

# Io IP

Transport, Capture, Display



## Installation and Operation Guide

Version 14.2  
Published July 3, 2018



# Notices

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## Contacting AJA Support

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When calling for support, have all information at hand prior to calling. To contact AJA for sales or support, use any of the following methods:

Telephone	+1.530.271.3190
FAX	+1.530.271.3140
Web	<a href="https://www.aja.com">https://www.aja.com</a>
Support Email	<a href="mailto:support@aja.com">support@aja.com</a>
Sales Email	<a href="mailto:sales@aja.com">sales@aja.com</a>

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# Chapter 1 – Introduction

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## Overview

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io IP is a portable Thunderbolt 3 ingest and playback device for professional HD video and audio over IP, bridging 10 GigE to the most popular creative software applications.

io IP has all the portable benefits of the AJA io family line with two Thunderbolt 3 ports for flexibility. It works with AJA's Control Room, Control Panel software and SDK tools, and provides support for leading content creation applications, such as Adobe Premiere® Pro, Apple FCP X, Avid Media Composer®, FilmLight products and more. Designed as a flexible platform with support for SMPTE 2022-6 and 2022-7 uncompressed IP video and audio, io IP offers you the flexibility to keep current as the IP transition proceeds.

## io IP Features

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io IP is designed as a flexible platform for supporting various different IP standards and types. See "[Video Formats](#)" on [page 52](#) for a complete listing.

**NOTE:** NDI is supported on io IP in the same way as it is supported on KONA 4, io 4K Plus etc., courtesy of running Newtek Connect.

### Physical Connection for IP Video

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- 2x 10 Gb Ethernet SFP+ Cages - SFP+ modules not included.

### Inputs and Outputs

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- AJA Desktop Software package configured by default for 2022-6 operation with two simultaneous uncompressed streams on SFP 1 (one In, one Out).
- For 2022-7 operation, a second SFP is used for redundant transport of the other SFP's signals.
- Dedicated 3G SDI monitor output
- Dedicated HDMI 2.0 output
  - HDR signaling and monitoring for HDR10 and HLG. HLG support is application dependent. Check with your software manufacturer for compatibility.

### Digital Audio Input

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- 16-Channel embedded audio

## Digital Audio Output

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- 16-Channel embedded audio, 16- and 24-bit per channel, 48 kHz sample rate, synchronous
- 8-Channel HDMI embedded audio, 48 kHz sample rate, synchronous

## Balanced Analog Audio Input and Output

---

A 25-pin connector provides 8-channel balanced analog audio. The eight analog audio channels can be configured in four different ways:

- Ch 1-8 Output
- Ch 1-4 Input and Ch 5-8 Output
- Ch 1-4 Output and Ch 5-8 Input
- Ch 1-8 Input

## Signal Timing

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- 1x BNC assignable to reference video or LTC input

## Internal HD/SD Hardware Downstream Keyer

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Io IP provides a powerful hardware keyer that can place graphic files with an alpha channel over video in a selectable matte or the contents of the card's framebuffer from a software application (including AJA TV). Key a bug or text over picture and avoid what might normally be a lengthy software render. Also, working with these software applications, you can key video that has an alpha-channel over video input or a matte. For example, you can load a QuickTime clip that has an alpha-channel (a flying logo generated in the Animation codec) into AJA TV and then place it over live video coming into the card and then passing both on to a VTR for recording or broadcast.

## AJA Software & Utilities

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Io IP operates with AJA's Desktop software package, developed for powerful integrated video/audio capture, editing, and production with a variety of 3rd-party software. AJA software is distributed as a unified package which includes all the software, firmware, plug-ins, and utility programs for the Io IP, as well as AJA's Io, KONA, and T-TAP products.

Two retail packages are available, one for Mac and one for Windows.

## Mac and Windows Packages

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These packages include:

### Firmware

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Firmware, otherwise referred to as a bit file or the card's 'personality', refers to very low level code that defines the capabilities of the hardware. It is important to always update to the firmware recommended following install of new, or older versions of software.

### Drivers

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AJA device drivers for the host system OS provide tightly integrated hardware/software operation.

### AJA Control Panel

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The Control Panel provides:

- Source selection and control of your AJA hardware.

- A block diagram to show visually what routing and processing is being performed.

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### AJA Control Room

Control Room is a cross-platform software application for ingest, playback and output with AJA products.

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### AJA System Test

AJA System Test provides accurate and detailed evaluations of drive and system performance statistics, allowing you to measure the capabilities of your system for recording and playing back various resolutions and codecs. The application includes:

- System Disk Test
- AJA Device Test
- Disk + Device Test
- System Report

The application tests Read and Write, Capture and Playback speeds in both Megabytes per second and Frames per second. The disk speed tests differ from standard disk I/O performance applications in that they specifically test the system under conditions typically encountered with video capture, playback, and editing.

*NOTE: Theoretically the best test (or simulation) is to fill your storage disk to 80% and then test capture at the highest data rate you will use.*

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### 3rd-Party Plug-ins

Plug-ins for popular 3rd-party Professional Video Applications from Adobe, Avid, Apple, Telestream, and others.

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## System Requirements

Your system should meet minimum hardware and software requirements to achieve a satisfactory level of performance. Updates to system requirements are subject to change.

*NOTE: See Software Vendor system requirements for GPU and additional hardware recommendations.*

Recommended system specifications:

- Mac OS 10.12 Sierra or later
- Win 10 or later with all updates
- 2.5 GHz quad core i7 minimum, for HD
- 8GB RAM minimum, 16GB or more recommended, especially for High Frame Rate applications
- A reasonably fast and powerful graphics card, with plenty of on-board memory. Examples (may be specific to application version and/or host CPU) include:
  - Nvidia K5200
  - Nvidia K4200
  - Nvidia M6000
  - Nvidia M5000
  - Nvidia M4000
  - AMD W7100
  - AMD W8100

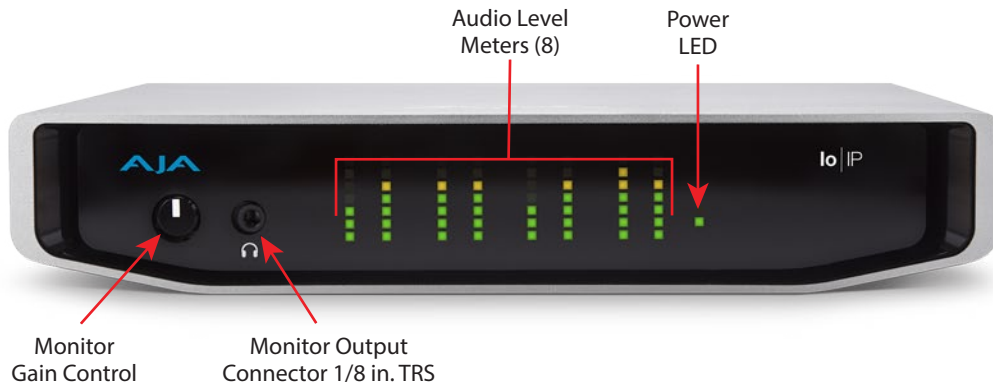
- Media storage with adequate bandwidth to sustain the capture and playback of the material you expect to be working with.

*NOTE: For large scale installations with shared storage, or for very high performance requirements, consultation with an experienced a system integrator is recommended. A consultant will be able to assist with many important variables.*

## Hardware Description

### Front Panel Controls and Indicators

Figure 1. Io IP Front Panel



The Io IP front panel has the following controls and indicators:

#### Monitor Output and Gain Control

A 1/8 inch TRS connector is available for monitoring two channels of audio, selectable in channel pairs using the Control Panel application. Typically used with a pair of headphones.

The Monitor Gain knob on the left adjusts the monitor output level. Pushing in the knob extends it (for adjustment) or recesses it (to prevent accidental changes).

#### Audio Level Meters

The Audio Level Meters in the center of the front panel indicate:

- During Capture - The first 8 channels of the audio source selected (SDI, HDMI, Analog).
- During Playback - The sum of whatever sources are being played out via the Aja hardware; i.e. NLE timeline and mix of host system audio output (if applicable).

The meter's LEDs are colored to indicate the amount below 0dBfs when averaged over a one millisecond time interval:

dBfs	LED Color and Location
-2 db	Red LED 1 (top)
-12 db	Yellow LED 2
-20 db	Yellow LED 1
-30 db	Green LED 4
-40 db	Green LED 3



-50 db	Green LED 2
-60 db	Green LED 1 (bottom)

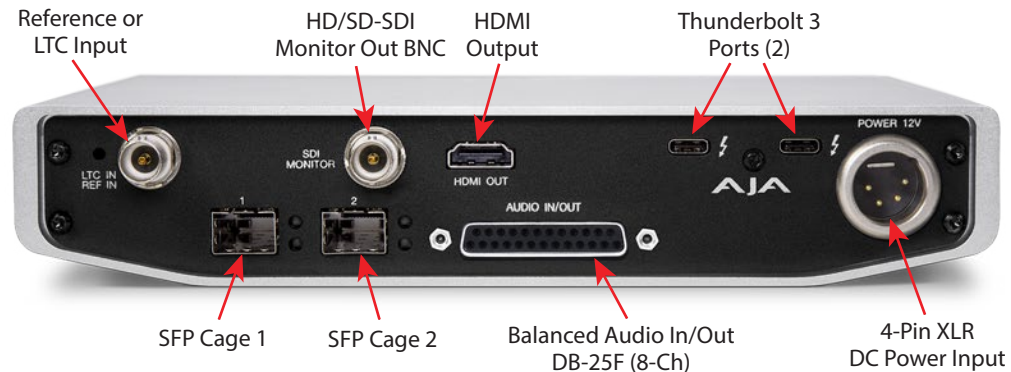
**NOTE:** These audio level meters are for guidance only. Third-party audio metering should be employed when doing critical audio editing and mixing.

## Power LED

The power LED lights up yellow when power is provided via the power supply. Once a Thunderbolt 3 connection is made, and the host is in an active state, the light turns green.

## Rear Panel Connectors

**Figure 2. Io IP Rear Panel**



## Thunderbolt 3

The Io IP provides the third-generation Thunderbolt 3 (USB-C) ports to support increased bandwidth between host computer and I/O device. Two ports are provided for daisy-chained network configurations.

## SFP Cages and Modules

Two SFP+ cages are provided to connect two separate 10 Gigabit Ethernet Links. Both links are bi-directional. Inputs and outputs for most uses will be set up over the same link if bandwidth allows it.

For a list of SFP+ modules tested by AJA, see ["Appendix A Specifications" on page 52](#).

## Dedicated SDI HD/SD Output

One BNC connector is provided for full-time, real-time output of 2K/HD/SD video.

## HDMI Output

A full-size HDMI connector on the Io IP endplate provides HDMI 2.0 capability. HDMI also supports multi-channel embedded audio (8 channels). HDCP is not supported on the output. HDMI Output also supports HDR (HDR10 and HLG).

## Reference Video

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When in SMPTE 2022-6/7 mode, Io IP can lock to reference analog or tri-level input, or the incoming SMPTE 2022-6/7 stream.

For analog reference, a single BNC on the Io IP endplate allows you to synchronize Io IP outputs to your house analog or tri-level reference video signal (or black burst). If you have a sync generator or central piece of video equipment to use for synchronizing other video equipment in your studio, connect its output here. When Io IP outputs video in SMPTE 2022-6/7 mode, it locks to this reference signal. When connecting a reference video source, the locking signal should be the same format as the Primary format selected in Io IP software. It is possible in some circumstances to use an alternate format video signal if the basic frame rate is compatible.

Io IP can also lock to an incoming SMPTE 2022-6 signal, or it can free run.

## Balanced Analog Audio Input and Output

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A 25-pin connector provides 8-channel balanced analog audio, 24-bit 48kHz sample rate D/A and A/D, for use with an industry standard 8x XLR on DB-25 breakout cable (cable not included). The eight analog audio channels can be configured four different ways:

- Ch 1-8 Output
- Ch 1-4 Input and Ch 5-8 Output (default setting)
- Ch 1-4 Output and Ch 5-8 Input
- Ch 1-8 Input

## 12V Power Connector

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A standard 4-pin XLR type connector is provided for either battery or line source power using the supplied AC power adapter.

## In This Manual

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Chapter 1 - Introduces the product briefly, listing features and system requirements.

Chapter 2 - Provides complete instructions for installing and configuring the product.

Chapter 3 - Discusses operational aspects and how to work with 3rd-party software.

Appendix A - Presents a list of technical specifications for the product.

Appendix B - Provides important Safety and Compliance information.

# Chapter 2 – Installation

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## Installation Overview

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1. If not previously installed on your Thunderbolt equipped computer, ensure that appropriate third party application software is installed as detailed in its user documentation.
2. Download and install the latest Io IP software from:  
<https://www.aja.com/en/support/downloads>
3. Connect your Io IP to your computer using an appropriate Thunderbolt 3 cable (and adapter if required). Information about Thunderbolt including cable recommendations is available here:  
<https://www.aja.com/solutions/thunderbolt>
4. Insert compatible SFP module(s) into the SFP cage(s) and connect to your media network.
5. Connect the video and audio inputs and outputs to your Io IP .
6. Power up the unit (AC supply or battery). The Io IP will startup automatically.

*IMPORTANT: You should wait at least two minutes after Io IP powers up before you open AJA Control Panel.*

7. When you run AJA Control Panel, the Io IP is auto-discovered as long as it is properly cabled and powered up.
8. You will now be able to configure your Io IP for operation on your network.

## Unpacking

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### Shipping Box Contents

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As you unpack your shipment, carefully examine the contents. Ensure you received everything and that nothing was damaged during shipping. If you find any damage, immediately notify the shipping service and supply them with a complete description of the damage. AJA will repair or replace damaged items. If you find shipping damage, contact your AJA dealer or distributor for details on how to have your AJA device repaired or replaced.

*NOTE: Save packing materials and the shipping box. If you ever require service or move your system use the packaging materials and box for safe shipment.*

## Installing Io IP Software

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*NOTE: If your computer has previously had another video capture or multimedia device installed, ensure you uninstall any related software before installing Io IP. This will prevent any hardware or software conflicts.*

Before installing the AJA Desktop Software package, ensure that your capture/editing application is installed as detailed in its user documentation. You cannot use the AJA Desktop Software package with a third-party application until the application has been installed and run at least once on your workstation. Next, install the AJA Desktop Software package. If at a later date you add any Io IP supported applications that require drivers, you must run the AJA install program again to install them.

*NOTE: Always uninstall the previous version of the AJA Desktop Software package before updating your Io IP.*

## Important MacOS High Sierra Installation Information

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With the introduction of macOS High Sierra (v10.13), Apple now requires that third party application developers be identified during kernel extension installations. Failure to do so will make AJA devices fail to operate (Unsupported AJA Device).

Depending on your macOS version and AJA Desktop Software installation history, the following installation outcomes are possible:

### MacOS Sierra and Earlier Supported Versions

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No problems exist for AJA software installation or updates with these earlier versions of macOS.

### Earlier MacOS to High Sierra Update

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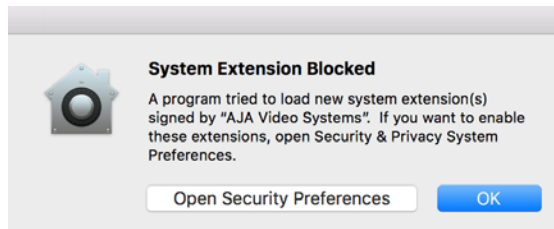
No problems should occur if you already have the AJA Desktop Software package installed on macOS Sierra (or earlier) and update your Mac to High Sierra. The identification of AJA as a trusted developer is passed from the earlier macOS to the High Sierra macOS.

### MacOS High Sierra First AJA Desktop Software Install

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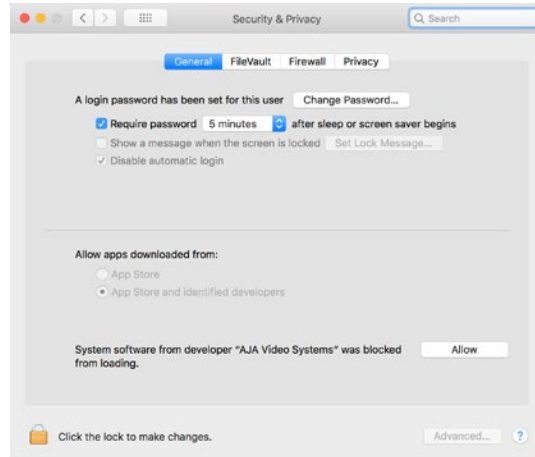
No problems should occur if your Mac is running High Sierra macOS, you install AJA Desktop Software for the first time, and you follow the instructions shown during installation ([Figure 3](#)).

*Figure 3. MacOS High Sierra Blocked Message Prompt*



Do NOT click **OK**. Instead click **Open Security Preferences** (or go to System Preferences>Security and Privacy) and then click **Allow** for AJA Video Systems developer ([Figure 4](#)).

Figure 4. MacOS High Sierra System Preferences, Allow Developer



**NOTE:** If after successful installation, you remove AJA applications from your computer using the AJA Uninstaller, developer identification is retained by macOS High Sierra. Re-installation should proceed without any problems.

## Recovery from Installation Approval Failure

If you just clicked OK during installation and skipped the developer approval step, the AJA Desktop Software installation will complete, but essential extension installations will not occur and AJA devices will not be operational (Unsupported AJA Device).

