



Installation/Operation Instructions

Fiber *Optic* Audio Transmission System

DT/DR-xAH Series
(Multi-Channel Audio Transmitter/Receiver)
(2 to 8 Channels)

(Multimode, Single-mode, CWDM)

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1.0 Product Description

Meridian's product series DT/DR-xAH are fiber optic modems that transmit and receive from 2 to 8 uni-directional audio channels over one optical fiber using digital transmission technologies (the exact number of channels is determined by the part number in Appendix 1).

The DT/DR-xAH series product incorporates a new digital encoding technology with Low Signal Latency.

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 output (Tx) connector is located on the left side of the module while the optical input (Rx) connector is adjacent to it on the right side of the module. Each of the four remaining SIM locations contains four uni-directional audio channel interfaces for a total of 8 (2 channels per SIM card), depending on part number. 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-xAH & DR-xAH 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 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

Connectors	
Audio	BNC
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)
Multimode (VCSEL Laser) 62.5/125	-5	-27	22	850	ST	24
Multimode (FP Laser) 62.5/125	-3	-25	22	1300	ST	24
Singlemode (FP Laser) 9/125	-3	-25	22	1310	ST, FC	24
Singlemode (DFB Laser) 9/125	+1	-24	25	1270-1610	ST	24

4.0 Operating

Audio - Connect the audio source to one of the channels' input pins as shown in section 4.0. 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.

4.1 Status indicators

The figures at the end of this document show the connector and LED indicator locations for the various audio status indicators on the module. There are a number of diagnostic indicators on the front panel of each module.

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 input connector	Optical input (Green – OK, Red – absent)
Rx Carrier	Under optical input connector	Optical Carrier input (Green – OK, Red – error)

Each audio input/output channel has four LED status indicators located under the associated audio I/O connector. Two of the 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									
DT-xAH					DR-xAH				
LED	Port 1	Port 2	Port 3	Port 4	LED	Port 1	Port 2	Port 3	Port 4
1	In 1 Present	In 1 Present	In 1 Present	In 1 Present	1	Out 1 Present	Out 1 Present	Out 1 Present	Out 1 Present
2	In 1 Overload	In 1 Overload	In 1 Overload	In 1 Overload	2	Out 1 Overload	Out 1 Overload	Out 1 Overload	Out 1 Overload
3	In 2 Present	In 2 Present	In 2 Present	In 2 Present	3	Out 2 Present	Out 2 Present	Out 2 Present	Out 2 Present
4	In 2 Overload	In 2 Overload	In 2 Overload	In 2 Overload	4	Out 2 Overload	Out 2 Overload	Out 2 Overload	Out 2 Overload
5	In 3 Present	In 3 Present	In 3 Present	In 3 Present	5	Out 3 Present	Out 3 Present	Out 3 Present	Out 3 Present
6	In 3 Overload	In 3 Overload	In 3 Overload	In 3 Overload	6	Out 3 Overload	Out 3 Overload	Out 3 Overload	Out 3 Overload
7	In 4 Present	In 4 Present	In 4 Present	In 4 Present	7	Out 4 Present	Out 4 Present	Out 4 Present	Out 4 Present
8	In 4 Overload	In 4 Overload	In 4 Overload	In 4 Overload	8	Out 4 Overload	Out 4 Overload	Out 4 Overload	Out 4 Overload

Audio input PRESENT LEDs (DT-xAH units) – 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

