



HANDBOOK

AVN-AH8 8 Stereo Headphone Output Dante® Audio Interface



Manufacturers of Audio Products for AV,
Installed Sound, Broadcast Radio & Broadcast TV

SONIFEX

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This handbook is for use with the following product:

**AVN-AH8 8 Stereo Headphone Outputs Dante Audio Interface
AW11098**

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Serial No: _____

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1. Definitions

‘the Company’ means Sonifex Ltd and where relevant includes companies within the same group of companies as Sonifex Limited.

‘the Goods’ means the goods or any part thereof supplied by the Company and where relevant includes: work carried out by the Company on items supplied by the Purchaser; services supplied by the Company; and software supplied by the Company.

‘the Purchaser’ means the person or organisation who buys or has agreed to buy the Goods.

‘the Price’ means the Price of the Goods and any other charges incurred by the Company in the supply of the Goods.

‘the Warranty Term’ is the length of the product warranty which is usually 12 months from the date of despatch; except when the product has been registered at the Sonifex website when the Warranty Term is 24 months from the date of despatch.

‘the Contract’ means the quotation, these Conditions of Sale and any other document incorporated in a contract between the Company and the Purchaser.

This is the entire Contract between the parties relating to the subject matter hereof and may not be changed or terminated except in writing in accordance with the provisions of this Contract. A reference to the consent, acknowledgement, authority or agreement of the Company means in writing and only by a director of the Company.

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- a. The Company agrees to repair or (at its discretion) replace Goods which are found to be defective (fair wear and tear excepted) and which are returned to the Company within the Warranty Term provided that each of the following are satisfied:
 - i. notification of any defect is given to the Company immediately upon its becoming apparent to the Purchaser;
 - ii. the Goods have only been operated under normal operating conditions and have only been subject to normal use (and in particular the Goods must have been correctly connected and must not have been subject to high voltage or to ionising radiation and must not have been used contrary to the Company’s technical recommendations);
 - iii. the Goods are returned to the Company’s premises at the Purchaser’s expense;
 - iv. any Goods or parts of Goods replaced shall become the property of the Company;
 - v. no work whatsoever (other than normal and proper maintenance) has been carried out to the Goods or any part of the Goods without the Company’s prior written consent;
 - vi. the defect has not arisen from a design made, furnished or specified by the Purchaser;

- vii. the Goods have been assembled or incorporated into other goods only in accordance with any instructions issued by the Company;
 - viii. the defect has not arisen from a design modified by the Purchaser;
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- c. The Company accepts liability:
- i. for death or personal injury to the extent that it results from the negligence of the Company, its employees (whilst in the course of their employment) or its agents (in the course of the agency);
 - ii. for any breach by the Company of any statutory undertaking as to title, quiet possession and freedom from encumbrance.
- d. Subject to conditions (a) and (c) from the time of despatch of the Goods from the Company's premises the Purchaser shall be responsible for any defect in the Goods or loss, damage, nuisance or interference whatsoever consequential economic or otherwise or wastage of material resulting from or caused by or to the Goods. In particular the Company shall not be liable for any loss of profits or other economic losses. The Company accordingly excludes all liability for the same.
- e. At the request and expense of the Purchaser the Company will test the Goods to ascertain performance levels and provide a report of the results of that test. The report will be accurate at the time of the test, to the best of the belief and knowledge of the Company, and the Company accepts no liability in respect of its accuracy beyond that set out in Condition (a).
- f. Subject to Condition (e) no representation, condition, warranty or other term, express or implied (by statute or otherwise) is given by the Company that the Goods are of any particular quality or standard or will enable the Purchaser to attain any particular performance or result, or will be suitable for any particular purpose or use under specific conditions or will provide any particular capacity, notwithstanding that the requirement for such performance, result or capacity or that such particular purpose or conditions may have been known (or ought to have been known) to the Company, its employees or agents.
- g. (i) To the extent that the Company is held legally liable to the Purchaser for any single breach of contract, tort, representation or other act or default, the Company's liability for the same shall not exceed the price of the Goods.
- (ii) The restriction of liability in Condition (g)(i) shall not apply to any liability accepted by the Seller in Condition (c).
- a. h. Where the Goods are sold under a consumer transaction (as defined by the Consumer Transactions (Restrictions on Statements) Order 1976) the statutory rights of the Purchaser are not affected by these Conditions of Sale.

Unpacking Your Product

Each product is shipped in protective packaging and should be

inspected for damage before use. If there is any transit damage take pictures of the product packaging and notify the carrier immediately with all the relevant details of the shipment. Packing materials should be kept for inspection and also for if the product needs to be returned.

The product is shipped with the following equipment so please check to ensure that you have all of the items below. If anything is missing, please contact the supplier of your equipment immediately.

Item	Quality
Product unit	1

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Please contact Sonifex or your supplier if you have any problems with your Sonifex product. Email technical.support@sonifex.co.uk for the repair/upgrade/returns procedure, or for support & questions regarding the product operation.