Apple has engineered a time window, within which you can belatedly approve a developer after a partial installation. If you go to System Preferences>Security and Privacy, within 30 minutes of a partial installation, the developer message and Approve button will be available for use. After 30 minutes, however, the message and button are removed from the window. Recovery from this involves uninstalling all AJA files (some manually), reinstalling the AJA Desktop Software package, and clicking on Allow for AJA Video Systems developer.

### Recovery Procedure

1. Run the AJA Uninstaller, located in the AJA Utilities folder in the Mac Applications folder.
2. Access the Users Library, which is hidden. To access the library:
  - A. Go to the Finder.
  - B. In the Finder Menu Bar and click on **Go**.
  - C. Hold down the **Option** key. The Library folder appears as long as the **Option** key is held down.
3. Go to Library>Preferences and delete all **com.aja.\*.\*** files. There may be one file or several files.
4. Remove AJA Control Panel from the Dock, if applicable.
5. Restart the Mac.
6. Install the AJA Desktop Software package.
7. During installation click on **Open Security Preferences** (or go to System Preferences,>Security and Privacy).
8. Under the **General** tab click on the **Allow** button for AJA Video Systems. The button is only available for 30 minutes.

# Cabling the System

See ["Rear Panel Connectors" on page 9](#).

## Io IP Cable Connections

For 2022-6 and 2022-7 operation, 10GbE infrastructure can be connected with either a short (3 feet) Direct Attached cable, or optical fiber cable with appropriate SFPs.

Figure 5. IP Configuration Example for 2022-6 Workflow

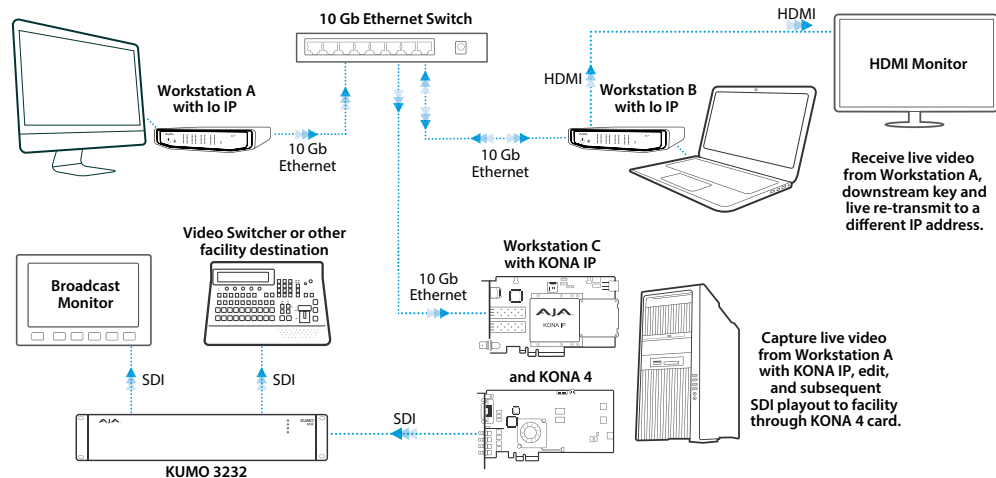
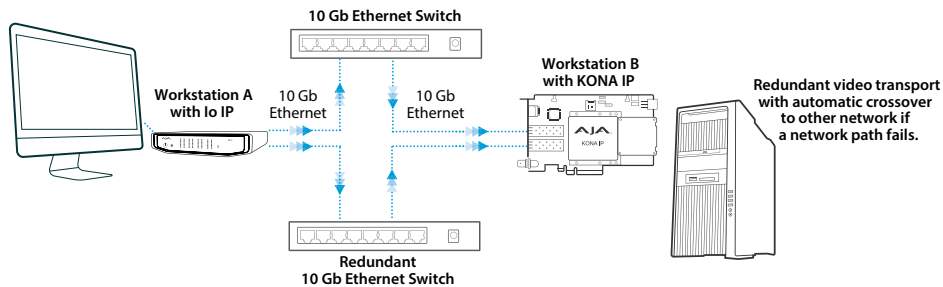


Figure 6. IP Configuration Example for 2022-7 Workflow



## SFP Module Connections

For SMPTE 2022-6 / SMPTE 2022-7 operation (s2022), modules inserted into the two SFP+ cages can be used to connect two separate 10 Gigabit Ethernet Links.

With AJA Desktop Drivers, the SFP 1 and 2 modules are configured using AJA Control Panel software, using the Input, Output, and Network Settings tabs. In most cases, only SFP 1 will be used, providing up to two total streams of SD or HD video, each with 16 audio channels and metadata, for simultaneous input or output, i.e. when using SMPTE 2022-6. Both links are bi-directional (one In, one Out). When in SMPTE 2022-7 mode SFP 2 carries a duplicate of the Upper SFP data.

For a list of SFP+ modules tested by AJA, see ["Appendix A Specifications" on page 52](#).

# Unicast and Multicast Support

Io IP supports both unicast and multicast operation. Unicast operation is point to point, from one sender to one receiver. Multicast operation is from one sender to possibly multiple receivers. In both cases, the sender transmits information to a location (IP address) on the network, and receivers access that information over the network using that location IP address. Compatible IP addresses are required for each type of operation. These network settings filter the IP addresses so the information is sent successfully to the desired receiver(s).

*IMPORTANT: Proper network configuration settings vary, depending on your particular network environment. Because the process can be complicated, you should always consult with your facility's IP or Networking Engineering department before configuring Io IP network settings.*

Listed below are example sets of compatible IP addresses that could be used in an isolated network to test Io IP network operation.

*Table 1. Example Compatible Unicast IP Addresses*

Control Panel Screen	Parameter	Io IP 1 (send)	Io IP 2 (receiver)
IP Network	Local IP Address	192.168.10.31	192.168.10.32
	Subnet Mask	255.255.255.0	255.255.255.0
IP Input	Destination IP Address	---	192.168.10.41
	Destination Port	---	2000
IP Output	Destination IP Address	192.168.10.41	---
	Destination Port	2000	---

*Table 2. Example Compatible Multicast IP Addresses*

Control Panel Screen	Parameter	Io IP 1 (send)	Io IP 2 (receiver 1)	Io IP 3 (receiver 2)
IP Network	Local IP Address	192.168.10.31	192.168.10.32	192.168.10.33
	Subnet Mask	255.255.255.0	255.255.255.0	255.255.255.0
IP Input	Destination IP Address	---	239.0.61.100	239.0.61.100
	Destination Port	---	10000	10000
IP Output	Destination IP Address	239.0.61.100	---	---
	Destination Port	10000	---	---

# Chapter 3 – Io IP Operation

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## Using Io IP with Professional Video /Audio Software

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After you install the AJA software package on your computer, you're ready to begin capturing and playing back video and audio using your choice of third-party software. You can go here for AJA software and documentation:

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

For further support information and downloads for third-party software and DirectShow for Developers, go to:

<https://www.aja.com/compatibility/io>

## Capture Formats

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When capturing, you can record data in the following file formats:

- DPX
- TGA
- BMP
- QuickTime
- MXF

*NOTE: Support by Io IP of QuickTime for Windows has been discontinued. Instead, AJA supports ProRes Playback on Windows via our own libraries.*

*NOTE: Other file types can be captured using third-party capture applications such as Sienna, Softron, Tools on Air, Drastic Technologies, or Quadrus.*

## AJA Control Panel Overview

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The AJA Control Panel is a software application that provides a simple visual showing how the Io IP hardware is currently configured and allows you to make changes. You can change signal input and output parameters and define the video processing that will be performed.

The AJA software installer automatically installs the Control Panel application on your computer.



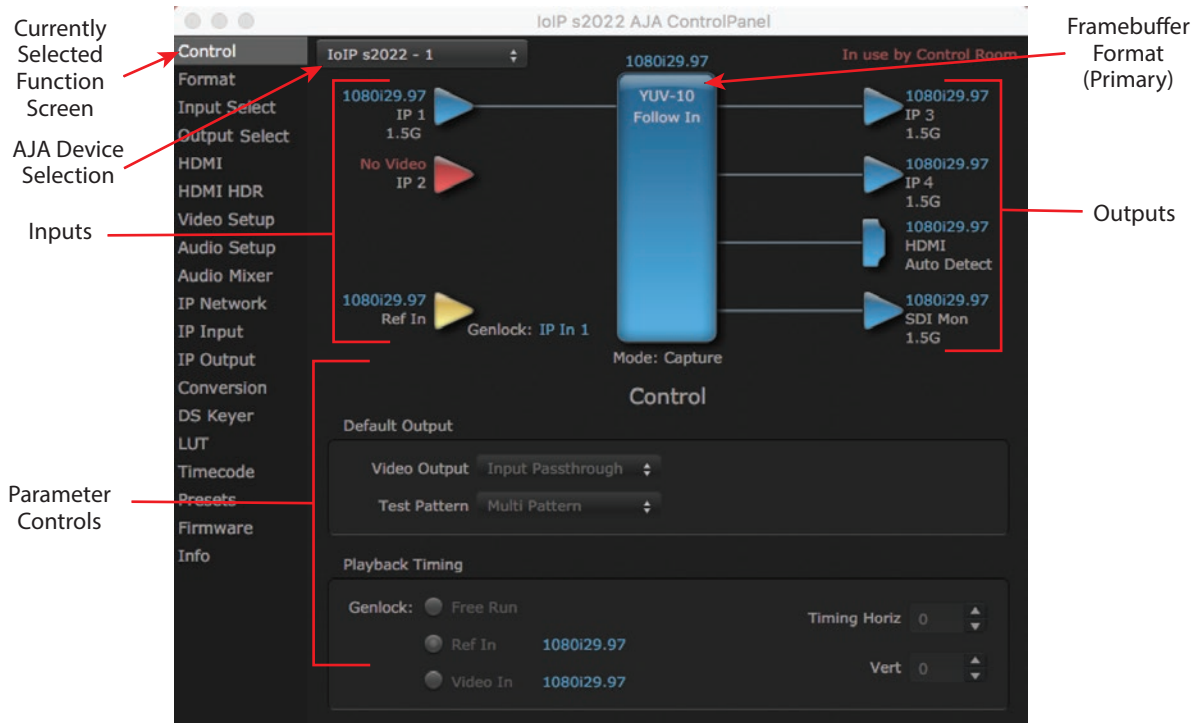
# AJA Control Panel User Interface

The AJA Control Panel user interface includes a visual block diagram of the unit's current configuration. The current status, input and output settings, and many other details are depicted in the color-coded block diagram. Below this block diagram are various controls for changing operating parameters, which will vary depending on which function screen has been selected.

The left side of the AJA Control Panel provides a navigation list of available function screens. Clicking on a link (or alternatively, a related element in the block diagram) displays a function screen corresponding to that topic.

*NOTE: Although IoIP is sending and receiving video over IP, once that data is decoded to memory it is governed by the same video menus used for SDI and HDMI based AJA I/O solutions.*

Figure 7. AJA Control Panel, Block Diagram and Controls

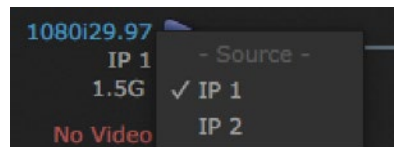


## Block Diagram Area

The top block diagram area of the Control Panel screen is a visual representation of the processing, if any, that's currently occurring, including inputs/outputs, reference source, and system status. Lines between inputs, the framebuffer, and outputs, show a video path. Where there are no lines, there is no connection; this can be because an input or output isn't selected in the Input Select menu. The lines will also show whether the outputs are video or video + key.

You can click any of the function screen selection links in the left column to view its current settings or click on an icon to call up its related settings screen. You can also right-click or Control-click to see context-sensitive information and choices.

Figure 8. Context Sensitive Menu



## Color Meanings

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All items in the AJA Control Panel block diagram are color-coded to show what is happening in real time. This applies to both icons and text. These colors indicate:

**Blue** - Video is same format as the Primary Format (framebuffer)

**Yellow** - Reference video (black burst or other reference source)

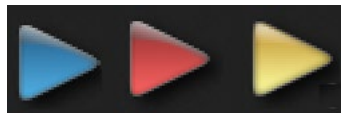
**Red** - The selected operation cannot be performed

## Input/Output Icons

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The input and output icons are triangles that together with their color show all the input and outputs and their status (selected, not selected, input present or not, format, etc.). A complete video path is shown when inputs and outputs are connected with lines going to/from the framebuffer.

*Figure 9. Input/Output Icons*



## Framebuffer

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The framebuffer is the “engine” where your third-party applications interface with the AJA device. The framebuffer has a format (called the “Primary Format”) and color space that it follows, as defined in the linked menu screens or via external application software.

## Primary Format

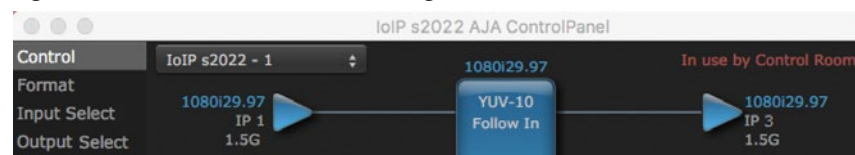
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The Primary Format is the media format written to disk and used in your project. This is the format that the framebuffer will use and is shown in the Control Panel using the color blue. It is the format that the third-party application software will either receive from the AJA hardware, or is sending to the hardware. All icons in blue are the same as the Primary Format used by the framebuffer. Also any text descriptions in the block diagram that appear in blue indicate that something is in the primary format.

## Controlling Application

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*Figure 10. Control Panel In Use Message (in red)*



In the top right corner, the Control Panel displays the name of the application controlling the unit. In some cases, applications may not always properly “let go” of the I/O interface as another takes over—you’ll be able to tell by looking at the Control Panel.

## Presets

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Setups can be named and saved as a snapshot (Preset) for recall at any time. You can save various AJA device Control Panel configurations associated with your frequent tasks. You don't have to spend time resetting interface configurations, just load the previously saved Preset for each task. See "[Saving, Loading and Deleting Presets](#)" on page 49 for more information.

If you work on multiple systems and want to carry your saved setups to another location, you can copy your saved Preset files on to movable storage and load them into any computer running the AJA Control Panel application.

### Mac OS Preset Files Storage Location

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- From the Finder, hold down the Option key (to display the Library directory) and click on Go/Library/Application Support/AJA/<device name>/Presets/

### Windows Preset Files Storage Location

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- c:\Users\<username>\AppData\Local\AJA\Control Panel\<device name>\Presets\

*NOTE: When you visually browse to the above location, depending on Windows OS setting you may not be able to visually see the folder referred to in the path. Instead, you have to fill out the rest of the Windows path manually (i.e. type the rest of the address in the navigation bar when you hit the "end" of the browsing path).*

## Default Preferences

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When an AJA device starts up, a preference can determine what settings it will have it when it begins to operate. The AJA Control Panel offers two default preference settings:

- Local Preference - A preference stored from the last AJA device's Control Panel settings to be used on next startup of AJA Control Panel. This occurs on next restoration of the default state (triggered by start up of host CPU, startup of the AJA device, or when a third-party application releases the AJA device).
- Global Preference - A preference saved for use as a global default start state for an AJA device that can be shared by multiple users, applied on first startup, or by pressing the Control Panel **Reset Device...** button.

### Local Preference

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The Local Preference file (com.aja.devicesettings) exists to immediately and automatically store all parameter changes made by a user on a particular AJA device. When any control is changed in the Control Panel, that change is recorded in the Local Preference file stored in a unique location on that computer that is dedicated to that particular device, serial number, and logged-in user. Then, when AJA Control Panel is restarted for any reason, the AJA device being controlled restores the settings being used when Control Panel was last closed.

The Local Preference file can be accessed at the following locations.

On Mac:

- From the Finder, hold down the Option key (to display the Library directory) and click on Go/Library/Preferences/com.aja.devicesettings.

On Windows:

- C:\Users\<USER\_NAME>\AppData\Local\aja\com.aja.devicesettings

*NOTE: Clicking on the AJA Control Panel "Erase All Prefs" button deletes the existing Local Preference file from this location. This file will be recreated as soon as any Control Panel setting is changed.*

*NOTE: Clicking on the AJA Control Panel "Reset Device..." button will delete the existing Local Preference file. If a Global Preference file is found, these settings are reloaded. If a Global Preference file is not found, "factory defaults" are loaded and the device is set to that state*

## Global Preference

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An administrator can establish a house standard for an AJA device by copying a preference file to a shared computer location. Once placed at that location, it becomes a Global Preference file where it will establish a standard default startup state for all users of that AJA device using that computer system. These settings preempt the initial AJA factory default settings, and are applied when an AJA device is first powered up, or when the Control Panel **Reset Device** button is pressed.

To establish a Global Preference, the administrator first configures the AJA device (which automatically creates a "com.aja.devicesettings" Local Preference file in the location identified above) and then copy or move that file to the correct computer locations (manually or by pushing it out across the network) on all the computers that use the AJA device.

*NOTE: If the user makes changes to an AJA Device's Control Panel settings, those changes are saved to the Local Preference file, which will take priority over the Global Preference file.*

The shared computer locations for a Global Preference file are:

On Mac:

- From the Finder, click on Go/Computer/<System HD>/Users/Shared/AJA/ and copy or move the "com.aja.devicesettings file" described above to this location.

