



Installation/Operation Instructions

Fiber Optic Video, C.C. & Data Transmission System

Part Number:

DT/DR-4V(W)7C2F/2F-x Series

***(1 to 4-Channel Video Tx/Rx, 1 to 7-Channel Contact Closure Tx/Rx
and 1 to 2-Channel BI-DI RS-422 Data)***

Part Number Variations:

***DT/DR-2V(W)2C2F/2F-x, DT/DR-2V(W)2C1F/1F-x
DT/DR-2V(W)4C2F/2F-x, DT/DR-2V(W)4C1F/1F-x
DT/DR-2V(W)6C2F/2F-x, DT/DR-2V(W)6C1F/1F-x
DT/DR-4V(W)2C2F/2F-x, DT/DR-4V(W)2C1F/1F-x
DT/DR-4V(W)4C2F/2F-x, DT/DR-4V(W)4C1F/1F-x
DT/DR-4V(W)6C2F/2F-x, DT/DR-4V(W)6C1F/1F-x***

Meridian Technologies, Inc.
700 Elmont Road, Elmont NY 11003, USA
Telephone : +1. 516. 285. 1000 Fax: +1. 516. 285. 6300
E-mail : sales@meridian-tech.com Web: www.meridian-tech.com

Document Version 1.1
08/22/2016

Table of Contents

1.0	Product Description.....	3
2.0	Installation	3
3.0	Product Signal Format & Specifications	4
3.1	Optical Specifications	5
4.0	Operating	6
4.1	Video Status indicators	6
4.2	RS-422 SIM Signal Assignment (Pinouts) & Indicator Lights	6
4.3	Contact Mapping SIM Signal Assignment (Pinouts) & Indicator Lights	7
4.4	External Connections Configuration.....	8
4.5	Contact Mapping SIM Jumper Settings.....	9
4.6	Changing the SIM jumpers	9
5.0	Front Panel Pinout Assignment Diagram	10
6.0	2-Fiber, CWDM Option.....	14
7.0	Product Part Number Variations	14
8.0	Troubleshooting	17

1.0 Product Description

Meridian's product series DT-4V(W)7C2F/2F and DR-4V(W)7C2F/2F are fiber optic modems that transmit one to four channels of uni-directional digitized video, one to seven channels of uni-directional contact closure and one to two channel of bi-directional RS-422 data signals over one optical fiber using digital-encoding transmission techniques. The video is available in either 8-bit resolution (DT/DR-4V7C2F/2F) or 10-bit resolution (DT/DR-4W7C2F/2F). 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 and third SIMs contains the video coaxial interface (either one or four channels of uni-directional video). The fourth SIM card contains the uni-directional Contact Closure. The bottom SIM card contains the bi-directional RS-422 data signals.

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

2.0 Installation

Series DT-4V(W)7C2F/2F and DR-4V(W)7C2F/2F products are two-slot wide cards and 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-4V(W)7C2F/2F-x series products transmit and receive the following signals:

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

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

Video		
	8-bit Video (V)	10-bit Video (W)
Format	NTSC, PAL, SECAM	NTSC, PAL, SECAM
Voltage/Impedance	1Vp-p, 75 Ohm, 1.5Vp-p (max)	1Vp-p, 75 Ohm, 1.5Vp-p (max)
Differential Gain	<0.6%	<0.6%
Differential Phase	<0.3°	<0.3°
SNR	>60dB (weighted)	>67dB (weighted)
Return Loss	>30dB	>30dB
Field Tilt	<0.5%	<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	
Connector	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 Female	
Data	DB9 Female	
Optical	Singlemode – ST or FC Multimode – ST	

3.1 Optical Specifications

Optical parameters will depend on number of transmitted video channels. Please select table below accordingly to your system configuration.