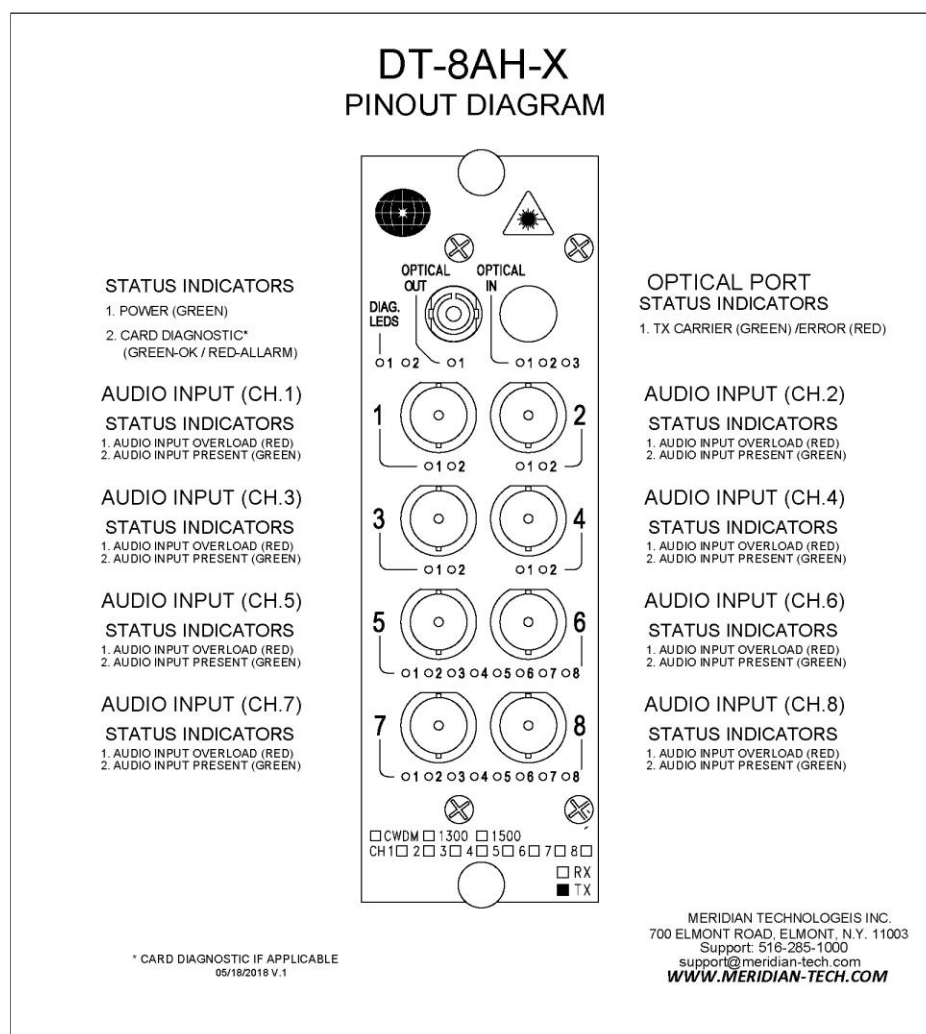
Audio input OVERLOAD LEDs (DT-xAH units) – when the audio input level of any channel exceeds +8dB, the associated audio channel input Overload LED will turn on indicating that the audio input level is too high and distortion on the output may result.

Audio output PRESENT LEDs (DR-xAH units)– This light will turn on when the audio input on the transmit side is present, the DT & DR units are powered and the fiber is connected between the two modems.

Audio output OVERLOAD LEDs (DR-xAH units) – 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)

5.0 Front Panel Pinout Assignment Diagram

Figures 5.1 and 5.2 below show the front panel layout, connector location and pin-out assignment for both the DT & DR modules



**Figure 5.1
DT-xAH Front Panel Diagram**

DR-8AH-X PINOUT DIAGRAM

STATUS INDICATORS

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

AUDIO OUTPUT (CH.1)

STATUS INDICATORS

1. AUDIO OUTPUT OVERLOAD (RED)
2. AUDIO OUTPUT PRESENT (GREEN)

AUDIO OUTPUT (CH.3)

STATUS INDICATORS

1. AUDIO OUTPUT OVERLOAD (RED)
2. AUDIO OUTPUT PRESENT (GREEN)

AUDIO OUTPUT (CH.5)

