



**Application
note**

**Intercom audio connection between a Grass
Valley camera XCU and a Clear-Com matrix
system using SMPTE 2110-30 and AES67**

14 June 2018

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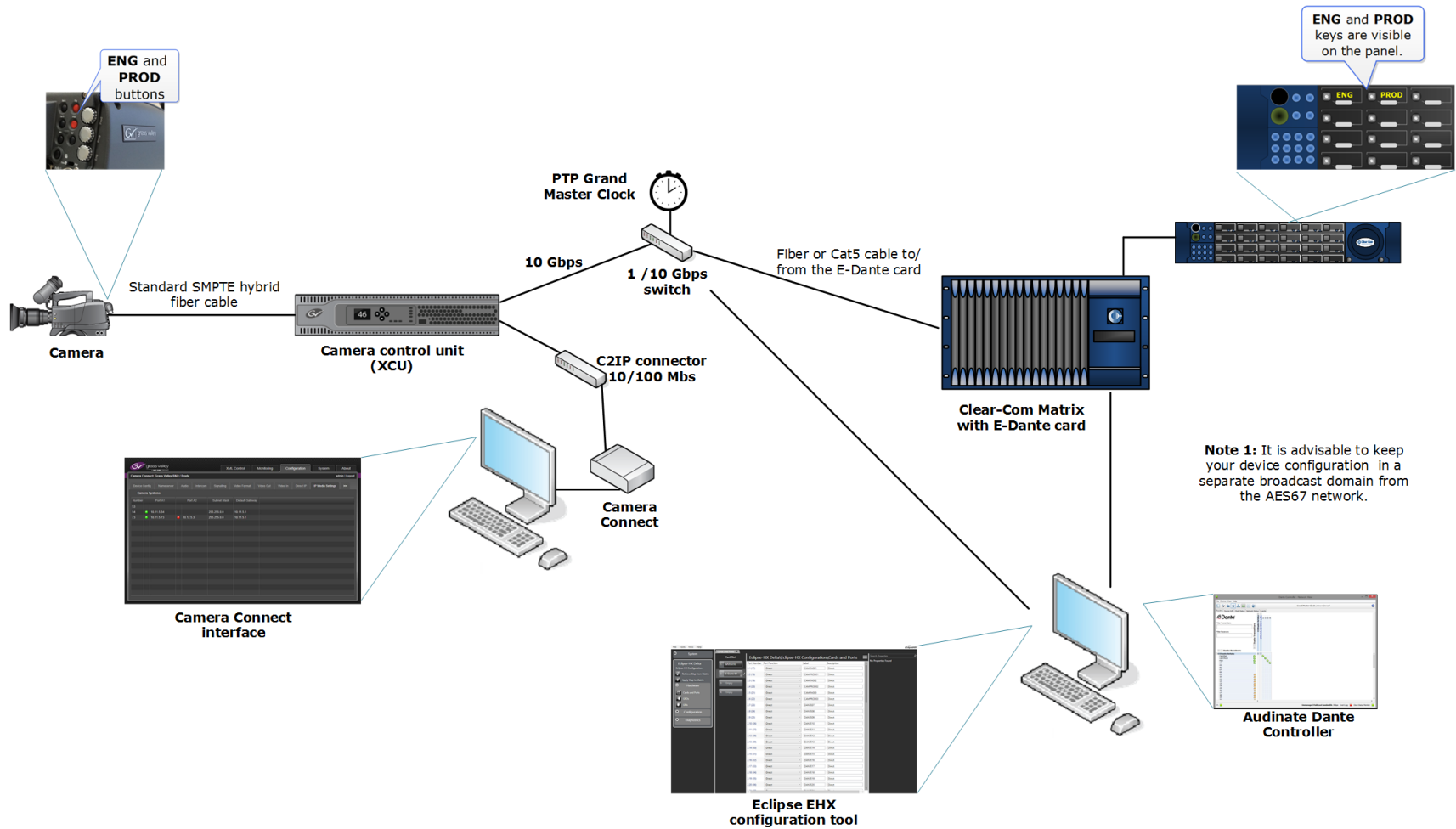
1 *Introduction*

This document assumes that the user has a basic familiarity with Grass Valley and Clear-Com equipment. It also assumes some understanding of networking.