1 Video Channel - Fiber Data Rate 250Mb/s							
Fiber Type/Size (um)	Optical Output (dBm)	Rx Sensitivity (dBm)	Optical Budget (dB)	Wavelength (nm)	Optical connector	Optical Dynamic Range (dB)	Max Distance (Km)
Multimode (Laser) 62.5/125	-3	-25	22	1300/850	ST	25	4
Singlemode (FP Laser) 9/125	-3	-25	22	1310/1550	ST, FC	25	62
Singlemode (CWDM-DFB Laser) 9/125	+3	-25	28	1270-1610	ST, FC	25	80

2 Video Channel - Fiber Data Rate 500Mb/s							
Fiber Type/Size (um)	Optical Output (dBm)	Rx Sensitivity (dBm)	Optical Budget (dB)	Wavelength (nm)	Optical connector	Optical Dynamic Range (dB)	Max Distance (Km)
Multimode (Laser) 62.5/125	-3	-24	21	1300/850	ST	24	2
Singlemode (FP Laser) 9/125	-3	-24	21	1310/1550	ST, FC	24	60
Singlemode (CWDM-DFB Laser) 9/125	+3	-24	27	1270-1610	ST, FC	24	77

4 Video Channel - Fiber Data Rate 1Gb/s							
Fiber Type/Size (um)	Optical Output (dBm)	Rx Sensitivity (dBm)	Optical Budget (dB)	Wavelength (nm)	Optical connector	Optical Dynamic Range (dB)	Max Distance (Km)
Multimode (Laser) 62.5/125	-3	-23	20	1300/850	ST	23	1
Singlemode (FP Laser) 9/125	-3	-23	20	1310/1550	ST, FC	23	55
Singlemode (CWDM-DFB Laser) 9/125	+3	-23	26	1270-1610	ST, FC	23	75



Compliant with Class 1 Laser Safety Rating.

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 4.2 & 4.3

4.1 Video Status indicators

The figures at the end of this document show the connector and LED indicator locations for the various video & data status indicators on the transmitter and receiver modules. There are a number of diagnostic indicators on the front panel of each module. In addition, each of the video input/output channels has indicators associated with them to provide quick visual indications of the channel activity. These indicators for each of the video channels are listed below:

LED Status 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 Input/Output	Under each video in/out connector	Green – Sync received
Video Input/Output	Under each video in/out connector	Video signal – Green OK, Red – video overload

*Note: The Card Diagnostic is optional and LED present only if applied.

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

There is one data SIM card that transmits & receives one to two RS-422 data channels. The data SIM has a DB9 female connector. Not all of the signals and LEDs apply to all versions of these modules.

The table below shows the appropriate pinout for each of the connectors

RS-422 Data Connector Pinout Assignment (PORT 4)		
Pin #	TRANSMITTER	RECEIVER
1	Ch 1 IN (+)	Ch1 OUT (+)
2	Ch 1 IN (-)	Ch1 OUT (-)
3	Ch 2 IN (+)	Ch2 OUT (+)
4	Ch 2 IN (-)	Ch2 OUT (-)
5	Gnd	Gnd
6	Ch1 OUT (+)	Ch 1 IN (+)
7	Ch1 OUT (-)	Ch 1 IN (-)
8	Ch2 OUT (+)	Ch 2 IN (+)
9	Ch2 OUT (-)	Ch 2 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

RS-422 Data Connector Status Indicators (PORT 4)		
LED #	TRANSMITTER	RECEIVER
1	Ch1 Data Input	N/A
2	N/A	Ch 1 Data Output
3	Ch2 Data Input	N/A
4	N/A	Ch 2 Data Output
5	N/A	Ch 1 Data Input
6	Ch1 Data Output	N/A
7	N/A	Ch 2 Data Input
8	Ch2 Data Output	N/A

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

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

The tables below identify the input/output functions, associated connector pinouts and LED status indicators for contact SIM card. Not all of the signals and LEDs apply to all versions of these modules.

TRANSMITTER SIDE PORT 3

Contact Mapping Connector Pinout Assignment (PORT 3)			Contact Mapping LED Status Indicators (PORT 3)
Pin #	1 to 7 CC	LED #	1 to 7 CC
1	Ch1 INPUT	1	Ch1 INPUT PRESENT
2	Ch2 INPUT	2	Ch2 INPUT PRESENT
3	Ch3 INPUT	3	Ch3 INPUT PRESENT
4	Ch4 INPUT	4	Ch4 INPUT PRESENT
5	GND	5	Ch5 INPUT PRESENT
6	Ch5 INPUT	6	Ch6 INPUT PRESENT
7	Ch6 INPUT	7	Ch7 INPUT PRESENT
8	Ch7 INPUT	8	NA
9 - 15	NA		

