Installation/Operation Instructions

Fiber Optic Video & Data Transmission System

Part Number:

DT/DR-2U(W)4F/7C4F-SFP Series

(2-Channel Video Tx/Rx, 4-Channel bi-directional RS-422 Data & 7-Channel Contact Closure Tx/Rx)

Part Number Variations:

DT/DR-1U(W)4F/7C4F-SFP, DT/DR-2U(W)4F/1C4F-SFP
DT/DR-1U(W)4F/7C2F-SFP, DT/DR-2U(W)4F/7C2F-SFP
DT/DR-1U(W)4F/4C4F-SFP, DT/DR-2U(W)4F/4C4F-SFP
DT/DR-1U(W)4F/2C4F-SFP, DT/DR-2U(W)4F/2C4F-SFP
DT/DR-1U(W)2F/2C4F-SFP, DT/DR-2U(W)2F/2C4F-SFP

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1.0 Product Description

Meridian's product series DT-2U(W)4F/7C4F-SFP and DR-2U(W)4F/7C4F-SFP are fiber optic modems that transmit one channel of uni-directional digitized video, four channels of bi-directional RS-422 data and seven channels of uni-directional contact closure signals using the industry standard Small Form Pluggable (SFP) optical device. This product series uses Meridian's standard 2-slot wide chassis mount card assembly and plugs into the following Meridian chassis: SR-1002/S, SR-1600/S and SR-2001 & SR-2000 series 19" equipment chassis.

The digital modules consist of various plug-in personality function cards or SIMs.
The top card is the optical card that contains the fiber optic interface. The optical input & output connectors are located on the right side of the module. The second SIM contains the video coaxial interface. The next SIM card in port 2 contains the uni-directional Contact Closure. The bottom SIM cards in port 3 & 4 contains the bi-directional RS-422 data signals.

SFP optical modules are supported. Optional conformal coating provides an additional level of protection from environments with high humidity.

2.0 Installation

Series DT-2U(W)4F/7C4F-SFP and DR-2U(W)4F/7C4F-SFP products are two-slot wide cards and, as such, occupy two slots 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 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 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 Signal Format & Specifications

The DT & DR-2U(W)4F/7C4F-SFP series products transmit and receive the following signals:

Signal Type	Channels	DT-1U4F/7C4F	DR-1U4F/7C4F
NTSC/PAL video	2	Transmit	Receive
Dry contact closure	7	Receive	Transmit
RS-422	4	Transmit/Receive	Transmit/Receive

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)
Differential Gain	<0.6%
Differential Phase	$<0.3^{o}$
SNR	>67dB (weighted)
Return Loss	>30dB
Field Tilt	<0.5%

Contact Mapping	
Input	Contact closure to ground
Output	Isolated contact closure outputs
Output Contact Rating	0.3A @ 30VAC/DC
Contact bounce time	5msec
Connectors	High Density DB15 Female

Data	
Formats	RS-422
Data Rate	DC to 1Mb/s
Bit Error Rate (BER)	Better than 10^{-9}

Connectors	
Video	75 Ohm BNC w/gold center pin
Dry contact closure	DB15 (HD) Female
Data	DB9 Female
Optical	LC, SC – SFP Dependent

3.1 Optical Specifications

The SFP series products are available for both singlemode and multimode fiber applications and ether one or two fiber versions. Recommended optical speed for this product 1.25Gb/s. Refer to optical SFP table 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 two BNC video connectors accepts a standard NTSC/PAL video input signal (DT module) and transmits these signals to the receive unit (DR module). The respective video output signal is located on the same channel (location) as the input video signal. Connect the input video signal to the appropriate BNC video input connector on the transmitter module and the output video connector on the associated port on the receiver module.