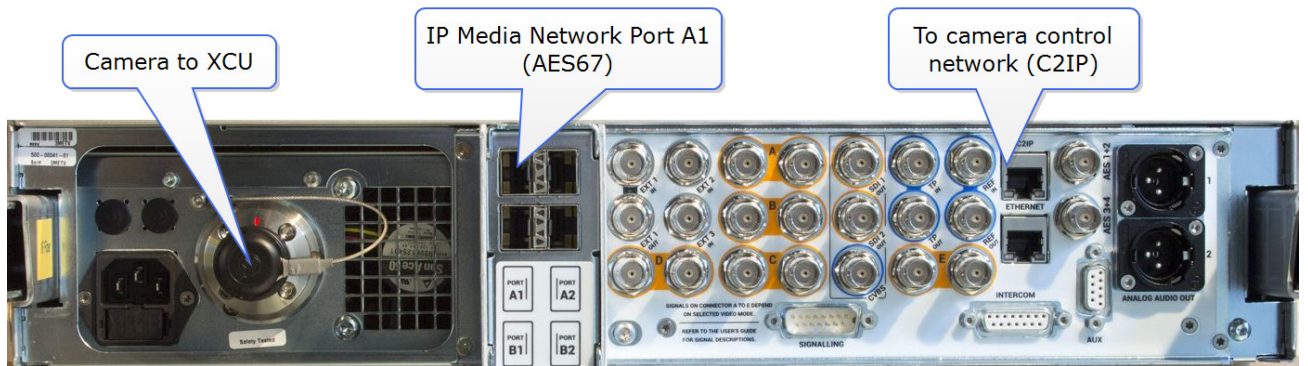
This example shows how to set up two audio routes (ENG, PROD) between a Grass Valley video camera and a Clear-Com panel using AES67.

Note: Some of the information in this document is subject to change and is beyond the control of Clear-Com. If in doubt, please check with the relevant company documentation.

2 Example set up

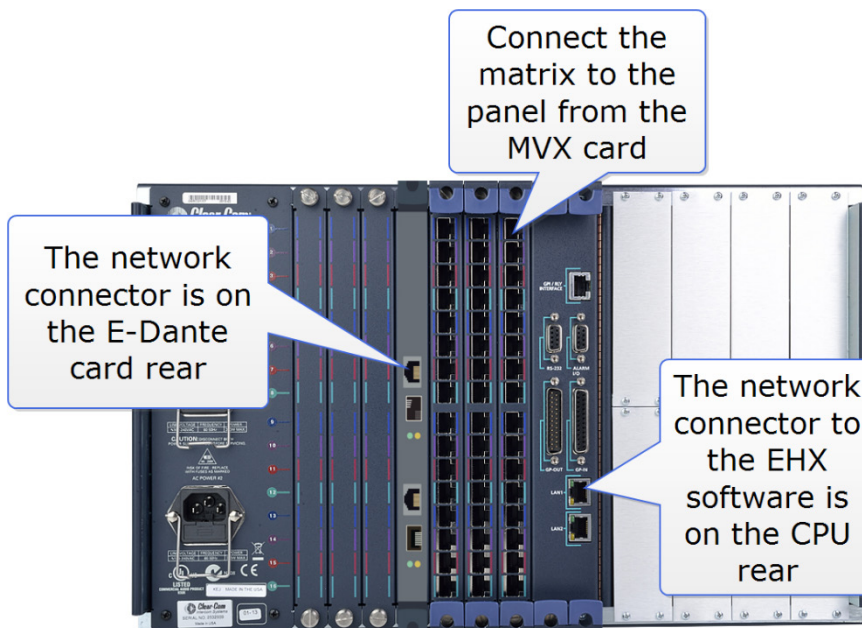


2.1 Cable connectors: XCU



For more information on setting up a Grass Valley camera in a network context see: [Application Note: Direct IP configuration](#).

2.2 Cable connectors: Clear-Com matrix



- Note:** It is advisable to keep your AES67 network separate from your device management network.
- Note:** The E-Dante card needs a 1 Gb port on the network switch. The XCU needs a 10 Gb port on the network switch (for video, audio and intercom). Control and setup are done via C2IP connector (10/100 Mbps).
- Note:** If you are installing an E-Dante card for the first time you must power the matrix down before installing the rear card. The front card is hot swappable (can be removed and inserted without power down).