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The products in this manual comply with the essential requirements of the relevant UK and European health, safety and environmental protection legislation. The technical justification file for this product is held at Sonifex Ltd. Relevant declarations of conformity can be found at: <https://www.sonifex.co.uk/declarations>

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Directive 2012/19/EU of the European Parliament and of the Council of 4th July 2012 lays down measures to protect the environment and human health by preventing or reducing the adverse impacts of the generation and management of waste from electrical and electronic equipment (WEEE).

The policy of Sonifex Ltd is to comply with all applicable laws of all jurisdictions having authority over Sonifex's business, including the WEEE directive. Accordingly, Sonifex has implemented a rigorous program designed to ensure compliance of its products with the WEEE directive. The latest statements can be found at: <https://www.sonifex.co.uk/company/recycling>

Atmosphere/Environment

This apparatus should be installed in an area that is not subject to excessive temperature variation (<0°C, >50°C), moisture, dust or vibration.

This apparatus shall not be exposed to dripping or splashing, and no objects filled with water, such as vases shall be placed on the apparatus.

AVN-AH8 8 Stereo Headphone Dante® Audio Interface



1. Introduction

The AVN-AH8 multi-channel headphone amplifier is a 1U rack-mount which distributes 2 sets of stereo audio to up to 8 different sets of headphones, fed from the Dante AoIP network. A typical application might be to provide common headphone feeds for guests in a radio studio, coming directly from the AoIP network, or a bilingual application where some users need a different feed to others.

Each output has front panel unbalanced 1/4" & 3.5mm jack sockets and a rotary level control. The front panel potentiometers adjust the headphone volumes from mute (fully anticlockwise) to 0dB of gain when fully clockwise. This is useful if the Dante stream level is low or high and requires adjusting.

There are 8 parallel 1/4" jacks on the rear panel, for ease of wiring if the unit is installed in an enclosed rack.

Each of the 8 professional headphone outputs can each select between 2 stereo Dante sources which are routed via Dante controller. The level of each stereo Dante stream can be adjusted ± 12 dB using one of the two front panel

rotary controls. The unit supports AES67 operation and is Dante Domain Manager compliant.

The AVN-AH8 front panel contains a power (PoE) LED, a DC LED, a network link status LED, and a clock LED. A recessed reset switch is also provided.

The unit is powered via Power over Ethernet (PoE) or a 12VDC input via a locking 2.5mm DC Input, 2A minimum rating.

Typical applications are to provide common headphone feeds for guests in a radio studio, or a bilingual application where some users need a different feed to others.

Features

- 8 x front panel 1/4" & 3.5mm jack sockets.
- 8 x parallel connections on rear panel
- 8 x volume control potentiometers.
- Switch selection for each headphone output between 2 dual-channel Dante sources.
- 2 x master level controls, one for each stereo Dante input.
- 1 x RJ45 Dante connector (100 Mb/s Ethernet Port).
- PoE, Link, DC and Clock LED status indicators.
- Configuration using Dante Controller.
- AES67 operation & Dante Domain Manager compliant.
- Powered by PoE or DC.
- 1U 19" rack-mount form factor.

The Dante sample rate can be configured between the following options via Dante Controller:

- 44.1kHz
- 48kHz
- 88.2kHz
- 96kHz



2. Controls, Indicators & Connections

This section describes the operational controls and indicators on the front and rear of the product, such as LED descriptions, functions and connector pin-outs.

Front Panel



Fig 2-1: AVN-AH8 Front Panel

Status LEDs

On the left-hand side of the front panel are the status LEDs and reset button.

Clock - The clock status LED is illuminated green when the device is a PTP master or synced to a valid PTP master.

PoE - The PoE status LED is illuminated when power over Ethernet is available.

Link - The link status LED is illuminated when the device is connected to a valid network.

DC - The DC status LED is illuminated green when a valid DC input is connected.

Reset Button

In the unlikely event that the unit fails to respond, press the Reset button to reboot it. This does not remove the Dante Controller configured settings.



Fig 2-2: AVN-AH8 Indicators and Reset



Fig 2-3: AVN-AH8 Master Level Adjust



Fig 2-4: AVN-AH8 Headphone Volume, Source Selection & Headphone O/P

Master Dante Input Level Adjustment

At the right end of the front panel are two linear potentiometers with centre detents. The left potentiometer adjusts the master level of source 1 (Dante channels 1&2) and the right potentiometer adjusts the master level of source 2 (Dante channels 3&4).

Each stereo Dante source can be boosted, or attenuated by 12dB, allowing level equalisation prior to the distributed headphone outputs.

Headphone Volume

For each headphone output, there is a logarithmic potentiometer giving volume adjustment from 100% to mute.

Source Selection Switch

Each headphone output has a source select switch, allowing you to listen to feed 1 (Dante channels 1&2) or feed 2 (Dante channels 3&4)

Headphone Output

The headphone output is provided on both ¼" and 3.5mm jack sockets. It is recommended to only connect one set of headphones to each headphone output.

Pin	Function
Tip	Left
Ring	Right
Screen	Chassis Ground/Screen

Rear Panel Connections

The rear panel of the device provides access to all the inputs and outputs. It provides the DC power input and Ethernet connections, as well as ¼” parallel outputs of the front panel jack sockets, to make cable routing tidier in installed applications.