RECEIVER SIDE PORT 3

Contact Mapping Connector Pinout Assignment (PORT 3)			Contact Mapping LED Status Indicators (PORT 3)
Pin #	1 to 7 CC	LED #	1 to 7 CC
1	Ch1 OUTPUT	1	Ch1 OUTPUT PRESENT
2	Ch1 OUTPUT	2	Ch2 OUTPUT PRESENT
3	Ch2 OUTPUT	3	Ch3 OUTPUT PRESENT
4	Ch2 OUTPUT	4	Ch4 OUTPUT PRESENT
5	GND	5	Ch5 OUTPUT PRESENT
6	Ch3 OUTPUT	6	Ch6 OUTPUT PRESENT
7	Ch3 OUTPUT	7	Ch7 OUTPUT PRESENT
8	Ch4 OUTPUT	8	NA
9	Ch4 OUTPUT		
10	Ch5 OUTPUT		
11	Ch5 OUTPUT		
12	Ch6 OUTPUT		
13	Ch6 OUTPUT		
14	Ch7 OUTPUT		
15	Ch7 OUTPUT		

4.4 External Connections Configuration

Contact closure communication between the DT and DR units is done in the following manner: **Inputs 1 through 4 on each contact closure SIM card –**

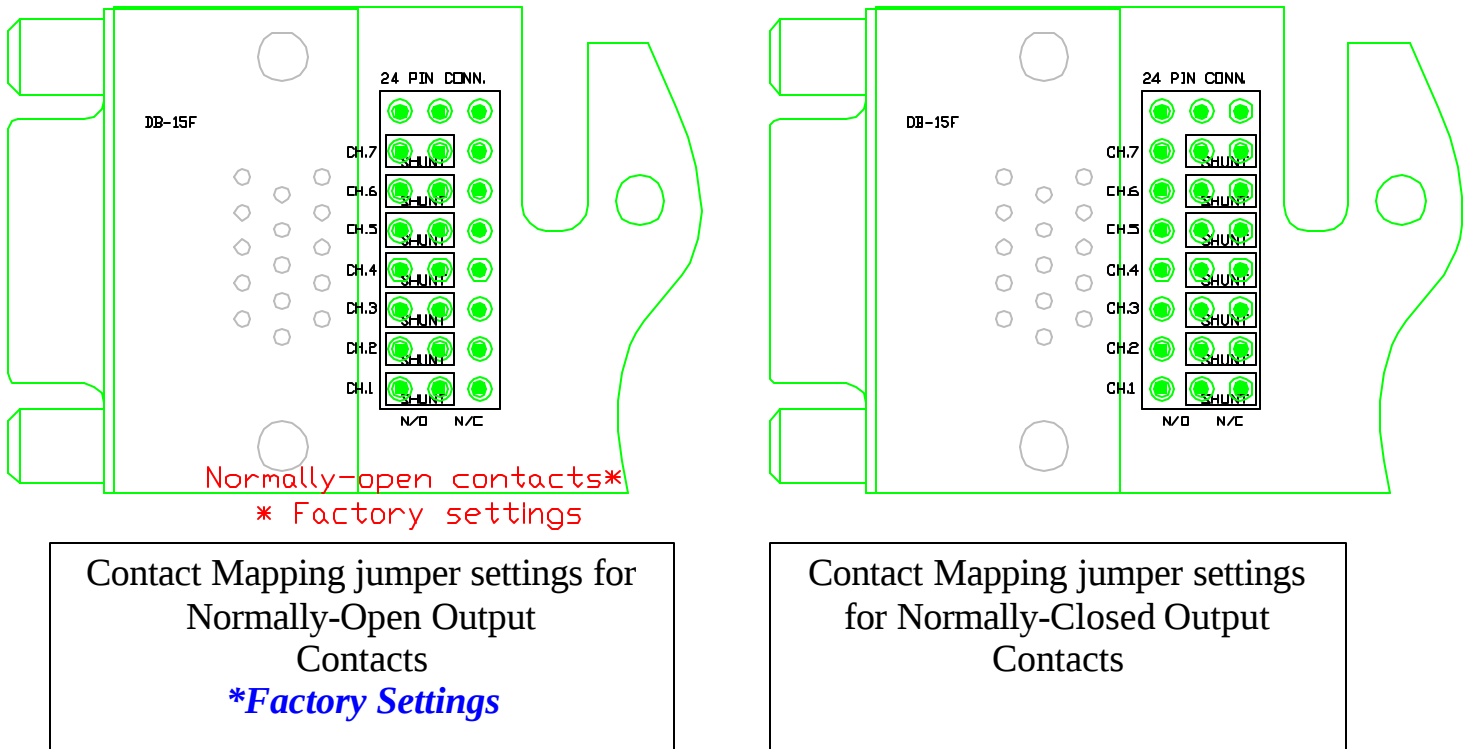
1. Connect each contact input between the input pins (1-8) and ground (pin 5) for each respective contact input channel.
2. The corresponding isolated contact outputs on the receive module are available on pins 1 -15 (for 7 channels respectively).
3. Note that the input/output contacts are located on the same SIM location on the DT & DR modules. For example, if the contact inputs are connected to the bottom SIM card on the DT module port 3, the corresponding outputs on the DR modules are located on the SIM card in the same bottom location port 3.

