



# **Installation and Operation Instructions**

## **Fiber Optic Data Transmission System**

**Part Number:**

**DXA/DXB-1A8C1F/1A8C1F-x**

1-Channel Bi-directional Audio, 8-Channel Bi-directional Contact Closure  
and 1-Channel Bi-directional RS-422 Data Transceiver

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## 1.0 Product Description

Meridian's DXA/DXB-1A8C1F/1A8C1F-x product series are fiber optic modems that transmit and receive one channels of bi-directional audio, eight channels of bi-directional contact closure and one channels of full-duplex RS-422 Data channels over one optical fiber using digital transmission technologies. This product series uses Meridian's standard 2-slot wide chassis mount card assembly and plugs into the following Meridian chassis: SR-1000, SR-1200, SR-1500 and SR-2001 & SR-2000 series 19" equipment chassis.

The DigiFlex™ cards consist of various plug-in personality modules or SIMs. The top card is the optical card that contains the fiber optic interface. The optical input (Rx) & output (Tx) connector is located on the right side of the module. The second SIM module contains one bi-directional audio, The third & forth SIM contains eight bi-directional contacts and SIM five will have one bi-directional RS-422 data channel.

## 2.0 Installation

Series DXA/DXB-1A8C1F/1A8C1F-x products are two-slot wide cards and occupy two slots in Meridian's standard chassis. To install card 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 it by hand and don't over tighten.

**Note:** A fully loaded sub-rack 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 Part # Signal Format & Specifications

The DXA/DXB-1A8C1F/1A8C1F series products transmit and receive the following signals:

| Part Number                                                  | Signal Type                    | Qty | Transmit | Receive |
|--------------------------------------------------------------|--------------------------------|-----|----------|---------|
| DXA-1A8C1F/1A8C1F-x (Side A)<br>DXB-1A8C1F/1A8C1F-x (Side B) | Bi-directional 24-Bit Audio    | 1   | Yes      | Yes     |
|                                                              | Bi-directional Contact closure | 8   | Yes      | Yes     |
|                                                              | Bi-directional RS-422 Data     | 1   | Yes      | Yes     |

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

| Audio                |                                |
|----------------------|--------------------------------|
| In/Out Impedance     | 600 Ohm, unbalanced/unbalanced |
| Frequency Response   | 10Hz to 20KHz                  |
| SNR                  | >90dB (weighted) @ 1KHz        |
| In/Out Level         | -6 to +6dBm (4Vp-p, max)       |
| THD                  | <0.01% @ 1KHz                  |
| Digitized Resolution | 24 bit                         |

| Data                 |                         |
|----------------------|-------------------------|
| Formats              | RS-422 (bi-directional) |
| Data Rate (RS-485)   | DC to 300Kb/s           |
| Bit Error Rate (BER) | Better than $10^{-9}$   |

| Contact Closure       |                                  |
|-----------------------|----------------------------------|
| 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 (1 BI-DI Audio channels per connector)  |
| Contact    | DB15 Female (4 BI-DI CC channels per connector)    |
| Data       | DB9 Female (1 BI-DI RS-422 channels per connector) |
| Optical    | Single-mode – ST or FC, Multimode - ST             |

| Optical Specifications     |                               |                      |                      |                     |                 |                   |                            |                        |
|----------------------------|-------------------------------|----------------------|----------------------|---------------------|-----------------|-------------------|----------------------------|------------------------|
| Meridian Optic code        | Fiber Type/Size (um)          | Optical Output (dBm) | Rx Sensitivity (dBm) | Optical Budget (dB) | Wavelength (nm) | Optical connector | Optical Dynamic Range (dB) | Estimated Max Distance |
| 2                          | Multimode (FP Laser) 62.5/125 | -3                   | -24                  | 21                  | 1300/850        | ST                | 24                         | 4                      |
| 5                          | Single-mode (FP Laser) 9/125  | -3                   | -24                  | 21                  | 1310/1550       | ST, FC            | 24                         | 60                     |
| Fiber Data Rate – 250 Mb/s |                               |                      |                      |                     |                 |                   |                            |                        |

## 4.0 Pin-out & Indicator Lights

The front panel pinout diagrams in the section 6.0 shows the connectors and LED indicators location and configuration. Each of the Audio, Contact and Data input/output channels has associated indicators, to provide quick visual indications of the channel activity.

