AJA and OBS

Quick Start Guide

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AJA VIDEO SYSTEMS

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Introduction

AJA I/O devices support a broad range of creative software. OBS Studio is a powerful live video production application. For Video Input, Output and Monitoring, AJA Thunderbolt devices and PCIe cards can be relied upon to provide the quality and stability required for live video workflows.

This document gives you some general procedures for setting up AJA I/O devices with OBS, including selecting live video inputs, sending your produced video out from OBS, and monitoring audio sources.

Supported AJA I/O Devices and their Capabilities

OBS supports a variety of AJA I/O devices, which can bring different capabilities to your OBS application. Multiple AJA I/O devices can be connected and operated simultaneously, making all the devices' connections available to your OBS system. For example, you can configure a KONA HDMI and a KONA 4 with one OBS system to provide four HDMI inputs and four SDI inputs simultaneously for HD workflows. Refer to the link below to learn more about the capabilities of each AJA I/O device:

https://www.aja.com/nav/products-desktop-io

https://www.aja.com/family/mobile-io

Below are recommended AJA devices for different requirements:

4K/UltraHD Workflows

IMPORTANT: A multi-channel 4K/UltraHD workflow will require a very powerful host system to handle the demand.

NOTE: OBS only supports two channels of Output via the Preview and Program Output settings. So while the KONA 5 can physically support 4 channels of 4K/UltraHD output with the 8K firmware loaded, the OBS software can only be configured for two channels.

Multi Channel SDI Workflows for 4K/UltraHD

- AJA KONA 5 - up to 4x SDI In or 4x SDI Out, and SDI 4 Out can be exchanged for HDMI Out
- AJA KONA 4 - up to 4x SDI In (Up to two channels of 4K/UltraHD) or 4x SDI Out (Up to two channels of 4K/UltraHD), and SDI 4 Out can be exchanged for HDMI Out

Single Channel HDMI Workflows for 4K/UltraHD

- AJA KONA HDMI - up to 1x 4K/UltraHD HDMI In

Mobile Multi Channel SDI Workflows for 4K/UltraHD

- AJA Io 4K Plus (via a Thunderbolt 3 connection) - up to 4x SDI In (Up to two channels of 4K/UltraHD), or 4x SDI Out (Up to two channels of 4K/UltraHD). SDI 4 Out can be exchanged for HDMI Out, and SDI 1 In can be exchanged for HDMI In.

NOTE: The T-TAP Pro will support up to one channel of 4K/UltraHD Output from the SDI & HDMI Outputs simultaneously.

HD Workflows

Multi Channel SDI Workflows for HD

- AJA KONA 5 - up to 4x SDI In or 4x SDI Out, and SDI 4 Out can be exchanged for HDMI Out
- AJA KONA 4 - up to 4x SDI In or 4x SDI Out, and SDI 4 Out can be exchanged for HDMI Out

Multi Channel HDMI Workflows for HD

- AJA KONA HDMI - up to 4x HD HDMI In

Mobile Multi Channel SDI Workflows for HD

- AJA Io X3 (via a Thunderbolt 3 connection) - up to 4x SDI In, or 4x SDI Out. SDI 4 Out can be exchanged for HDMI Out, and SDI 1 In can be exchanged for HDMI In.
- AJA Io 4K Plus (via a Thunderbolt 3 connection) - up to 4x SDI In, or 4x SDI Out. SDI 4 Out can be exchanged for HDMI Out, and SDI 1 In can be exchanged for HDMI In.

IMPORTANT: Some AJA devices (e.g. KONA 5, KONA 4) support multiple firmware versions offering different capabilities. For example, one version might support multiple simultaneous HD/SD workflows, and another version might support UltraHD/4K or UltraHD2/8K workflows. You will need to install the appropriate firmware version on your AJA device. Refer to your AJA device's Installation and Operation Guide for detailed information.

NOTE: OBS Studio does not support 8K workflows with KONA 5. The Io4K Plus device used for the examples in this Quick Start Guide supports a single firmware version, and so does not require installing different versions for different OBS functionality.

NOTE: OBS Studio does not support the Io IP, Avid Artist DNxIP, KONA IP, KONA LHi or KONA LHe Plus even though the devices will be recognized as available in OBS if connected to the host system."

Table 1. AJA Hardware Feature Summary, Thunderbolt Devices

	Io 4K Plus **Avid Artist DNxIV**	**Io X3**	**T-TAP Pro**
Tbolt Ports	Tbolt 3	Tbolt 3	Tbolt 3
macOS	Intel or Apple silicon	Intel or Apple silicon	Intel or Apple silicon
Windows	√	√	√
Linux			
Max Input Resolution	4K	2K	
Max Output Resolution	4K	2K	4K
SDI In	12G/6G/3G	3G	
SDI Out	12G/6G/3G	3G	12G/6G/3G
HDMI In	2.0	1.4b	
HDMI Out	2.0	1.4b	2.0
HDR over HDMI	√	√	√
HDR over SDI	√	√	√
Closed Captions	√	√	√
SMPTE 2022-6 (10GbE)			
SMPTE 2022-7 (10GbE)			
IP Video In/Out			
IP Audio in/Out			
Analog Audio In	√	√	
Analog Audio Out	√	√	√
Control Panel Audio Mixer	√	√	√
XLR Mic Input	DNxIV only		
	√ = Supported	(blank) = Unsupported	

Table 2. AJA Hardware Feature Summary, PCIe Devices

	KONA 5	KONA 4	KONA 1	KONA HDMI
PCIe	3.0 8-lane	2.0 8-lane	2.0 2-lane	2.0 8-lane
macOS	Intel or Apple silicon	Intel or Apple silicon	Intel or Apple silicon	Intel or Apple silicon
Windows	√	√	√	√
Linux	√	√	√	√
Max Input Resolution	4K	4K	2K	4K
Max Output Resolution	4K	4K	2K	
SDI In	12G/6G/3G	3G	3G	
SDI Out	12G/6G/3G	3G	3G	
HDMI In				2.0/1.4b
HDMI Out	2.0	1.4b		
HDR over HDMI	√	√		
HDR over SDI	√	√	√	
Closed Captions	√	√	√	
SMPTE 2022-6 (10GbE)				
SMPTE 2110 (10GbE)				
IP Video In/Out				
IP Audio in/Out				
Analog Video In				
Analog Video Out		√		
Analog Audio In				
Analog Audio Out		with K3G box		
Control Panel Audio Mixer	4K Mode	4K Mode	√	√
	√ = Supported	(blank) = Unsupported		

Setting up an AJA I/O device

1. If not previously installed on your computer, ensure that the third party application software (OBS) is installed as detailed in the OBS user documentation.