Fig 2-5: AVN-Rear Back Panel

Each of the headphone outputs can be routed in Dante Controller, to receive AoIP streams. The source of each headphone position is selectable (between 2 stereo feeds) using the front panel toggle switch.

The headphone output line up is +18dBu when a 0dBFS full scale signal is routed from the AoIP network, the headphone channel is set to full volume, and the master level is set at the centre (0dB) position. The master level then gives ±12dB of adjustment for audio that is too low/high on the Dante network.

The headphone outputs have the following pin-out:

Pin	Function
Tip	Left
Ring	Right
Screen	Chassis Ground/Screen



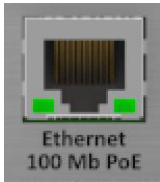


Fig 2-6: Ethernet Connector

Ethernet Dante® Connection(s)

On the right-hand side of the rear panel is a single Ethernet/PoE connection. The Ethernet connection provides PoE and networking capability. There are two status LEDs on the connector. The left LED indicates the link speed, the right indicates link activity

Left LED Link Speed	Off	Green
	10Mbps	100Mbps

The LED on the right indicates traffic on the connection. When the LED is flashing Green, data is being transmitted/received.



Fig 2-7: DC Power Input

DC Power Input

The AVN-AH8 can be powered by PoE and/or using a DC power adapter.

The rear panel DC input uses a 2.5mm pin connection with the positive voltage on the centre pin. The DC supply is 12V nominal (10-14V) and has protection if an invalid supply is connected.



3. Dante Controller

Dante Controller is used to create connections between Dante enabled devices on the network. This section will help you get up and running. However for more detailed documentation it is recommended that you visit the official Audinate documentation page at:

<http://dev.audinate.com/GA/dante-controller/userguide/pdf/latest/>

Download and Install Dante Controller

The Dante Controller application can be downloaded from the official Audinate website. You will have to create an Audinate account if you don't have one already:

<https://www.audinate.com/products/software/dante-controller>

On the website you will notice the download section towards the right-hand side of the web page.

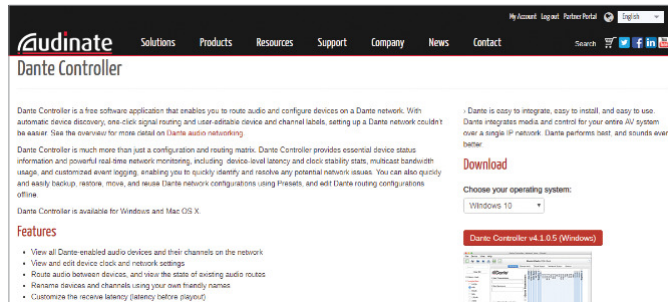


Fig 3-1: Dante Controller Download Web Page

Select your operating system and click the red button, this will take you to another page with the correct download file.

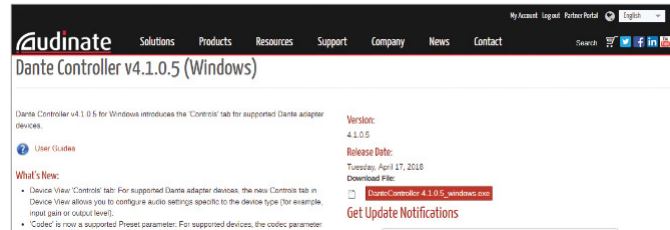


Fig 3-2: Download Dante Controller Installer

Click the red button to download the installation file. The installer will be downloaded. Open the installation file and follow the on-screen instructions. After the installation is complete open the start menu and type:

apps: Dante Controller

Press 'enter' on the keyboard and Dante Controller will open.

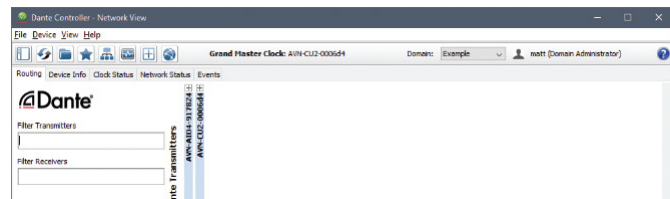


Fig 3-3: Dante Controller Application Window

Configuring a Device

In order to open the 'Device View' window for a device in Dante Controller, double click the name of that device in the routing grid.

Device Name

To change the device name, open the 'Device View' window and click on the 'Device Config' tab.

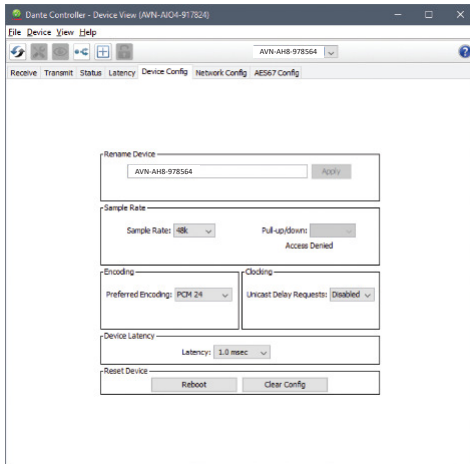


Fig 3-4: Device Config Tab

In the 'Rename Device' field you can change the name that appears in Dante Controller for the device. Change the name in the field and click apply. The name is then updated in the routing grid.

