



Installation/Operation Instructions

Fiber Optic Audio & C.C. Transmission System

Part Numbers:

DXA-4A8C/4A8C-x Series

DXB-4A8C/4A8C-x Series

***(4-Channel bi-directional Audio & 8-Channel
Bi-directional Contact Closure Transceiver)***

Compatible Part Numbers:

***DXA/DXB-4A6C/4A8C-x
DXA/DXB-4A8C/4A6C-x
DXA/DXB-2A8C/4A8C-x
DXA/DXB-4A8C/2A8C-x***

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1.0 Product Description

Meridian's product series DXA-4A8C/4A8C-x and DXB-4A8C/4A8C-x are fiber optic modems that transmit and receive one to four channels of bi-directional audio, and one to eight channel of bi-directional contact closure signals over one or two optical fibers using digital-encoding transmission technologies. 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, 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 two fiber units have two optical ports. The port on the left side of the front panel is the transmit port while the optical port on the right side of the module's front panel is the optical receive port. It is important that, when connecting these modules together, it is necessary that the transmit port of one of the modules optically connects to the receive port of other module. The second & third SIM cards contain the bi-directional audio. The third and fourth SIMs contains the bi-directional Contact Closure.

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 DXA/DXB-4A8C/4A8C-x series 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 DXA & DXB-4A8C/4A8C series products transmit and receive the following signals:

Signal Type	Qty	Transmit	Receive
Audio (600 ohm, unbalanced) -default	4	Yes	Yes
Dry contact closure	8	Yes	Yes

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

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

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

Connectors	
Audio	DB9 Female (4 audio channels per connector)
Dry contact closure	DB15 Female (8 CC channels per connector)
Optical	Singlemode – ST or FC Multimode – ST

Optical Specifications							
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



Compliant with Class 1 Laser Safety Rating.

4.0 Operating

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 Optical Status indicators

The front panel pinout diagrams in section 5 show the connector and LED indicator locations for the various audio & data status indicators on the unit. There are a number of diagnostic indicators on the front panel of each module to provide quick visual indications of the channel activity.

The indicators for optical signals are listed below:

Transceiver (DXA/DXB) 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)

*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 1 and 2. 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:

DB-9F	DXA Port-1 / DXB Port-2	DXA Port-1 / DXB Port-2
Pinout	INPUT	OUTPUT
1	Audio Ch 1 Input (-)	Audio Ch 1 Output (-)
2	Audio Ch 1 Input (+)	Audio Ch 1 Output (+)
3	Audio Ch 2 Input (-)	Audio Ch 2 Output (-)
4	Audio Ch 2 Input (+)	Audio Ch 2 Output (+)
5	GND	GND
6	Audio Ch 3 Input (-)	Audio Ch 3 Output (-)
7	Audio Ch 3 Input (+)	Audio Ch 3 Output (+)
8	Audio Ch 4 Input (-)	Audio Ch 4 Output (-)
9	Audio Ch 4 Input (+)	Audio Ch 4 Output (+)

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.

DXA Port-1 / DXB Port-2		DXA Port-1 / DXB Port-2
LED	INPUT Function	OUTPUT Function
1	Input 1 – Present	Output 1 – Present
2	Input 1 – Overload	Output 1 – Overload
3	Input 2 – Present	Output 2 – Present
4	Input 2 – Overload	Output 2 – Overload
5	Input 3 – Present	Output 3 – Present
6	Input 3 – Overload	Output 3 – Overload
7	Input 4 – Present	Output 4 – Present
8	Input 4 – Overload	Output 4 – 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 Contact Mapping SIM Signal Assignment (Pinouts) & Indicator Lights

The contact closure SIM is inserted in the module at port 3 and 4. 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.