To learn more go to the OBS Knowledge Base link:

https://obsproject.com/help

NOTE: It is best practice to have installed and run the software at least once on your computer before proceeding.

2. Download and install the latest software for your AJA device from:

   https://www.aja.com/en/support/downloads

3. Connect your AJA device(s) to your computer, either with an appropriate Thunderbolt 3 connection cable if it is an AJA desktop device, or install your KONA card(s) into one of your workstation's PCIe slots.
4. Follow this link to see AJA's recommendations for which PCIe slots to install the AJA card:

   https://www.aja.com/page/system-configuration

5. Follow this link to see AJA's recommendations for computing systems when using AJA Thunderbolt devices:

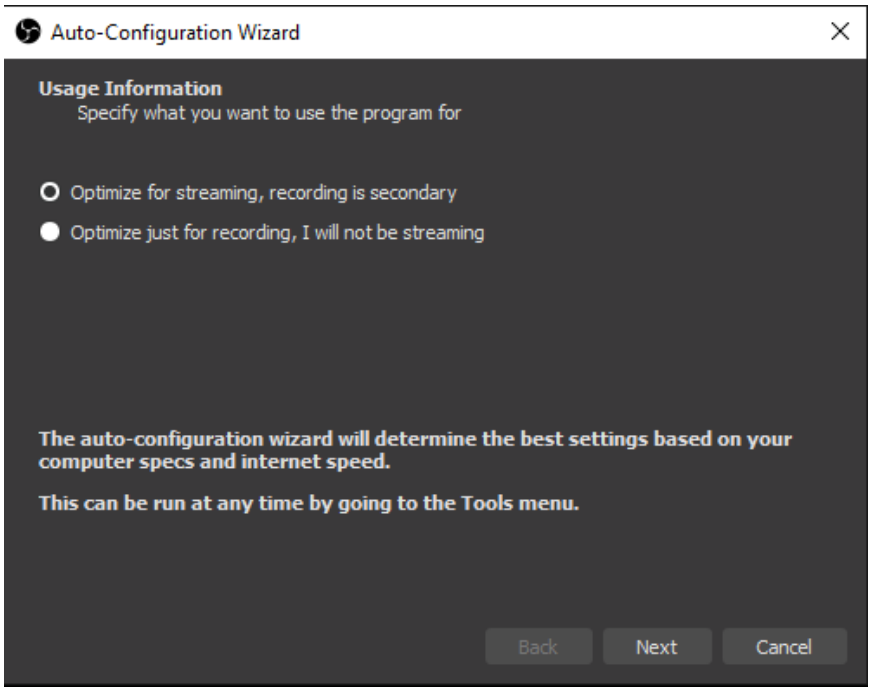
   https://www.aja.com/page/thunderbolt-system-support

6. Connect the AJA I/O device's video and audio inputs and outputs.
7. Power up the unit (AC supply or battery). The AJA device will start up automatically.
8. AJA recommends that you now run AJA Control Panel, as this allows you to verify that the installation has completed successfully.

Using the OBS Auto-Configuration Wizard

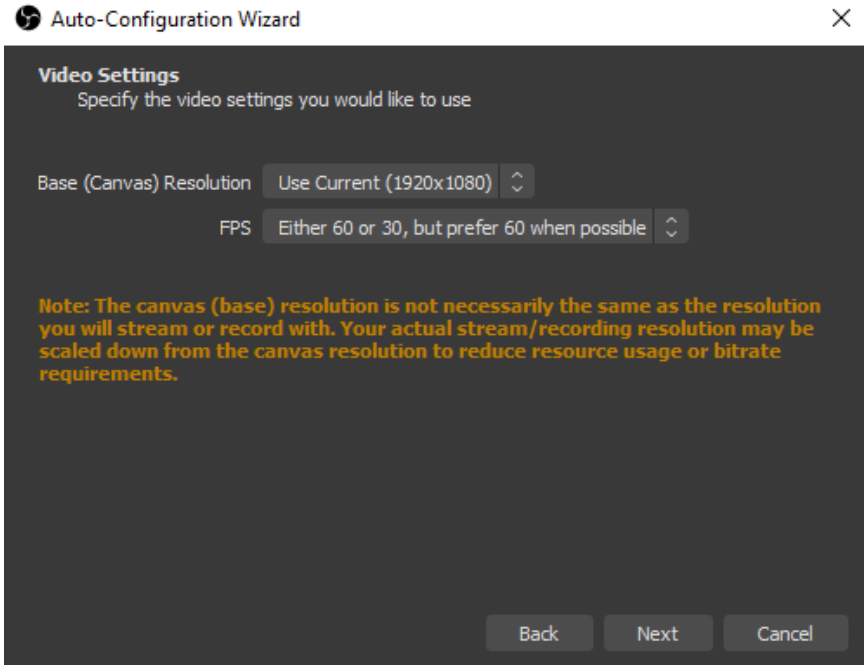
1. Running the OBS software the first time will launch the "OBS Auto-Configuration Wizard" window, Select an optimization preference for streaming or recording to be used as the starting configuration and then click "Next". This setting can be changed later by selecting the "Auto-Configuration Wizard" under the Tools Tab in the OBS Header.

