AJA Control Room

Software

Installation and Operation Manual

Version 17.1
Published July 16, 2024

AJA VIDEO SYSTEMS

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Contents

Chapter 1 – Introduction

Overview

AJA Control Room™ enables professional quality video and audio capture, conversion, playback, and output for 8K, 4K, HD and SD. With AJA Control Room you can:

- Playback professional file-based sources with or without AJA Video hardware attached.
- Capture from live feeds, cameras, consoles, and disk/tape-based sources to highest quality uncompressed and compressed video files.
- Playout or Master-to-tape using a single application.
- Configure your video/audio I/O via an AJA device using the AJA Control Panel launched from the AJA Control Room application.

Supported Files and Systems

AJA Control Room supports a wide range of file-types and codecs including .mov, .mxf, QuickTime*, Apple ProRes, Avid DNxHD and DNxHR, DVCProHD, DPX, and .mp4. Playback performance is highly tuned for high quality frame codecs, and the experience can be different with long GOP sources such as H.264 and H.265.

*NOTE: *Apple has ended QuickTime for Windows support. Instead, AJA supports ProRes family capture and playback for macOS, Windows and Linux via AJA Control Room.*

For more information see *"Table 1 Control Room Supported Read and Write Codecs by Operating System" on page 37*, and see *"Appendix B Control Room: H.264, H.265" on page 38* for additional data rate information.

Supported Hardware

You can use AJA Control Room with a variety of AJA video and audio processing hardware products.

AJA Control Room supports the following AJA devices:

- Io X3, Io 4K Plus, Io IP
- KONA X, KONA Xpand, KONA 5, KONA 4, KONA HDMI, KONA IP, KONA 1, KONA LHi, KONA LHe Plus
- T-TAP Pro

NOTE: This release of AJA Desktop Software works with EOL (End of Life) products, including IoXT/Io4K/KONA IP/IoIP/T-TAP. However, releases after v16.2 were no longer qualified with end-of-life products. What this means is that issues affecting these EOL products may arise that are not caught during the testing phase for new software releases, and these issues may not be fixed. In some cases, AJA may elect to fix issues that affect EOL products, but that cannot be guaranteed.

AJA Control Room also works with:

- Avid Artist | DNxIV
- Avid Artist | DNxIP

NOTE: On macOS, AJA Control Room supports Apple silicon processors as well as earlier Intel processors.

H.264/5 Hardware Requirements

Capturing (encoding) and playback (decoding) of H.264 and H.265 requires some degree of hardware assistance to be present on the host system where Control Room is installed. If no hardware acceleration is present (or it cannot be accessed), then H.264/5 capture/playback will not be available in Control Room.

macOS:

- Apple silicon based host systems have the necessary integral hardware, which will be used for encode/decode.
- Apple Intel based systems will use AMD or Nvidia GPUs for encode/decode.

Windows

- An Nvidia GPU or an Intel GPU will be used for encode/decode if available.

Linux

- An Nvidia GPU will be used for encode/decode if available.

Installation

AJA Control Room software is available from the AJA website:

https://www.aja.com/family/software/

Control Room has four different installer packages available depending on your operating system:

- macOS
- Windows
- Linux Redhat/CentOS
- Linux Ubuntu

See the Release Notes for you AJA Card or Device, available on the AJA website and also installed with the software package, for minimum and recommended system requirements including OS, CPU, RAM, and GPU.

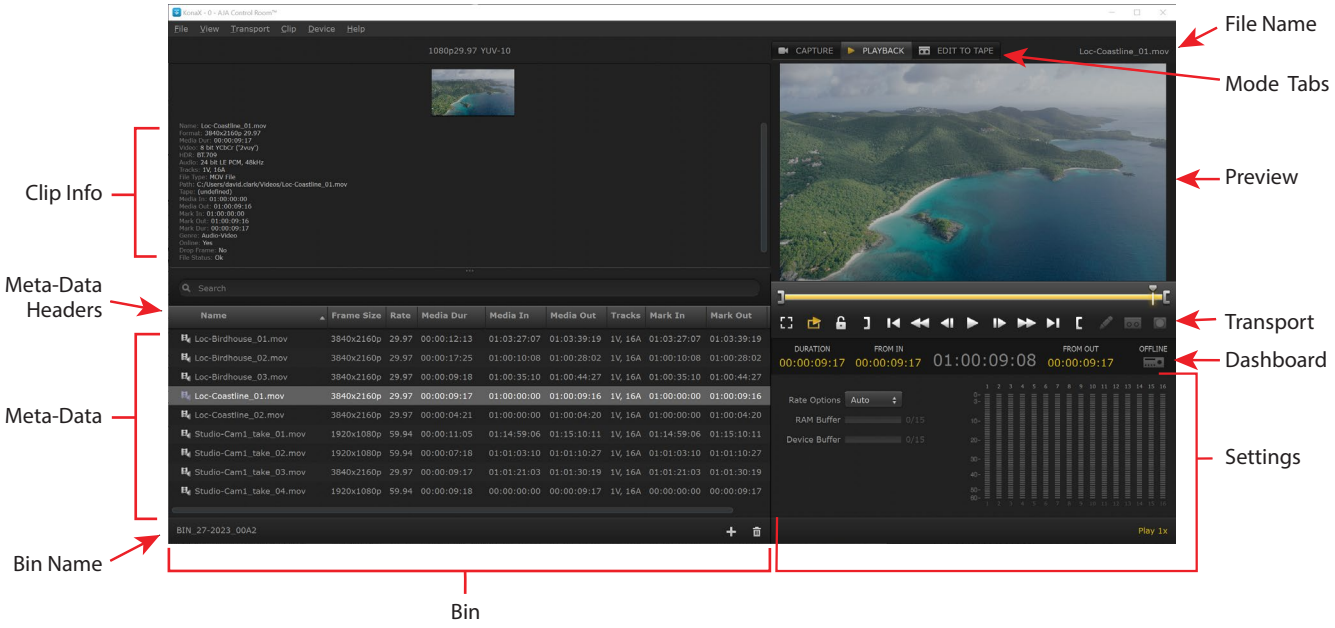
NOTE: Thunderbolt connected devices are supported when using Linux but may cause system issues if they are removed during DMA (Direct Memory Access).

1. Locate the appropriate AJA Desktop Software installer package for your OS.
2. Download the installer.
3. Double-click the installer file to open it and run the installer.
4. Follow the installation wizard instructions to install AJA Control Room along with the AJA drivers.

5. After installation, the applications are ready to run.

Control Room User Interface

Figure 1. AJA Control Room Screen layout (Windows)



Screen Layout

Besides displaying playback or capture video, the Control Room screen is divided into different panes, which can be shown or hidden as desired.

- Bin - Shows the clips currently imported into the bin and information for them
- Mode Tabs - Shows the Capture, Playback and Edit-to-Tape Mode Select Tabs
- Transport - Contains clip playback controls
- Dashboard - Displays information for the currently loaded clip
- Settings - Shows controls

Operating Mode Tabs

Control Room has three operating modes. Mode Select Tabs at the top of the page allow you to easily switch between Capture, Playback and Edit To Tape modes.

Capture - The Capture screen allows capturing video and audio to the computer from an external video/audio source, such as a VTR/DDR, using the AJA hardware.

Playback - The Playback screen loads files from your computer and plays them out through your AJA hardware.

Edit To Tape - This is a workspace where you can perform an insert or assemble Edit to Tape to record your clips to a VTR/DDR.

Context Sensitive Menus

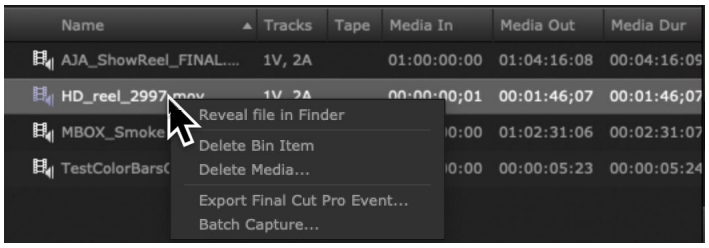
Right clicking on different elements of the screen can display context sensitive menus of commands, available for quick execution. Examples include:

Right Click On Video Image

Figure 2. Right-Click on video image: flyup menu

Right Click On Bin Clip

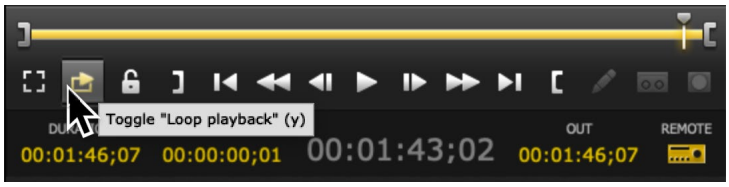
Figure 3. RIght-Click on Bin clip name: flyup menu



Hover Cursor Help

Hovering the cursor over a control can also display a description of its function.

Figure 4. Cursor hover reveals Help Tips



Application Menus

These top-level application menus provide information and control of the workspace panes and the overall application performance.

- AJA Control Room (macOS only)
- File
- View
- Transport
- Clip
- Device
- Help

The drop-down menus list the features available, and display the macOS or Windows keyboard shortcuts. See *"Keystroke Commands" on page 35* for a listing of all shortcuts.

AJA Control Room (macOS/Windows)

Figure 5. AJA Control Room Menu: (macOS)

About AJA Control Room

Displays the Control Room application version number and copyright.

Preferences

On Mac, click Preferences to open the Preference panes for configuring Control Room.

Hide and Quit AJA Control Room

Click Hide to close the Control Room application menu but keep it running, or click Quit to close the application.

File Menu

Figure 6. File Menu: macOS (left), Windows OS (right)

New Bin

Opens a new blank bin panel for a new project.

Open Bin

Opens a browse window to load an existing saved bin (.crbin file)

Import Files to Bin

Imports media to bin. Also loads EDLs for setting up batch captures adding them to the Bin.

Save Bin and Save Bin As

Standard file save operations.

Preferences (Windows OS)

Opens the Windows Control Room Preferences pane. Preference panes on macOS is accessed via the AJA Control Room dropdown menu.