DB-15F Pin #	Contact Mapping Connector Pinout Assignment (PORT 3/4)	LED #	Contact Mapping LED Status Indicators (PORT 3/4)
1	Ch1 INPUT	1	Ch1 INPUT PRESENT
2	Ch2 INPUT	2	Ch1 OUTPUT PRESENT
3	Ch3 INPUT	3	Ch2 INPUT PRESENT
4	Ch4 INPUT	4	Ch2 OUTPUT PRESENT
5	GND	5	Ch3 INPUT PRESENT
6	Ch1 OUTPUT	6	Ch3 OUTPUT PRESENT
7	Ch1 OUTPUT	7	Ch4 INPUT PRESENT
8	Ch2 OUTPUT	8	Ch4 OUTPUT PRESENT
9	Ch2 OUTPUT		
10	Ch3 OUTPUT		
11	Ch3 OUTPUT		
12	Ch4 OUTPUT		
13	Ch4 OUTPUT		
14	NA		
15	NA		

There are four jumpers for the user to configure the input/output Contact Mapping settings for Normally-Open or Normally-Close contacts, see section 6.0

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.

DXA-4A8C/4A8C-X

PINOUT DIAGRAM

STATUS INDICATORS

1. POWER (GREEN)
2. NA

STATUS INDICATORS

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

AUDIO INPUT (PORT 1) (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+

AUDIO OUTPUT (PORT 2) (DB-9 FEMALE)

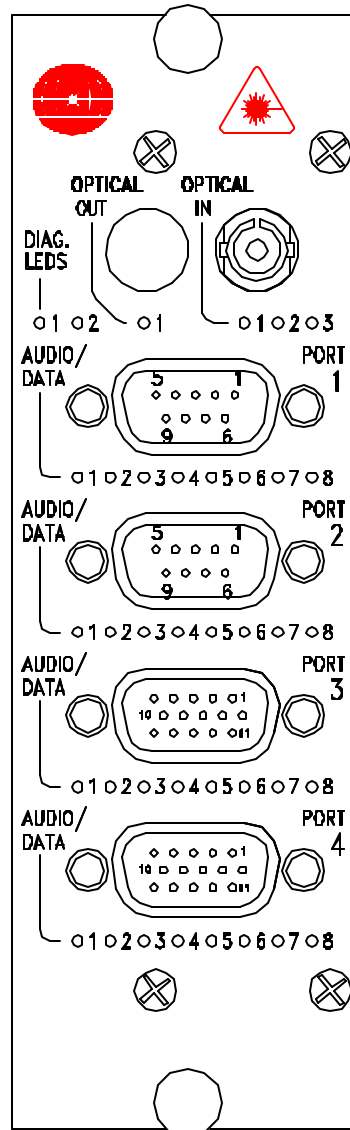
1. (CH.1) OUTPUT-
2. (CH.1) OUTPUT+
3. (CH.2) OUTPUT-
4. (CH.2) OUTPUT+
5. GND
6. (CH.3) OUTPUT-
7. (CH.3) OUTPUT+
8. (CH.4) OUTPUT-
9. (CH.4) OUTPUT+

DATA IN/OUT (PORT 3) (DB-15 FEMALE)

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

DATA IN/OUT (PORT 4) (DB-15 FEMALE)

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



OPTICAL PORT STATUS INDICATORS

1. NA
2. RX OPTICAL SIGNAL (GREEN)/ABSENT (RED)
3. RX CARRIER (GREEN)/ERROR (RED)

STATUS INDICATORS (PORT 1)

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.3) AUDIO INPUT PRESENT
6. (CH.3) AUDIO INPUT OVERLOAD
7. (CH.4) AUDIO INPUT PRESENT
8. (CH.4) AUDIO INPUT OVERLOAD

STATUS INDICATORS (PORT 2)

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

STATUS INDICATORS (PORT 3)

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

STATUS INDICATORS (PORT 4)

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

Figure 5.1
DXA-4A8C/4A8C-X Front Panel Layout Diagram

DXB-4A8C/4A8C-X

PINOUT DIAGRAM

STATUS INDICATORS

1. POWER (GREEN)
2. NA

STATUS INDICATORS

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

AUDIO OUTPUT (PORT 1) (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+

AUDIO INPUT (PORT 2) (DB-9 FEMALE)

