



Installation/Operation Instructions

Fiber Optic Video, Audio & Data Transmission System

Part Numbers:

DT-2V(W)2A8D/2A8D-x Series

(1 to 2-Channel Video Transmitter, 1 to 2-Channel Audio & 1 to 8-Channel RS-232 Data bi-directional Transceiver)

DR-2V(W)2A8D/2A8D-x Series

(1 to 2-Channel Video Receiver, 1 to 2-Channel Audio & 1 to 8-Channel RS-232 Data bi-directional Transceiver)

Compatible Part Numbers:

***DT/DR-2V(W)2A6D/2A6D-x
DT/DR-2V(W)1A6D/1A6D-x
DT/DR-1V(W)2A6D/2A6D-x
DT/DR-1V(W)1A6D/1A6D-x***

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1.0 Product Description

Meridian's product series DT-2V(W)2A8D/2A8D-x and DR-2V(W)2A8D/2A8D-x are fiber optic modems that transmit or receive one to two channels of uni-directional video, one to two channels of bi-directional audio, and one to eight channel of bi-directional RS-232 data signals over one optical fiber using digital-encoding transmission technologies. The video is available in either 8-bit resolution (DT/DR-2V2A8D/2A8D) or 10-bit resolution (DT/DR-2W2A8D/2A8D) and uses Meridian's standard 2-slot wide chassis mount card assembly and plugs into the following Meridian chassis: SR-1002/S, SR-1600/S, SR-2000 and SR-2001 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 connector is located on the right side of the module for both units. The second SIM cards contain the uni-directional video coaxial interface. The audio input/output connections are located on Port 2. The data connections are located on the two bottom SIM cards Port 3 and Port 4.

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. The FC optical interface is available only for singlemode products. Optional conformal coating provides an additional level of protection from environments with high humidity.

2.0 Installation

Series DT-2V(W)2A8D/2A8D-x and DR-2V(W)2A8D/2A8D-x series 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-2V(W)2A8D/2A8D series products transmit and receive the following signals:

Signal Type	Qty	DT	DR
NTSC/PAL video	2	Transmit	Receive
Audio (600 ohm, unbalanced) -default	2/2	Transmit / Receive	Receive / Transmit
RS-232 data	8/8	Transmit / Receive	Receive / Transmit

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

Video		
	8-bit (V)	10-bit (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%
Audio		
In/Out Impedance	600 Ohm balanced / 47K Ohm unbalanced	
Frequency Response	10Hz to 20KHz	
SNR	>90dB (weighted) @ 1KHz	
In/Out Level	-8 to +8dBm (4Vp-p, max)	
THD	<0.01% @ 1KHz	
Digitized Resolution	24 bit	
Data		
Formats	RS-232	
Data Rate	DC to 125Kb/s	
Bit Error Rate (BER)	Better than 10 ⁻⁹	
Connectors		
Video	75 Ohm BNC w/gold center pin	
Audio	DB9 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



Compliant with Class 1 Laser Safety Rating.

4.0 Operating

Video – The BNC video connector on the video card (Port 1) accept standard NTSC/PAL video input signals (DT modules). The respective video output signals are located on Port 1 of the associated (DR) module. Likewise, the video input connections on the DT unit are located on the second video SIM card (Port 2) while the respective video output connections on the DXA unit are also located on the second video SIM card. Connect the input video signals to the appropriate BNC video input connectors on the each unit and the output video connectors on the associated ports on the other module.

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.

Data – Connect the data for each of the data channels to the appropriate data Tx/Rx pins on the connector as shown in section 4.3

4.1 Video Status indicators

The front panel pinout diagrams in section 5 show the connector and LED indicator locations for the various video, audio & data status indicators on the unit. 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. The indicators for optical signals and 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 Audio SIM Signal Assignment (Pinouts) & Indicator Lights

The audio board (SIM) is inserted in the module at port 3. The attached figures in section 5 show the module front panel and associated connector location & pinouts. Not all of the signals and LEDs apply to all versions of these modules.

The Audio channel connector pinouts are shown in the table below:

Audio DB-9F Connector Pinout Assignment	
Pinout	PORT 3
1	Audio Ch 1 Output (-)
2	Audio Ch 1 Output (+)
3	Audio Ch 2 Output (-)
4	Audio Ch 2 Output (+)
5	GND
6	Audio Ch 1 Input (-)
7	Audio Ch 1 Input (+)
8	Audio Ch 2 Input (-)
9	Audio Ch 2 Input (+)

Each audio input/output channel has four LED status indicators located under the associated audio I/O connector. Two adjacent LEDs are associated with each audio input channel and two are associated with the respective audio output channel. The table below shows the relationship between the connectors (I/O channels) and LEDs.

