See the possibilities

Multi-Streaming Camera Connection Guide

for GigE Cameras

Document Version: 1.2
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Thank you for purchasing this product.

⚠Be sure to read this documentation before use.

This documentation includes important safety precautions and instructions on how to operate the unit. Be sure to read this documentation to ensure proper operation.

The contents of this documentation are subject to change without notice for the purpose of improvement.

Table of Contents

Introduction

This guide will explain how to set up multi streaming on multi-sensor cameras (e.g. Fusion series, Sweep+ series) with GigE interface using eBUS Player for JAI.

Notes:

- For instructions on how to use the camera, refer to the User Manual available for download from the JAI website (www.jai.com).
- For more information about eBUS Player for JAI, refer to eBUS Player User Guide available for download from the JAI software page (https://www.jai.com/supportsoftware/jai-software).

Install eBUS SDK for JAI (First Time Only)

When using the camera for the first time, install the software for configuring and controlling the camera (eBUS SDK for JAI) on the computer.

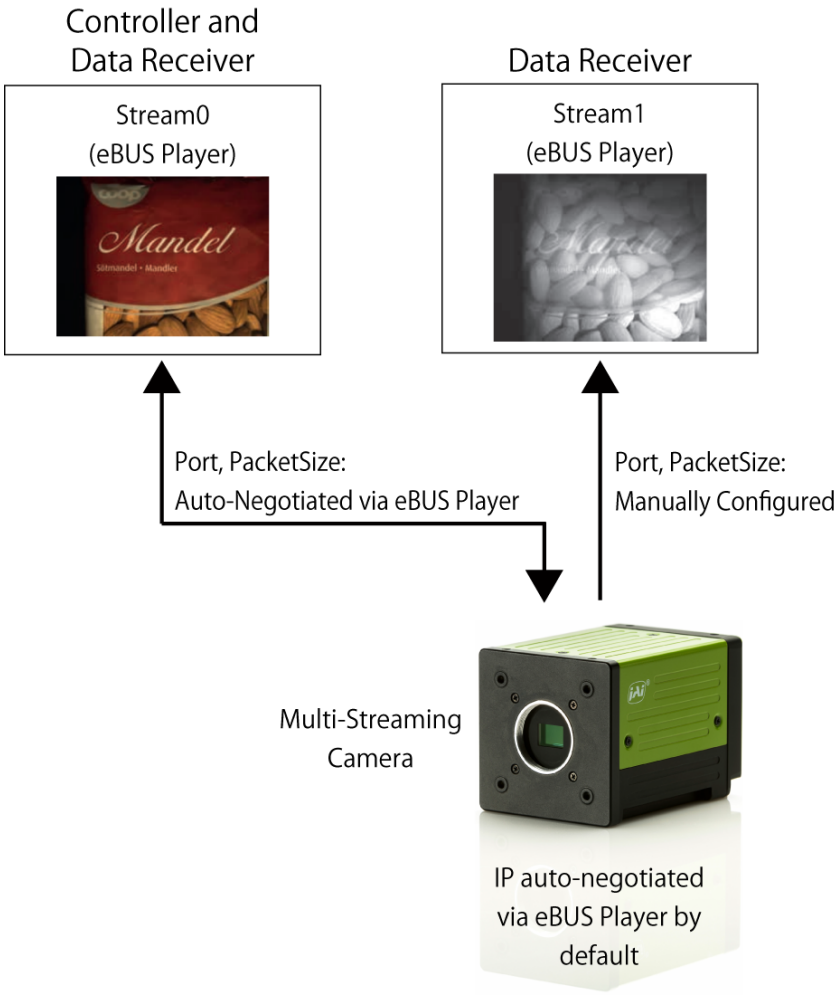
Note: When you install eBUS SDK for JAI, eBUS Player for JAI will also be installed.

1. Download the eBUS SDK for JAI from the JAI website (https://www.jai.com/support-software/jai-software).
2. Install eBUS SDK for JAI on the computer.

Dual Streaming Cameras

This chapter shows how to set up dual streaming on a multi-sensor camera using eBUS SDK for JAI.

> **Note:** The number of streamings on your camera can be found on **DeviceStreamChannelCount** [DeviceControl].



> **Notes:**
> - If you use multiple cameras, please refer to our article on setting the correct Packet Delays: https://support.jai.com/hc/en-us/articles/360010698019-Multiple-cameras-on-a-single-network
> - To set up a persistent IP address, please refer to our relevant Technical Note: https://www.jai.com/uploads/documents/Technical-notes/English/TNE-0028-20200324-00-TechNote-PersistentIP_eBus.pdf

How to Set Up

To configure two streams (for example, RGB and NIR) on a dual streaming camera, we need to open "two" separate eBUS Player windows.

Configure eBUS Player Role

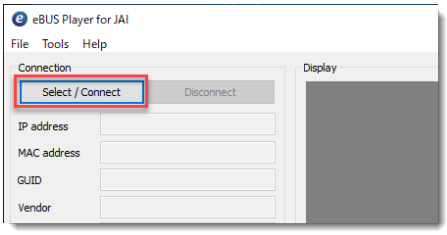
In the first steps, we will connect to the camera from the Stream0 window and configure Stream1's **eBUS Player Role** as **Data Receiver**.