Channel Labels

The labels of transmit and receive channels can also be changed. By default, the channels are labelled with numbers.



Fig 3-5: Device with Default Labels

Open the 'Device View' window, and navigate to the 'Receive' or 'Transmit' tab. Within the 'Receive' tab enter the new channel label in the 'Channel' field.

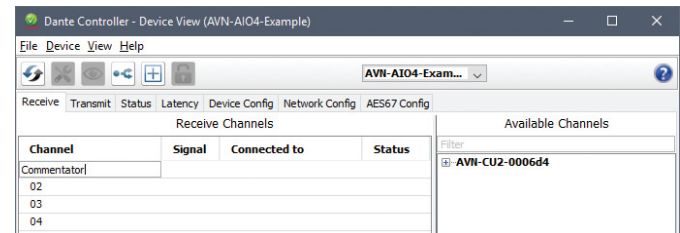


Fig 3-6: Changing Receive Label

Within the 'Transmit' tab the names of labels are instead entered in the 'Channel Label' field.

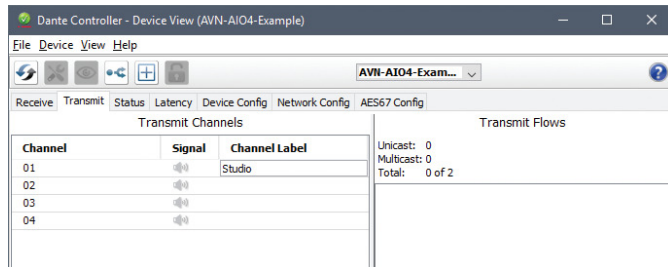


Fig 3-7: Changing Transmit Label

After the desired changes have been made the configuration window can be closed. The changes made are then reflected in the routing grid.

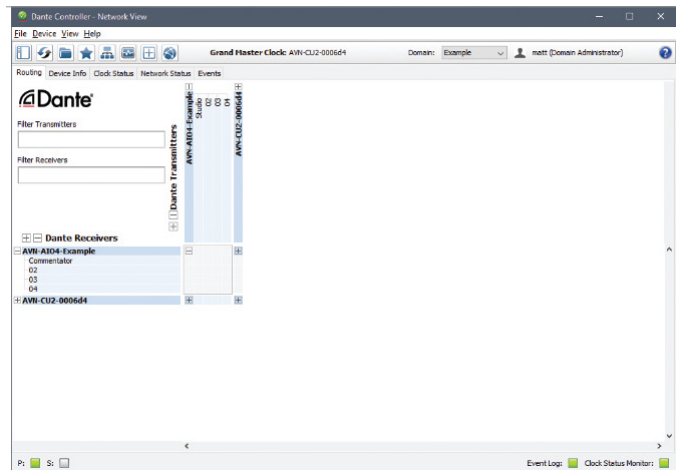


Fig 3-8: Channels with Updated Labels

Filtering Devices

When there are a large number of devices on a network it could take a while to look through all the transmitters and receivers to find the right one. Therefore, filters are available which allow the user to sort through the devices and find the device they need quickly.

By pressing the icon shown in the top left-hand corner the filter pane can be shown or hidden. Within the filter pane various different filters are displayed.

The sample rate section is expanded in this example and '48k' is selected to filter only devices with a sample rate of 48kHz.

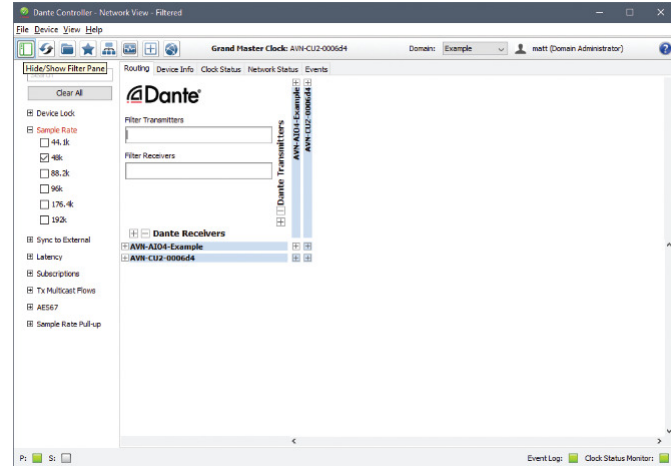


Fig 3-9: Showing the Filter Pane

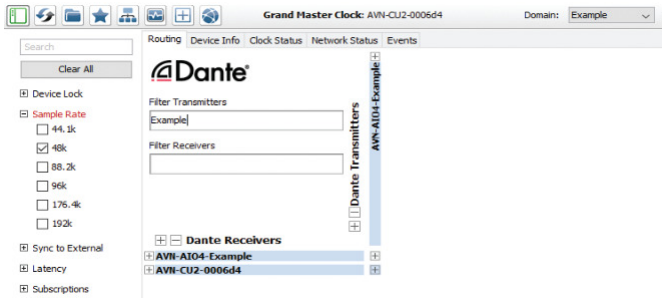


Fig 3-10: Filtering Transmitters

Transmitters can be filtered by typing into the 'Filter Transmitters' field, in the example 'Example' is typed and devices which include this in their name are filtered.