Exit (Windows OS)

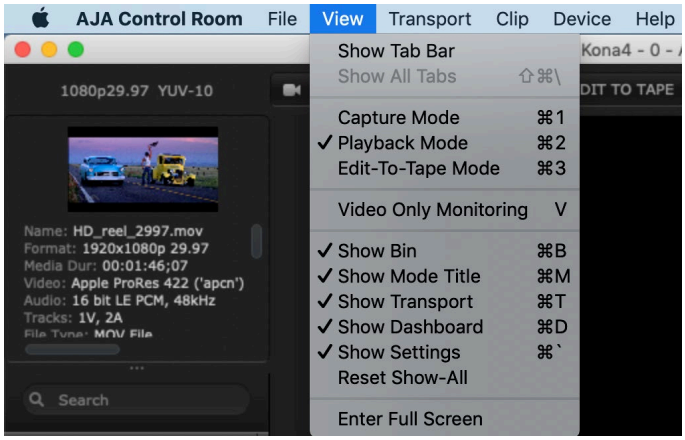
Closes the Control Panel application.

AJA Control Panel

Opens the AJA Control Panel for setting up or changing AJA hardware.

View Menu

Figure 7. View Menu (macOS)



The View menu offers the following view options and shows the keystroke commands for on-the-fly selection:

Capture Mode

Selects the Capture workspace.

Playback Mode

Selects the Playback workspace.

Edit-To-Tape Mode

Selects the Edit to Tape workspace.

Video Only Monitoring

Toggles the workspace display between a full screen window showing just the clip or capture video, and a standard window size that includes the currently selected user interface areas. Double clicking on the video also toggles Video Only Monitoring on and off.

NOTE: The following options are useful to hide unused setup and information space and maximize the Display Screen area while working with clip edits.

Show Bin

Toggles the Bin pane on and off. Located in the left column, the Bin lists and allows selection of the clips you are working with.

Show Mode Title

Toggles the Mode Title (CAPTURE, PLAYBACK and EDIT TO TAPE tabs) on and off.

Show Transport

Toggles the Transport controls on and off.

Show Dashboard

Toggles the Dashboard display on and off.

Show Settings

Toggles the Viewer Settings pane on and off. The Viewer Setting pane is for setting up control operations for workspaces—Capture, Playback, and Edit To Tape.

Reset Show-All

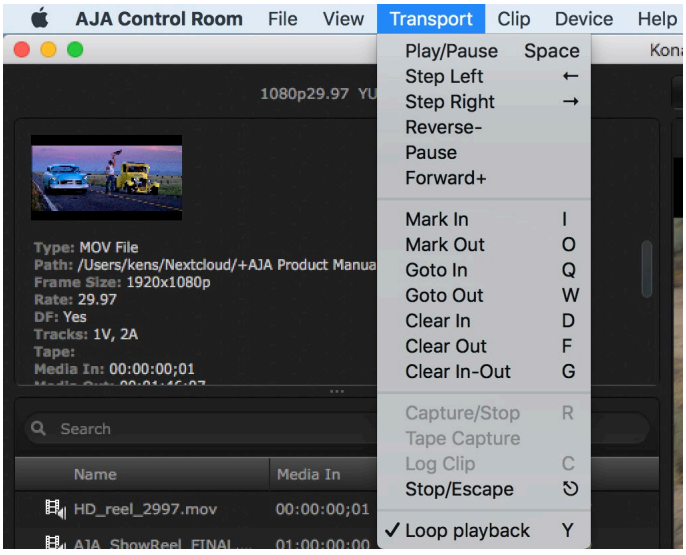
Restores the default display showing all panes.

Enter/Exit Full Screen

Toggles the entire user interface, including the currently selected control panes, between a full screen display and a window display.

Transport Menu

Figure 8. Transport Menu (macOS)



The Transport menu displays different controls, depending on the Control Room operating mode and currently loaded clip. Grayed out selections are inactive in the current operating state. For example, Capture controls are not available in Playback mode. Most of the functions are self-explanatory by name.

The J, K, and L keystrokes may be used to control the Transport as follows:

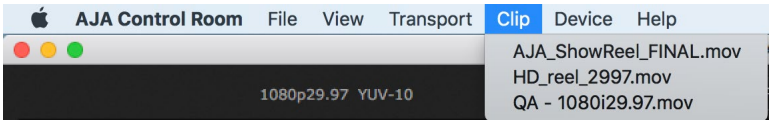
J: Reverse Play (multiple presses increases the speed)
K: Stop Play
L: Play (multiple presses increases the speed)

Log Clip

Log Clip allows the user to set the VTR In & Out for Batch Capture with a VTR.

Clip Menu

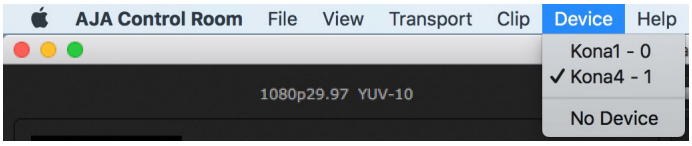
Figure 9. Clip Menu (macOS)



Displays a listing of the clips in the current bin, which can be selected by clicking on the clip name.

Device Menu

Figure 10. Device Menu (macOS)



If you have more than one AJA hardware device installed or connected to your computer, this menu allows you to select the one that AJA Control Room will use.

Help Menu

Figure 11. Help Menu: macOS (left), Windows OS (right)

Click the AJA Software Site link to visit the AJA website for the latest release notes, manual and AJA software downloads.

On Windows, click About AJA Control Room see the application version number and copyright information.

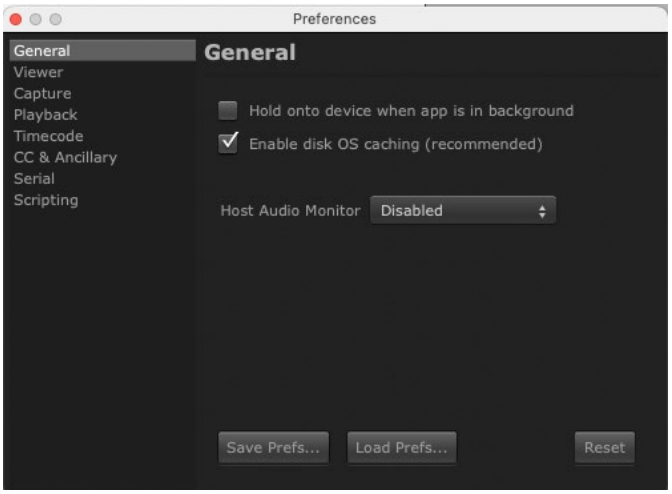
Preferences

In Windows, the Preferences screen is under the File Menu. For MacOS, it is under the AJA Control Room menu.

This menu includes basic preferences under the following subject heads:

General Prefs

Figure 12. Control Room Preferences: General (macOS)



User interface settings reside on this screen.

Hold onto device when app is in background

Check this box if you want the AJA device held onto by Control Room when the application is backgrounded. This is recommended for working seamlessly between Control Room and Control Panel. For example, unless this preference is enabled, play or capture will stop if you click off Control Room and onto another application or the desktop.

Enable disk OS caching

When checked, Control Room will use Disk Caching that is built into the operating system when reading and writing files. In many cases this aids short term file reading and writing performance (the feature defaults to ON). However in some situations with large raster files and many channels of audio this selection can reduce performance. In those cases turning disk OS caching OFF may help improve performance.

Host Audio Monitor

- Disabled - Playback or capture audio is routed only through the connected AJA device. On macOS, you may also need to select the AJA device in System Prefs to hear the audio. With this setting, video/audio sync should be maintained.
- Built-in Output (variously named, and you may also see multiple options depending on the sound cards installed) - Audio is also routed through the host computer's audio system. This allows the monitoring of incoming audio being captured by an AJA device, or the monitoring of playback audio, directly on the host computer. Computer audio playback monitoring with Control Room is available even if no AJA hardware is connected, or, as with in the case of KONA HDMI the AJA hardware only supports audio Video and Audio input/capture. On macOS, you may also need to select the host system audio in System Prefs to hear the audio. With this setting, the computer audio may not have perfect video/audio sync, but should be close enough for general audio monitoring (when not editing picture with sound).

Save and Load Prefs

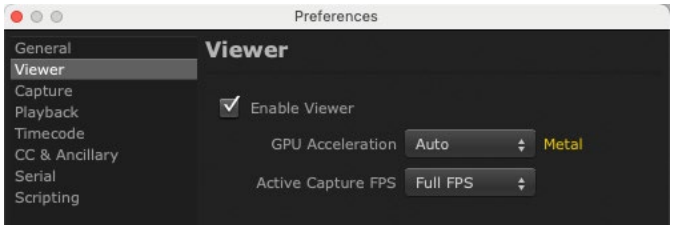
The Save Prefs and Load Prefs buttons let you manage your Control Room preferences, by saving and loading named prefs files.

Reset Button

The Reset button will return all Control Room prefs to their factory defaults

Viewer Prefs

Figure 13. Control Room Preferences: Viewer (macOS)



Enable display-to-desktop and choose format options:

NOTE: You can also access Viewer options by Control- or Right-clicking in the Viewer Screen.

Enable Viewer

Turns Viewer ON or OFF. This is useful if you have a second monitor set-up and you want to lighten the load on your computer during an intensive capture (by turning Enable Viewer OFF).

GPU Acceleration

This feature uses the GPU to scale and display video in the Control Room UI. When Control Room is launched, it will test the GPU for required functionality, and if it passes the test this feature will default to ON. If not, it will be turned OFF.

In some cases, you can troubleshoot display and performance problems by turning this feature OFF. Generally speaking, having it ON will reduce work for the CPU, letting the system focus on other tasks like compression/decompression and file reading/writing.

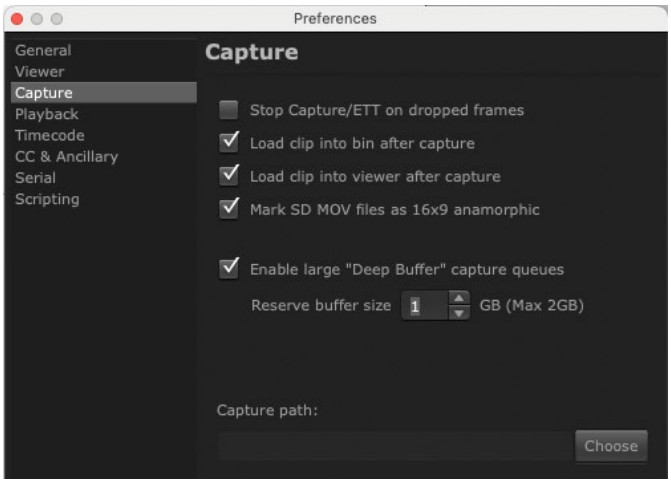
Active Capture FPS

Select a preview display frame rate during capture, useful to conserve system resources for capture functions:

- Full frame rate
- 2 frames per second
- 1 frames per second
- 0 frames per second

Capture Prefs

Figure 14. Control Room Preferences: Capture (Windows)



NOTE: Reserve Buffer Size is limited to 2 GB Maximum

Stop Capture/ETT on dropped frames

In the default preference mode, Control Room will display a red dropped frame counter during Capture and Edit to Tape (ETT). If you enable Stop Capture/ETT on dropped frames, the counter is not displayed and the process will stop immediately if a dropped frame occurs.