Audio Input/Output Status Indicators	
LED	Function
1	Input 1 – Present
2	Input 1 – Overload
3	Input 2 – Present
4	Input 2 – Overload
5	Output 1 – Present
6	Output 1 – Overload
7	Output 2 – Present
8	Output 2 – Overload

Audio input PRESENT LEDs – Each of the LEDs associated with a specific audio input channel will light when the audio input source is connected and has a signal level greater than -8dB

Audio input OVERLOAD LEDs – when the audio input level of any channel exceeds +8dB, the associated audio channel input Overload LED will turn on indicating that the audio input level is too high and distortion on the output may result.

Audio output PRESENT LEDs – This light will turn on when the audio input on the transmit side is present, the DXA & DXB units are powered and the fiber is connected between the two modems.

Audio output OVERLOAD LEDs – These lights will light when the respective audio input on the transmit side is over +8dB. Since the audio output level will track the audio input level, this light should not illuminate when the audio input is below the overload condition (+8dB)

4.3 RS-232 Data SIM Signal Assignment (Pinouts) & Indicator Lights

There are two RS-232 data SIM cards in this module located in Port 3 and 4. This data card transmits/receives four RS-232 data channels. The data SIM has a DB9 female connector. The table below shows the appropriate pinout for port 3 and 4.

	RS-232 Data Connector Pinout Assignment (Port 3)	RS-232 Data Connector Pinout Assignment (Port 4)
1	Ch 4 INPUT	Ch 8 INPUT
2	Ch 1 OUTPUT	Ch 5 OUTPUT
3	Ch 1 INPUT	Ch 5 INPUT
4	Ch 2 INPUT	Ch 6 INPUT
5	Gnd	Gnd
6	Ch 2 OUTPUT	Ch 6 OUTPUT
7	Ch 3 INPUT	Ch 7 INPUT
8	Ch 3 OUTPUT	Ch 7 OUTPUT
9	Ch 4 OUTPUT	Ch 8 OUTPUT

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 and output channel to show activity on both the input (transmit) and output (receive) pins. The table below shows the relationship between the connectors (I/O channels) and LEDs.

RS-232 Data Input/Output Status Indicators		
LED	(Port 3)	(Port 4)
1	Input 1 – Green - data present	Input 5 – Green - data present
2	Output 1 – Green - data present	Output 5 – Green - data present
3	Input 2 – Green - data present	Input 6 – Green - data present
4	Output 2 – Green - data present	Output 6 – Green - data present
5	Input 3 – Green - data present	Input 7 – Green - data present
6	Output 3 – Green - data present	Output 7 – Green - data present
7	Input 4 – Green - data present	Input 8 – Green - data present
8	Output 4 – Green - data present	Output 8 – Green - data present

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

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.