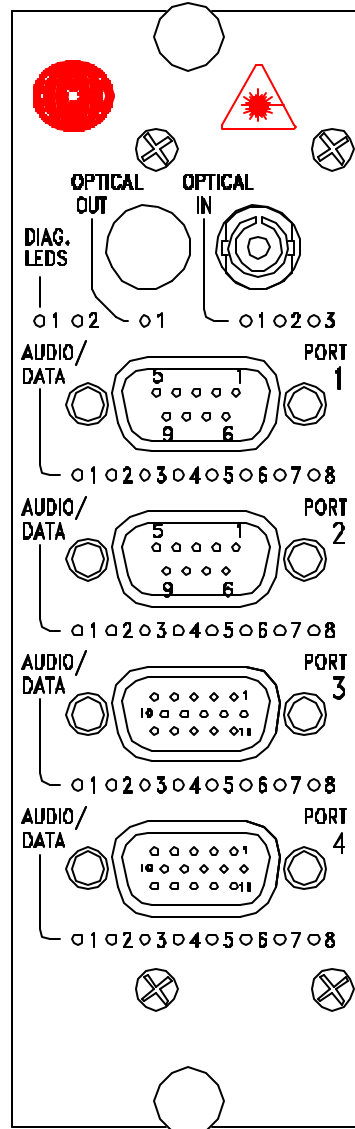
1. (CH.1) INPUT-
2. (CH.1) INPUT+
3. (CH.2) INPUT-
4. (CH.2) INPUT+
5. GND
6. (CH.3) INPUT-
7. (CH.3) INPUT+
8. (CH.4) INPUT-
9. (CH.4) INPUT+

DATA IN/OUT (PORT 3) (DB-15 FEMALE)

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

DATA IN/OUT (PORT 4) (DB-15 FEMALE)

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



OPTICAL PORT STATUS INDICATORS

1. NA
2. RX OPTICAL SIGNAL (GREEN)/ABSENT (RED)
3. RX CARRIER (GREEN)/ERROR (RED)

STATUS INDICATORS (PORT 1)

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

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.3) AUDIO INPUT PRESENT
6. (CH.3) AUDIO INPUT OVERLOAD
7. (CH.4) AUDIO INPUT PRESENT
8. (CH.4) AUDIO INPUT OVERLOAD

STATUS INDICATORS (PORT 3)

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

STATUS INDICATORS (PORT 4)

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

Figure 5.2
DXB-4A8C/4A8C-X Front Panel Layout Diagram

6.0 Signal Conditioning Jumper Settings

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

6.1 Audio SIM Jumper Settings

Each audio SIM has 4 jumpers for TX and 8 jumpers for RX on it (located directly behind the DB9 connector). There are two jumpers for each channel on RX and one jumper for each channel on TX. These jumpers are used to set the input/output impedance of the audio channels. Each audio input channel can be set to either 600ohm (balanced) or 47kohm (unbalanced) input impedance. Each audio output channel's impedance can be set to either 600 ohm, balanced or low impedance. The default setting is 600 ohm, balanced.