- Note:** It is advisable to keep the layer 2 forwarding (number of switch hops) in your network to a minimum to avoid introducing latency.
- Note:** You need the Grass Valley UXF XCU 5.0 software and above in order to work with Dante SAP (SDP files).
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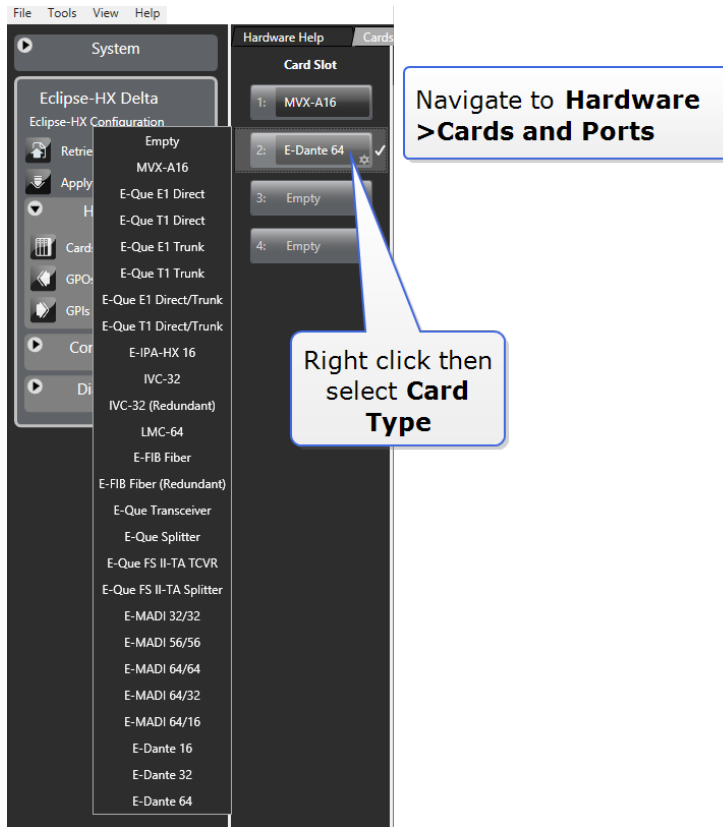
Once the equipment is set up and cabled according to the illustration the audio setup can be configured as follows.

3 Software configuration

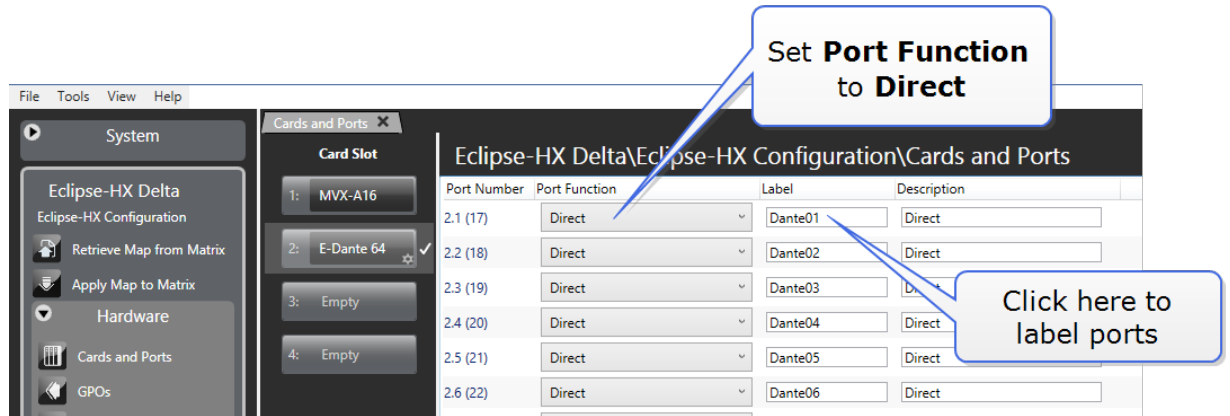
3.1 Configure the matrix settings

Open the EHX configuration software on the connected PC.

