# Io Express

## Capture, Display, Convert

# Installation and Operation Manual

**AJA**
VIDEO SYSTEMS

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## Contacting AJA Support

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 | https://www.aja.com |
| Support Email | support@aja.com |
| Sales Email | sales@aja.com |

# Contents

# Chapter 1 – Introduction

## Overview

Io Express is the perfect cross-platform, Mac or PC, interface for anyone who needs an inexpensive monitoring and mastering solution when working with Apple ProRes Formats, XDCAM HD, DVCPRO HD, and more. Portable and simple to use, Io Express is ideal for file based workflows.

## Features

The Io Express package includes the following features:

- HD/SD-SDI input and output
- HDMI 1.3a input and output
- Component Video output for monitoring
- 2-channel RCA audio output
- LTC I/O (selectable LTC input or Reference Video Input)
- RS-422
- PCIe card computer interface
- For Mac OSX and 64-bit Windows operating systems
- Small portable case design fits in 1RU rackmount option
- 1-meter PCIe tether cable
- 12V DC power supply

Playback formats supported by Io Express include:

- Apple ProRes 422 HD/SD (Mac OSX only)
- DVCPRO HD
- DV25/DV50
- HDV
- SD Uncompressed
- XDCAM
- XDCAM EX
- XDCAM HD

NOTE:    Encoding of Apple ProRes is available only on Apple computers, except Windows supports Control Room capture of ProRes. Apple ProRes can be played back on a PC with the appropriate QuickTime Windows decoder.

# Io Express Audio Monitoring

For analog audio output monitoring, Io Express provides two-channel unbalanced audio (RCA jacks).

A 1/8 inch TRS headphone jack, with volume control, is also available on the front panel.

# AJA Software & Utilities

Io Express 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, plugins, and utility programs for the Io Express, 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

These packages include:

### Firmware

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

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

### AJA Control Panel

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.

### AJA Control Room

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

### 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.*

### 3rd-Party Plug-ins

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

# System Requirements

AJA Video recommends that your system 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 recommendations and additional hardware requirements and recommendations.*

AJA recommends:
- MacOS 10.12 Sierra or later (including 10.15 Catalina)
- Win 10 or later with all updates
- 2.5 GHz quad core i7 minimum, for HD
- 16GB RAM minimum, for HD
- 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:
  - NvidiaK5200
  - 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, AJA recommends consultation with an experienced a system integrator. A consultant will be able to assist with many important variables.*

# Cable Connections

*Figure 1. Io Express Rear Connectors*
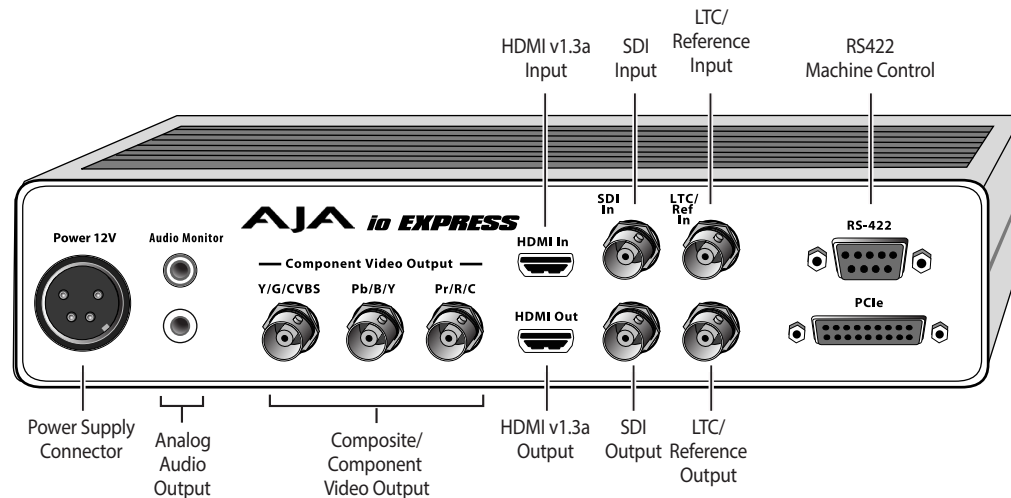


Io Express connections are made directly to the unit's rear connector plate.

## HD/SD SDI Input and Output

BNC connectors are provided on Io Express for one HD/SD-SDI input and one HD/SD-SDI output. The input and output support video and embedded 24-bit digital audio. Use SDI wherever possible for the best quality 10-bit uncompressed video input, capture and output. If peripheral equipment has a variety of inputs/outputs, look to see if it has SDI I/O, and use it where possible. Most high-end professional broadcast equipment supports SDI (VTRs, cameras, media storage servers, etc.).

## HDMI Input and Output

Two HDMI connectors on the Io Express provide input and output of HDMI compatible video and multi-channel embedded audio (8 channels). HDMI v1.3a capability at 30 bits per pixel allows full support of the latest 10-bit monitors. HDCP is not supported on either input or output. Io Express HDMI output does not have HDCP, and input sources having HDCP are not supported. The HDMI input is designed to support long cable runs—up to 100 ft. when using 22 or 24AWG HDMI cable, or up to 50 ft. using 28 or 30AWG HDMI cable. The HDMI output supports standard HDMI cables only. The AJA Control Panel allows selection and adjustment of some HDMI parameters.

## Analog 2-Channel Unbalanced Audio Output

Io Express provides two analog output connectors, one for each channel. These connectors are RCA-style phono jacks.

A 1/8 inch TRS headphone jack, with volume control, is also available on the front panel.

## RS422 Machine Control

A female DE-9 connector on Io Express provides connection for VTRs, camcorders, disk media servers, and other devices using RS422 SMPTE (Sony) protocol. (Connector pinout is listed in *"Appendix A Specifications"* .)

## Component Video Output (with Composite and Y/C)

Io Express features a group of 3 BNC connectors for output of component, composite and Y/C functions. The signals are labeled on the BNC connectors on the rear panel of Io Express.

Component Video, or YPbPr, has been given several names over time. YUV, Y/R-Y/B-Y, and YCbCr, are just some examples. Although these various formats have some differences in levels, they are all basically the same. Io Express uses the modern YPbPr terminology exclusively. Io Express supports three different types of YPbPr: SMPTE/EBU N10, Betacam (NTSC), and Betacam (NTSC Japan). These three formats differ in level only and are configured in the Mac System via the Io Express Control Panel.

## Reference Video and LTC Input

Two BNC connectors on Io Express provide reference Input and Output. The Reference Video input can also be used for LTC input. The selection of Reference (sync) or LTC is set using the Io Express Control Panel.

In Video Pass-through mode, these connectors are effectively loop-through. Supplying reference signal to the Reference input allows you to synchronize Io Express outputs to your house analog 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, then connect its analog composite output here. When Io Express outputs video, it uses this reference signal for locking. When connecting a reference video source, the locking signal should be the same format as the Primary format selected in the Io Express Control Panel. It is possible in some circumstances to use an alternate format video signal as long as the basic frame rate is compatible.

# In This Manual

Chapter 1 gives general Io Express information and lists product features and system requirements.

Chapter 2 provides instructions for installing and configuring Io Express.

Chapter 3 discusses the operation of Io Express when used with AJA Control Panel and third-party applications.

Appendix A presents a list of Io Express technical specifications.

Appendix B contains important safety and compliance information for Io Express.

# Chapter 2 – Installation

## What's In The Box?

As you unpack the shipping box(es), carefully examine the contents. Ensure you received everything and that nothing was damaged during shipment. 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 Io Express repaired or replaced. 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.

When you unpack your AJA Io Express, you'll find the following components:

- Io Express
- PCIe Card
- PCIe Tether Cable

## Installation

### Overview

The installation and set up of Io Express is very simple. The steps of installation and configuration are discussed here and summarized as follows:

1. Unpack the shipping box.

2. If not previously installed on your Mac Pro or Windows workstation, ensure that appropriate application software, such as Apple's Final Cut Pro or Adobe Premiere Pro, is installed as detailed in its user documentation. Editing software must be installed and have been run at least once prior to installing Io Express software.

