CION™

CAMERA OPERATIONS MANUAL

AJA®

VIDEO SYSTEMS

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Web: http://www.aja.com

Support Email: support@aja.com

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Chapter 1: Introduction

Overview

This manual covers the operation of CION and the optional accessories for the product.

CION is a 4K/Ultra HD/2K/1080 HD capable camera that features an APS-C sized CMOS sensor with an electronic global shutter. It may be used for live video output or the on-board recording of Apple ProRes files to the following formats:

- 4096x2160
- 3840x2160
- 2048x1080
- 1920x1080

The recorded QuickTime files can be used in a variety of non-linear editing, compositing and color correction applications without file transcoding.

Physical Design

Attention was given to CION's physical design because not all production environments or production demands are the same.

- CION is supplied with a removable PL (positive lock) lens mount. The PL lens mount allows the use of high-quality prime or zoom lenses.
- CION features an integrated OLPF (optical low pass filter) and IR (infrared) cut filter. The OLPF helps eliminate undesirable moire in images and the IR cut eliminates unwanted infrared image contamination to produce accurate colors.
- Industry standard hirth-tooth rosettes allow easy integration with accessories such as hand grips.
- The top and bottom of the body feature removable cheese plates with multiple threaded holes so that accessories, like the AJA-supplied top handle, may be easily attached to the unit.
- The use of magnesium body panels makes the unit exceptionally lightweight yet rigid.
- No proprietary connectors have been used in the design so that readily-available cables may be used with the device.
- Transport buttons are provided for the review of recordings made on the device.
- Dedicated menu buttons are provided for the easy configuration of settings.
- User interface navigation is via a single User Interface Control Knob.
- A built-in screen supplies menu information as well as a confidence image.

Hardware Connectivity

An array of audio and video connectors make integrating CION with other products easy:

- 4x 3G SDI/HD-SDI Outputs (4x BNC connectors)
- 2x 3G SDI/HD-SDI Monitor Outputs (1x front mounted BNC connector, 1x rear mounted BNC connector
- 1x HDMI v1.4 Output (rear mounted HDMI v1.4 Type A connector)
- 1x HDMI v1.3 Output (front mounted HDMI v1.3 Type A connector)
- 2x Balanced Analog Audio Inputs ((2x 3-pin XLR connectors with line/mic/48v selection switch per input)
- 1x Reference (BNC connector, analog color black)
- 1x LTC (BNC connector, 0.5 to 4.5Vpp)
- 1x USB (Type A connector, v2.0)
- 2x LANC (1x 2.5mm top connector and 1x 2.5mm side connector)
- 1x 2-pin Power Output Connector (top front mounted, 10W recommended maximum)
- 1x 4-pin XLR Power Input Connector (12-18Vdc, 5A max)
- 1x 2-pin Power Input Connector (12-18Vdc, 5A max)
- 1x LAN (RJ45 connector, 10/100/1000)
- 1x Thunderbolt (Mini Display Port connector, Thunderbolt v1)
- 1x Headphone Jack (3.5mm stereo mini TRS)

Open Architecture

The open architecture of CION means that it may be used with a wide variety of third-party accessories:

- PL mount lenses
- Electronic viewfinders (EVFs)
- On-board monitors
- External recorders
- Microphones
- Hand grips
- Baseplates and more

Figure 1. Fully-outfitted CION

Functionality

The following is only a partial list of CION's capabilities:

- The global shutter means that footage is free from the unwanted effects of rolling shutter artifacts such as skewing or "jello"
- Records Apple ProRes files to removable Pak media
- Records standard frame rates or may be configured to record time-lapse or slow motion
- Outputs baseband video or raw via SDI
- CION may be controlled from the front panel UI or remotely via a web browser interface
- Control the recordings of multiple CIONs simultaneously via the web browser interface
- Upload or download files via the LAN connection and the web browser interface
- 20 system presets may be stored or recalled making instant custom configuration easy
- User feedback, including alarms and alerts, is supplied on the User Interface Screen
- Superimposed information, such as timecode, transport state, shutter setting, exposure index value, voltage, etc. may be displayed on the monitor outputs via a user selection
- Histogram information is provided as an aid for proper exposure
- Physical VU meters as well as an option for superimposed VU meters on the video output aids with setting proper audio levels

Physical Layout

The following section will help you familiarize yourself with the physical components of CION referenced throughout the rest of this manual.

Front

The front of the unit features the PL Lens Mount and the Back Focus Access Door.

Figure 2. CION Front

1. Back Focus Access Door
2. PL Lens Mount
3. PL Lens Mount Cover

Operator Side

This side of the unit features the various menu controls an operator might need to adjust or monitor.

Figure 3. CION Operator Side
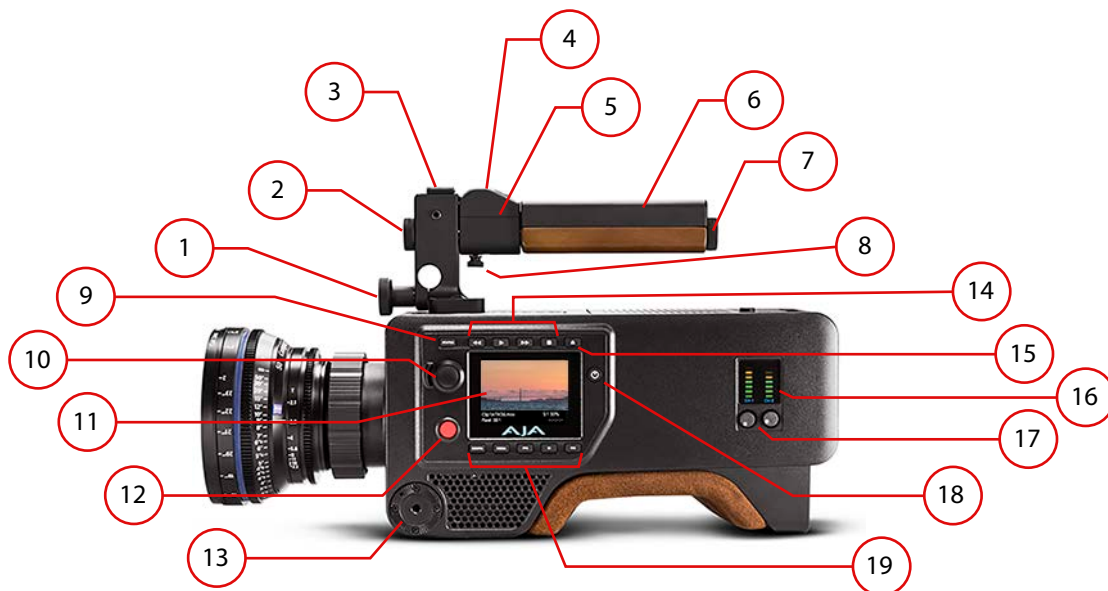
1. 15mm rod clamp knob
2. Rod End Cap
3. Cold Shoe
4. Tally Light
5. LANC Collar
6. Top Handle
7. Rod End Cap
8. LANC Collar Knob
9. STATUS Menu Button
10. User Interface Control Knob
11. User Interface Screen
12. Record Button
13. Hirth-Tooth Rosette (M6 thread)
14. Transport Buttons
15. Media Unmount Button
16. Audio VU Meters
17. Audio Control Knobs
18. Power Button
19. Menu Buttons

NOTE: *Natural variations in the wooden portion of the handle are to be expected since wood grain and stain may vary. Color variations in the shoulder pad are also possible due to the use of natural material.*

Figure 4. CION Transport and Menu Buttons

1. Status Menu Button
2. Reverse Playback Button
3. Playback Button
4. Fast Forward Playback Button
5. Stop (Pause) Button
6. Media Unmount Button
7. CONFIG Menu Button
8. MEDIA Menu Button
9. FPS Menu Button
10. EI Menu Button
11. WB Menu Button

User Interface Screen

CION features a User Interface Screen on the operator side. This User Interface Screen features not only information about the status of the device, but also menu information and a confidence image.