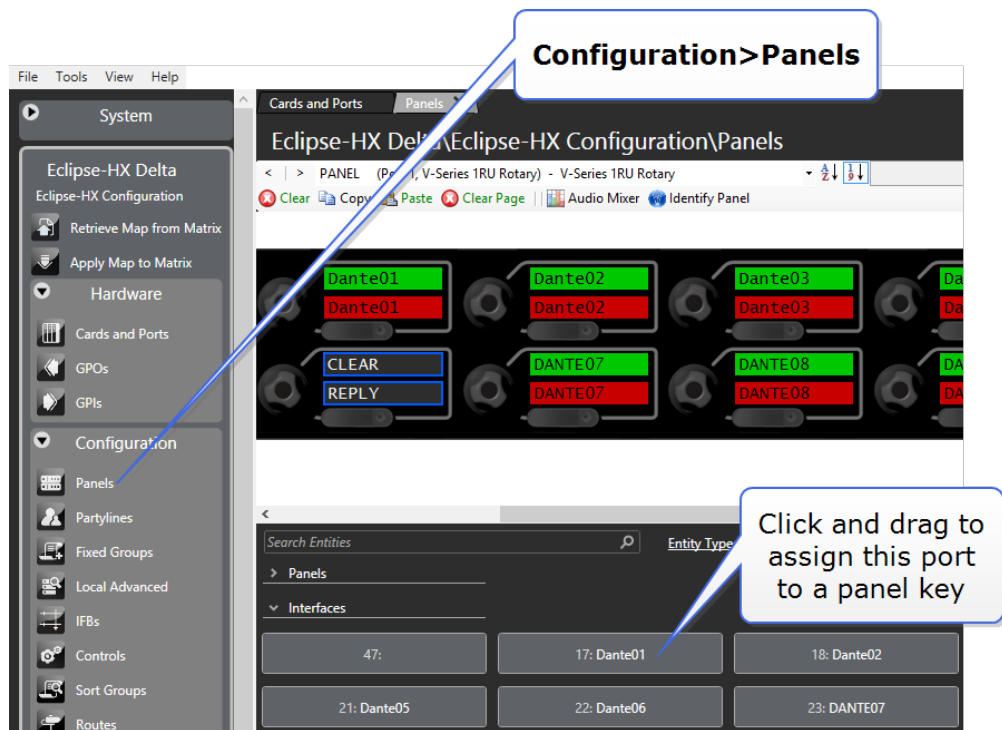
- 1) Select the card and set the card type and properties.



- 2) Declare the ports that you require. You will probably need a minimum of two ports per camera.



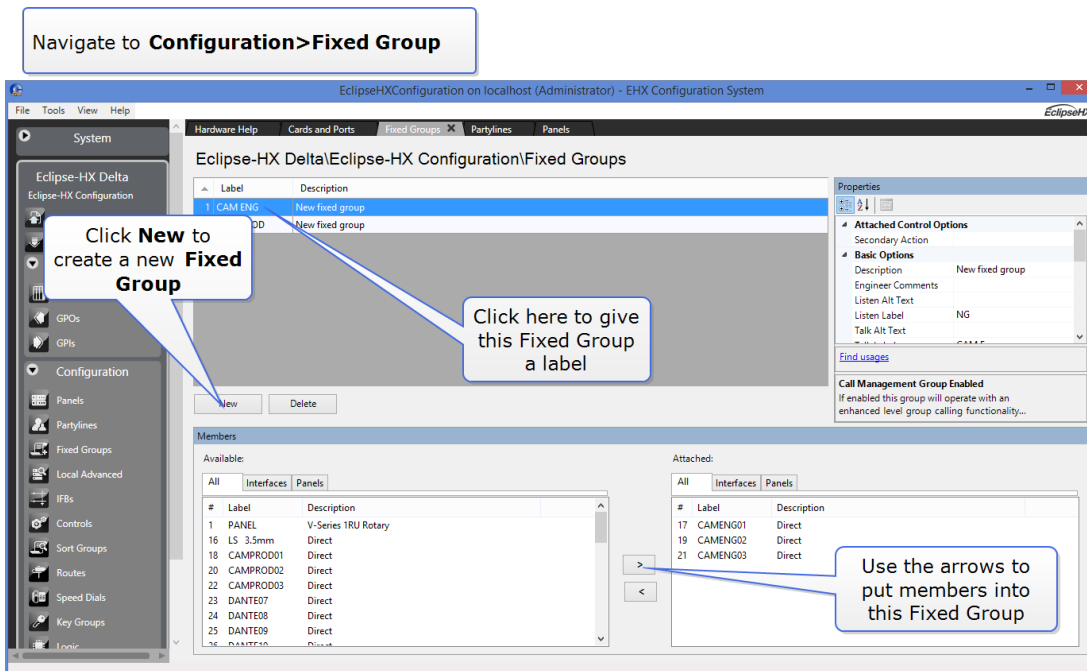
- 3) Assign the E-Dante ports to the panel.