*NOTE: The "AJA" folder needs to be created manually at this location before moving the preference file into it.*

On Windows there are three possible shared locations depending on your system:

- C:\Users\Public\Aja\
- C:\Users\All Users\Aja\
- C:\ProgramData\Aja

Copy or move the "com.aja.devicesettings file" described above to one of these locations.

*NOTE: The AJA Control Panel Info screen displays the path to the Global Preference file on that computer.*

*NOTE: Clicking on the AJA Control Panel Erase All Prefs button does NOT delete an existing Global Preference file from this location.*

## Io IP Audio Monitoring

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Io IP hardware can be used as your single audio monitoring solution whether you are auditioning music in a web browser, playing a movie file on the desktop, creating music, or playing a YouTube clip. As long as the output of your work or application is normally output via the host system audio, your AJA hardware can route this audio for monitoring. This cuts down on unnecessary cabling, and means you can take advantage of a consistent audio monitoring environment whatever you are currently doing with your host system.

**NOTE:** On first use, you will need to tell your operating system to use AJA hardware as the default Input and Output hardware.

Io IP lets you listen to Host System audio concurrently with your NLE audio. This is useful if you need to audition music tracks against playback of your NLE timeline, or if you need to Skype with a remote producer during an edit session, or for a myriad of other reasons.

You can also listen to Io IP Input concurrently with your NLE (with the exception of Avid Media Composer). This is useful if you need to listen out for the readiness of talent, or the presence of some other feed, whilst you continue to work.

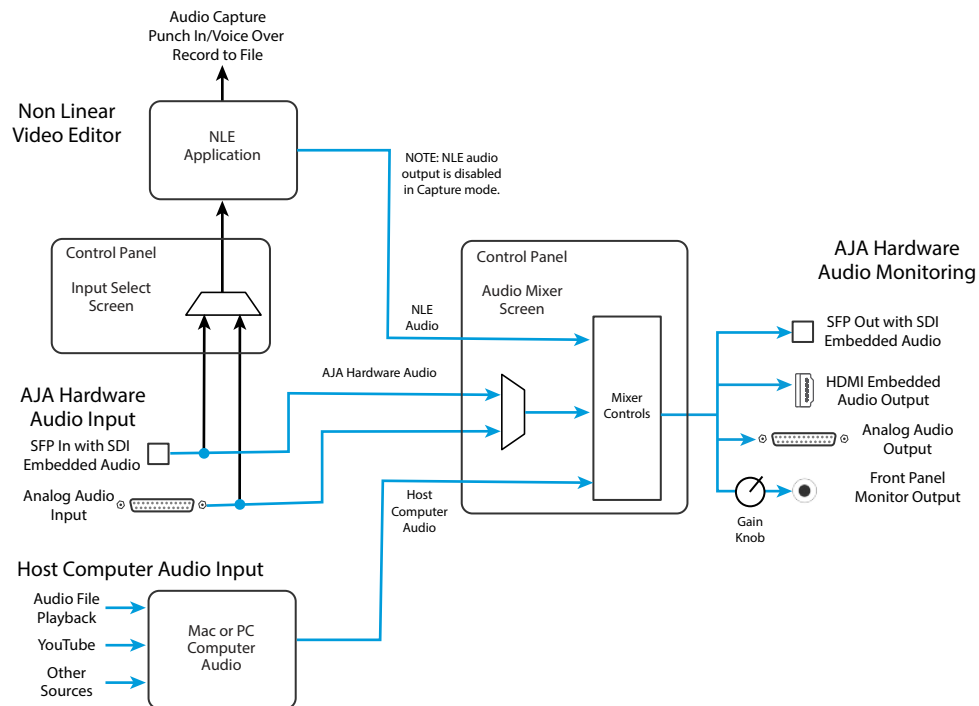
Io IP audio monitoring is routed and mixed using the Control Panel application's Audio Mixer screen. You can select sources to be monitored, and can adjust their levels. If you are using the 1/4 inch monitor output connector, an additional overall mix gain control is conveniently available on the Io IP's front panel.

The mixed audio monitor signal is routed to:

- Front Panel Monitor Output (headphone jack)
- SDI Embedded Audio Out
- HDMI Embedded Audio Out
- Analog Audio Out (via DB25 cable)

**IMPORTANT:** Even though you can hear changes in the signals and levels adjusted with the Audio Mixer screen, these changes are NOT recorded to disk during NLE Capture or Audio Punch In / Voice Over to Timeline. The Audio Mixer screen is dedicated for monitoring only, not program mixing.

Figure 11. Io IP Audio Monitoring Routing Diagram



**NOTE:** Linux OS has not yet been tested with this functionality and as such remains unsupported until a future announcement.

To control which AJA hardware audio is used during recording, you use the Control Panel application's Input Select Screen, Audio Input Select drop down to select from:

- SDI embedded
- Analog (via DB25 cable)

Any level adjustments to Capture or Audio Punch In / Voice Over to Timeline recording operations will either need to be made upstream of the AJA input, or else via adjustments within the main NLE application (e.g. via a pass through mix tool).

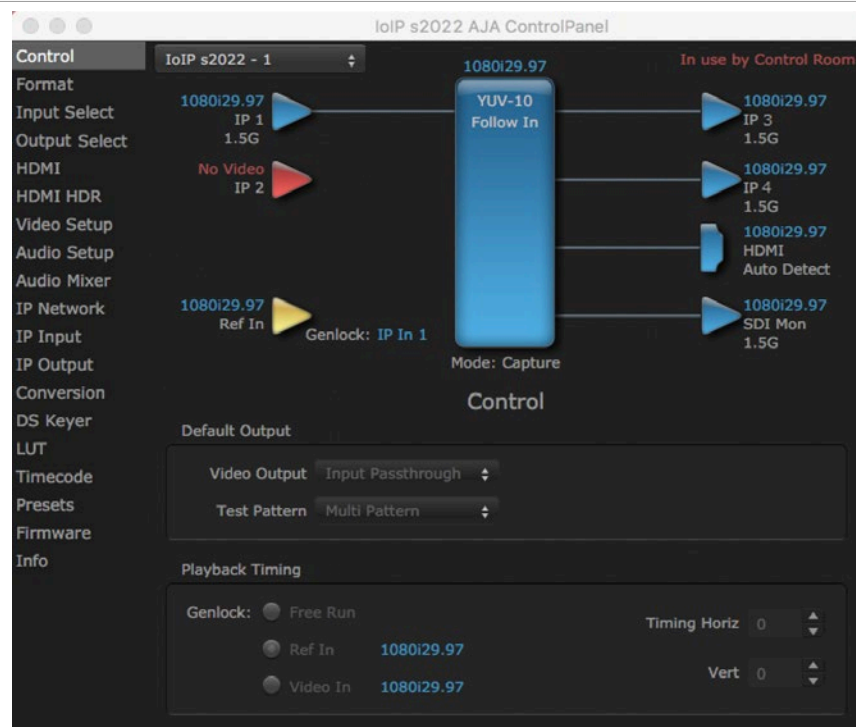
## Control Panel Function Screens

*Table 3. Io IP Function Screens*

<b>Screen</b>	<b>Functions</b>
Control	Configure some basic Io IP operation options and output timing.
Format	Select the framebuffer primary video format and any secondary formats for conversion of inputs/outputs
Input Select	View and edit input selections and audio mapping.
Output Select	Select output format.
HDMI	Configure the HDMI Output
HDMI HDR	Configure High Dynamic Range settings for HDMI output
Video Setup	Configure Video such as composite black level, progressive format and ancillary data (Closed Caption) option.
Audio Setup	Configures Audio options such as analog audio monitor level.
Audio Mixer	Select and mix audio sources for playback and capture.
IP Network	Configure network parameters for the location of each Io IP physical SFP cage.
IP Input	Configure parameters for receiving inputs from the media network.
IP Output	Configure parameters for sending outputs to the media network.
Conversion	(Mac platform only) Select codec options such as whether paused video is full frame or single field, pulldown settings, and color space conversion.
DS Keyer	Setup and control the insertion of keyed video from the frame buffer or graphics files with alpha channel.
LUT	Load a lookup table (LUT) file to adjust the calibration of color for any source.
Timecode	Monitors SMPTE 12M-2 timecode and configure timecode window burn output.
Presets	Add or delete saved preset configurations (handy for quick and easy recall of different Io IP settings for varied workflows).
Firmware	Install firmware from your currently installed AJA software package.
Info	Display status information and the firmware version number. This information is generally intended for troubleshooting/support.

# Control Panel Operation in s2022 Mode

## Control Screen



The Io IP card can be controlled by various software applications running on a host computer. The Control screen is where you select how the Io IP directs video and is used by application software. This screen also provides control for configuring output timing with regard to external reference video and horizontal/vertical delay. The top of the Control Screen shows the currently selected AJA device if more than one is available in your system.

## Default Output

This is where you select what the Io IP card will output as a default when no application has control of the board, such as when the Mac Finder or Windows Navigation Pane is active. Since Io IP can be controlled by software applications as well as its own control panel, the output can change dynamically. When you select many video applications, they will take control of the Io IP inputs and outputs. However, when an application that doesn't take control is active, these settings determine what Io IP will output.

### Input Passthrough

This selection directs Io IP to route video from its selected input through the card for processing and output.

### Test Pattern

This selection directs the Io IP card to output a choice of preset pattern when no other application is using the Io IP card. You can choose from:

- Black, Color Bars (75% or 100%), Ramp, Multiburst, Line Sweep, Multi Pattern, or Flat Field, Check Field, White, Border, Linear Ramp, Slant Ramp, Zone Plate, and Color Quadrant.

In addition to the preset test pattern choices, a "Load File..." selection at the bottom of the menu allows you to load any standard RGB graphics file (.tif,.psd, etc.) into the frame buffer for display.

While in Test Pattern mode, you can select RGB or YUV output via a pulldown menu.

*NOTE: The graphic file will not be scaled to fit. If it's smaller than the current frame buffer format, lo IP will center it in the frame. If it's larger than the current frame buffer format, it will be cropped on the right and bottom. Also some graphics formats and bit depths may not be supported. Once a graphic file is loaded into the frame buffer it will be retained until it is overwritten by another graphic or test pattern, or when power is turned off. Graphic file names are only "remembered" in the menu until the AJA Control Panel application closed.*

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## Hold Last App

This selection directs lo IP to hold and output the last frame of video from the last application to control lo IP. This can be helpful when operating in an environment where you're switching back and forth between multiple application windows.

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## Playback Timing

Use these controls to set Genlock and Timing adjustment.

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### Genlock

Selects how lo IP will synchronize program video:

- Freerun - In this mode, lo IP generates sync without an external reference source
- Ref In - Directs lo IP to use the Ref Video source for sync (usually an analog black burst video signal)
- Video In - Directs lo IP to use whichever video input source has been selected in the Inputs Screen for sync

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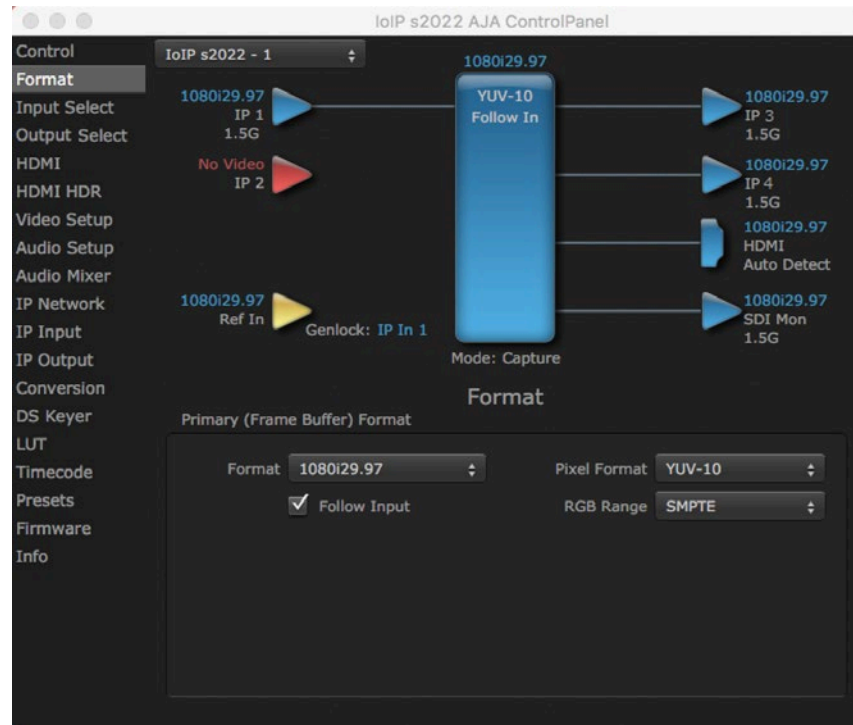
### Timing (Horiz and Vert):

These two pull-downs allow output timing adjustment with reference to the Ref Video source selected:

- Horizontal selects a number of pixels (clocks) to offset
- Vertical specifies a number of lines to offset



## Format Screen



The Format Screen shows the video format currently in use by the Io IP framebuffer (called the Primary Format) and allows you to change it. All throughout the Control Panel, choices are always presented based on what Io IP can do with the signals available and the inputs/outputs selected.

**IMPORTANT:** Do not confuse this Format function screen conversion, which uses AJA hardware and operates on either Mac or PC, with the separate Conversion function screen, which uses QuickTime for conversion and is only available on Mac.

## Primary (Frame Buffer) Format

### Format

This pull-down menu shows the currently selected format. When a change is made via the Video Format pull-down or by clicking an icon and selecting a new format via a contextual menu, the block diagram will change to reflect the new format.

**NOTE:** The AJA Control Panel software uses the abbreviation “sf” instead of “PsF” when referring to “progressive segmented frame” formats.

### Pixel Format

Use this pulldown menu to choose from: YUV-10, YUV-8, RGB-10, or ARGB-8 or RGB-12.

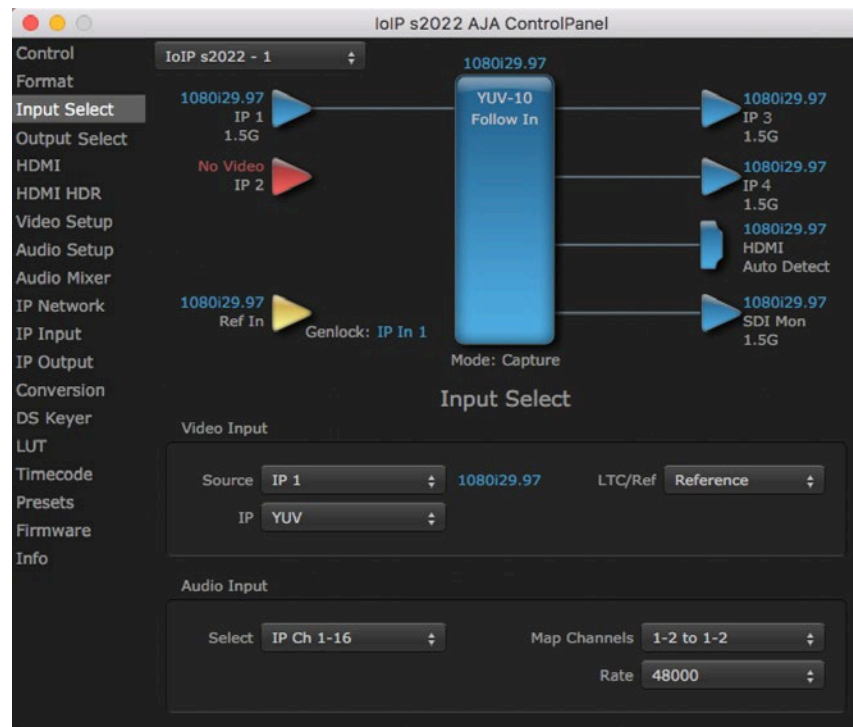
### RGB Range

The RGB Range pulldown menu allows you to select either Full-range (0-1023) or SMPTE range (typically 64-940) for RGB color output.

## Follow Input

Enabling the Follow Input checkbox allows the Control Panel Buffer to auto-switch to whatever is the detected input format. This feature works only if the controlling application supports input-based capture—AJA Control Room for example.

## Input Select Screen



On the Input Select Screen you can view the currently selected video and audio input sources and map audio sources to the channels supported by your editing application.

## Video Input

### Source

The pulldown menu allows you to change the currently selected video input. Select from IP 1 or IP 2.

### IP

Selects the input color space. Select from YUV, RGB-SMPTE, or RGB-Full.

### LTC/Ref

Use the LTC/Ref menu pulldown to identify the type of signal being received by the LTC/Ref BNC:

- Reference - BNC is used as a video reference input.
- LTC- BNC is used for linear time code (LTC) input.

## Audio Input

Select the audio input. Choose from:

- Analog - Analog input (four or eight channels, depending on configuration).
- IP Ch 1-16 - Embedded SDI or HDMI incoming audio (up to 16 mono channels).