NOTE: *The confidence image is not intended to act as a substitute for a more full-featured electronic viewfinder or an on-board monitor.*

Figure 5. CION Onboard User-Interface Screen and Controls

Connector Side

This side of the unit features the audio and video connections. Both front and rear connections are provided for ease of use.

Figure 6. CION Connector Side
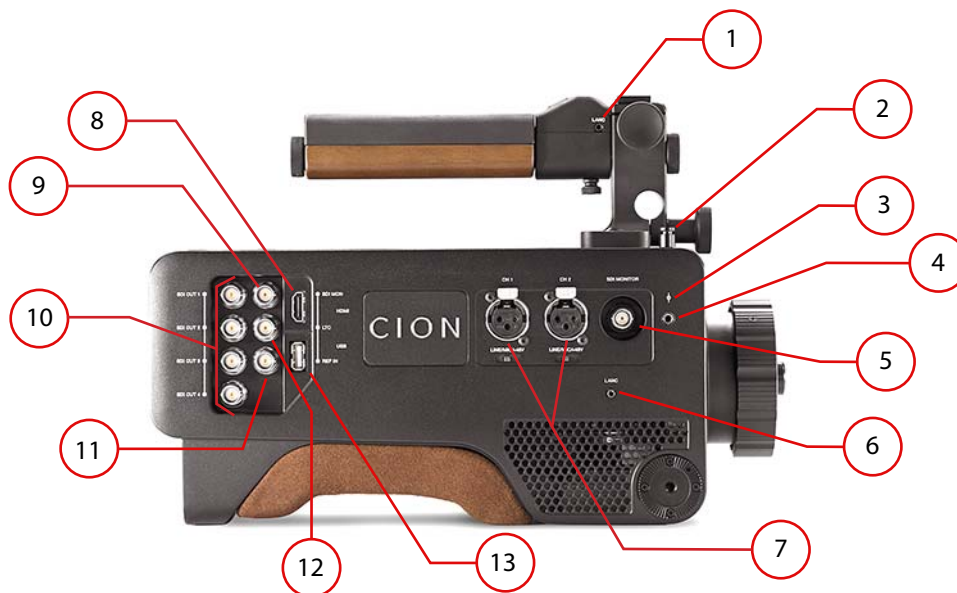
1. LANC (2.5mm connector)
2. Sensor Plane Post/Tape Hook

NOTE: *The Sensor Plane Post/Tape Hook may be positioned on either the side of the unit or on the top of the unit (as shown)*

3. Sensor Plane Indicator Mark
4. Sensor Plane Post/Tape Hook Threaded Insert
5. Front SDI Monitor Output (BNC connector, 3G/1.485Gbps)
6. LANC (2.5mm connector)
7. Analog Audio Input (2x 3-pin XLR connectors with line/mic/48v selection switch per input)
8. HDMI (Type A connector, v1.4)
9. Rear SDI Monitor Output (BNC connector, 3G/1.485Gbps)
10. SDI 1-4 Main Outputs (4x BNC connectors, 3G/1.485Gbps)
11. Reference Input (BNC connector, analog color black)
12. LTC (BNC connector, 0.5 to 4.5Vpp)
13. USB (Type A connector, v2.0)

NOTE: *Natural variations in the wooden portion of the handle are to be expected since wood grain and stain may vary. Color variations in the shoulder pad are also possible due to the use of natural material.*

Top

The top side of the unit features audio and video connections as well as the Media Slot

Figure 7. CION Top
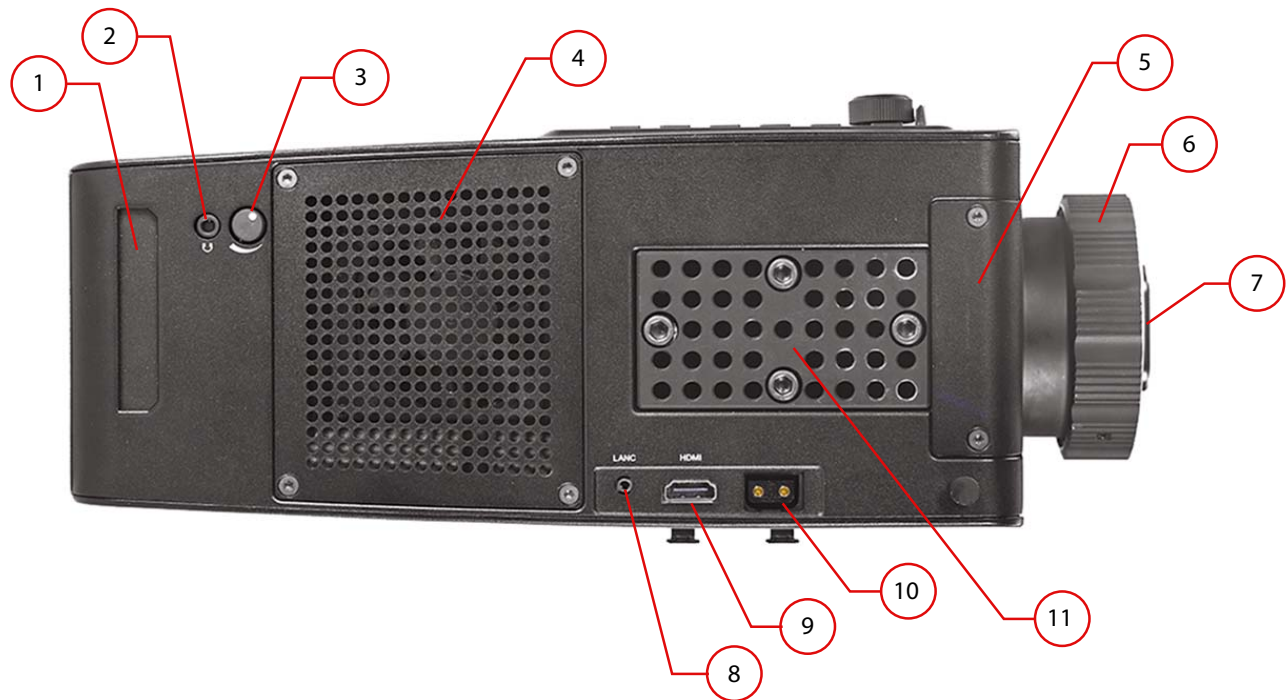
1. Media Slot
2. Headphone Jack (3.5mm stereo mini TRS)
3. Headphone Volume Control Knob
4. Fan Cover
5. Back Focus Access Door
6. PL Lens Mount
7. PL Lens Mount Cover
8. LANC (2.5mm connector)
9. HDMI (Type A connector, v1.3)
10. 2-pin Power Output Connector (10W recommended maximum)
11. Cheese Plate Top Handle Mount

Bottom

The bottom of the unit features threaded holes for mounting the unit to baseplates or tripods directly.