DT-2V2A8D/2A8D-X

PINOUT DIAGRAM

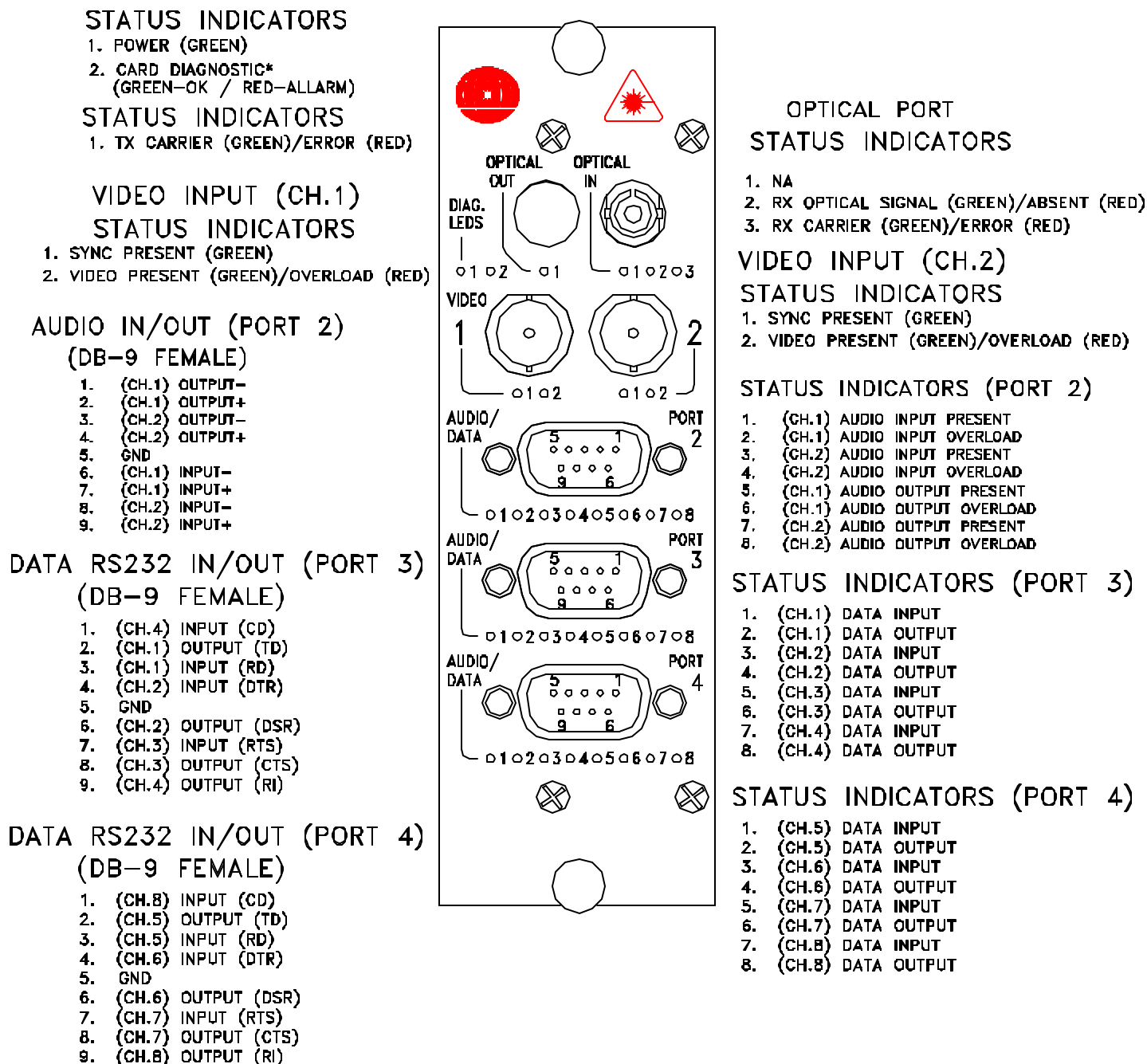


Figure 5.1

DT-2V(W)2A8D/2A8D-X Front Panel Layout Diagram

DR-2V2A8D/2A8D-X

PINOUT DIAGRAM

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)

AUDIO IN/OUT (PORT 2)

(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+

DATA RS232 IN/OUT (PORT 3)

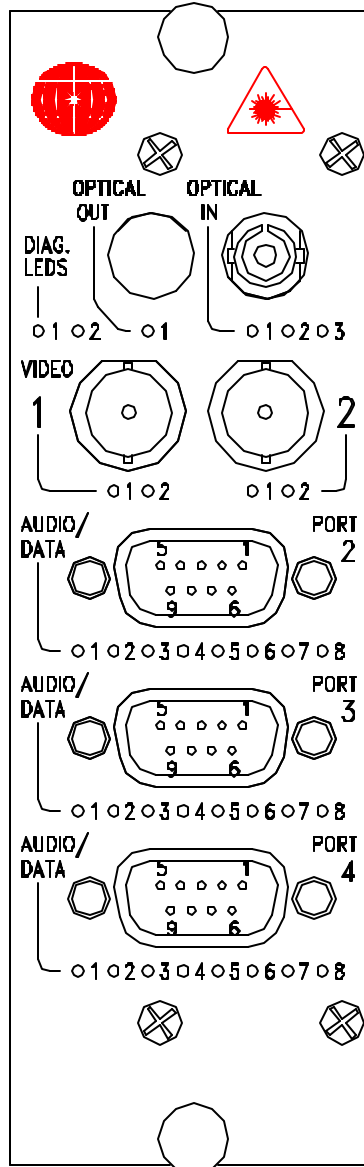
(DB-9 FEMALE)

1. (CH.4) INPUT (CD)
2. (CH.1) OUTPUT (TD)
3. (CH.1) INPUT (RD)
4. (CH.2) INPUT (DTR)
5. GND
6. (CH.2) OUTPUT (DSR)
7. (CH.3) INPUT (RTS)
8. (CH.3) OUTPUT (CTS)
9. (CH.4) OUTPUT (RI)