Data – Connect the data for each of the data channels to the appropriate data Tx/Rx pins on the connector as shown in section 5.0 & 6.0

4.1 Video Status indicators

The front panel pinout diagrams in section 7.0 show the connector and LED indicator locations for the video & various data status indicators on the transmitter and receiver modules. These indicators show the operation status of the module's power and optical carriers. These indicators can be used for troubleshooting the module, electrical and optical connections. In addition, each of the input/output channels has indicators associated with them to provide quick visual indications of the channel activity. These indicators for each of the data channels are listed in sections 5.0 & 6.0

Transceiver LED Indicators		
Indicator	**Location**	**Function**
Power	Left side of module	Green – ON
Card Diagnostic*	Left side of module	Green – OK, Red – Alarm
Tx carrier	Under optical output connector	Optical output (Green – OK, Red – error)
Rx Optical signal	Under optical input connector	Optical input (Green – OK, Red – error)
Rx Carrier	Under optical input connector	Optical Carrier input (Green – OK, Red – error)
Video 1	Under video in/out connectors	Green – Sync received
Video 1	Under video in/out connectors	Video signal – Green OK, Red – video overload

*Note: The Card Diagnostic is optional and LED present only if applied.
Not all of the LEDs apply to all versions of these modules. Please refer to the module's part number for the appropriate signals, description.

5.0 Contact Mapping SIM Signal Assignment (Pinouts) & Indicator Lights

The Contact Mapping boards (SIM) is inserted in the module at the Port 2.
The DT & DR Contact Mapping channel pinouts for DB-15HD connector are shown in the table below:

Contact Mapping Connector Pinout Port 2		
Pin #	**DT- INPUT**	**DR- OUTPUT**
1	Ch 1 Input	Ch 1 Output
2	Ch 2 Input	Ch 1 Output
3	Ch 3 Input	Ch 2 Output
4	Ch 4 Input	Ch 2 Output
5	GND	GND
6	Ch 5 Input	Ch 3 Output
7	Ch 6 Input	Ch 3 Output
8	Ch 7 Input	Ch 4 Output
9	NA	Ch 4 Output
10	NA	Ch 5 Output
11	NA	Ch 5 Output
12	NA	Ch 6 Output
13	NA	Ch 6 Output
14	NA	Ch 7 Output
15	NA	Ch 7 Output

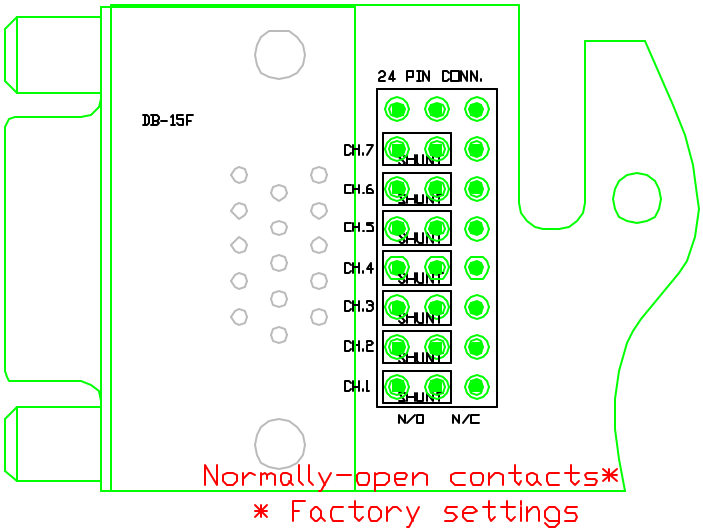
The table below identifies the input/output functions LED status indicators for contact SIM card.

Contact Mapping Input/Output Status indicators		
LED #	DT-Port 2	DR-Port 2
1	Channel 1 - input present	Channel 1 - output present
2	Channel 2 - input present	Channel 2 - output present
3	Channel 3 - input present	Channel 3 - output present
4	Channel 4 - input present	Channel 4 - output present
5	Channel 5 - input present	Channel 5 - output present
6	Channel 6 - input present	Channel 6 - output present
7	Channel 7 - input present	Channel 7 - output present
8	NA	NA