3. Download and install the latest Io Express software from:

   http://www.aja.com/en/support/io/mac/io-express/

4. Install the Io Express PCIe card in your Mac or PC (see *"Connecting To Your Computer"* below).

5. Cable the system audio and video sources, VTR, audio monitor, and video monitor (see *"Cabling the System" on page 11*).

### Connecting To Your Computer

**CAUTION:** *Always have power off when connecting any device to the PCIe bus.*

1. With your computer off, install the PCIe card into the computer or external PCIe chassis.

NOTE: *Refer to your PC manufacturer's documentation for installing a PCIe card.*

2. Connect the PCIe tether cable between the Io Express PCIe port and the PCIe card.

3. Assemble the Power Adapter and cable and connect to the Io Express 12V power connector.

4. Connect the Power Supply to AC power and turn on Io Express using the front power switch.
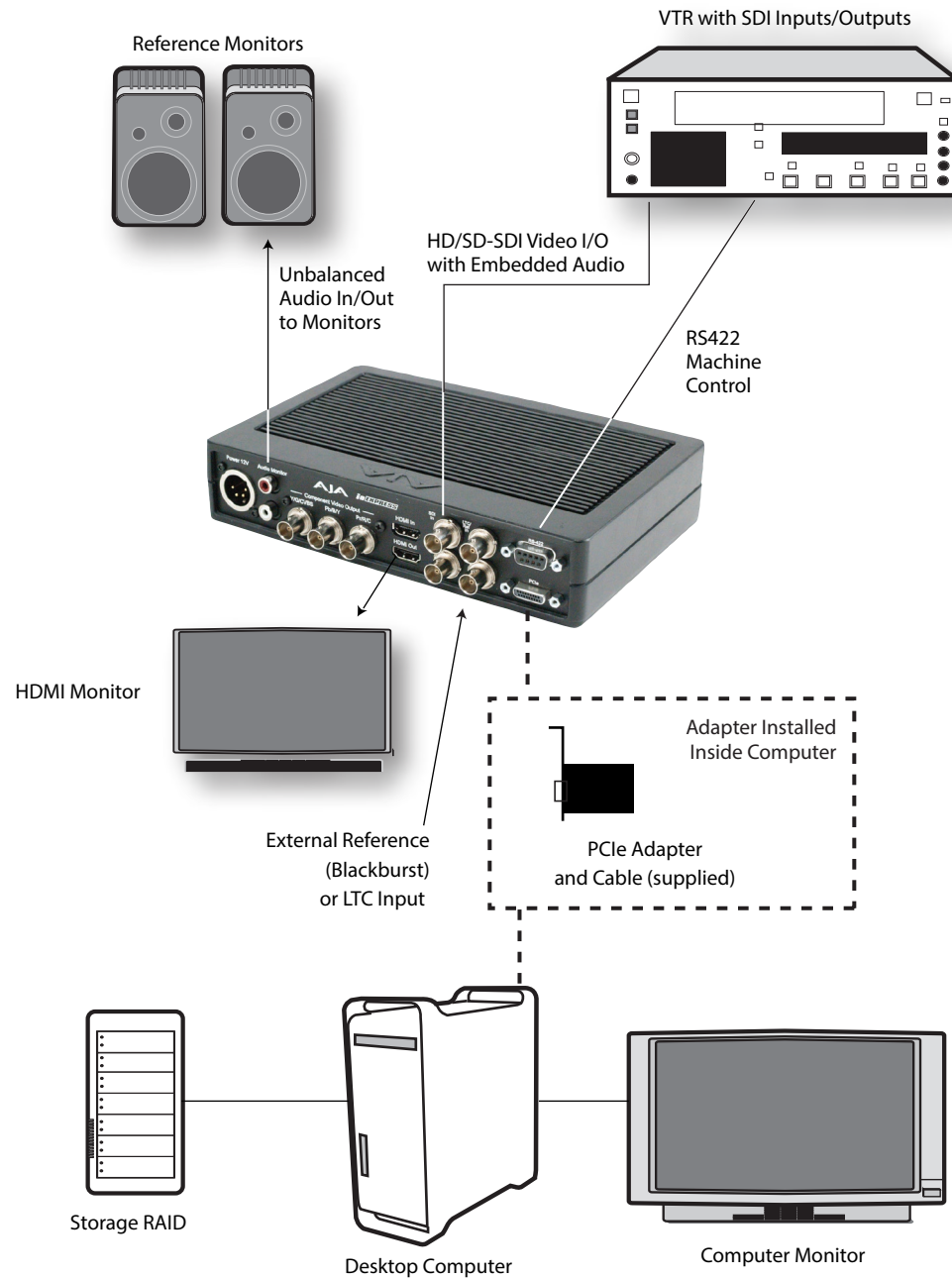
NOTE: *For correct performance, always power up Io Express before starting your computer and power down your computer before powering down Io Express.*

## Cabling the System

The following figure shows a typical interconnection for a system with digital A/V sources. Your system may differ depending on VTRs, audio monitoring, and video monitoring.

1. If desired, connect your house reference sync to the Io Express Ref/LTC connector (BNC). The second Io Express Ref Loop connector (if used in Pass through mode) can be connected to the VTR or terminated with a 75-ohm terminator. If instead you are using LTC timecode input, connect to the Ref/LTC input.

2. Connect an HDMI Video Monitor to the Io Express HDMI Out connector. Or instead, use the Component Analog Video Out BNC connectors to go to an analog monitor.

3. Connect a 9-pin DE-9 machine control cable between your VTR's RS422 control port and the Io Express RS-422 machine control connector.

4. Connect two SDI cables between Io Express and your digital VTR (Digital Betacam etc.): one from Io Express SDI In to the VTR SDI Out, and one from Io Express SDI Out to the VTR SDI In. The Io Express SDI connections have embedded audio so the VTR must be configured accordingly.

5. Use the two RCA-style unbalanced stereo output jacks for audio monitoring output.

*Figure 2. Typical Desktop System Connections*

Reference Monitors

VTR with SDI Inputs/Outputs

Unbalanced
Audio In/Out
to Monitors

HD/SD-SDI Video I/O
with Embedded Audio

RS422
Machine
Control

HDMI Monitor

Adapter Installed
Inside Computer

External Reference
(Blackburst)
or LTC Input

PCIe Adapter
and Cable (supplied)

Storage RAID

Desktop Computer

Computer Monitor

# Chapter 3 – Operation

## AJA Control Panel Overview

The AJA Control Panel is a software application that provides a simple visual showing how the Io Express 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 Operating Modes

AJA Control Panel has two fundamental operating modes.

**Playback Mode** - Used for playing back video files from the computer, usually with a non-linear editing application (NLE) or AJA Control Room, through the Io Express's video/audio outputs for viewing and/or external recording.

**Capture Mode** - Used for capturing video/audio signals that are coming into the Io Express from an external source to create video files on the computer using AJA Control Room or an NLE, or just for display on the Io Express outputs. This mode is also used for stand-alone video display or conversion when Control Panel is being used without an external controlling application.