| Common Indicators |                                |                                                 |
|-------------------|--------------------------------|-------------------------------------------------|
| Indicator         | Location                       | Function                                        |
| Power             | Left side of module            | Green – ON                                      |
| Tx carrier        | Under optical output connector | Optical output (Green – OK, Red – error)        |
| Rx Optical signal | Under optical output connector | Optical input (Green – OK, Red – error)         |
| Rx Carrier        | Under optical output connector | Optical Carrier input (Green – OK, Red – error) |

### 4.1 Audio Connector Pin-out & Indicator Lights

Each Audio input/output channel has four status LEDs. Two LEDs are associated with Input channels and two are associated with respective output channels.

| Audio Input / Output Status Indicators |                     |
|----------------------------------------|---------------------|
| LED                                    | Function            |
| 1                                      | Input 1 – Present   |
| 2                                      | Input 1 – Overload  |
| 5                                      | Output 1 – Present  |
| 6                                      | Output 1 – Overload |

| Terms Explained                                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------|
| <b>Audio Input Present</b> - Audio signal is present and signal level greater than -8Db                                             |
| <b>Audio Input Overload</b> - Audio input level is too high (exceeds +8dB) and distortion may result on the output.                 |
| <b>Audio Output Present</b> - Audio input on Tx side and fiber-optic connection between Tx and Rx cards is present                  |
| <b>Audio Output Overload</b> - Reflects Audio Input Overload. Should not be lit when the Audio Input not in the overload condition. |

The DXA/DXB-1A8C1F/1A8C1F-x Audio channel connector pinouts are shown in the table below:

| <b>Audio connector pin-out</b> |                       |
|--------------------------------|-----------------------|
| Pinout                         |                       |
| 1                              | Audio Ch 1 Output (-) |
| 2                              | Audio Ch 1 Output (+) |
| 5                              | GND                   |
| 6                              | Audio Ch 1 Input (-)  |
| 7                              | Audio Ch 1 Input (+)  |

#### 4.2 Contact Closure Connector Pin-out & Indicator Lights

The table below identifies the input/output functions and associated connector pinouts for Contact Closure SIMs.

| <b>Contact Pin-out (Each SIM Card)</b> |               |
|----------------------------------------|---------------|
| Pin #                                  | Function      |
| 1 & 5 (Gnd)                            | (Ch 1) Input  |
| 2 & 5 (Gnd)                            | (Ch 2) Input  |
| 3 & 5 (Gnd)                            | (Ch 3) Input  |
| 4 & 5 (Gnd)                            | (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                                     | N/A           |
| 15                                     | N/A           |

Each contact closure input/output has indicator lights to visually show the status of each contact. Below each contact electrical connector are 8 small LEDs (1 through 8). The table below shows the contact input/output state and the corresponding LED state.

| <b>Contact Input / Output Status Indicators</b> |         |         |         |         |         |         |         |         |
|-------------------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
|                                                 | LED # 1 | LED # 2 | LED # 3 | LED # 4 | LED # 5 | LED # 6 | LED # 7 | LED # 8 |
| Input # 1                                       | X       |         |         |         |         |         |         |         |
| Output # 1                                      |         | X       |         |         |         |         |         |         |
| Input # 2                                       |         |         | X       |         |         |         |         |         |
| Output # 2                                      |         |         |         | X       |         |         |         |         |
| Input # 3                                       |         |         |         |         | X       |         |         |         |
| Output # 3                                      |         |         |         |         |         | X       |         |         |
| Input # 4                                       |         |         |         |         |         |         | X       |         |
| Output # 4                                      |         |         |         |         |         |         |         | X       |

(X indicates a closed contact input and corresponding 'ON' LED)

#### 4.3 Contact Closure - External Connections Configuration

Contact closure communication between the DXA and DXB units is done in the following manner:

For Inputs 1 through 4 on each contact closure SIM card:

1. Connect each contact input between the input pins (1-4) and ground (pin 5) for each respective contact input channel.
2. The corresponding isolated contact outputs on the receive module are available on pins 6 & 7, 8 & 9, 10 & 11, 12 & 13 (for channels 1, 2, 3, 4, respectively).
3. Note that the input/output contacts are located on the same SIM location on the DXA & DXB modules. For example, if the contact inputs are connected to the bottom SIM card on the DXA module, the corresponding outputs on the DXB modules are located on the SIM card in the same bottom location.

