UDC-4K

12G-SDI and HDMI Up/Down/Cross-Converter with Frame Sync

Installation and Operation Guide

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AJA VIDEO SYSTEMS

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Chapter 1 – Introduction

Overview

Rugged, compact, and designed for professional workflows, the UDC-4K is our most versatile Mini-Converter. The UDC-4K is a broadcast-quality Up/Down/Cross Mini-Converter that can seamlessly convert between 4K/UltraHD and 2K/HD video formats. Not only does it perform raster and frame rate conversions, but it can also function as a frame synchronizer and as a 1x4 12G-SDI DA, supporting video formats up to 4Kp60. With both 12G-SDI and HDMI 2.0 inputs and outputs, the UDC-4K makes SDI and HDMI signal conversion simple and efficient.

Designed on AJA's industry-leading conversion technology, the UDC-4K offers the highest-quality conversions required in professional broadcasting, live events, and other critical AV environments. The UDC-4K's wide range of conversion possibilities makes it ideal for aligning disparate sources to a common format and timing reference, integrating legacy signals into higher resolution workflows, and handling many production challenges that may arise. It even offers utility frame rate conversion to convert 59.94 to 50 or 50 to 59.94 frame rates.

The UDC-4K features 12G-SDI and HDMI 2.0 inputs, four 12G-SDI outputs, and one HDMI 2.0 output. The multiple SDI outputs function as a distribution amplifier, or DA, enabling the transmission of a clean or processed signal to multiple destinations. It offers SDI and HDMI loop outputs for simple confidence monitoring or pass-through to the next device. A reference input enables the UDC-4K to lock to an external reference, or it can lock to the SDI or HDMI input, providing frame synchronization capabilities for untimed video signals.

It also offers the ability to convert 12G-SDI to HDMI 2.0 and vice versa with pristine image fidelity and support up to 60p for 4K/UltraHD. The UDC-4K is also "HDR-aware" supporting HDR workflows with proper SDI VPID and HDMI InfoFrame metadata signaling management.

The UDC-4K can easily be configured with its built-in button control panel and LCD display or via AJA's Mini-Config software.

These features make it the preferred solution for “all-in-one” Mini-Converter needs. The UDC-4K should be included in every professional AV, film/TV production, live production, broadcast, and DIT tool kit!

Key Features

- Up, down, cross-conversion
- Frame sync: times input signals to an external reference
- Utility frame rate conversion
- Converts 12G-SDI to/from HDMI 2.0, up to 4Kp60
- Supports 12-bit workflows
- Scaling technology utilizes AJA’s high-quality multi-tap polyphase scaling algorithm
- Motion adaptive deinterlacer
- HDR signaling metadata pass-through and optional override
- EDID Emulation up to UHDp60
- Loss of input management
- HDMI embedded audio support 8-channel 24-bit
- SDI embedded audio support 16-channel 24-bit
- Embedded audio pass-through of AC-3 (Dolby Digital) and E-AC-3 (Dolby Digital Plus) compressed audio, including DD+ Atmos (aka DD+ JOC)
- Supports up to 100 frames of audio delay
- 12G-SDI and HDMI 2.0b loop outputs
- 4x 12G-SDI outputs can be used as a 1-to-4 distribution amplifier
- Genlock: External Reference Input, SDI Input, HDMI Input, or Free Run
- Configuration via built-in button control panel and LCD display or AJA Mini-Config software
- Universal power supply included
- Five-year warranty and technical support

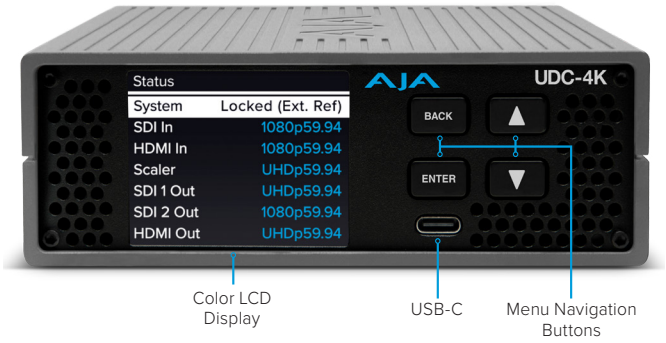
Display and Menu Navigation Buttons

The UDC-4K front panel display and buttons are used for viewing status information and for direct control of all* features. Up, Down, Back and Enter buttons are used to navigate the functions on the display. See *"Front Panel Display" on page 30* for detailed information on the front panel

*NOTE: * All features can be configured from the front panel with the exception of some HDMI HDR metadata signaling settings which are configured via Mini-Config.*

There is also an additional front panel USB-C port, for convenient use of the AJA Mini-Config application. See*"AJA Mini-Config Setup" on page 36* for installation and usage details.

Figure 1. UDC-4K Front Panel with Display and Buttons



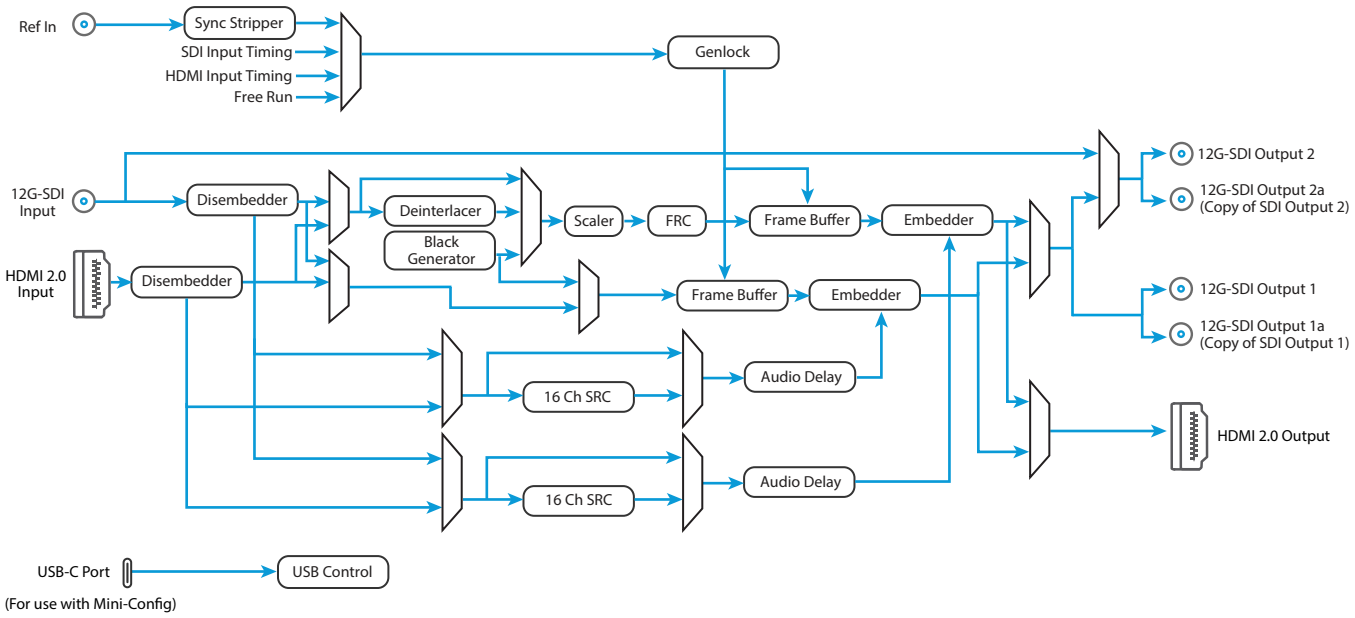
USB-C Port

Used for connection to AJA Mini-Config application. 3-ft. USB-C to USB-C and 3-ft. USB-C to USB-A cables are included.

NOTE: The USB-C port is intended for connection to the AJA Mini-Config application ONLY and should not be used for power.

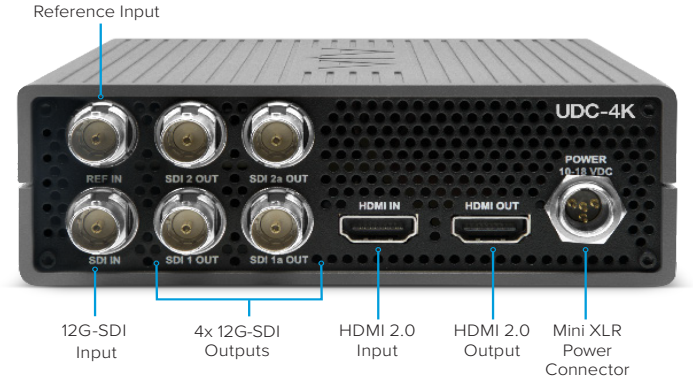
UDC-4K Simplified Block Diagram

Figure 2. UDC-4K Block Diagram



UDC-4K Rear Panel Connections

Figure 3. UDC-4K Rear Panel I/O Connections



Form Factor

The form factor of this converter design is 1RU high and 1/3RU wide, supporting up to three devices per 1RU. Six can be installed into the 3RU AJA DRM2-Plus which also offers redundant power supplies.

Figure 4. UDC-4K Dimensions (Oblique view)

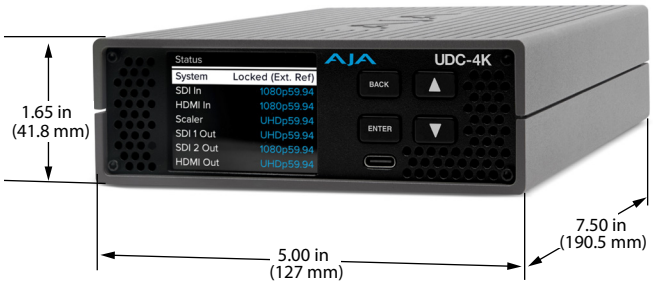
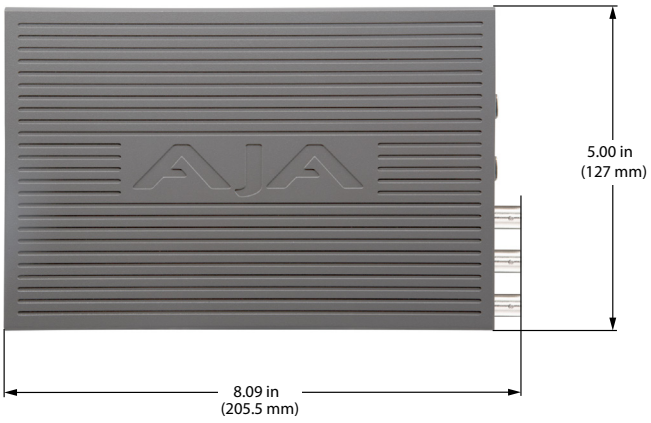