> **Note:** Stream0's **eBUS Player Role** is automatically set to **Controller and Data Receiver** by default.

Stream0

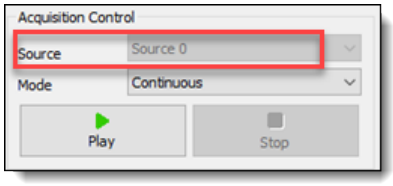
First, go to Stream0's window.

1. Open **eBUS Player for JAI**.
   Click **Select / Connect** to open the **Device Selection** dialog.



   In the Device Selection dialog, select the camera and click **OK** to connect to the camera.

2. In the eBUS Player window, ensure that **Source** is set to **Source0** (Acquisition Control).



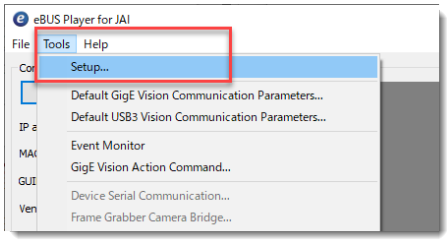
> **Note: Source0** indicates that Stream0's **GevStreamChannel** is set to **0**.

Stream1

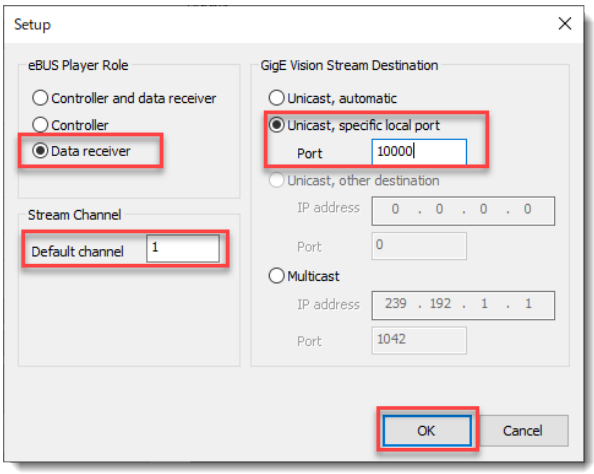
Now, configure the Stream1 settings.

> **Caution:** Steps 3 through 5 must be completed **before connecting to the camera** in this window.

3. Open a second eBUS Player window and select **Tools** > **Setup**. The **Setup** dialog opens.



4. Configure the Setup dialog as follows:

Stream1	
	
eBUS Player Role	Data receiver
Default channel (Stream Channel)	1
GigE Vision Stream Destination	Unicast, specific local port
Port	User-specified port value (in this example, "10000")

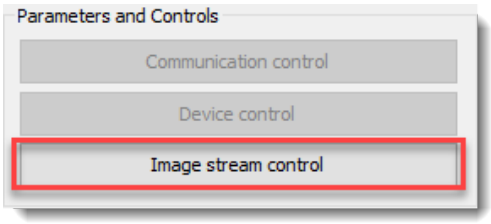
5. Click **OK** to close the **Setup** dialog.
6. In the eBUS Player window for **Stream1**, click **Select/Connect** to open the **Device Selection** dialog. In the dialog, select the same camera and click **OK**.

Configure the Host Port

In the following steps, we will align the Host Port between the two streams.

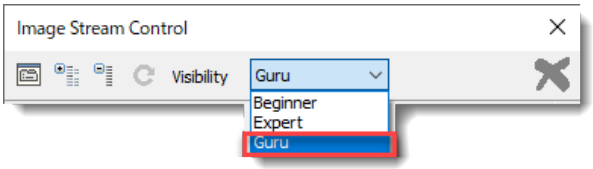
Stream1 (Image Stream Control)

7. In the eBUS Player window for Stream1, click **Image Stream Control** (Parameters and Controls). The **Image Stream Control** dialog opens.

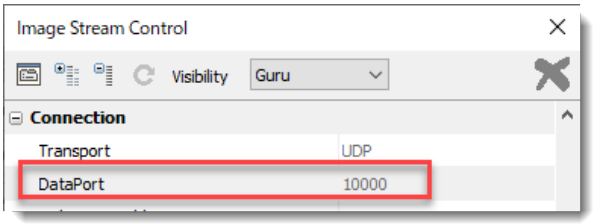


8. In the **Image Stream Control** dialog, do the following:

   a. Set **Visibility** to **Guru**.

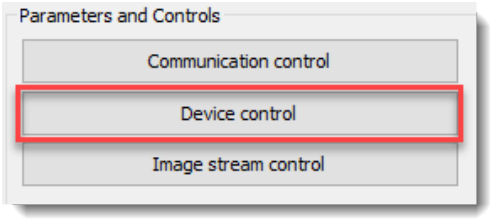


   b. Check the value of **DataPort** (Connection). It should match the **Port** value you have specified in the Setup dialog (in this example: 10000).