Note: In this setup, the panel will take its labels from EHX. You will see the port labels that you have configured in step 2.

Note: To take labels from the Dante Controller use the Update Auto Alias feature (**EHX > Cards and Ports > E-Dante card > Port > Port Properties > Basic Options > Update Auto Alias**).

- 4) Click **Apply Map to Matrix**.
- 5) A common configuration for these ports is to add them as members to a Fixed Group or Partyline.
 - a) Fixed Group: the camera users hear the announcer but not the other camera users
 - b) Partyline: the camera users hear and can be heard by all members of the Partyline.



When you have created fixed groups or partylines, these can be assigned to a panel key in the usual way.

3.2 Configure E-Dante card settings

Open the Audinate Dante Controller on the PC.

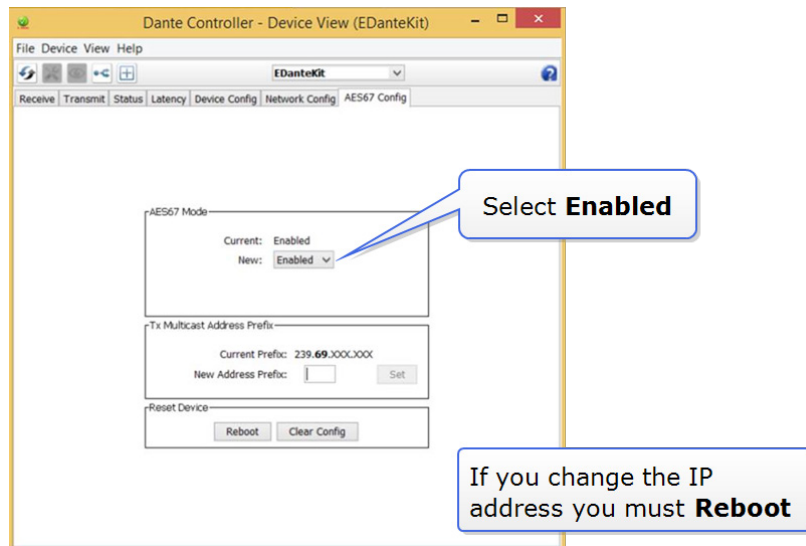
The Dante Controller will detect Dante enabled devices automatically. You will see the E-Dante card show in the **Routing** page of the Dante Controller.

Note: Dante will work with either DHCP or static IP addressing. Use DHCP unless you have a good reason to use a static IP address.

Label the channels. In the **Routing** page double click on the device to open **Device** view. Click on each channel (RX and TX) to label them.

3.2.1 Set up the AES67 streams

- 1) In **Device** view, select **AES67 Config** and **Enable** AES67.



2) Create new flows.

Click the Multicast button to create new flows

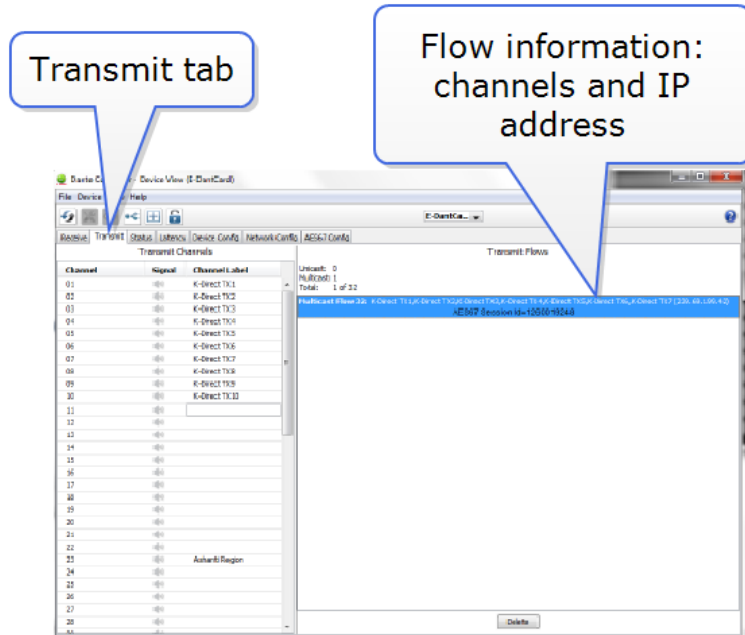
Click for AES67 flow

Add channels to the flow (up to 8 per flow)