DATA RS232 IN/OUT (PORT 4)

(DB-9 FEMALE)

1. (CH.8) INPUT (CD)
2. (CH.5) OUTPUT (TD)
3. (CH.5) INPUT (RD)
4. (CH.6) INPUT (DTR)
5. GND
6. (CH.6) OUTPUT (DSR)
7. (CH.7) INPUT (RTS)
8. (CH.7) OUTPUT (CTS)
9. (CH.8) OUTPUT (RI)



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)

STATUS INDICATORS (PORT 2)

1. (CH.1) AUDIO INPUT PRESENT
2. (CH.1) AUDIO INPUT OVERLOAD
3. (CH.2) AUDIO INPUT PRESENT
4. (CH.2) AUDIO INPUT OVERLOAD
5. (CH.1) AUDIO OUTPUT PRESENT
6. (CH.1) AUDIO OUTPUT OVERLOAD
7. (CH.2) AUDIO OUTPUT PRESENT
8. (CH.2) AUDIO OUTPUT OVERLOAD

STATUS INDICATORS (PORT 3)

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

STATUS INDICATORS (PORT 4)

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

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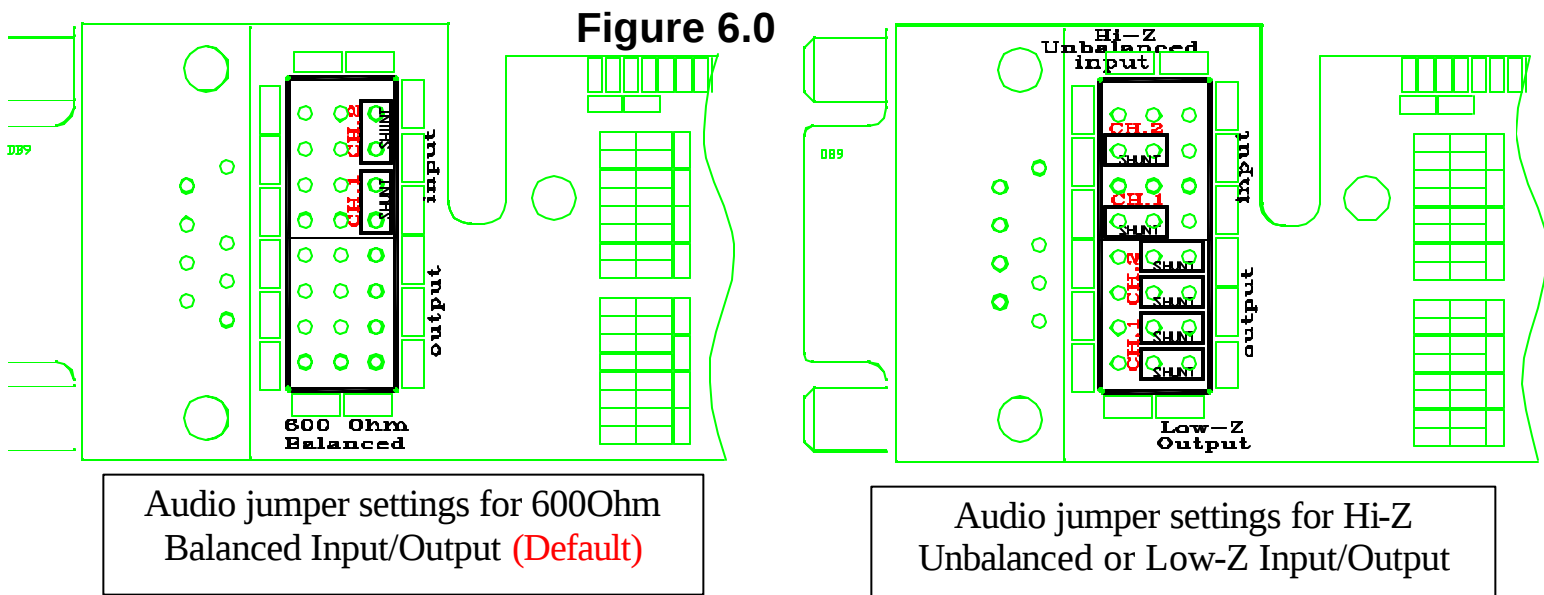
Figure 5.2
DR-2V(W)2A8D/2A8D-X Front Panel Layout Diagram

6.0 Signal Conditioning Jumper Settings

The sections below illustrate how to change the various audio impedance conditions.

