

Multi-Streaming Camera Connection Guide

for GigE Cameras



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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.

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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 (<u>https://www.jai.com/support-software/jai-software</u>).
- 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].



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

eBUS Player for JAI File Tools Help		
Connection Select / Connect	Disconnect	Display
IP address MAC address GUID Vendor		

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).

Source	Source 0	~
Mode	Continuous	~
р	lav St	

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				
	Setup eBUS Player Role Controller and data re Controller Data receiver Stream Channel Default channel 1	CigE Vision Stream Destination		
eBUS Player Ro	le	Data receiver		
Default channel (Stream	Channel)	1		
GigE Vision Stream De	stination	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.

Parameters and Controls			
Communication control			
Device control			
Image stream control			
	Ξ.		

- 8. In the **Image Stream Control** dialog, do the following:
 - a. Set Visibility to Guru.

Image Stream Control		×
E 1 C Visibility	Guru V Beginner Expert 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).

Image Stream Control		×
C Visibility	Guru 🗸	×
Connection		^
Transport	UDP	
DataPort	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.

Device Control			Х
œ °⊨ °⊨ e	Visibility	Guru 🗸	×
		Beginner Expert	-
		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.

Device	Control		×
•	C Visibility Guru	~	×
Search	h gevstream	Result 1 of 1	×
	GevMCSP	54125	
	GevStreamChannelSelector	1	-

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

Devic	e Contro	ol				;	×
6		e	Visibility	Guru	~	7	5
	GevSt	ream	Channel	Selector	1		^
	GevSCF	Hosti	Port		10000	▲ ▼	

d. Specify the PacketSize value for Stream1 in GevSCPSPacketSize.



- 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).

Image Stream Control		×
C Visibility Beginn	er 🗸	×
Connection		
LocalIPAddress	169.254.118.77	

Stream0 (Device Control)

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

Device Control		×
C Visibility Guru	\sim	×
GevStreamChannelSelector	• 1	^
GevSCPD	0	
GevSCDA	169.254.118.77	

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].



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

eBUS Player for JAI File Tools Help		
Connection Select / Connect	Disconnect	Display
IP address MAC address GUID Vendor		

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).

Acquisition (Control	
Source	Source 0	\sim
Mode	Continuous	~
F	lay St	op

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	
eBUS Player for JAI File Tools Help Cor Setup Default GigE Vision Communication Parameters IP a Default USB3 Vision Communication Parameters GigE Vision Action Command Gut Device Serial Communication Frame Grabber Camera Bridge	eBUS Player for JAI File Tools Help Cod Setup Default GigE Vision Communication Parameters IP a Default USB3 Vision Communication Parameters Max Event Monitor GigE Vision Action Command GUI Device Serial Communication Frame Grabber Camera Bridge

4. Configure the Setup dialogs as follows:

Stream1		Stream2	
Setup eBUS Player Role GigE Vision Stream Destination	×	Setup eBUS Player Role	GigE Vision Stream Destination
O Controller and data receiver O Unicast, automatic Image: Controller Image: Controller Image: Controller Image: Cont	0 . 0	Controller and data receiver Controller Data receiver Stream Channel Default channel	O Unicast, specific local port Port 11000 Unicast, other destination IP address 0 . 0 . 0 . 0 Port 0 O Multicast IP address 239 . 192 . 1 . 1 Port 1042
	:	Stream1	Stream2
eBUS Player Role	Da	ta receiver	Data receiver
Default channel (Stream Channel)		1	2
GigE Vision Stream Destination	Unicast,	specific local port	Unicast, specific local port
Port	User-spe (in this ex	ecified port value kample, "10000")	User-specified port value (in this example, "11000")

- 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
Parameters and Controls	Parameters and Controls
Communication control	Communication control
Device control	Device control
Image stream control	Image stream control

- 8. In the two Image Stream Control dialogs, do the following:
 - a. Set Visibility to Guru.

Stream1		Stream2
Image Stream Control	×	Image Stream Control X
E ● O Visibility Guru ✓ Beginner Expert	×	E P C Visibility Guru ✓ K Beginner Expert Guru

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
Image Stream Control	Image Stream Control
🖆 🎯 📲 🕐 Visibility 🛛 Guru 🗸	🖼 📲 🔿 Visibility Guru 🗸
Connection	Connection
Transport UDP	Transport UDP
DataPort 10000	DataPort 11000

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.

Device Control		Х
🖻 🔍 🔍 C Visibility	Guru 🗸	×
	Beginner Expert	
	Guru	

- b. First, configure the Stream1 settings.
 - i. Set GevStreamChannelSelector (TransportLayerControl) to 1.

Device G	ontrol		Х
	C Visibility Gur	u ~	×
Search	gevstream	Result 1 of 1	×
Ge	VMCSP	54125	
G	evStreamChannelSelec	tor 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).

Device Control			×
C Visibility	Guru	\sim	×
GevStreamChanne	Selector	1	^
GevSCPHostPort		10000	▲ ▼

iii. Specify the PacketSize value for Stream1 in GevSCPSPacketSize.



- c. Second, configure the **Stream2** settings.
 - i. Set GevStreamChannelSelector (TransportLayerControl) to 2.

Device Control	×
🗈 📲 😋 Visibility Guru 🗸	×
Search gevstream () Result 1 of 1	×
GevMCSP 54125	
GevStreamChannelSelector 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).

Device Control				×
	Visibility	Guru	\sim	×
GevStrea	amChannelS	elector	2	^
GevSCPHo	stPort		11000	 ▼

iii. Specify the PacketSize value for Stream2 in GevSCPSPacketSize.

Device	e Contro	ol				;	×
•	8	е	Visibility	Guru	\sim	>	5
	GevSt	ream	Channel	Selector	1		^
	GevSCPSPacketSize		1476	▲ ▼			

- 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	
Image Stream Control	×	Image Stream Control	×
🖻 📲 C Visibility Beginner 🗸	×	🖻 📲 C Visibility Beginner 🗸	×
Connection		Connection	
LocalIPAddress 169.254.118.77		LocalIPAddress 169.254.118.77	

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).

Device	· Control		×
6	C Visibility Guru	\sim	×
Search	h gevstream (> Result 1 of 1	×
	GevMCSP	54125	
	GevStreamChannelSelector	1	•

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

Device Control	×
C Visibility Gu	× ×
GevStreamChannelSelec	or 1 ^
GevSCPD	0
GevSCDA	169.254.118.77

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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Europe, Middle East & Africa Phone +45 4457 8888 Fax +45 4491 8880 Asia Pacific Phone +81 45 440 0154 Fax +81 45 440 0166 Americas Phone (Toll-Free) 1 800 445 5444 Phone +1 408 383 0300