Create the flow

Channel Name	Add to New Flow
01	<input type="checkbox"/>
02	<input type="checkbox"/>
03	<input type="checkbox"/>
04	<input type="checkbox"/>
05	<input type="checkbox"/>
06	<input type="checkbox"/>
07	<input type="checkbox"/>
08	<input type="checkbox"/>

- 3) As the flows are created you will be able to see them in the **Device>Transmit** page of the Dante Controller. On the right side of the screen you will see the stream information, which includes channel names and an IP address.

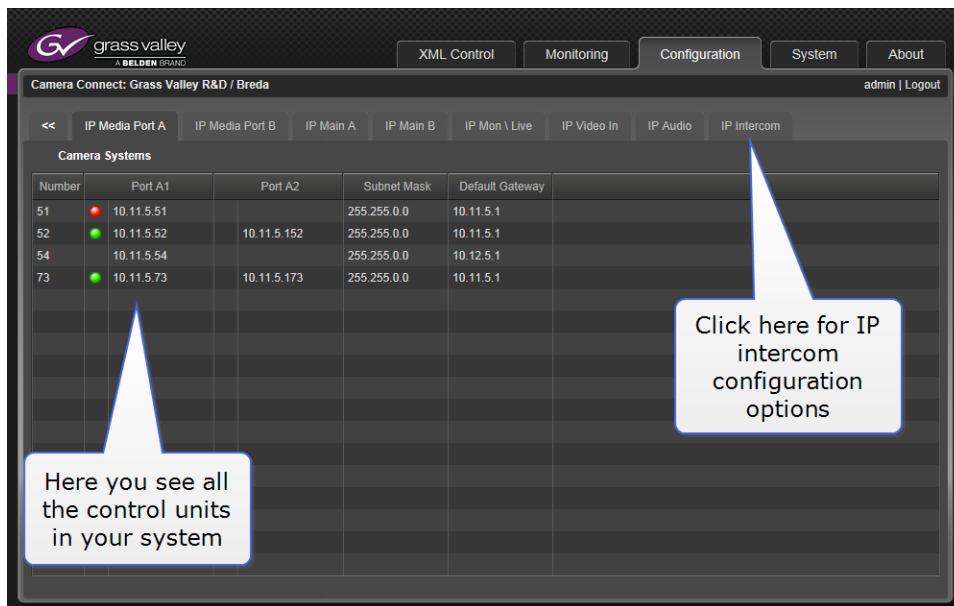


- 4) Make a note of the multicast IP address which you will see in the **Device>Transmit** page (239.XXX.XXX.XXX). You will need this for your Grass Valley configuration.

3.3 Configure the XCU (Camera Connect)

Open the Camera Connect configuration interface on the PC (username: **admin**, password: **admin**).

In the Camera Connect interface you will see all your control units.



- 1) Navigate to IP intercom configuration options (the camera must already be configured to receive IP intercom).

The screenshot shows the 'IP Intercom' configuration page for a camera system. The page title is 'Camera Connect: Grass Valley R&D / Breda'. The navigation tabs include XML Control, Monitoring, Configuration, System, and About. The sub-navigation tabs are IP Media Port A, IP Media Port B, IP Main A, IP Main B, IP Mon \ Live, IP Video In, IP Audio, and IP Intercom. The main content area is titled 'Camera Systems' and contains a table with the following data:

Number	Output (Port A)	Output (Port B)	Channels Out	Input	Port	Multicast Src	Channels In	Prog Src
51				IP				
52	Off 239.11.5.2 5004	Off 239.12.5.112 65535	8 1 ms	Analog	5002	239.11.5.11	8 3 ms	Intercom
54				Analog				
73	Off 239.11.5.11 5002	Off 10.12.5.11 5002	8 1 ms	AES67	5004	239.11.5.52	8 3 ms	Audio