The figures below illustrate these jumpers and how they are configured

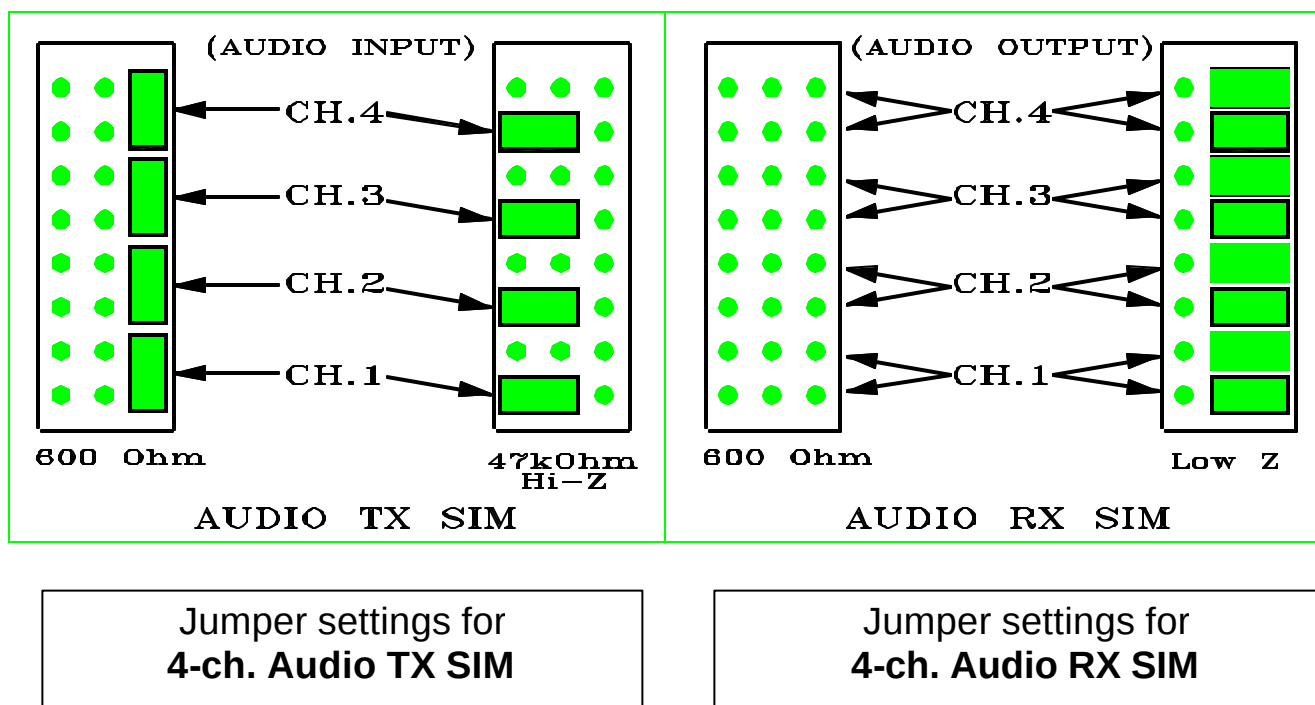


Figure 6.1

6.2 Contact Mapping SIM Jumper Settings

The Contact Closure SIM has 4 jumpers on it (located directly behind the DB15 connector), one for each RX channel. These jumpers are used to set the output Contact Mapping settings for Normally-Open or Normally-Close contacts.

The default setting is Normally-Open.