Figure 1. OBS Auto-Configuration Window



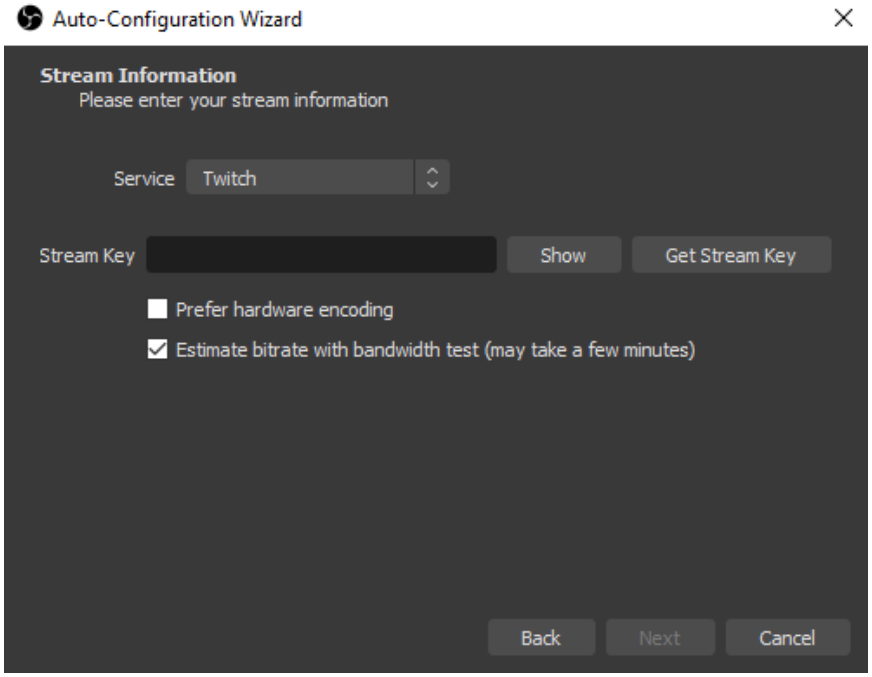
2. OBS will then display the optimal Base Resolution and FPS. Select **Next** at the bottom right as indicated with the red rectangle in the following figure.

Figure 2. OBS Auto-Configuration Window



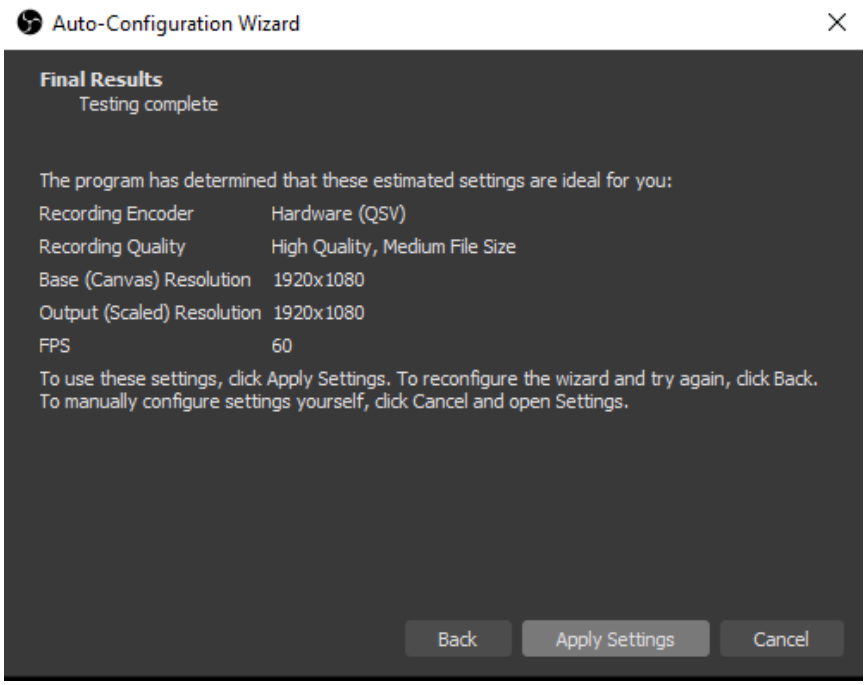
3. If you chose Streaming, select your preferred streaming platform , then select the "Get Stream Key" button. This will open up the URL of the host and allow you to copy and paste the appropriate stream key in the window. Then click "Next".

Figure 3. OBS Auto-Configuration Window



4. If you choose "Optimize just for recording", OBS will provide you with the optimal recording encoding and quality settings. Select "Apply Settings" to complete the initial configuration process.