Figure 8. CION Bottom Mounts

1. Removable cheese plate with 1/4-20 and 3/8-16 threaded holes and guide pin holes (The cheese plate is attached via 1/4-20 cap screws, 3/16 hex heads)
2. 1/4-20 threaded holes with 9mm center-to-center spacing
3. Removable shoulder pad (attached via 1/4-20 cap screws, 3/16 hex heads)
4. Rear heel 1/4-20 threaded inserts

NOTE: *Color variations in the shoulder pad are possible due to the use of natural material.*

Rear

The rear of the unit features power and data connections:

Figure 9. CION Rear
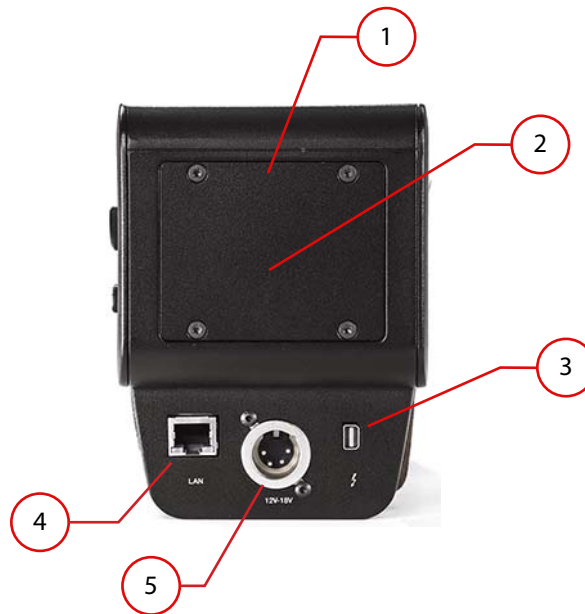
1. Standard Rear Door (an Alternate Rear Door is used when attaching the Battery Adapter Plate)
2. 2-pin Power Input Connector (housed behind the Standard Rear Door, used for interfacing with battery plates, 12-18Vdc, 5A max)
3. Thunderbolt Connector (Mini Display Port connector, Thunderbolt 1)
4. LAN connector (RJ45 connector, 10/100/1000)
5. 4-pin XLR Power Connector (12-18Vdc 4-pin XLR connector, 5A max)

Chapter 2: Making Basic Connections

Overview

Before you operate CION, familiarize yourself with all of the operational guidelines and menu parameters presented in this manual. This section covers making basic connections to CION prior to use.

Supplying Power to CION

CION may be powered by the AJA-supplied AC/DC power supply or a third-party battery solution. Using the AC/DC power supply for CION may be appropriate for environments where AC power is readily available, such as a studio setting. CION's operational voltage range is 12 to 18 Vdc.

NOTE: *Do not supply excess voltage to CION. To properly operate CION, be sure to supply voltage within the specified 12 to 18 Vdc range.*

Connecting an AJA AC/DC Power Supply to CION

Tools needed: None

Parts needed: AJA AC/DC power supply and line cord.

1. Connect the line cord to the AC/DC power supply and then plug the line cord into a power outlet. A green indicator light will illuminate on the power supply if it is receiving power.
2. Connect the 4-pin XLR connector on the power supply to the 4-pin XLR connector on the rear of CION

Connecting a Battery Plate to CION

Tools needed: Torx T10, Hex 3/32 and Phillips #2 (Note: These tools are not supplied with the product.)

Parts needed: AJA-supplied Alternate Rear Door, 4x T10 Torx screws, 3x 4-40 cap screws, Battery Adapter Plate and third-party battery plate. (Note: The third-party battery plate is not supplied with the product.)

For non-studio use, you may wish to connect a battery to CION. AJA supplies the necessary screws to mount the AJA-supplied Battery Adapter Plate to CION. This Battery Adapter Plate has threaded holes that allow a variety of third-party professional battery plate solutions to be connected to it.

1. To connect the Battery Adapter Plate to CION, first remove the Standard Rear Door of the unit. Set aside the 4x Torx T10 screws from the Standard Rear Door as they will be needed to attach the Alternate Rear Door.
2. Attach the Alternate Rear Door using the 4x Torx T10 screws being sure to allow the 2-pin power lead to protrude through the opening as pictured in *Figure 10 on page 17*.

NOTE: *The 2-pin power lead is a Tyco Electronics (172165-1) connector with two (1-7709870-0) crimp pins. These crimp pins accept 20AWG wire. The expected mating connector on the battery plates is a Tyco Electronics (172233-1) connector with two (170366-1) crimp pins (or similar). These connectors are referred to as Mini Universal MATE-N-LOCK by Tyco Electronics, but may be referred to by other names by other vendors. This 2-pin power connector type is common to various ENG cameras so battery plates with the appropriate mating connector are available from a variety of vendors such as Anton Bauer (Example: QR-DP800), IDX (Example: P-V2), etc.*

Figure 10. Alternate Rear Door & 2-Pin Power Lead

3. Attach the Battery Adapter Plate using the 3x 4-40 cap screws.

4. Attach the third-party battery plate to the Battery Adapter Plate.

NOTE: *Requires third-party supplied battery plate and M3 threaded screws.*

NOTE: *You may elect to connect the Battery Adapter Plate and the third-party battery plate once and then leave them connected to the unit for future ease of use.*

Power Up and Power Down of CION

To power up CION, press the Power Button. A progress indication with percentages will appear during the power up sequence.

To power down CION, you must press and hold the Power Button down for three seconds while the User Interface Screen displays a count down. This design prevents accidental power-off during normal operation. When the unit is powering down, you can abort the power-down process by simply removing your finger from the power button before three seconds have elapsed.

Mounting a Lens to CION

Tools needed: None

Parts needed: PL mount lens.

CION features a PL (positive lock) lens mount. This lens mount is robust, yet simple to operate. Lenses may be exchanged when CION is powered up or powered down.

1. To remove the PL Lens Mount Cover, place one hand on the PL Lens Mount Cover and with the other hand, turn the outer locking ring of the PL Lens Mount counter clockwise.

NOTE: *Limit the amount of time that the PL Lens Mount Cover or a lens is not attached to CION to avoid dust and other debris entering the lens mount.*

NOTE: *Some PL mount lenses will have a notch in each of their four pronged flanges, while others will have only a single notch in one flange. If your lens only has a single notch in one flange, align this notch with the pin inside of the PL Lens Mount accordingly prior to sliding the lens into the lens mount. The locating pin inside of the PL Lens Mount is located on the upper right hand side of the mount.*

2. Slide the lens into the PL Lens Mount carefully.
3. Once the lens is in place, turn the outer locking ring of the PL Lens Mount clockwise to lock the lens in place.

NOTE: *Do not remove your hand from supporting the lens until you are confident that the lens is secured in the PL Lens Mount.*

NOTE: *With heavier lenses (lenses in excess of approximately 5.5 lbs/2.5 kg), the use of a third-party lens support is required.*

Connecting a Monitoring Device to CION

Tools needed: None

Parts needed: User supplied 3G or 1.485Gbps SDI cables (BNC connectors) and/or HDMI cables (type A connectors).

CION may be used with a wide variety of monitoring devices. CION features multiple SDI and HDMI output connectors that may be attached to electronic viewfinders, onboard monitors, off-board monitors, projectors, etc. As a general rule, the use of the SDI connections on CION are preferred due to the locking BNC connector design.

Figure 11. Front & Rear Video Connector

Connectors side, rear

Top, front

Connectors side, front

CION offers both front and rear connections to make cabling and balancing of monitoring devices easier and more ergonomic. Typically, if you are connecting an electronic viewfinder, you will want to use the front SDI Monitor connector. If your electronic viewfinder does not offer an SDI input connection, a front mounted HDMI connection is also offered.

NOTE: CION is capable of outputting a wide variety of formats and frame rates. Not all electronic viewfinders or monitors support all of the possible formats and frame rates. Be sure to consult the specifications for your electronic viewfinder or monitor.

If the electronic viewfinder has an external power input, you may find it useful to power the electronic viewfinder from the CION 2-Pin Power Connector located near the front of the device on the top of the unit. Many electronic viewfinders will come supplied with an appropriate power cable to connect to CION as part of their standard accessory package.

NOTE: If you do elect to connect an electronic viewfinder power cable to the CION 2-Pin Power Connector, be sure to carefully note the orientation of CION's 2-Pin Power Connector and your cable as well as any polarity markings prior to making a connection.

NOTE: Some power connector cables may have cabling layouts that makes the simultaneous use of the front HDMI port difficult or even impossible. If this is the case, you may alternately use the rear HDMI connector on CION for an HDMI electronic viewfinder.

NOTE: If you do power your electronic viewfinder or monitor using the CION 2-Pin Power Connector, be aware that if you power down CION, power will still be provided via this connection so to conserve battery life, be sure to power down the electronic viewfinder or monitor when CION is powered down.

Since there are so many possible configurations of electronic viewfinders and on-board monitors, specific instructions for configuration are not supplied here. Consult your monitoring product's manual for additional configuration details.