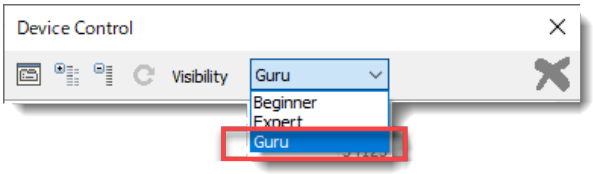
Stream0 (Device Control)

9. In the eBUS Player window for Stream0, click **Device Control** (Parameters and Controls). The **Device Control** dialog opens.



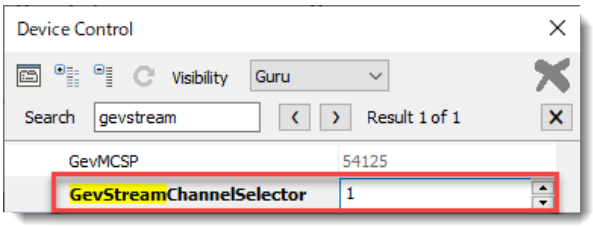
10. In the **Device Control** dialog, configure the following:

    a. Set **Visibility** to **Guru**.

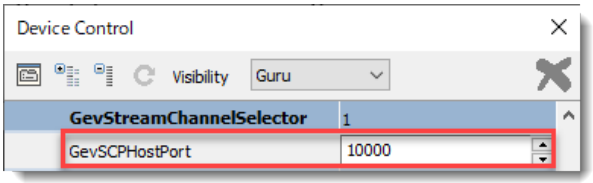


    b. Set **GevStreamChannelSelector** (TransportLayerControl) to **1**.

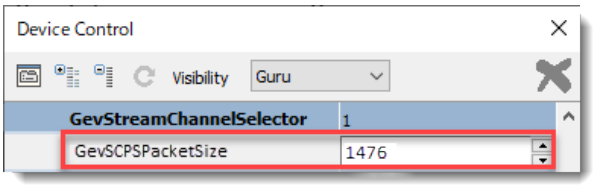
> **Notes:**
> - By setting GevStreamChannelSelector to **1**, you are now configuring the **Stream1** settings.
> - You can use the search box by pressing **Ctrl + F**.



    c. Enter the **Port** value you have specified in the Setup dialog into **GevSCPHostPort** (in this example: 10000).



d. Specify the PacketSize value for Stream1 in **GevSCPSPacketSize**.



Notes:

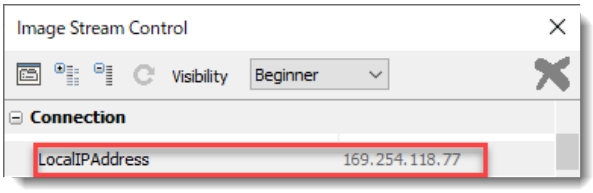
- eBUS Player automatically sets the PacketSize for Stream0 using the AutoNegotiation setting (default = On); however, the PacketSize for other streams (for example, Stream1) must be set manually.
- If the Host receiving multiple data streams is the same device, it is common to set the same packet size for all channels. If the data is sent to multiple Hosts via a switching hub, etc., different values can be set according to the host's upper limit.

Align the IP Addresses

Now we will align the IP addresses between the two streams:

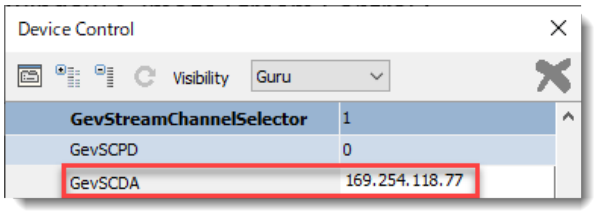
Stream1 (Image Stream Control)

11. In the Image Stream Control dialog for Stream1, copy the **IP address** from **LocalIPAddress** (Connection).

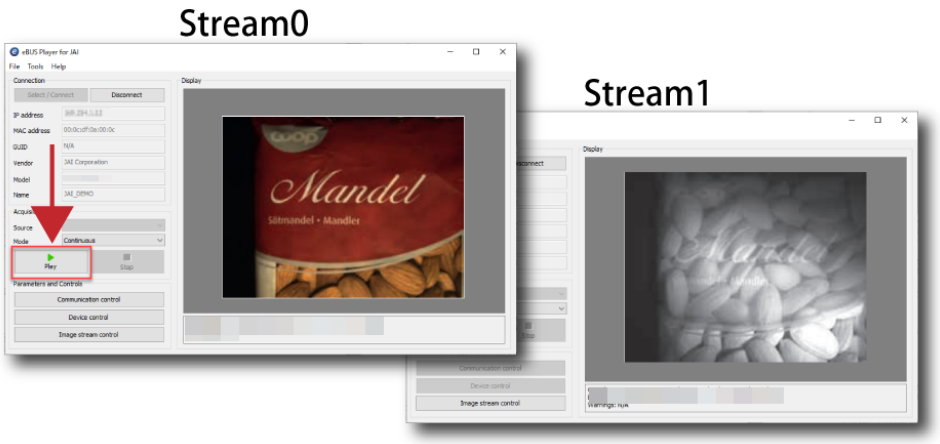


Stream0 (Device Control)

12. In the Device Control dialog for Stream0, paste the IP address into **GevSCDA** (TransportLayerControl).



13. Now when you click **Play** in the Stream0 eBUS Player window, streaming will start in both windows.



Note: All your Acquisition settings are controlled from the **Device Control** dialog for Stream0.