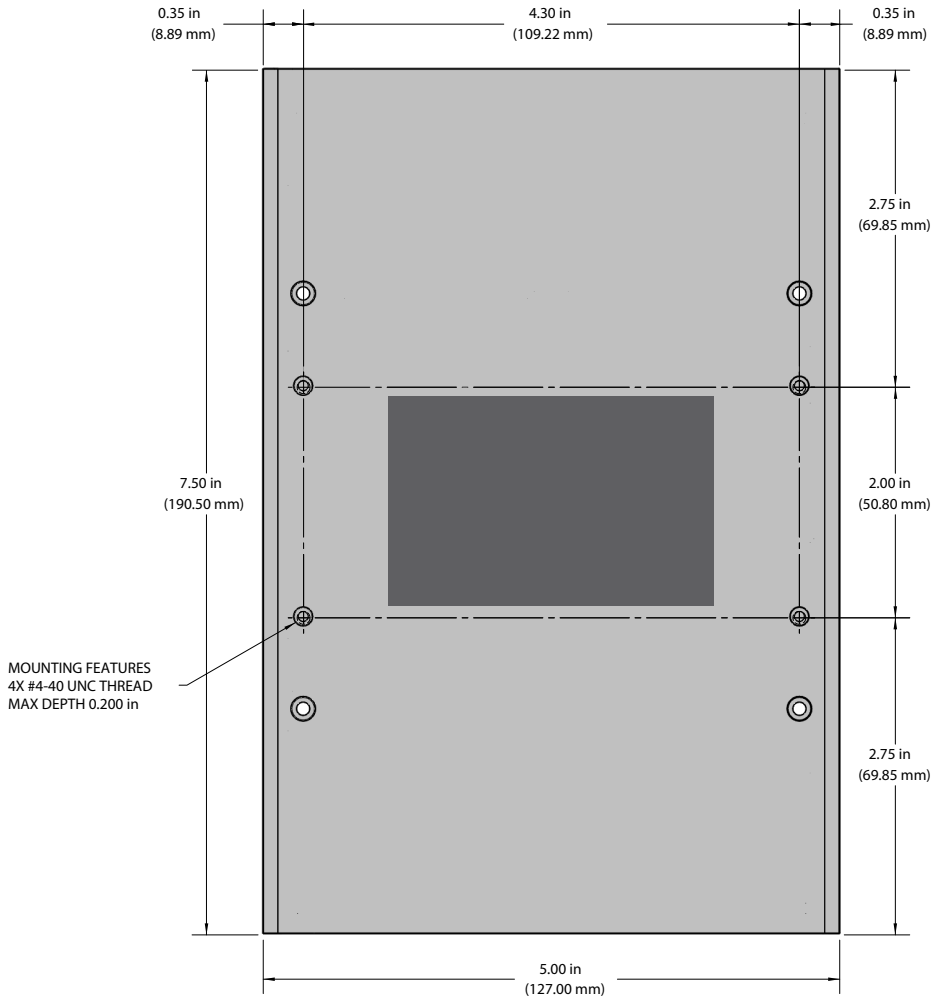
Figure 5. UDC-4K Dimensions (Top view)



NOTE: Oblique view shows case dimensions ONLY. See Top view for measurment including rear connectors.

Mounting Holes

Figure 6. UDC-4K Mounting Holes (bottom view)



Bottom mounting holes for UDC-4K may be used for mounting to third-party 1RU rack shelves.

NOTE: Threads inside the holes have a max depth of 0.20 inches and take 4-40 Phillips Flat Head screws.

Installation and Setup

Typically, UDC-4K installation consists of the following steps:

1. Connect an SDI source (if one is available) to the SDI Input (SDI IN).
2. Connect an SDI Output (SDI OUT) to an SDI router, Monitor and/or other SDI equipment.

NOTE: SDI 1 and SDI 1a always output the same signal. SDI 2 and SDI 2a always output the same signal and can also be the SDI input's looped output. See "SDI Out 2 Loop" on page 20 for details.

3. Connect an HDMI source (if one is available) to the HDMI Input (HDMI IN).
4. Connect an HDMI output to a Monitor and/or other HDMI equipment.

NOTE: HDMI output can be the HDMI input's looped output.

5. Apply power to the converter (AJA power supply included).
6. The UDC-4K will now run using the default factory settings.
7. To change the factory settings via the front display:
   - From the UDC-4K front display Home Screen, choose the desired subscreen and select the settings to modify.
   - Confirm modifications by hitting the Enter button. See *"Chapter 3 – Front Panel Display" on page 30* for details.
8. To change the factory settings via Mini-Config:
   - Connect the UDC-4K to a computer with a USB cable (provided).
   - Install the AJA Mini-Config software on the same computer.
   - Make changes using AJA Mini-Config setup screens. See *"Using AJA Mini-Config" on page 39* for details.

Chapter 2 – Software Operation

User operation of the UDC-4K is comprised of two complementary control methods, one via the front display on the device and one via AJA configuration software:

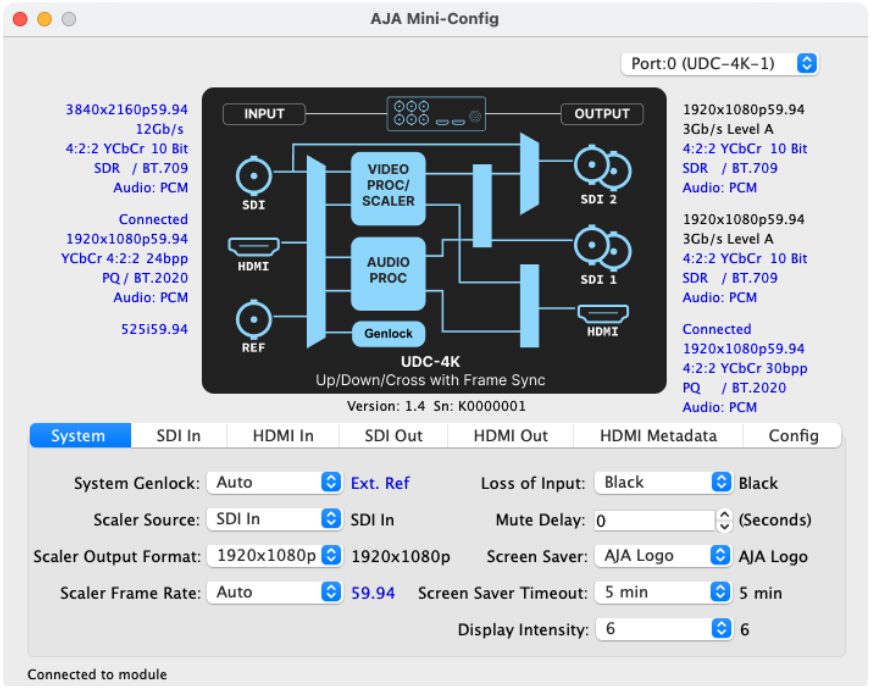
- **Front Panel Display and Buttons**. Used for display of status information and setting of configuration parameters. No connection to a computer is required. See *"Front Panel Display" on page 30*.
- AJA **Mini-Config** application. The AJA Mini-Config application is available for firmware updates and configuration. The Mini-Config application provides configuration controls for the UDC-4K along with real-time signal status. For details on installation and use of AJA Mini-Config, see Chapter 4, *"AJA Mini-Config Setup" on page 36.*

NOTE: USB connection and a host computer is required for use of Mini-Config.

UDC-4K Mini-Config User Interface

The UDC-4K Mini-Config User Interface (UI) consists of numerous tabbed screens for user configuration. For details on installation and use of AJA Mini-Config, see Chapter 4, *"AJA Mini-Config Setup" on page 36.*

System Tab Screen



Click on the System tab to view and make changes to the System Genlock source, Scaler configuration, Loss of Input management, and Display settings.

System Genlock

Determines the timing reference for the UDC-4K video outputs. The selected reference is displayed to the right of the Genlock pull-down. This control also allows the UDC-4K to free run rather than locking to an incoming signal or external reference. Choose from the following:

Choose from the following:

- Auto (default)- Auto uses the external reference input if present, or locks to the SDI input if no reference is present or if the reference is present but is not compatible.
- SDI In
- HDMI In
- Ext Ref
- Free Run - The scaler's output frame rate sets the frame rate family.

NOTE: If Genlock is set to SDI In, HDMI In or External Reference, this sets the frame rate family. If none are detected, Genlock goes to Free Run and whatever frame rate the scaler output is set to sets the frame rate family.

Scaler Source

Selects input to be processed. Choose from the following:

- SDI In (default)
- HDMI In

Scaler Output Format

Sets the scaler output format for selection by SDI and/or HDMI outputs. Scaling is performed using a high quality multi-tap polyphase scaling algorithm. Choose from the following:

- Follow Input (default)
- 1280x720p
- 1920x1080i
- 1920x1080p
- 2048x1080p
- 3840x2160p
- 4096x2160p

Scaler Frame Rate

Sets the scaler frame rate. Choose from the following:

- Auto (default) - Scaler Frame Rate matches the closest frame rate of the scaler's input within the frame rate family set by the System Genlock source. If System Genlock is Free Run, the scaler output frame rate is set to the frame rate of the Scaler Source.
- 23.98
- 24
- 25
- 29.97
- 30
- 47.95
- 48
- 50
- 59.94

- 60

NOTE: If the two inputs are different frame rates, integer and non-integer. Both SDI and HMDI outputs will be set to the System Genlock selection.

Loss of Input

Determines what action is taken when an input video signal is lost for the output to which it is routed.

Choose from the following:

- Black (default)- The output goes to black.
- Freeze - The output freezes on the last known good frame.
- Mute - No signal is output. A time delay to when the switch to mute occurs can be adjusted with the Mute Delay control.

Mute Delay

If Mute is selected under Loss of Input, a time delay, measured in seconds, can be set to specify how long until a switch to mute occurs. The UDC-4K output will remain Black until the timer expires, then it switches to Mute. Range is 0-15 seconds.

Screen Saver

Selects the type of menu screen saver. Choose from the following:

- AJA Logo (default)- The AJA logo is used as moving screen saver.
- Off - Screen saver is not displayed.
- System Name - System Name is used as moving screen saver.