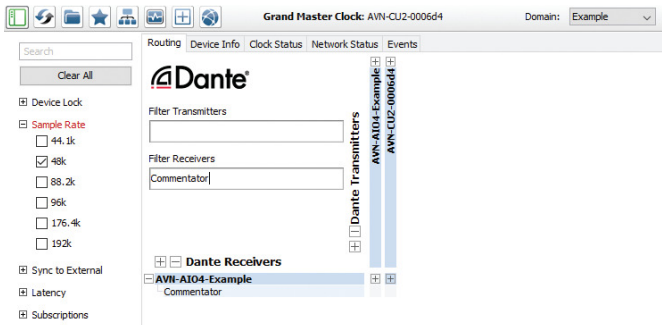


Fig 3-11: Filtering Channels

These two fields can also filter the channels of transmitters and receivers. Typing 'Commentator' into the 'Filter Receivers' field all channels with 'Commentator' in their name are displayed.

Routing Audio

Routing audio between two Dante devices is simple. Click on the box at which a transmit and receive channel meet.

In the example '01@AVN-CU2' is routed to 'Commentator@AVN-AI04-Example'. Initially an hour glass icon is shown on the square to indicate a routing is pending. After a short time this then changes to a green circle with a tick in it to show the routing has been made successfully.

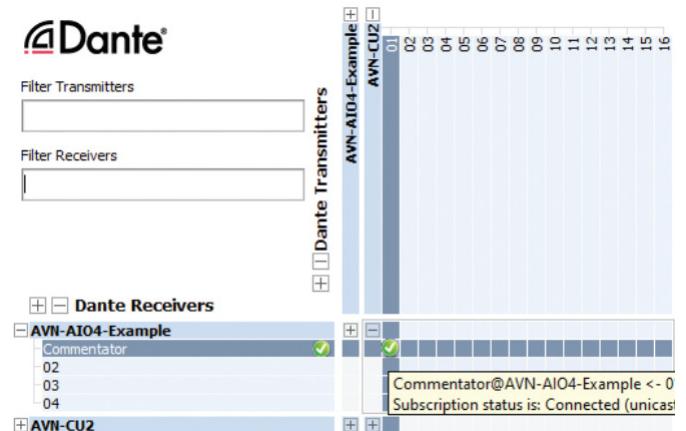


Fig 3-12: Simple Routing

Multiple channels in a diagonal line can be routed at once by holding 'Ctrl' down and pressing on the box with a minus sign.

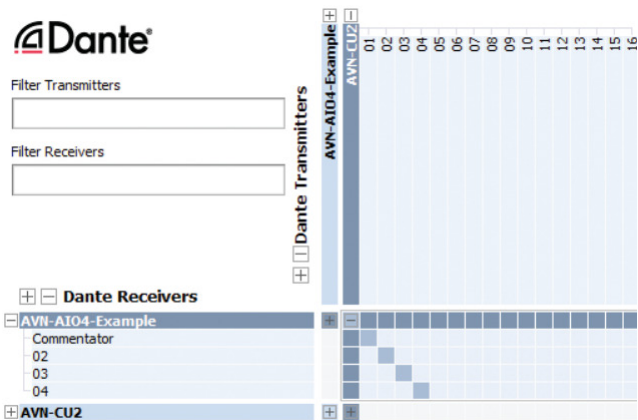


Fig 3-13: Quick Routing Before

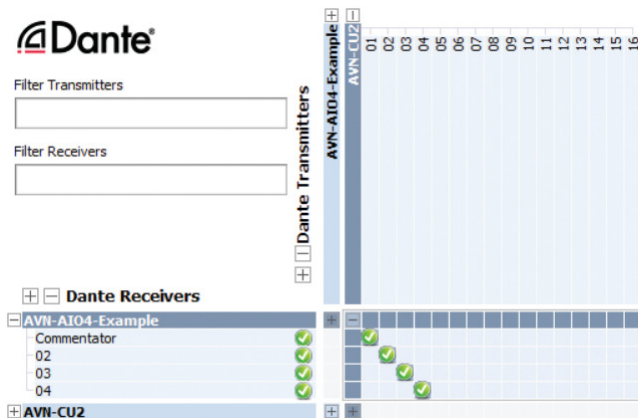


Fig 3-14: Quick Routing After

Clock Synchronisation

The clock synchronisation can be checked in the ‘Clock Status’ tab.

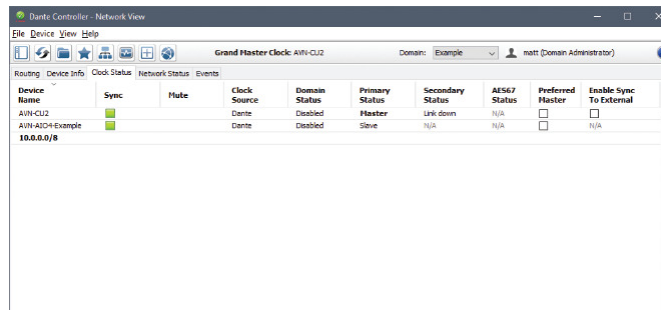


Fig 3-15: Clock Status Tab

The status of the PTP clocking between devices keeping audio in sync can be checked here. The ‘Primary Status’ field tells the user whether their device is a PTP master or a PTP slave. A master device provides a clock which all slave devices on a network remain in sync with. The master device is selected using the best PTP clock algorithm. If you wish a certain device to be the master however then the ‘Preferred Master’ checkbox can be selected.

