



Fiber Optic Video/Audio/Contact Closure Transmission System

Installation Instructions

Part Numbers:

NT-1U1A1C-SFP

(Video Transmitter with 1ch. Audio & Contact Closure)

NR-1U1A1C-SFP

(Video Receiver with 1ch. Audio & Contact Closure)

Part Number Variations:

***NT/NR-1U1A-SFP, NT/NR-1U/1A-SFP,
NT/NR-1A/1A-SFP, NT/NR-1A-SFP,
NT/NR-1U1C-SFP, NT/NR-1U/1C-SFP,
NT/NR-1C/1C-SFP, NT/NR-1C-SFP.***

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NT/NR-1U1A1C-SFP
Fiber Optic Video/Audio/Contact Closure
Transmission System Installation Instructions

1.0 Product Description

Meridian's NT/NR-1U1A1C-SFP products are fiber optic modems that transmit one channel of uni-directional 10-bit video, one channel of uni-directional audio and contact closure or one channel of bi-directional audio or one channel of bi-directional contact closure, over SFP optical fiber using digital transmission technologies. The NT/NR-1U1A1C-SFP is the stand-alone model. This product is powered by internal switching power supply and will accept 12-24V AC or DC. For the NT/NR-1U1A1C-SFP-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. For the 5VDC power option add "A" on the end of the part number.

SFP optical modules are supported. This SFP gives you the option for singlemode, multimode or CWDM wavelength selections by simply plugging in the appropriate SFP module.

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

2.0 Installation

The NT/NR-1U1A1C-SF 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 12-24V AC/DC (default) or WP-5 power supply for 5VDC (optional) power input.

3.0 Product Signal Format & Specifications

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

Signal Type	Channels	Transmit	Receive
NTSC/PAL video	1	Video Tx	Video Rx
Audio	1	Yes	Yes
Contact Mapping	1	Yes	Yes

Video	
Format	NTSC, PAL, SECAM
Voltage/Impedance	1Vp-p, 75 Ohm, 1.5 Vp-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%

Audio	
In/Out Impedance	600 Ohm balanced or 47K Ohm unbalanced
Frequency Response	10Hz to 20KHz
SNR	>90dB (weighted) @ 1KHz
In/Out Level	-8 to +8 dBm (4Vp-p, max)
THD	<0.01% @ 1KHz
Digitized Resolution	24 bit

Contact Mapping	
Contact Type	Relay, normally-open (N.O.), normally-closed (N.C.) - jumper selectable, Isolated contacts
Contact rating	0.3amps, 30 VAC/VDC
Contact bounce	5 msec
Max switching rate	10Hz

Connectors	
Video	75 Ohm BNC w/gold center pin
Audio or Contact	5 pin terminal strip
Optical	LC, SC – SFP dependent
Power	2 pin terminal strip (for 12-24V AC/DC) or DC Power Jack (for 5VDC)

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 is 155 Mbps. Refer to optical SFP table in for complete part and ordering information.

For more specifications on a SFP optic devices refer to SFP data sheet on Meridian website:

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

4.0 Operating

Video – Each of the BNC video connector accepts a standard NTSC/PAL video input signal (NT module) and transmits these signal to the receive unit (NR module). The respective video output signal is located on the same location as the input video signal. Connect the input video signal to the BNC video input connector on the transmitter module and the output video connector on the receiver module. The video input or output channel has indicators associated with them to provide quick visual indications of the channel activity.

Audio - Connect the audio source to one of the channels' input pins as shown in section 4.2. Connect an audio output device to the associated channel's output pins on the other module. To obtain optimal performance, the audio input level should be set to 0dB. The audio output level will track the input level. Once proper operation is verified, the other channels can be connected per the pinout diagram in this manual.

Contact Closute – Connect the CC data Tx channel to the appropriate CC data Rx pins on the connector as shown in section 4.2

4.1 LED Status Indicators

The modules diagram shown in section 5.0. 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
VID	- Green – Video present/ Overload - Red
SYN	- Green – Sync present/ Error - Red
TX	- Green – Optical carrier output/ Error - Red
RX	- Green – Optical carrier input/ Error - Red
TX1	- Green – Audio input
TX2	- Green – CC input
RX1	- Green – Audio output
RX2	- Green – CC output

4.2 Audio & Contact Closure Connector Pin Assignment

The 5 pin terminal block connector on the front of the module is used for the Audio and Contact interfaces. The diagrams below indicate the variation of audio and contact closure connection terminals.