Figure 12. Viewfinders

As a general rule, make all of the power and video connections from CION to the monitoring device(s) prior to powering up the monitoring device(s).

Front Monitor Outputs

The Front SDI Monitor Output allows support for the output of the following formats and frame rates:

- 2K progressive (2048x1080)
    - 23.98/24/25/29.97/30
    - Note that 50/59.94/60 will be decimated (reduced) to 25/29.97/30 for output
- 1080 progressive HD (1920x1080)
    - 23.98/24/25/29.97/30
    - Note that 50/59.94/60 will be decimated (reduced) to 25/29.97/30 for output
- 1080 interlaced HD (1920x1080)
    - 25/29.97/30

NOTE: *Formats and frame rates output are dependent upon CONFIG, MEDIA and FPS menu parameter selections.*

NOTE: *Not all electronic viewfinders or monitors will support all of the formats and frame rates that CION is capable of outputting. Be sure to consult the specifications of your devices to see if a given format and frame rate is supported.*

The Front HDMI Monitor Output allows support for the output of the following formats and frame rates:

- 2K progressive (2048x1080)
    - 23.98/24/25/29.97/30
    - Note that 50/59.94/60 will be decimated (reduced) to 25/29.97/30 for output
- 1080 progressive HD (1920x1080)
    - 23.98/24/25/29.97/30
    - Note: 50/59.94/60 will be decimated (reduced) to 25/29.97/30 for output
- 1080 interlaced HD (1920x1080)
    - 25/29.97/30

NOTE: *Formats and frame rates output are dependent upon CONFIG, MEDIA and FPS menu parameter selections.*

NOTE: *Not all electronic viewfinders or monitors will support all of the formats and frame rates that CION is capable of outputting. Be sure to consult the specifications of your devices to see if a given format and frame rate is supported.*

Rear Monitor Outputs

The Rear SDI Monitor Output allows support for the output of the following formats and frame rates:

- 2K progressive (2048x1080)
    - 23.98/24/25/29.97/30
    - Note that 50/59.94/60 will be decimated (reduced) to 25/29.97/30 for output
- 1080 progressive HD (1920x1080)
    - 23.98/24/25/29.97/30
    - Note that 50/59.94/60 will be decimated (reduced) to 25/29.97/30 for output
- 1080 interlaced HD (1920x1080)
    - 25/29.97/30

NOTE: Formats and frame rates output are dependent upon CONFIG, MEDIA and FPS menu parameter selections.

NOTE: Not all electronic viewfinders or monitors will support all the formats and frame rates CION is capable of outputting. Be sure to consult the specifications of your devices to see if a given format and frame rate is supported.

The Rear HDMI Monitor Output allows support for the output of the following formats and frame rates:

- 2K progressive (2048x1080)
    - 23.98/24/25/29.97/30
    - Note that 50/59.94/60 will be decimated (reduced) to 25/29.97/30 for output
- 1080 progressive HD (1920x1080)
    - 23.98/24/25/29.97/30
    - Note that 50/59.94/60 will be decimated (reduced) to 25/29.97/30 for output
- 1080 interlaced HD (1920x1080)
    - 25/29.97/30

NOTE: Formats and frame rates output are dependent upon CONFIG, MEDIA and FPS menu parameter selections.

NOTE: Not all electronic viewfinders or monitors will support all of the formats and frame rates that CION is capable of outputting. Be sure to consult the specifications of your devices to see if a given format and frame rate is supported.

Additionally, the Rear HDMI Monitor Output, may also be configured to output 4K (4096x2160) or Ultra HD (3840x2160) formats and frame rates dependent upon CONFIG and FPS menu parameter selections.

- 4K progressive (4096x2160)
    - 23.98/24
- Ultra HD progressive (3840x2160)
    - 23.98/24/25/29.97/30
    - Note that 50/59.94/60 will be decimated (reduced) to 25/29.97/30 for output

NOTE: The rear HDMI output is an HDMI v1.4 output and therefore is limited to 4K 24Hz and Ultra HD 30Hz natively as specified by the HDMI v1.4 standard. When CION is operating at higher frame rates for 4K or Ultra HD, the signal will be decimated or reduced to a lower frame rate that is supported by the HDMI v1.4 standard.

NOTE: When using the rear HDMI output for 4K or Ultra HD output, no superimposed output information will be applied to the image.

NOTE: Not all electronic viewfinders or monitors will support all of the formats and frame rates that CION is capable of outputting. Be sure to consult the specifications of your devices to see if a given format and frame rate is supported.

The SDI 1-4 Main Outputs are always free of superimposed on-screen information. These outputs may be routed to monitors, projectors, external recorders, routers, converters, etc. The SDI 1-4 Main Outputs support all of the formats and frame rates that CION is capable of:

- 4K progressive (4096x2160)
    - 23.98/24/25/29.97/30/50/59.94/60
- Ultra HD progressive (3840x2160)
    - 23.98/24/25/29.97/30/50/59.94/60
- 1080 progressive HD (1920x1080)
    - 23.98/24/25/29.97/30/50/59.94/60
- 1080 interlaced HD (1920x1080)
    - 25/29.97

NOTE: *For formats that do not require the use of all four of the SDI 1-4 Main Outputs, the remaining outputs are duplicated. For example, if the recording format, frame rate and video output settings are configured for 1080p 23.98 YCbCr, then each of the four SDI 1-4 outputs will produce a 1080p 23.98 YCbCr output.*

NOTE: *Not all connected devices will support all of the formats and frame rates that CION is capable of outputting. Be sure to consult the specifications of your devices to see if a given format and frame rate is supported.*

Connecting the LANC Cable to the CION Top Handle LANC Collar

Tools needed: None

Parts needed: AJA-supplied LANC cable.

Included with CION is a LANC Collar. The LANC Collar is a remote control ststop unit that sits between the Top Handle and the Handle Base. The supplied LANC cable may be connected to either the LANC connector on the top of CION or the LANC connector on the side of CION. Typically, you will want to connect the LANC cable to the LANC connector on the top of CION so that the other LANC connector on the side of CION may be used for a handgrip LANC connection.

NOTE: *The LANC ports on CION only support ststop recording commands; no other LANC functionality is supported.*

Figure 13. LANC Cable and Connector

LANC cable connector
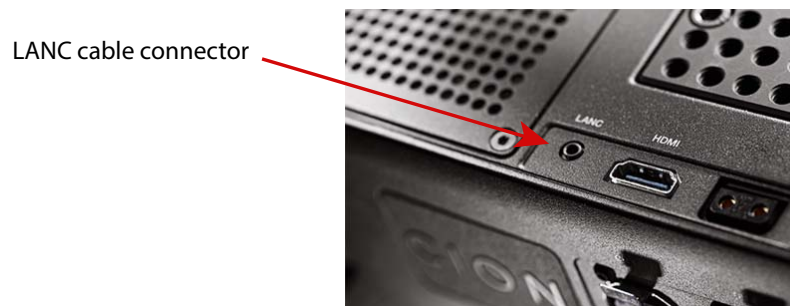
Using Pak Media with CION

Tools needed: None

Parts needed: AJA Pak media.

Pak media features a protective metal housing with a multi-insertion rated connector making it suitable for repeated field use.

Inserting Pak media in CION

1. Power up CION. Be sure to wait for CION to complete the boot up sequence.
2. Insert Pak media into the media slot. The media should be inserted with the blue "AJA" logo facing upright and the logo facing the front of the camera.

Figure 14. Media Being Inserted

3. The Pak media will be scanned upon insertion and a "Media Mounting" prompt will appear on the User Interface Screen.
4. You will know that the media is properly mounted when the green LED indicator on the Pak is illuminated and the CION user interface reports a capacity remaining percentage for the media (99% for example).

NOTE: Before you perform recordings, review the menu parameters and configure them with the desired settings for format, frames per second, encode type, etc.