Load Clip Settings

Check these boxes to automatically load a clip into the Bin and/or Viewer after capture.

Mark SD MOV files as 16:9 anamorphic

(Only available for SD input format.) When capturing an anamorphic signal, checking the box marks the captured file as anamorphic.

Enable large "Deep Buffer" capture queues

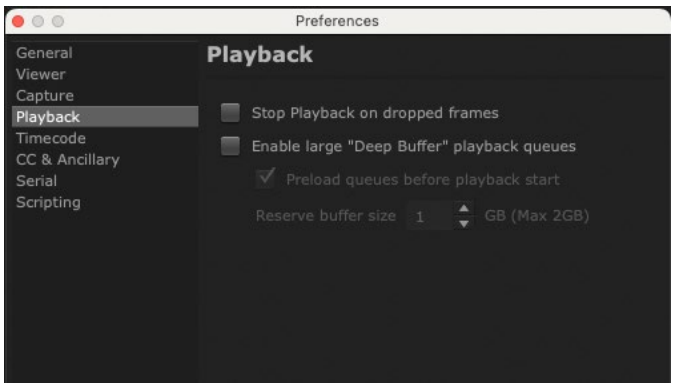
Checking this box lets you set a reserve buffer size, which can permit uninterrupted writing of frames to storage even during intermittent access. When checked the Reserve buffer size parameter is activated. The range available depends on the amount of your computer's available RAM, which is reported on the screen. AJA recommends not using more than half of the available RAM, and Control Room limits the maximum buffer size to 2 GB of RAM.

Capture Path

Use the Choose button to select the directory path to be used for Capture.

Playback Prefs

Figure 15. Control Room Preferences: Playback (Windows)



Stop Playback on dropped frames

In the default preference mode, Control Room will display a red dropped frame counter during Playback. If you enable Stop Playback on dropped frame, the counter is not displayed and the process will stop immediately if a dropped frame occurs.

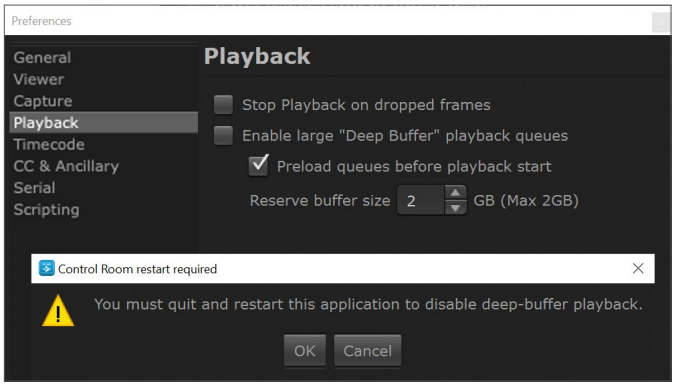
Figure 16. Dropped Frame Counter

Enable large "Deep Buffer" playback queues

Checking this box lets you set a reserve buffer size, which can permit uninterrupted playback from storage even when storage, fabric or network bottlenecks interrupt the flow of data. When checked the Reserve buffer size parameter is activated. The range available depends on the amount of your computer's available RAM, which is reported on the screen. AJA recommends not using more than half of the available RAM. Control Room limits the maximum buffer size to 2GB of RAM.

IMPORTANT: If you uncheck 'Enable large "Deep Buffer" playback queues" (when it had been checked) you will be prompted that a restart of the Control Room application will be required. (Note that a computer restart is not required.)

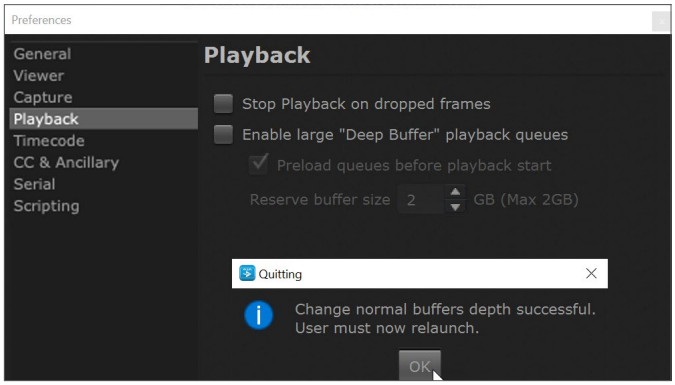
Figure 17. Restart required dialog (Windows)



Click OK, unless you are capturing or playing to a live destination, in which case you may want to click Cancel.

CAUTION: *Avoid disabling 'large Deep Buffer playback queues' while capturing or when playing to a live broadcast destination. Otherwise you may inadvertently restart Control Room, which will definitely interrupt any in-progress capture or playback.*

Figure 18. Must now relaunch dialog (Windows)



Click OK.

This is normal for changing the Deep Buffer parameter, and is not an error condition.

Preload queues before playback start

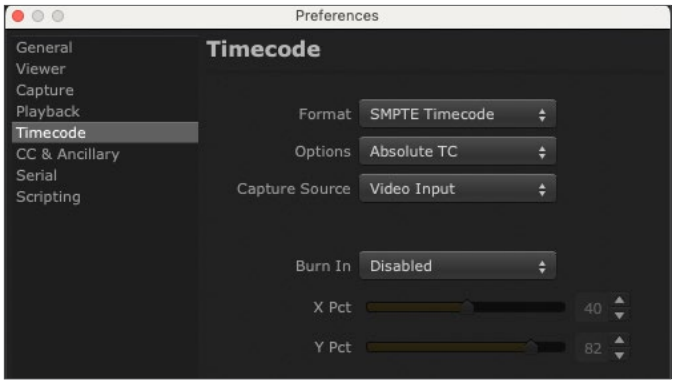
Checking this box will preload video queues before starting playback, which can reduce dropping frames when playback starts. A brief delay (typically less than two seconds), will be imposed after playback in initiated.

Reserve Buffer Size

The Reserve Buffer setting is for improving performance by reserving (setting aside) RAM for I/O operations. The reserve buffer can be from 0 to 2GB. If Control Room is functioning as you expect, you can leave this setting in default. If you notice sluggish or inconsistent performance, you can adjust this setting, starting with a minimal reserve buffer, and increasing from there until performance is nominal.

Timecode Prefs

Figure 19. Control Room Preferences: Timecode (macOS)



Format

- SMPTE Timecode
- Frames

Options

- Absolute TC - Fixed in and out timecode values are displayed on the Dashboard.
- Relative TC - Dynamic From In and From Out timecode values are displayed on the Dashboard (see *Figure 28 on page 24*).

Capture Source

- Video Input
- Time-of-Day

Burn In

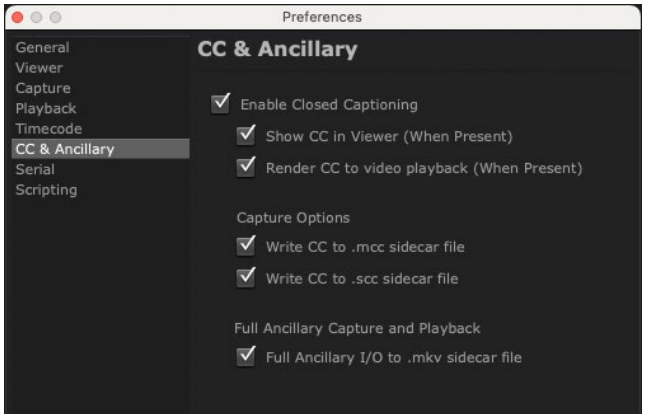
- Disabled - No timecode is displayed
- Playback Only - Reads embedded Timecode data and displays as a real time overlay during playback
- Capture Only - Reads embedded Timecode data from input source and burns that into then picture area during capture
- Enabled All - Both Playback and Capture behaviors are concurrent

X Pct/Y Pct

You can define the X and Y axis location of the timecode display on the video, using the sliders, up/down arrows, or text entry controls.

CC and Ancillary

Figure 20. Control Room Preferences: CC and Ancillary (macOS)



Control Room supports CC (closed captions) in QuickTime files and creates side car files in .scc and .mcc formats that are stored in the same directory as your current project (Capture Path). The files are automatically named the same as the subject video clip with the appropriate file extension (.scc and .mcc).

Control Room also supports full ancillary I/O VANC data capture and playback via sidecar .mkv file.

Enable Closed Captioning

To capture and output Closed Captioning using compatible devices, check the Enable Closed Captioning (master enable) box.

Show CC In Viewer (When Present)

Displays in the Viewer any captions that are present in the video. In this mode, Control Room will detect and show captions in Control Room even when an external monitor does not support them.

Render CC to video playback (When Present)

Provides a real time overlay of the Closed Captioning data on the video output, rather than in the Control Room Viewer. This feature can be used to show Closed Captioning on the video monitor display in the bay for the producer, or you can output a screener with the Closed Captioning burned in

Capture Options

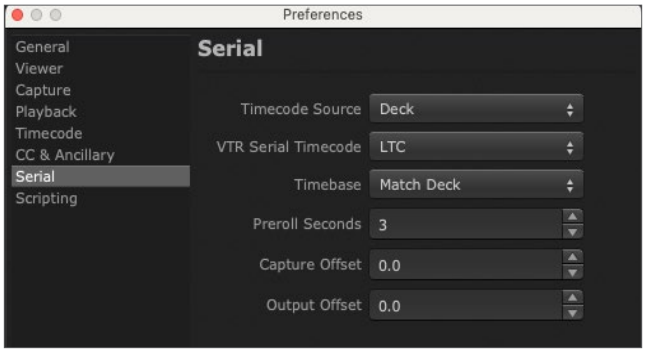
- Write CC to .mcc sidecar file
- Write CC to .scc sidecar file

Full Ancillary Capture and Playback

When enabled, writes ancillary I/O VANC to sidecar .mkv file for use in Capture or Playback modes.