Screen Saver Timeout

Sets the time before Screen Saver is activated. Choose from the following:

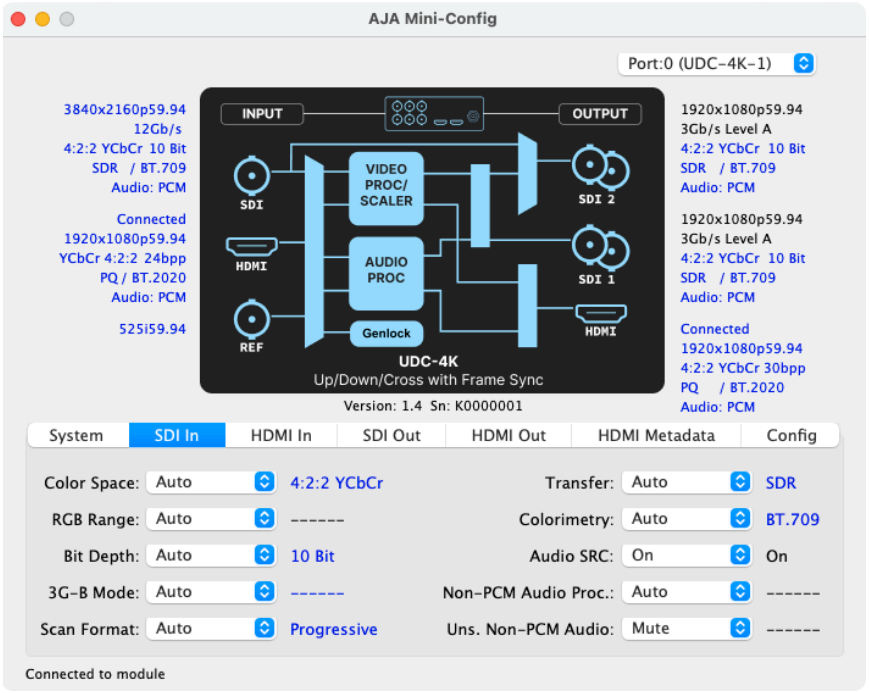
- Never
- 30 sec
- 1 min
- 5 min (default)
- 10 min
- 30 min

Display Intensity

Specifies the brightness of the display and buttons.

- Range: 1 (dimmest) to 8 (brightest) (default 6).

SDI Input Tab Screen



Click on the SDI Input tab to view and make changes to the UDC-4K's SDI input settings.

The UDC-4K can identify HDR Metadata from the incoming SDI signal as defined by SMPTE ST 352 and either pass it through to the SDI and/or HDMI output or override them and set new values for the outputs. See*"Transfer"* and *"Colorimetry" on page 16*.

For SDI, this metadata defines the VPID (Video Payload Identifier) for Transfer Characteristic and Colorimetry. For most workflows, the Auto settings for the SDI override parameters are appropriate, which will automatically pass incoming HDR metadata, if present, through to the output. However, this metadata may need to be edited for a specific workflow, or to correct inaccurate incoming metadata.

Color Space

Selects the SDI Input Video Color Space. Choose from the following:

- Auto (default)- Automatically selects color space based on the input video parameters and payload ID.
- 4:2:2 YCbCr
- 4:4:4 RGB
- 4:4:4 YCbCr

RGB Range

Selects the SDI Input Video Color Range when the input is RGB. Does not apply when the input is YCbCr. Choose from the following:

- Auto (default)
- SMPTE
- Full

Bit Depth

Selects the SDI Input Video Bit Depth. Choose from the following:

- Auto (default)
- 10-bit
- 12-bit

3G-B Mode

Selects the 3G level B Video Mode. Choose from the following:

- Auto (default) - Automatically selects the format based on the input video parameters.
- Level B-DL (Dual Link) - Select this option if there is a Dual Link signal coming in through SDI.
- B-DS (Dual Stream) Link 1 - Select this option if there is a 3GB-Dual Stream input in order to extract Data Stream A (first raster) and send to an output.
- B-DS (Dual Stream) Link 2 - Select this option if there is a 3GB-Dual Stream input in order to extract Data Stream B (second raster) and send to an output.

Scan Format

This control can be used to force the UDC-4K's SDI input video receiver to interpret that incoming video signal as either Progressive, Interlaced, or PsF (Progressive Segmented Frame). The default setting is Auto, in which the UDC-4K examines the incoming video signal to determine which format is appropriate. Choose from the following:

- Auto (default) - Automatically selects the format based on the input video parameters and the payload ID.
- Progressive - Forces the UDC-4K to interpret the incoming video as Progressive.
- Interlaced - Forces the UDC-4K to interpret the incoming video as Interlaced.
- PsF - Forces the UDC-4K to interpret the incoming video as PsF.

NOTE: If SDI input is PsF, scaled, and output as PsF by setting P to PsF on the SDI Out tab to ON, HDMI input is disabled.

NOTE: Under normal circumstances the UDC-4K *should always run in Auto mode. However, because interlaced and PsF formats are essentially the same signal, the* UDC-4K *might confuse them. For example, if it is confirmed that the* UDC-4K *is receiving a PsF signal, but the* UDC-4K *is interpreting it as an Interlaced signal while running in Auto mode, setting this control to PsF will force the receiver to interpret that signal as PsF. However, if the* UDC-4K *is receiving a Progressive signal and it is forced to interpret the signal as Interlaced, an invalid output video signal will be created.*

Transfer

This setting controls what transfer characteristic metadata value is applied to the video output. Choose from the following:

- Auto (default) - Passes the transfer characteristic value from the video input to the output.
- SDR - An SDR value is applied to the output.
- PQ - A PQ value is applied to the output.
- HLG - An HLG value is applied to the output.

Colorimetry

This setting controls what Colorimetry metadata value is applied to the video output. Choose from the following:

- Auto (default) - Passes the Colorimetry value from the video input to the output.
  - BT.709 and BT.2020 values are passed through.
  - If a non-supported colorimetry value is received, then BT.709 is signaled for HD/UltraHD formats.
- BT.709 - A BT.709 value is applied to the output.
- BT.2020 - A BT.2020 value is applied to the output.

Audio SRC

Choose the audio conversion to be performed on the incoming SDI audio. Choose from the following:

- On (default) - SDI audio will be sample rate converted, if necessary, to 24-bit/48 kHz audio.
- Off - SDI audio will be passed through to the output without sample rate conversion.

Non-PCM Audio Processing

Used to specify the processing mode for non-pcm audio. Audio Processing Status will reflect the type of audio that is passed when the control is set to Off. Choose from the following:

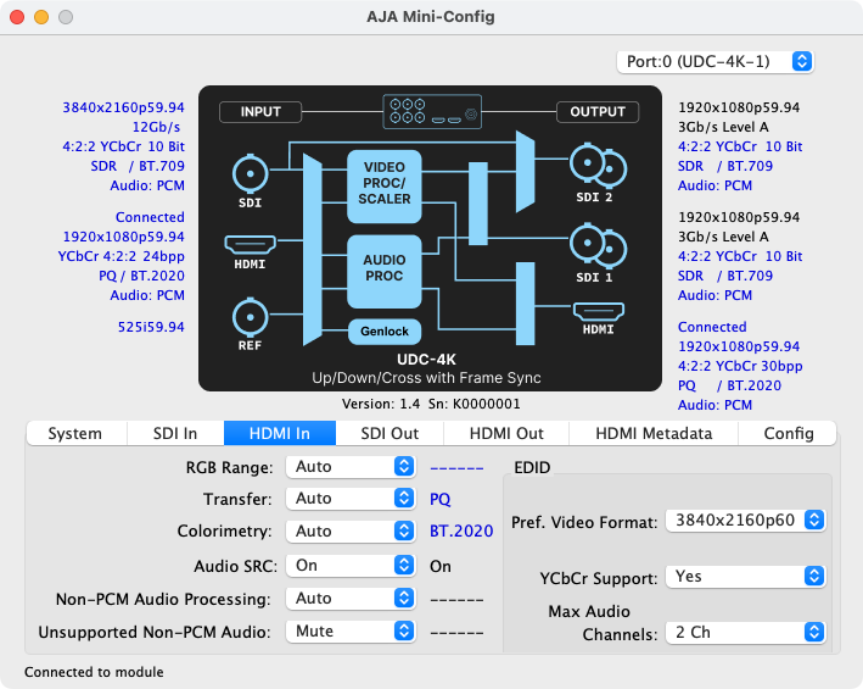
- Auto (default) - Non-pcm audio will be processed.
- Off - Non-pcm audio will not be processed.

Unsupported Non-PCM Audio

Used to specify behavior if unsupported non-pcm audio is detected. Audio Processing Status will reflect Mute/Pass status. Choose from the following:

- Mute (default) - Unsupported non-pcm audio is not passed to output.
- Pass - Unsupported non-pcm audio is passed to output.

HDMI Input Tab Screen



Click on the HDMI In tab to view and make changes to the UDC-4K's HDMI input settings.

The UDC-4K can identify HDR Metadata from the incoming HDMI signal as defined by CTA-861.3 and HDMI v2.0a and either pass it through to the SDI and/or HDMI output or override them and set new values for the outputs. See*"Transfer"* and *"Colorimetry" on page 18*.

For HDMI, it defines the EOTF and Colorimetry and sets parameters for the Dynamic Range and Mastering infoframes. The HDR metadata is a mechanism to inform an HDMI sink device (such as a TV or monitor) that the video content is HDR encoded. For most workflows, the Auto settings for the HDMI override parameters are appropriate, which will automatically pass incoming HDR metadata, if present, through to the output. However, this metadata may need to be edited for a specific workflow, or to correct inaccurate incoming metadata.

About Bits Per Pixel

With HDMI, YCbCr is always reported as 24bpp, which is 12 bit depth (whether the input signal is 8, 10, or 12-bit depth).

To determine the bit depth for RGB, divide the bpp by 3. For example:

- 24bpp = 8-bit depth
- 30bpp = 10-bit depth
- 36bpp = 12-bit depth

This field is display only and there are no configurable options.

RGB Range

Selects the HDMI Input Video Color Range when the input is RGB. Does not apply when the input is YCbCr. Choose from the following:

- Auto (default)
- SMPTE

- Full

Transfer

This setting controls what transfer characteristic metadata value is applied to the video output. Choose from the following:

- Auto (default) - Passes the transfer characteristic value from the video input to the output.
- SDR - An SDR value is applied to the output.
- PQ - A PQ value is applied to the output.
- HLG - An HLG value is applied to the output.

Colorimetry

This setting controls what Colorimetry metadata value is applied to the video output. Choose from the following:

- Auto (default) - Passes the Colorimetry value from the video input to the output.
  - BT.709 and BT.2020 values are passed through.
  - If a non-supported colorimetry value is received, then BT.709 is signaled for HD/UltraHD formats.
- BT.709 - A BT.709 value is applied to the output.
- BT.2020 - A BT.2020 value is applied to the output.

Audio SRC

Choose the audio conversion to be performed on the incoming HDMI audio. Choose from the following:

- On (default) - HDMI audio will be sample rate converted, if necessary, to 24-bit/48 kHz audio.
- Off - HDMI audio will be passed through to the output without sample rate conversion.

Non-PCM Audio Processing

Used to specify the processing mode for non-pcm audio. Audio Processing Status will reflect the type of audio that is passed when control is set to Off. Choose from the following:

- Auto (default) - Non-pcm audio will be processed.
- Off - Non-pcm audio will not be processed.

Unsupported Non-PCM Audio

Used to specify behavior if unsupported non-pcm audio is detected. Audio Processing Status will reflect Mute/Pass status. Choose from the following:

- Mute (default) - Unsupported non-pcm audio is not passed to output.
- Pass - Unsupported non-pcm audio is passed to output.