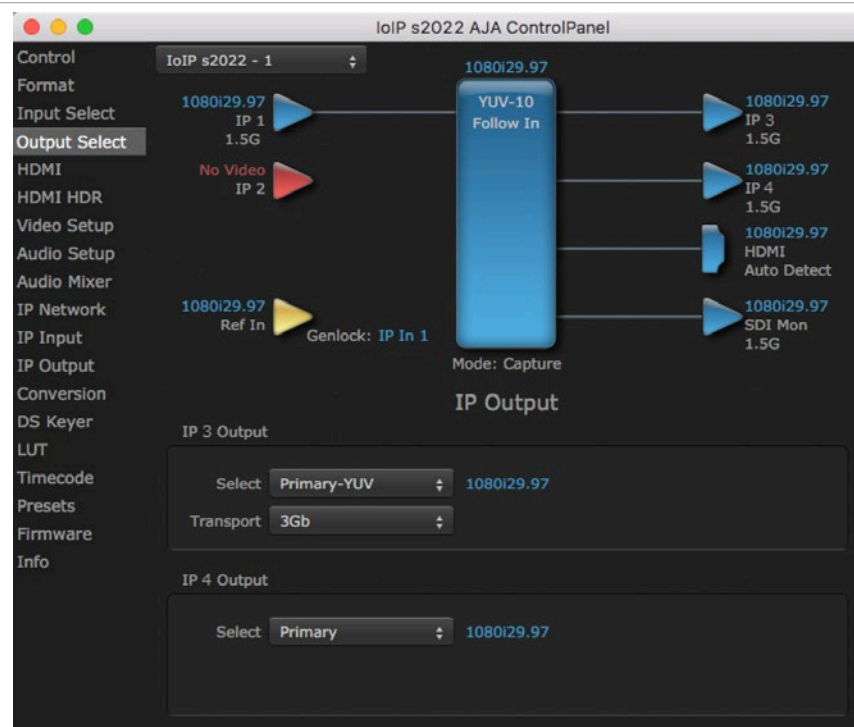
### Map Channels

If only two channels were selected in the third-party application you are using, you can select which two channels from the 16 embedded will be mapped to that application.

### Rate

The sampling rate is fixed at 48K.

## Output Select Screen



The IP Output Screen shows the current settings for both of the IP outputs. The outputs can be configured independently.

## IP 3 Output

### Select

- Primary-YUV - When selected, this indicates that the output is set to the same format as the frame buffer with YUV color.
- RGB-SMPTE and RGB-Full - Selects RGB color output, an alternative to Primary-YUV above.
- Video+Key - When selected, this indicates that the IP 3 video is set to the same format as the framebuffer. IP 4 is set to a video key signal associated with IP 3 (the shape to be cut out from the video - this will appear as a black and white image/matte). Using the second io IP output as an Alpha Channel key, with the video output, may be useful for feeding production switchers, DVEs or other

professional video equipment. If Video+Key has been selected as an output, the block diagram will indicate the outputs with video in blue and the key in red.

## Transport

- Auto - The correct transport is automatically selected. For example, if in 3GB high frame rate, level B is forced.
- 3Gb - Output (SMPTE 424M) using a single-link transport.

## IP 4 Output

Same as IP 3 Output, except no transport selection.

## HDMI Screen



## HDMI Output

### Select

- Primary - The HDMI Output of the io IP is always the primary format. The current format and frame rate are displayed on the right.
- Stereo 3D - A pulldown menu for 3D output allows you to select either Side-by-Side or Top-Bottom (Stacked) output of left-eye and right-eye signals.

**NOTE:** This selection must agree with the format selection in the third-party CineForm Codec pulldown menu (NOT included with AJA Desktop Software).

### Audio Ch

An Audio Channel pulldown allows you to select the number of embedded audio channels for the HDMI output.

## Protocol

The Protocol pulldown allows you to choose Auto Detect, HDMI or DVI protocol—use DVI if you're outputting to a DVI monitor using an HDMI to DVI adapter.

## Color Space

Selects the HDMI output color space and depth. Choose from:

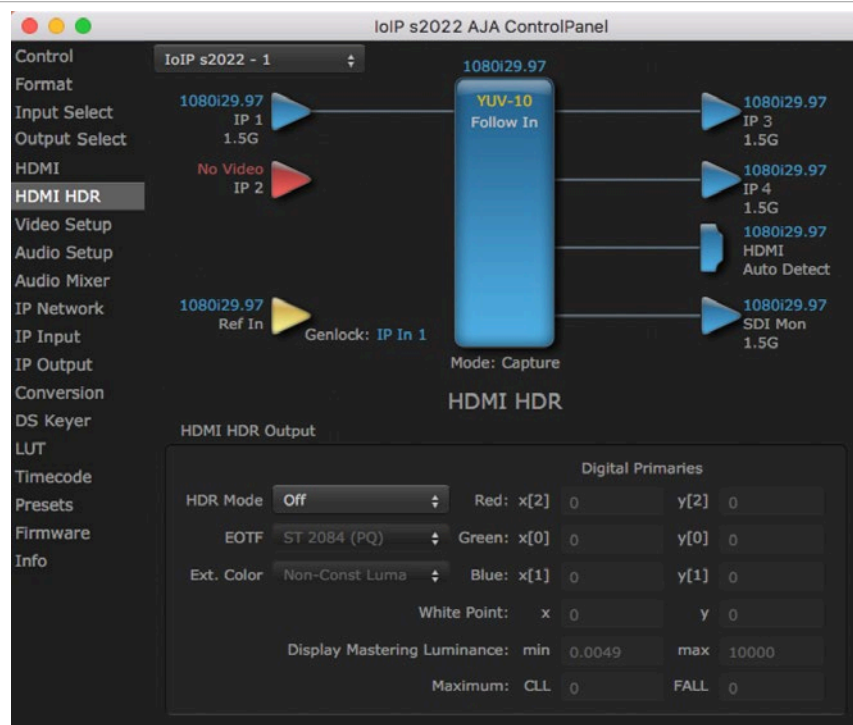
- Auto Detect - Automatically selects the mode based on getting the attached HDMI device's EDID information. This is the recommended setting.
- RGBA 8Bit - Uses 8-bit RGB mode regardless of the attached device's EDID.
- RGB 10Bit - Uses 10-bit RGB mode regardless of the attached device's EDID.
- YCbCr 10Bit - Uses 10-bit YCbCr mode regardless of the attached device's EDID.

## RGB Range

The RGB Range pulldown menu allows you to select the type of RGB color output.

- SMPTE - (typically 64-940)
- Full - (0-1023)

## HDMI HDR Screen



The HDMI-HDR screen provides a mechanism to inform an HDMI display device (such as a TV or monitor) that the video content is HDR. This includes generation of the Dynamic Range and Mastering Infoframe and the static metadata descriptors as defined in CTA-861.3 and HDMI v2.0a. Included are pre-defined primaries values for BT.2020 and DCI P3 color gamuts.

## HDMI HDR Output

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### HDR Mode

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- Off - HDR Mode disabled (default).
- DCI-P3 D65 - Only Display Mastering Luminance available for Digital Primaries.
- BT.2020 - Typically used with HDR.
- Custom - Allows custom values for the Digital Primaries.

### EOTF

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The Electrical Optical Transfer Function metadata bit tells the HDMI display which EOTF to use. Most TV's will require this to be set to ST 2084 for their HDR modes.

- Trad Gamma SD
- Trad Gamma HD
- ST 2084 (HDR-10)
- HLG (Hybrid Log Gamma) - No meta-data for Digital Primaries.

### Ext. Color

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Most TV's require this be set to Non-Const Luma to go into their HDR modes.

## Digital Primaries

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Selecting Custom HDR Mode allows the editing of digital primaries information that is passed as metadata accompanying the video signal. However, when HLG selected as the EOTF digital primaries information cannot be edited, because HLG does not use metadata.

### Display Mastering Luminance

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Represents the minimum and maximum Display Mastering Luminance.

- **Minimum:** Defines the floor of the SMPTE ST 2086 color volume (in the case of HDR) and is determined by the mastering environment.
  - Range: 0.00000 cd/m<sup>2</sup> to 1.00000 cd/m<sup>2</sup>.
  - Step size: 0.00002 cd/m<sup>2</sup>.
- **Maximum:** Defines the ceiling of the SMPTE ST 2086 color volume (in the case of HDR) and is determined by the mastering environment.
  - Range: 1 cd/m<sup>2</sup> to 65535 cd/m<sup>2</sup>.
  - Step size: 1 cd/m<sup>2</sup>.

### Maximum Content Light Level (CLL)

---

Represents the highest-value pixel component in an entire scene. It is determined by analyzing each frame of video, and can be determined in the post environment.

- Range: 1 cd/m<sup>2</sup> to 65535 cd/m<sup>2</sup>.
- Step size: 1 cd/m<sup>2</sup>.

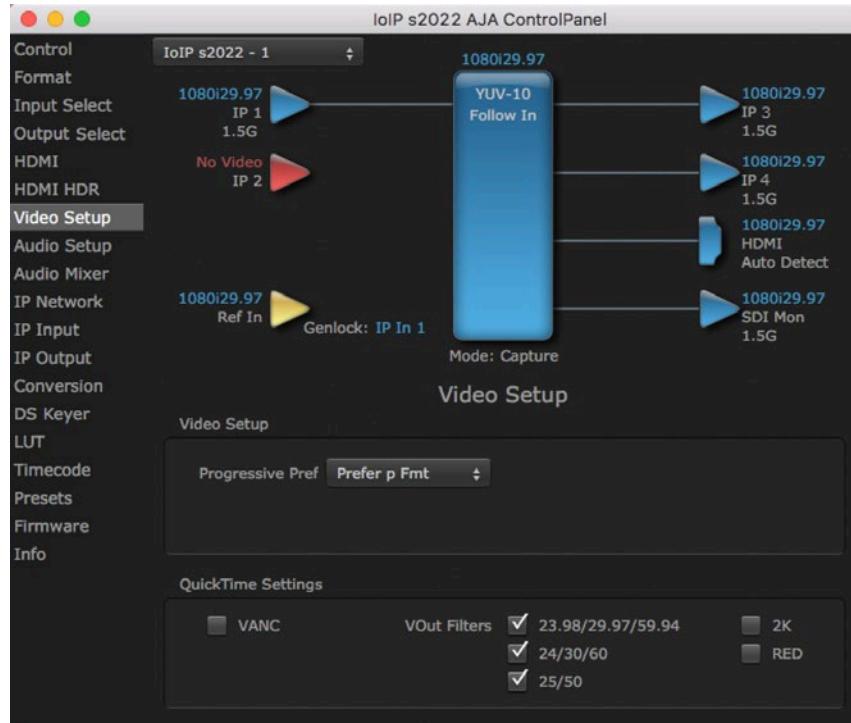
### Maximum Frame Average Light Level (FALL)

---

Represents the maximum of frame-based average light levels taken over an entire scene, and can be determined in the post environment.

- Range: 1 cd/m<sup>2</sup> to 65535 cd/m<sup>2</sup>.
- Step size: 1 cd/m<sup>2</sup>.

## Video Setup Screen



The Video Setup screen shows various other settings which will affect how video inputs and outputs behave, and how Io IP interacts with some software applications.

## Video Setup

### Progressive Pref

This feature is used to default the hardware to use either p (progressive frames) or PsF (progressive segmented frames) output when it has not been specified by the application.

## QuickTime Settings

### VANC Checkbox

When checked ON, the VANC checkbox tells the Io IP to capture and process any ancillary data in the SDI stream. This can include Closed Captioning data, and other types of metadata. Applications such as Premiere Pro and Final Cut Pro will not capture or output this data through the Io IP, if this box is not checked ON.

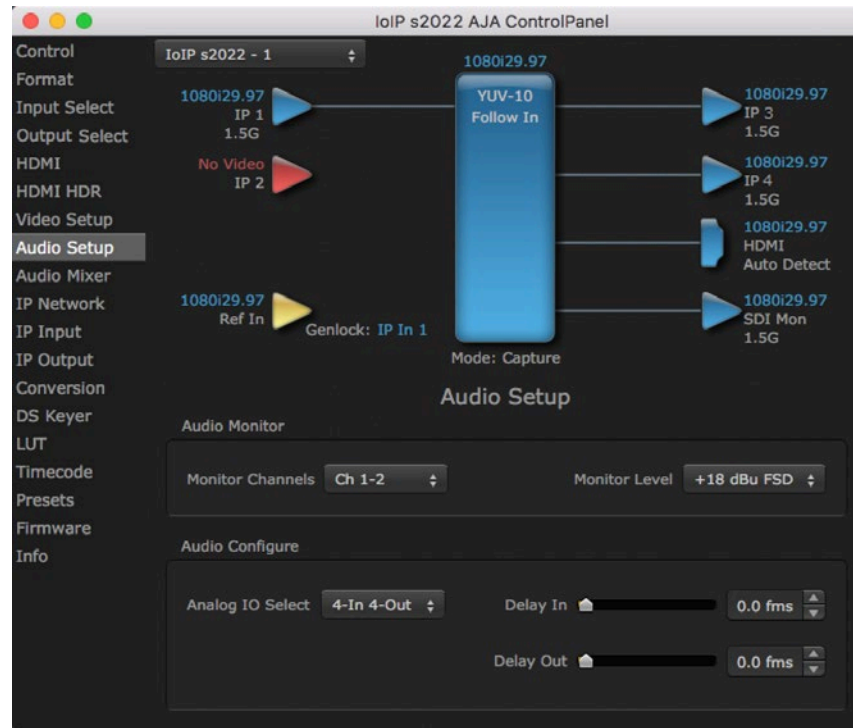
Io IP does not require enabling the VANC checkbox for Closed Captioning.

### VOut Filters (Mac only)

These controls enable/disable output capabilities in the QuickTime VOut filter. This filter is used by older applications that are built on legacy QuickTime architecture such as FCP7, AJA TV, VTR Exchange, and older versions of After Effects. Boxes that are checked will define what framerate and resolution types

will appear in the list of available formats in the AJA hardware. For example, if 25/50 is unchecked, then all resolution/framerate combinations with 25 or 50 fps will not appear in the list of capabilities for the installed AJA hardware, when using software that relies on the QuickTime VOut filter.

## Audio Setup Screen



The Audio Setup Screen shows the current settings for the analog audio output, allowing you to re-configure it when desired.

## Audio Monitor

Monitor Channels

Monitor Level

Lock Audio Gain To Unity

When set, io IP will ignore the third-party application gain setting and set the audio gain at unity. When not set, this checkbox tells the io IP to get the audio gain setting from the application.

## Audio Configure

Analog IO Select

This setting controls how the analog audio inputs and outputs are configured. Select from:

- 8-Out (Ch 1-8 output)
- 4-In 4-Out (Ch 1-4 input, Ch 5-8 output)
- 4-Out 4-In (Ch 1-4 output, Ch 5-8 input)
- 8-In (Ch 1-8 input)



## Delay In

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Here you can set up to 6 frames (in tenths of a frame) of input audio delay.

## Delay Out

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Here you can set up to 6 frames (in tenths of a frame) of output audio delay.

The AJA Control Panel delays all audio outputs—SDI, HDMI, and Analog.

*IMPORTANT: If you use Control Panel delay, do not use other delay settings in your applications, as they can conflict.*

## Audio Mixer Screen

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The Audio Mixer screen has two tabs; Playback and Capture. These tabs display what sources are available for monitoring / mixing via the AJA hardware when in either of those two modes (if applicable). The controls on this screen are dedicated only to monitoring adjustments, and do not affect the level at which inbound audio signals are captured to storage.

The selection check boxes and screen slider controls affect the following Io IP, outputs:

- SDI Embedded Audio Out
- HDMI Embedded Audio Out
- Analog Audio Out (via DB25 cable)
- Front Panel Monitor Out (headphone jack) - This level can also be adjusted with the front panel gain knob, and is additive to the screen slider controls.

*IMPORTANT: Even though you can hear changes in the signals and levels adjusted with the Audio Mixer screen, these changes are NOT recorded to disk during NLE Capture or Audio Punch In / Voice Over to Timeline. In addition, muting or activating sources on this screen will not affect audio signals being recorded. The Audio Mixer screen is dedicated for monitoring only, not program mixing.*

The branching arrow on the lower right indicates which sources are being routed for monitoring in that operating mode, and is colored blue when active and red when disabled.

Each source has a confidence meter, which enables you to tell immediately if you have a source arriving correctly at the AJA hardware (without having to launch any other software). The level sliders allow a simple plus or minus adjustment to the Source level being monitored. This is to allow for fine-tuning of your listening environment (on occasions the host system audio can be unexpectedly loud, or an incoming feed may be very loud or very quiet).

Two different Audio Mixer screens are available, selected by clicking on the Playback Monitor or Capture Monitor tabs. During regular editing, the Playback tab is used to control your monitoring experience. During capture operations, the Capture tab is used for your monitoring experience.

Controls in each tab are only in effect when Io IP, is in the correct operating mode, as determined by the controlling application or the Control Panel application's Default Output setting. When the mode doesn't match, the mode indicator on the right goes red (see Figure 51 on page 69). However, settings can be adjusted while in that disabled mode, and will be applied when you return to that operating mode.

## Audio Mixer Playback Monitor Tab



### Playback Source Selection

Clicking the On checkbox selects the audio for that item for playback to the audio monitor outputs. Multiple sources can be selected simultaneously.

#### Main App

If an external application is controlling the lo IP, it will be displayed in the Item Select column and its audio can be selected for playback with the checkbox.

#### AJA Input

Selects for monitoring the audio being input to lo IP.

*NOTE: The AJA Input Item Select dropdown selection is linked to the Input Select screen's Audio Input Select dropdown. Changing the setting on one screen will also change the setting on the other screen.*

In the Item Select column, click on the dropdown and choose from:

- Analog - The Analog Audio being received on the lo IP, DB-25 connector.
- IP Ch 1-16 - The embedded audio being received by the lo IP.