Serial Prefs

Figure 21. Control Room Preferences: Serial (macOS)



Settings for serial control via selected timecode source:

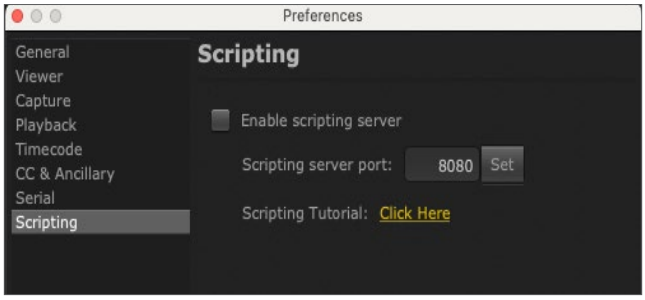
- AJA Control Panel timecode settings
- Tape deck control via RS-422 port

For information on using Capture and Output offsets to adjust Tape Deck frame accuracy, see *"Tape Deck Timing Adjustment" on page 33*.

Scripting Prefs

NOTE: *"Python Scripting Tutorial" on page 39.*

Figure 22. Control Room Preferences: Scripting (macOS)

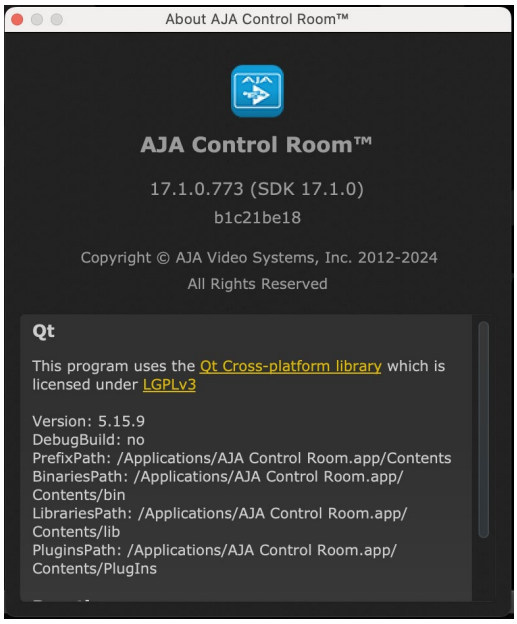


For users who want to use Python Scripting to operate AJA Control Room, it is enabled here and a link to an online tutorial is available. (The tutorial is also available in*"Python Scripting Tutorial" on page 39*.

When you enable scripting, a popup message indicates the "Hold device in background" setting on the General Preferences page must also be enabled, which Control Room can do for you if you click on the Enable and Continue button.

About AJA Control Room

Figure 23. About AJA Control Room (Windows)



In the Windows OS the About AJA Control Room screen is found under the Help menu. In MacOS it is found in the AJA Control Room dropdown menu.

Chapter 2 – Operation

Startup

Once installed, the AJA Control Room application is launched the same as any other application, depending on your computer's operating system.

Reset all preferences to factory values

AJA Control Room settings can be restored to factory defaults by holding down the Shift key during startup.

Figure 24. Control Room Startup Options (macOS)

Force software-only render in viewer

This reduces the load on the systems graphics card. Selecting this option will result in the "Enable GPU Accelerated Viewer" being grayed out as an option.

Using the Bin

The Bin is a list of links to media files in your project directory.

The project directory is defined in the Preferences>Capture screen where you choose a Capture Path (see *"Capture Prefs" on page 15*).

You can begin a new project by selecting New Bin under the File Menu.

Adding to the Bin

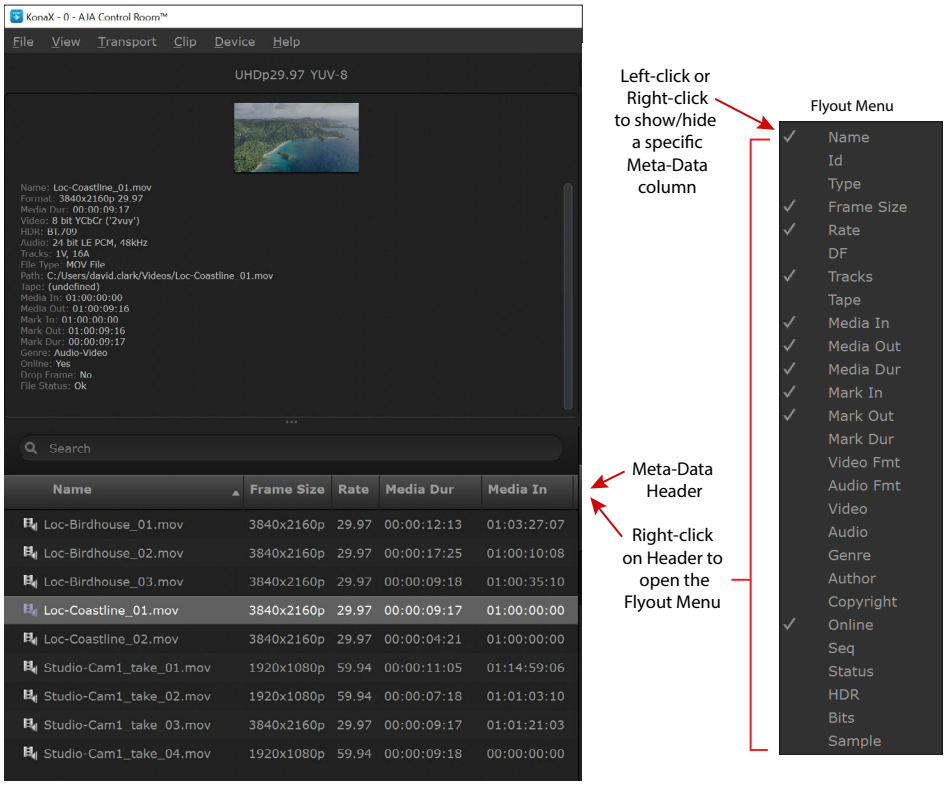
To add Clips or a DPX folder to your project bin, you can:

- Use the Import Files to Bin command
- Click the plus (+) at the bottom of the Bin, then browse and select a file
- Drag media from the Finder/Explorer to the bin

To open an existing Bin that you have saved, go to the File Menu and select Open Bin, then browse and select the Bin (bin files are appended .crbin).

You may also use the Capture Tab to create a new clip and a file that is added to the Bin and your directory. This automatic bin addition feature is enabled (the default setting) or disabled via a checkbox in Preferences>Capture.

Figure 25. AJA Control Room Bin (Windows)



Moving Clips and Metadata

The Bin panel can be expanded by dragging the right-edge to display a wide range of metadata for each clip. Right-click on the Bin metadata header to select the specific information columns you want to display.

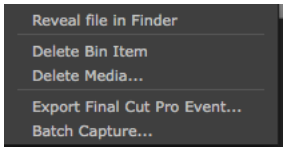
To further organize the bin, you can move Meta-data columns by dragging and dropping header titles to the right or left.

To remove a file from the Bin, you can select it and click the trash can icon.

NOTE: Removing a file does NOT delete the file from your directory but removes the link from the Bin.

Bin Item Menu Right Click

If you select a bin item and right-click, you will access this menu.



From the menu, you can:

- Go to the project directory to access clips
- Delete the Bin Item while keeping the clip (content)
- Delete Media allows you to delete while keeping the Bin Item (no content) or delete both the item and media
- Export your project Bin as an Event to Final Cut Pro (MacOS), see below

- Batch Capture clips (see *"Batch Capture" on page 30*)

Export to Final Cut Pro Event (macOS)

Events in Final Cut Pro (FCP) are where you store your project footage. AJA Control Room can create an XML file that is read by FCP which then generates an Event containing the selected files.

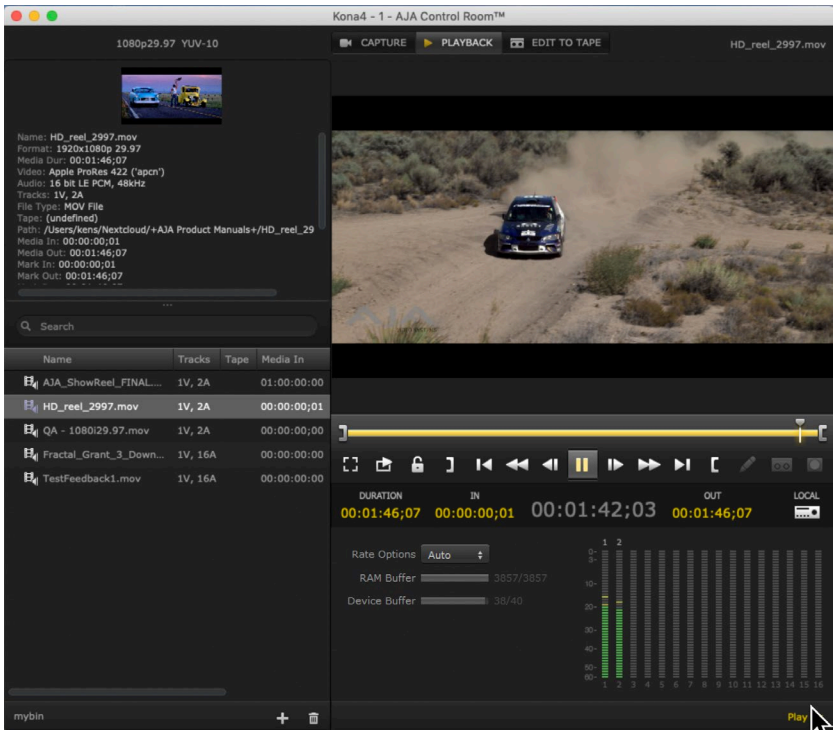
You can select a clip or group of clips in the bin then right-click to select Export Final Cut Pro Event.

The Final Cut Pro application automatically launches when an Event is generated.

NOTE: In this process, files are not moved but links to them are created.

Playback Tab

Figure 26. Control Room Playback Tab (macOS)



When the Playback Tab screen mode is selected, AJA Control Room allows you to playback, view and trim the clips in your project.

Use playback functions for any clips that are loaded in the Bin. Double-click on a clip in the bin to open it in the Playback viewer pane.

Playback Controls

In Playback mode you can use the transport controls to play, stop, rewind, and jog through the clip and set IN and OUT points to trim the playback region.

Various methods are available in the Dashboard to change IN/OUT and Duration values. You can enter the cursor and type values into the fields or use keystroke commands (see *"Keystroke Commands" on page 35*).