### 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.

*Figure 3. Io Express, Block Diagram set for UltraHD Format*

Currently Selected Function Screen

Framebuffer Format (Primary)

Inputs

Outputs

Parameter Controls
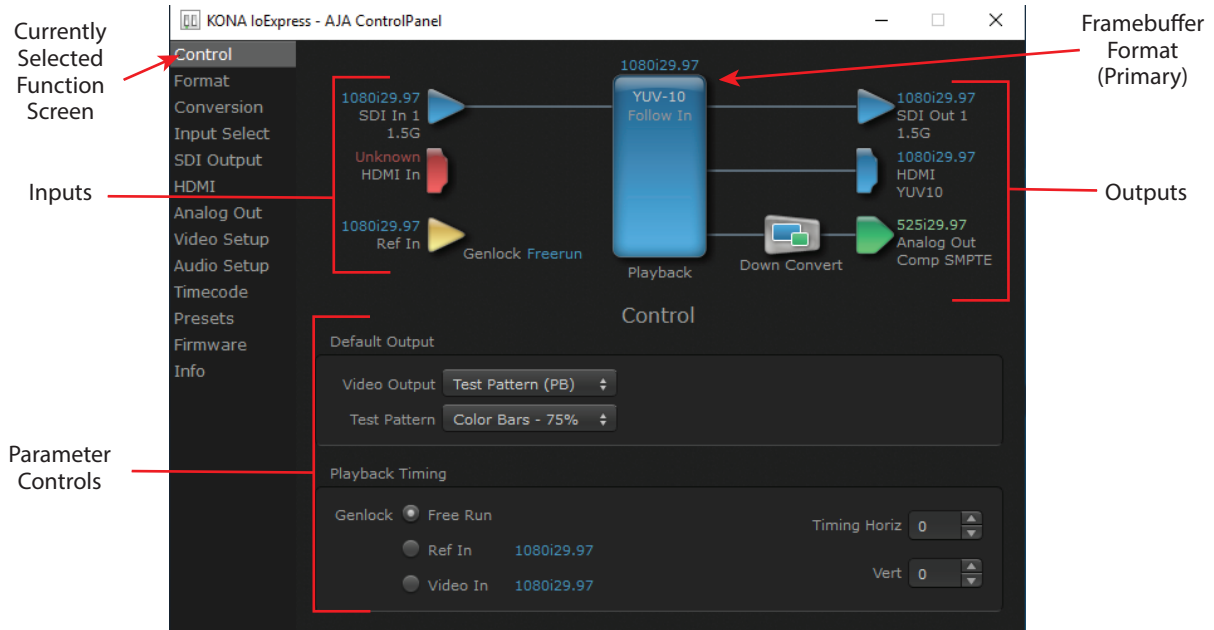
## Screen Navigation Shortcuts

Various Control Panel screen navigation shortcuts are available.

- Click on an icon to call up its related parameters screen. For example, clicking on an Input triangle brings up the Input Select screen.
- Right-click or Control-click on an icon to see context-sensitive information and direct select choices (*Figure 4*).

*Figure 4. Context Sensitive Menu*
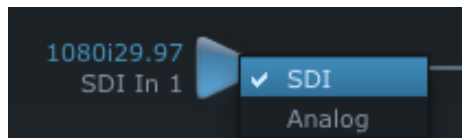


- Left or right-clicking on some items opens a direct selection list. Hovering the cursor over these items colors them yellow. These items include:
  - Format and frame rate shown above the framebuffer
  - Pixel format and Follow Input shown in the framebuffer
  - Current mode (Playback or Capture) shown below the framebuffer
  - Genlock

## Playback and Capture Modes

The current AJA device operating mode is shown below the framebuffer. When no external application is in control, selecting Input Passthrough in the Control screen enables Capture Mode. Selecting Test Pattern or Hold Last App enables Playback Mode.

When an external application is in control, it may change the operating mode depending on the function that application is performing. For example, in Adobe Premier Pro, selecting the Capture window will change the AJA Control Panel mode to Capture Mode.

## 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 5*).

*Figure 5. Context Sensitive Menu*
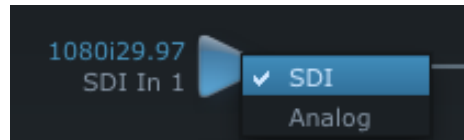
## Color Meanings

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 Device Format (framebuffer).

### Green

Indicates that Io Express is performing an active change to the video making it different from the Device Format (e.g., down-conversion).

### Red

The selected operation cannot be performed.

### Yellow

Reference video (black burst or other reference source).

## Input/Output Icons

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 6. Input/Output Icons*
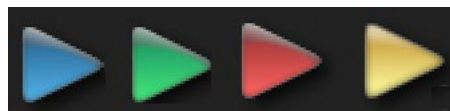
## Framebuffer

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

## Device Format

The Device 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 Device Format used by the framebuffer. Also any text descriptions in the block diagram that appear in blue indicate that something is in the Device Format. For example:

- If the input and output icons are blue, you know that the same format is used throughout the video path. No format conversion is being performed.
- If the input or output icon colors differ (blue input and green output icons for example), you know that a format conversion is being performed.

## Converted Format

Any format other than the currently selected Device Format is a Converted Format. As described previously, this means that either the Inputs or Outputs are somehow different from the framebuffer's assigned format—the Device Format. A conversion is readily apparent because of the color change from blue. In some cases the application you use with the Io Express will automatically set the Device Format, overriding the user's selected Device Format in the AJA Control Panel.

All conversions use AJA 10-bit hardware on the card.

Down-conversion display mode choices that may be available include:

- Anamorphic: full-screen
- Letterbox: image is reduced with black top and bottom added to image area with the aspect ratio preserved
- Crop: image is cropped horizontally to fit new screen size

The table below contains the available Io Express down-conversion options.

*Table 1. Io Express Down-Conversion Options*

| Primary Video Format | Secondary Format Options |
|---|---|
| 1280x720 @ 23.976p | 720x486 @ 29.97i |
| 1280x720 @ 25.00p | 720x576 @ 25.00i |
| 1280x720 @ 29.97p | 720x486 @ 29.97i |
| 1280x720 @ 50.00p | 720x576 @ 25.00i |
| 1280x720 @ 59.94p | 720x486 @ 29.97i |
| 1920x1080 @ 23.976sF | 720x486 @ 29.97i |
| 1920x1080 @ 25.00sF | 720x576 @ 25.00i |
| 1920x1080 @ 29.97sF | 720x486 @ 29.97i |
| 1920x1080 @ 25.00i | 720x576 @ 25.00i |
| 1920x1080 @ 29.97i | 720x486 @ 29.97i |

## Conversion Icon

When an input or output is a different standard than the framebuffer, the Io Express may be down-converting the signal to the selected standard. This may be automatic, because it's detected an input signal that differs from the standard currently selected, or because you've explicitly told it to convert. In either case, the block diagram will show the conversion by displaying a conversion icon in between the input/output and the framebuffer.
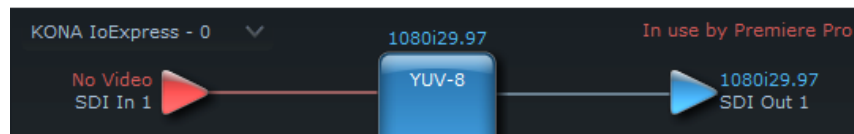
*Figure 7.  Down -Convert Icon*



# Controlling Application

It is important to understand that the computer can contain many applications that can use the AJA device (as you switch from window to window) and it may not always be obvious which currently controls it.

*Figure 8.  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.

## Controlling Application Format Selection

If a running controlling application uses Io Express for capture or output, it controls the Device Format via its own menus and settings. For example, when the Third-party editing application is active (it's the front-most application) and has Io Express as its "A/V Device", the Io Express's Device Format is determined by the application's "Video Playback" settings. These format selections are reported in the AJA Control Panel block diagram.

Controlling applications can start and stop and change modes—even while they are running. And the behavior of different controlling applications can vary: some applications take control of the interface as soon as they are launched and don't give it up until they quit, while other applications take control of the interface only when they are the "front-most" running application and then relinquish control when they're not. Even these controlling applications may not relinquish control until capture or output operations are completed.

## Control Recommendations

We recommend you have the Control Panel running and visible at all times. When the Control Panel is running in the background (not front-most) you can see what the interface is doing and who has control of it.

## Presets

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 32* 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

• 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\

# Default Preferences

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:

• Default User 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).

• Default 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.

## Default User Preference

The Default User 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 Default User Preference file stored in a unique location on that computer that is dedicated to that particular device and serial number. Then, when AJA Control Panel is restarted for any reason, the AJA device being controlled restores the settings it had when Control Panel was last closed.