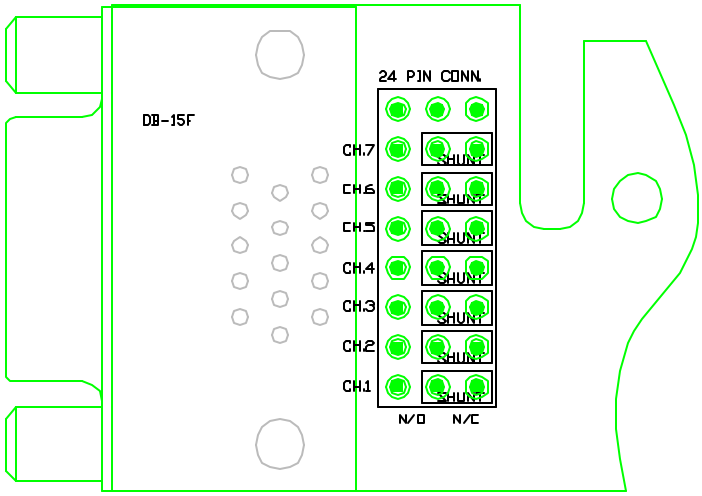
5.1 Contact Mapping SIM Jumper Settings

The Contact Closure SIM has 7 jumpers on it (located directly behind the DB15 connector), one for each channel. These jumpers are used to set the output Contact Mapping settings for Normally-Open or Normally-Clouse contacts.

The default setting is Normally-Open.
The figures below illustrate these jumpers and how they are configured:



Contact Mapping jumper settings for Normally-Open Output Contacts
Factory Settings



Contact Mapping jumper settings for Normally-Closed Output Contacts

5.2 Changing the SIM jumpers

The jumpers to change the data from Normally-Open to Normally-Closed format can be easily changed as follows:

1. Lay the module on its side with the front panel facing to the left.
2. Remove the screws in each of the 4 corners of the side cover and carefully remove the cover.
3. The Contact Closure (C) card is located in the middle of the module on port 2.
4. Refer to the above drawing to locate the 7 jumpers that are located near the DB-15 connector.
5. Using a small tool, carefully remove the jumper and place it on the appropriate pins to properly select the data format (see table above)
6. Carefully replace the side cover and secure with the screws.
7. Repeat this process for the other module. The jumper selection needs to be the same for both the Tx and Rx units.

6.0 RS-422 SIM Signal Assignment (Pinouts) & Indicator Lights

There is one data SIM card, which transmits and receives one to four RS-485 (4-wire) data channels. The data SIM has a DB9 female connector.
The table below shows the appropriate pinout for each of the connectors:

RS-422 Data Connector Pinout Assignment		
Pin #	**OUTPUT (DT PORT 4) (DR PORT 3)**	**INPUT (DT PORT 3) (DR PORT 4)**
1	Ch1 OUT (+)	Ch1 IN (+)
2	Ch1 OUT (-)	Ch1 IN (-)
3	Ch2 OUT (+)	Ch2 IN (+)
4	Ch2 OUT (-)	Ch2 IN (-)
5	Gnd	Gnd
6	Ch3 OUT (+)	Ch3 IN (+)
7	Ch3 OUT (-)	Ch3 IN (-)
8	Ch4 OUT (+)	Ch4 IN (+)
9	Ch4 OUT (-)	Ch4 IN (-)

Each data input/output channel has two LED status indicators located under the associated data I/O connector. One LED is associated with each data input channel on the DR unit while the second LED is associated with the respective data output channel on the DT unit. The table below shows the relationship between the connectors (I/O channels) and LEDs. The table below shows the LED status indicators associated with each data SIM

RS-422 Data Connector Status Indicators		
LED #	**OUTPUT (DT PORT 4) (DR PORT 3)**	**INPUT (DT PORT 3) (DR PORT 4)**
1	N/A	Ch1 Data Input
2	Ch 1 Data Output	N/A
3	N/A	Ch 2 Data Input
4	Ch 2 Data Output	N/A
5	N/A	Ch 3 Data Input
6	Ch 3 Data Output	N/A
7	N/A	Ch 4 Data Input
8	Ch 4 Data Output	N/A

There are no jumpers or switches for the user to configure for this data card.