EDID

EDID (Extended Display Identification Data) is used to find the highest signal resolution that is compatible with both the source and the destination (sink) devices. When an HDMI source device is initially connected to the UDC-4K, the UDC-4K (sink) sends its EDID information to that source. The source uses this information to decide what format to send.

Preferred Video Format

The default EDID selection for the UDC-4K is set to 3840x2160p60, but it can be configured by the user. Choose from the following:

- 1280x720p50
- 1280x720p60
- 1920x1080i50
- 1920x1080i60
- 1920x1080p24
- 1920x1080p25
- 1920x1080p30
- 1920x1080p50
- 1920x1080p60
- 2048x1080p24
- 2048x1080p25
- 2048x1080p30
- 2048x1080p48
- 2048x1080p50
- 2048x1080p60
- 3840x2160p24
- 3840x2160p25
- 3840x2160p30
- 3840x2160p50
- 3840x2160p60 (default)

YCbCr Support

Determines whether the UDC-4K will signal to its HDMI source that the UDC-4K will support (Yes) or will not support (No) YCbCr input formats. Choose from the following:

- Yes (default)
- No

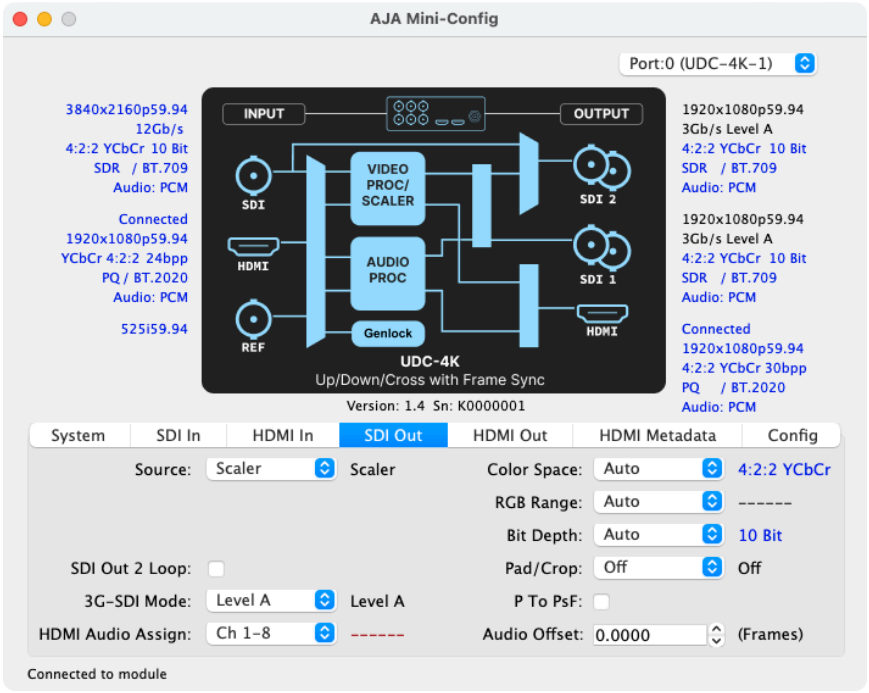
NOTE: RGB formats are always supported by default in an HDMI sink.

Max Audio Channels

Selects the number of audio channels to be used from the signal source. Choose from the following:

- 2 Ch (default)
- 8 Ch

SDI Output Tab Screen



Click on the SDI Output tab to view and make changes to the UDC-4K SDI Output settings.

Source

Selects source to be used.

- SDI In (default)
- HDMI In
- Scaler

SDI Out 2 Loop

Enables loop of SDI input to SDI 2 and SDI 2a Outputs.

- When enabled, sends SDI In to SDI 2 Outputs.

3G SDI Mode

Selects the 3G-SDI Video Mode. Choose from the following:

- Level A (default)
- Level B

HDMI Audio Assign

Choose which set of SDI embedded audio output channels will receive up to eight channels of embedded audio received from the incoming HDMI signal. Choose from the following:

- Ch 1-8 (default)
- Ch 9-16

Color Space

Selects the desired SDI Output Color Space. Choose from the following:

- Auto (default)- automatically detects the selected input signals color space.
- 4:2:2 YCbCr (HFR 4K/UltraHD limited to 10-bit 4:2:2 YCbCr)
- 4:4:4 RGB (HFR 4K/UltraHD limited to 10-bit 4:2:2 YCbCr)
- 4:4:4 YCbCr (HFR 4K/UltraHD limited to 10-bit 4:2:2 YCbCr)

RGB Range

Selects the SDI Output Video Color Range. Choose from the following:

- Auto (default) - The UDC-4K automatically detects the RGB range (if the input signal is RGB).
- SMPTE
- Full

Bit Depth

Selects the SDI output video bit depth. Choose from the following:

- Auto (default)
- 10-bit
- 12-bit

Pad/Crop

Selects pixel padding and cropping conversions between UltraHD and 4K or HD and 2K formats. Choose from the following:

- Off (default) - No processing.
- Pad - Add black pixels to the left and right sides of the raster to fill a wider aspect ratio (UltraHD to 4K, or HD to 2K).
- Crop - Crop pixels from left and right sides of the raster to fit a narrower aspect ratio (4K to UltraHD, or 2K to HD).

P to PsF

Allows conversion of incoming progressive format to PsF. Choose from the following:

- Off (default) -No conversion.
- On - Converts the video to PsF.

When PsF is selected the following also occurs:

- Both SDI Out and HDMI Out sources are forced to Scaler.
- If the scaler format is not 2048x1080p, it will be forced to 1920x1080p.
- If source is high frame rate, it will be converted to a low frame rate.
- This conversion adds additional processing latency.
- HDMI Out does not support PsF and will output a progressive scan format.

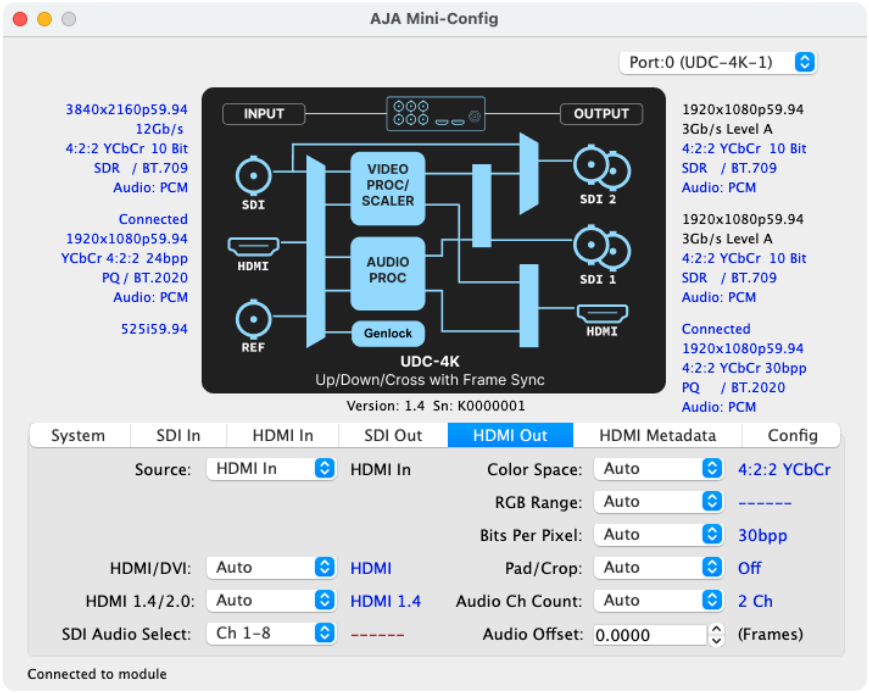
Audio Offset

Permits delaying the embedded audio in relationship to the video (for example, to correct for lip sync problems), in 1/16 of a frame increments.

- Range: 0 to 100 frames of delay (default: 0)

NOTE: The actual time duration of delay will vary depending on the frame rate of the format being converted.

HDMI Output Tab Screen



Click on the HDMI Out tab to view and make changes to the UDC-4K HDMI Output settings.

Source

Selects source to be used. Choose from the following:

- SDI In (default)
- HDMI In
- Scaler

NOTE: When set to HDMI In, this loops the HDMI input to the HDMI output through a frame buffer which may change its frame rate.

HDMI/DVI

When the incoming signal is 4K or UltraHD and the HDMI/DVI control is set to "DVI," the output will be downsampled to deliver a 2048x1080 or 1920x1080 image. The downsampling is accomplished by passing only one of the four 2SI sub-images from the SDI input signal. The output will appear to be a full picture, but is actually only one quarter of the total pixels. This feature is very helpful when connecting to a non-4K/UHD preview monitor. Choose from the following:

- Auto (default) - Automatically selects the output mode based on the attached device's capabilities.
- HDMI
- DVI - When DVI is selected, any audio signals present are not passed.

HDMI 1.4/2.0

Selection for this control will depend on whether the UDC-4K is connected to a sink device that supports HDMI 2.0 (maximum bandwidth of 18 Gbps) or HDMI 1.4 (maximum bandwidth of 10.2 Gbps). The UDC-4K supports HDMI 2.0 and can pass through 4K/UltraHD high frame rate (HFR) signals such as 50, 59.94 or 60. Choose from the following:

- Auto (default) - If connected to an HDMI 2.0 sink device, the 4K UHD HFR source will pass straight through with no loss of data. If connected to an HDMI 1.4 sink device, the unit will reduce its output data rate by dropping every other video frame, reducing bit depth, or both.
- HDMI 1.4 - When the video source is 4K or UltraHD with a high frame rate (HFR) including 50, 59.94 or 60, the UDC-4K will automatically drop every other video frame, reduce bit depth, or both. This setting can be used to support connection to an HDMI 1.4 sink device such as a monitor.
- HDMI 2.0 - When the video source is 4K or UltraHD with a high frame rate (HFR) including 50, 59.94 or 60, the HDMI 2.0 setting supports the UDC-4K in passing through 4K/UltraHD high frame rate (HFR) signals such as 50, 59.94 or 60.

SDI Audio Select

Choose which SDI embedded audio channels are routed to the HDMI output. Eight channels are routed at a time. Choose from the following:

- Ch 1-8 (default)
- Ch 9-16

Color Space

Selects the HDMI Output Color Space. Choose from the following:

- Auto (default) - Automatically selects color space based on the input video parameters attached devices capabilities.
- 4:2:2 YCbCr
- 4:4:4 RGB
- 4:4:4 YCbCr
- 4:2:0 YCbCr

NOTE: DVI output is limited to 4:4:4 RGB.

RGB Range

Selects the Output Video Color Range when the output is RGB. Does not apply when the output is YCbCr. Choose from the following:

- Auto (default)
- SMPTE
- Full

NOTE: DVI output is limited to RGB.