To remove Pak media from CION

1. Make certain that transport operations like recording or playback are stopped; if this has not been done, a prompt will appear instructing you to "Press STOP."
2. Depress the Media Unmount button designated with the "eject" icon.
3. Wait for the green LED indicator on the Pak to no longer be illuminated and then grasp the media and pull up to remove it.

    Caution! Do not remove the Pak media from CION while the LED is illuminated or flashing.

    Warning! Not using the Media Unmount Button to properly unmount the media could result in media issues or even damage to the media. If inserted media has any issues, prompts such as **"WARNING Backup and Reformat"** may be displayed.

NOTE: If media is inappropriately removed, the "Please Reboot" warning prompt may appear. The camera will need to be restarted if this prompt appears. To avoid this, always be sure to properly unmount media before removing it.

NOTE: In the event of sudden power loss, recordings that are in progress may not be written properly to the media. Note that there is a "Low Battery" warning prompt that users should take note of and stop recordings in progress if at all possible before battery failure. CION can sometimes manage to close the file before the battery stops providing sufficient power, but this is not always possible due to the nature of some batteries and the duration of some recordings. It is best to be mindful of remaining battery life. The use of batteries with metering or remaining power indications is highly recommended.

Connecting Audio Devices to CION

Tools needed: None

Parts needed: Third-party XLR audio cables and Mini TRS headphones.

CION features two balanced analog audio XLR inputs with dedicated line, mic and phantom power selections for each input. Audio Control Knobs for each input are also provided so that signal level may be controlled. Additionally, an Analog Audio CONFIG menu parameter allows you to determine the appropriate input audio signal level type (+24dBu, +18dBu, +15dBu or +12dBu) based on the type of audio equipment you are using with CION. Audio is recorded as 24-bit 48kHz.

NOTE: Use the +48 dip switch setting for microphones which require phantom power (condenser

mic.) and use Mic for microphones that do not require phantom power (dynamic microphones).

7-segment LEDs show audio input levels for the two analog audio inputs. Knobs underneath the VU meters allow you to adjust the input levels independently to prevent clipping and ensure proper signal amplitude.

Green LED segments of the VU meters indicate the "safe" area (no clipping) of an audio signal. Vertically, the green LEDs also show the signal strength, so you can see if the signal level is low. Generally, it's preferred to have the signal near the top of the green or even occasionally peaking into the yellow LED segments.

Yellow LED segments of the VU meters indicate audio levels that are at the peak edge of the safe area before clipping will occur.

Red LED segments of the VU meters indicate that the amplitude is too hot and the signal is clipping at the signal peaks. You should reduce the input gain at the source (mixer or source equipment supplying the signal) or by using the Audio Control Knobs on CION.

To adjust the audio level, press the Audio Control Knob inward and the knob will then pop out for easy adjustment. This feature allows the knobs to be recessed, preventing accidental changes in a production environment.

A headphone jack is provided for audio monitoring. A Headphone Volume Control Knob is also provided to make volume adjustments. To adjust the headphone listening level, press the knob inward and the knob will then pop out for easy adjustment—just like the audio input level knobs.

Embedded audio is also provided via the SDI 1 output of the SDI 1-4 Main Outputs, the SDI Monitor Outputs and the HDMI outputs.

NOTE: Audio is only present on the SDI 1 output of the SDI 1-4 Main Outputs, not SDI 2, 3 or 4.

Chapter 3: ProRes Recording & RAW Output

Overview

CION records Apple ProRes QuickTime files to solid state Pak media. Pak media is formatted as HFS+ which means that it reads natively on Mac OS computers and may also be read by Windows OS computers when used with third-party software utilities.

Once removed from CION, the Pak media can be inserted in the AJA Pak Dock media reader. The Pak Dock connects directly to a computer via either Thunderbolt or USB 3.0. High-speed connectivity allows you to rapidly transfer and back up files.

Apple ProRes 422 and Apple ProRes 444

Apple ProRes 422 or Apple ProRes 444 codecs are virtually indistinguishable from uncompressed 4K/Ultra HD/2K/HD. Apple ProRes maintains quality during editorial, surviving multiple encoding/decoding generations without degradation. Some of the advantages of using Apple ProRes include:

- Resolution support for 4K (4096x2160), Ultra HD (3840x2160), 2K (2048x1080), and HD (1920x080) at frame rates from 23.98 to 60.
- 4:2:2 chroma sampling up to 60 fps or 4:4:4 up to 30 fps.
- 10-bit sample depth (Apple ProRes 422 versions) preserves subtle gradients making it perfect for green-screen compositing or color correction with no visible banding artifacts.
- 12-bit sample depth (Apple ProRes 444) has all of the merits of 10-bit with added specificity making it ideal for situations where the highest quality may be required.
- Apple ProRes features I frame-only encoding. This ensures consistent quality in every frame and no artifacts when capturing complex motion.
- Apple ProRes features variable bit-rate (VBR) encoding. "Smart" encoding analyzes the image and allocates more bits to complex frames.
- Low data rate requirements (when compared to uncompressed) means less media space is required to store high-quality video.
- Apple ProRes codecs may be used in a variety of non-linear editing applications, color correction applications and compositing applications without the need for transcoding.

AJA Raw

In addition to baseband video output, CION also offers the ability to output raw sensor data via the SDI 1-4 Main Output connections or the Thunderbolt connection.

NOTE: *Raw output is dependent upon specific CONFIG menu parameter selections.*

AJA's Corvid Ultra hardware and TruZoom software may be used to record the 4K or Ultra HD SDI raw output from CION up to and including 120Hz.

The SDI 1-4 Main Outputs main be configured for the following raw formats and frame rates:

- 4K progressive (4096x2160) 23.98/24/25/29.97/30 via SDI 1 RAW
- 4K progressive (4096x2160) 50/59.94/60 via SDI 1-2 RAW
- 4K progressive (4096x2160) 119.88/120 via SDI 1-4 RAW
- Ultra HD progressive (3840x2160) 23.98/24/25/29.97/30 via SDI 1 RAW
- Ultra HD progressive (3840x2160) 50/59.94/60 via SDI 1-2 RAW
- Ultra HD progressive (3840x2160) 119.88/120 via SDI 1-4 RAW

AJA also offers support for raw output of 4K or Ultra HD at up to 30 fps via the Thunderbolt connection.

NOTE: *The SDI raw output and the Thunderbolt raw output are mutually exclusive; you cannot use both at the same time.*

To capture 4K or Ultra HD raw data at up to 30 fps, the Thunderbolt output of CION may be used in conjunction with AJA's CamXchange software application and an appropriately configured host computer and RAID array featuring Thunderbolt.

For more information about working with AJA Raw, please refer to additional AJA-supplied supplemental documentation and the AJA CamXchange manual.

Chapter 4: Basic Operations

Making a Recording

Before you attempt to make a recording, be sure to review the menu parameters and configure them with the desired settings for format, frames-per-second, encode type, etc. For detailed information about the menu parameter settings see *"Chapter 5: User Interface Navigation on page 33"*.

CION has a built-in Record Button on the operator side. With Pak media inserted in CION, the first depression of the Record Button begins recording and the next depression of the button stops recording. During recording, the Record Button will illuminate and the Pak media LED will flash to alert you that recording is in progress. If connected, the Tally Light on the LANC Collar will also illuminate red and flash.

The LANC Collar may be also be used to perform the start and stop of recording. Like the built-in record button, the first depression of the record button on the LANC Collar begins recording and the next depression of the button stops recording.

NOTE: *Either the built-in Record Button or the record button on the LANC Collar may be used to start or stop recording even if one method was initially used. You may depress the Record Button on the body and then the record button on the LANC Collar to stop recording for example.*

CION alerts you when the Pak media is nearly full with a "Media Low" warning prompt at 15% of the remaining capacity of the media. At 10% of the total capacity of the media, the "Media Full" alert will appear. Any recordings that have been started will stop once 10% is reached and no further recordings can be performed using this media until it is formatted or the deletion of some or all clips has been performed. Deleting clips to produce more than 10% free space will allow recording to resume.