Figure 4. OBS Auto-Configuration Window

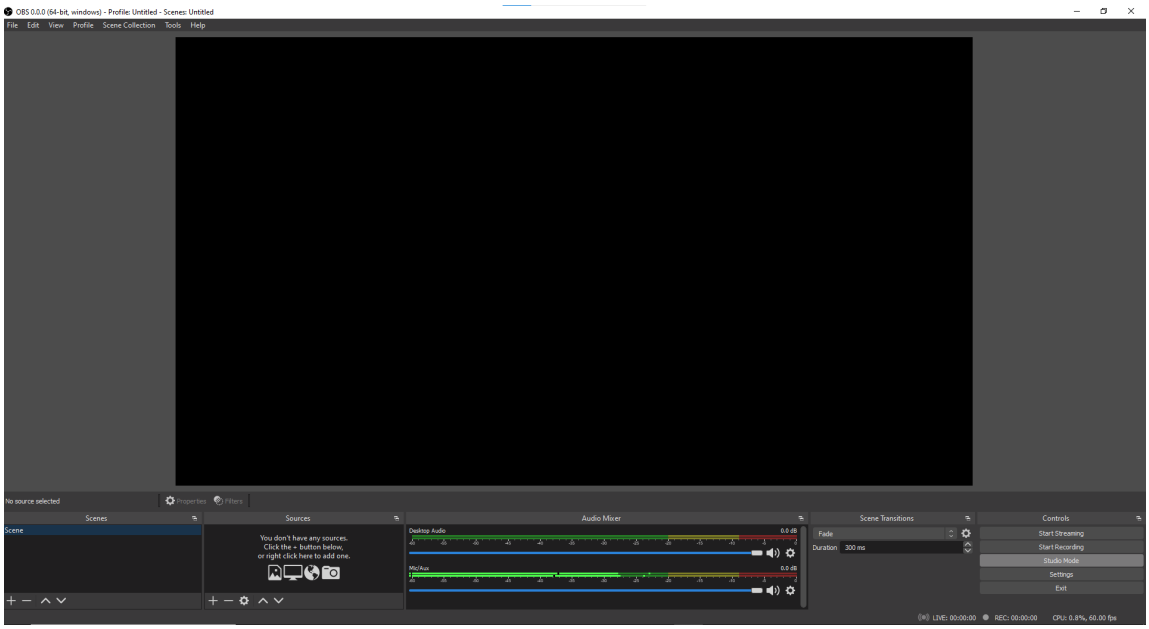


Adding a Video Input for a Multi Channel HD Workflow

NOTE: The following instructions use an AJA Io 4K Plus as an example for the I/O device.

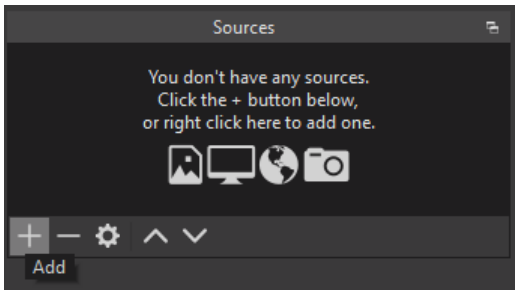
1. Upon opening OBS, if you are planning to use more than one input or source, it would be beneficial to select the "Studio Mode" button in the lower right-hand corner in order to view both your Preview & Program windows.

Figure 5. OBS Standard Mode



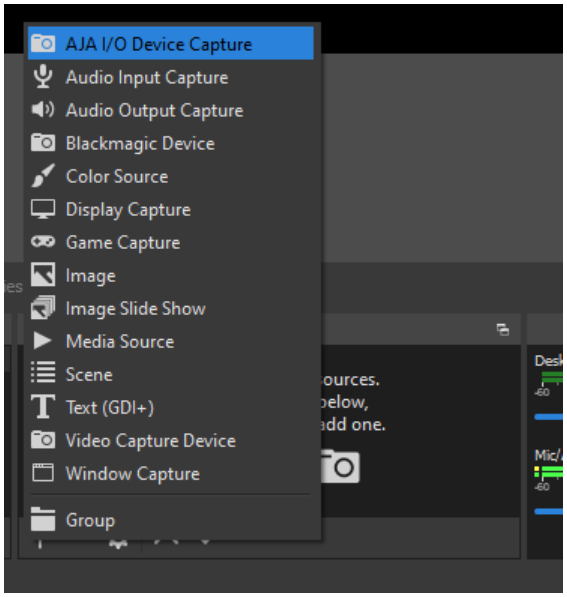
2. Click on the "+" icon in the Sources Window to add your first AJA capture device.

Figure 6. OBS Sources Window



3. Next you will want to select the "AJA I/O Device Capture" camera icon at the top of the list. For This tutorial we will show you how to add one HDMI input and two SDI inputs.

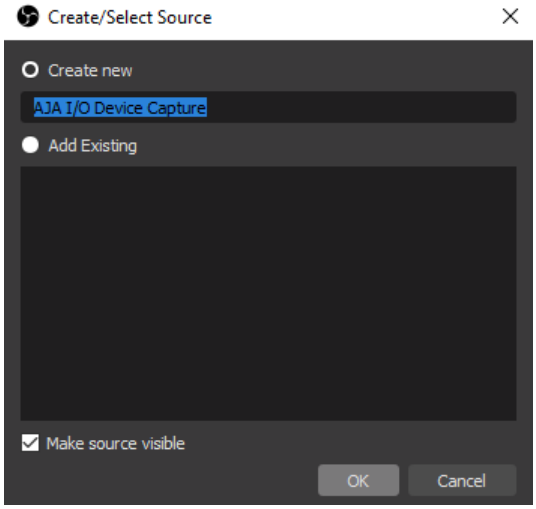
Figure 7. OBS Source Menu Options



NOTE: To add an AJA U-TAP, you will need to select the Video Capture Device Icon and the Audio Input Capture icon.

4. Here you will hit "OK" to accept the new AJA I/O Device Capture source. Each time you add an AJA I/O Device Capture from the sources window, a new enumerated title will be available for you to create as a source.

Figure 8. OBS Create/Select Source Window



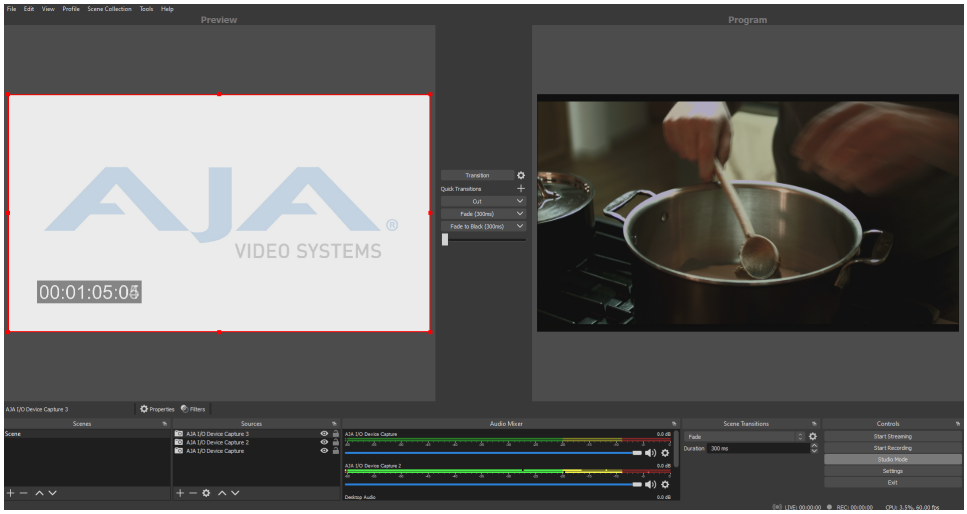
5. The Properties for AJA I/O Device Capture will allow you to select the Device, Input, Mode and desired Video Format. If there is video present on that device and input, you should see that image active in the window when you select it. When applicable, a 2- wire or 4-wire source can be selected here. If a channel is already in use for input or output, it will appear grayed out. In most cases, selecting the default "Auto" option for Video Format is the easiest method to capture your video.