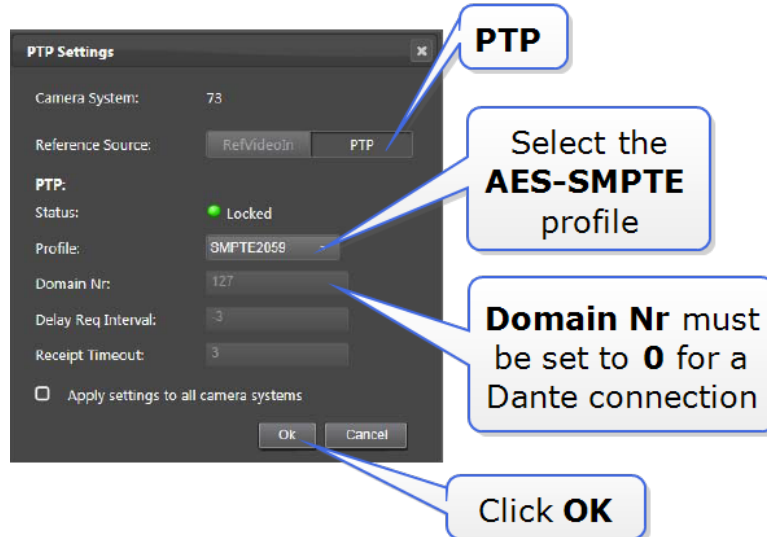
A callout box with a blue arrow pointing to camera 73 contains the text: 'Click on the camera you wish to configure for AES67 intercom'.

- 2) Set the device PTP profile

The screenshot shows the 'PTP' configuration page for a camera system. The page title is 'Camera Connect: Grass Valley R&D / Breda'. The navigation tabs include XML Control, Monitoring, Configuration, System, and About. The sub-navigation tabs are Device Config, Nameserver, Audio, Intercom, Signalling, Video Format, Video Out, Video In, Direct IP, PTP, and >>. The main content area is titled 'Camera Systems' and contains a table with the following data:

Number	PTP	PTP Profile	Offset to GM	Path delay
51				
52	●	SMPTE2059	127 -3 3	7 ns 7019 ns
54				
73	●	SMPTE2059	127 -3 3	-57 ns 7131 ns

Two callout boxes are present: one pointing to the 'PTP' tab with the text 'Click the PTP tab', and another pointing to a button in the row for camera 73 with the text 'Click to change profile'.



Note: For this setup, AES-SMPTE is a useful profile as this profile is suitable for both video and intercom audio.

3) Set the IP Intercom details

a) AES67 intercom IN

Input settings

AES67

Intercom

AES67 Intercom Out:

Enabled: Port A+B

Channels: 8

Packet Time: 1 ms

Port A output:

Dest. IP Address: 10.11.5.54

Dest. Port: 5005

Port B output:

Dest. IP Address: 10.12.5.34

Dest. Port: 5004

AES67 Intercom In:

Present: Yes

Port: 9000

Multicast: No Yes

Multicast IP: 239.0.123.70

Channels: 8

Buffer size: 3 ms

Apply settings to all camera systems

OK Cancel

Dante AES67 streams use port **5004** by default

Set to **Multicast**

Input the IP address found in the Dante Controller. See **Configure E-Dante card settings** point 4.

Set no. of channels. This number must match the number of channels set up in the Dante Controller. See **Configure E-Dante card settings** point 2.

b) AES67 intercom OUT

Output settings

Set to Port A

Set number of channels

Select 1ms (required)

Click OK

Edit IP Intercom

Camera System: 73

Source: AES67

Program source: Intercom Audio

AES67 Intercom Out:

Enabled: Port A+B

Channels: 8

Packet Time: 1 ms

Port A output:

Dest. IP Address: 10.11.5.54

Dest. Port: 5005

Port B output:

Dest. IP Address: 10.12.5.34

Dest. Port: 5004

AES67 Intercom In:

