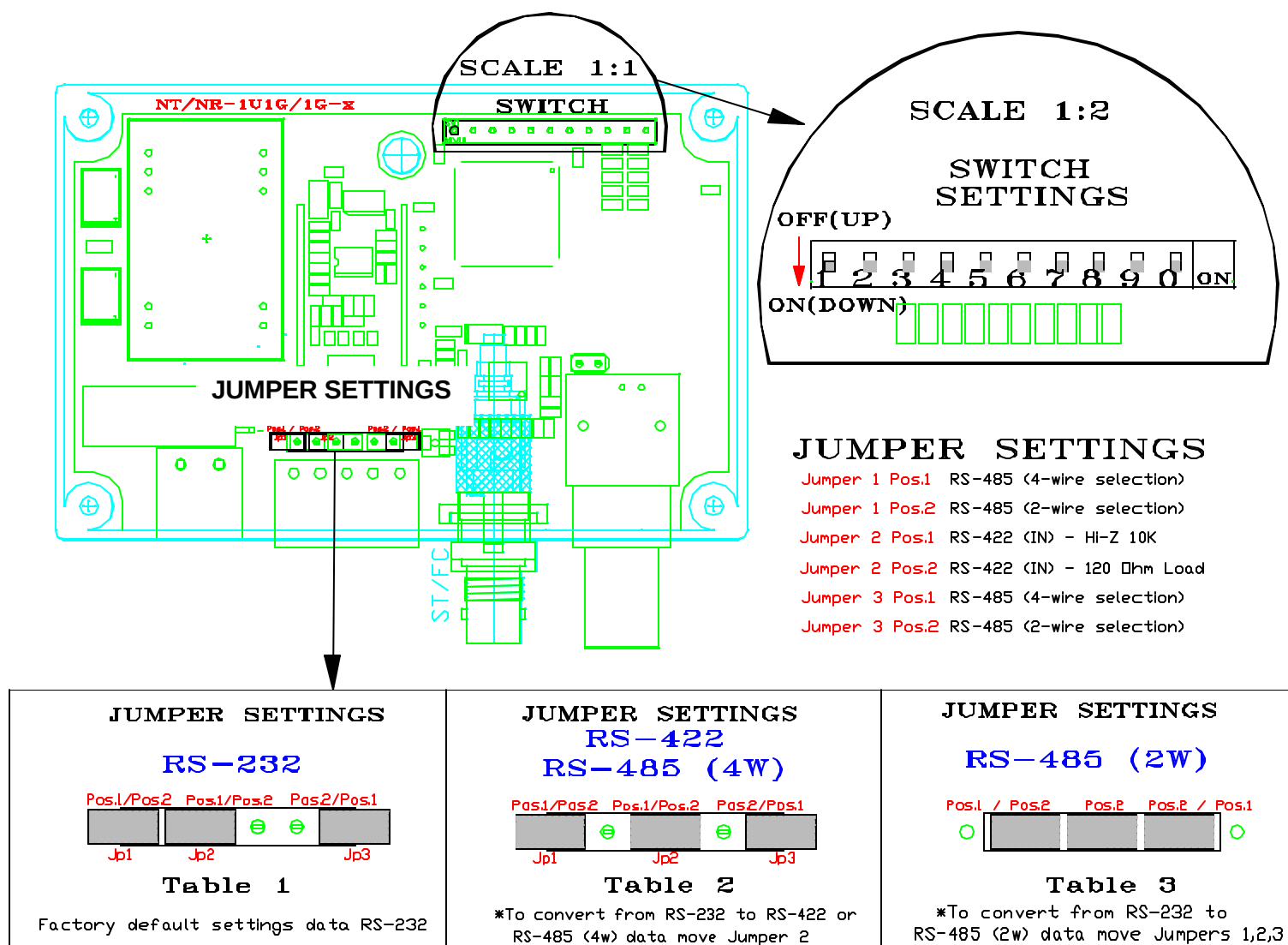
Data Format Selection Switch Settings				
	RS-232	RS-422	RS-485 (2-wire)	RS-485 (4-wire)
Switch #1	OFF (up)	ON (down)	ON (down)	OFF (up)
Switch #2	OFF (up)	ON (down)	OFF (up)	ON (down)

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

6.1 Data Selection jumpers

There are three (3) 2-pin jumpers located directly behind the 5-pin terminal front-panel mounted connector. The 3 jumpers are used to select appropriate data driver. The illustration below describes the function of each of these data jumpers. The factory-supplied default setting is for RS-232 data.