#### Host Audio

Selects the audio from the host computer, thus enabling the AJA hardware to monitor anything that would normally be presented via the host laptop, CPU or computer monitor. For example, an editor could sample music from an online library, while concurrently playing back their NLE timeline. Or, a producer and editor could be communicating live during an editing session, using Skype or some other video calling tool.

## Source Gain

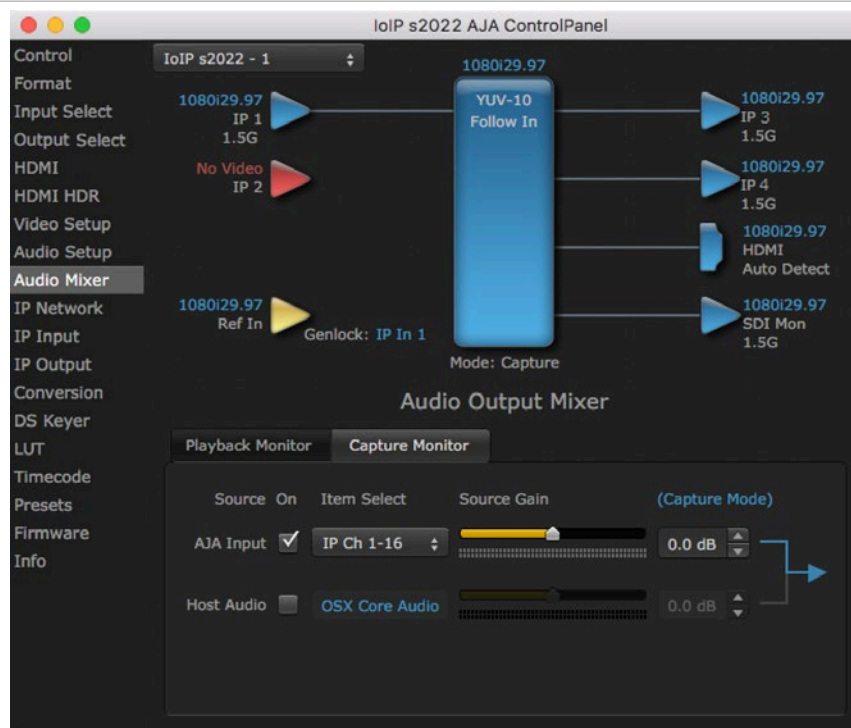
Meters display the input audio levels of the source, colored green when that source is On, and gray when that source is not selected. The levels shown do not change when the gain is adjusted, because the input levels are being monitored, not the output levels.

When activated, the source gain controls can be used to adjust the monitoring output gain of that source, from +6dB to -infinity (mute). Adjustment methods include:

- Sliders - The sliders on the right can be used to change the values for each color.
- Numeric Entry - You also enter a numeric value by clicking on the displayed number, and can increase or decrease the values clicking on the up/down arrow boxes.
- Cut and Paste - Right clicking on a displayed number opens a Cut, Copy, Paste dropdown menu for convenient numeric entry.

As mentioned before, these controls are for monitoring only, and do not change the audio recorded to a NLE file. Any actual recording level adjustments to Capture or Audio Punch In / Voice Over to Timeline operations will either need to be made upstream of the AJA input, or else via adjustments within the main NLE application (e.g. via a pass through mix tool).

## Audio Mixer Capture Monitor Tab



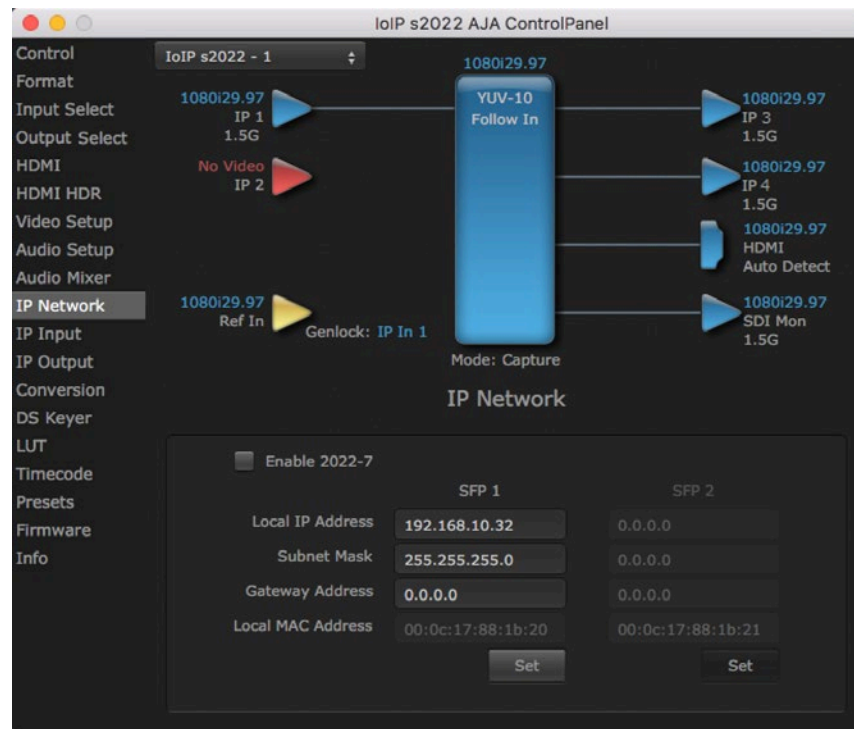
The Capture Monitor Mode screen is used to select and mix audio to be monitored during capture operations.

**IMPORTANT:** Even though you can hear changes in the signals and levels adjusted with the Audio Mixer screen, these changes are NOT recorded to disk during NLE Capture or Audio Punch In / Voice Over to Timeline. In addition, muting or activating sources on this screen will not affect audio signals being recorded. The Audio Mixer screen is dedicated for monitoring only, not program mixing.

The controls on this screen are similar to those on the Playback Monitor Mode screen, except the Main App is not available for selection (you cannot capture from the application that is capturing). See "Audio Mixer Playback Monitor Mode Screen" on page 70 for more information.

**NOTE:** *If you want different behavior when the Capture tab is triggered; i.e. for host system audio to be muted, then simply check the host system audio in the Capture tab only. This way when you exit NLE Capture and return to regular editing, the Playback tab settings will be applied and your host system audio monitoring will resume.*

## IP Network Screen



The IP Network Screen lets you input the network parameters that define the location of each physical SFP+ cage of the Io IP hardware.

### Enable 2022-7

Enables 2022-7 redundant network operation. See "[IP Network Screen, 2022-7 Operation](#)" on page 37 for more information.

### Local IP Address

This is the IP address that identifies each physical Io IP SFP+ link on the network. This field must be filled in for at least one of the Io IP SFPs for Io IP to work properly.

### Subnet Mask

This is the subnet mask defined by the system administrator. Generally speaking, this value must be defined in the AJA Control Panel for Io IP to work correctly on the network.

## Gateway Address

This is the IP address of a network gateway to a remote network. This value must be defined if/when the lo IP needs to send signals to, or receive signals from a remote network.

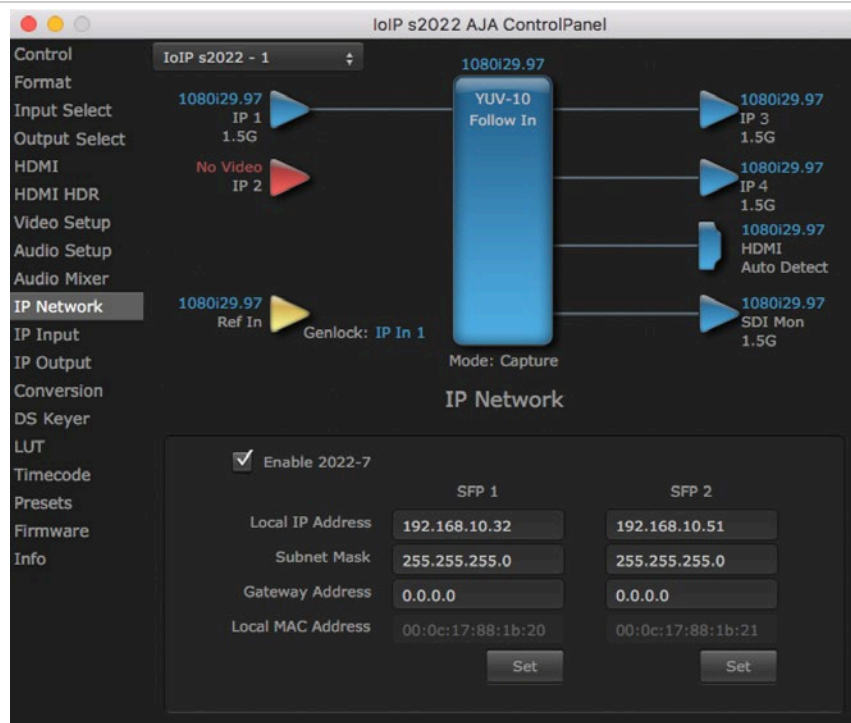
## Local MAC Address

This is an information display field that cannot be changed. It is the MAC address that is assigned to the specific SFP cage on the lo IP.

## Set Button

Click the 'Set' button to apply the changes.

## IP Network Screen, 2022-7 Operation



Enabling 2022-7 makes it possible to configure redundant networking capabilities using both SFP modules. No additional inputs or outputs are activated. In 2022-7 operation each SFP transmits and receives the same information. This allows the use of two separate network paths, making recovery possible if one path fails.

When 2022-7 is enabled, additional settings are available for configuring your network settings.

- SFP Top - Indicates the top physical SFP cage on the lo IP board, farthest from the copper contacts where the lo IP, card connects to its PCIe slot.
- SFP Bottom - Indicates the bottom physical SFP cage on the lo IP board closest to the copper contacts where the lo IP, card connects to its PCIe slot.

# IP Input Screen



The IP Input Screen on lo IP, lets you define parameters for receiving inputs to the lo IP from another device on the network. This screen has two tabs, one for each Channel.

**NOTE:** The IP 1 Input and IP 2 Input labels do not represent the physical SFP cages on the lo IP. They represent different transmissions being received by the lo IP card, possibly over the same 10GbE link.

## Channel 1 or 2

Select the input channel to be configured.

## Multicast

When selected, Multicast operation is used. Enter a valid multicast IP address into the Dest IP Address field.

## Unicast

When selected, Unicast operation is used. The Dest IP Address field is automatically filled with that card's Local IP Address (from the IP Network screen) and the field will be grayed out (not editable).

**NOTE:** Turning off Unicast operation makes the Dest IP Address editable, but it retains the previously applied Unicast IP address. You must edit the Dest IP Address field on this screen to resume Multicast operation.

## Destination IP Addr

This filter lets you specify the network address where a multicast from another device on the network can be found.

## Destination Port

This filter lets you specify the port number being used to send a multicast to the 'Destination IP' address specified above.

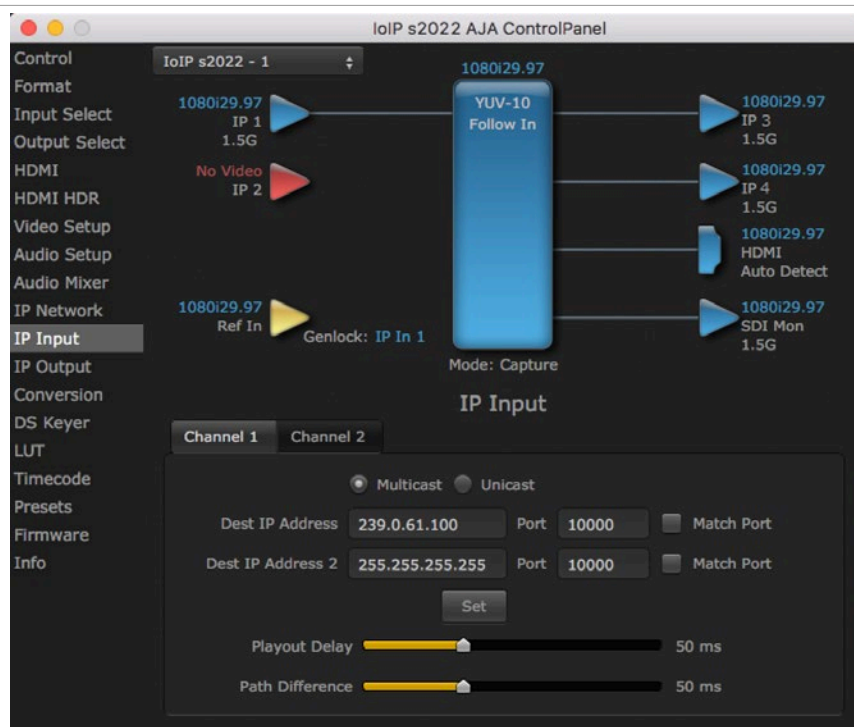
## Match Checkboxes

The 'Match' checkbox can be used to match the Destination Port to the Destination IP Address.

## Playout Delay

The Playout Delay slider can be used to adjust the amount of buffering before packets are sent to the network, in a range of 0 to 150 milliseconds. Network traffic conditions may require setting a larger buffer. Default is 50 milliseconds.

## IP Input Screen, 2022-7 Operation



These fields will only be available when 2022-7 is Enabled in the IP Network section. See ["IP Network Screen, 2022-7 Operation" on page 37](#).

## Destination IP Addr 2

This filter lets you specify the network address where a duplicate multicast from another 2022-7 device on the network can be found. That device should be sending two duplicate IP video multicasts and the IP addresses of those streams will be specified in 'Destination IP Addr' and 'Destination IP Addr 2'.

## Destination Port 2

This filter lets you specify the port number being used to send a multicast to the 'Destination IP Addr 2' address specified above.

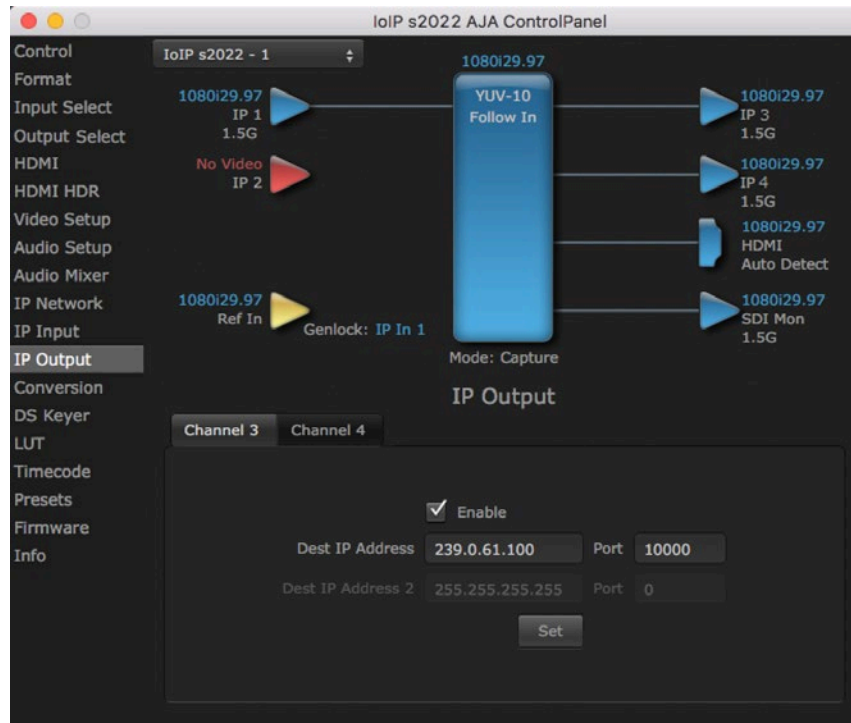


## Path Difference

The Path Difference slider can be used to adjust the buffering used for redundant operation, where the paths through the network of the two streams may have different delays. Adjustable in a range of 0 to 150 milliseconds, with 50 milliseconds the default.

## IP Output Screen

Figure 12. AJA Control Panel, IP Output Screen



The IP Output Screen on lo IP lets you define parameters for sending outputs from the lo IP card onto the network. This screen has two tabs, one for each Channel.

**NOTE:** The IP 1 Input and IP 2 Input labels do not represent the physical SFP cages on the lo IP. They represent different transmissions being received by the lo IP card, possibly over the same 10GbE link.

### Channel 1 or 2

Select the output channel to be configured.

### Destination IP Addr

This parameter lets you specify the network address where a multicast from this lo IP can be sent for use by other devices on the network.

### Destination Port

This lets you specify the port number being used to send a multicast to the Destination IP address specified above.



## Destination IP Addr 2

This field will only be available when 2022-7 is Enabled in the IP Network section. This filter lets you specify the network address where a duplicate multicast from this Io IP output can be sent. This IP output will then be sent to both the address specified in 'Remote IP Addr', and to the address specified in 'Remote IP Addr 2'.