4.5 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-Closed contacts.

The default setting is Normally-Open.

The figures below illustrate these jumpers and how they are configured:



4.6 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 on the bottom of the module port 3.
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.

5.0 Front Panel Pinout Assignment Diagram

The following front panel diagram shows a layout of the front panel including connector location, status indicators and connector pin-out information. 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.

DT-4V7C2F/2F-XD
DT-4W7C2F/2F-XD

PINOUT DIAGRAM

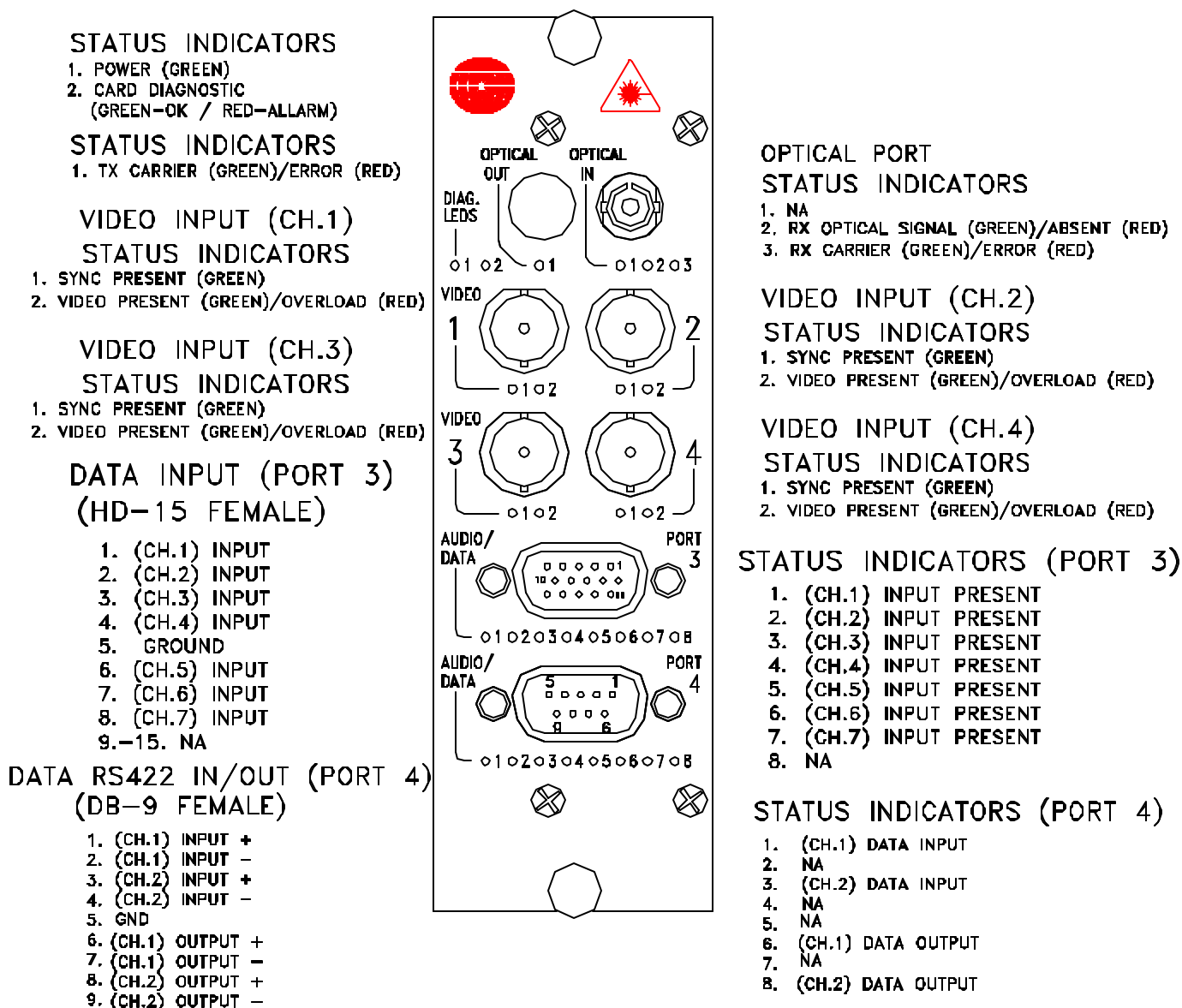


Figure 5.1
DT-4V(W)7C2F/2F-x Module Front Panel Diagram.