Dragging Markers

You can also drag the marker elements along the timeline to set edit points. Note that active elements will display in yellow. The timeline markers (shown below) include:

- IN Point slider icon
- OUT Point slider icon
- Current Playhead Position Indicator

Figure 27. Transport and Dashboard controls

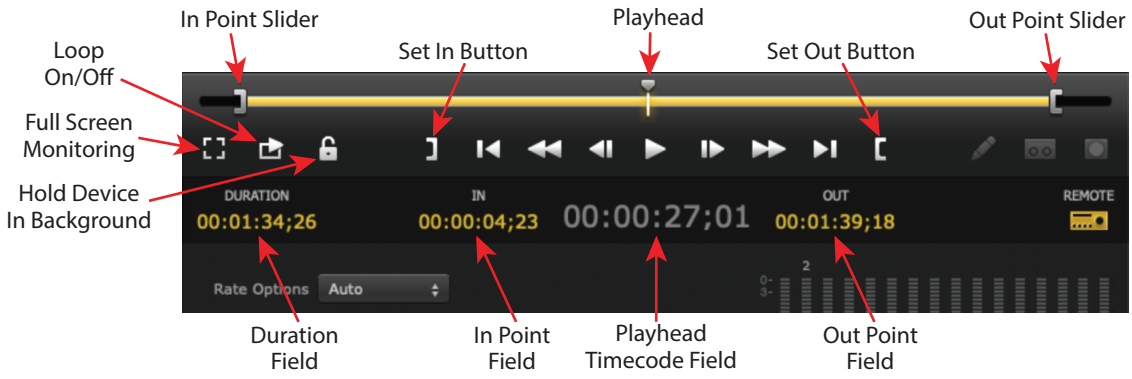
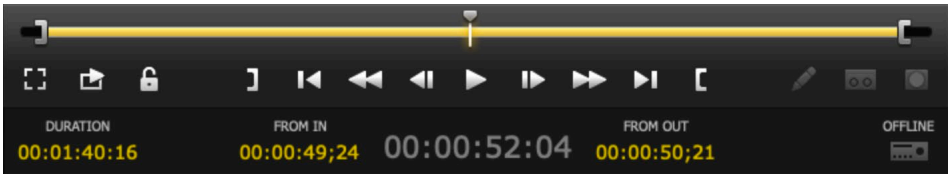


Figure 28. Relative Timecode Preference selected



Set the IN/OUT Points

Perhaps the easiest and most precise method of setting IN/OUT points, is to advance the Playhead to the desired start location and click the Set IN button. Then do the same for the end location using Set OUT.

You can adjust the Set points by click-and-holding in the IN Point or OUT Point fields and dragging left or right.

NOTE: The IN/OUT points and Current Playhead position are displayed as either Frames or Clip Timecode values depending on your Preference settings.

Rate Options

Rate options include:

- Auto - Play video and audio tracks at the same frame rate captured
- No Video - Play audio tracks only
- Frame Rate - Select a speed to play an image sequence such as DPX files (available when an image sequence is loaded for playback)

RAM Buffer

The RAM buffer shows how many frames are buffered into your system's RAM that are ready for delivery to your AJA device. As the device outputs frames, the RAM buffer keeps the device filled with the next set of frames.

NOTE: If Deep Buffer playback is enabled, the number of RAM buffered frames increases according to how much RAM has been allocated and the frame rate of the clip.

Device Buffer

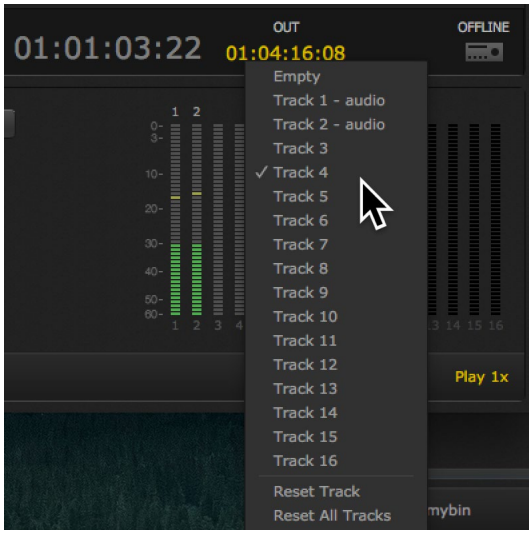
The Device buffer shows how many frames are buffered into the AJA device. Fewer frames will be reported in this buffer than in the RAM buffer, but this is an extra safeguard to prevent a dropped frame if the software RAM buffer empties.

NOTE: As long as the RAM and Device buffers are filled, your system should not drop frames during playback.

Audio Meters

The Tab Settings Pane contains meters for 8 or 16 audio channels determined by the number of audio channels your AJA edit device supports.

Figure 29. Playback Mode Audio Meters



In Playback mode, you can turn audio on/off by clicking on any of the meter channels. Option-click a meter to enable/disable all available channels.

You can also re-route audio from any audio input to any audio output. The number below each meter indicates the output channel, which is fixed. The number above the meter indicates the input channel. Clicking on that number opens a dropdown allowing you to choose any other audio input channel, make the output channel empty (no input), or reset one or all the channels to the default (1 to 1, 2 to 2, etc.) Each input audio channel can be routed to only one output channel.

Audio meter operation for Capture and Edit-To-Tape is different for each mode and is described in their respective sections in this chapter.

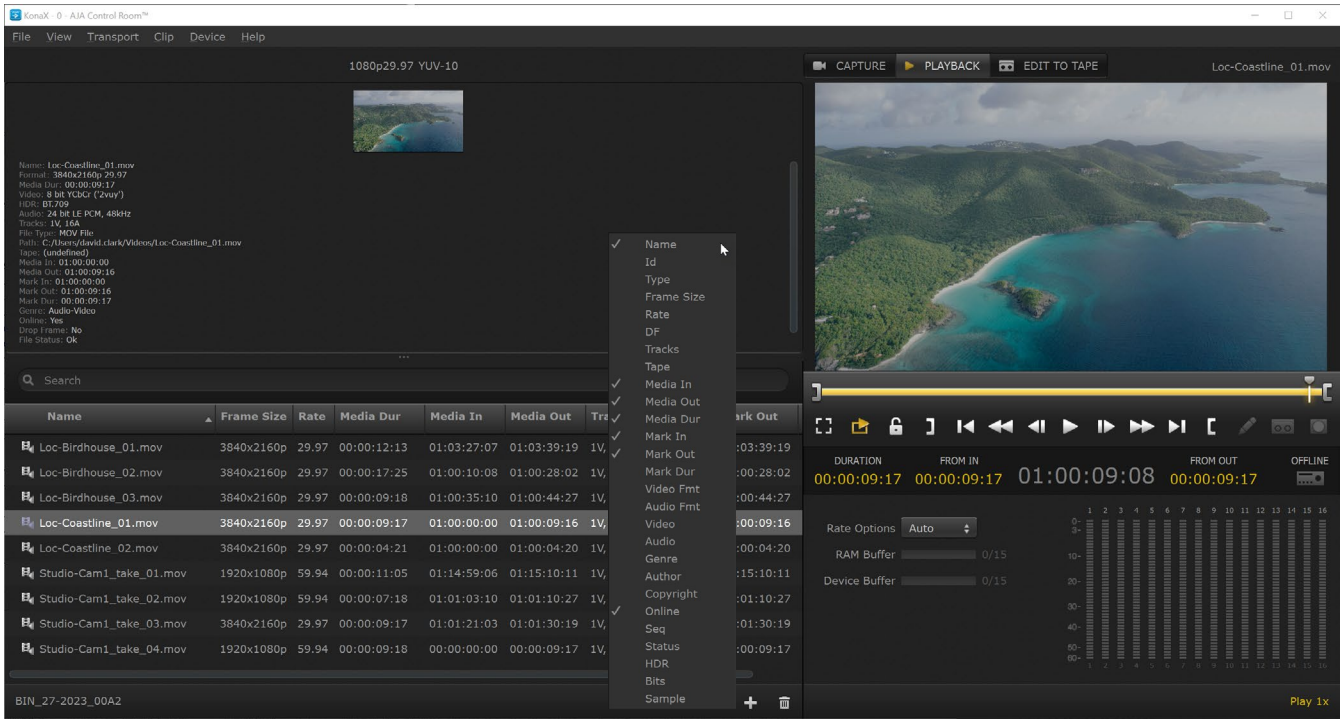
Bin Pane Options

You may select any combination of Bin Meta-Data as columns in the Bin Pane. Available Meta-Data columns include:

Name, ID, Type, Frame Size, Rate, DF, Tracks, Tape, Media In, Media Out, Media Dur, Mark In, Mark Out, Mark Dur, Video Fmt, Audio Fmt, Video, Audio, Genre, Author, Copyright, Onine, Seq, Status, HDR, Bits and Sample.

Meta-Data columns may be freely repositioned within the Bin Pane by dragging a heading left or right.

Figure 30. Playback Tab with Bin Meta-Data selection menu open (Windows)



Capture Tab

Figure 31. Control Room Capture Tab (macOS)

Using the Capture Tab, you can create a new clip from the input of your AJA device.

Input Based Capture

Your AJA device frame buffer must be set for the expected video format either via the Control Panel Format setting or the Follow Input function. In the Format screen, you enable the Follow Input checkbox which automatically switches the buffer format to match the detected input format.

NOTE: KONA 5 in 8K mode does not support color space conversion for any video formats. You will need to manually match the color space (YCbCr, RGB) of the Video codec type in AJA Control Room (or other controlling application) with the KONA 5 card's framebuffer color space. In general, 444 = RGB, and 422 = YCbCr.

In AJA Control Room you can go to File>AJA Control Panel to open AJA Control Panel (see *"File Menu" on page 9.)*

Remote Control

If your input is from a Tape Deck and you have RS-422 connection, AJA Control Room provides remote control of the deck and captures according to Timecode settings for DURATION, VTR IN, and VTR OUT points (see *"Playback Controls" on page 23*).

Capture mode also supports Batch Capture which automates the process of capturing multiple clips from one or more tapes (see *"Batch Capture" on page 30*).

NOTE: When a Capture is in-progress, the viewer is outlined in red.

Capture Clip Settings

The Capture Tab provides the Clip Settings panel that allows you to enter metadata and library information for the clip you will create. In the top row, from pulldown menus, you will select format options for the file:

File Types

- BMP
- DPX
- MOV
- MP4
- MXF
- Targa

After a File Type has been selected, a drop down list can be used to select a version (encoding, bit depth, etc.) supported by that file type.