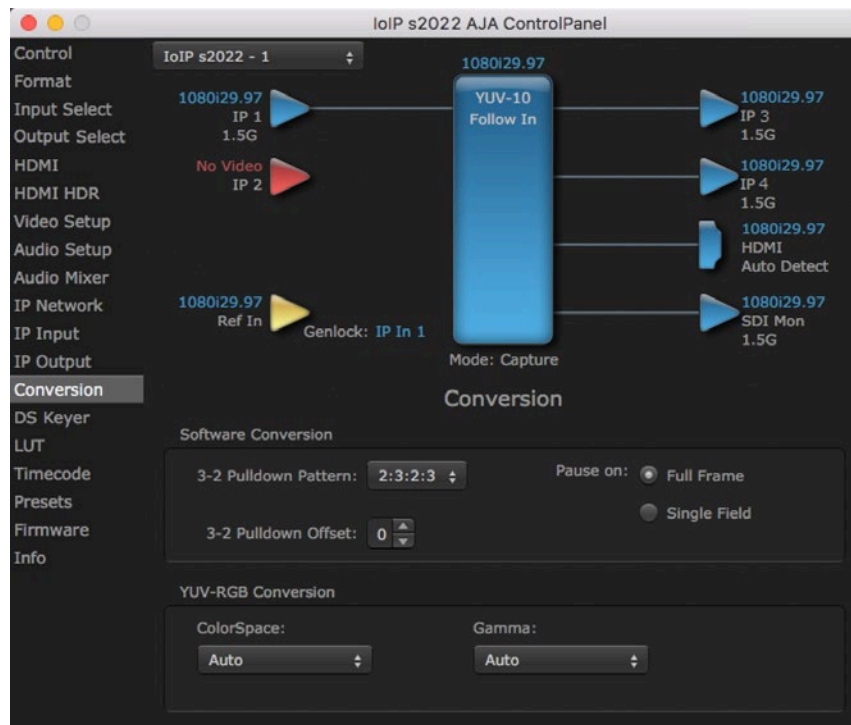
## Destination Port 2

This field will only be available when 2022-7. It lets you specify the port number being used to send a multicast to the 'Remote IP Addr 2' address specified above.

## Enable Checkbox

The 'Enable' checkbox connects the Io IP to the network address specified by all the matched output parameters. Any time a parameter is changed, the output should be re-enabled.

## Conversion Screen (Mac OS only)



In the Mac OS version of the AJA Control Panel, this screen offers controls that determine how the card behaves with 3rd-party applications.

**IMPORTANT:** Do not confuse this Conversion function screen, which uses QuickTime for conversion and is only available on Mac, with the Format function screen which uses AJA hardware for conversion and operates on either Mac or PC.

## Software Conversion

These parameters can affect pulldown and pause behavior. This group of software conversion parameters apply ONLY when using legacy QuickTime based applications on Mac OS. These applications include things like FCP7, VTR Exchange, and AJA TV. Applications like FCP X, Premiere Pro, Media Composer and Control Room, no longer use these legacy QuickTime Components.

### 3:2 Pulldown Pattern

---

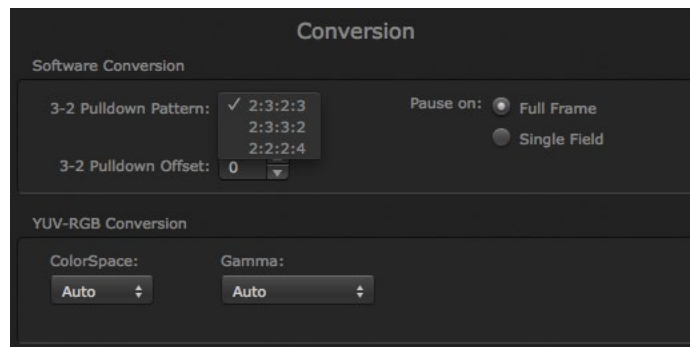
The value selected from this list is used whenever, due to format selection, you've chosen to do 24 frames-per-second to 30 conversion where extra fields will be added to pad the existing ones. Depending on video content, selection of different field patterns may be useful in reducing jitter due to the content of adjacent fields. The numbers in the pattern choices specify the frequency with which inserted fields will be repeated. For example, "2:3:2:3" means duplicate a field twice, then the next field three times, then the next twice, and then back to three times.

### 3:2 Pulldown Offset

---

The 3-2 Pulldown offset is used if the 3-2 pulldown feature is removing the wrong frames. This setting lets you adjust when the pulldown begins in a sequence of frames.

Figure 13. AJA Control Panel, Codec Screen, Frame-padding Pattern Choices



### Pause On

---

These two choices determine what happens when the editing application is paused in stop mode:

- Full Frame: both fields are displayed resulting in some jitter while paused
- Single Field: a single field is displayed, showing no flicker (useful when color correcting or whenever the flickering would be a distraction).

## YUV-RGB Conversion

---

These pulldowns select industry standard color space and gamma transfer functions for the YUV-RGB conversion, or allow you to direct the Io IP to automatically determine it for you.

### Colorspace

---

Choose from:

- Rec 601
- Rec 709
- Auto

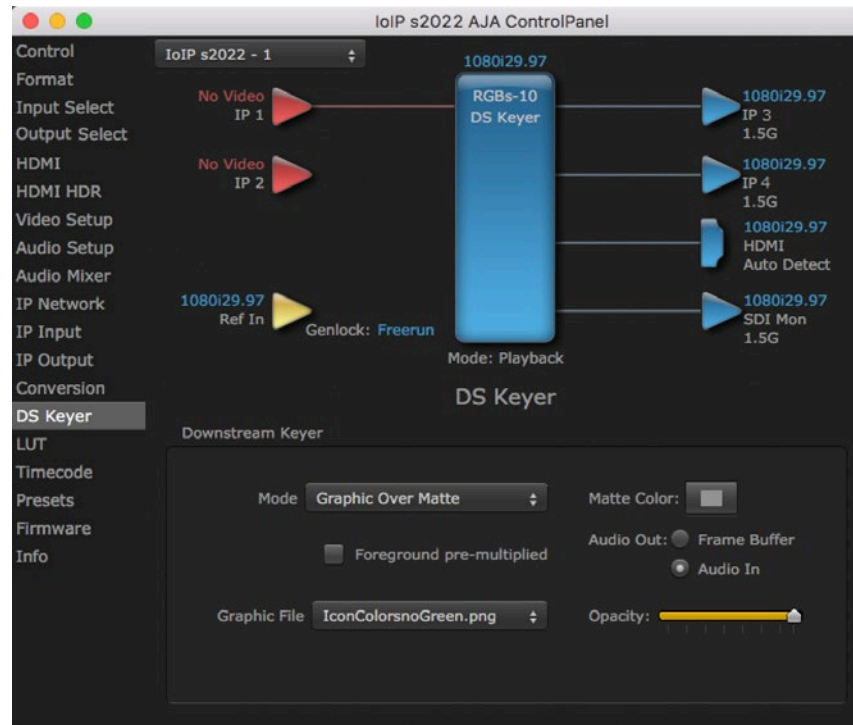
### Gamma

---

Choose from the following:

- Linear (1.8)
- Rec 601 (2.20)
- Rec 709 (2.22)
- Auto

## DS Keyer Screen



Io IP has a hardware-based downstream keyer that is ideal for putting logos, “bugs” or other video material with an alpha channel on top of video being played out or printed to tape. A typical application would be putting a television station’s call letters or channel over program video content. Keyed video can be from the Io IP’s internal Frame Buffer (from storage, Video In, etc.) or from a graphics file that has an alpha channel (PhotoShop etc.).

Settings in the DS Keyer Screen provide control over how the keyer operates and whether it’s turned on or off.

## Downstream Keyer

### Mode

- Downstream Keyer Off - When this pulldown menu item is selected the downstream keyer will be turned off.
- Frame Buffer over Matte - Places the keyed video with alpha channel currently in the Frame Buffer over a fixed color matte determined by the “Matte Color” setting set separately.
- Frame Buffer over Video In - Places the keyed video currently in the Frame Buffer over the video input for playout or print-to-tape.
- Graphic over Matte - Places a graphics file having an alpha channel (chosen in “Graphic File” pulldown) over a fixed color matte determined by the “Matte Color” setting set separately.
- Graphic over Video In - Places a graphics file having an alpha channel (chosen in “Graphic File” pulldown) over the video input for playout or print-to-tape.
- Graphic over Frame Buffer - Places a graphics file having an alpha channel (chosen in “Graphic File” pulldown) over the current contents of the KONA card’s Frame Buffer (which might be from storage, video In, KONA TV, etc.).

## Matte Color

---

Only available when the pulldown “Frame Buffer over Matte” or “Graphic over Matte” are selected—pressing this button brings up a color selection dialog. The dialog provides a variety of ways to select a matte color including a color wheel, color picker (choose from a location anywhere on the computer screen), numeric sliders, swatches, “crayons”, and spectrums. The matte chosen will be used as a video background under the keyed video.

## Foreground pre-multiplied (checkbox)

---

Use to avoid “matte lines” and improve the appearance of the foreground (key) being composited over the background.

## Audio Out

---

- Frame Buffer - Select audio out to be routed from the contents of the Frame Buffer.
- Audio In - Select audio out to be routed from Io IP’s currently selected input(s).

## Opacity

---

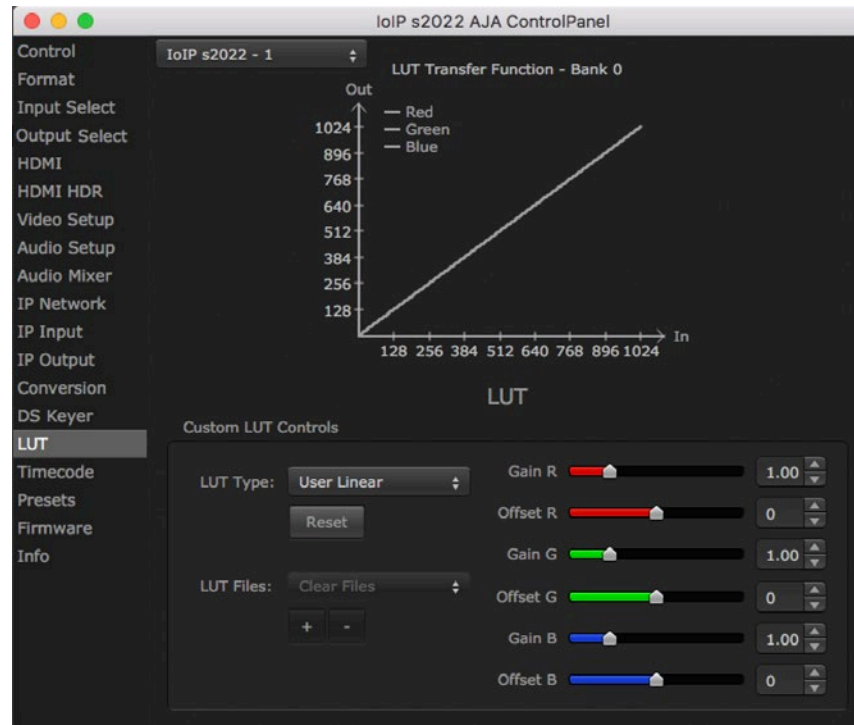
This slider controls the transparency of the keyed video (over the background) from translucent to completely opaque.

## Graphic File Load

---

This pulldown allows you to choose from any recently accessed file or select a new file (“Load File...”), which then brings up a file dialogue. Remember that the file raster (pixel x pixel count) should match the primary format in the frame buffer. Example: you wish to key a logo on top of your 1920x1080 footage, the still image with alpha channel that you load should be 1920x1080.

## LUT Screen



This screen lets you control RGB look up table (LUT) color conversion. You can let io IP automatically apply LUT conversion as appropriate, or you can load and adjust LUT data to meet your requirements. The frame buffer must be set to RGB (Format screen, Pixel Format) to enable, apply, and adjust LUT conversions.

*NOTE: io IP also uses a hardware based color-space converter in conjunction with the LUT. For example,*

## LUT Transfer Function

The upper right side of the LUT screen displays an approximate representation of the Red, Green, and Blue curves of the current transfer function.

*NOTE: The LUT Transfer Function display may not always be an accurate representation of the color conversion being applied. For example, if other parameters are not set correctly, you may be able to change the curves on the screen but that conversion is not applied to the output until the parameters are adjusted correctly.*

## LUT Type

Select the type of LUT. Choose from

Auto (default)

When the Frame Buffer is set to **RGB** and LUT Type is set to **Auto** the type of LUT automatically loaded is determined by the video format and how the video output(s) are configured.

- For SD format and YUV output the LUT is automatically loaded with a REC601 gamma.
- For HD format and YUV output: the LUT is automatically loaded with a REC709 Gamma.

- For HD format and RGB output (e.g. dual link RGB), the LUT is automatically loaded with linear since both the buffer and output are both RGB (1:1).
- For an RGB source and RGB output, and for a YUV source and YUV output the LUT will be linear because no conversion is taking place.
- For an RGB source and a YUV output (common if receiving files from an animator or motion graphics artist), and vice versa, then Auto will apply the proper curve to enable this (along with a color space conversion)

---

#### Linear

Forces a straight linear transfer function.

---

#### SMPTE->FullRange

Forces a SMPTE to Full Range transfer function.

---

#### FullRange->SMPTE

Forces a Full Range to SMPTE transfer function.

---

#### User Linear

On first use, sets a linear transfer function and activates the Gain and Offset sliders on the right, permitting individual Red, Green, and Blue color adjustments. These settings are retained if you select another LUT type and then return to this setting.

---

#### User Film Stream

Similar to User Linear, above but sets a film style transfer function that can be adjusted with the Gain and Offset sliders.

---

#### User LUT File

Activates the LUT Files controls, allowing the loading of a custom LUT .txt file. See ["User Defined LUTs" on page 46](#).

---

### Reset Button

Returns the settings of the currently selected LUT type to their default values.

---

### Gain and Offset Sliders

When a User setting is selected, individual sliders for Gain and Offset for Red, Green, and Blue are activated.

---

### User Defined LUTs

Users can specify their own custom LUTs by creating a LUT file and uploading it to an AJA Video Device using the LUT (lookup table) screen in the Control Panel. You can create a custom LUT file using most text editors or spread sheets, provided the data is arranged according to the LUT File Format Specification (see ["LUT File Format Specification" on page 47](#)).

---

#### Uploading A Custom User LUT File

Once the LUT file is created, you can upload it with the following steps:

1. Before loading a LUT, make sure you are using an RGB frame buffer format. Go to the Format screen and adjust the Pixel Format.

2. Open AJA Control Panel and select the "LUT" screen.
3. Click the "LUT Type" popup and choose "User LUT File". LUT Files options become enabled.
4. Click the "+" button and use the navigation dialog to choose a custom LUT file. The file is loaded and the LUT will be applied, if it is properly formatted.

### LUT File Format Specification

LUT files are normal text files that contain 1025 lines (numbered 0 - 1024).

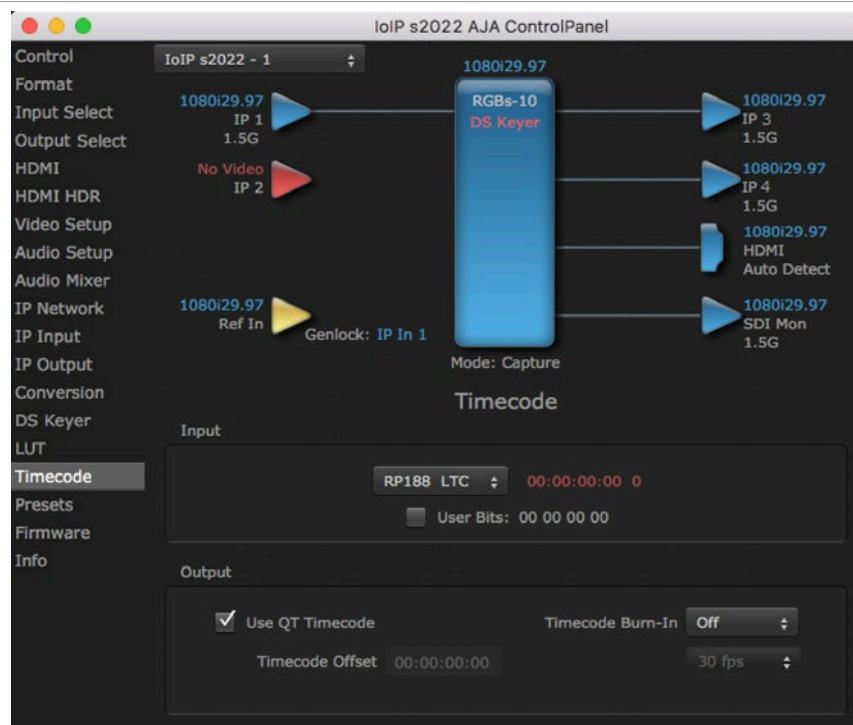
Each line contains 3 integer values in the range 0 - 1023, representing 10 bit R, G, B component output values. Component values may be separated by one or more commas, spaces, or tabs. The example below show LUT File contents for Line 0, Line 1, Line 2, and Line 1024, with different valid ways to separate the numbers in a line.

- 16, 17, 17
- 17 18 18
- 19 19 21
- ...
- 1000, 1022, 1023

In the example above, the first line (Line 0) represents the output values for the case where R=0, G=0, or B=0. In other words, if the R component of a pixel is set to 0, then set R component value to 16. Likewise, if G is set to 0, then set G to 17. The second line (Line 1) does a similar thing for input component values equal to 1.

A simple way to construct a LUT file is to use a Spreadsheet like Excel. Simply fill 3 columns and 1025 rows with LUT data, and save the result as a "CSV" file.

## Timecode Screen



The Timecode Screen selects the timecode stream read for applications that use it (for example, when the timecode source is set to “Use control panel setting,” AJA Control Room will read the selected stream). It is also used for monitoring the RP-188 timecode embedded in the digital data stream, and can be used for selecting a timecode offset (if required).