Figure 9. OBS Properties for 'AJA I/O Device Capture

NOTE: With the Io4K Plus, you can only select an HDMI input if the SDI 1 Input is not being used for an input or output.

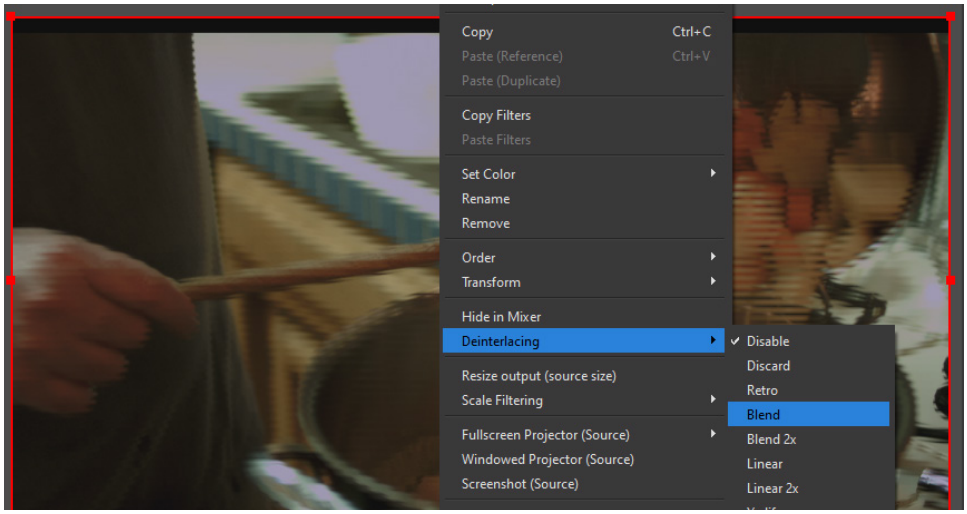
6. After hitting “OK”, you will now see the video appear in the Preview window. Simply use the slider, Transition, Cut, or Fade button to send the video to the Program. This will now allow the audio for the source to be active in the Audio Mixer. With the Io4K Plus, there are four channels of video available. We have used the first channel for the HDMI input and now additional channels of SDI input can be added by repeating the previous four steps. We can only use three channels for inputs for the Io4k plus if we want to use the fourth available channel for an output.

Figure 10. OBS Studio Mode with Three AJA I/O Sources



7. If you are using an interlaced source, right click on the video in the Preview monitor and select the desired “De-interlaced “ option.

Figure 11. OBS Deinterlacing Options



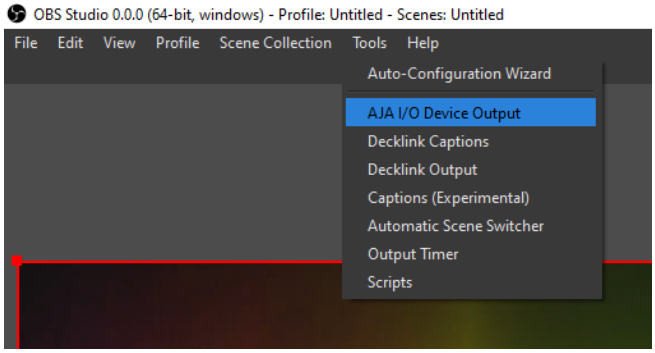
Routing OBS Output to an I/O Device’s SDI or HDMI Output

You can configure an AJA I/O devices’ SDI or HDMI output port for your OBS Program or Preview output. Many AJA I/O devices’ SDI ports are bi-directional. The Io 4K Plus can receive up to four SDI inputs. With the Io 4K Plus, SDI 4 Out can be exchanged for HDMI Out, or SDI 1 In can be exchanged for Channel One HDMI

In while still utilizing SDI 2 and 3 for two additional inputs. Alternatively, the Io 4K Plus can receive three SDI inputs and send one SDI output, or it can receive two inputs and send two outputs simultaneously. Under the Audio Monitoring tab, select the desired device and select “Monitor and Output”.