Figure 4.3

	Bi-Directional Connector Pin Assignment	
Pin #	Audio (1A/1A)	Contact Closure (1C/1C)
1	Audio INPUT+	CC OUTPUT+
2	Audio INPUT-	CC OUTPUT-
3	Audio OUTPUT+	CC INPUT
4	Audio OUTPUT-	CC GND
5	GROUND	

Figure 4.4

	Uni-Directional Connector Pin Assignment	
Pin #	TX Audio w/CC (NT-1A1C)	RX Audio w/CC (NR-1A1C)
1	Audio INPUT+	CC OUTPUT+
2	Audio INPUT-	CC OUTPUT-
3	CC INPUT	Audio OUTPUT+
4	CC GND	Audio OUTPUT-
5	GROUND	

5.0 Module Pinout Diagram

Figures 5.1 & 5.2 below show the module, LED lights and Video, Audio & CC connector and SFP optical ports location for the module. Not all of the signals and LEDs apply to all versions of these modules. Please refer to the module's part number for the appropriate signal description.

NT/NR-1U1A1C-SFP

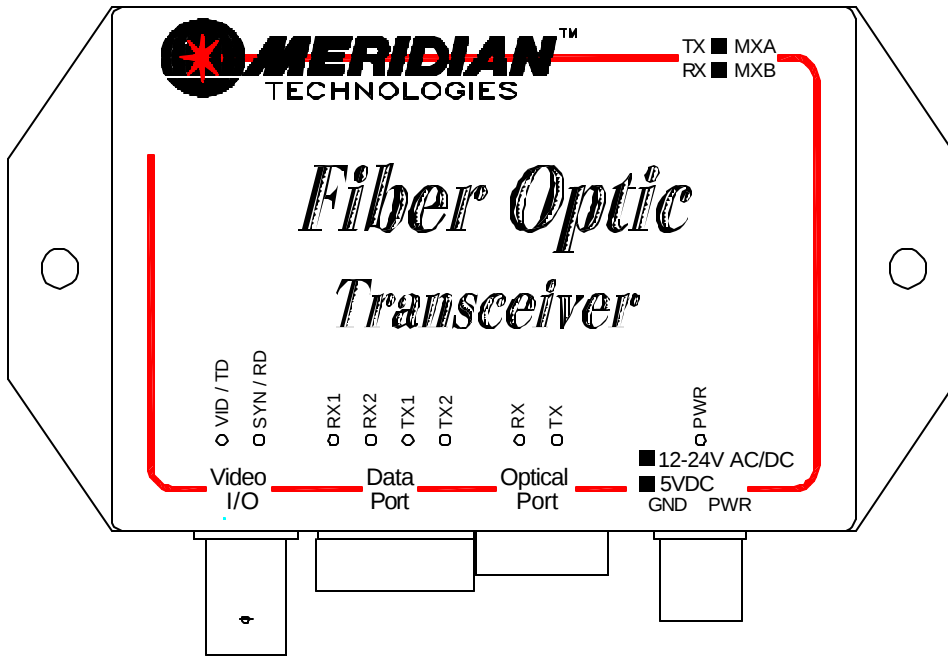
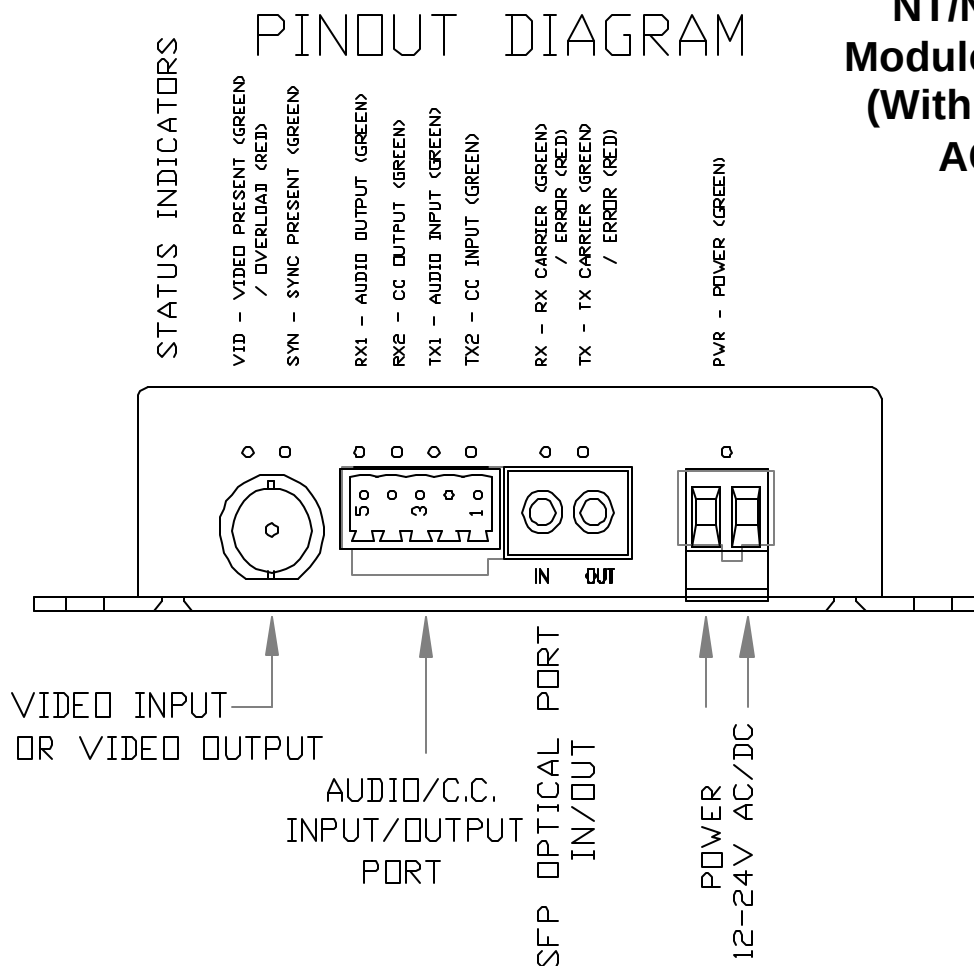
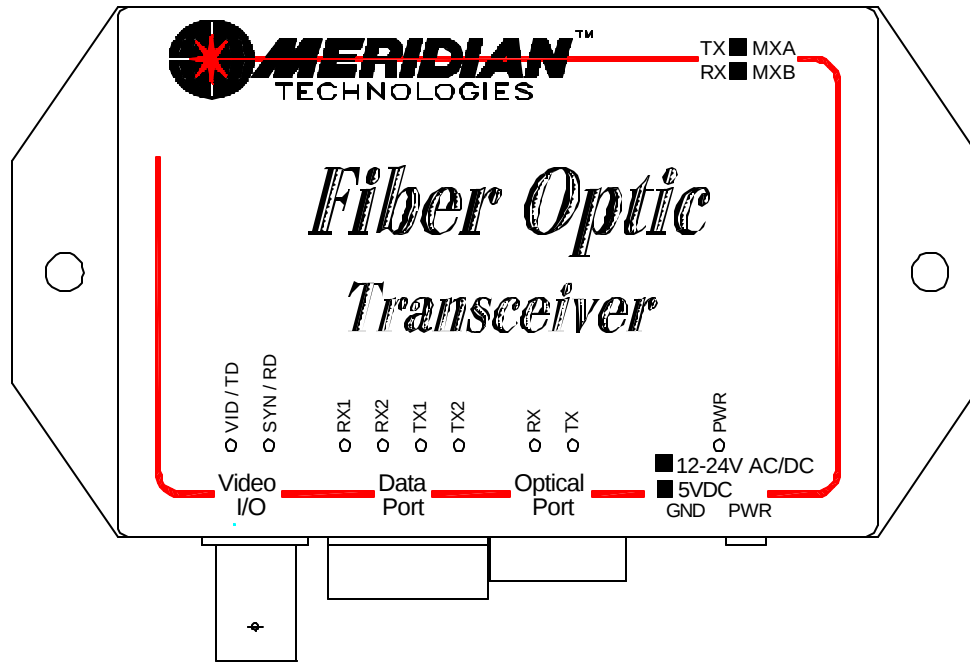