MOV Files

Control Room supports Apple ProRes, AVID DNxHD, and AVID DNxHR (for 4K/UltraHD only) files.

- Apple ProRes 422
- Apple ProRes 422 HQ
- Apple ProRes 422 LT
- Apple ProRes 422 Proxy
- Apple ProRes 4444
- Apple ProRes 4444 XQ
- AVID DNxHD HQ
- AVID DNxHD HQX
- AVID DNxHD SQ
- AVID DNxHR 444
- AVID DNxHR 444 12bit
- AVID DNxHR HQ
- AVID DNxHR HQX
- AVID DNxHR LB
- AVID DNxHR SQ

MP4 Files

Control Room will attempt to use a hardware path for encode. If the path does not exist it will do a software only encode. These conditions vary on systems depending on the CPU, drivers loaded and platform. Decode at this time uses only software.

NOTE: H.264/5 interlaced video will be captured as progressive.

- AVC/H.264 Low
- AVC/H.264 Med Low
- AVC/H.264 Med
- AVC/H.264 Med High
- AVC/H.264 High
- AVC/H.264 Max
- HEVC/H.265 Low
- HEVC/H.265 Med Low
- HEVC/H.265 Med
- HEVC/H.265 Med High
- HEVC/H.265 High
- HEVC/H.265 Max

See *"Appendix B Control Room: H.264, H.265" on page 38* for additional information.

MXF Files

MXF files captured by AJA Control Room are type OP-1A. For MXF container files, Control Room supports the following codecs:

- AVID DNxHD HQ
- AVID DNxHD HQX
- AVID DNxHD SQ
- AVID DNxHR HQ
- AVID DNxHR HQX
- AVID DNxHR 444
- AVID DNxHR 444 12bit

- AVID DNxHR LB
- AVID DNxHR SQ

Targa Files

- 8 bit BGRA
- 8 bit BGR

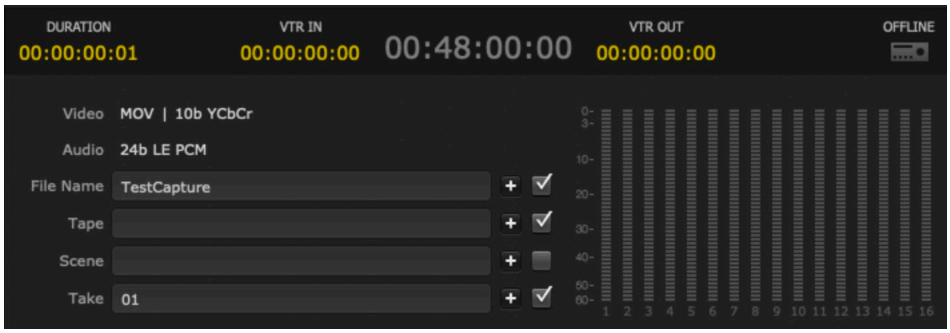
Clip Naming

A Clip Name will be generated automatically or you can choose to enter your own designations for:

- File Name
- Reel name
- Scene description
- Take designation

NOTE: If you want your information to be displayed as part of the Clip Name in AJA Control Room, you must enable the check boxes to the right of the entry field. The plus (+) buttons are used to add/increment a numeric designation.

Figure 32. Capture Tab Settings Pane



Audio Channel Selection

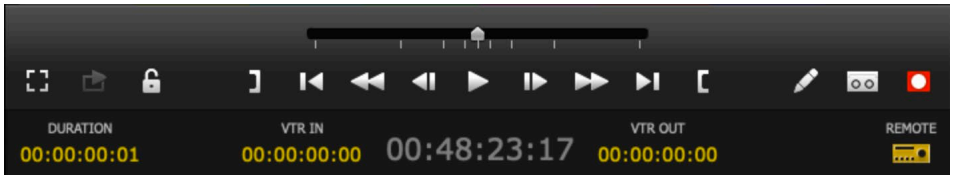
To select audio channels for capture:

- Single-click to enable/disable individual channels
- Single-click between the odd/even channel pair numbers (1&2, 3&4, etc.) to select audio-pairs (a plus sign will indicate paired channels). In this mode, clicking one of the paired meter bars will turn on/off both channels
- Option-click to enable/disable all available channels

Capture Controls

The Capture controls offer standard tape deck play controls (as described previously) and adds the jog control slider above the transport controls.

Figure 33. Capture Controls with Jog Control Slider



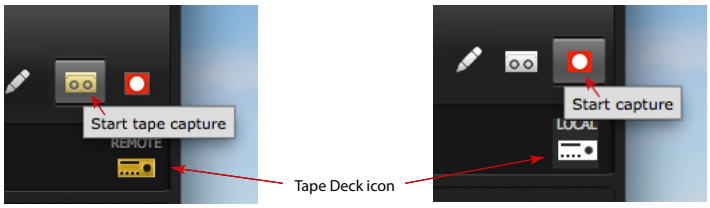
AJA Control Room can control a Tape Deck via RS422 or can do manually initiated captures. The Tape Deck Control icon indicates the communication status of the deck. If no active RS422 connection is present, the icon reports OFFLINE. When connected, the status will report:

- LOCAL – remote control is not enabled for the VTR
- REMOTE – the VTR is set for remote control via RS422

To activate Remote mode:

1. Verify the RS422 cable connection between your AJA device and the deck.
2. Verify the remote control mode on your recording device is enabled.

Figure 34. Capture Buttons & Tape Deck Control Indicator



NOTE: If the Tape Deck icon is lit (yellow), AJA Control Room is detecting an RS-422 connection that is active. If it is white, there is no active RS422 connection.

Two record buttons are available:

- Start tape capture - captures from the deck according to timecode VTR IN and VTR OUT settings
- Start capture - initiates immediate manual capture of the AJA device input

Batch Capture

The batch capture procedure consists of these steps:

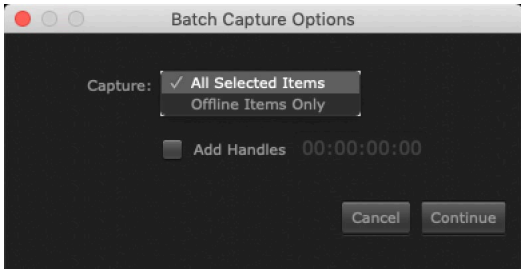
1. Create bin items without content by entering:
   - File Type and Clip information in the capture tab settings pane
   - IN Point and OUT Point or Duration information for the clip.
2. Click the Pencil icon. You will see a red line through the bin icon that indicates “Footage is offline”.
3. Repeat this process for additional bin items.

NOTE: You can enter bin items from different tapes entering the numbers in the Tape field (Clip information). The batch capture will pause for tape change and resume to complete the batch.

4. When all the bin items are listed, select them in the bin and right-click to select Batch Capture from the resulting menu.
5. Next, in the options screen you can set the Capture type to:

- All Selected Items – captures content for all selected bin items
- Offline Items Only – captures content only for items in the bin with “footage offline”
- You may enable Add Handles to add pre- and post-footage to your captures. After setting Batch Capture Options, click Continue.

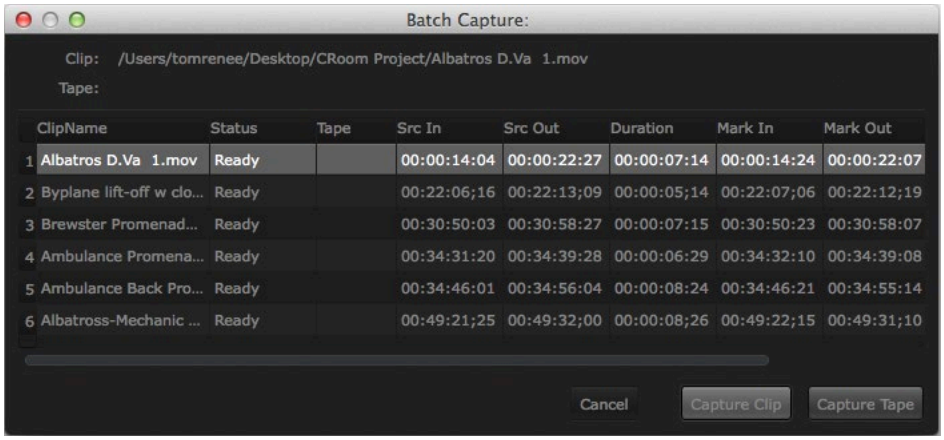
Figure 35. Batch Capture Options Screen (macOS)



6. On the Batch Capture Screen, you may:
   - Select a single item and click Capture Clip to capture one item
   - Click on Capture Tape to capture all listed items.

AJA Control Room will sequentially record multiple clips into the project directory and assign the bin item links as the capture media is run.

Figure 36. Batch Capture Screen (macOS)



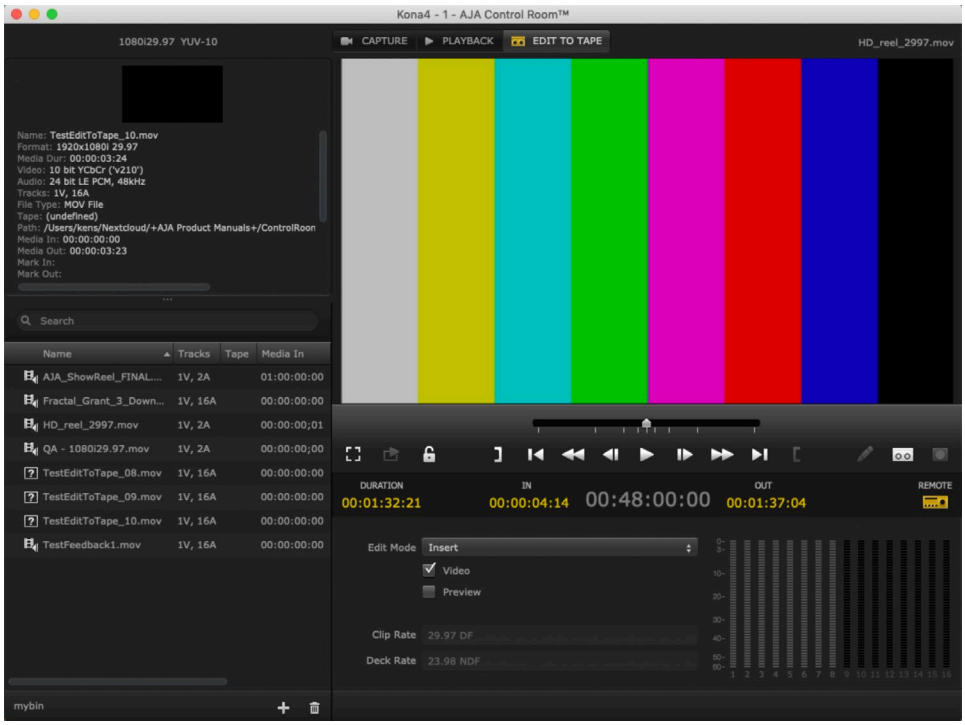
You can right-click in the bin to delete a bin item, its media content, or both, from the bin (refer to *"Bin Item Menu Right Click" on page 22*). If you keep the bin item and delete the media, the bin item icon's red line returns.