## Timecode Input Settings

---

### RP-188 Timecode <n>

---

In RP-188 timecode (SMPTE 12M-2) there can be multiple timecode types in the data stream. Use this pull-down to select the one you wish to monitor:

- RP188 LTC (Linear timecode)
- RP188 VITC (Vertical Interval timecode)

The selection will be displayed in the timecode value to the right of the pull-down.

### User Bits

---

For monitoring a variable framerate (VFR) timecode (such as Varicam), you may wish to check the User-bits box. If you set this checkbox, lo IP will detect and interpret the user-bits and display them next to the checkbox. You will see the original framerate (30 fps in the figure below) followed by the adjusted frame padding (two digits reporting discarded and retained frame padding).

*NOTE: SMPTE 12M-2 is the updated name and specification for what was RP-188.*

## Timecode Output Settings

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### Use QT Timecode (Mac OS Only)

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This feature is for Final Cut Pro 7 (or earlier), AJA Control Room, and AJA TV only. When checked, it directs lo IP to output timecode from the QuickTime timecode track.

### Timecode Burn-in

---

This pulldown selects whether the timecode value is displayed in a “burned-in” window in video output. If set to “OFF”, timecode will not be keyed over the video. If set to “Timecode”, then the timecode value will be keyed over the output video for all of the lo IP outputs. This can be useful for synchronizing, choosing edit points, dailies, and many other purposes.

### Timecode Offset (entry field and FPS pull-down)

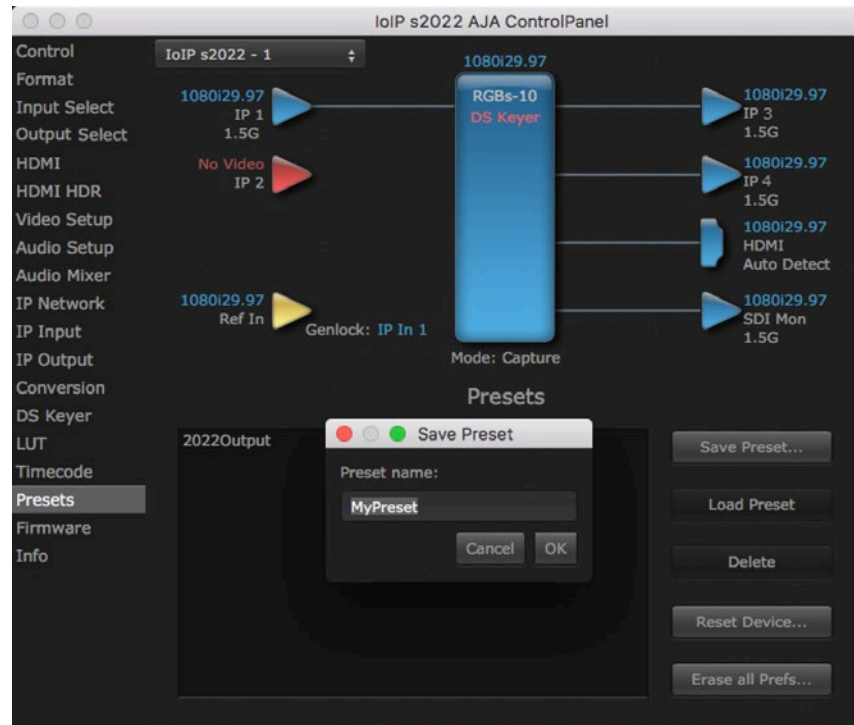
---

When QuickTime timecode is disabled, this text entry field allows you to generate a timecode based on the offset entry. You can select a framerate from the pulldown menu at the right side of the pane. Use that same value here as the source video to ensure the timecode is synchronized.

*NOTE: SMPTE RP 188 defines a standard for the transmission of time code and control code in the ancillary data space of a digital television data stream. Time code information is transmitted in the ancillary data space as defined in ANSI/SMPTE 291M. Multiple codes can be transmitted within a single digital video data stream. Other time information, such as real time clock, DTTR tape timer information, and other user-defined information, may also be carried in the ancillary time code packet instead of time code. The actual information transmitted through the interface is identified by the coding of a distributed binary bit. Equipment manufacturers can use the meta data for different purposes.*



## Presets Screen



After configuring the AJA Control Panel screens, you can then save all your settings as a snapshot for later recall, called a preset. In this way, you can organize presets for all your typical tasks, eliminating manual reconfiguration.

## Saving, Loading and Deleting Presets

To save a preset, simply go to the Presets screen and click “Save Preset”. A dialog will be presented asking you for a file name. Enter a meaningful name and click “OK”. Thereafter the preset will be available under the Control Panel “Presets” list.

From the Presets screen you can manage your collection of presets easily. To Load or Delete a stored preset, just select it with your mouse and then click the “Load Preset” or “Delete” button respectively .

## Transferring Saved Presets

If you want to use a saved Preset on another workstation, you can simply copy the file on removable storage and install it at the new location. The Preset files are stored at:

### Mac OS Preset Files Storage Location

- From the Finder, hold down the Option key (to display the Library directory) and click on Go/Library/Application Support/AJA/<device name>/Presets/

### Windows Preset Files Storage Location

- c:\Users\<username>\AppData\Local\AJA\Control Panel\<device name> Presets\

## Reset to Default

When you click the "Reset Device" button the Default User Preference file will be deleted and AJA Control Panel will do one of the following:

- If a Default Global Preference is found, it is loaded and the device is set to this state.
- If a Default Global Preference file is not found, "factory defaults" are loaded and the device is set to this state.

*NOTE: See "Default Preferences" on page 19 for more information.*

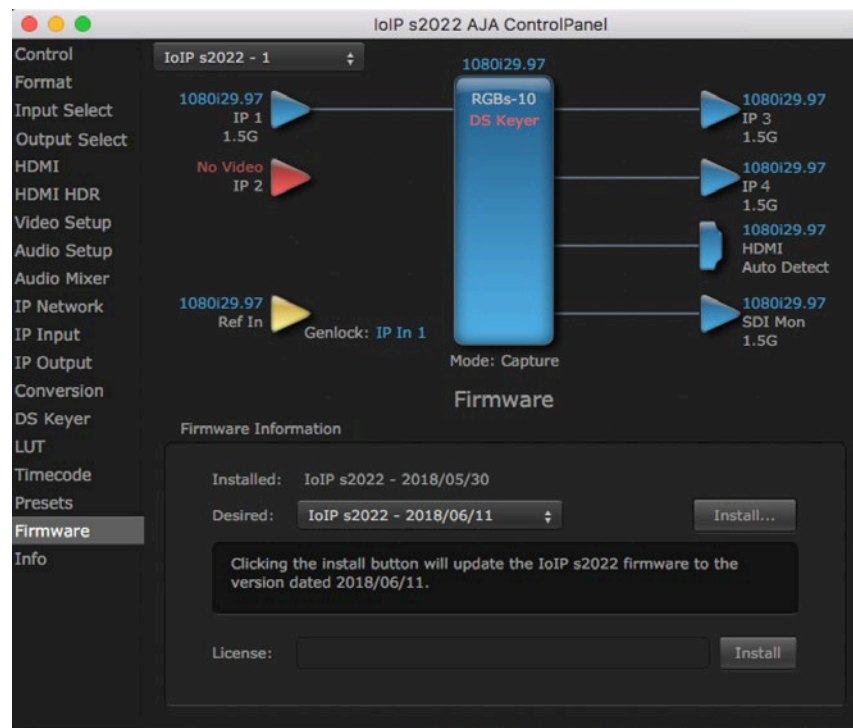
## Erase all Prefs

For technical support purposes you may be required to remove the current Preference settings. Clicking on the "Erase all Prefs" button deletes the current Default User Preference file without accessing a Default Global Preference file, if one exists. Current AJA device settings are not altered, but changing any setting will immediately regenerate a Default User Preference file with the changed settings.

*NOTE: Clicking on the AJA Control Panel Erase All Prefs button does NOT delete an existing Global Preference file from that shared location.*

## Firmware Screen

Figure 14. AJA Control Panel, Firmware Screen

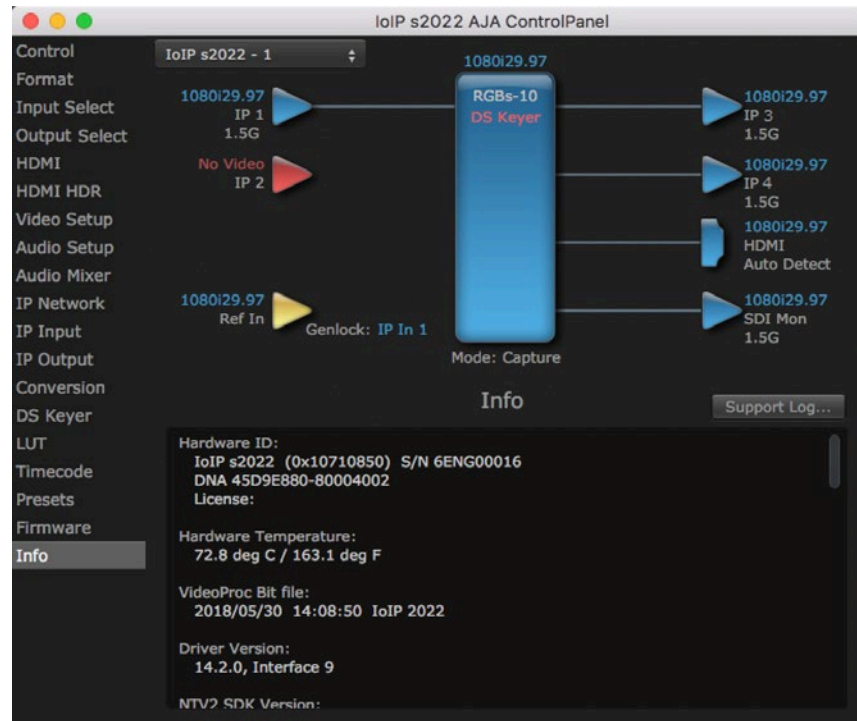


Use the Firmware screen to access the firmware install screen. Click install to erase current firmware and load the firmware version contained in your current driver installation.

You will be required to power-cycle your Io IP and computer to finish the update.

# Info Screen

Figure 15. AJA Control Panel, Information Screen (Standard Mode)



The Info Screen shows the software files that have been installed on your system. This information may be needed if you talk to an AJA Customer Service representative to determine if files are missing or need updating.

# Appendix A – Specifications

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## Io IP Tech Specs

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### Video Formats

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- (2K) 2048 x 1080p 23.98, 24, 25, 29.97, 30
- (2K) 2048 x 1080PsF 23.98, 24, 25, 29.97, 30
- (HD) 1080p 23.98, 24, 25, 29.97, 30, 50, 59.94, 60
- (HD) 1080PsF 23.98, 24, 25, 29.97, 30
- (HD) 1080i 50, 59.94, 60
- (HD) 720P 50, 59.94, 60
- (SD) 625i 50
- (SD) 525i 59.94

Note: High Frame Rate capabilities are dependent on host system attributes. Not all systems and configurations will support all frame rates.

### Media Transport Interfaces

---

- SMPTE 2022-6, 2022-7
  - 2 x SFP+ Cages - SFPs not included
- Recommended SFP+ modules:
  - Arista Networks SFP-10G-SR Compatible 10GBASE-SR
  - Fiberstore SFP-10GSR-85 10G SFP+ 850nm
  - Finisar FTLX1471D3BCL (for single mode 1310nm)
  - Mellanox MFM1T02A-SR 850nm 10G

### Video Input IP

---

- SMPTE 2022-6, 2022-7
    - Single channel input for NLE applications\*
    - Up to 4 channels input available
- \*Capture and simultaneous monitoring is supported

### Video Output IP

---

- SMPTE 2022-6, 2022-7
    - Single channel output for NLE applications\*
    - Up to 4 channels output available
- \*Capture and simultaneous monitoring is supported

### Video Output Digital

---

- HDMI v2.0
  - 30/36-bits/pixel, RGB or YUV, 6 Gbps per color component
  - HDR10 Support - HDR Infoframe metadata, compatible with HDMI 2.0a/CTA-861.3
  - HLG Support - compatible with HDMI 2.0b/CTA-861-G\*

\*HLG support is application dependent. Check with your software manufacturer for compatibility.

Note: Bit depth support is application dependent. Check with your software manufacturer for compatibility.

## Audio Input IP

---

- Up to 16-Channel embedded audio, 24-bit per channel, 48 kHz synchronous

## Audio Inputs Analog

---

- 8-Channel, 24 and 16-bit A/D analog audio, 48 kHz sample rate, balanced, using industry standard 8x XLR on DB-25 breakout cable (cable not included)
- +24 dBu full scale digital (0dBFS)
- +/- 0.2 dB 20 to 20 kHz frequency response
  - Input supported across Ch 1-8, Ch 1-4, or Ch 5-8 depending on configuration chosen

## Audio Output IP

---

- Up to 16-Channel embedded audio, 24-bit per channel, 48 kHz synchronous

## Audio Output Digital

---

- 8-Channel HDMI embedded audio, 48 kHz sample rate, synchronous

## Audio Outputs Analog

---

- 8-Channel, 24-bit D/A analog audio, 48 kHz sample rate, balanced, using industry standard 8x XLR on DB-25 breakout cable (cable not included)
- +24 dBu full scale digital (0dBFS)
- +/- 0.2 dB 20 to 20 kHz frequency response
  - Output supported across Ch 1-8, Ch 1-4, or Ch 5-8 depending on configuration chosen

## Downstream Keyer

---

- Supports graphics with alpha channel over video, matte or framebuffer, or framebuffer content over incoming video or matte

## Reference and LTC I/O

---

- 1x BNC assignable to Reference video or LTC input

## Reference

---

- Analog Color Black (1V) or Composite Sync (2 or 4V) or HD Tri-Level Sync (1V)
- Reference input is terminated into 75 ohms when Genlock is set to Ref In

## Electrical Interface

---

- Thunderbolt 3 (2x)

## Machine Control

---

- RS-422, Sony 9-pin protocol
- 9-pin D-connector pinout is as follows:
  - 1 GND
  - 2 RX-
  - 3 TX+
  - 4 GND
  - 5 No Connection
  - 6 GND
  - 7 RX+
  - 8 TX-
  - 9 GNDShell GND

#### Size (w x d x h)

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- 8.74" x 8.11" x 1.65" (222.0 x 206.0 x 41.91 mm)

#### Weight

---

- 3.3 lbs (1.5 kg)

#### Power (device only)

---

- 10-20V, 33W typical, 38W max, 72W max with USB-C power delivery to external devices

#### Environment

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- Safe Operating Temperature Range: 0 to 40C (32 F to 104 F)
- Safe Storage Temperature (Power OFF): -40 to 60 C (-40 to 140 F)
- Operating Relative Humidity: 10-90% noncondensing
- Operating Altitude: <3,000 meters (<10,000 feet)

# Appendix B – Safety and Compliance

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## Federal Communications Commission (FCC) Compliance Notices

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### Class A Interference Statement

---

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15, Subpart B of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

### FCC Caution

---

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

## Canadian ICES Statement

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### Canadian Department of Communications Radio Interference Regulations

This digital apparatus does not exceed the Class A limits for radio-noise emissions from a digital apparatus as set out in the Radio Interference Regulations of the Canadian Department of Communications. This Class A digital apparatus complies with Canadian ICES-003.

### Règlement sur le brouillage radioélectrique du ministère des Communications

Cet appareil numérique respecte les limites de bruits radioélectriques visant les appareils numériques de classe A prescrites dans le Règlement sur le brouillage radioélectrique du ministère des Communications du Canada. Cet appareil numérique de la Classe A est conforme à la norme NMB-003 du Canada.

## European Union and European Free Trade Association (EFTA) Regulatory Compliance

---

This equipment may be operated in the countries that comprise the member countries of the European Union and the European Free Trade Association. These countries, listed in the following paragraph, are referred to as The European Community throughout this document:

AUSTRIA, BELGIUM, BULGARIA, CYPRUS, CZECH REPUBLIC, DENMARK, ESTONIA, FINLAND, FRANCE, GERMANY, GREECE, HUNGARY, IRELAND, ITALY, LATVIA, LITHUANIA, LUXEMBOURG, MALTA, NETHERLANDS, POLAND, PORTUGAL, ROMANIA, SLOVAKIA, SLOVENIA, SPAIN, SWEDEN, UNITED KINGDOM, ICELAND, LICHTENSTEIN, NORWAY, SWITZERLAND

## Declaration of Conformity

Marking by this symbol indicates compliance with the Essential Requirements of the EMC Directive of the European Union 2014/30/EU.



This equipment meets the following conformance standards:

This equipment meets the following conformance standards:

### Safety

EN 60065: 2014 (T-Mark License),

IEC 60065: 2014, (CB Scheme Report/Certificate)

Additional licenses issued for specific countries available on request.

### Emissions

EN 55032: 2012, CISPR 32: 2015

EN 61000-3-2: 2014, EN 61000-3-3: 2013

### Immunity

EN 55103-2: 2009

61000-4-2: 2009, EN 61000-4-3: 2006 + A1: 2008 + A2: 2010,

EN 61000-4-4: 2004 + A1: 2010, EN 61000-4-5: 2006,

EN 61000-4-6: 2009, EN 61000-4-11: 2004

Environments: E2, E3 and E4

The product is also licensed for additional country specific standards as required for the International Marketplace.



**Warning!** This is a Class A product. In a domestic environment, this product may cause radio interference, in which case, the user may be required to take appropriate measures.