Bits Per Pixel

Selects the input video bits per pixel. Choose from Auto, 24 bpp, 30 bpp, or 36 bpp. Choosing “Auto” automatically selects the bits per pixel based on the input video and the attached device’s capabilities. High frame rate (HFR) 4K/UltraHD 4:4:4 limited to 24 bpp. DVI output is limited to 24 bpp.

About Bits Per Pixel

With HDMI, YCbCr is always reported as 24bpp, which is 12-bit depth (whether the input signal is 8, 10, or 12-bit depth). To determine the bit depth for RGB, divide the bpp by 3. For example:

- Auto (default) - automatically selects the bits per pixel based on the input video and the attached device's capabilities.
- 24bpp = 8-bit depth
- 30bpp = 10-bit depth
- 36bpp = 12-bit depth

Pad/Crop

Selects pixel padding and cropping conversions between UltraHD and 4K or HD and 2K formats. Choose from the following:

- Auto (default) - Crops the output if the signal is 4K/2K and the sink only supports UHD/HD.
- Off - No processing.
- Pad - Add black pixels to the left and right sides of the raster to fill a wider aspect ratio (UltraHD to 4K, or HD to 2K).
- Crop - Crop pixels from left and right sides of the raster to fit a narrower aspect ratio (4K to UltraHD, or 2K to HD).

Audio Channel Count

Choose the number of channels for embedded audio. Choosing "Auto" automatically selects the audio channels based on the attached device's capabilities.

- Auto (default)
- 2 Ch
- 8 Ch

NOTE: When the '2 Channels' option is selected, the HDMI will output CH 1-2 if CH 1-8 is selected in the HDMI Source menu and will output CH 9-10 if CH 9-16 has been selected.

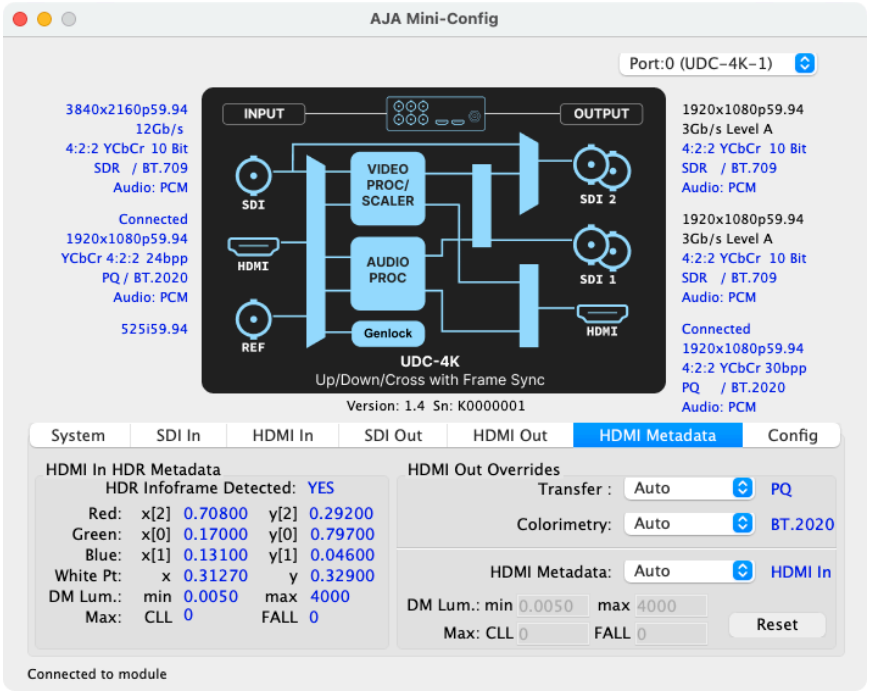
Audio Offset

Permits delaying the embedded audio in relationship to the video (for example, to correct for lip sync problems), in 1/16 of a frame increments.

- Range: 0 to 100 frames of delay (default: 0)

NOTE: The actual time duration of delay will vary depending on the frame rate of the format being converted.

HDMI Metadata Tab Screen



Click on the HDMI Metadata tab to view High Dynamic Range HDMI metadata for the UDC-4K.

For HDMI, this screen indicates whether HDR metadata is being received on the HDMI input. If so, it decodes and presents the static metadata descriptors as defined in CTA-861.3 and HDMI v2.0a.

NOTE: HDR Metadata values do not modify video image data. They define the HDR metadata included in the video output.

NOTE: Hover the cursor over each parameter field to view its corresponding description in a pop-up window.

HDMI in HDR Metadata

HDR In Infoframe Detected

Indicates whether an HDMI HDR Infoframe is being received.

- YES - Indicates HDR metadata is being received. Twelve metadata parameters of the incoming HDMI HDR color, white point, and luminance values, etc. are displayed.
  - Red, Green, Blue, White Point - These eight values define the color gamut and white point, with a range of 0.00000 to 1.00000 cd/m^2
  - DM Lum - These two parameters define the Display Mastering Luminance:
    - Minimum: Defines the floor of the SMPTE ST 2086 color volume (in the case of HDR) and is determined by the mastering environment. Range: 0.00000 cd/m2 to 1.00000 cd/m^2.
    - Maximum: Defines the ceiling of the SMPTE ST 2086 color volume (in the case of HDR) and is determined by the mastering environment. Range: 1 cd/m2 to 65535 cd/m^2

- Maximum: CLL - Represents the highest-value pixel component in an entire scene. It is determined by analyzing each frame of video, and can be determined in the post environment. Range: 1 cd/m2 to 65535 cd/m^2
- Maximum: FALL - Represents the maximum of frame-based average light levels taken over an entire scene, and can be determined in the post environment. Range: 1 cd/m2 to 65535 cd/m^2

- NO - HDR metadata is not being received.

HDMI Out Overrides

Displays the HDR metadata generated on the HDMI output and provides override controls for static metadata descriptors as defined in CTA-861.3 and HDMI v2.0a.

The override controls can be used to replace incoming or missing HDR metadata with alternative values for the UDC-4K's output.

Transfer

This setting controls what transfer characteristic metadata value is applied to the video output. Choose from the following:

- Auto (default) - Passes the transfer characteristic value from the video input to the output.
- SDR - An SDR value is applied to the output.
- PQ - A PQ value is applied to the output.
- HLG - An HLG value is applied to the output.

Colorimetry

This setting controls what Colorimetry metadata value is applied to the video output. Choose from the following:

- Auto (default) - Passes the Colorimetry value from the video input to the output.
  - BT.709 and BT.2020 values are passed through.
  - If a non-supported colorimetry value is received, then BT.709 is signaled for HD/UltraHD formats.
- BT.709 - A BT.709 value is applied to the output.
- BT.2020 - A BT.2020 value is applied to the output.

HDMI Metadata

This setting can be used to insert custom metadata values on the HDMI outputs. Choose from the following:

- Auto (default) - The 8 RGB vertices/white point parameters that get inserted into the HDMI HDR Infoframe are automatically generated:
  - If the incoming Colorimetry value is BT.709, Color VANC Packet, or Unknown, then BT.709 values are passed to the output.
  - If the incoming Colorimetry value is BT.2020, BT.2020 values are passed to the output.

NOTE: If the source is HDMI with an HDR Infoframe and HDMI Metadata is set to Auto, the 12 metadata values for RGB vertices/white point and mastering display will be passed through and mastering display metadata will not be editable.

- BT.709 - The 8 RGB vertices/white point parameters defined by BT.709 are applied to the HDMI output.
- BT.2020 - The 8 RGB vertices/white point parameters defined by BT.2020 are applied to the HDMI output.
- DCI-P3 – The 8 RGB vertices/white point parameters defined by DCI-P3 are applied to the HDMI output.

DM Lum

These two parameters define the Display Mastering Luminance. Choose from the following:

- Min: Defines the floor of the SMPTE ST 2086 color volume (in the case of HDR) and is determined by the mastering environment.
  - Range: 0.0000 cd/m^2 to 6.5535 cd/m^2 (default: 0.0005 cd/m^2)
  - Step size: 0.0001 cd/m^2
- Max: Defines the ceiling of the SMPTE ST 2086 color volume (in the case of HDR) and is determined by the mastering environment.
  - Range: 0 cd/m2 to 65535 cd/m^2 (default: 1000 cd/m^2)
  - Step size: 1 cd/m^2

Max CLL

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

- Range: 0 cd/m^2 to 65535 cd/m^2 (default: 1000 cd/m^2)
- Step size: 1 cd/m^2

Max FALL

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

- Range: 0 cd/m^2 to 65535 cd/m^2 (default: 400 cd/m^2)
- Step size: 1 cd/m^2

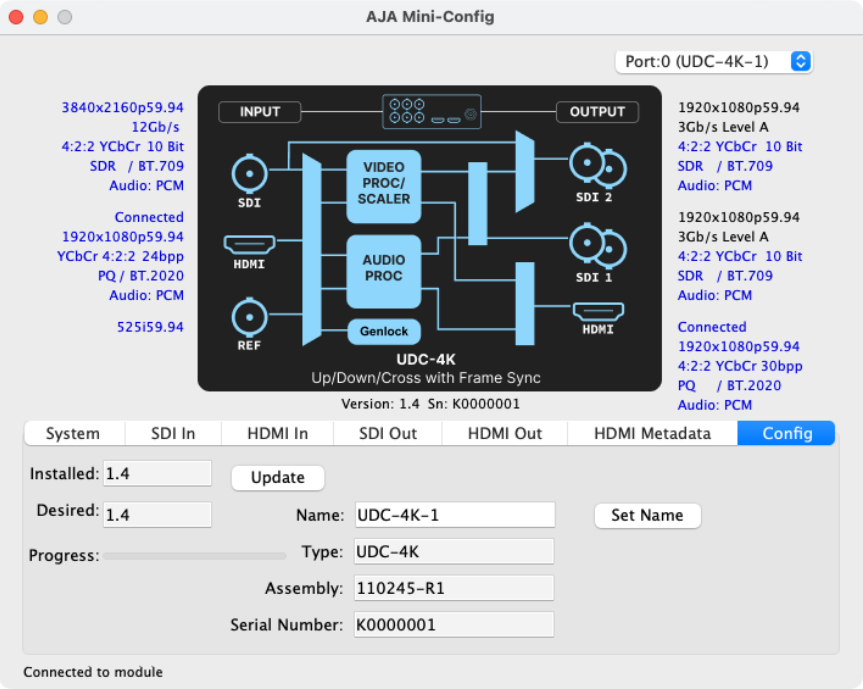
Reset

Resets the DM Lum min/max, Max CLL, and Max FALL to defaults.

- DM Lum min = 0.0005 cd/m^2
- DM Lum max = 1000 cd/m^2
- Max CLL = 1000 cd/m^2
- Max FALL = 400 cd/m^2

NOTE: The four mastering parameters (Max CLL, etc.) set in Mini-Config are always inserted into the HDMI HDR Infoframe, although HDMI HDR Infoframes are only generated if the transfer characteristic value is PQ or HLG.