Figure 5.1
NT/NR-1UA1C-SFP
Module Pinout Diagram
(With standard 12-24V
AC/DC Power)



NT/NR-1U1A1C-SFP-A



PINOUT DIAGRAM

STATUS INDICATORS

VID - VIDEO PRESENT (GREEN)
/ OVERLOAD (RED)

SYN - SYNC PRESENT (GREEN)

RX1 - AUDIO OUTPUT (GREEN)

RX2 - CC OUTPUT (GREEN)

TX1 - AUDIO INPUT (GREEN)

TX2 - CC INPUT (GREEN)

RX - RX CARRIER (GREEN)

/ ERROR (RED)

TX - TX CARRIER (GREEN)

/ ERROR (RED)

PWR - POWER (GREEN)

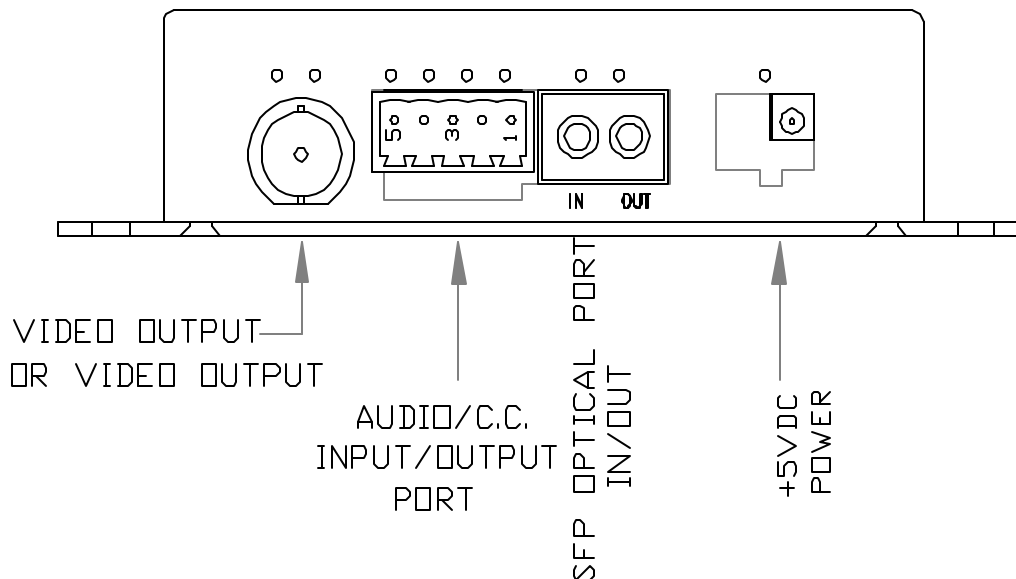


Figure 5.2
NT/NR-1U1A1C-SFP-A
Module Pinout Diagram
(With optional 5V DC Power)

6.0 Audio Impedance & Contact Mapping Selection jumpers

There is five 3-pin jumpers located directly behind 5 pin screw terminal front-panel mounted connector. The first row of jumpers are used to select power-on state of the contacts (NO or NC). The rest four rows are used to select the Input/Output Audio Impedance.

Audio Impedance - The input/Output impedance of each of the audio channels can be changed between 600 Ohm balanced and 47K Ohm unbalanced. The default impedance is 600 Ohm.

Contact Mapping - The output state of each of the contacts can be changed from Normally-Open (NO) POS.1 to Normally-Closed (NC) POS.2 by properly selecting the jumpers. A NO contact (output side) closes when the contact input on the input module's side is closed to ground. The default contact setting is NO (normally-open).

The illustration below describes the function of these jumpers. The jumpers are shown in their default condition.