NOTE: *The best practice operation is to back up all of your recordings and then format the media prior to performing new recordings. This method removes any chance that you will accidentally perform an unwanted deletion of recordings.*

Playing Back a Recording

For playing back recorded material, CION features dedicated transport buttons.

Figure 16. CION Transport Buttons

Stop Button: The Stop Button serves a dual function. When playing back a clip (Play, Fast Forward, or Reverse) the first push of the Stop Button acts as a "pause" mode: the playback is paused, the current point of the clip is displayed, and the Stop Button flashes. A second push of Stop Button completely stops the playback and CION's outputs return to an "E-to-E" mode where a live view is presented.

NOTE: *To determine at a glance if the Stop Button is in a "pause" mode, note that the stop button will flash if media playback is paused. The Stop Button is fully illuminated in "stop" mode.*

Play Button: Press the Play Button to begin forward playback of the current clip at normal speed.

Fast Forward Playback Button: Press this button to begin fast playback of the current clip at 2x speed. Successive pushes increase the speed to 4x, 8x and 16x.

NOTE: *Pushing the button after 16x speed is reached has no further effect. When fast-forwarding at any speed, audio is muted.*

Reverse Playback Button: Pressing this button when not lit begins playback of the current clip in reverse at 2x speed. Successive pushes increase the speed to 4x, 8x and 16x.

NOTE: *Pushing the button after 16x speed is reached has no further effect. When playing in reverse, audio is muted for all speeds.*

Move from Clip to Clip: Rotate the User Interface Control Knob clockwise or counter clockwise.

NOTE: *If you have not already entered playback, turning the User Interface Control Knob will automatically enter the playback paused state (Stop Button flashing) and navigate you from clip to clip.*

Jog: From a paused playback state (Stop Button flashing), you may push in on the User Interface Control Knob to enter a jog speed playback mode. Rotate the knob:

- Counter-clockwise to jog frame by frame in reverse
- Clockwise to jog forward

To exit the Jog mode, press in on the User Interface Control Knob.

NOTE: *A text prompt, "JOG", will appear on the User Interface Screen when you are in this mode.*

To playback recorded media

4. Press the Stop Button to get to the default, "idle" transport mode (if you are not already in this mode).
5. Find the clip you want to play back by rotating the User Interface Control Knob until the clip name appears on the User Interface Screen.
6. Press the Play Button.
7. When the clip stops playing back, the Stop Button will flash. If you do not wish to review any other clips, simply press the Stop Button again to return to the default "E to E" mode where a live video output will then be presented.

Formatting Media and Deleting Clips

Pak media is provided pre-formatted. However, you may want to format media that has already been used or name media and format it during your shoot. To format Pak media, the media must first be inserted into the Media Slot of CION. Once the media is mounted, follow these steps:

1. Press the MEDIA button
2. Rotate the User Interface Control Knob until you see the menu parameter 16.1 Format Media.
3. Push in the User Interface Control Knob.
4. Rotate the User Interface Control Knob until "Format" appears. Push in on the User Interface Control Knob.
5. Press and hold in the User Interface Control Knob as instructed by the prompt for two seconds (or longer) and then formatting will begin.

NOTE: *You may select any other key to abort the format operation should you inadvertently enter this menu parameter. The confirmation process used for formatting media helps you avoid accidentally formatting media.*

Warning! Once you have formatted media, you will not be able to recover recordings that were previously made on the media. Always be sure that any media you format has been properly backed up prior to formatting.

CION will display formatting progress, and when done, will display a completion confirmation. Press any key to clear the completion prompt.

Delete a recorded clip: 1.   In the default mode, rotate the User Interface Control Knob to browse through the clips on the Pak media.

2.   When you find a clip you want to delete, press the Stop Button.

3.   Press the MEDIA menu button, navigate to parameter 16.25 Delete Current Clip.

4.   Press in on the User Interface Control Knob, select "Delete" and press in on the knob again.

5.   Follow the prompt information to delete the clip.

NOTE: *After a clip has been deleted, the camera will go into a paused mode with the last recorded clip displayed. You may navigate through additional clips by turning the User Interface Control Knob to determine if there are other individual clips you wish to delete or you may press the STOP button to return to an "E-to-E" mode where a live view is presented.*

Chapter 5: User Interface Navigation

Overview

There are two ways to control CION:

• From the operator side using the menu buttons and the User Interface Control Knob

• Remotely from a web browser connected using CION's LAN connection

This chapter discusses configuring CION using the menu buttons and the User Interface Control Knob. For Web Browser control information, refer to *"Chapter 6: Web Browser Remote Control on page 66"*.

Default Display for the User Interface Screen

The User Interface Screen has a default display mode. With Pak media inserted, the default display mode has a top line of information that provides the clip name on the left side and the percentage of the remaining media capacity on the right side.

The second line provides the current reel number on the left side and the timecode for the clip on the right side.

Entering the Menu Structure

CION uses a flat menu structure—there are no sub-menus or menus-within-menus. CION's menu parameters are divided among the following dedicated menu buttons:

CONFIG: Contains general configuration options for:
- Audio and video settings
- Superimposed output information
- Audio and video signal generators and more

MEDIA: Contains configuration options for:
- Encode type
- Clip naming
- Playback settings

FPS: Contains configuration options for:
- Format
- Frames per second

EI: Contains configuration options for:
- Exposure index value
- Shutter speed/angle and more

WB: Contains configuration options for:
- White balance
- Color and saturation settings

STATUS: Is not a configuration menu but provides:

Status information

Warnings and alarms

To enter a specific menu

1. Depress the button associated with the parameters you would like to adjust.
2. Enter the desired menu.
3. Rotate the User Interface Control Knob to see the various menu parameters.
4. To enter one of the specific menu parameters and make an adjustment, push in on the User Interface Control Knob.
5. Once you have entered the menu parameter, rotate the knob to review the various choices available for that parameter.

NOTE: *The currently selected choice appears in yellow typeface while the other choices appear in white typeface.*

When you want to make a selection from one of the menu parameter choices, turn the User Interface Control Knob until you reach the desired choice and then press in on the User Interface Control Knob.

Your selection should now appear in yellow typeface.

To exit the menu parameter, rotate the User Interface Control Knob until you see the Exit selection. Select EXIT by pressing in on the User Interface Control Knob. To continue reviewing menu parameters, simply rotate the User Interface Control Knob. When you are finished reviewing or making menu parameter selections, simply press the menu button you originally pressed or enter another menu by pressing a different menu button.

Example: You want to change the frames-per-second you are recording from 23.98 to 29.97.

1. Depress the FPS Menu Button.
2. Rotate the User Interface Control Knob until you reach the 23.2 Frame Rate menu parameter.
3. Push in on the User Interface Control Knob. Rotate the User Interface Control Knob until you reach the 29.97 choice.
4. Push in on the User Interface Control Knob. 29.97 should appear in yellow typeface.
5. To exit the menu parameter, rotate the User Interface Control Knob until you see the Exit selection. Select EXIT by pressing in on the User Interface Control Knob.
6. Press the FPS Menu Button again to exit the FPS menu.

Multiple Value Entry: For selections such as date, time and IP address where several values must be entered, you use multiple depressions of the User Interface Control Knob to navigate between value entry fields. When all values are ready to be set, an "Accept" or "Reject" selection appears with an additional rotation of the User Interface Control Knob. To accept the values, push in the User Interface Control Knob when "Accept" appears. To reject a value, push in the User Interface Control Knob when "Reject" appears and you may continue editing the menu parameter's values.

Reset to Factory Default Value: To reset a specific parameter to the factory default value, depress and hold the User Interface Control Knob for three continuous seconds.

CONFIG Menu Parameters

CONFIG contains general configuration options for:

- Audio and video settings
- Superimposed output information
- Audio and video signal generators and more

Press the CONFIG Menu Button to enter the CONFIG menu parameters. Rotate the User Interface Control Knob to review the various menu parameters and selections.