Summary (Dual Streaming Camera)

Setup dialogs for Stream1

Configure the following settings in the Setup dialog for Stream1.

	Stream1
eBUS Player Role	Data receiver
Default Channel (Stream Channel)	1
GigE Vision Stream Destination	Unicast, specific local post
Port	User-specified

Device Control dialog for Stream0

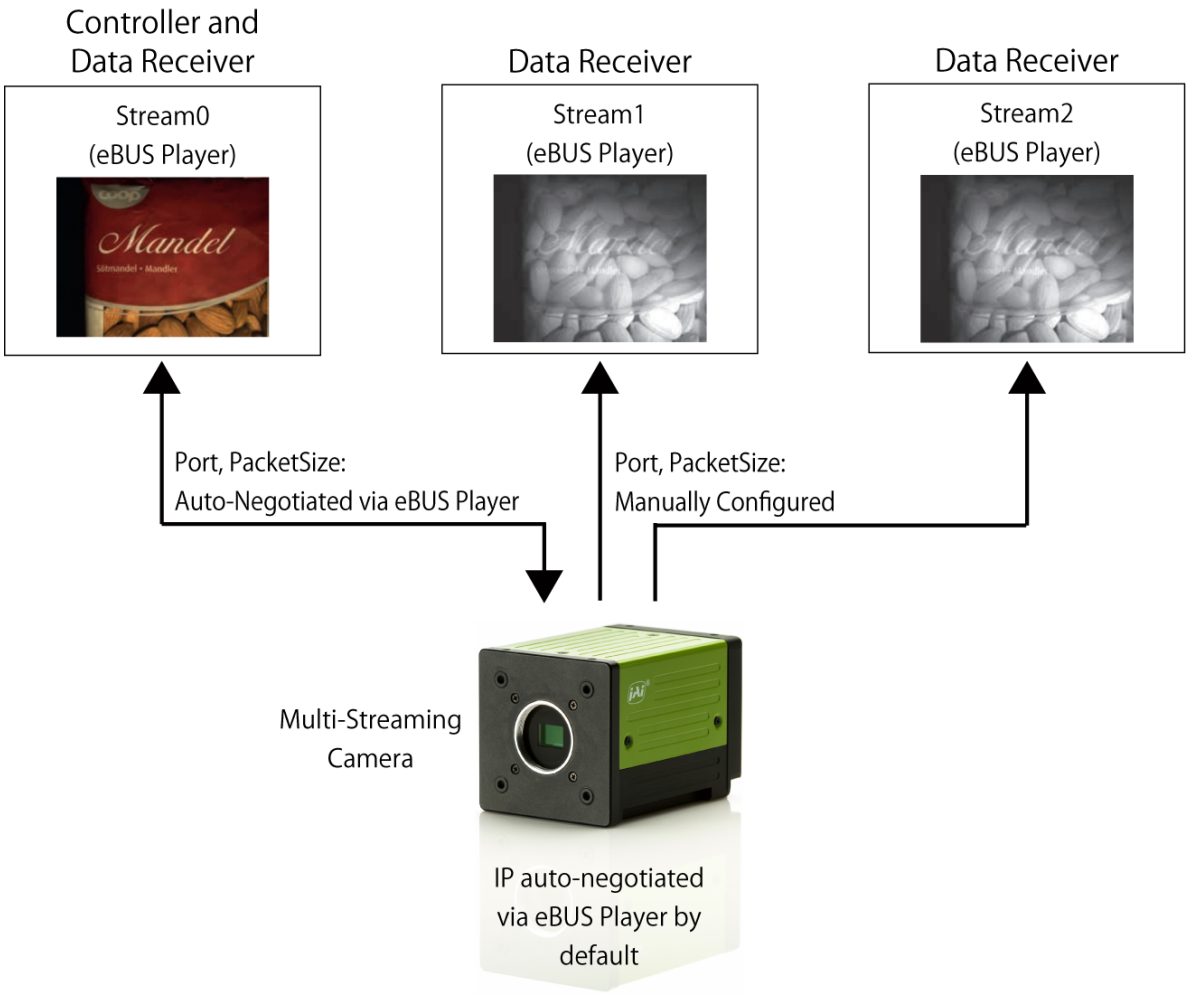
Configure the following settings in the Device Control dialog for Stream0.

	Stream1
GevStreamChannelSelector	1
GevSCPHostPort	Specified Port value in the Setup dialog for Stream1
GevSCPSPacketSize	User-specified PacketSize
GevStreamCannelSelector	1
GevSCDA*	Stream1's IP address
*__GevSCDA__: The IP address is displayed in the LocalIPAddress (Connection) in the Image Stream Control dialog.	

Triple Streaming Cameras

This chapter shows how to set up triple streaming on a multi-sensor camera using eBUS SDK for JAI.

> **Note:** The number of streamings on your camera can be found on **DeviceStreamChannelCount** [DeviceControl].