Edit-To-Tape Tab

Using the Edit-To-Tape tab you can output your current clip to a tape deck or recording device using remote control. A tape deck connected via RS-422 and set in remote control mode allows AJA Control Room to send an Insert Edit or Assemble Edit with timecode VTR IN and VTR OUT or Duration designated.

IMPORTANT: Not all tape machines can be controlled for edit-to-tape functionality. Contact tape machine manufacturer for more information on specific tape machine models.

Figure 37. Edit-To-Tape Tab (macOS)



Edit To Tape Controls

The controls for Edit-To-Tape provides the same functions as described for Capture mode (see *"Capture Controls" on page 29*.

Edit To Tape Settings Pane

Edit Mode

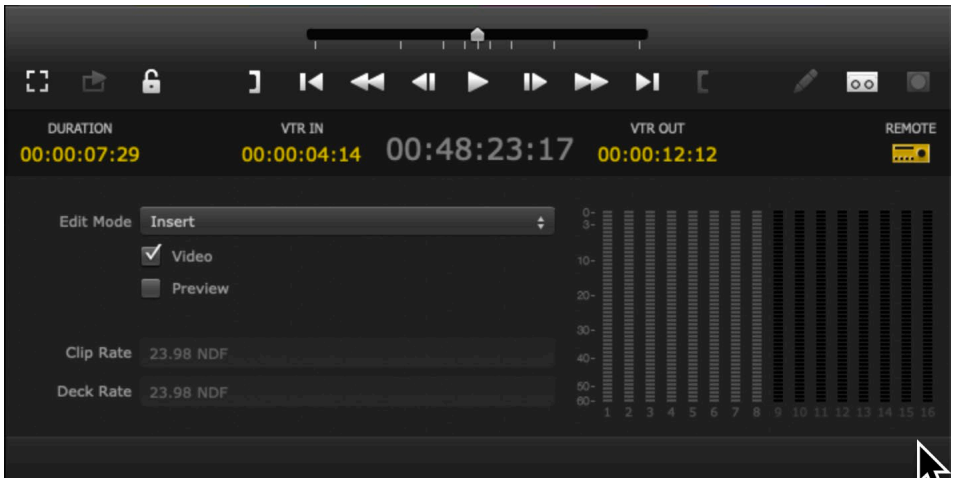
- Insert – lays down selected video and audio tracks using timecode VTR IN/VTR OUT or Duration maintaining existing control tracks on the tape
- Assemble – erases previous content and records all video, audio, timecode, and control track information onto tape according to the timecode information (VTR IN/VTR OUT/Duration) set in AJA Control Room

Edit Track Content

The Video checkbox allows you to include/exclude Video content in an Insert Edit (not applicable to Assemble Edits).

If you check the Preview box, you can use the play control to view the content in AJA Control Room without recording it to the deck.

Figure 38. Edit-To-Tape Transport and Dashboard Controls



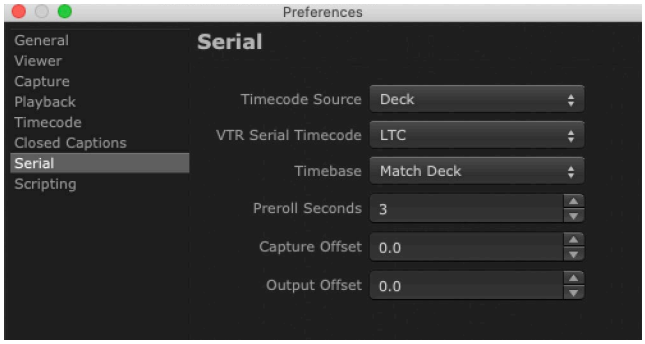
Audio Track Inclusion

In Insert mode you have complete control of the individual audio tracks you want to include in the edit. Click on each track you want to enable/disable or Option-click to enable/disable all available tracks. An Assemble edit has no control of the audio track selection.

Tape Deck Timing Adjustment

Both Capture and Edit-To-Tape operations employ Timecode for executing seamless frame-accurate operation. Latency in communication between devices can cause delays of several frames depending on the signal format and tape machine being used. To fine-tune timing between the tape deck and your computer and AJA edit device I/O, open AJA Control Room Preferences and select the Serial screen.

Figure 39. AJA Control Room Serial Preferences Screen (macOS)



In the following procedure, you will use the Capture Offset for Capture timing and Output Offset for Edit-To-Tape. Offset values presented are in whole Frames and tenths.

Offset Adjustment Procedure

This procedure is basically the same for both Capture and Edit-to-Tape adjustment.

You will enter an Offset value and then capture or output-to-tape a number of clips while checking the resultant timecode accuracy.

We recommend ten edits or captures (with timecode burn-in output from the VTR) be examined.

Machine and Video Format Changes

If you use multiple tape deck types, you will want to perform and record these adjustments for each.

Timing can vary between deck manufacturers and models. Also, changing video formats between 30 fps video (eg. 1080i 29.97) and 50 to 60 fps video (720p 59.94) may require offset adjustment.

Our experience indicates required offsets will be approximately:

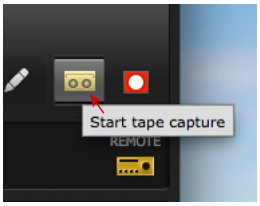
- 2.0 frames for 30 fps formats
- 1.0 frames for 60 fps formats

Capture Timing

NOTE: For Capture testing, you can use Batch Capture to quickly generate a series of sample captures.

Capture Adjustment Procedure

1. Enter your Capture Offset (1 frame for this example).
2. Set an IN Point for the Capture noting it's timecode.
3. Set a two-second Duration or an OUT Point.



4. Click the Tape Capture button to start the capture.
5. When Capture is complete, double-click on the clip in the bin to enter Playback mode.
6. Compare the first two frames of the burned-in timecode of the capture with the timecode values in the dashboard's Current Position Indicator (CPI).
7. If the capture resulted in a timecode beginning a frame before the CPI, adjust the offset by adding a frame. Conversely, if the clip was late, decrease the offset.

As you perform more trial captures, you may see a variance in frame accuracy. If so, you can use the tenth-of-a-frame offset (beginning with five-tenths) to make more subtle adjustment until the clip timecode and CPI consistently match.

NOTE: 720p 50 to 60 fps formats actually records two frames for each timecode frame value. For frame accuracy you must check that the timecode value does not change for the first two frames of video.

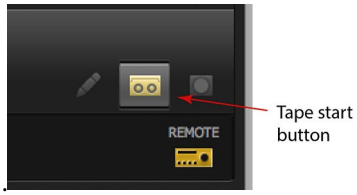
Edit-to-Tape Timing

For Edit-to-Tape Timing you enter frame values in the Output Offset field in Serial Preferences. AJA Control Room must begin playout so that the correct frame is on-air at the edit IN point.

Edit Adjustment Procedure

Begin the procedure by doing a test edit.

1. Using a clip with timecode burn-in, select a CPI point marking the desired edit IN.
2. Set a two-second Duration or an OUT Point



3. Click the Tape start button to perform the edit.
4. When the edit is complete, roll the tape back to the edit IN point and verify that the first frame that was captured on tape was the frame you expected.
5. If the edit begins a frame early, adjust the offset by adding a frame. Conversely, if the clip was late, decrease the offset.

As you perform more trial edits, you may see a variance in frame accuracy. If so, you can use the tenth-of-a-frame offset (beginning with five-tenths) to make more subtle adjustment until the edit is consistently frame-accurate.

Again, for video formats of 720p 50 to 60 fps, refer to the NOTE above.

Keystroke Commands

Many Control Room functions can also be performed using computer keyboard shortcuts. Many are entered using the Cmd key (⌘ on macOS) or the Ctrl key (Windows).

AJA Control Room (macOS)

Function	macOS
Preferences	Cmd+,
Hide AJA Control Room	Cmd+H
Hide Others	Option+Cmd+H
Quit AJA Control Room	Cmd+Q

File Menu Keystroke Commands

Function	macOS	Windows
New Bin	Cmd+N	Ctrl+N
Open Bin	Cmd+O	Ctrl+O
Import Files to Bin	Cmd+I	Ctrl+I
Save Bin	Cmd+S	Ctrl+S
Preferences	Cmd+,	Ctrl+,

View Menu Keystroke Commands

Function	macOS	Windows
Capture Mode	Cmd+1	Ctrl+1
Playback Mode	Cmd+2	Ctrl+2
Edit-To-Tape Mode	Cmd+3	Ctrl+3
Video Only Monitoring	V	V
Show Bin	Cmd+B	Cmd+B
Show Mode Title	Cmd+M	Cmd+M
Show Transport	Cmd+T	Cmd+T
Show Dashboard	Cmd+D	Cmd+D
Show Settings	Cmd+'	Cmd+'
Toggle Fullscreen		Ctrl+F

Transport Menu Keystroke Commands

Function	macOS	Windows
Play/Pause	Space	Space
Step Left	Left Arrow Up Arrow	Left Arrow Up Arrow
Step Right	Right Arrow Down Arrow	Right Arrow Down Arrow
Play Reverse (repeat faster)	J	J
Pause	K	K
Play Forward (repeat faster)	L	L
Mark In	I	I
Mark Out	O	O
Goto In	Q	Q
Goto Out	W	W
Clear In	D	D
Clear Out	F	F
Clear In-Out	G	G
Capture/Stop	R	R
Log Clip	C	C
Stop/Escape	Esc	Esc
Loop Playback	Y	Y

Appendix A – Supported Read/Write Codecs

Control Room supports the compressors listed in the capture settings dropdown lists. Different selections are available under different conditions.

The following table lists the read and write capabilities of Control Room by codec and operating system.