NOTE: *The default parameter in the following menus is highlighted in bold typeface.*

1.3 Progressive Playback

This parameter defines how progressive recordings are output. Unless you are connected to a CRT monitor that may require PsF, it is best to leave the menu parameter configured for the default of progressive output.

These are the options:

- **Progressive** (default) – Playback as progressive frame
- PsF – Playback as progressive segmented frame

NOTE: *To ensure HDMI output during playback, "Progressive" needs to be selected.*

NOTE: *PsF is disabled as a selection when working with 4K or Ultra HD formats.*

1.5 Crop SDI 1-4 Output

This parameter enables or disables a cropped output for the main SDI 1-4 outputs.

These are the options:

- **OFF** (default) – No crop is applied to the SDI 1-4 outputs
- ON – Crops 4K (4096x2160) to (3840x2160) Ultra HD output or crops 2K (2048x1080) to (1920x1080) HD output

NOTE: *Some monitors and devices connected to CION may not offer support for 4K (4096x2160) or 2K (2048x1080) and you may need to enable the crop feature to properly interact with these devices. Be sure to consult your device's technical specifications to see what formats and frame rates it supports.*

NOTE: *Enabling the crop feature has no impact if Ultra HD, 1080p or 1080i video has been configured in the FPS menu.*

1.6 SDI 1-4 Output

This menu parameter determines the type of output used by the SDI 1-4 Main Outputs.

These are the options:

Table 1. SDI Output Parameter Options

SDI 1-4 RGB (default)	Sets SDI 1-4 outputs to RGB (supports up to 4K 30 fps)
SDI 1-4 YCbCr	Sets SDI 1-4 outputs to YCbCr (supports up to 4K 60 fps)
SDI 1-4 RAW	Sets SDI 1-4 to RAW (supports up to 4K 120 fps)

Table 1. SDI Output Parameter Options

SDI 1-2 RGB	Sets SDI 1-2 outputs to RGB (supports up to 2K 30 fps)
SDI 1-2 YCbCr	Sets SDI 1-2 outputs to YCbCr (supports up to 2K 60 fps)
SDI 1-2 RAW	Sets SDI 1-2 outputs to RAW (supports up to 4K 60 fps)
SDI 1 RGB	Sets SDI 1 to RGB (supports up to 2K 30 fps)
SDI 1 YCbCr	Sets SDI 1 to YCbCr (supports up to 2K 60 fps)
SDI 1 RAW	Sets SDI 1 to RAW (supports up to 4K 30 fps)

NOTE: *Format, Frame Rate and Encode Type menu parameter selections impact which of the above selections are visible or possible to configure. CION is designed to automatically hide values that would be incorrect video output configurations, therefore, not all options will appear at the same time.*

See *"Special Considerations for Format and Frame Rate Selections" on page 59* for specific details.

1.61 SDI 1-4 RGB Range

This parameter determines whether the SDI 1-4 main outputs will output SMPTE range or full range video.

NOTE: *The value should typically be configured for SMPTE range to interface with most devices.*

These are the options:
- **SMPTE** (default) – The SDI 1-4 RGB output will be SMPTE range
- Full Range – The SDI 1-4 RGB output will be full range

1.62 SDI 12-bit/10-bit

The SDI 12-bit/10-bit selection allows the SDI 1-4 Main Outputs to be configured for 12-bit or 10-bit output.

These are the options:
- **10-bit** (default) – Sets the SDI output to 10-bit
- 12-bit – Sets the SDI output to 12-bit

NOTE: *In the event that a Format, Frame Rate or Encode Type is selected that does not support 12-bit, then the selection automatically reverts to 10-bit. Also, not all devices provide support for 12-bit so you may need to configure the CION output for 10-bit to interface with some devices.*

1.64 3G SDI Level

This parameter allows the 3G SDI output to be configured for either Level A or Level B. While many 3G SDI devices will support both Level A and Level B, some devices may need a specific 3G SDI selection to operate as expected.

These are the options:
- **Level B** (default) – For use with devices that accept or require Level B
- Level A – For use with devices that accept or require Level A

NOTE: *If menu parameter 1.6 SDI 1-4 Output is configured for SDI Raw output, the 1.64 3G SDI Level menu parameter must be configured for Level B to ensure proper interaction with other devices.*

1.66 Rear HDMI Out

This parameter determines whether scaled or full-raster video will be output from the Rear HDMI Output.

NOTE: *The Full Raster selection only has an impact on the output when a 4K or an Ultra HD format is used.*

These are the options:
- **Scaled** (default) – The HDMI output is limited to 2K or HD
- Full Raster – The HDMI output may produce 4K or Quad HD

NOTE: *The rear HDMI output is an HDMI v1.4 output and therefore is limited to 4K 24Hz and Ultra HD up to 30Hz as specified by the HDMI v1.4 standard. For frame rates of 50/59.94/60, the Full Raster HDMI output is decimated to 25/29.97/30 respectively to produce an output. Various menu parameters can be configured so that no video output is produced by the rear HDMI connector. For example, if the 23.1 Format menu parameter from the FPS menu is configured for 4K and the 23.2 Frame Rate menu parameter is configured for 25 and no crop has been configured via menu parameter 1.8 Crop SDI/HDMI Monitor Outputs, the configuration results in a format that is not natively supported by HDMI v1.4. To produce video output, cropping the video output via the 1.8 Crop SDI/HDMI Monitor Outputs menu parameter may be desirable.*

1.68 Rear HDMI 10-bit/8-bit

This parameter determines whether the Rear HDMI Output is auto-negotiated with the receiving device via EDID (extended display identification data) or via a specified output type.

These are the options:
- **Auto** (default) – The HDMI output is negotiated automatically with the receiving device via EDID
- 10-bit YCbCr – Configures the HDMI output for 10-bit YCbCr
- 8-bit RGB – Configures the HDMI output for 8-bit RGB

NOTE: *Typically, you will want to simply leave the selection configured for Auto so that the negotiation between the devices is handled automatically.*

1.8 Crop SDI/HDMI Monitor Output

This parameter determines whether the SDI/HDMI Monitor outputs are cropped. Many electronic viewfinders and on-board monitors, for example, will only offer support for 1080 HD, not 2K, so it is often advisable to have this parameter configured for a cropped output if you are working with 4K or 2K recording formats.

These are the options:
- **ON** (default) – Scaled video for the monitor outputs is additionally cropped to 1080 HD (if the source is not already 1080 HD)
- OFF – No cropping is applied to the monitoring outputs

NOTE: *If the rear HDMI monitor output connector is configured for Full-Raster output, a 4K signal will be cropped to Ultra HD.*

1.85 SDI/HDMI Monitoring LUT

This parameter determines whether the recording gamma or a video gamma LUT will be applied to the video monitoring outputs. Applying a video gamma LUT can be useful when shooting with the Disabled or Expanded 1 gamma selections.