Notes:

- If you use multiple cameras, please refer to our article on setting the correct Packet Delays: https://support.jai.com/hc/en-us/articles/360010698019-Multiple-cameras-on-a-single-network
- To set up a persistent IP address, please refer to our relevant Technical Note: https://www.jai.com/uploads/documents/Technical-notes/English/TNE-0028-20200324-00-TechNote-PersistentIP_eBus.pdf

How to Set Up

To configure three streams (for example, RGB, NIR1, and NIR2) on a triple streaming camera, we need to open "three" separate eBUS Player windows.

Configure eBUS Player Role

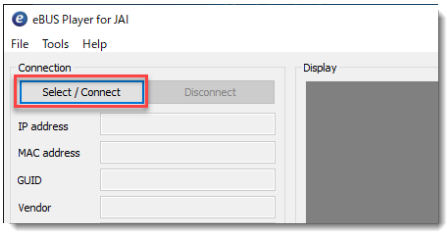
In the first steps, we will connect to the camera from the Stream0 window, and configure **eBUS Player Role** for Stream1 and Steam2 as **Data Receiver**.

> **Note:** Stream0's **eBUS Player Role** is automatically set to **Controller and Data Receiver** by default.

Stream0

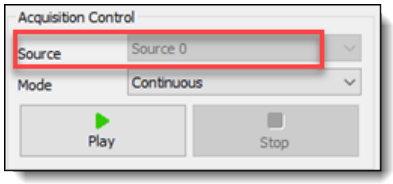
First, go to Stream0's window.

1. Open **eBUS Player for JAI**.
   Click **Select / Connect** to open the **Device Selection** dialog.



   In the Device Selection dialog, select the camera and click **OK** to connect to the camera.

2. In the eBUS Player window, ensure that **Source** is set to **Source0** (Acquisition Control).



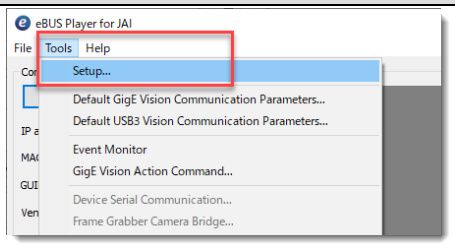
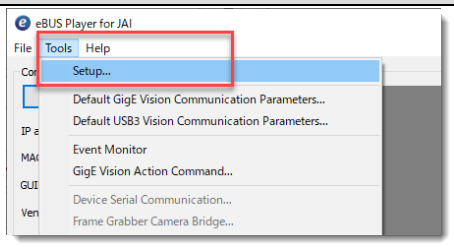
> **Note: Source0** indicates that Stream0's **GevStreamChannel** is set to **0**.

Stream1 and Stream2

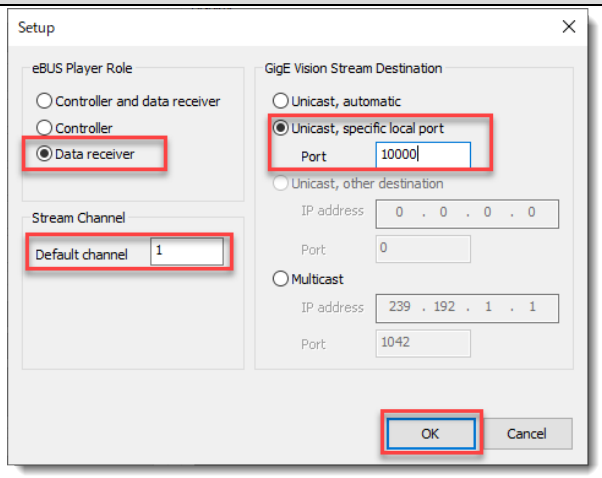
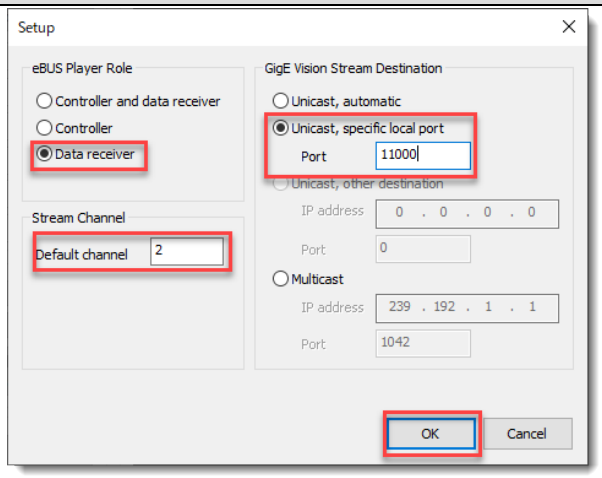
Now configure the Stream1 and Stream2 settings.

> **Caution:** Steps 3 through 5 must be completed **before connecting to the camera** in these windows.

3. Open a second (Stream1) and a third (Stream2) eBUS Player windows, and select **Tools** > **Setup** on both windows. The **Setup** dialogs open.

Stream1	Stream2
	

4. Configure the Setup dialogs as follows:

Stream1	Stream2
	

	Stream1	Stream2
eBUS Player Role	Data receiver	Data receiver
Default channel (Stream Channel)	1	2
GigE Vision Stream Destination	Unicast, specific local port	Unicast, specific local port
Port	User-specified port value (in this example, "10000")	User-specified port value (in this example, "11000")

Notes:

- The **Port** values for Stream1 and Stream2 must be different.
- The specified **Port** values will be used in the later steps.