#### 4.4 RS-422 Data Pinouts & Indicator Lights

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.

There is one Data SIM card in these modules. This data card transmits/receives one RS-485 (4-wire) data channel. The data SIM has a DB9 female connector.

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

| <b>RS-422 Data Connector Pinout Assignment</b> |                          |                          |
|------------------------------------------------|--------------------------|--------------------------|
| <b>Pin #</b>                                   | <b>DXA-1A8C1F/1A8C1F</b> | <b>DXB-1A8C1F/1A8C1F</b> |
| 1                                              | Ch1 IN (+)               | Ch1 OUT (+)              |
| 2                                              | Ch1 IN (-)               | Ch1 OUT (-)              |
| 5                                              | GND                      | GND                      |
| 6                                              | Ch 1 OUT (+)             | Ch1 IN (+)               |
| 7                                              | Ch 1 OUT (-)             | Ch1 IN (-)               |

The table below shows the LED status indicators associated with RS-422 Data SIM

| <b>RS-422 Data Connector Status Indicator</b> |                          |                          |
|-----------------------------------------------|--------------------------|--------------------------|
| <b>LED #</b>                                  | <b>DXA-1A8C1F/1A8C1F</b> | <b>DXB-1A8C1F/1A8C1F</b> |
| 1                                             | Ch1 Data Input           | N/A                      |
| 2                                             | N/A                      | Ch 1 Data Output         |
| 3                                             | N/A                      | N/A                      |
| 4                                             | N/A                      | N/A                      |
| 5                                             | N/A                      | Ch1 Data Input           |
| 6                                             | Ch 1 Data Output         | N/A                      |
| 7                                             | N/A                      | N/A                      |
| 8                                             | N/A                      | N/A                      |

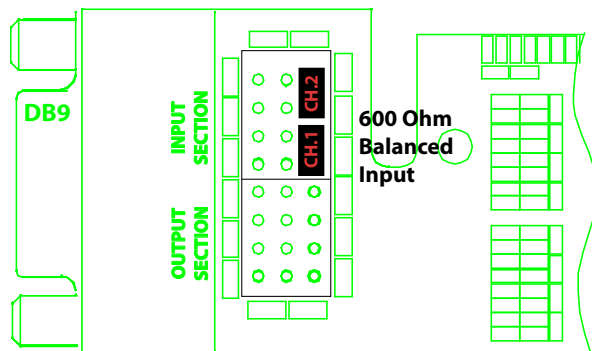
## 5.0 Signal Jumper Settings

The sections below illustrate how to change the Audio and Contact Mapping configurations.

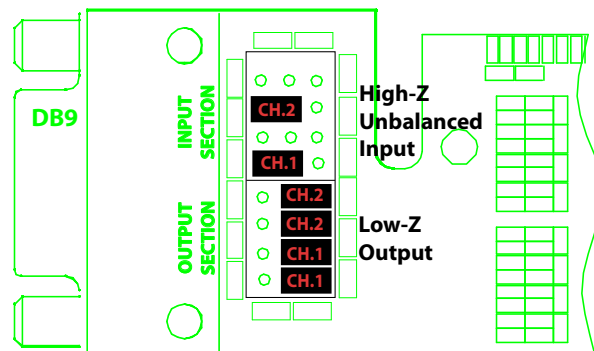
### 5.1 Audio SIM Jumper Settings

The Audio SIM jumpers are 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 600 Ohm (balanced) or 47k Ohm (unbalanced) input impedance. Each audio output channel 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.



Audio jumper settings for 600Ohm  
Balanced Input / Output (Default)



Audio jumper settings for Hi-Z  
Unbalanced Input, Low-Z Output

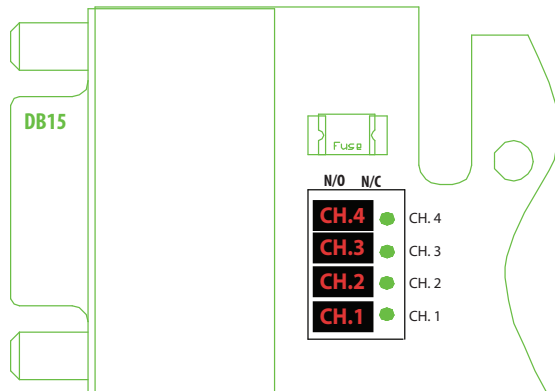
## 5.2 Contact Mapping SIM Jumper Settings

The Contact Closure SIM jumpers are 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.