The Default User 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 Default User Preferences file from this location. This file will be recreated as soon as any Control Panel setting is changed.*

## Default Global Preference

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 Default 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 Default Global Preference, the administrator first configures the AJA device (which automatically creates a "com.aja.devicesettings" Default User Preference file in the location identified above) and then copy or move or 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 Single-User Preference file, which will take priority over the Default Shared Preference file.*

The shared computer locations for a Default 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 two possible shared locations depending on your system:

- C:\Users\Public\Aja\
- C:\Users\All Users\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 Default Global Preference file on that computer, if it exists.*

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

## Function Screens

Listed below are the Control Panel function screens for Io Express and what they are used for.

*Table 2. Io Express Function Screens*

| Screen | Functions |
|---|---|
| Control | Configure basic Io Express operation options and output timing. |
| Format | Select the framebuffer primary video format settings. |
| Conversion | Permits selection of a Conversion Format. |
| Input Select | View and edit input selections and audio mapping. |
| SDI Output | Select output format. |
| HDMI | Configure the HDMI I/O |
| Analog Out | Configure the component/composite analog output |
| Video Setup | Configure Video such as composite black level, progressive format and ancillary data (Closed Caption) option. |

| Screen | Functions |
| --- | --- |
| Audio Setup | Configures Audio options such as analog audio monitor level. |
| 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 Express 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. |

# AJA Control Panel Function Screens

## Control Screen
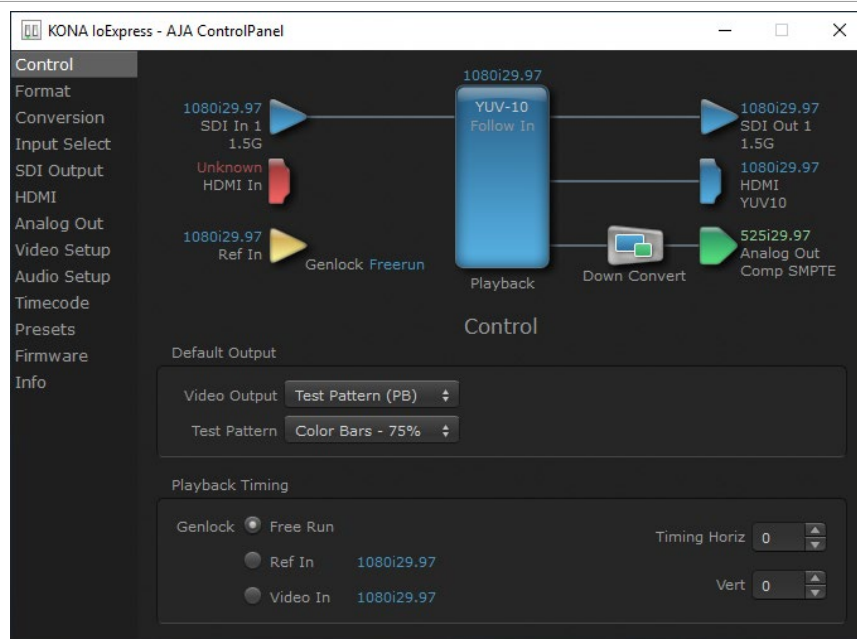


The Control Screen is where you set the Default Output, what the device outputs when no application has control of the board. This screen also has controls for setting the genlock source, and for setting the Horiz and Vert timing offsets. The top of the Control Screen shows the current state of the device and also shows the name of the Application which has control of the board, if there is one.

## Default Output

Many video applications can grab control of the Io Express, so its outputs can change dynamically. The Default Output settings are used to select what will be output when no third-party video application is controlling Io Express.

### Video Output

- Pass Through (Cap) - This selection directs Io Express to route video from its selected input through the card for processing and output, and enables Capture Mode.
- Test Pattern - This selection directs the Io Express to output a choice of preset pattern when no other application is using the Io Express, and enables Playback Mode. The test patterns you can choose are:
    - Black, Color bars (75% or 100%), Ramp, Multiburst, Line Sweep, Multi Pattern, Flat Field, Check Field, White, Border, Linear Ramp, Slant Ramp, Zone Plate, Color Quadrant, or Color Quad Border.
- Hold Last App - This selection directs Io Express to hold and output the last frame of video from the last application to control Io Express. This can be helpful when operating in an environment where you're switching back and forth between multiple application windows.

## Playback Timing

Use these controls to set the Genlock source and Timing adjustment.

### Genlock

Selects how Io Express will synchronize program video:
- Freerun: Generates sync without an external reference source
- Ref In: Use the Ref Video source for sync (usually an analog black burst video signal)
- Video In: Use whichever video input source has been selected in the Inputs screen for sync

For video stability and proper system operation, you can genlock all equipment to house sync. However genlock is not required for Io Express due to its excellent freerun accuracy. On the Io Express house sync is connected to "LTC/Ref In".

Alternatively, Io Express can receive externally supplied Linear Time Code on that same input connector. The LTC/Ref setting on the Input Select screen (see *"LTC/ Ref" on page 24*) selects how that input signal will be used.

### Timing (Horiz and Vert)

NOTE:    *The Playback Timing controls are greyed out when in Capture Mode.*

These two pull-downs allow output timing adjustment with reference to the Ref Video source selected.
- Horizontal: The Horizontal reference can be adjusted by selecting a number of pixels (clocks) to offset
- Vertical: The vertical reference can be adjusted by specifying a number of lines to offset.

# Format Screen
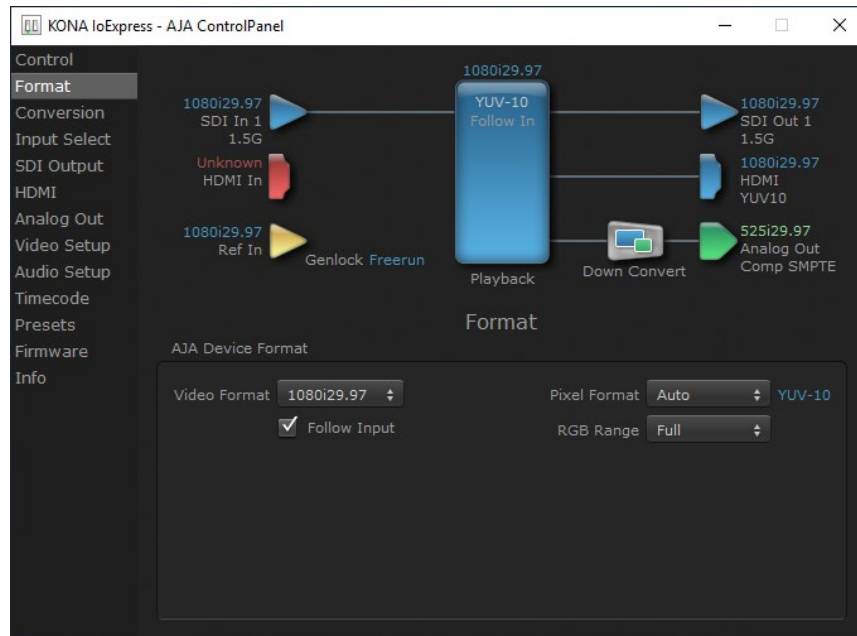


The Format Screen shows the video format currently in use by the Io Express framebuffer (called the Primary Format) and allows you to change it.

## AJA Device Format

### Video Format

This pull-down menu shows the currently selected Device 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.