7.0 Front Panel Pinout Assignment Diagram

DT-2U4F/7C4F-SPF
DT-2W4F/7C4F-SPF
PINOUT DIAGRAM

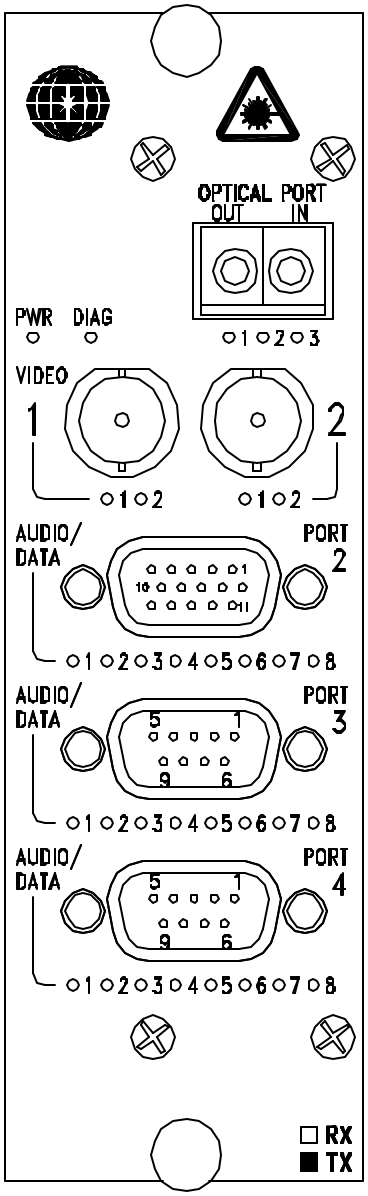
STATUS INDICATORS
1. POWER (GREEN)
2. CARD DIAGNOSTIC*
   (GREEN-OK, RED-ALARM)

VIDEO INPUT (CH.1)
STATUS INDICATORS
1. SYNC PRESENT (GREEN)
2. VIDEO PRESENT (GREEN)/OVERLOAD (RED)

DATA C.C. INPUT (PORT 2)
(HD-15 FEMALE)
1. (CH.1) INPUT
2. (CH.2) INPUT
3. (CH.3) INPUT
4. (CH.4) INPUT
5. GND
6. (CH.5) INPUT
7. (CH.6) INPUT
8. (CH.7) INPUT
9.-15. NA

DATA RS422 IN (PORT 3)
(DB-9 FEMALE)
1. (CH.1) INPUT +
2. (CH.1) INPUT -
3. (CH.2) INPUT +
4. (CH.2) INPUT -
5. GND
6. (CH.3) INPUT +
7. (CH.3) INPUT -
8. (CH.4) INPUT +
9. (CH.4) INPUT -

DATA RS422 OUT (PORT 4)
(DB-9 FEMALE)
1. (CH.1) OUTPUT +
2. (CH.1) OUTPUT -
3. (CH.2) OUTPUT +
4. (CH.2) OUTPUT -
5. GND
6. (CH.3) OUTPUT +
7. (CH.3) OUTPUT -
8. (CH.4) OUTPUT +
9. (CH.4) OUTPUT -



SFP OPTICAL PORT
STATUS INDICATORS
1. TX CARRIER (GREEN)/ERROR (RED)
2. RX OPTICAL SIGNAL (GREEN)/ABSENT (RED)
3. RX CARRIER (GREEN)/ERROR (RED)

VIDEO INPUT (CH.2)
STATUS INDICATORS
1. SYNC PRESENT (GREEN)
2. VIDEO PRESENT (GREEN)/OVERLOAD (RED)

STATUS INDICATORS (PORT 2)
1. (CH.1) INPUT PRESENT
2. (CH.2) INPUT PRESENT
3. (CH.3) INPUT PRESENT
4. (CH.4) INPUT PRESENT
5. (CH.5) INPUT PRESENT
6. (CH.6) INPUT PRESENT
7. (CH.7) INPUT PRESENT
8. NA

STATUS INDICATORS (PORT 3)
1. (CH.1) DATA INPUT
2. NA
3. (CH.2) DATA INPUT
4. NA
5. (CH.3) DATA INPUT
6. NA
7. (CH.4) DATA INPUT
8. NA

STATUS INDICATORS (PORT 4)
1. NA
2. (CH.1) DATA OUTPUT
3. NA
4. (CH.2) DATA OUTPUT
5. NA
6. (CH.3) DATA OUTPUT
7. NA
8. (CH.4) DATA OUTPUT

Figure 7.1
DT-2U(W)4F/7C4F-SFP Front Panel Pinout Diagram

DR-2U4F/7C4F-SPF
DR-2W4F/7C4F-SPF
PINOUT DIAGRAM

STATUS INDICATORS
1. POWER (GREEN)
2. CARD DIAGNOSTIC*
   (GREEN-OK, RED-ALARM)