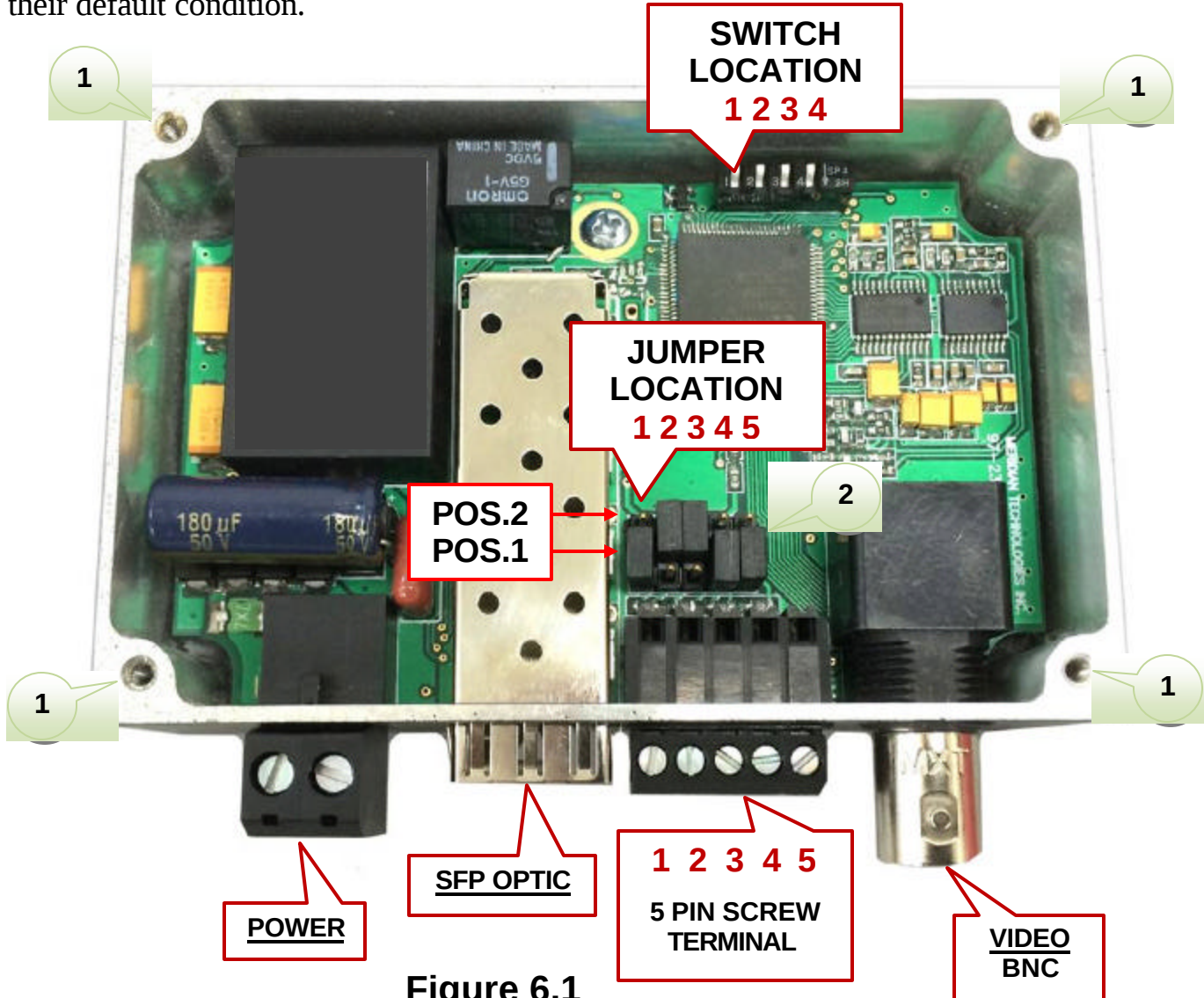


Figure 6.1
Module Jumper and Switch Location

SWITCH & JUMPER SETTINGS FOR NT/NR MODULE

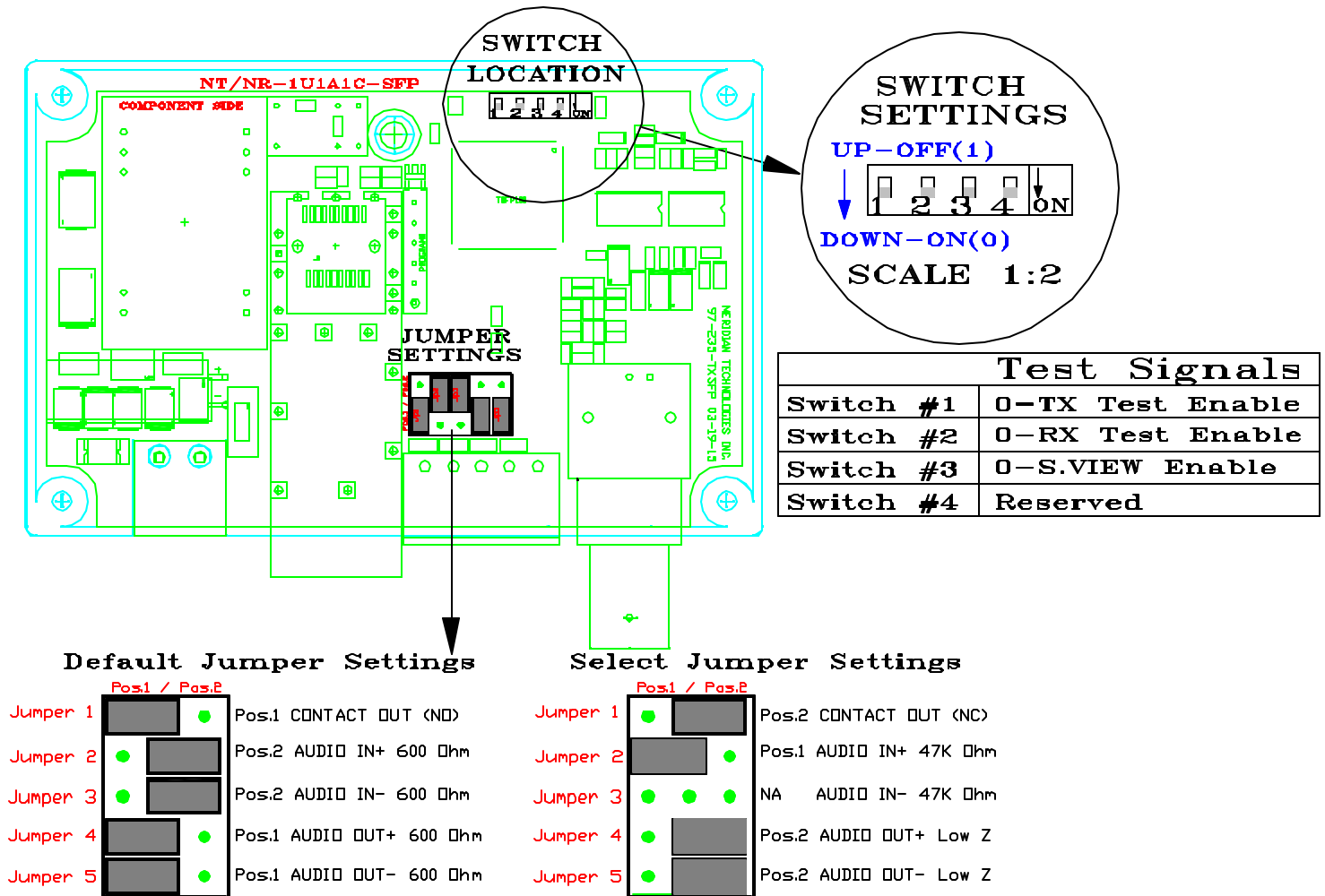


Figure 6.2
Module Jumper and Switch Settings

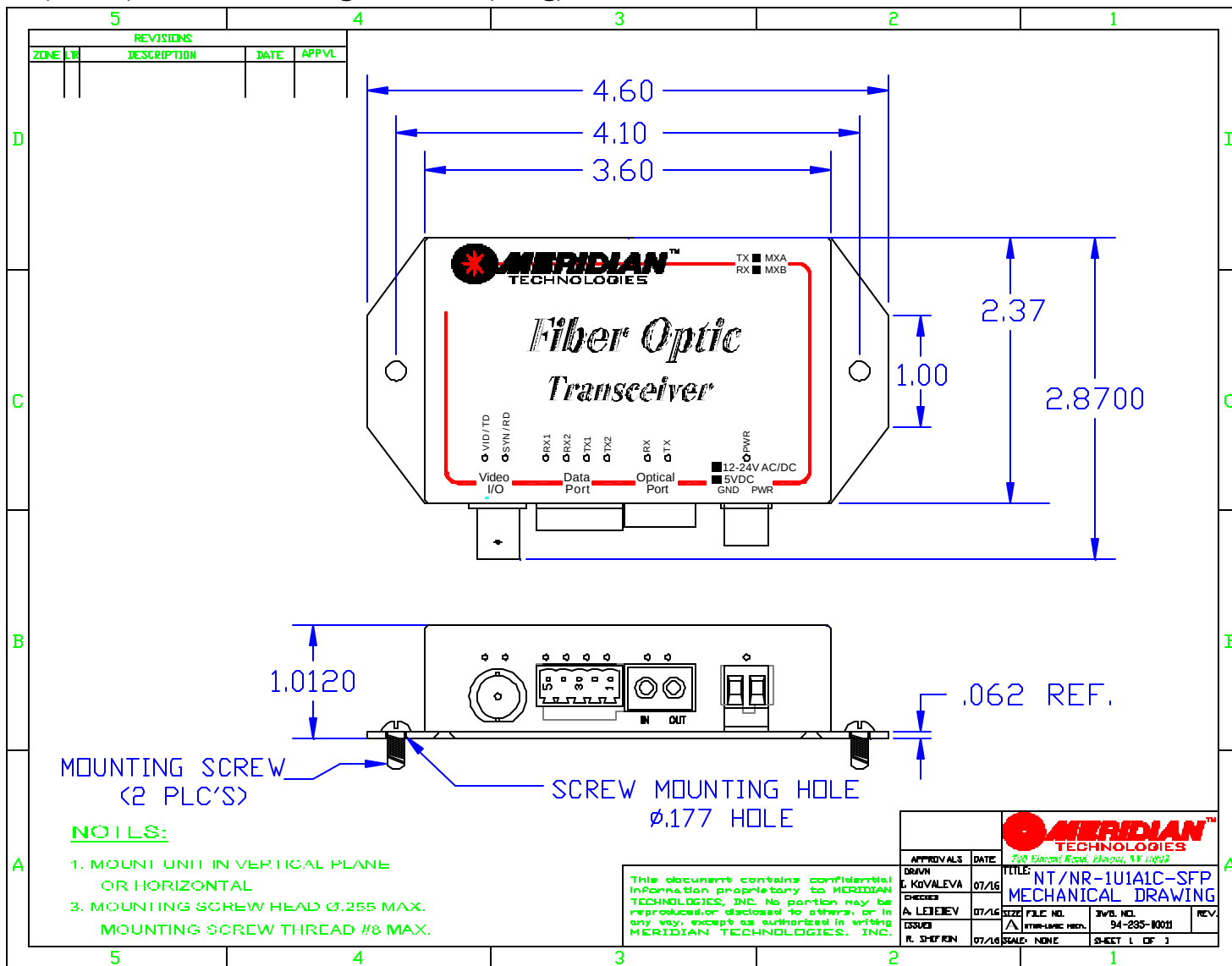
6.1 Changing Default Jumper Settings

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 . It will be on the bottom side of the circuit board directly behind the 5 pin screw terminal connector.
3. Configured the proper format options.
4. Carefully place the bottom cover and secure with the 4 screws.
5. Repeat, as required, with the other unit.

7.0 Mechanical Dimensions

Module physical dimensions: Lent – 3.6”(9.2cm), Width – 2.4” (6cm), Height – 1” (2.5cm). Module weight: 0.3 Lb (135g)



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	ON	OFF	OFF
SW2	OFF	ON	OFF
SW3	OFF	OFF	ON
SW4	NA	NA	NA

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:

Audio/Contact Transmit Test (SW1) – applicable to both full-duplex transceiver modules and one-way 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 modules must be connected together via fiber and power applied in order to perform the Transmit tests.
- ✍ The Transmit Test switch (SW1) on the module initiating the test must be in the ON (down) position
- ✍ Test switches (SW2-4) 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 Audio and Contact Closure 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:

Contact closure - 1Hz square wave

Once the Transmit test switch on the remote NT or NR module is switched ON, the above signals will be transmitted over fiber to the receiving unit. The outputs can be monitored by standard Audio and Contact mapping measurement/monitoring techniques.