### 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 if the controlling application supports input-based capture. Follow Input can also be active when there is no 3rd party controlling application and the Default Output setting is Input Passthrough (see *"Video Output" on page 21*).
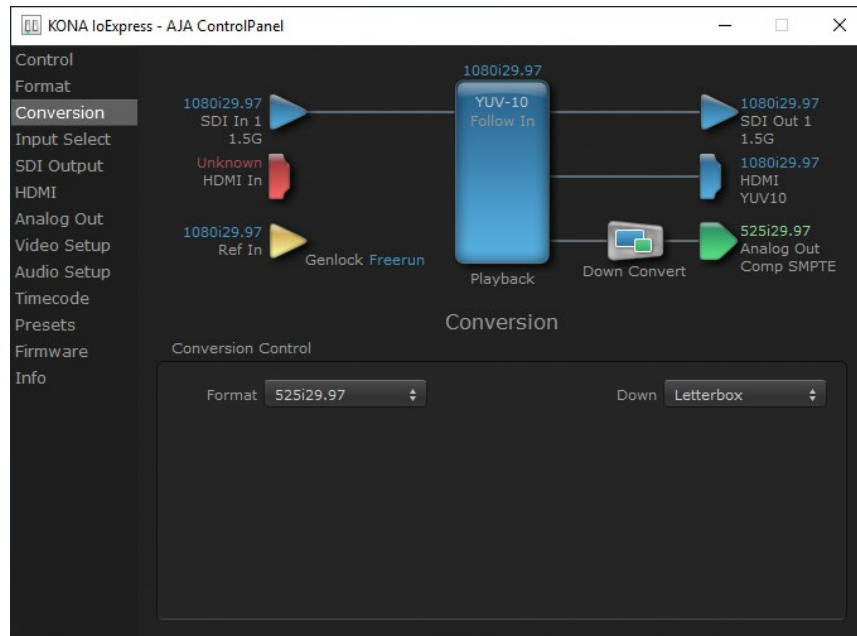
### Pixel Format

Use this pulldown menu to choose from:

- YUV-10
- YUV-8

### RGB Range

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

# Conversion Screen



The Conversion Screen allows you to select an alternative Conversion format that can be defined for the Io Express outputs, when operating in UFC mode.

# Conversion Control

## Format

The Format control shows the currently selected Conversion format. When the Converson Format is different from the Device Format, a conversion will be performed on the output, and the block diagram changes to reflect the new processing.

The Conversion Formats available can vary based on what the Device Format is and the input signal (frame rates of input sources limits the to/from conversion choices). The pull-down menu lists all compatible formats for selection (incompatible formats are not shown). This allows you to see what you've chosen, and also see those formats that are compatible with the selected Device format.

## Down

For down-conversion the following choices are available:

- Letterbox: image is reduced with black top and bottom added to image area with the aspect ratio preserved
- Crop: image is cropped to fit new screen size
- Anamorphic: full-screen "stretched" image

# Input Select Screen
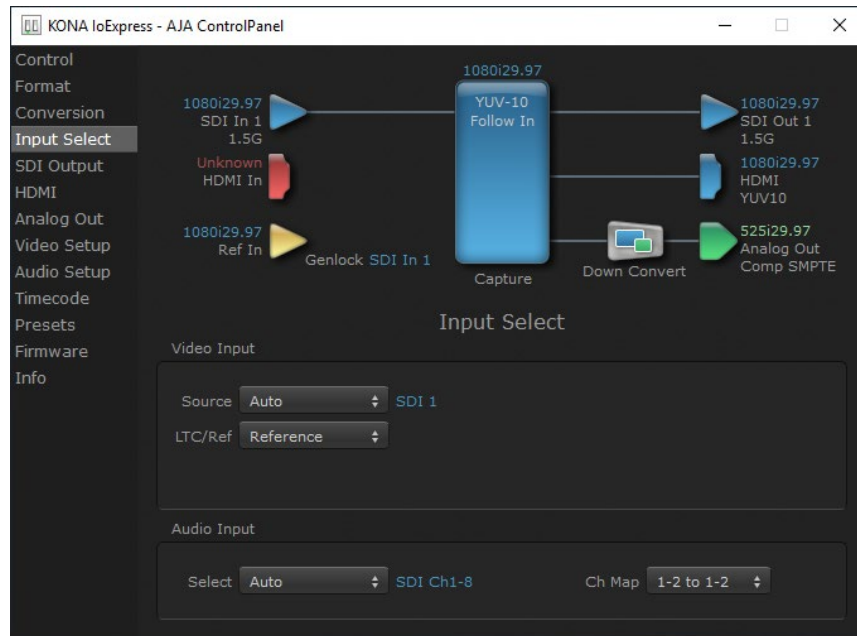


On the Input Select screen you can view or set the currently selected video and audio input sources and map audio sources to the channels supported by your editing application. Two information panes in the screen are provided: Video Input and Audio Input.

## Video Input

### Source

The Source pulldown menu allows you to see and change what's currently selected and shows the video format that Io Express has detected (if any). To select a different input use the pulldown to choose from:

- SDI
- HDMI

### 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

This pulldown menu allows you to pick where the audio comes from. Io Express supports up to 8 channels of SDI or HDMI audio

- HDMI
- SDI Ch 1-8
- SDI Ch 9-16

### Map Channels

Here you can select which two audio input channels will be mapped to your editing application if only two channels (Ch 1 and Ch2) are selected in that application.
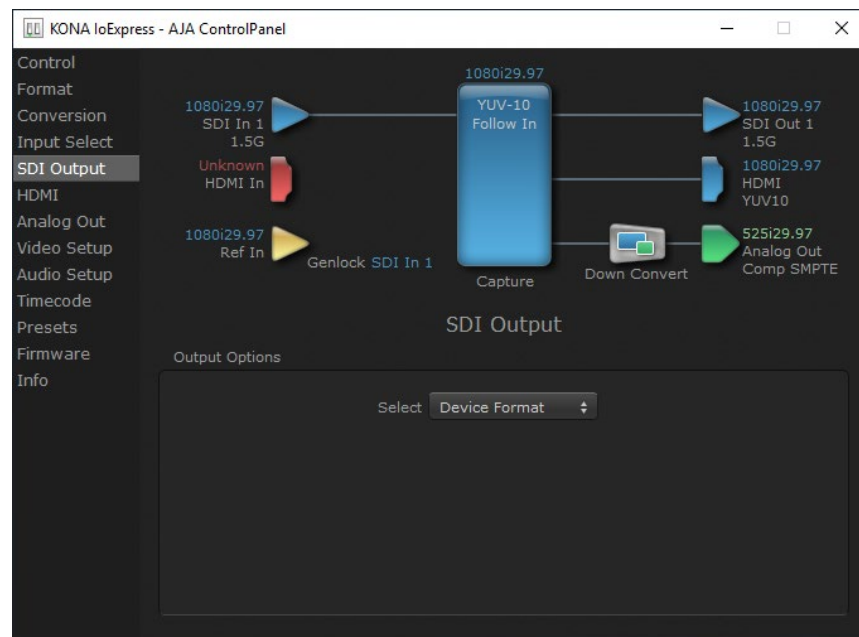
- Choose in pairs from 1-2 through 7-8.

NOTE:   *This setting does not affect the embedded audio being sent to the Io Express's BNC or HDMI output connectors.*

### Rate

Io Express digital audio sampling is fixed at 48k.

## SDI Output Screen



The SDI Out screen shows the current settings for the SDI output.
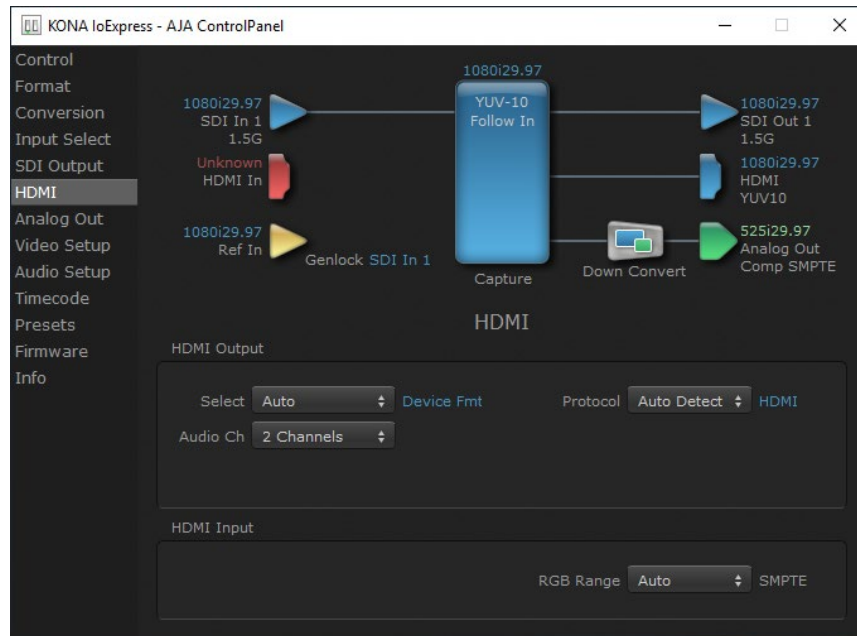
## Output Options

### Select

Configure the SDI Outputs from:

- Auto
- Device Format - The SDI output is set to the same format as the framebuffer.
- Converted Format - The SDI output is set to the currently selected Converted format.