Present: Yes

Port: 9000

Multicast: No Yes

Multicast IP: 239.0.123.70

Channels: 8

Buffer size: 3 ms

Apply settings to all camera systems

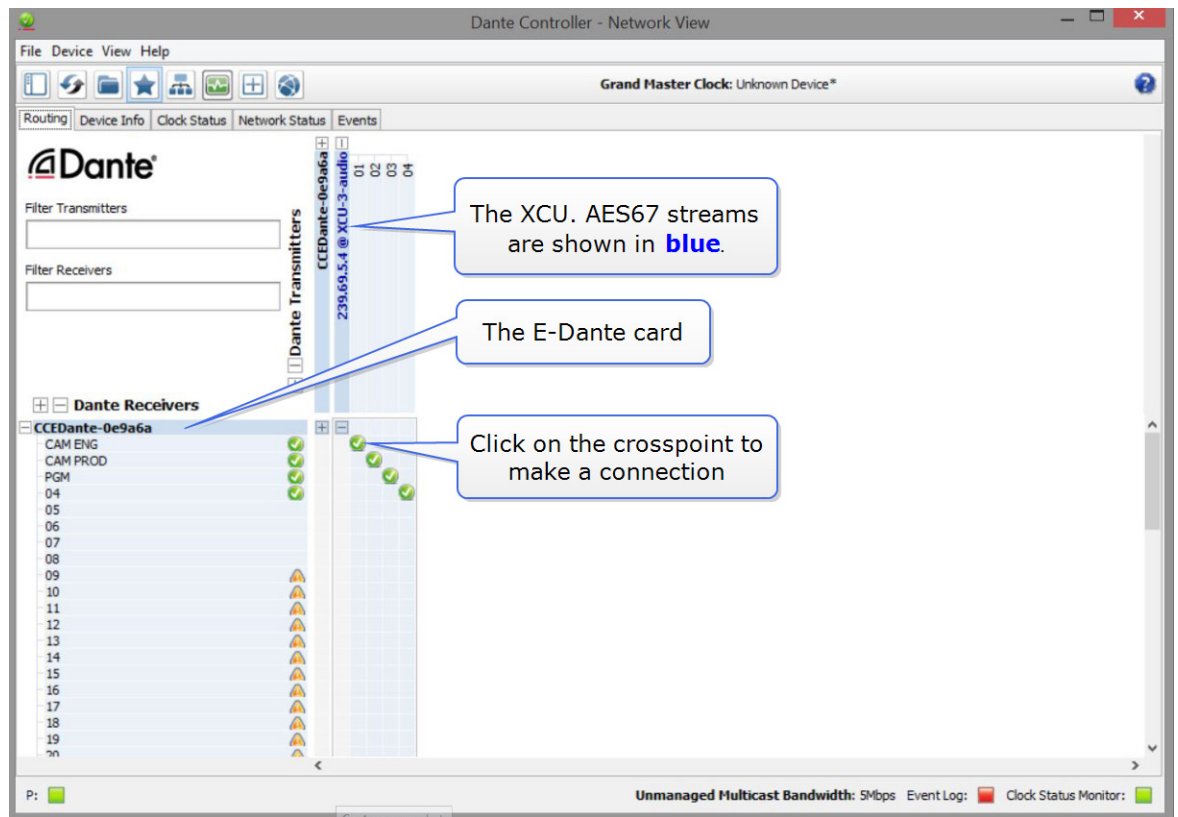
OK Cancel

Note: Packet Time and Buffer size are related settings. Buffer size 3 ms is good for 1 ms packet size. If the intercom stream is not synchronised (the light remains red or amber) try increasing the buffer size.

When the PTP profile and the IP intercom settings have been set, a green light should be seen in the PTP and Intercom IP tabs. These indicate that connection has been successful.

3.4 Make audio connections in the Dante Controller

- 1) Open the Dante Controller on the PC. You should now see the AES67 transmitter in the Routing page.



3.5 General troubleshooting

3.5.1 The Ravenna-2-SAP application

When configuring AES67 streams, you may find the free Ravenna-2-SAP application (<https://www.ravenna-network.com/aes67/rav2sap/>) useful.

Use this app to inspect the Session Description Protocol (SDP) element of your source files. This can provide useful information to enable the handshake between devices.

3.5.2 Network switches: general guidelines

- Enable IGMP snooping for multicast devices
- Enable QoS

In addition to the above, to minimize offset delay from the Grand Master Clock consider these measures:

- Minimize layer 2 forwarding (switch hops)
- Use PTP aware switches

Note: AES67 uses IEEE1588-2008 Precision Time Protocol (v.2 PTP) to ensure synchronization between devices.

Note: Dante devices use Session Announcement Protocol (SAP). Grass Valley supports SAP.

3.5.3 Latency in Dante

In the Dante Controller, latency should be set as high as possible in the first instance. This is because the Dante Controller will not transmit if the latency is not within its specified range. This setting can be reduced later, when the latency range has been established.

To set latency go to **Dante Controller>Device>Latency**.