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

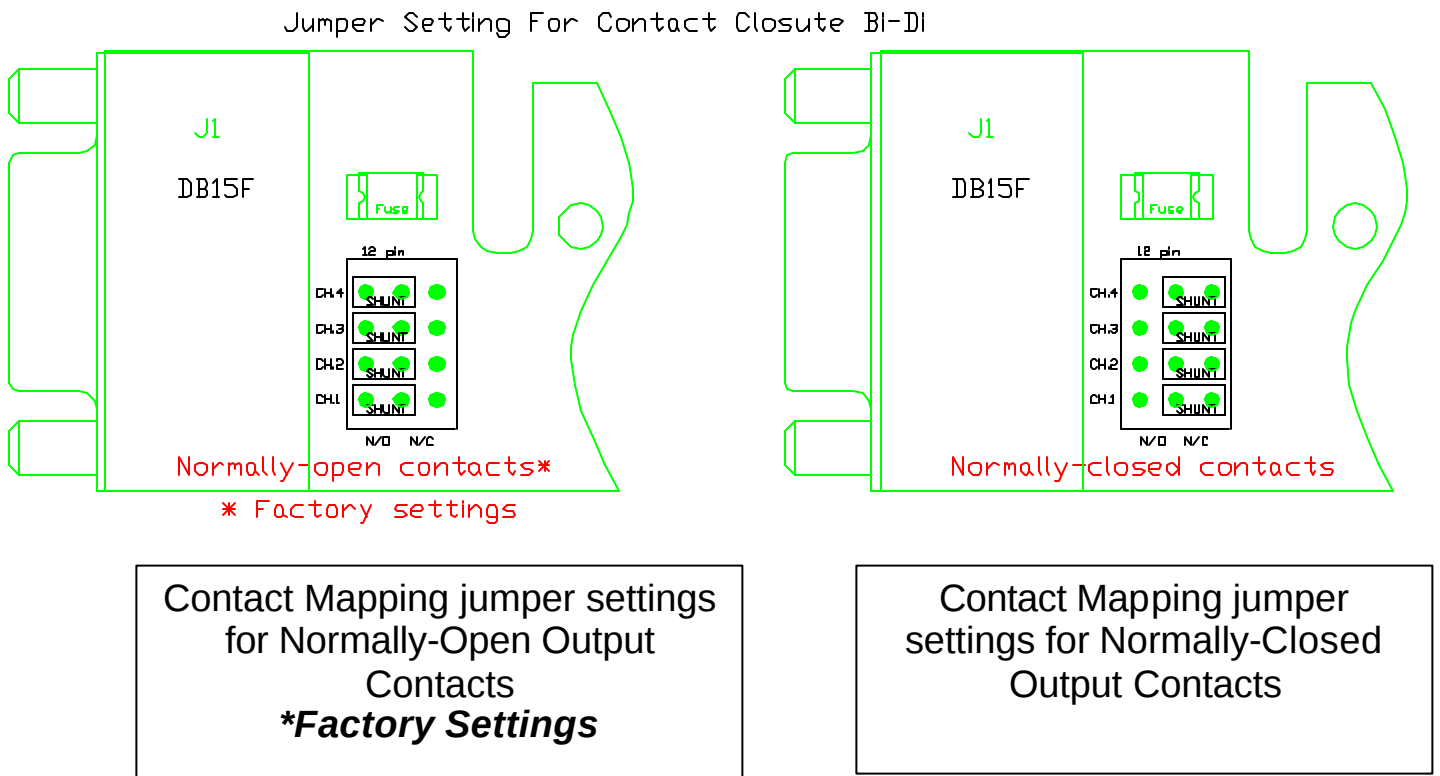


Figure 6.2

6.3 Changing the SIM jumpers

The jumpers to change the Audio from 600 Ohm balanced to 47K Ohm unbalanced or Contacts 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 Audio SIMs are located on the port 1 and 2, and Contact SIMs in port 3 and 4.

4. Refer to the figure 6.1 and 6.2 to locate the jumpers that are located near the DB-9 or DB-15 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 DX unit will transmit on one unique CWDM wavelength and receive 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.

Part #	Transmit Wavelength
DX-4A8C/4A8C-27	1270nm
DX-4A8C/4A8C-29	1290nm
DX-4A8C/4A8C-31	1310nm
DX-4A8C/4A8C-33	1330nm
DX-4A8C/4A8C-35	1350nm
DX-4A8C/4A8C-37	1370nm
DX-4A8C/4A8C-39	1390nm
DX-4A8C/4A8C-41	1410nm
DX-4A8C/4A8C-47	1470nm
DX-4A8C/4A8C-49	1490nm
DX-4A8C/4A8C-51	1510nm
DX-4A8C/4A8C-53	1530nm
DX-4A8C/4A8C-55	1550nm
DX-4A8C/4A8C-57	1570nm
DX-4A8C/4A8C-59	1590nm
DX-4A8C/4A8C-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:

Audio: 4-channels, bi-directional

Contact Closure: 8-channels, bi-directional

Side “A”	Side “B”	# Fibers & Type	Wavelength	Optical Connector
DXA-4A8C/4A8C-2	DXB-4A8C/4A8C-2	1 (MM)	1300/850nm	ST
DXA-4A8C/4A8C-5	DXB-4A8C/4A8C-5	1 (SM)	1310/1550nm	FC
DXA-4A8C/4A8C-5ST	DXB-4A8C/4A8C-5ST	1 (SM)	1310/1550nm	ST

For proper operation, it is necessary to match the side “A” unit (DXA) with the associated side “B” (DXB) 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 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 Contact Closure transmission*

Action: Check the individual contact closure channel input status indicator lights #1 through 8 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 8) 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.

If the problem still persists after reviewing the above items, please contact Meridian technical support (516-285-1000).

Notes:



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