# HDMI Screen



The HDMI input and output are configured with this screen.

## HDMI Output

### Select

- Auto
- Device Format - The HDMI output is set to the same format as the framebuffer.
- Converted Format - The HDMI output is set to the currently selected Converted format.

### Audio Ch

This pulldown allows you to select the number of embedded audio channels for the HDMI output. Select from:

- 2 Channels
- 8 Channels

### Protocol

This pulldown allows you to choose:

- Auto Detect - Selects HDMI or DVI depending on signal.
- HDMI - Selects HDMI.
- DVI - Selects DVI. Use when outputting to a DVI monitor using an HDMI to DVI adapter.
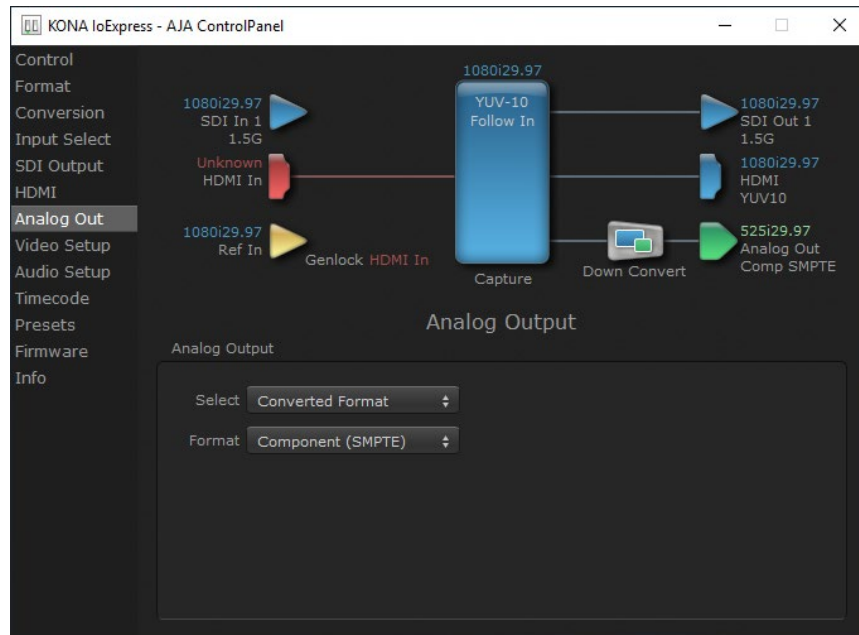
## HDMI Input

The detected HDMI input video format is displayed and you're given a chance to configure the RGB range of the HDMI input.

### RGB Range

Choose from:

- SMPTE
- Full

## Analog Out Screen



Io Express provides a high-quality analog component or composite output, generally used for monitoring. This screen shows the current settings for that analog output, and allows you to reconfigure it when desired.

## Analog Output Settings

### Select

Select the Analog Video output format from:

- Auto
- Device Format - The Analog output is set to the same format as the framebuffer.
- Converted Format - The Analog output is set to the currently selected Converted format.

### Format

Choices in the Analog Format pulldown menu vary depending upon the Analog Output video standard. For example, the "Composite + Y/C" selection is only available when an SD (525i29.97 or 625i25) format is in use. Analog formats can include:

- Composite +Y/C
- Component (SMPTE)
- Component (Beta)
- Component (RGB)
- Component (RGB-HV)

# Video Setup Screen
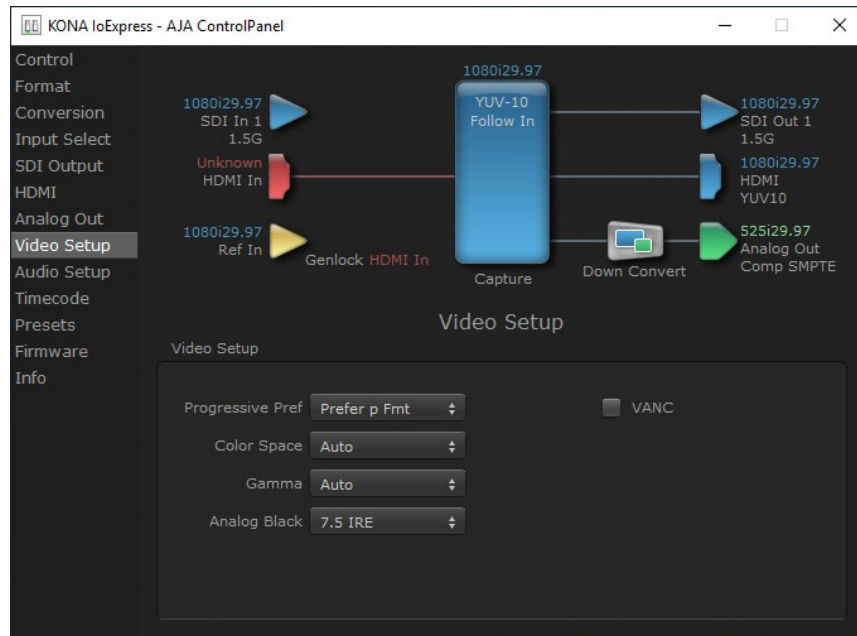


The Video Setup screen shows various other settings which will affect how video inputs and outputs behave, and how Io Express interacts with some software applications.

## Video Setup

### Progressive Pref

This feature is used to default the hardware to use either p or PsF output over SDI when it has not been specified by the application. Choose between:

- Prefer p Fmt - progressive frames non-interlaced output
- Prefer psf Fmt - progressive segmented frames

NOTE:   If you change this option while your NLE is open and running, you may need to then make a change in one of your NLE settings in order for this to be reflected dynamically in the project.

### Color Space

Sets the video color space. Select from:

- Auto
- Rec 601
- Rec 709

### Gamma

Sets the video gamma. Intended for use with legacy Apple displays. Select from:

- Auto
- Gamma 1.8

### Analog Black

Select the settings for black level setup for the analog video. Choose from:

- 7.5 IRE
- 0 IRE

### VANC Checkbox

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

NOTE: *Io Express does not require enabling the VANC checkbox for Closed Captioning.*

## Audio Setup Screen
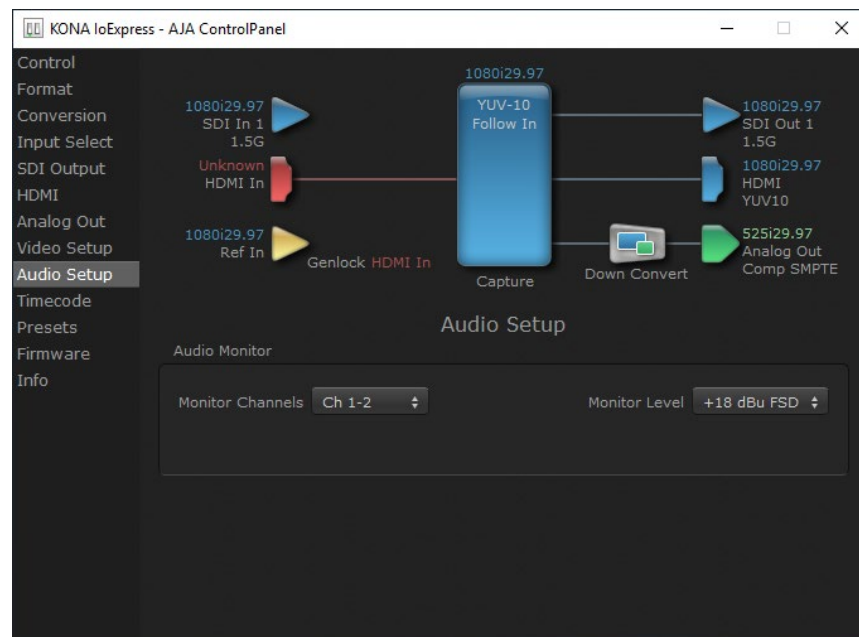


The Audio Setup screen shows the current settings for the analog audio output, allowing you to re-configure it when desired.