Table 1. Control Room Supported Read and Write Codecs by Operating System

Codec	WIN OS	MAC OS	LINUX Red Hat/CentOS	LINUX Ubuntu
ProRes Family Read	**Yes**	**Yes**	**Yes**	**Yes**
ProRes Family Write	**Yes**	**Yes**	**Yes**	**Yes**
DNxHD Read - MOV	**Yes**	**Yes**	**Yes**	**Yes**
DNxHD Write - MOV	**Yes**	**Yes**	**Yes**	**Yes**
DNxHD Read - MXF	**Yes**	**Yes**	**Yes**	**Yes**
DNxHD Write - MXF	**Yes**	**Yes**	**Yes**	**Yes**
DNxHR Read - MOV	**Yes**	**Yes**	**Yes**	**Yes**
DNxHR Write - MOV	**Yes**	**Yes**	**Yes**	**Yes**
DNxHR Read - MXF	**Yes**	**Yes**	**Yes**	**Yes**
DNxHR Write - MXF	**Yes**	**Yes**	**Yes**	**Yes**
DVCProHD Read **	**Yes**	**Yes**	No	No
DVCProHD Write **	**Yes**	**Yes**	No	No
DPX Read	**Yes**	**Yes**	**Yes**	**Yes**
DPX Write	**Yes**	**Yes**	**Yes**	**Yes**
BMP Read	**Yes**	**Yes**	**Yes**	**Yes**
BMP Write	**Yes**	**Yes**	**Yes**	**Yes**
Targa Read	**Yes**	**Yes**	**Yes**	**Yes**
Targa Write	**Yes**	**Yes**	**Yes**	**Yes**
MP4 Read	**Yes**	**Yes**	**Yes**	**Yes**
MP4 Write	**Yes**	**Yes**	**Yes**	**Yes**

** Requires a UFC bitfile which contains the DVCProHD hardware scaler.

Appendix B – Control Room: H.264, H.265

H.264/AVC

Control Room supports six target data rates specified for HD:

H.264 (AVC)	Low	Low-Med	Medium	Med-High	High	Maximum
Reference Quality Format 1080p60, 10-bit 4:2:2	5Mb/sec	10 Mb/sec	15 Mb/sec	20 Mb/sec	25 Mb/sec	50 Mb/sec

H.265/HEVC

Control Room supports six target data rates specified for HD:

H.265 (HEVC)	Low	Low-Med	Medium	Med-High	High	Maximum
Reference Quality Format 1080p60, 10-bit 4:2:2	2Mb/sec	5 Mb/sec	8 Mb/sec	10 Mb/sec	15 Mb/sec	20 Mb/sec

Appendix C – Python Scripting Tutorial

AJA has implemented a Python Scripting interface for the AJA Control Room application.

Under Python script control you can:

- Name the file to be captured
- Start Capturing
- Stop Capturing
- Load Files into the bin
- Use transport controls
- Get a list of files in the bin
- Set the mode (Capture, Playback, Edit To Tape)
- Show/Hide the Bin and Settings panes

NOTE: The AJA implementation is based upon Python 3.x.

This tutorial and the example files are available as a download in the Documents section from:

https://www.aja.com/software/control-room/tutorials

Python Installation

Windows

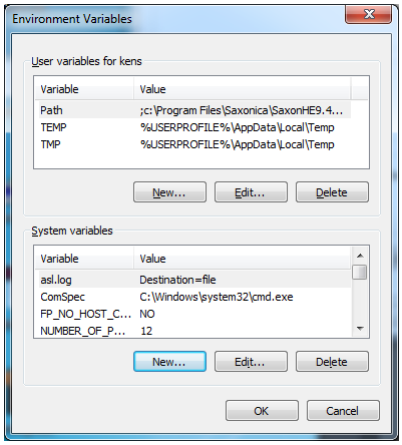
The Python libraries are not installed with Windows by default. You can get the Python 2.7.6 installer from:

https://www.python.org/downloads/windows/

Once this is installed, you must set an environmental variable to point to your Python installation. To add an Environmental Variable for Python:

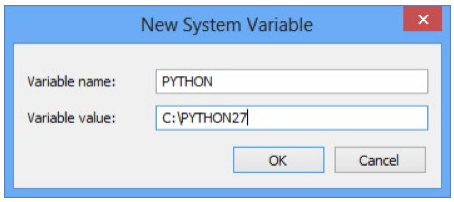
1. Right-click My Computer, and then click Properties.
2. Click the Advanced System Settings.
3. Click Environment Variables.

Figure 40. Environment Variables Screen



4. Click one the New buttons to add either a User or a System variable:
5. Enter the name and value.

Figure 41. Python Environment Variable Window



6. Click OK.

macOS

Python v2.7 is installed as part of the standard macOS X system install. No additional installation is necessary.

AJA Control Room Setup for Python Scripting

1. Copy the python folder to your desktop. It can be copied anywhere, but for this example we will expect it to be on your Desktop
2. Launch the AJA Control Room application
3. Open the AJA Control Room Preferences
4. Select the Scripting pane
   - Make sure Enable Scripting Server is checked
   - The Scripting server port defaults to Port 8080.

NOTE: You can change this if desired but our example code expects it to be set to Port 8080. If you modify this port number you must change the appropriate value in the code to match.

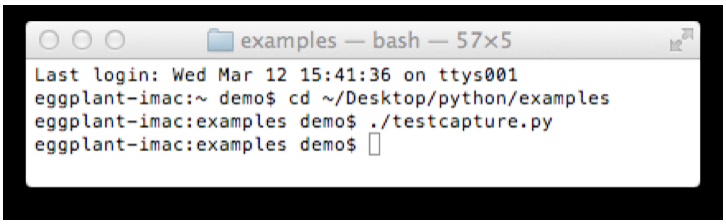
5. Select the General pane and
   - Make sure Hold onto device when app is in background is checked
   - Make sure a Capture Path is specified
6. Dismiss Preferences window
7. Select Capture tab in Main window
   - Specify desired File Type
   - Specify desired Video Codec
   - Specify desired Audio Codec
   - Specify number of Audio Channels
   - Confirm that the checkbox next to the File Name field is checked

Macintosh Instructions

1. Make sure the AJA Control Room app is running and is set up as described above.
2. Open the Terminal application
3. Type cd ~/Desktop/python/examples
4. Type ./testcapture.py to run the testcapture Python script.

The testcapture script tells AJA Control Room to capture a one-second clip called “testClip”. The captured clip will appear in the bin.

Figure 42. Desktop Python Examples



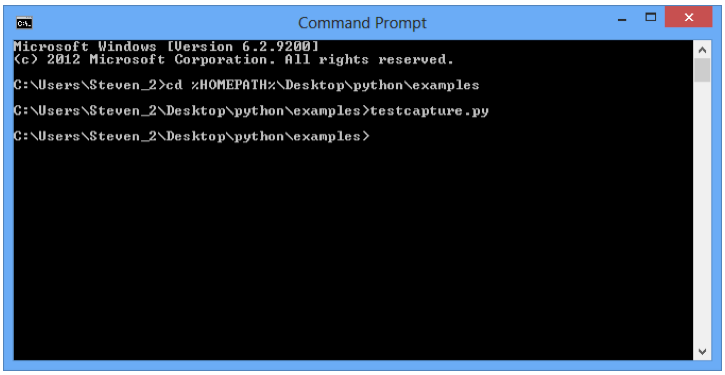
Windows Instructions

The following instructions expect the AJA Python folder to be on your Desktop. Make sure the AJA Control Room application is running.

1. Open up a Command Prompt
2. Type cd %HOMEPATH%\Desktop\python\examples
3. Type testcapture.py to run the testcapture Python script.

The testcapture script tells AJA Control Room to capture a one-second clip called "testClip". The captured clip will appear in the bin.

Figure 43. Command Prompt Entries



Simple Modifications

Following is the code for testcapture.py

You can change the duration of the capture by changing the number (in seconds) in the parentheses in line 15 time.sleep(1)

The name of the file to be captured comes from the word in quotes in line 26 ("testClip" in the example below) captureTest(client, "testClip")

This script is meant to control the AJA Control Room app on the local computer, however you can control an AJA Control Room app on a different computer on the network by replacing 'localhost' on line 22 with the IP address (e.g. 10.192.168.40) of another computer on your network. If the Scripting server port in the Scripting Preferences has been changed you must match that port number in line 23. An instance of the AJA Control Room app must be running on the remote computer.

Figure 44. Example Python script "testcapture.py"

```
#!/usr/bin/python
# vim: tabstop=8 expandtab shiftwidth=4 softtabstop=4

import sys

sys.path.append("../")

from aja.controlroom.client import Client
import time


def captureTest(client,file):
        client.capture.setFileName(file)
        client.capture.startRecord()
        time.sleep(1)
        client.capture.stopRecord()

def main():
    """
    Used for testing
    """
    server = 'localhost'
    port   = '8080'

    client = Client(server,port)
    captureTest(client,"testClip")




if __name__ == '__main__':
    status = main()
    sys.exit(status)

```

Figure 45. Example Python script "testplayback.py"

File Path ▾ : ~/Desktop/python/examples/testplayback.py

testplayback.py (no symbol selected)

```
#!/usr/bin/python
# vim: tabstop=8 expandtab shiftwidth=4 softtabstop=4

import sys
import os
sys.path.append("../")

from aja.controlroom.client import Client
import time


def simplePlayback(client,file):
    #setup the window to viewer only
    client.app.setPosition(300,100)
    client.app.setSize(1000,700)
    client.bin.setVisible(True)
    client.viewer.setMode("playback")

    #make sure file is in bin
    filesInBin = client.bin.files()
    if any(file in filePath for filePath in filesInBin) == False:
        client.bin.addFile(file)
        #wait a bit
        time.sleep(1.0)

    client.viewer.playFile(file)


def main():
    """
    Used for testing
    """
    server = 'localhost'
    port   = '8080'

# Example - load and playback file. Replace filename with file on your system
    client = Client(server,port)
    simplePlayback(client,"/Users/steven/Movies/Testmovie.mov")

# Example - Add files to bin. Replace filenames with files on your system
#   client.bin.addFiles (["/Users/steven/Movies/Movie1.mov", "/Users/steven/Movies/Movie2.mov"])

# Example - Print list of files in bin
    #print client.bin.files()

#Example - Load files from directory. Replace moviePath with valid path to movies on your system
#   moviePath = "/users/demo/Desktop/movies/"
#   movieFiles = os.listdir(moviePath)

#   for file in movieFiles:
#       print (moviePath+file)
#       client.bin.addFile(moviePath+file)



if __name__ == '__main__':
    status = main()
    sys.exit(status)

```

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Index