Config Tab Screen



Click on the Configuration tab to view the currently installed software version for the UDC-4K or to install new software. This screen also provides basic information about the UDC-4K . This information is useful when calling AJA Support for service or technical support.

NOTE: When discussing Mini-Converters, "Firmware" is software that will be stored in the Mini-Converter's non-volatile memory and used when it is powered up. This is something different than the AJA Mini-Config application software. The version numbers shown in the Update screen refer only to the device firmware.

Installed

This field shows the version of the firmware currently installed on the UDC-4K.

Desired

This field shows the version of firmware embedded in the AJA Mini-Config application which can be installed into the UDC-4K by clicking the Update button.

Update

This button initiates a software update operation loading the "Desired" version of firmware into the UDC-4K 's non-volatile memory.

Progress

This indicator bar shows the progress of firmware installation.

Name

This field allows for modification of the name assigned to the UDC-4K . This can be useful if there are several Mini-Converters attached to a Mac/PC via USB in order to distinguish between them easily (especially if they're the same model). Click Set Name to apply new name.

Type

This is the factory set model name of the UDC-4K.

Assembly

This is the factory assembly number.

Serial Number

This is the factory set unique serial number of the UDC-4K . When calling AJA Support for service, this number may be required.

Chapter 3 – Front Panel Display

Figure 7. UDC-4K Front Panel Display showing Home Screen

The UDC-4K Home Screen includes seven subscreens that closely match the tabs in the Mini-Config configuration software. Color coding on the display is similar to that which is used in Mini-Config:

- Blue text indicates values which have been automatically selected
- White text (Black in Mini-Config) indicates values that have been manually selected
- Red text indicates that the Mini-Converter is not detecting a signal, cannot operate, or is incompatible with the current user settings.

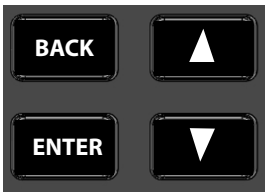
An overview of each screen is provided below. For full configuration and setting details, see corresponding Mini-Config tabs under*"UDC-4K Mini-Config User Interface" on page 11*.

- *"Status Screen"* - provides device status.
- *"System Screen"* - provides System Genlock, Scaler configuration, and Display settings.
- *"SDI In Screen"* - provides Colorspace, RGB Range, Bit Depth, 3G-B Mode, Scan Format, Transfer, Colorimetry, Audio SRC, Non-PCM Audio Processing, and Unsupported Non-PCM Audio settings.
- *"HDMI In Screen"* - provides Bits per Pixel, RGB Range, Transfer, Colorimetry, Audio SRC, Non-PCM Audio Processing, Unsupported Non-PCM Audio, EDID, Preferred Video Format, Frame Rate, YCbCr Support, and Max Audio Channels settings.
- *"SDI Out Screen"* - provides Source Selection, SDI Out 2 Loop, Color Space, RGB Range, P to PsF, 3G-SDI Mode, Pad/Crop, Bit Depth, HDMI Audio Assign, and Audio Offset (Frames).
- *"HDMI Out Screen"* - provides Source Selection, Color Space, Bits per Pixel, RGB Range, 4K/2K Crop, HDMI/DVI, HDMI 1.4/2.0, SDI Audio Select, and Audio Channel Count, Audio Offset (Frames).
- *"HDMI Metadata Screen"*- provides status and configuration of various HDMI HDR Metadata settings.

NOTE: *Both the front panel display and AJA Mini-Config may be used for configuration of the UDC-4K. See corresponding Mini-Config tabs under"UDC-4K Mini-Config User Interface" on page 11. For details on installation and use of AJA Mini-Config, see "AJA Mini-Config Setup" on page 36.*

Menu Navigation Buttons

Figure 8. UDC-4K Front Panel Control Buttons.



On any display screen:

- Navigate to the desired screen using the **Up Arrow** and **Down Arrow** buttons.
- Press the **Enter** button to open the controls for that screen.
- Press the **Back** button to return to the previous screen.

Within menu screens, use the Up Arrow and Down Arrow buttons to select (highlight) the desired option and then press the Enter button to select and set a parameter.

UDC-4K Safeboot

UDC-4K has a safety feature where an internal “safeboot” copy of minimal system software is retained in the event the update process fails or the loaded software becomes corrupted. The safeboot software is intended only to restore the unit to a known configuration (the last network configuration settings are retained) with which you can successfully connect to the device over the network and download and reinstall fully functional system software.

NOTE: UDC-4K safeboot software does not provide any video processing. You will need to install new UDC-4K firmware to restore full operation.

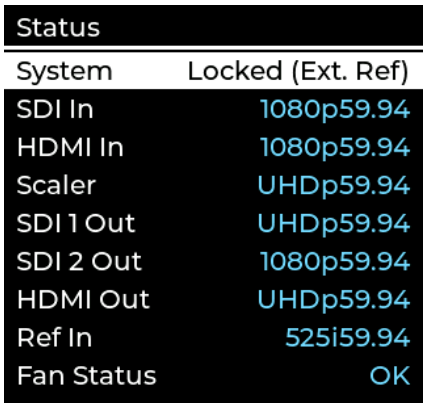
UDC-4K safeboot is initiated by immediately holding in the front panel **ENTER** button for five seconds while powering up the unit, which launches the safeboot software version. When running safeboot, the UDC-4K's front display shows 'AJA SAFEBOOT' as will the the Config Tab Screen in AJA Mini-Config.

With the safeboot software running, you will be able to update your UDC-4K to the latest firmware version using the AJA Mini-Config software on the *"Config Tab Screen" on page 28*.

To exit safeboot mode, power cycle the UDC-4K.

Status Screen

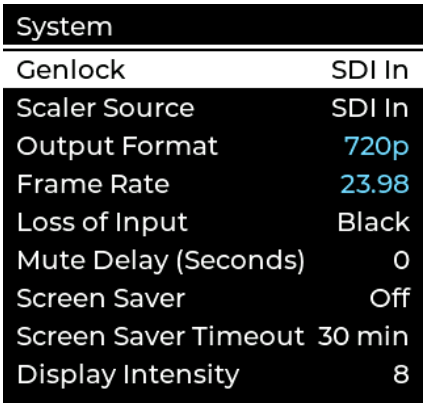
Figure 9. Status Screen



Displays overall status including Fan status and I/O details.

System Screen

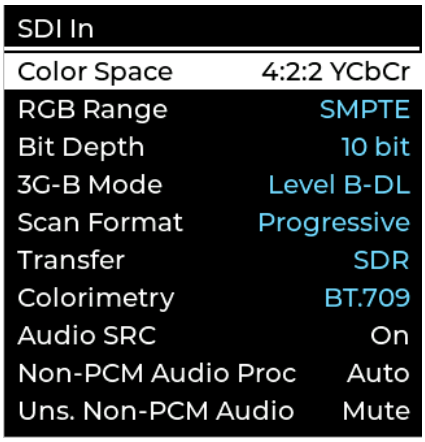
Figure 10. System Screen



Status and configuration of Genlock, Scaler configuration, and various Display settings. See *"System Tab Screen" on page 11* for control descriptions.

SDI In Screen

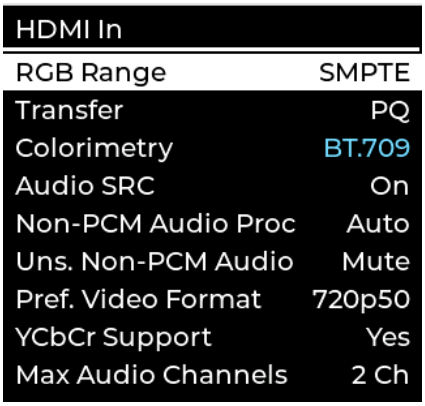
Figure 11. SDI In Screen



Status and configuration of various SDI Input settings. See *"SDI Input Tab Screen" on page 14* for control descriptions.

HDMI In Screen

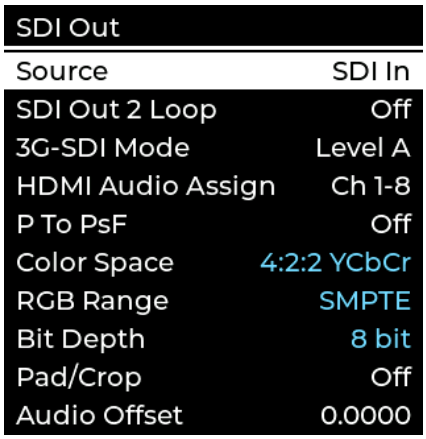
Figure 12. HDMI In Screen



Status and configuration of various HDMI Input settings. See *"HDMI Input Tab Screen" on page 17* for control descriptions.

SDI Out Screen

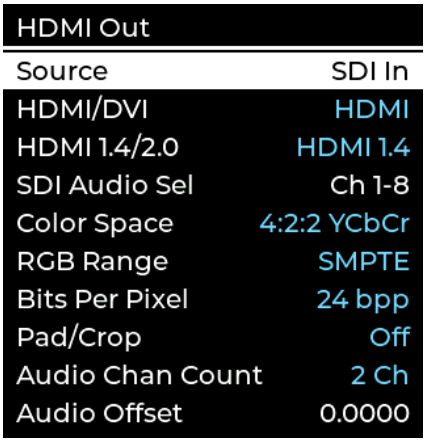
Figure 13. SDI Out Screen



Status and configuration of various SDI Output settings. See *"SDI Output Tab Screen" on page 20* for control descriptions.

HDMI Out Screen

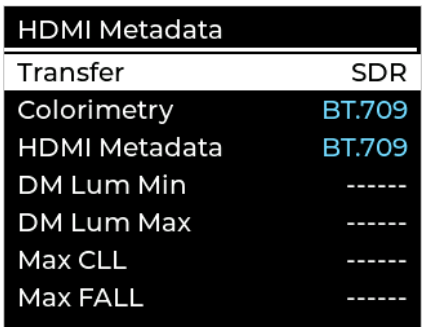
Figure 14. HDMI Out Screen



Status and configuration of various HDMI Output settings. See *"HDMI Output Tab Screen" on page 22* for control descriptions.

HDMI Metadata Screen

Figure 15. HDMI Metadata Screen



Status and configuration of various HDMI Metadata settings. See *""HDMI Metadata Tab Screen" on page 25* for control descriptions.

NOTE: DM Lum, Max CLL, and Max FALL controls are only available for configuration in Mini-Config.

Chapter 4 – AJA Mini-Config Setup

Installing AJA Mini-Config

The UDC-4K can be used right out of the box for some applications since it is designed to recognize inputs and perform standard actions automatically by default and has a built in control interface. However, to use its full capability, use AJA's Mini-Config software application for PCs and Macs. This same application can be used to update to new Mini-Converter software released by AJA.

Acquiring AJA Mini-Config

AJA's Mini-Config application is available for download from the AJA website.