### Audio Monitor

This control selects which pair of channels from the NLE will be monitored. For most editing scenarios this should remain as Ch 1-2, since most NLEs default to dual track / stereo monitoring as a sum of the entire timeline.

NOTE: *This setting only applies to dual channel monitoring environments (for example, the headphone jack on the front of the Io Express).*
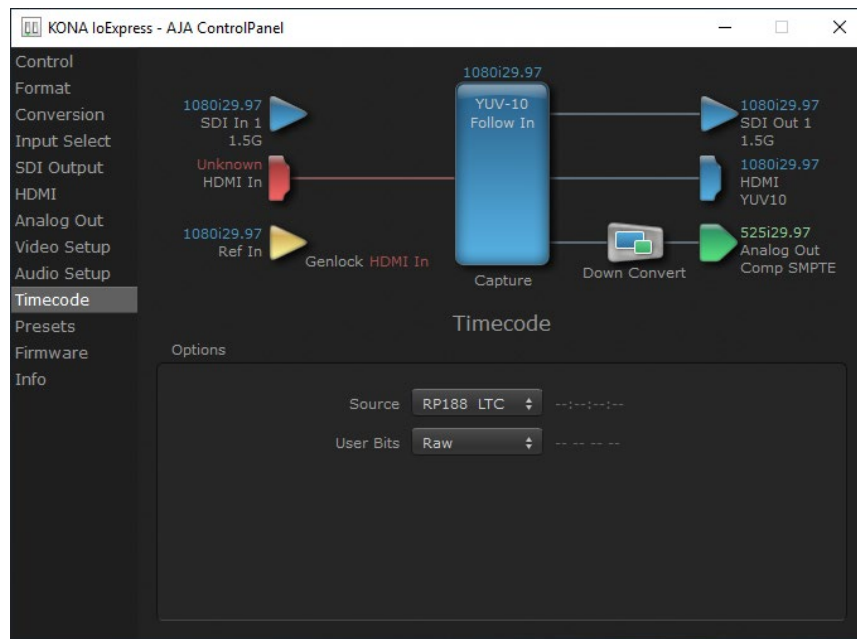
Select from:
- Ch 1-2 through Ch 7-8

### Analog Audio Monitor Level

This selection determines the analog audio output level ("FSD" is full-scale-deflection reading as measured on a VU meter). In addition to the front panel monitor (headphone) output, this setting also effects the analog output via the DB25 cable. Select from
- +24dBu, +18dBu, +15dBu, or +12dBu

# Timecode Screen



The Timecode screen is used to select the timecode stream read for applications that use it (for example, in AJA Control Room when the Timecode Source preference is set to "Control Panel Setting" that application will read the selected stream). This screen is also used for monitoring the RP-188 timecode embedded in the digital data stream, for selecting a timecode offset (if required), and setting timecode outputs.

## Options

### Source

In RP-188 timecode (SMPTE 12M-gg2) 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)
- LTC Port

The selection will be displayed in the timecode value displayed 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, Io Express 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.*

## Output Settings

### Use QuickTime Timecode (Mac OS Only)

This feature is for Final Cut Pro 7 (or earlier), VTR Exchange, and AJA TV only. When checked, it directs Io Express 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 Io Express outputs. This can be useful for synchronizing, choosing edit points, dailies, and many other purposes.

### Timecode Offset

When QuickTime timecode in 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
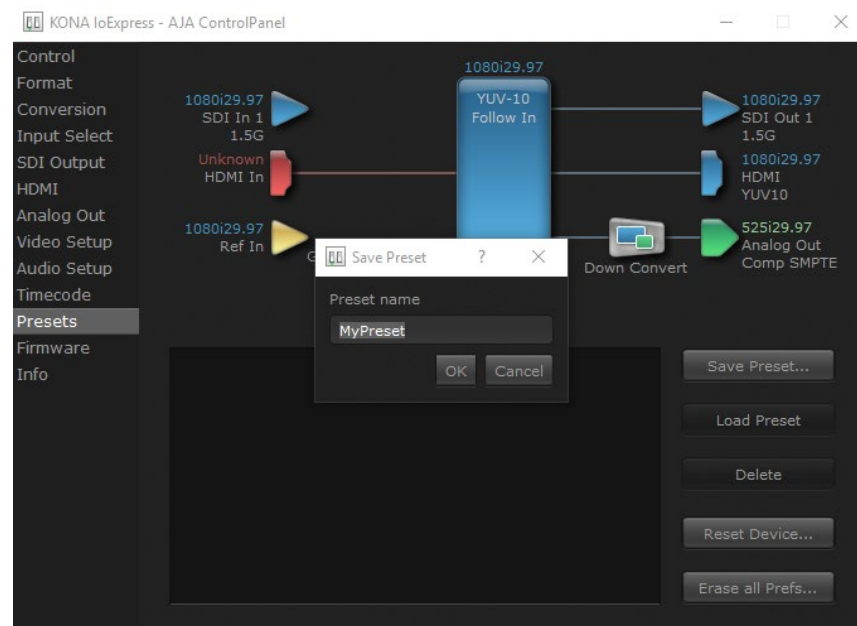


After configuring the AJA Control Panel screens, you can then save all your settings as a snapshot for later recall, called a preset. In this way, you can organize presets for all your typical tasks, eliminating manual reconfiguration.

## 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 if 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 18* 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 Use Preference file with the changed settings.

# Firmware Screen
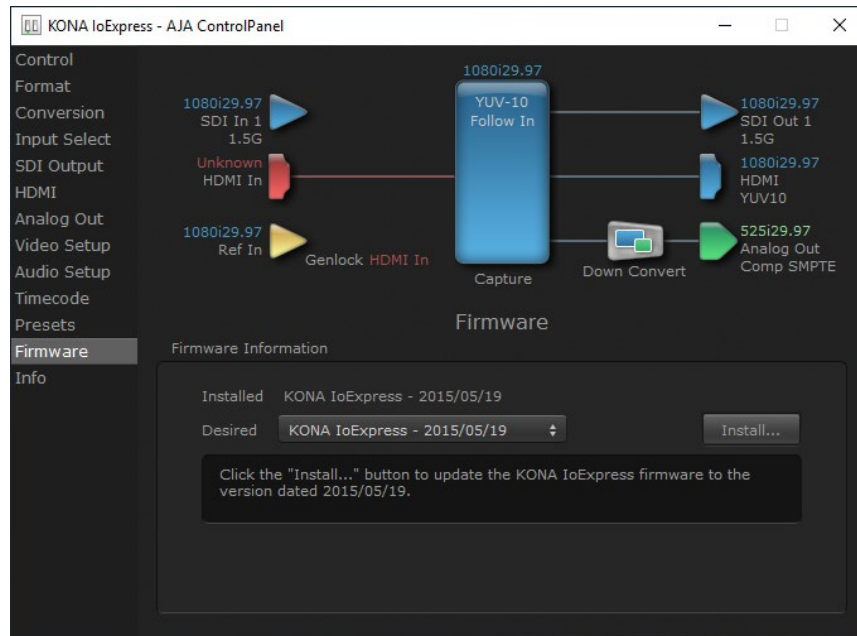


Use the Firmware screen to access the firmware install screen. Click install to erase current firmware and load the firmware version contained in your current driver installation. Note the Installation message shown below.