LED indicator status – During the test, the Tx channel indicator lights for the contact mapping (CC Tx) on the module initiating the test will flash at a 1Hz rate. The audio transmit light (Audio Tx) will be ON continuously. 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 contact mapping (CC Tx) on the receiver module’s front panel will flash at a 1Hz rate to indicate proper reception of the test signals while the audio receive light (Audio Rx) will be ON continuously.

To disable the test, move SW1 on the NT or NR switch to the OFF position.

Audio/Contact Receive Test (SW2) - applicable to both full-duplex transceiver modules and one-way receiver modules. These tests will test all of the audio and contact closure transmission channels installed on the module associated with the remote loop back 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 test, it is necessary to configure both modules as follows:

- ✍ The NT or NR modules do not need to be connected together via fiber.
- ✍ The Receive Test switch (SW2) 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:

Audio - 1Khz square wave
Contact closure - 1Hz square wave

Once the Receive test switch on the NR or NR 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 Audio and Contact mapping measurement/monitoring techniques.

LED indicator status – During the test, each of the channel's front panel Rx channel indicator lights for the Contact closure 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 SW2 on the NT or NR switch to the OFF position. This will restore operation to its normal mode.

Video Test – (Applicable to one-way transmission modules). 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:

- ✍ SW1 on the NT video Tx module must be set to the ON (down) position.
- ✍ SW2 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:

- ✍ SW1 on the NT video Tx module must be set to the OFF (up) position.
- ✍ SW2 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 (SW3) - (Applicable to one-way transmission modules with video). 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 3 on the NR (video Receiver) module must be set to the ON (down) position
- ✍ SW 3 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/audio /contact channels within Meridian's DigiCool fiber optic digitally-encoded transmission modules.

9.0 Product Part Number Variations

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

Part Numbers	Description
NT-1U1A-SFP	Video TX w/1-ch uni-directional Audio TX
NR-1U1A-SFP	Video RX w/1-ch uni-directional Audio RX
NT-1U/1A-SFP	Video TX w/1-ch uni-directional Audio RX
NR-1U/1A-SFP	Video RX w/1-ch uni-directional Audio TX
NT/NR-1A/1A-SFP	1-ch bi-directional Audio
NT/NR-1A-SFP	1-ch uni-directional Audio
NT-1U1C-SFP	Video TX w/1-ch uni-directional Contact Closure TX
NR-1U1C-SFP	Video RX w/1-ch uni-directional Contact Closure RX
NT-1U/1C-SFP	Video TX w/1-ch uni-directional Contact Closure RX
NR-1U/1C-SFP	Video RX w/1-ch uni-directional Contact Closure TX
NT/NR-1C/1C-SFP	1-ch bi-directional Contact Closure
NT/NR-1C-SFP	1-ch uni-directional Contact Closure

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

10.0 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: *No Tx Carrier light*

Action: Check to see that the correct SFP module properly installed into socket.

Problem: *No Rx Carrier light*

Action: 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 or distorted Audio*

Action: Check to ensure that the audio input/output connections are correct and that the Input/Output impedance jumpers are set correctly.

Problem: *Contact closure not working*

Action: Input (Tx) side – Ensure that the input contact is connected between the appropriate input connection and ground. Verify that the contact is closed by viewing the associated input contact status LED. If it is off when the contact is closed, verify that the closed circuit input impedance is with the specifications listed.

- Verify that the carrier Tx light is green

Output side – Confirm that the output contact status LED is on and that the optical input power LED is on. If not, check the optical path or measure the input optical power to verify that it is within the specified input levels.

Ensure that the terminal device is connected to the proper output contact pinouts and that the individual contact channel jumpers are set to the appropriate normally-open or normally-closed position

- Verify that the carrier Rx light is green

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

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