On devices with the AES67 mode enabled an ‘AES67 Status’ is also displayed. A device with AES67 mode enabled will act as a boundary clock linking the AES67 network to the Dante network. If an AES67 only device is setup as a master clock, a Dante device acting as a boundary clock will sync to the AES67 master and then provide a master clock to any Dante only devices.

AES67 Compatibility

Dante devices with AES67 compatibility will have an 'AES67 Config' tab within the 'Device View' window.

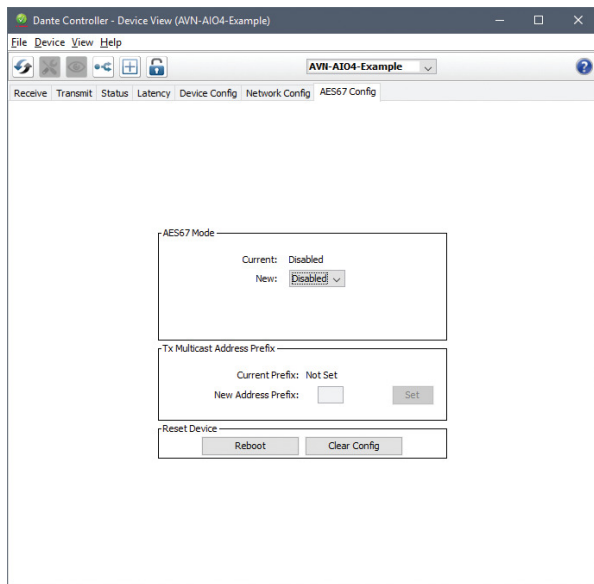


Fig 3-16: AES67 Config Tab with AES67 Mode Disabled

This is 'Disabled' by default. Select 'Enabled' from the dropdown menu to enable this mode. This option will not be available if the device is part of a Dante domain. A warning will be displayed asking you to confirm the change, and that the device must be rebooted before the changes are made.

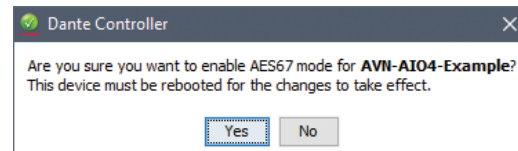


Fig 3-17: Warning Message

Click 'Yes' to continue. Then reboot the unit by clicking the 'Reboot' button in the 'Reset Device' section of this tab.

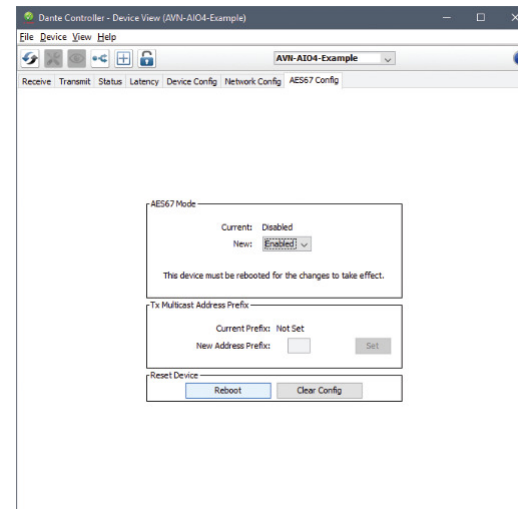


Fig 3-18: Reboot Device

Another warning message will be shown asking you to confirm the reboot procedure.

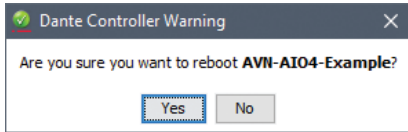


Fig 3-19: Reboot Warning Message

Again, click 'Yes' if you would like to continue. The device will reboot and upon re-entering the 'AES67 Config' tab you will see that AES67 mode is now enabled. Also note that the prefix address used for multicast is set to '69' by default.

To route audio from an AES67 device to a Dante device with AES67 mode enabled, first ensure that the multicast address of the source AoIP stream has the same prefix as the device you would like to route it to. By default the prefix is '69' so the multicast address of the AoIP stream should be 239.69.X.X where the value of X can be any number between 0 and 255. Then you should make sure the address is not used more than once otherwise AoIP streams will clash.