DT-4V4C1F/1F-XD DT-4W4C1F/1F-XD

PINOUT DIAGRAM

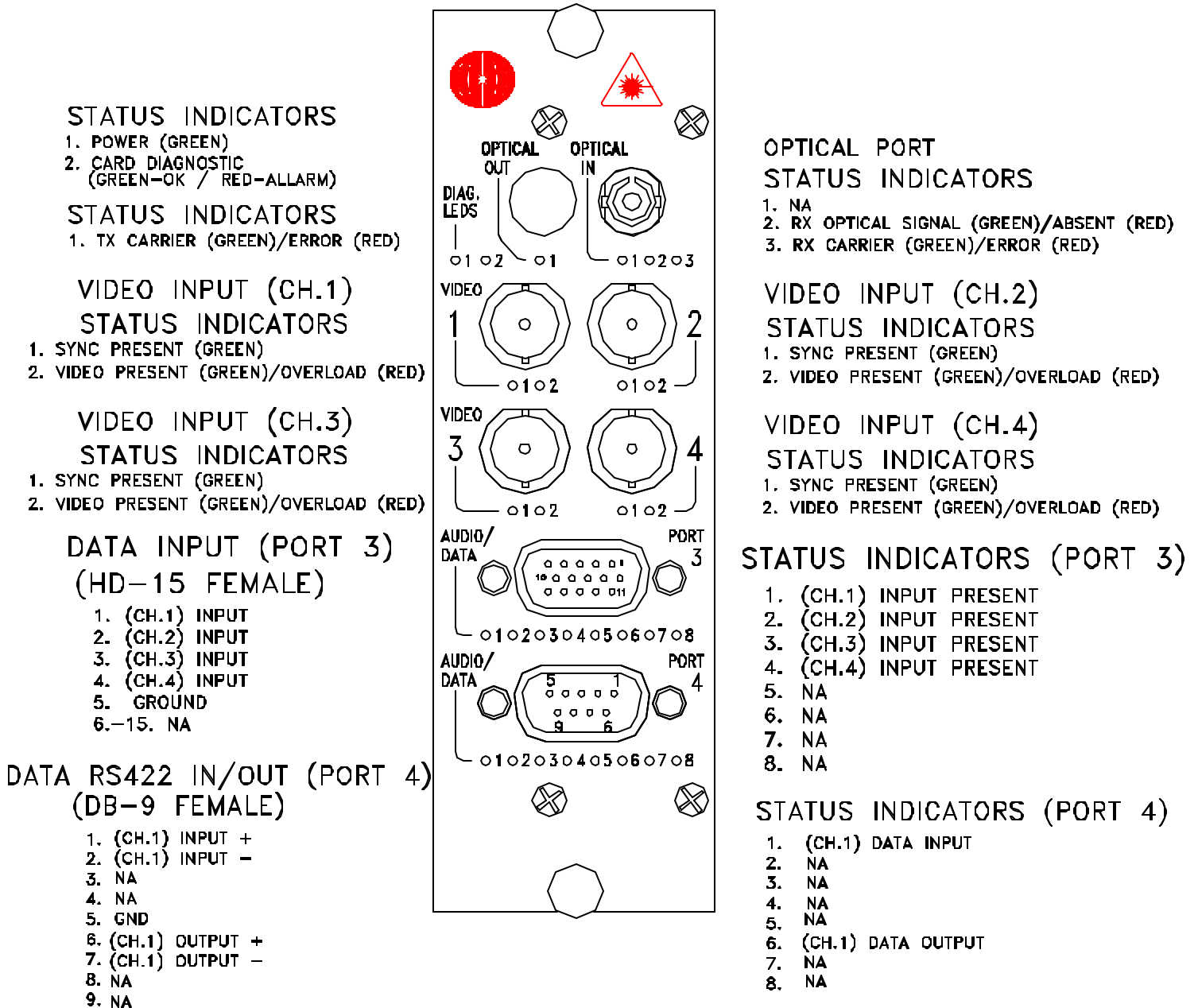


Figure 5.2
DT-4V(W)4C1F/1F-x Module Front Panel Diagram.

DR-4V7C2F/2F-XD DR-4W7C2F/2F-XD

STATUS INDICATORS

1. POWER (GREEN)
2. CARD DIAGNOSTIC (GREEN-OK / RED-ALLARM)

STATUS INDICATORS

1. TX CARRIER (GREEN)/ERROR (RED)

VIDEO OUTPUT (CH.1)

STATUS INDICATORS

1. SYNC PRESENT (GREEN)
2. VIDEO PRESENT (GREEN)/OVERLOAD (RED)

VIDEO OUTPUT (CH.3)

STATUS INDICATORS

1. SYNC PRESENT (GREEN)
2. VIDEO PRESENT (GREEN)/OVERLOAD (RED)

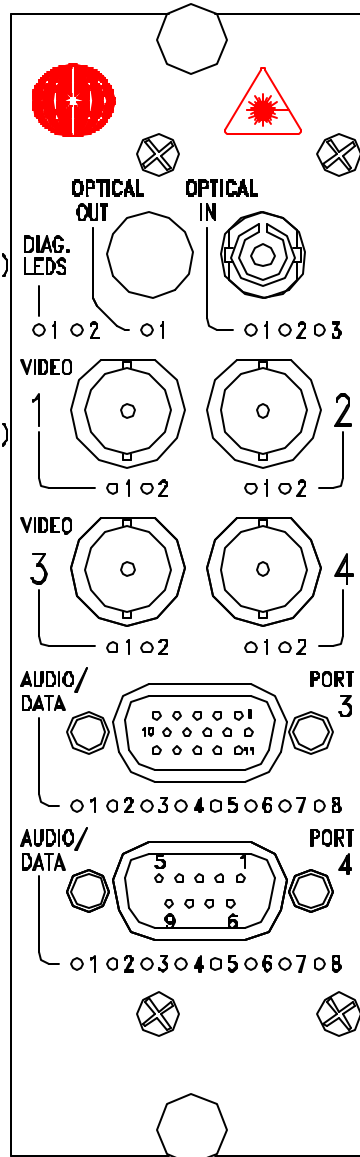
DATA OUTPUT (PORT 3) (HD-15 FEMALE)

1. (CH.1) OUTPUT
2. (CH.1) OUTPUT
3. (CH.2) OUTPUT
4. (CH.2) OUTPUT
5. GROUND
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 IN/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.1) INPUT +
7. (CH.1) INPUT -
8. (CH.2) INPUT +
9. (CH.2) INPUT -

PINOUT DIAGRAM



OPTICAL PORT

STATUS INDICATORS

1. NA
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)

VIDEO OUTPUT (CH.4)

STATUS INDICATORS

1. SYNC PRESENT (GREEN)
2. VIDEO PRESENT (GREEN)/OVERLOAD (RED)

STATUS INDICATORS (PORT 3)

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 4)

1. NA
2. (CH.1) DATA OUTPUT
3. NA
4. (CH.2) DATA OUTPUT
5. (CH.1) DATA INPUT
6. NA
7. (CH.2) DATA INPUT
8. NA

Figure 5.3
DR-4V(W)7C2F/2F-x Module Front Panel Diagram.