*Figure 9. Update Completed*
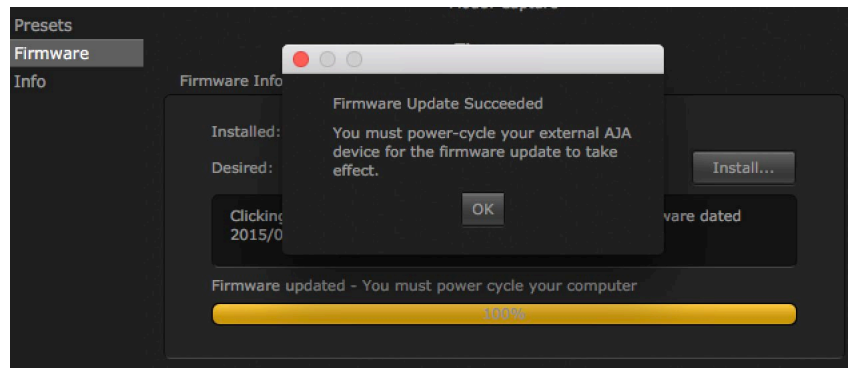


You will need to power-cycle your Io Express and your computer to finish the update.

NOTE: *For correct performance, always power up Io Express before starting your computer and power down your computer before powering down Io Express.*

# Info Screen
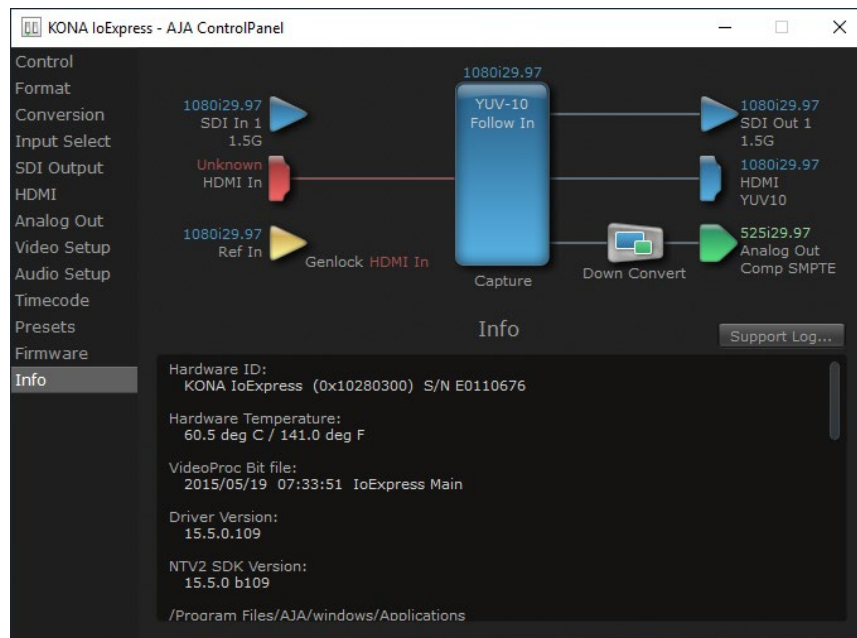


The Info Screen shows the software files that have been installed on your system. This information may be needed if you talk to an AJA Customer Service representative to determine if files are missing or need updating.

# Appendix A – Specifications

## Io Express Tech Specs

### Video Formats

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

### Video Input

- SD/HD SDI, SMPTE-259/292/296/424, 8 or 10-bit
- Single Link 4:2:2 (1x BNC)
- HDMI v1.3

### Video Output Digital

- SD/HD SDI, SMPTE-259/292/296/424, 8 or 10-bit
- Single Link 4:2:2 (1x BNC)
- HDMI v1.3

### Video Output Analog

- Composite/S-Video (Y/C) (1x BNC)
- NTSC, NTSCJ, PAL
- Component (3x BNC)
- HD: YPbPr, RGB
- SD: YPbPr, RGB (component mode)
- SMPTE/EBU N10, Betacam 525 line, Betacam 525J, RGB
- 12-bit D/A, 8 x oversampling
- +/- .2 dB to 5.0 mHz Y frequency response
- +/- .2 dB to 1 mHz C frequency response
- .5% 2T pulse response
- <1% Diff Phase
- <1% Diff Gain
- <1 ns Y/C delay inequity

### Audio Input Digital

- 8-Channel, 16- and 24-bit SMPTE-259 SDI embedded audio, 48 kHz sample rate, synchronous
- 8-Channel, 16 and 24-bit HDMI embedded audio, 48 kHz sample rate, synchronous

### Audio Output Digital

- 8-Channel, 16 and 24-bit SMPTE-259 SDI embedded audio, 48 kHz sample rate, synchronous
- 8-Channel, 16 and 24-bit HDMI embedded audio, 48 kHz sample rate, synchronous

### Audio Output Analog

- 2-Channel 16- and 24-bit unbalanced audio (via RCA jack)

### Reference Input or LTC Input

- 1x BNC assignable to Reference video or LTC input

### Reference

- Analog Color Black (1V) or Composite Sync (2 or 4V)
- Nonterminating

### Electrical Interface

- PCI Express x1

### 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  GND

Shell  GND

### Size (w x d x h)

- 8.74" x 7.09" x 1.65" (222mm x 180mm x 42mm)

### Weight

- 1.5 lbs (0.7 kg)

### Power

- 12-18V, 11-13W

### Environment

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

# Appendix B – Safety and Compliance

## Federal Communications Commission (FCC) Compliance Notices

### 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

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.

CE    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

EN 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<br>(업무용 방송통신기자재)                                        | 이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는<br>이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을<br>목적으로 합니다. |
|------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Class A<br>(Broadcasting Communication<br>Equipment for Office Use) | As an electromagnetic wave equipment for office use (Class A),<br>this equipment is intended to use in other than home area.<br>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       Hazard 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!** 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 expiga 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.

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**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 rimane 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.

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

**Avertissement!** Débranchez cet appareil pendant les orages avec éclairsou 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!** 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

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**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!** 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.

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⚠️ **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.

# Warranty and Liability Information

## Limited Warranty on Hardware.

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 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 the Customer brings a valid claim under this limited warranty for a hardware product or storage module (hereafter, a "product") during the applicable warranty period, AJA Video will, at its sole option and as the Customer's sole remedy for breach of the above warranty, provide one of the following remedies:

- Repair or facilitate the repair the product within a reasonable period of time, free of charge for parts and labor.
- Replace the product with a direct replacement or with a product that performs substantially the same function as the original product.
- Issue a refund of the original purchase price less depreciation to be determined based on the age of the product at the time remedy is sought under this limited warranty.

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 https://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. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES OR LIMITATIONS ON APPLICABLE STATUTORY RIGHTS OF A CONSUMER, SO SOME OR ALL OF THE TERMS OF THIS PARAGRAPH MAY NOT APPLY TO YOU.

## Limitation of Liability

Under no circumstances shall AJA video BE LIABLE IN ANY WAY FOR ANY LOST, CORRUPTED OR DESTROYED DATA, FOOTAGE OR WORK, OR FOR ANY OTHER INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOST PROFITS, OR FOR ANY THIRD PARTY CLAIM, IN CONNECTION WITH THE PRODUCT, WHETHER RESULTING FROM DEFECTS IN THE PRODUCT, SOFTWARE OR HARDWARE FAILURE, OR ANY OTHER CAUSE WHATSOEVER, EVEN IF AJA VIDEO HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. AJA VIDEO'S LIABILITY IN CONNECTION WITH THE PRODUCT SHALL UNDER NO CIRCUMSTANCES EXCEED THE PURCHASE PRICE PAID FOR THE PRODUCT.  The foregoing limitations apply even if any remedy set forth in this LIMITED WARRANTY fails of its essential purpose.  SOME JURISDICTIONS DO NOT ALLOW THE LIMITATION OF LIABILITY FOR PERSONAL INJURY, OR OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO SOME OR ALL OF THE TERMS OF THIS PARAGRAPH MAY NOT APPLY TO YOU.

## Governing Law and Language; Your Rights.

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.

# Index