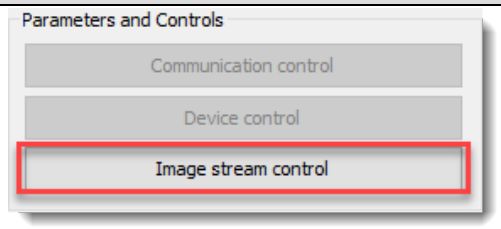
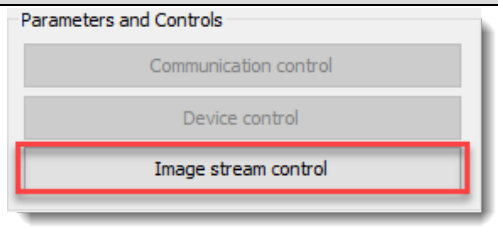
5. Click **OK** to close both **Setup** dialogs.
6. In the eBUS Player windows for **Stream1** and **Stream2**, click **Select/Connect** to open the **Device Selection** dialogs. In the dialogs, select the same camera and click **OK**.

Configure the Host Port

In the following steps, we will align the Host Port between three streams.

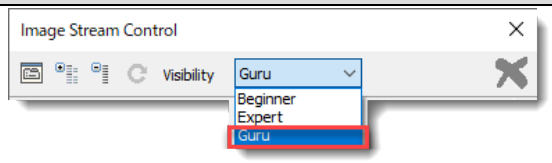
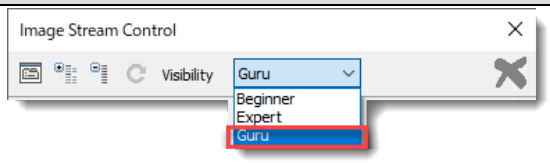
Stream1 and Stream2 (Image Stream Control)

7. In the eBUS Player windows for Stream1 and Stream2, click **Image Stream Control** (Parameters and Controls). Two **Image Stream Control** dialogs open.

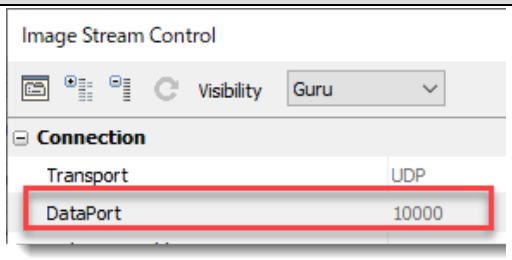
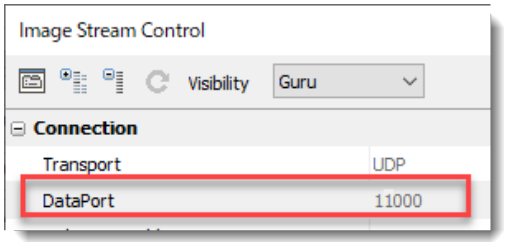
Stream1	Stream2
	

8. In the two **Image Stream Control** dialogs, do the following:

   a. Set **Visibility** to **Guru**.

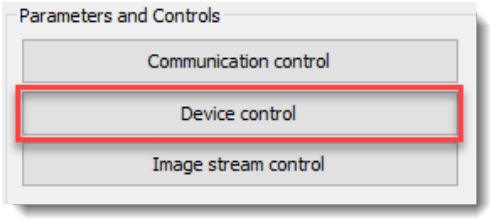
Stream1	Stream2
	

   b. Check the value of **DataPort** (Connection). It should match the **Port** value you have specified in the Setup dialogs (in this example, Stream1 = 10000, Stream2 = 11000).

Stream1	Stream2
	

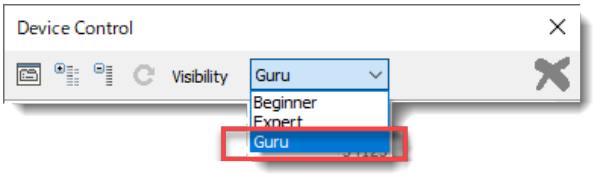
Stream0 (Device Control)

9. In the eBUS Player window for Stream0, click **Device Control** (Parameters and Control). The **Device Control** dialog opens.



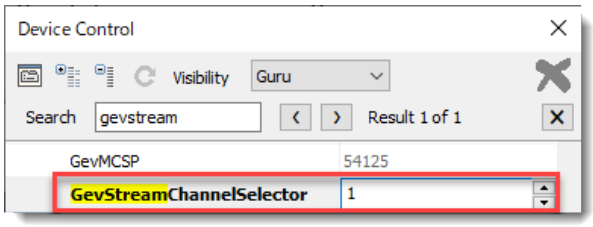
10. In the **Device Control** dialog, configure the following.

    a. Set **Visibility** to **Guru**.