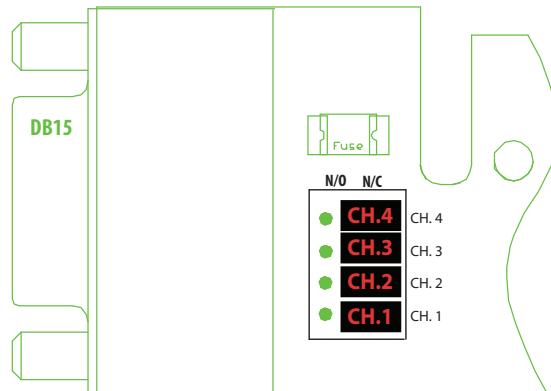
The figures below illustrate these jumpers and how they are configured:

### Jumper Setting for Bi-di Contact Closure



Normally-Open Output Contacts (default)

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



Normally-Closed Output Contacts (default)

Contact Mapping jumper settings for  
Normally-Closed Output Contacts.

### 5.3 Changing the SIM jumpers

The procedure for changing Audio or Contacts jumpers setting is:

1. Lay the module on its side with the front panel facing to the left.
2. Remove the 4 corner screws and remove the cover.
3. The Audio SIMs are located on the port 1 and Contact Closure SIMs in ports 2 and 3.
4. Refer to the figures in section 5.1 and 5.2 to locate the jumpers.
5. Carefully remove the jumper and place it on the appropriate pins to select needed format.
6. Repeat this process for the other module.
7. Carefully replace the cover.

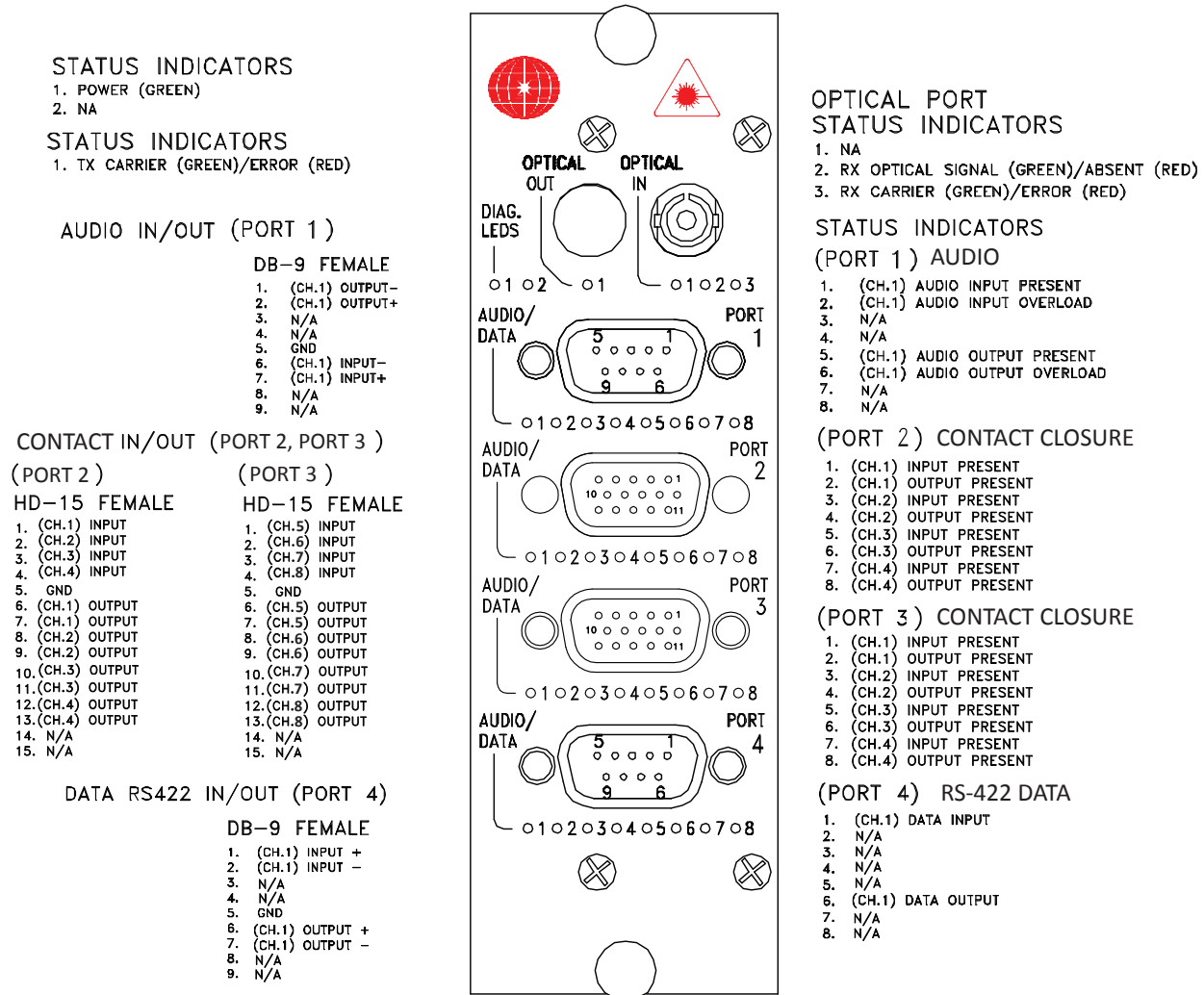
Note: The jumper selection needs to be the same for both the Tx and Rx units.