**Achtung!** Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkstörungen auftreten, in welchen Fällen der Benutzer für entsprechende Gegenmaßnahmen verantwortlich ist.

**Attention!** Ceci est un produit de Classe A. Dans un environnement domestique, ce produit risque de créer des interférences radioélectriques, il appartiendra alors à l'utilisateur de prendre les mesures spécifiques appropriées..

## Recycling Notice



This symbol on the product or its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste for recycling, please contact your local authority, or where you purchased your product.



## Korea KCC Compliance Statement

A급 기기 (업무용 방송통신기자재)	이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.
Class A (Broadcasting Communication Equipment for Office Use)	As an electromagnetic wave equipment for office use (Class A), this equipment is intended to use in other than home area. Sellers or users need to take note of this.

## Taiwan Compliance Statement

**警告使用者：**  
這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

This is a Class A product based on the standard of the Bureau of Standards, Metrology and Inspection (BSMI) CNS 13438, Class A. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

## Japan Compliance Statement

この装置は、クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。 VCCI-A

This is a Class A product based on the standard of the VCCI Council (VCCI 32: 2016). If this equipment is used in a domestic environment, radio interference may occur, in which case, the user may be required to take corrective actions.

## Translated Warning and Caution Messages

The following caution statements, warning conventions, and warning messages apply to this product and manual.



Warning Symbol



Caution Symbol

## Before Operation Please Read These Instructions



**Warning!** Read and follow all warning notices and instructions marked on the product or included in the documentation.

**Avertissement!** Lisez et conformez-vous à tous les avis et instructions d'avertissement indiqués sur le produit ou dans la documentation.

**Warnung!** Lesen und befolgen Sie die Warnhinweise und Anweisungen, die auf dem Produkt angebracht oder in der Dokumentation enthalten sind.

**¡Advertencia!** Lea y siga todas las instrucciones y advertencias marcadas en el producto o incluidas en la documentación.

**Aviso!** Leia e siga todos os avisos e instruções assinalados no produto ou incluídos na documentação.

**Avviso!** Leggere e seguire tutti gli avvisi e le istruzioni presenti sul prodotto o inclusi nella documentazione.



**Warning!** Do not use this device near water and clean only with a dry cloth.

**Avertissement!** N'utilisez pas cet appareil près de l'eau et nettoyez-le seulement avec un tissu sec.

**Warnung!** Das Gerät nicht in der Nähe von Wasser verwenden und nur mit einem trockenen Tuch säubern.

**¡Advertencia!** No utilice este dispositivo cerca del agua y límpielo solamente con un paño seco.

**Aviso!** Não utilize este dispositivo perto da água e limpe-o somente com um pano seco.

**Avviso!** Non utilizzare questo dispositivo vicino all'acqua e pulirlo soltanto con un panno asciutto.



**Warning!** Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.

**Avertissement!** Ne bloquez aucune ouverture de ventilation. Suivez les instructions du fabricant lors de l'installation.

**Warnung!** Die Lüftungsöffnungen dürfen nicht blockiert werden. Nur gemäß den Anweisungen des Herstellers installieren.

**¡Advertencia!** No bloquee ninguna de las aberturas de la ventilación. Instale de acuerdo con las instrucciones del fabricante.

**Aviso!** Não obstrua nenhuma das aberturas de ventilação. Instale de acordo com as instruções do fabricante.

**Avviso!** Non ostruire le aperture di ventilazione. Installare in conformità con le istruzioni del fornitore.



**Warning!** Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

**Avertissement!** N'installez pas l'appareil près d'une source de chaleur telle que des radiateurs, des bouches d'air de chauffage, des fourneaux ou d'autres appareils (amplificateurs compris) qui produisent de la chaleur.

**Warnung!** Nicht in der Nähe von Wärmequellen wie Heizkörpern, Heizregistern, Öfen oder anderen Wärme erzeugenden Geräten (einschließlich Verstärkern) aufstellen.

**¡Advertencia!** No instale cerca de fuentes de calor tales como radiadores, registros de calor, estufas u otros aparatos (incluidos amplificadores) que generan calor.

**Aviso!** Não instale perto de nenhuma fonte de calor tal como radiadores, saídas de calor, fogões ou outros aparelhos (incluindo amplificadores) que produzam calor.

**Avviso!** Non installare vicino a fonti di calore come termosifoni, diffusori di aria calda, stufe o altri apparecchi (amplificatori compresi) che emettono calore



**Warning!** Unplug this device during lightning storms or when unused for long periods of time.

**Avertissement!** Débranchez cet appareil pendant les orages avec éclairs ou s'il est inutilisé pendant de longues périodes.

**Warnung!** Das Gerät ist bei Gewitterstürmen oder wenn es über lange Zeiträume ungenutzt bleibt vom Netz zu trennen.

**¡Advertencia!** Desenchufe este dispositivo durante tormentas eléctricas o cuando no se lo utilice por largos periodos del tiempo.

**Aviso!** Desconecte este dispositivo da tomada durante trovoadas ou quando não é utilizado durante longos períodos de tempo.

**Avviso!** Utilizzare soltanto i collegamenti e gli accessori specificati e/o venduti dal produttore, quali il treppiedi e l'esoscheletro.



**Warning!** Do not open the chassis. There are no user-serviceable parts inside. Opening the chassis will void the warranty unless performed by an AJA service center or licensed facility.

**Avertissement!** Ne pas ouvrir le châssis. Aucun élément à l'intérieur du châssis ne peut être réparé par l'utilisateur. La garantie sera annulée si le châssis est ouvert par toute autre personne qu'un technicien d'un centre de service ou d'un établissement agréé AJA.

**Warnung!** Öffnen Sie das Gehäuse nicht. Keine der Geräteteile können vom Benutzer gewartet werden. Durch das Öffnen des Gehäuses wird die Garantie hinfällig, es sei denn, solche Wartungsarbeiten werden in einem AJA-Service-Center oder einem lizenzierten Betrieb vorgenommen.

**¡Advertencia!** No abra el chasis. El interior no contiene piezas reparables por el usuario. El abrir el chasis anulará la garantía a menos que se lo haga en un centro de servicio AJA o en un local autorizado.

**Advertência!** Não abra o chassi. Não há internamente nenhuma peça que permita manutenção pelo usuário. Abrir o chassi anula a garantia, a menos que a abertura seja realizada por uma central de serviços da AJA ou por um local autorizado.

**Avvertenza!** Non aprire lo chassis. All'interno non ci sono parti riparabili dall'utente. L'apertura dello chassis invaliderà la garanzia se non viene effettuata da un centro ufficiale o autorizzato AJA.



**Warning!** Only use attachments and accessories specified and/or sold by the manufacturer.

**Avertissement!** Utilisez seulement les attaches et accessoires spécifiés et/ou vendus par le fabricant.

**Warnung!** Verwenden Sie nur Zusatzgeräte und Zubehör angegeben und / oder verkauft wurde durch den Hersteller.

**¡Advertencia!** Utilice solamente los accesorios y conexiones especificados y/o vendidos por el fabricante.

**Aviso!** Utilize apenas equipamentos/acessórios especificados e/ou vendidos pelo fabricante.

**Avviso!** Utilizzare soltanto i collegamenti e gli accessori specificati e/o venduti dal produttore.



**Warning!** Refer all servicing to qualified service personnel. Servicing is required when the device has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the device, the device has been exposed to rain or moisture, does not operate normally, or has been dropped.

**Avertissement!** Référez-vous au personnel de service qualifié pour tout entretien. L'entretien est exigé quand l'appareil a été endommagé de quelque manière que ce soit, par exemple lorsque le cordon d'alimentation ou la prise sont endommagés, que du liquide a été versé ou des objets sont tombés dans l'appareil, que l'appareil a été exposé à la pluie ou à l'humidité, ne fonctionne pas normalement ou est tombé.

**Warnung!** Das Gerät sollte nur von qualifizierten Fachkräften gewartet werden. Eine Wartung ist fällig, wenn das Gerät in irgendeiner Weise beschädigt wurde, wie bei beschädigtem Netzkabel oder Netzstecker, falls Flüssigkeiten oder Objekte in das Gerät gelangen, das Gerät Regen oder Feuchtigkeit ausgesetzt wurde, nicht ordnungsgemäß funktioniert oder fallen gelassen wurde.

**¡Advertencia!** Consulte al personal calificado por cuestiones de reparación. El servicio de reparación se requiere cuando el dispositivo ha recibido cualquier tipo de daño, por ejemplo cable o espigas dañadas, se ha derramado líquido o se han caído objetos dentro del dispositivo, el dispositivo ha sido expuesto a la lluvia o humedad, o no funciona de modo normal, o se ha caído.

**Aviso!** Remeta todos os serviços de manutenção para o pessoal de assistência qualificado. A prestação de serviços de manutenção é exigida quando o dispositivo foi danificado mediante qualquer forma, como um cabo de alimentação ou ficha que se encontra danificado/a, quando foi derramado líquido ou caíram objectos sobre o dispositivo, quando o dispositivo foi exposto à chuva ou à humidade, quando não funciona normalmente ou quando foi deixado cair.

**Avviso!** Fare riferimento al personale qualificato per tutti gli interventi di assistenza. L'assistenza è necessaria quando il dispositivo è stato danneggiato in qualche modo, ad esempio se il cavo di alimentazione o la spina sono danneggiati, è stato rovesciato del liquido è stato rovesciato o qualche oggetto è caduto nel dispositivo, il dispositivo è stato esposto a pioggia o umidità, non funziona correttamente o è caduto



**Warning!** Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

**Avertissement!** La sécurité de la prise polarisée ou de la prise de type mise à la terre ne doit en aucun cas être empêchée de fonctionner. Une prise polarisée a deux broches, l'une étant plus large que l'autre. Une prise de type mise à la terre a deux broches et une troisième broche pour la mise à la terre. La broche large ou la troisième broche sont fournies pour votre sécurité. Si la prise fournie ne s'insère pas dans votre prise femelle, consultez un électricien pour le remplacement de la prise femelle obsolète.

**Warnung!** Der Sicherheitszweck des gepolten bzw. Schukosteckers ist zu berücksichtigen. Ein gepolter Stecker verfügt über zwei Pole, von denen einer breiter als der andere ist. Ein Schukostecker verfügt neben den zwei Polen noch über einen dritten Pol zur Erdung. Der breite Pol bzw. der Erdungspol dienen der Sicherheit. Wenn der zur Verfügung gestellte Stecker nicht in Ihren Anschluss passt, konsultieren Sie einen Elektriker, um den veralteten Anschluss zu ersetzen.

**¡Advertencia!** No eche por tierra la finalidad del tipo de enchufe polarizado con conexión a tierra. Un enchufe polarizado tiene dos espigas, una más ancha que la otra. Un enchufe con conexión a tierra tiene dos espigas iguales y una tercera espiga que sirve para la conexión a tierra. La espiga ancha, o la tercera espiga, sirven para su seguridad. Si el enchufe suministrado no encaja en el tomacorriente, consulte con un electricista para reemplazar el tomacorriente obsoleto.

**Aviso!** Não anule a finalidade da segurança da ficha polarizada ou do tipo ligação terra. Uma ficha polarizada tem duas lâminas sendo uma mais larga do que a outra. Uma ficha do tipo de ligação à terra tem duas lâminas e um terceiro terminal de ligação à terra. A lâmina larga ou o terceiro terminal são fornecidos para sua segurança. Se a ficha fornecida não couber na sua tomada, consulte um electricista para a substituição da tomada obsoleta.

**Avviso!** Non compromettere la sicurezza della spina polarizzata o con messa a terra. Una spina polarizzata ha due spinotti, di cui uno più largo. Una spina con messa a terra ha due spinotti e un terzo polo per la messa a terra. Lo spinotto largo o il terzo polo sono forniti per motivi di sicurezza. Se la spina fornita non si inserisce nella presa di corrente, contattare un elettricista per la sostituzione della presa obsoleta.



**Warning!** Disconnect the external AC power supply line cord(s) from the mains power before moving the unit.

**Avertissement!** Retirez le ou les cordons d'alimentation en CA de la source d'alimentation principale lorsque vous déplacez l'appareil.

**Warnung!** Trennen Sie die Wechselstrom-Versorgungskabel vom Netzstrom, bevor Sie das Gerät verschieben.

**¡Advertencia!** Cuando mueva la unidad desenchufe de la red eléctrica el/los cable(s) de la fuente de alimentación CA tipo brick.

**Advertência!** Remova os cabos CA de alimentação brick da rede elétrica ao mover a unidade.

**Avvertenza!** Scollegare il cavo dell'alimentatore quando si sposta l'unità.



**Warning!** Since the Mains plug is used as the disconnection for the device, it must remain readily accessible and operable.

**Avertissement!** Puisque la prise principale est utilisée pour débrancher l'appareil, elle doit rester aisément accessible et fonctionnelle.

**Warnung!** Da der Netzstecker als Trennvorrichtung dient, muss er stets zugänglich und funktionsfähig sein.

**¡Advertencia!** Puesto que el enchufe de la red eléctrica se utiliza como dispositivo de desconexión, debe seguir siendo fácilmente accesible y operable.

**Aviso!** Dado que a ficha principal é utilizada como a desconexão para o dispositivo, esta deve manter-se prontamente acessível e funcional.

**Avviso!** Poiché il cavo di alimentazione viene usato come dispositivo di sconnessione, deve rimanere prontamente accessibile e operabile.



**Warning!** Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the device.

**Avertissement!** Protégez le cordon d'alimentation pour que l'on ne marche pas dessus ou qu'on le pince, en particulier au niveau des prises mâles, des réceptacles de convenance, et à l'endroit où il sort de l'appareil.

**Warnung!** Vermeiden Sie, dass auf das Netzkabel getreten oder das Kabel geknickt wird, insbesondere an den Steckern, den Steckdosen und am Kabelausgang am Gerät.

**¡Advertencia!** Proteja el cable de energía para que no se le pise ni apriete, en especial cerca del enchufe, los receptáculos de conveniencia y el punto del que salen del equipo.

**Aviso!** Proteja o cabo de alimentação de ser pisado ou de ser comprimido particularmente nas fichas, em tomadas de parede de conveniência e no ponto de onde sai do dispositivo.

**Avviso!** Proteggere il cavo di alimentazione in modo che nessuno ci cammini sopra e che non venga schiacciato soprattutto in corrispondenza delle spine e del punto in cui esce dal dispositivo.

# Warranty and Liability Information

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AJA VIDEO SYSTEMS, INC.

## Limited Warranty on Hardware

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AJA Video Systems, Inc. (AJA Video) warrants that the hardware product, not including storage modules or software components, will be free from defects in materials and workmanship for a period of three (3) years from the date of purchase. AJA Video warrants that the storage modules provided as part of the hardware product will be free from defects in materials and workmanship for a period of one year from the date of purchase. AJA Video provides a separate software warranty as part of the license agreement applicable to software components.

If a hardware product or storage module (hereafter, a “product”) proves to be defective during the applicable warranty period, AJA Video, at its option, will either repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product.

To obtain service under this warranty, the Customer must notify AJA Video of the defect before expiration of the warranty period and make suitable arrangements for the performance of service by contacting AJA Video support through the channels set forth on the support contacts web page at <http://www.aja.com/support>. Except as stated, the Customer shall bear all shipping, packing, insurance and other costs, excluding parts and labor, to effectuate repair. Customer shall pack and ship the defective product to a service center designated by AJA Video, with shipping charges prepaid. AJA Video shall pay to return the product to Customer but only if to a location within the country in which the AJA Video service center is located.

This warranty shall not apply to any defect, failure or damage caused by negligent, inadequate or improper use, handling or maintenance. Without limiting the foregoing, AJA Video shall not be obligated to furnish service under this warranty or repair any damage or malfunction a) resulting from attempts by personnel other than AJA Video representatives to install, repair or service the product, b) resulting from improper use or connection to incompatible equipment, c) caused by the use of non-AJA Video parts or supplies, d) if the product has been modified or integrated with other products when the effect of such a modification or integration increases the time or difficulty of servicing the product, or e) resulting from being dropped or otherwise subjected to undue force, exposure to moisture or other corrosive or conductive substances, exposure to strong magnetic fields, use with improperly regulated power supplies, exposure to electric shock, use in temperatures outside the specified operating range, or otherwise failing to treat the product in accordance with the standard of care appropriate to sensitive and delicate electronic equipment.

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THE PRODUCT IS NOT INTENDED, STATED, OR WARRANTED TO OPERATE UNINTERRUPTED OR ERROR-FREE. YOU UNDERSTAND AND ACKNOWLEDGE THAT THE PRODUCT IS NOT INTENDED TO BE USED AS THE SOLE OR PRIMARY DATA SOURCE OR TARGET FOR CRITICAL DATA, AND THAT IT IS YOUR RESPONSIBILITY TO IMPLEMENT REDUNDANT CAPTURE AND BACKUP SYSTEMS AS APPROPRIATE.

## Limitation of Liability

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## Governing Law and Language; Your Rights.

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This limited warranty is the only warranty provided by AJA Video on the hardware product. It supersedes all prior or contemporaneous understandings regarding such subject matter. No amendment to or modification of this warranty will be binding unless in writing and signed by AJA Video. The laws of the State of California, USA will govern this warranty and any dispute arising from it. Any translation of this Agreement is intended for convenience and to meet local requirements and in the event of a dispute between the English and any non-English versions, the English version of this warranty will govern. This limited warranty gives you specific legal rights and you may have other rights that vary from jurisdiction to jurisdiction, some of which are noted above.



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