DR-4V4C1F/1F-XD DR-4W4C1F/1F-XD

PINOUT DIAGRAM

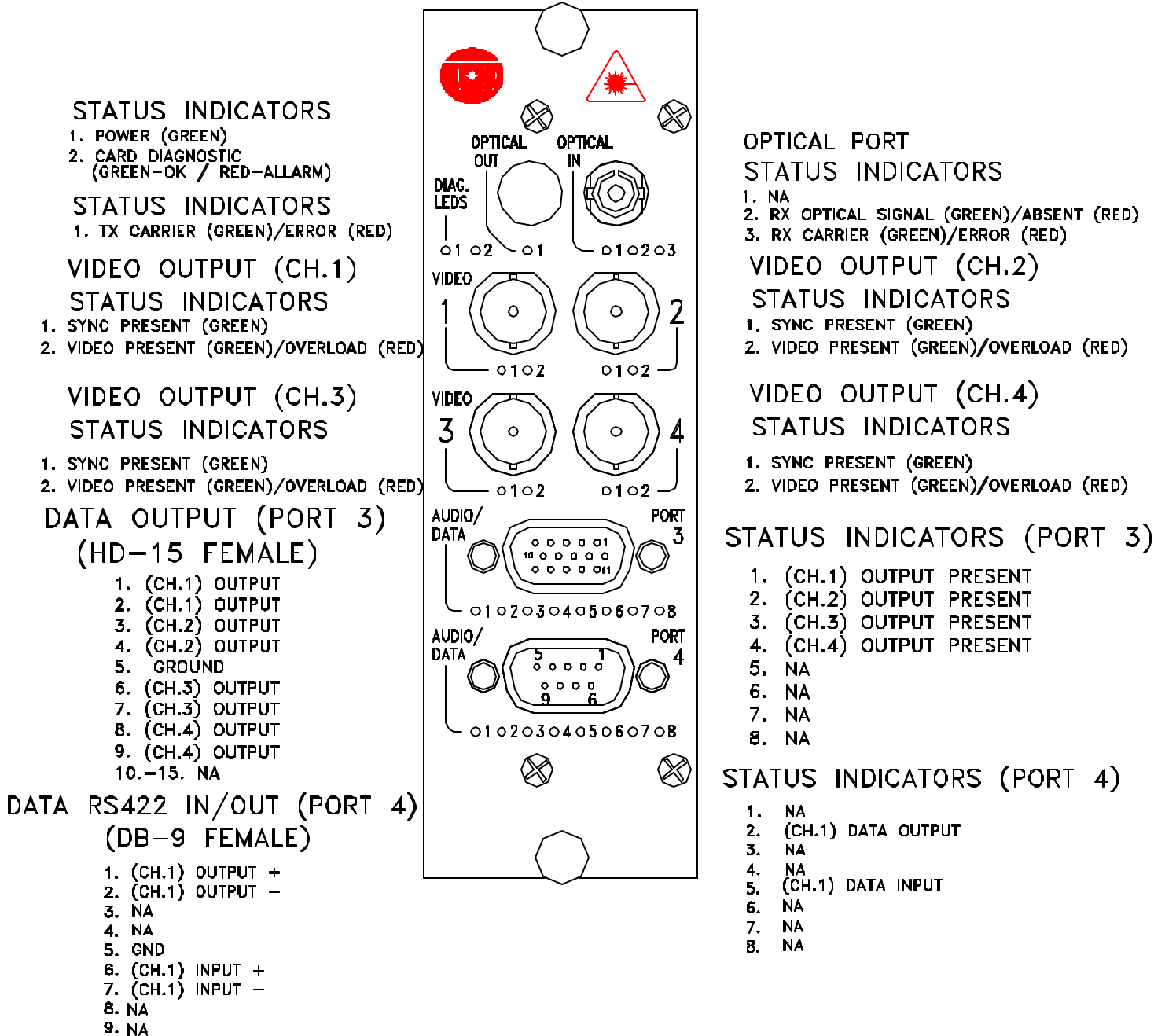


Figure 5.4
DR-4V(W)4C1F/1F-x Module Front Panel Diagram.