## 6.0 Pin-out diagrams

The front panel diagrams below show the Status Indicators and Pin-out diagrams for all ports.

### DXA-1A8C1F/1A8C1F-x

#### PIN-OUT DIAGRAM



# DXB-1A8C1F/1A8C1F-x

## PIN-OUT DIAGRAM

### STATUS INDICATORS

1. POWER (GREEN)
2. NA

### STATUS INDICATORS

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

### AUDIO IN/OUT (PORT 1)

#### DB-9 FEMALE

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

### CONTACT IN/OUT (PORT 2, PORT 3)

#### (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.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. N/A
15. N/A

#### (PORT 3)

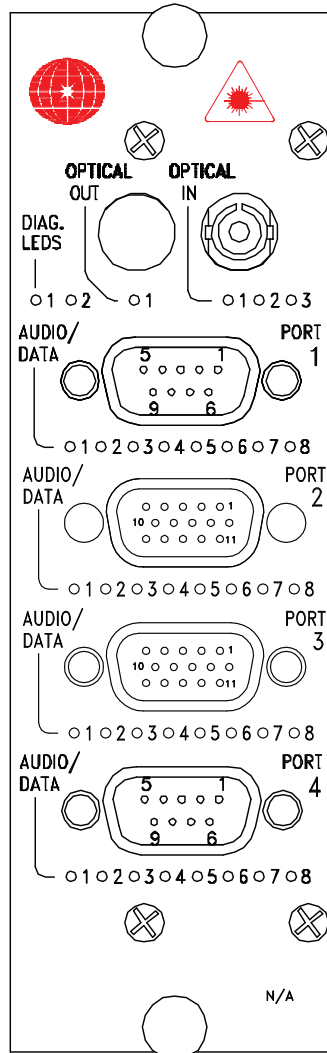
#### HD-15 FEMALE

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

### DATA RS422 IN/OUT (PORT 4)

#### DB-9 FEMALE

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



### OPTICAL PORT STATUS INDICATORS

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

### STATUS INDICATORS

#### (PORT 1) AUDIO

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

#### (PORT 2) CONTACT CLOSURE

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

#### (PORT 3) CONTACT CLOSURE

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

#### (PORT 4) RS-422 DATA

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

## 7.0 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 module 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/sub-rack 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 Audio transmission

Action: Check the audio input status indicator lights (5 & 6) on the transmit module to ensure that they are on (indicating an audio input signal). Also check the audio output status indicator lights (1 & 2) 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: No Contact Closure transmission

Action: Check the individual contact closure channel input status indicator lights # 1, 3, 5, 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, 4, 6, 8) on the other 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 transmission

Action: Check the data input status indicator lights below data connector to ensure it is on (indicating a data input signal). Also check the associated 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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