To download the latest AJA Mini-Config package, which includes the AJA Mini-Config application, Mini-Converter firmware, and documentation, go to:

https://www.aja.com/products/mini-config-software

Select either the Windows or Mac icon to download the desired version.

Mini-Converter Documentation

Included with the AJA Mini-Config package is a complete set of documentation for all Mini-Converters supported by AJA Mini-Config. A .PDF of the *Installation and Operation Guide* for the currently connected Mini-Converter can be accessed from the AJA Mini-Config UI via the **Help/Manual** drop-down menu.

Documentation for all AJA Mini-Converters that use AJA Mini-Config can also be accessed directly in the AJA Mini-Config download package Documentation folder, and via the Documentation icon available on the Mac installer.

Documentation (and firmware) included with the AJA Mini-Config application are the versions available at the time of distribution. However, Mini-Converter software, firmware and documentation are updated regularly, so newer versions may exist.

To download the latest documentation for an individual Mini-Converter, go to:

https://www.aja.com/family/mini-converters

and navigate to the Support webpage of that Mini-Converter.

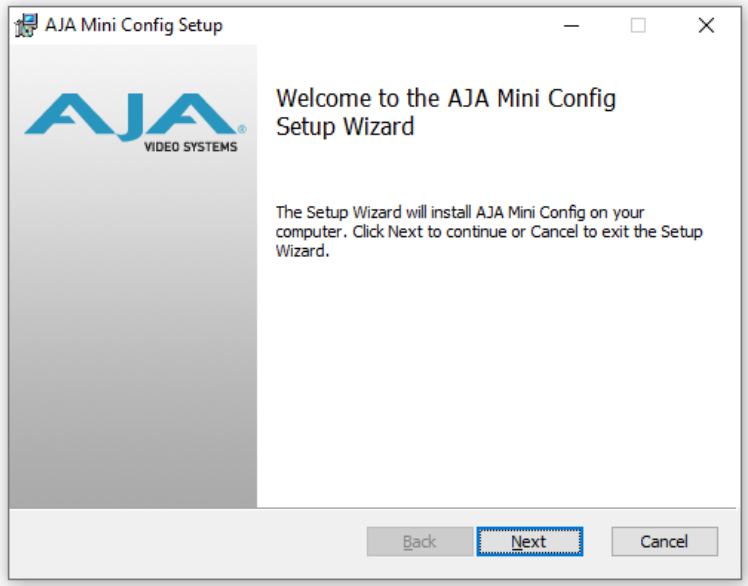
Installation

PC Installation

To install Mini-Config on a Windows PC:

1. Download the application from the AJA website (select the Windows icon on the Mini-Config Support web page).
2. Open the AJA_MiniConfig.zip file
3. Double-click on the MiniInstaller.msi file.
4. A Setup Wizard will guide you through the installation.

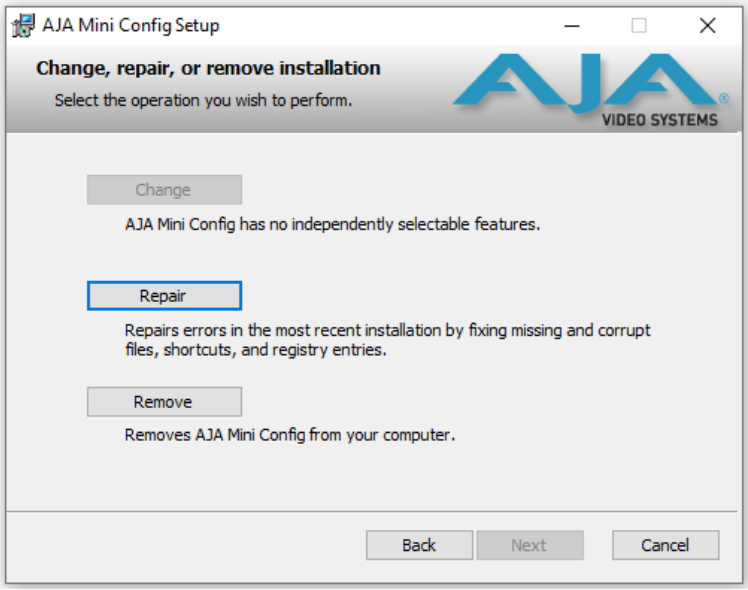
Figure 16. Mini-Config PC Setup Wizard



5. Click Next to begin. Answer the questions in the subsequent dialogs. When finished, an AJA Mini-Config shortcut will be installed on the desktop, and you will be able to locate the Mini-Config application in the AJA folder in the Programs listing.

NOTE: If the same version of the Mini-Config application already exists on the PC, a different Setup Wizard appears.

Figure 17. Mini-Config Setup Wizard, Reinstallation



With this screen you can Repair (reinstall) or Remove (uninstall) Mini-Config on the PC.

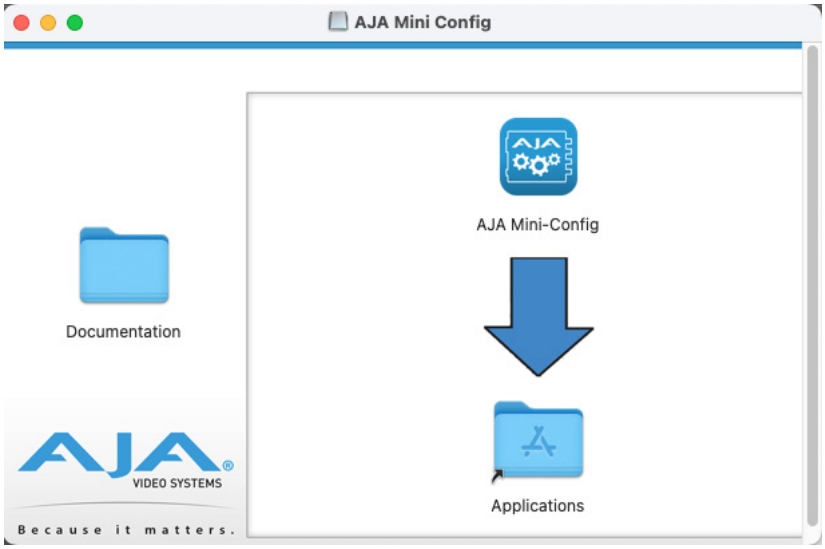
Mac Installation

NOTE: Intel and Apple Silicon based CPUs are supported for use with AJA Mini-Config software.

To install the application on a Mac:

1. Download the application from the AJA website (select the Apple icon on the Mini-Config Support web page).
2. Open the AJA_MiniConfig folder.
3. Double-click on the AJAMiniConfig.dmg file.
4. Answer the prompt and a utility program will be launched.

Figure 18. Mini-Config Mac Installer



5. To complete the installation drag the MiniConfig.app icon to the Applications folder.

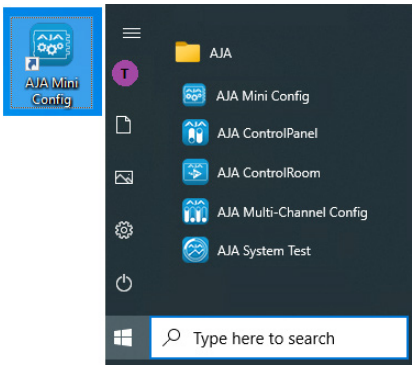
Running Mini-Config

Connect the Mini-Converter to the PC or Mac via the supplied USB cable. Connect the external power supply (supplied) to the Mini-Converter.

PC Startup

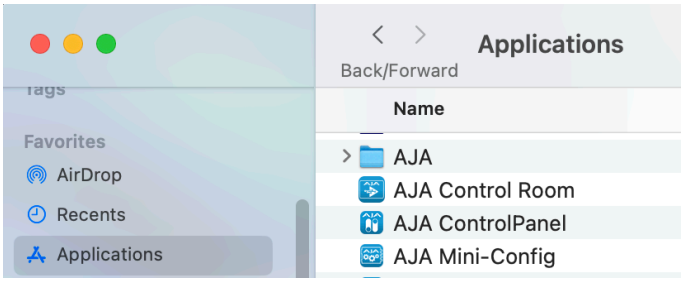
To run Mini-Config on a PC, double-click on the AJA Mini-Config icon on your desktop, or open the AJA folder in the program list and click on the AJA Mini-Config application located inside the Mini-Config folder.

Figure 19. Mini-Config PC Startup icon and Folder Location



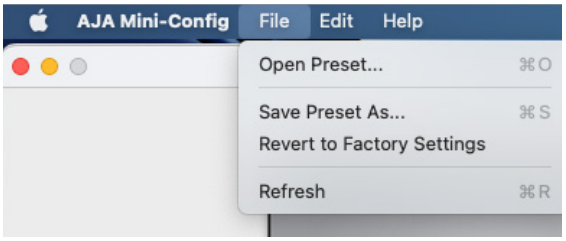
Mac Startup

To run Mini-Config on a Mac, open the Applications folder and locate the AJA Mini-Config application. Double-click the application to launch it.



Saving Setups

A **File** drop down menu on the Mini-Config application bar (similar for Mac and PC) allows you to save the current state of the Mini-Converter to a preset file for later recall.



Using this feature you can set up the converter for different applications, storing each configuration (**Save Preset As...**) with a unique name for easy recall (**Open Preset...**).

A **Revert to Factory Settings** menu item similarly allows you to change the settings back to AJA's factory defaults.

Using AJA Mini-Config

The AJA Mini-Config application provides a graphic interface for viewing settings and updating software. It consists of an information area at the top that shows the available Mini-Converters attached to the computer via USB, with a graphical rendering of the selected Mini-Converter showing all the connectors and their current state.