Figure 6.1
Module Switch and Jumper Location



The factory jumper settings can be easily changed as follows:

1. Position the module as shown in the above photograph and remove the bottom cover by removing the 4 screws in the corners of the side cover.
2. Locate the jumpers. These will be directly behind the 5-pin connector and pull directly upwards (away from the circuit board) being careful not to bend the pins on the circuit board.
3. Move the jumpers according to the data selected in Figure 6.1, 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.

7.0 Mechanical Dimensions

Module physical dimensions:

Length3.6” (9.2 cm) (4.6” with flanges)
 Width 2.4” (6 cm)
 Height..... 1” (2.5 cm)
 Weight0.3 lb (135 gm)

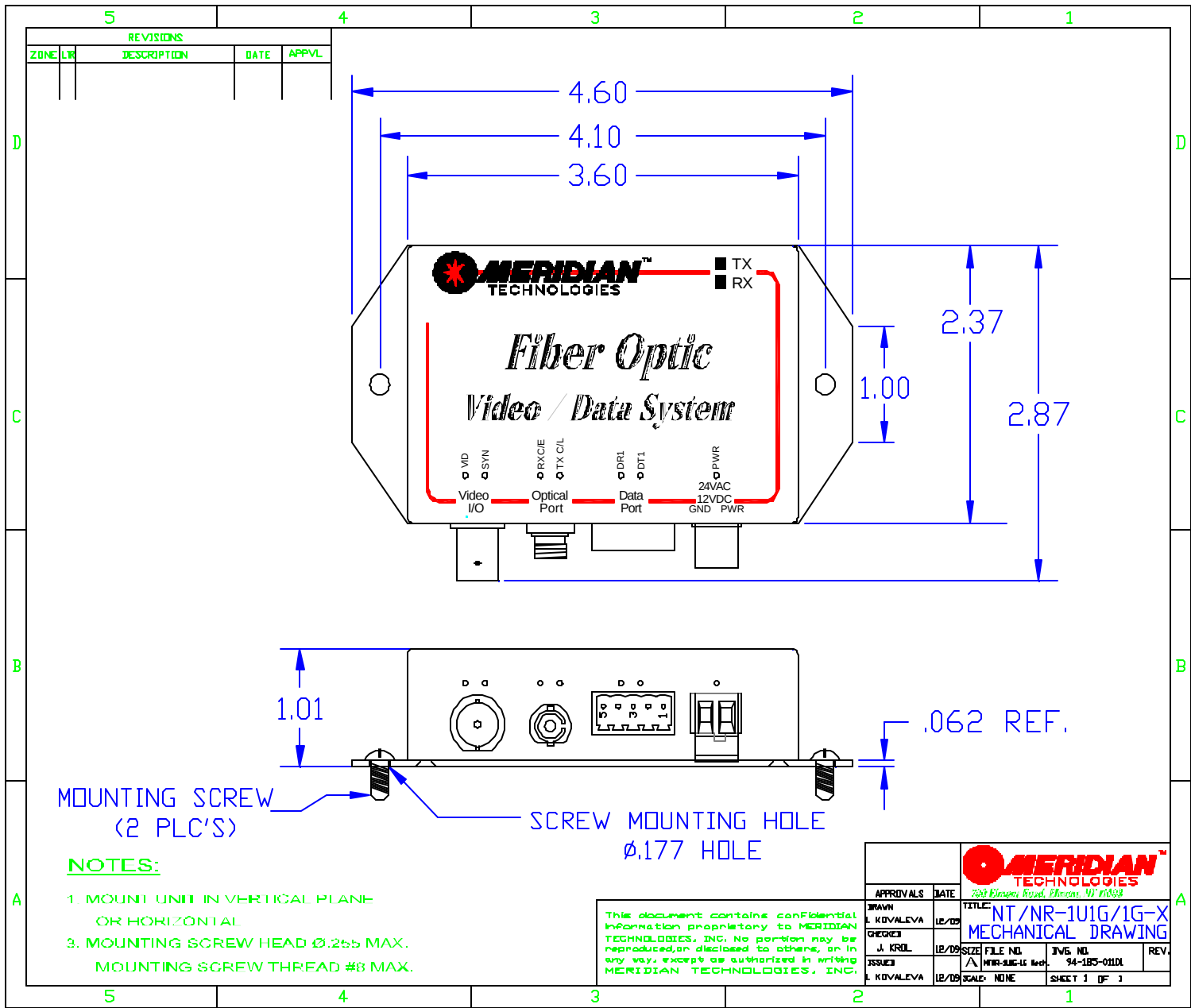


Figure 7.1
Module Mechanical Drawing

8.0 SpectraView™ Network Monitoring System

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
SW1 – SW2 – Data format selection switches			
SW5	OFF	OFF	OFF
SW6	OFF	OFF	OFF
SW7	ON	OFF	OFF
SW8	OFF	ON	OFF
SW9	OFF	OFF	ON
SW10	OFF	OFF	OFF

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 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 NT or NR and NXA & NXB modules must be connected together via fiber and power applied in order to perform the Transmit tests.
- ✍ When testing the data channels, it is necessary that the data formats for both the 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 the 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 inject the Data test signal 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 NT, NR, NXA or NXB 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 (Data Tx) 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 (Data Rx) 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 the NT, NXA or NXB switch to the OFF position.