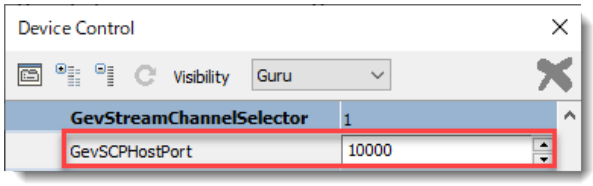
    b. First, configure the **Stream1** settings.

        i. Set **GevStreamChannelSelector** (TransportLayerControl) to **1**.

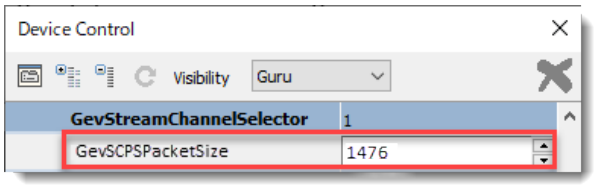


> **Note:** You can use the search box by pressing **Ctrl + F**.

        ii. Enter the **Port** value you have specified in the Setup dialog **for Stream1** into **GevSCPHostPort** (in this example: 10000).

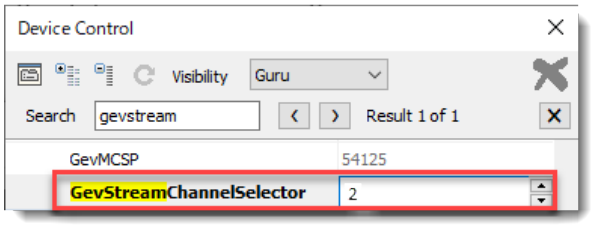


iii. Specify the PacketSize value for Stream1 in **GevSCPSPacketSize**.



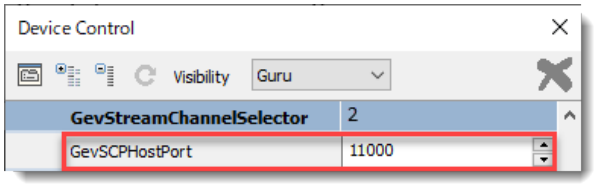
c. Second, configure the **Stream2** settings.

i. Set **GevStreamChannelSelector** (TransportLayerControl) to **2**.

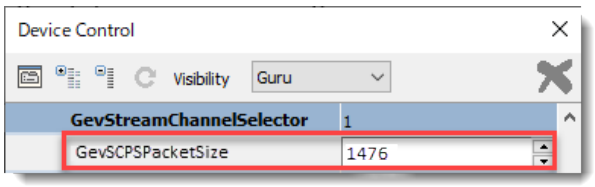


> **Note:** You can use the search box by pressing **Ctrl + F**.

ii. Enter the **Port** value you have specified in the Setup dialog for **Stream2** into **GevSCPHostPort** (in this example: 11000).



iii. Specify the PacketSize value for Stream2 in **GevSCPSPacketSize**.



Notes:

- eBUS Player automatically sets the PacketSize for Stream0 using the AutoNegotiation setting (default = On); however, the PacketSize for other streams (for example, Stream1) must be set manually.
- If the Host receiving multiple data streams is the same device, it is common to set the same packet size for all channels. If the data is sent to multiple Hosts via a switching hub, etc., different values can be set according to the host's upper limit.

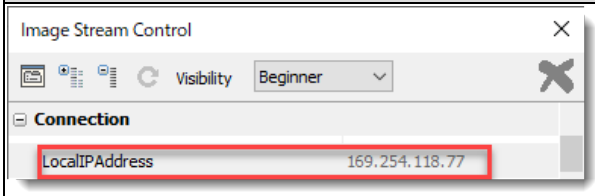
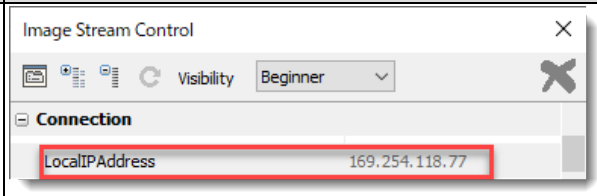
Align the IP Addresses

Now we will align the IP addresses between the three streams:

Stream1 and Stream2 (Image Stream Control)

11. In the Image Stream Control dialogs for Stream1 and Stream2, copy the **IP addresses** from **LocalIPAddress** (Connection).

> **Note:** If the same PC receives image data from each stream, the IP address will be the same. If a different PC receives image data, it will have a different IP address.

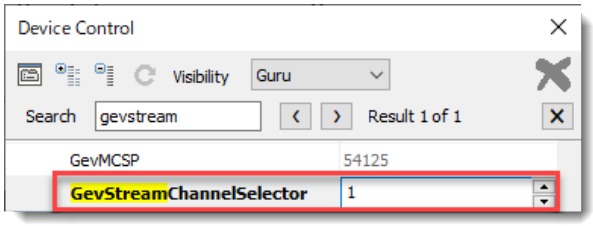
Stream1	Stream2
	

Stream0 (Device Control)

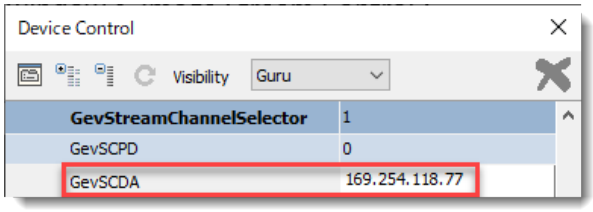
12. In the **Device Control** dialog for Stream0, do the following:

    a. First, configure the IP address for **Stream1**.

        i. Set **GevStreamCannelSelector** to **1** (TransportLayerControl).