Colored text next to the connectors indicates the signal type and what the Mini-Converter is doing:

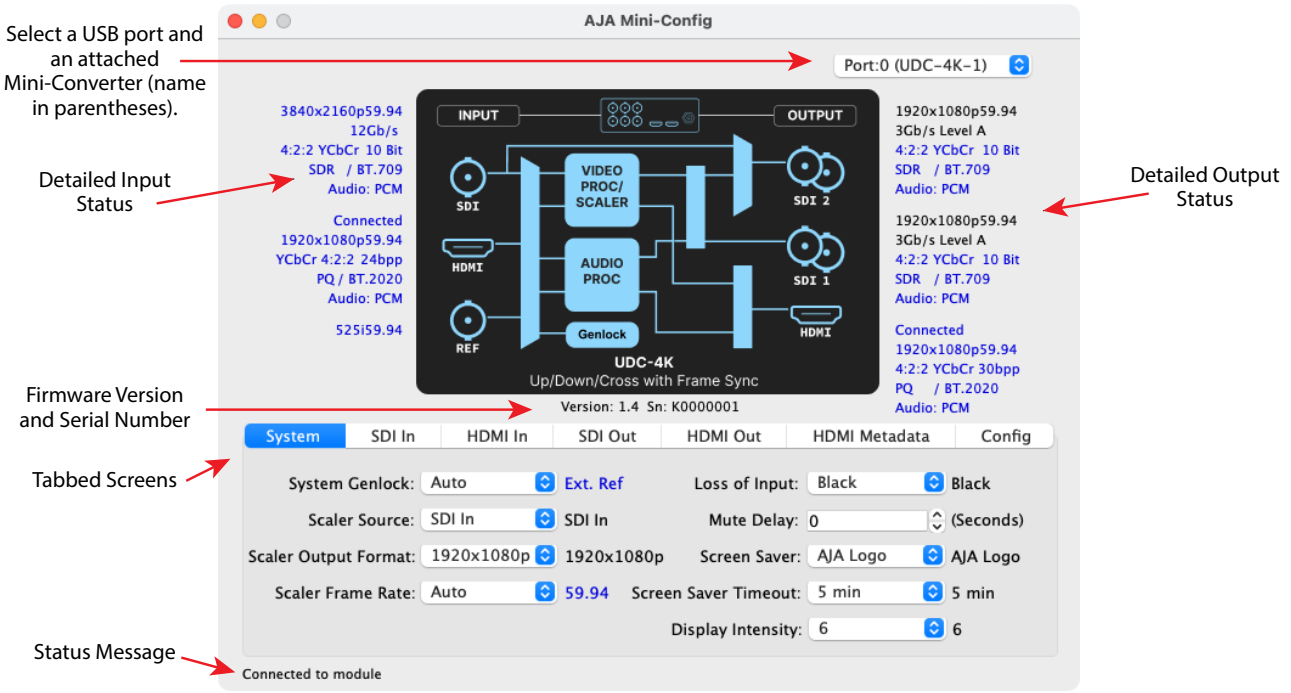
- Blue text indicates the values automatically selected
- Black text indicates values that you have manually selected
- Red text indicates the Mini-Converter is not detecting a signal, or cannot operate with the current user settings.

NOTE: Even if no output device is detected, the SDI connector text still shows the signal it is outputting.

NOTE: Configuration settings in red will change based on the attached output device as well as input signals. For improved accuracy and reliability, you should configure the Mini-Converter only when the target output device is attached and input signals are supplied at the inputs.

Screens are virtually the same on both PC and Mac, with subtle differences that reflect the general look of the platform environment.

Figure 20. Example AJA Mini-Config Screen



Selecting a Mini-Converter with the pulldown menu causes this application to connect to the selected converter. The graphic of Mini-Converter and text below it provides:

- Type of converter
- Firmware version
- Serial number of the unit.

A status field at the bottom of the screen shows if the Mini-Config application is connected and communicating with the Mini-Converter.

When configuring the Mini-Converter, select it from the top pulldown, view the current settings and change any values. Making a change communicates that new value to the Mini-Converter's non-volatile memory.

Tabbed Screens

The Tabs delineate control screens with groups of controls for each type of task to be performed. The controls for the actual configuration parameters are specific to each Mini-Converter type. By clicking on any of the tab buttons, the pane below the tabs will change to match the tab selection. Any changes that are made will be immediately applied and saved, overwriting previous settings.

For UDC-4K tabbed screens, see *"UDC-4K Mini-Config User Interface" on page 11*.

Appendix A – Specifications

UDC-4K Tech Specs

Video Formats

- (4K) 4096 x 2160p
- (UHD) 3840 x 2160p
- (2K) 2048 x 1080p
- (HD) 1920 x 1080p
- (HD) 1920 x 1080i
- (HD) 1280 x 720p

Note: Raster and Frame Rate Dependent, please see UDC-4K Video Formats in the Download / Documents section of the website product page.

Video Input and Output SDI

- 1x 12G-SDI Input BNC, SMPTE-292/424/2081/2082
- 4x 12G-SDI Output BNCs, SMPTE-292/424/2081/2082
  - HDR VPID decoder and generation with pass-through or override for Colorimetry and Transfer Characteristic, SMPTE ST 352
  - YCbCr 4:2:2/4:4:4
  - RGB 4:4:4, SMPTE or Full level
  - 10 or 12-bit*
- 1x 12G-SDI
  - (4K) 4096x2160p 23.98, 24, 25, 29.97, 30, 47.95, 48, 50, 59.94, 60
  - (UHD) 3840x2160p 23.98, 24, 25, 29.97, 30, 50, 59.94, 60
- 1x 6G-SDI
  - (4K) 4096x2160p 29.97, 30
  - (UHD) 3840x2160p 29.97, 30
- 1x 3G-SDI (Level A or B Dual Link)
  - (2K) 2048x1080p 23.98, 24, 25, 47.95, 48, 50, 59.94, 60
  - (2K) 2048x1080PsF 23.98, 24, 25, 29.97, 30
  - (HD) 1920x1080p 23.98, 24, 25, 29.97, 30, 50, 59.94, 60
  - (HD) 1920x1080PsF 23.98, 24, 25, 29.97, 30
  - (HD) 1920x1080i 50, 59.94, 60
  - (HD) 1280x720p** 50, 59.94, 60
- 1x 1.5G-SDI
  - (2K) 2048x1080p 23.98, 24, 25, 29.97, 30
  - (2K) 2048x1080PsF 23.98, 24, 25, 29.94, 30
  - (HD) 1920x1080p 23.98, 24, 25, 29.97, 30
  - (HD) 1920x1080PsF 23.98, 24, 25, 29.97, 30
  - (HD) 1920x1080i 50, 59.94, 60
  - (HD) 1280x720p 50, 59.94, 60

* Some 12-bit formats not supported, please see UDC-4K Video Formats in the Download / Documents section of the website product page.

** 1280 x 720p is Level A Only

Video Input and Output HDMI

- 1x HDMI Input Type A connector, HDMI v2.0b
- 1x HDMI Output Type A connector*, HDMI v2.0b
- HDR Infoframe decoder and generation with pass-through or override for Colorimetry and Transfer Characteristic as defined in CTA-861.3 and HDMI v2.0b
- YCbCr 4:2:2/4:4:4/4:2:0
- RGB 4:4:4, SMPTE or Full level
- 24, 30, or 36 Bits Per Pixel (HFR 4K/UHD 4:4:4 limited to 24 BPP)
- (4K) 4096x2160p 23.98, 24, 25, 29.97, 30, 47.95, 48, 50, 59.94, 60
- (UHD) 3840x2160p 23.98, 24, 25, 29.97, 30, 50, 59.94, 60
- (2K) 2048x1080p 23.98, 24, 25, 29.97, 30, 47.95, 48, 50, 59.94, 60
- (HD) 1920x1080p 23.98, 24, 25, 29.97, 30, 50, 59.94, 60
- (HD) 1920x1080i 50, 59.94, 60
- (HD) 1280x720p 50, 59.94, 60

* If a connected monitor doesn't support HDMI protocol the unit automatically switches to DVI protocol (which does not pass audio).

Note: Raster and Frame Rate Dependent, please see UDC-4K Video Formats in the Download / Documents section of the website product page.

HDCP

- Does not encode the HDMI output with HDCP encryption
- Does not accept HDCP input
- SDI outputs are unencrypted

Reference Input

- External, 1x BNC
- 75-ohm terminating
- Blackburst or tri-level sync

Genlock

- Ext Ref
- SDI In
- HDMI In
- Free Run based on Temperature Compensated Crystal Oscillator

Audio Pass-Through Formats

- PCM
- Dolby Digital (AC-3)
- Dolby Digital Plus (E-AC-3), including Atmos Immersive Sound (JOC)

Audio Input Digital

- SDI embedded audio, 24-bit, 16-channel
- HDMI embedded audio, 24-bit, 8-channel

Audio Output Digital

- SDI embedded audio, 24-bit, 16-channel
- HDMI embedded audio, 24-bit, 8-channel

User Interface

- Color LCD Display
- 4x dedicated, backlit navigation and selection buttons
- USB-C port used with supplied cable and Mini-Config software application to configure and view device status via Mac or Windows

Video Processing

- Frame synchronization
- Up, down, cross-conversion
- Format conversion
- Frame rate conversion
- Polyphase scaling algorithm
- Motion adaptive deinterlacer
- Hardware 12-bit
- Nominal video delay 2 frames (interlaced and PsF formats increase delay)
  - Frame sync can be 1 frame when locked to input

Audio Processing

- High quality Sample Rate Conversion supported on all audio inputs
- SRC bypass for non-PCM audio (e.g. Dolby E, AC-3, etc.)
- Delay audio 0 to 100 video frames in 1/16 of a frame increments

Ancillary Data

- Supports pass-through of PCM embedded audio
- Supports pass-through of non-PCM audio when source is in time with the selected ref (SDI In, HDMI In, or Ext Ref). Non-PCM audio is not supported during frame sync operation.

Size (w x d x h)

- 5.0" x 8.09" x 1.65" (127.0 x 205.5 x 41.8 mm)

Weight

- 2.0 lb (0.9 kg)

Power

- External power supply required
  - Enclosure: 10-18VDC regulated, 4-pin mini-XLR, 25W max
  - AC Adapter, included: 100-240VAC, 50/60 Hz, universal input, 60W
  - Optional spare AC adapter sold separately, AJA-PWR-12-60W

Environment

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

Appendix B – Safety and Compliance

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, European Free Trade Association (EFTA) and United Kingdom Regulatory Compliance

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

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

Declaration of Conformity

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

This equipment meets the following conformance standards:

Safety

EN 62368-1: 2014 + A11 (T-Mark License),

IEC 62368-1: 2014 (CB Scheme Report/Certificate)

Emissions

CISPR 32: 2015 + AMD1: 2019, EN 55032: 2015 + A11: 2020,

EN 61000-3-2: 2019,

EN 61000-3-3: 2013 + A2: 2021 + AC: 2022

Immunity

CISPR 35: 2016, EN 55035: 2017 + A11: 2020,

EN 61000-4-2: 2009,

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

EN 61000-4-4: 2012,

EN 61000-4-5: 2014 + A1: 2017,

EN 61000-4-6: 2014, EN 61000-4-8: 2010, EN 61000-4-11: 2020

The product is also licensed, as required, for additional country specific standards for the International Marketplace. Additional issued licenses available upon request.

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

사 용 자 안 내 문
이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서 가정 용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다.

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 15936: 2016, 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.

China Compliance Statement

This product has been tested to the following Chinese standards:

GB/T 9254.1-2021; GB 4943.1-2022

This is to certify that the above mentioned product(s) complies with the requirements of certification rules of CQC12-045800-2022 under certificate number CQC25001492995.

Translated Warning and Caution Messages

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

 Warning Symbol  Caution Symbol

Before Operation Please Read These Instructions

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Warning! 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.

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 corriente 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.

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.

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.

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.

5 Year Warranty and Liability Information

Limited Warranty on Hardware

AJA Video Systems, Inc. (AJA Video) warrants that the hardware product, not including software components, will be free from defects in materials and workmanship for a period of five years 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 (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.

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