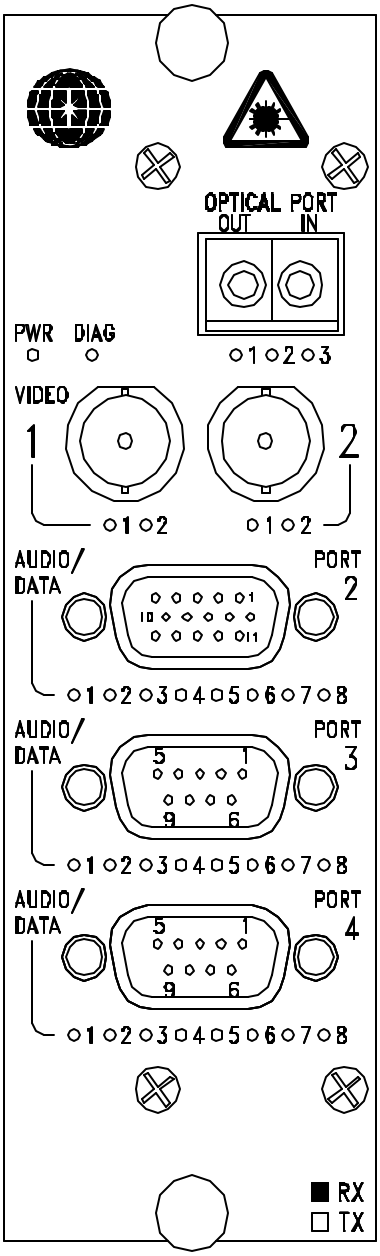
VIDEO OUTPUT (CH.1) STATUS INDICATORS
1. SYNC PRESENT (GREEN)
2. VIDEO PRESENT (GREEN)/OVERLOAD (RED)

DATA C.C. OUTPUT (PORT 2)
(HD-15 FEMALE)

1. (CH.1) OUTPUT
2. (CH.1) OUTPUT
3. (CH.2) OUTPUT
4. (CH.2) OUTPUT
5. GND
6. (CH.3) OUTPUT
7. (CH.3) OUTPUT
8. (CH.4) OUTPUT
9. (CH.4) OUTPUT
10. (CH.5) OUTPUT
11. (CH.5) OUTPUT
12. (CH.6) OUTPUT
13. (CH.6) OUTPUT
14. (CH.7) OUTPUT
15. (CH.7) OUTPUT

DATA RS422 OUT (PORT 3) (DB-9 FEMALE)
1. (CH.1) OUTPUT +
2. (CH.1) OUTPUT -
3. (CH.2) OUTPUT +
4. (CH.2) OUTPUT -
5. GND
6. (CH.3) OUTPUT +
7. (CH.3) OUTPUT -
8. (CH.4) OUTPUT +
9. (CH.4) OUTPUT -

DATA RS422 IN (PORT 4) (DB-9 FEMALE)
1. (CH.1) INPUT +
2. (CH.1) INPUT -
3. (CH.2) INPUT +
4. (CH.2) INPUT -
5. GND
6. (CH.3) INPUT +
7. (CH.3) INPUT -
8. (CH.4) INPUT +
9. (CH.4) INPUT -



SFP OPTICAL PORT STATUS INDICATORS
1. TX CARRIER (GREEN)/ERROR (RED)
2. RX OPTICAL SIGNAL (GREEN)/ABSENT (RED)
3. RX CARRIER (GREEN)/ERROR (RED)

VIDEO OUTPUT (CH.2) STATUS INDICATORS
1. SYNC PRESENT (GREEN)
2. VIDEO PRESENT (GREEN)/OVERLOAD (RED)

STATUS INDICATORS (PORT 2)
1. (CH.1) OUTPUT PRESENT
2. (CH.2) OUTPUT PRESENT
3. (CH.3) OUTPUT PRESENT
4. (CH.4) OUTPUT PRESENT
5. (CH.5) OUTPUT PRESENT
6. (CH.6) OUTPUT PRESENT
7. (CH.7) OUTPUT PRESENT
8. NA