6.1 Audio SIM Jumper Settings

The bidirectional Audio SIM (Port 3) has 2 jumpers on it (located directly behind the DB9 connector), one for each channel. These jumpers are used to set the input/output impedance of the audio channels. Each audio input channel can be set to either 600 Ohm (balanced) or 47K Ohm (unbalanced) input impedance (Hi-Z). Each audio output channel's impedance can be set to either 600 Ohm, balanced or low impedance (Low-Z). The default setting is 600 Ohm, balanced. The figures below illustrate these jumpers and how they are configured:



6.3 Changing the SIM jumpers

The jumpers to change the audio (from 600 Ohm balanced to 47K Ohm unbalanced) 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 Audio bi-di SIM is located on the bottom of the module in port 3.
4. Refer to the figure 6.1 to locate the 2 (or 6) jumpers that are located near the DB-9 connector.
5. Using a small tool, carefully remove the jumper and place it on the appropriate pins to properly select needed format (see tables 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.

7.0 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-2V(W)2A8D/2A8D-27	DR-2V(W)2A8D/2A8D-27	1270nm
DT-2V(W)2A8D/2A8D-29	DR-2V(W)2A8D/2A8D-29	1290nm
DT-2V(W)2A8D/2A8D-31	DR-2V(W)2A8D/2A8D-31	1310nm
DT-2V(W)2A8D/2A8D-33	DR-2V(W)2A8D/2A8D-33	1330nm
DT-2V(W)2A8D/2A8D-35	DR-2V(W)2A8D/2A8D-35	1350nm
DT-2V(W)2A8D/2A8D-37	DR-2V(W)2A8D/2A8D-37	1370nm
DT-2V(W)2A8D/2A8D-39	DR-2V(W)2A8D/2A8D-39	1390nm
DT-2V(W)2A8D/2A8D-41	DR-2V(W)2A8D/2A8D-41	1410nm
DT-2V(W)2A8D/2A8D-47	DR-2V(W)2A8D/2A8D-47	1470nm
DT-2V(W)2A8D/2A8D-49	DR-2V(W)2A8D/2A8D-49	1490nm
DT-2V(W)2A8D/2A8D-51	DR-2V(W)2A8D/2A8D-51	1510nm
DT-2V(W)2A8D/2A8D-53	DR-2V(W)2A8D/2A8D-53	1530nm
DT-2V(W)2A8D/2A8D-55	DR-2V(W)2A8D/2A8D-55	1550nm
DT-2V(W)2A8D/2A8D-57	DR-2V(W)2A8D/2A8D-57	1570nm
DT-2V(W)2A8D/2A8D-59	DR-2V(W)2A8D/2A8D-59	1590nm
DT-2V(W)2A8D/2A8D-61	DR-2V(W)2A8D/2A8D-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.

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

Audio: 1 to 2-channel bi-directional

Data: 1 to 8-channel, bi-directional RS-232 data

Transmitter	Receiver	Video Resolution	# Fibers & Type	Wavelength
DT-2W2A8D/2A8D-2	DT-2W2A8D/2A8D-2	10-bit	1 (MM)	850/1300nm
DT-2W2A8D/2A8D-5	DT-2W2A8D/2A8D-5	10-bit	1 (SM)	1310/1550nm
DT-2V2A8D/2A8D-2	DT-2V2A8D/2A8D-2	8-bit	1 (MM)	850/1300nm
DT-2V2A8D/2A8D-5	DT-2V2A8D/2A8D-5	8-bit	1 (SM)	1310/1550nm

For proper operation, it is necessary to match the DT unit with the associated 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: *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 Audio*

Action: Check the audio input status indicator lights on the transmit module to ensure that they are on (indicating an audio input signal). Also check the audio output status indicator lights on the corresponding receiver module to ensure that the signal is being transmitted and received. If not, please check the audio input/output and fiber connections.

Problem: *Low/High Audio output*

Action: Check to ensure that the input/output impedance properly matches the impedance of the audio input source and output device.

Problem: *Audio distortion on output*

Action: Check the status of the associated channel input/output Overload LEDs. If they are on, reduce the audio input level at the source to bring it below the overload condition. This should resolve problem.

Problem: *No Data*

Action: Check the channel data input status indicator lights on the transmit module to ensure it is on (indicating a data input signal). Also check the associated channel data output status indicator lights 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 (516-285-1000).

Notes:



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