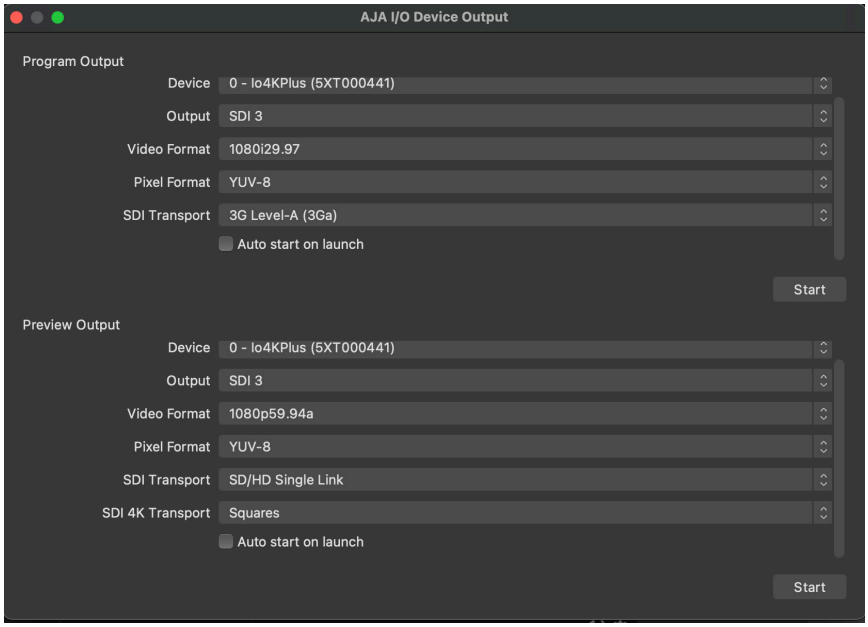
1. Select “Tools” from the OBS main page Header and then select “AJA I/O Device Output”.

Figure 12. OBS Tools Drop Down Menu



2. The AJA I/O Device Output Window allows you to select the Device, Output Video Format, Pixel Format, and SDI Transport for the Program and Preview outputs. In most cases, the best practice is to match your Output settings with your Input settings when possible. Select “Start” to turn on the Output. Starting either the Program or Preview Output will also turn on the Analog and AES Audio outputs for the AJA Device.

Figure 13. OBS AJA I/O Device Output Window

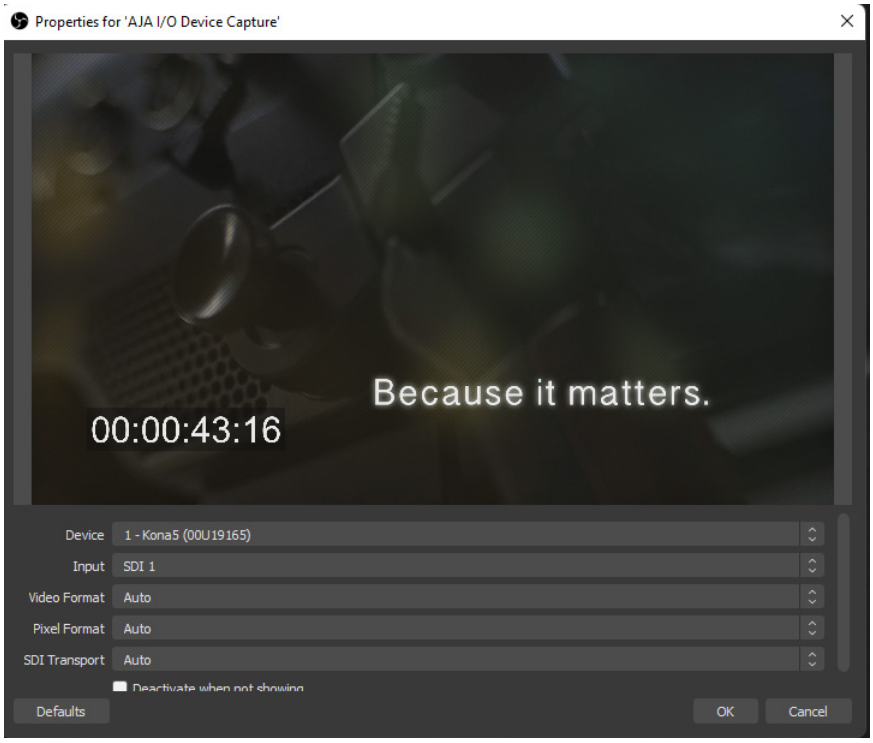


4K/UltraHD Guidance

Capturing a 4K/UltraHD Source

To capture a 4K/UltraHD source using the "Auto" method, simply follow the same steps described for capturing in the HD workflow (see *"Routing OBS Output to an I/O Device's SDI or HDMI Output" on page 13*).

Figure 14. 4K/UltraHD Capture

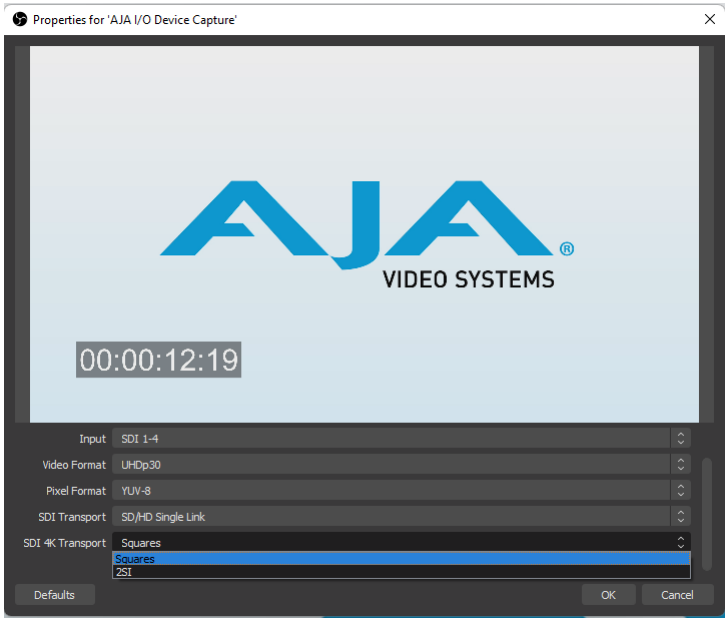


Configuring a 4K/UltraHD Source

To manually configure capture for the 4K/UltraHD source, after selecting the desired Input, select your preferred Video Format, Pixel Format, SDI Transport, and SDI 4K Transport settings from the drop-down menus.

NOTE: The option to select from the SDI 4K Transport menu will only become available once a 4K/UltraHD Video Format has been selected.

Figure 15. 4K/UltraHD Configuration



NOTE: When capturing a 4K/UltraHD Squares source, you will want to select the "SD/HD Single Link" option from the SDI Transport drop-down menu.