STATUS INDICATORS (PORT 3)
1. NA
2. (CH.1) DATA OUTPUT
3. NA
4. (CH.2) DATA OUTPUT
5. NA
6. (CH.3) DATA OUTPUT
7. NA
8. (CH.4) DATA OUTPUT

STATUS INDICATORS (PORT 4)
1. (CH.1) DATA INPUT
2. NA
3. (CH.2) DATA INPUT
4. NA
5. (CH.3) DATA INPUT
6. NA
7. (CH.4) DATA INPUT
8. NA

Figure 7.2
DR-2U(W)4F/7C4F-SFP Front Panel Pinout Diagram

8.0 Product Part Number Variations

The table below lists the various part numbers associated with different module types:
Basic module description:
Video: 1 to 2 channels, one way
Contact Closure: 1 to 7-channel uni-directional
Data RS-422: 1 to 4 channels, bi-directional

The table below indicates the part numbers and product description that are included in this manual. The pinout diagram in section 7.0 shows the connectors pinout (input/output connections) for the all-inclusive product. The appropriate modules consist of various combinations of bi-directional and uni-directional Data SIMs. Please use this table to determine the exact pinout of the particular model of interest. Note that if there is only one data channel, the pinouts for "Ch1" are used.

Part Numbers Transmitter Side	Part Numbers Receiver Side	Description
DT-1U(W)4F/7C4F-SFP	DR-1U(W)4F/7C4F-SFP	1Ch. Video, 4Ch. RS-422 Data bi-directional, 7Ch. CC Data uni-directional
DT-2U(W)4F/1C4F-SFP	DR-2U(W)4F/1C4F-SFP	2Ch. Video, 4Ch. RS-422 Data bi-directional, 1Ch. CC Data uni-directional
DT-1U(W)4F/7C2F-SFP	DR-1U(W)4F/7C2F-SFP	1Ch. Video, 2Ch. RS-422 Data bi-directional, 2Ch. RS-422 Data uni-directional, 7Ch. CC Data uni-directional
DT-2U(W)4F/7C2F-SFP	DR-2U(W)4F/7C2F-SFP	2Ch. Video, 2Ch. RS-422 Data bi-directional, 2Ch. RS-422 Data uni-directional, 7Ch. CC Data uni-directional
DT-1U(W)4F/4C4F-SFP	DR-1U(W)4F/4C4F-SFP	1Ch. Video, 4Ch. RS-422 Data bi-directional, 4Ch. CC Data uni-directional
DT-2U(W)4F/4C4F-SFP	DR-2U(W)4F/4C4F-SFP	2Ch. Video, 4Ch. RS-422 Data bi-directional, 4Ch. CC Data uni-directional
DT-1U(W)4F/2C4F-SFP	DR-1U(W)4F/2C4F-SFP	1Ch. Video, 4Ch. RS-422 Data bi-directional, 2Ch. CC Data uni-directional
DT-2U(W)4F/2C4F-SFP	DR-2U(W)4F/2C4F-SFP	2Ch. Video, 4Ch. RS-422 Data bi-directional, 2Ch. CC Data uni-directional
DT-1U(W)2F/2C4F-SFP	DR-1U(W)2F/2C4F-SFP	1Ch. Video, 2Ch. RS-422 Data bi-directional, 2Ch. RS-422 Data uni-directional, 2Ch. CC Data uni-directional
DT-2U(W)2F/2C4F-SFP	DR-2U(W)2F/2C4F-SFP	2Ch. Video, 2Ch. RS-422 Data bi-directional, 2Ch. RS-422 Data uni-directional, 2Ch. CC Data uni-directional

For proper operation, it is necessary to match the DT unit with the associated side DR unit.

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: *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 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 Contact Closure transmission*

Action: Check the individual contact closure channel input status indicator lights #1 through 7 to ensure that the lights toggle on and off as the contact is closed and opened. These lights are located below the corresponding DB15. Also check the corresponding contact closure output lights (#1 through 7) on the receiver module to see if the corresponding lights are activated when the corresponding input contact is closed. If not, please check the data input/output and fiber connections.

Problem: *No Data*

Action: Check the data input status indicator light #1 on the transmit module to ensure it is on (indicating a data input signal). Also check the data output status indicator light #2 on the corresponding receiver module to ensure that the signal is being transmitted and received. If not, please check the data input/output and fiber connections.

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