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

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

- ✍ The NT and NR or NXA and NXB 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 through 2 (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 NT, NR, NXA or NXB 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 NT, NR, NXA or NXB switch to the OFF position. This will restore operation to its normal mode.

Video Test – (Applicable to one-way transmission modules (NT & NR units). This video test mode will allow the user to test the video transmission channel without the use of an external camera to generate a video signal.

There are two video tests available – Transmit video & Receive video. The following describes the test setup for each:

Transmit video test – This test injects a 4-bar video test pattern into the video transmitter and sends this signal over fiber to the associated receiver module.

In order to initiate the internal transmit video test it is necessary to configure the modules as follows:

- ✍ SW7 on the NT video Tx module must be set to the ON (down) position.
- ✍ SW8 on the NR video Rx module must be set to the OFF (up) position.
- ✍ The optical fiber between the NT & NR modules must be connected together
- ✍ Connect a standard video monitor to the output of the NR (Video Receiver) module
- ✍ 4 grey-scale vertical bars will be displayed on the monitor
- ✍ Receiver module LEDs – If a video monitor is not available, the activity of the transmit video test can be monitored on the receiver's front panel LEDs. When this test is activated, the receiver modules Video Sync & Video Present green LEDs (SYN & VID) will light.

Receive video test – This test injects an 8-bar video test pattern into the video receiver and sends it to the receiver output BNC for display on a video monitor.

In order to initiate the internal receive video test it is necessary to configure the modules as follows:

- ✍ SW7 on the NT video Tx module must be set to the OFF (up) position.
- ✍ SW8 on the NR video Rx module must be set to the ON (down) position.
- ✍ The optical fiber between the NT & NR modules must be connected together
- ✍ Connect a standard video monitor to the output of the NR (Video Receiver) module
- ✍ 8 grey-scale vertical bars will be displayed on the monitor

SpectraView Enabled (SW9) - (Applicable to one-way transmission modules with video (NT & NR units). This video mode will enable the vertical video bars to be displayed in the event that either the incoming video signal has been removed or if the optical signal from the transmitter has been interrupted.

To enable this video bars feature it is necessary to configure the modules as follow:

- ✍ SW 9 on the NR (video Receiver) module must be set to the ON (down) position
- ✍ SW 9 on the NT (video Transmitter) module must be set to the ON (down) position

Under normal operation, the video from the CCTV camera will be displayed on the respective monitor at the receive side. There are two 'alarm' modes - one for loss of video sync and one for loss of optical signal. When one or the other of these alarm modes is present, the monitor will display the following:

Loss of video sync - 4 vertical gray-scale bars across the monitor screen

Loss of optical signal - 8 vertical gray-scale bars across the monitor screen

This procedure concludes the testing of the video /data channels within Meridian's DigiCool fiber optic digitally-encoded transmission modules.

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: *Card power LED does not light when power to the module is applied or power indicator turns on and off*

Action: Check power supply to ensure that it is plugged in and turned on.

Problem: *Tx signal light*

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

Problem: *Rx signal light*

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

Problem: *No video at output of module*

Action: Check to ensure that the video channel-specific LEDs are on (Green). Also, check to ensure that the optical LEDs are ON. If no video is still present, check to ensure that the monitor is ON and the video cable is connected to the correct video port on the Rx module.

Problem: *Video image is dark*

Action: Check the iris control on the camera to ensure that it is open to the proper amount for the conditions.

Problem: *Video image is too bright and appears overexposed*

Action: Check the Video overload indicator on the Rx module. If it is Red, the video signal level is too high and the CCTV iris should be checked to ensure that it is open properly for the conditions.

Problem: *No Data*

Action: Check to ensure that an NT unit is optically connected to an NR unit. An NT or an NR will not communicate with a module of the same type NT or NR. Check that both of the modules have the data jumpers set correctly for the application.

If the problem still persists after reviewing the above items, please contact Meridian technical support : +1(516)-285-1000 / +1(516)-285-0570 or support@meridian-tech.com

Notes:



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