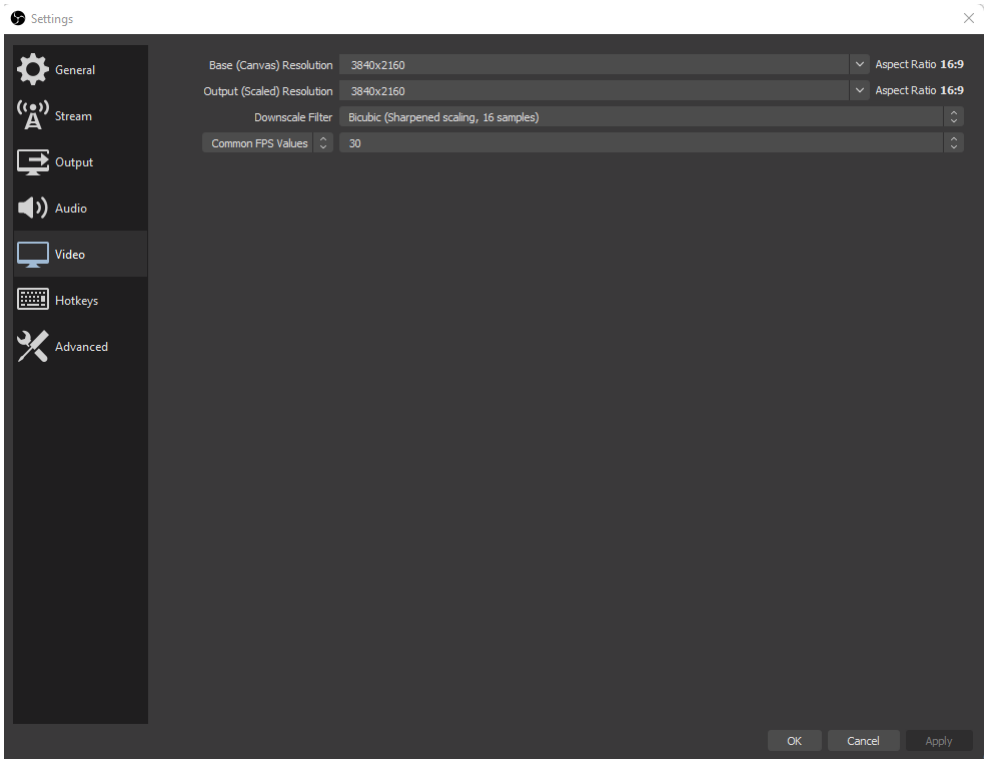
Routing 4K/UltraHD OBS Output to Device's SDI or HDMI Output

NOTE: Only Low Frame Rates (30, 29.97, 25, 24, 23.98) are supported for 4K/UltraHD Output.

4K/UltraHD can be configured a few different ways depending on your device and desired method of outputting the signal. Since only Low Frame Rate is supported for 4K/UltraHD, it is important to first configure the correct frame rate and raster size in the OBS settings. Before opening and setting up the AJA I/O Device Output.

1. First select the Video Icon, and then change the Common FPS Values to the matching Low Frame Rate of either your Medias Source or Capture Source. 1920x 1080 is the default setting for the Base (Canvas) Resolution and Output (Scaled) Resolution. These can be changed to match the 4K/ UltraHD raster sizes by manually typing in the corresponding numbers (4096x2160/3840x2160).

Figure 16. OBS Video Settings Window



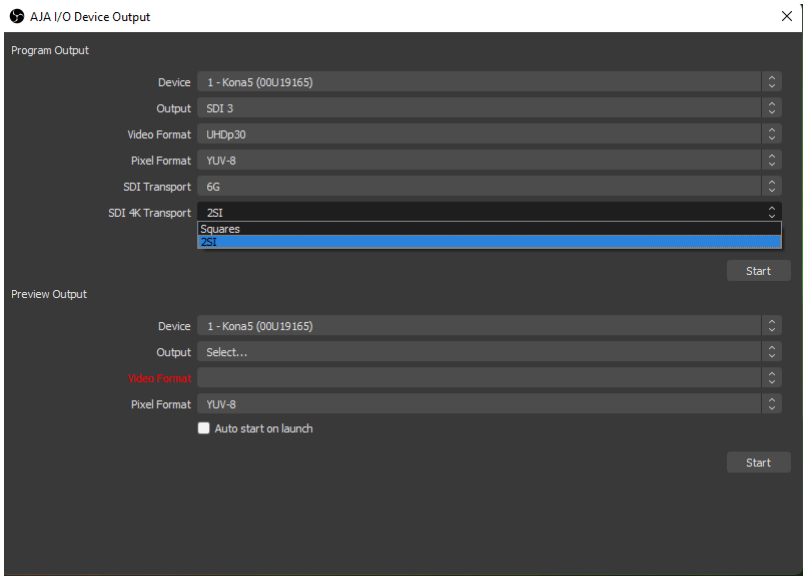
2. Hit Apply and Ok when finished.
3. Next, select Tools and then AJA I/O Device Output from the menu options.
4. With the KONA 5 (4K) Firmware, or the Io4K Plus, a 4K/UltraHD signal can be routed out the Program or Preview Output (Engaging both simultaneously might cause issues.) This can be done be selecting a single SDI channel, dual

SDI channels, 1-4 SDI channels, or the HDMI out. Depending on the users choice, the following configurations need to be selected:

- **1 Wire Output** - SDI 3, Video Format: Desired 4K/UltraHD Rate, Pixel Format: YUV-8 (RGB Not supported for 4K/UltraHD), SDI Transport: 6G, SDI 4K Transport: 2SI.