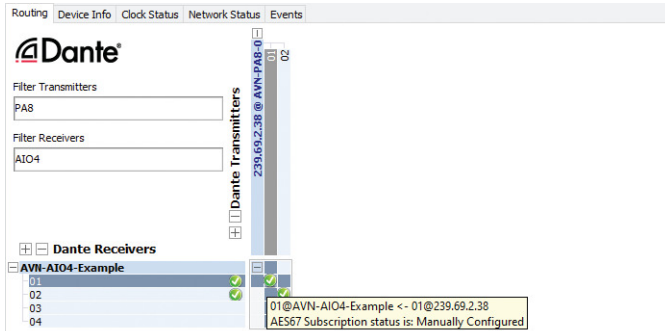


Fig 3-20: AES67 Stream Routing

In the example an AES67 stream 'AVN-PA8-0' on the multicast address '239.69.2.38' is routed to channels '01' and '02' on the device 'AVN-AIO4-Example'.

To create AES67 transmit streams first open the device configuration window, and click on the 'Create Multicast' flow icon. Alternatively hold 'Ctrl' and press 'M', the 'Create Multicast Flow' window will then open.

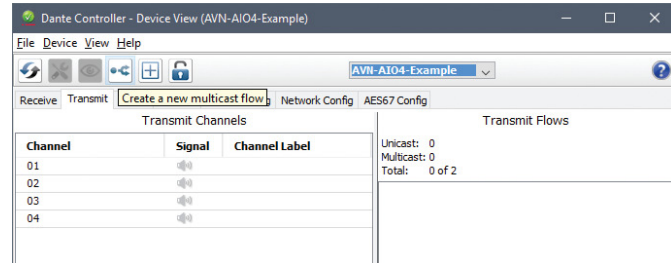


Fig 3-21: New Multicast Flow Icon

In the 'Create Multicast Flow' window select the 'AES67 Flow' checkbox and select the channels you would like to add to the multicast flow.

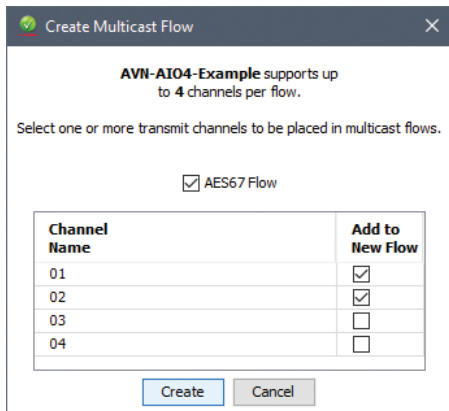


Fig 3-22: Create Multicast Flow Window

In the example the channels '01' and '02' are added to the AES67 multicast flow, the 'Create' button is then clicked.

The 'Transmit' tab of the device configuration window will show the new multicast flow in the 'Transmit Flows' side pane. This also shows the multicast address of the multicast flow.

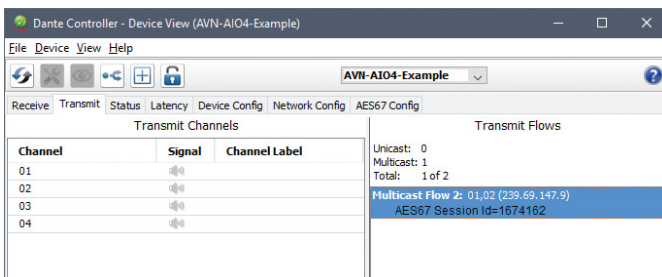


Fig 3-23: Multicast Flow in Side Pane

In the example 'Multicast Flow 16' is created and has a multicast address of '239.69.147.9'.

The multicast flow can then be added to AES67 devices. In the example below the multicast flow is added to an AVN-Portal.

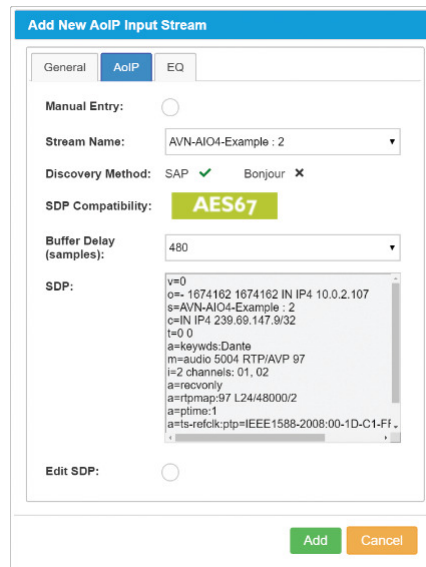


Fig 3-24: Adding the Multicast Flow to an AES67 Device, e.g. an AVN-Portal

The stream name is the name of the device followed by the flow number, in this case '2'. The SDP compatibility shows it is AES67 compatible.

Network Troubleshooting

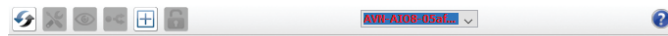
The device can be seen within Dante® Controller if it is connected to the same network as the computer. If the device doesn't show up in Dante® Controller please check that the connection to the network is correct and that the device and computer are on the same network.

If the computer and the device are on different IP subnets, the device will appear in Dante® Controller with red text:

Device Name	Sync	Mute	Clock Source	Domain Status	Primary Status
AVN-AIO8-05afa0	■		Dante	N/A	N/A
Matt-PC	■		Dante	N/A	Slave
Recording-Studio	■		Dante	N/A	Master

Fig 3-25: Red Device Name Indicates Different Network Subnet

Opening the **Device View** for the device will provide details about the problem.