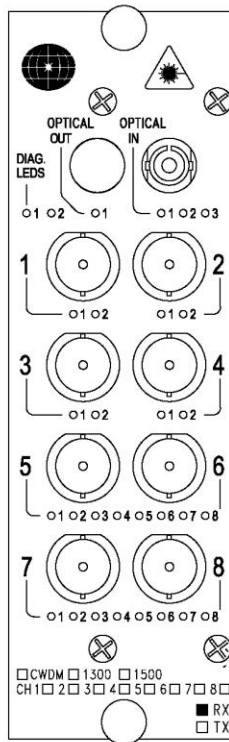
STATUS INDICATORS

1. AUDIO OUTPUT OVERLOAD (RED)
2. AUDIO OUTPUT PRESENT (GREEN)

AUDIO OUTPUT (CH.7)

STATUS INDICATORS

1. AUDIO OUTPUT OVERLOAD (RED)
2. AUDIO OUTPUT PRESENT (GREEN)



OPTICAL PORT STATUS INDICATORS

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

AUDIO OUTPUT (CH.2)

STATUS INDICATORS

1. AUDIO OUTPUT OVERLOAD (RED)
2. AUDIO OUTPUT PRESENT (GREEN)

AUDIO OUTPUT (CH.4)

STATUS INDICATORS

1. AUDIO OUTPUT OVERLOAD (RED)
2. AUDIO OUTPUT PRESENT (GREEN)

AUDIO OUTPUT (CH.6)

STATUS INDICATORS

1. AUDIO OUTPUT OVERLOAD (RED)
2. AUDIO OUTPUT PRESENT (GREEN)

AUDIO OUTPUT (CH.8)

STATUS INDICATORS

1. AUDIO OUTPUT OVERLOAD (RED)
2. AUDIO OUTPUT PRESENT (GREEN)

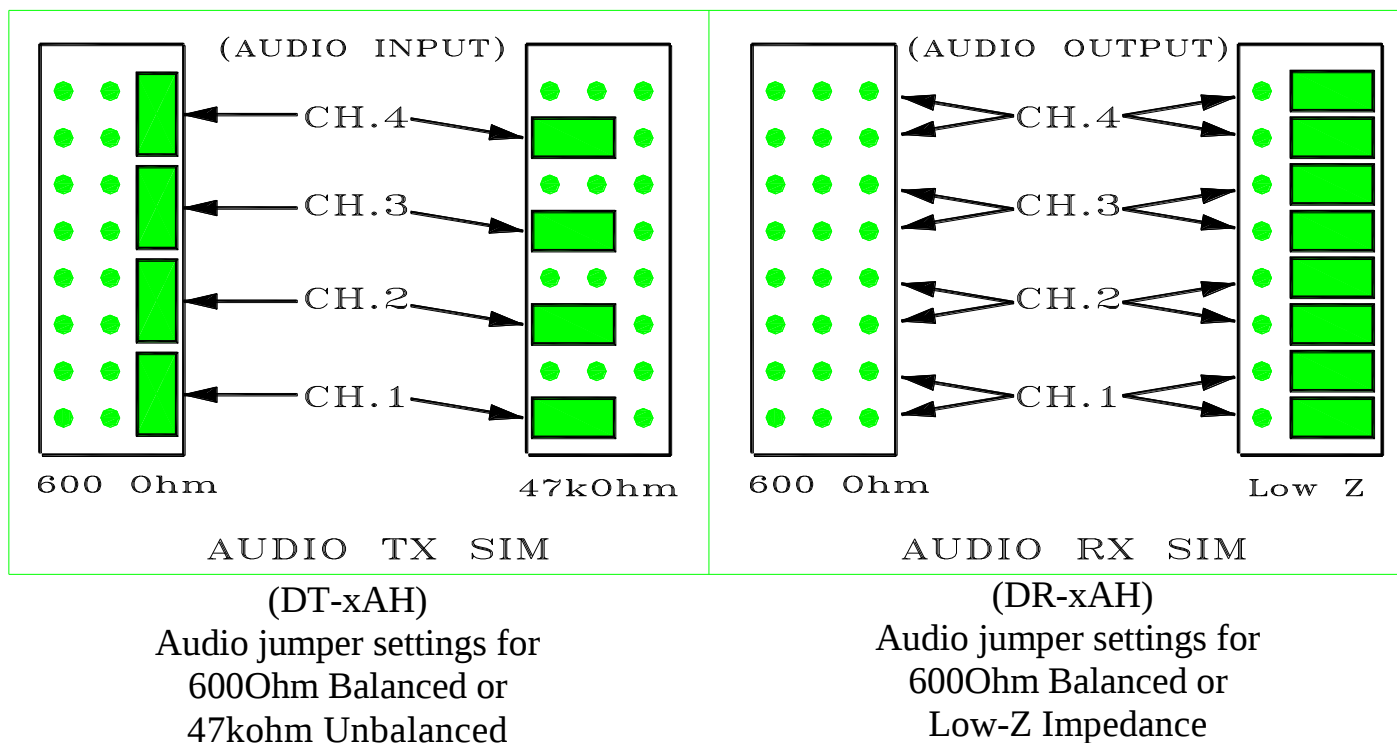
* CARD DIAGNOSTIC IF APPLICABLE
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Figure 5.2
DR-xAH Front Panel Diagram