  In 1-wire output set-ups, 4K/UltraHD can only be captured or output using the KONA 5 (4K Firmware). Use the KONA 5 (8K firmware) instead if you would like to be able to capture and output 4K/UltraHD 6G signals simultaneously. The 8K firmware supports 4 channels of 4K/UltraHD. Therefore, up to 3 separate channels of 4K/UltraHD can be captured while simultaneously being able to output a 1-wire 4K/UltraHD 6G LFR signal.
- **2 Wire Output** - SDI 1-2 or SDI 3-4, Video Format: Desired 4K/UltraHD Rate, Pixel Format: YUV-8 (RGB Not supported for 4K/UltraHD), SDI Transport: 3G Level-B (3Gb), SDI 4K Transport: 2SI
- **4 Wire Output** - SDI 1-4, Video Format: Desired 4K/UltraHD Rate, Pixel Format: YUV-8 (RGB Not supported for 4K/UltraHD), SDI Transport: SD/HD Single Link, SDI 4K Transport: Squares
- **HDMI Output** - HDMI Out, Video Format: Desired 4K/UltraHD Rate, Pixel Format: YUV-8 (RGB Not supported for 4K/UltraHD)

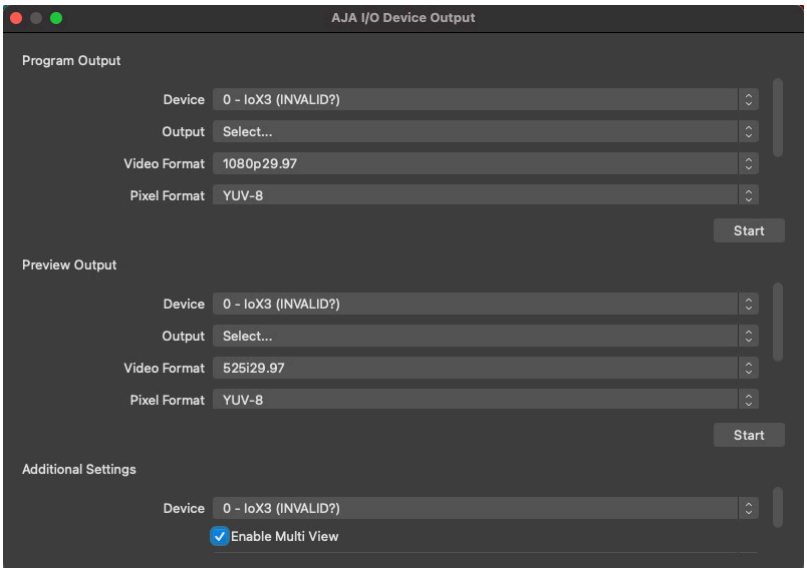
Figure 17. OBS SDI 4K Transport Window



MultiView Operation

When using the Io X3 with OBS, the HDMI MultiView Output can be engaged for source confidence monitoring by selecting the "Enable Multi View" box in the Additional Settings section at the bottom of the AJA I/O Device Output window.

Figure 18. OBS AJA I/O Device Output Window Additional Settings



Monitoring AJA I/O Device Audio

1. To be able to monitor the audio from the input in your Host Audio system, either right click or select one of the gear icons to the right of the sound icons in the Audio Mixer panel, and then choose “Advanced Audio Properties”.

Figure 19. OBS Audio Mixer & Drop Down Menu

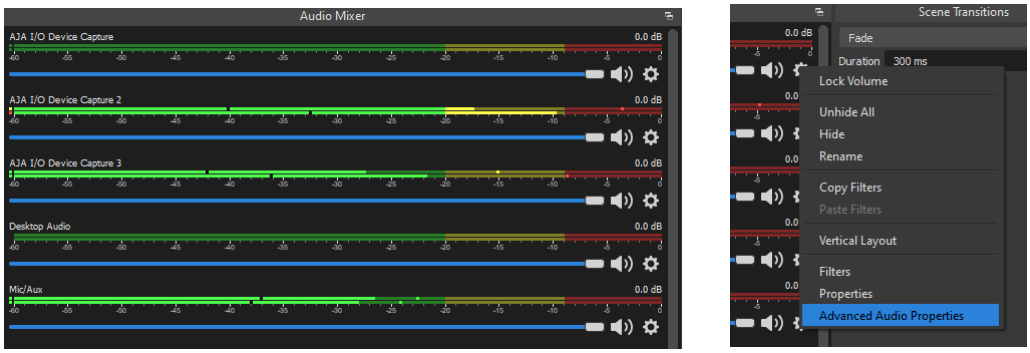
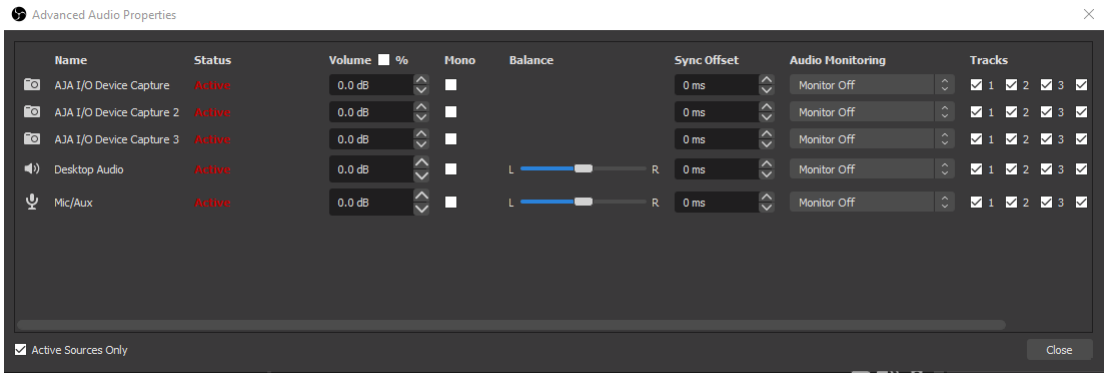


Figure 20. OBS Advanced Audio Properties Window



2. Under the Audio Monitoring tab, select the desired device and select “Monitor and Output”

Figure 21. OBS Audio Monitoring Drop Down Menu