Dante Controller has discovered an address for device 'AVN-AIO8-05afa0' that does not match the subnet configuration of the local Dante interface 'Ethernet 2'.

Possible causes of this problem include:

- Multiple DHCP servers on the network
- Using a static IP address on a local interface that is on a different subnet to the DHCP address obtained by the device

Details:

- Resolved device address on Dante interface is 192.168.1.200
- Local address on Primary Dante interface 'Ethernet 2' is 10.0.60.1/255.0.0

Fig 3-26: Problem Details

In this example notice the device is on the 192.168.1.X subnet and the computer is on the 10.X.X.X subnet. To correct this, edit the computer's IP address.

In Windows 10, type **View Network Connections** into the search bar. Right-click the network that the device is connected to and select **Properties**.

Double click **Internet Protocol Version 4 (TCP/IPv4)** in the item list and edit the IP address.

Obtain an IP address automatically
 Use the following IP address:

IP address:
 Subnet mask:
 Default gateway:

Fig 3-27: Windows IPv4 Settings

Save the changes made to the settings then close and re-open Dante® Controller. The device should now appear correctly. If the device name is still red, you may need to disable the other network connections on the computer. To do this, in Windows 10, type **View Network Connections** into the search bar. Right-click the network connection to disable and select **Disable**.

Now that the device appears in Dante® Controller, it can be configured and the network settings can be modified so that the device is in the correct subnet.

Open the Device View for the device and select the Network Config tab. Within this tab are options to obtain an IP address automatically, or to configure an IP address manually.

After configuring the devices address, click the Reboot button and then revert your computers IP address so that it is on the original subnet using the process above.

Addresses

Obtain an IP Address Automatically (default)

Manually configure an IP Address

IP Address: . . .

Netmask: . . .

DNS Server: . . .

Gateway: . . .

Reset Device

Fig 3-28: Dante Controller Network Config

For more troubleshooting information please see the official Dante® FAQs at:

<https://www.audinate.com/resources/faqs>

And Dante® Controller User Guide at:

<https://dev.audinate.com/GA/dante-controller/userguide/pdf/latest/>

4. Technical Specification

Network and AoIP

Aoip Standard	Dante
Number of Channels	4 receive
Number of Streams	2 receive
Sample Rates	44.1kHz, 48 kHz, 88.2kHz, 96kHz
Encoding Format:	Linear PCM, 16, 24 or 32 bit
AES67 Support:	Yes
Connectivity:	1 x RJ45
Speed:	100Mbps
Dante Domain Manager Ready	Yes

PoE Power

Standard	802.3af
Class	0
PD Power Range	0.44 W to 12.94 W
Typical PSE Power Usage	6 W
Max PSE Power Usage	15.4 W

Front Panel Connections & Controls

LED Indicators	Clock LED – indicates valid clock on AoIP network PoE LED – indicates power presence Link LED – indicates network link status DC LED – indicates DC power applied
Reset	Recessed system reset button
Headphone Outputs:	8 x dual 1/4"/3.5mm jack sockets
Headphone Output Volume Controls:	8 x dual log potentiometers
Headphone Input Source Selection:	8 x toggle switches for individual source selection between two stereo inputs

Input Level Controls:	2 x dual linear potentiometers, 1 for each set of stereo inputs
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Rear Panel Connections

Parameter	Description
Network	Ethernet port (100Mbps capable) for data and PoE connection
Headphone Parallel Outputs:	8 x ¼" jack sockets for parallel headphone outputs 1-8
DC Power in:	1 x Locking 2.5mm DC Input, 2A minimum rating. 12V nominal ±2V

Headphone Input Specifications

Master Level Adjustment	±12dB
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Headphone Output Specifications

Parameter	Description
Output Impedance:	Capable of driving 150mW into 32Ω to 600Ω headphones
Maximum Output Level:	+18dBu unclipped
D to A Line-Up:	0dBFS = +18dBu (Volume = 100%, Master level = 50% = 0dB)
Volume Pot Range	-80dB (Volume = 0%) to 0dB (Volume = 100%)
Frequency Response:	20Hz to 20kHz, +0/-0.5dB (ref 1kHz)
THD+N:	<0.07%, -10dBFS input, volume = 100%, master level = 50% = 0dB, 20Hz to 20kHz, 20kHz BW
Dynamic Range:	108dB, volume = 100%, master level = 50% = 0dB, 20kHz BW
Crosstalk:	<-95dB @ 1kHz

Headphone Jack Output Pin-out

Pin	Function
Tip	Left
Ring	Right
Screen	0V Common

Equipment Type

AVN-AH8	8 Stereo Analogue Headphone Outputs Dante Interface, PoE + DC
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Physical Specification

Dimensions (Raw):	48cm (W) x 11cm (D) x 4.3cm (H)(1U)19" (W) x 4.3" (D) x 1.7" (H)
Dimensions (Boxed):	58.5cm (W) x 22.5cm (D) x 7cm (H) 23" (W) x 8.9" (D) x 2.8" (H)
Weight:	Nett: 1.4kg Gross: 2.0kg Nett: 3.1lbs Gross: 4.4lbs

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