6.0 Audio SIM Jumper Settings

Each audio SIM has 8 jumpers on it (located directly behind the BNC connector). There are two jumpers 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 600ohm, balanced or 47kohm, 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:



6.1 Changing the SIM jumpers

The jumpers for the audio impedance: from 600 Ohm balance to Hi-Z (for TX) or Low-Z (for RX) unbalance, can be easily changed as follows:

1. Lay the module on its side with the front panel facing to the left.
2. If there is a side cover on the module, remove the screws in each of the 4 corners of the side cover and carefully remove the cover.
3. The Audio TX SIMs and Audio RX SIMs located in ports 1-4
4. Refer to the above drawing to locate the 4 (or 8) jumpers that is near the DB-9 connector.
5. Using a small tool, carefully remove the jumper and place it on the appropriate pins to properly select the audio format (see table above)
6. Carefully place the side cover and secure with the screws.
7. Repeat this process for the other module. The jumper selection needs to be set differently for the TX and RX SIMs.

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 receive on a DR unit on the complementary wavelengths. 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.

TX Part #	RX Part #	Transmit Wavelength
DT-xAH-27	DR-xAH-3	1270nm
DT-xAH-29		1290nm
DT-xAH-31		1310nm
DT-xAH-33		1330nm
DT-xAH-35		1350nm
DT-xAH-37		1370nm
DT-xAH-39		1390nm
DT-xAH-41		1410nm
DT-xAH-47		1470nm
DT-xAH-49		1490nm
DT-xAH-51		1510nm
DT-xAH-53		1530nm
DT-xAH-55		1550nm
DT-xAH-57		1570nm
DT-xAH-59		1590nm
DT-xAH-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 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 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 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.

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

Notes:

Appendix 1 – Applicable Product Part Number Variations

The table below indicates the part numbers and product description that are included in this manual. The pinout diagram in section 5.0 shows the connector pinouts (input/output connections) for the all-inclusive product. The appropriate modules consist of various combinations of uni-directional Audio channels (4, 8). Please use this table to determine the exact pinout and port location of the particular model of interest.

Part Numbers	# Audio Channels	Type of Fiber
DT/DR-4AH-1	4	Multimode, 1300nm
DT/DR-4AH-3	4	Singlemode, 1310nm
DT/DR-8AH-1	8	Multimode, 1300nm
DT/DR-8AH-3	8	Singlemode, 1310nm

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