6.0 2-Fiber, CWDM Option

These cards are also available with a 2-fiber, CWDM option. In this configuration, 2 fibers on each unit are used for transmission of the bi-directional signals. The DT unit will transmit on one unique CWDM wavelength and DR unit will transmit on the complementary wavelength. The optical input connector will be located on the right side of the module and the output will be on the left.

The table below shows these various wavelength combinations 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.

Transmitter Part #	Receiver Part #	Transmit Wavelength
DT-4V(W)7C2F-2F-27	DR-4V(W)7C2F-2F-27	1270nm
DT-4V(W)7C2F-2F-29	DR-4V(W)7C2F-2F-29	1290nm
DT-4V(W)7C2F-2F-31	DR-4V(W)7C2F-2F-31	1310nm
DT-4V(W)7C2F-2F-33	DR-4V(W)7C2F-2F-33	1330nm
DT-4V(W)7C2F-2F-35	DR-4V(W)7C2F-2F-35	1350nm
DT-4V(W)7C2F-2F-37	DR-4V(W)7C2F-2F-37	1370nm
DT-4V(W)7C2F-2F-39	DR-4V(W)7C2F-2F-39	1390nm
DT-4V(W)7C2F-2F-41	DR-4V(W)7C2F-2F-41	1410nm
DT-4V(W)7C2F-2F-47	DR-4V(W)7C2F-2F-47	1470nm
DT-4V(W)7C2F-2F-49	DR-4V(W)7C2F-2F-49	1490nm
DT-4V(W)7C2F-2F-51	DR-4V(W)7C2F-2F-51	1510nm
DT-4V(W)7C2F-2F-53	DR-4V(W)7C2F-2F-53	1530nm
DT-4V(W)7C2F-2F-55	DR-4V(W)7C2F-2F-55	1550nm
DT-4V(W)7C2F-2F-57	DR-4V(W)7C2F-2F-57	1570nm
DT-4V(W)7C2F-2F-59	DR-4V(W)7C2F-2F-59	1590nm
DT-4V(W)7C2F-2F-61	DR-4V(W)7C2F-2F-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. Otherwise, the individual wavelengths will not pass through the CWMD mux/demux device.

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.

7.0 Product Part Number Variations

The table below lists the various part numbers associated with different module types. Basic module description:

Video: 1 to 4-channels, one way

Contact Closure: 1 to 7-channel uni-directional Contact Closure

Data: 1 to 2-channel, bi-directional RS-422 data

The pinout diagram in section 5.0 shows the connectors pinout (input/output connections) for the all-inclusive product. The appropriate modules consist of various combinations of uni-directional Video, Data and CC SIM. 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.

Transmitter	Receiver	Video Resolution	# Fibers & Type	Wavelength
DT-4W4C1F/1F-2	DR-4W4C1F/1C1F-2	10-bit	1 (MM)	1310/850nm
DT-4W4C1F/1F-5	DR-4W4C1F/1C1F-5	10-bit	1 (SM)	1310/1550nm
DT-4V4C1F/1F-2	DR-4V4C1F/1C1F-2	8-bit	1 (MM)	1310/850nm
DT-4V4C1F/1F-5	DR-4V4C1F/1C1F-5	8-bit	1 (SM)	1310/1550nm
DT-4W7C2F/2F-2	DR-4W7C2F/2F-2	10-bit	1 (MM)	1310/850nm
DT-4W7C2F/2F-5	DR-4W7C2F/2F-5	10-bit	1 (SM)	1310/1550nm
DT-4V7C2F/2F-2	DR-4V7C2F/2F-2	8-bit	1 (MM)	1310/850nm
DT-4V7C2F/2F-5	DR-4V7C2F/2F-5	8-bit	1 (SM)	1310/1550nm

For proper operation, it is necessary to match the transmitter (DT) with the associated receiver module (DR).

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 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: *Tx signal light*

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

Problem: *Rx signal*

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 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 (#2 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

Meridian Technologies, Inc.
700 Elmont Road, Elmont NY 11003, USA
Telephone: +1-516-285-1000 Fax: +1-516-285-6300
E-mail: support@meridian-tech.com Web: www.meridian-tech.com

Document Version 1.1

08/22/2016