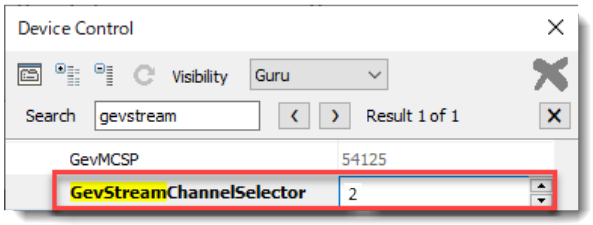


        ii. Paste the **IP address** from Stream1's LocalIPAddress into **GevSCDA**.

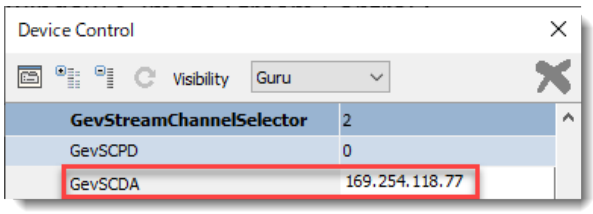


    b. Second, configure the IP address for **Stream2**.

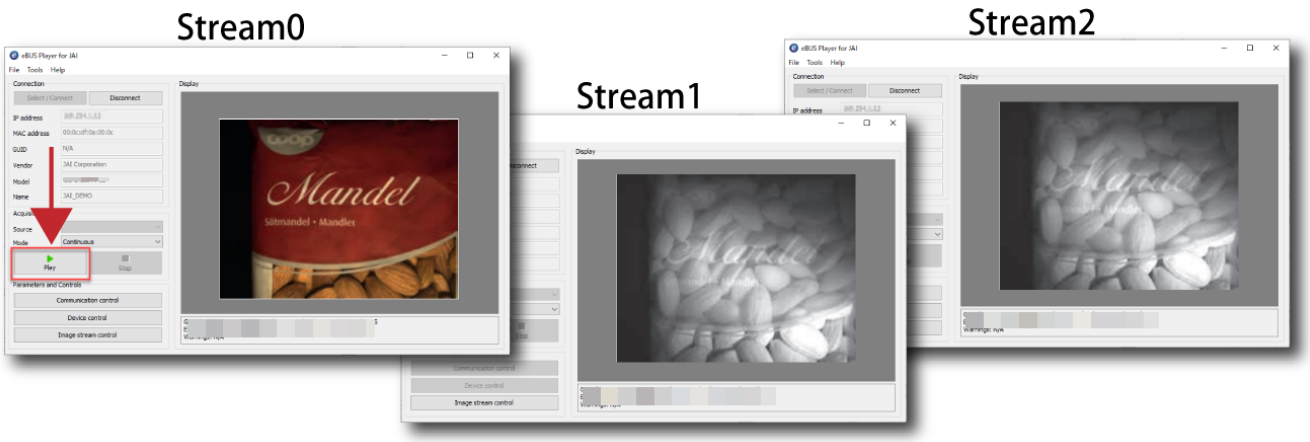
i. Set **GevStreamCannelSelector** to **2** (TransportLayerControl).



ii. Paste the **IP address** from Stream2's LocalIPAddress into **GevSCDA**.



13. Now when you click **Play** in the eBUS Player window for **Stream0**, streaming will start in the Stream0, Stream1, and Stream2 windows.



> **Note:** All your Acquisition settings are controlled from the **Device Control** dialog for Stream0.

Summary (Triple Streaming Camera)

Setup dialogs for Stream1/Stream2

Configure the following settings in the Setup dialogs (2 dialogs opened for Stream1 / Stream2).

	Stream1	Stream2
eBUS Player Role	Data receiver	Data receiver
Default Channel (Stream Channel)	1	2
GigE Vision Stream Destination	Unicast, specific local post	Unicast, specific local post
Port*	User-specified	User-specified
***Port**: Different values must be used for each Stream. The value will be displayed in DataPort in the Image Stream Control dialog for each Stream.		

Device Control dialog for Stream0

Configure the following settings in the Device Control dialog for Stream0.

	Stream1	Stream2
GevStreamChannelSelector	1	2
GevSCPHostPort	Specified Port value in the Setup dialog for Stream1	Specified Port value in Setup dialog for Stream2
GevSCPSPacketSize	User-specified PacketSize	User-specified PacketSize
GevStreamCannelSelector	1	2
GevSCDA*	Stream1's IP address	Stream2's IP address
***GevSCDA**: The IP address is displayed in the LocalIPAddress (Connection) in the Image Stream Control for the stream. If the same PC receives image data from each stream, the IP address will be the same. If a different PC receives image data, it will have a different IP address.		

Revision History

Revision	Date	Changes
1.2	2023/12/21	Added the summary section at the end of each chapter.
1.1	2023/11/22	Updated to cover all multi-streaming cameras with GigE interface.
1.0	2023/09/27	First release.

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