NOTE: *The video gamma LUT only applies a gamma correction to the monitoring video outputs, not any additional color correction; the color correction selection made in WB menu parameter 25.4 Color Correction.*

These are the options:

- **Record Gamma LUT Enabled** (default) – The gamma selection made in 24.7 Gamma is applied to the SDI/HDMI monitoring outputs
- Video Gamma LUT Enabled – A video gamma LUT is applied to the SDI/HDMI monitoring outputs

NOTE: *The Video Gamma LUT should only be considered a visual reference for what the image may look like when it is post-processed or graded. You should not rely on the image being produced by the Video Gamma LUT to judge your exposure while shooting. For exposure, you should rely on the histogram feature to help evaluate your exposure.*

1.9 Super Out

Figure 17. Super Out Example Images — Record State
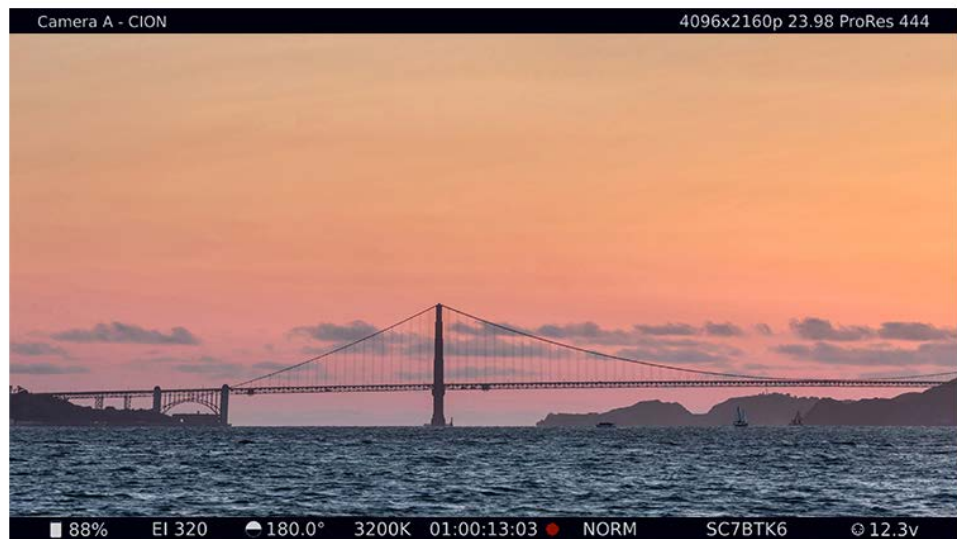
This parameter controls whether superimposed data will be applied to specific SDI or HDMI monitor outputs.

NOTE: *The Super Out applies only to the SDI/HDMI Monitor Outputs, not the SDI 1-4 Main Outputs or the Rear HDMI Output when it is configured for 4K or Ultra HD.*

These are the options:

- **SDI/HDMI Monitor** (default) – Superimposed data is enabled for the SDI Monitor and HDMI outputs
- OFF – Superimposed data is disabled
- SDI Monitor Outputs – Superimposed data is enabled for the SDI Monitor outputs
- HDMI Monitor Outputs – Superimposed data is enabled for the HDMI outputs

1.92 Super Displayed

This parameter determines whether superimposed information appears on the monitor output(s) selected in menu parameter 1.9 Super Out. Additionally, this men parameter allows specific information to be displayed at the bottom, top or both top and bottom of the image.

These are the options:

- **Top+Bottom** (default) – Superimposed data is displayed along the top and bottom of the image
- OFF – No superimposed data is displayed
- Bottom – Superimposed data is displayed along the bottom of the image
- Top – Superimposed data is displayed along the top of the image

The superimposed data at the bottom of the image includes:
- Remaining media capacity
- Exposure index value
- Shutter setting
- White balance value
- Timecode
- Transport state
- Gamma
- Battery voltage

The superimposed data at the top of the image includes:
- Camera name
- Alarms
- Format
- Frame rate
- Encode type

1.93 Super Area Opacity

This menu parameter determines how opaque the area behind the superimposed text and data appears.

These are the options:

- **25%** (default) – A lightly shaded area behind the text; this allows the picture behind the text to be most apparent
- 75% – This produces a relatively dark area behind the text
- 50% – A medium dark area behind the text; this allows more of the picture behind the text to be apparent

NOTE: *The 25% setting may not be appropriate when shooting against a white background as the superimposed text may be hard to read in such a situation.*

NOTE: *The Super Area Opacity setting also impacts the superimposed histogram and VU meters.*

1.94 Graticules

Graticules are typically simple lines that may be overlaid on an image to help determine things like the center of the image or frame guidelines for an aspect ratio, etc.

These are the options:

Table 2. Graticule Options

OFF (default)	No graticule is overlaid on the image
4K/2K Crop	Crop line indications are overlaid on the image
Crosshairs	Crosshairs, centered in the middle, are overlaid on the image
4K/2K Crop + Crosshairs	Crop line indications and crosshairs are overlaid on the image
1.85:1	1.85:1 aspect ratio frame guidelines are overlaid on the image
2.35:1	2.35:1 aspect ratio frame guidelines are overlaid on the image
2.39:1	2.39:1 aspect ratio frame guidelines are overlaid on the image
Crosshairs + 1.85:1	Crosshairs and 1.85:1 aspect ratio frame guidelines are overlaid on the image
Crosshairs + 2.35:1	Crosshairs and 2.35:1 aspect ratio frame guidelines are overlaid on the image
Crosshairs + 2.39:1	Crosshairs and 2.39:1 aspect ratio frame guidelines are overlaid on the image
4K/2K Crop + Crosshairs + 1.85:1	Crop line indications, crosshairs and 1.85:1 aspect ratio frame guidelines are overlaid on the image
4K/2K Crop + Crosshairs + 2.35:1	Crop line indications, crosshairs and 2.35:1 aspect ratio frame guidelines are overlaid on the image
4K/2K Crop + Crosshairs + 2.39:1	Crop line indications, crosshairs and 2.39:1 aspect ratio frame guidelines are overlaid on the image

NOTE: *The aspect ratio graticules are based on the shooting format to avoid confusion, not the SDI output which could have a crop applied.*

Here are the values for the aspect ratios:

- 4096x2160
    - with a 2.39:1 aspect ratio applied = 4096 x 1716. (DCI defined)
    - with a 2.35:1 aspect ratio applied = 4096 x 1743. (Mathematically derived)
    - with a 1.85:1 aspect ratio applied = 3996 x 2160. (DCI defined)
- 3840x2160
    - with a 2.39:1 aspect ratio applied = 3840x1607. (Mathematically derived)
    - with a 2.35:1 aspect ratio applied = 3840 x 1634. (Mathematically derived)
    - with a 1.85:1 aspect ratio applied = 3840x2076. (Mathematically derived)
- 2048x1080
    - with a 2.39:1 aspect ratio applied = 2048 x 858. (DCI defined)
    - with a 2.35:1 aspect ratio applied = 2048 x 871. (Mathematically derived)
    - with a 1.85:1 aspect ratio applied = 1998 x 1080. (DCI defined)

- 1920x1080
    - with a 2.39:1 aspect ratio applied = 1920x803. (Mathematically derived)
    - with a 2.35:1 aspect ratio applied = 1920 x 817. (Mathematically derived)
    - with a 1.85:1 aspect ratio applied = 1920x1038. (Mathematically derived)

NOTE: *The sizes that are labeled "Mathematically derived," were obtained using the following methodology:*

Horizontal width divided by aspect ratio = vertical height (rounded off, no decimal places used)

Examples: 1920 / 2.39 = 803.35 (803)

1920 / 1.85 = 1037.84 (1038)

1.95 Graticules Color

The graticules may be displayed in either white or black. For most situations, white is preferred, but in very bright scenes black may be preferable.

These are the options:
- **White** (default)
- Black.

1.97 Display VU Meters

This parameter allows you to enable superimposed VU meters for monitoring and determining appropriate audio levels.

These are the options:
- **Off** (default)
- Horizontal
- Vertical

1.98 Histogram

The histogram provides an aid for exposure. The histogram menu parameter lets you determine how you would like the histogram to be interpreted. The default linear selection shows a representation of the sensor values with no interpretation or expansion applied. Alternately, a logarithmic selection may be used that expands the displayed data.

These are the options:
- **Logarithmic** (default) – Logarithmic mapping is used to display the sensor values
- OFF – No histogram is superimposed on the monitoring outputs
- Linear – Linear mapping is used to display the sensor values

NOTE: *While the histogram feature serves as an accurate exposure guide during live preview or recording, it is not representative when playing back recorded material.*

1.99 Histogram Mode

The histogram may be configured to display luminance, individual colors of RGB, RGB, or RGB and luminance at the same time.

- These are the options:
- **RGB+Luma** (default)
- Luma
- R
- G
- B
- RGB

4.1 Analog Audio

This parameter configures the analog audio signal level for input.

These are the options:

- **+24dBu** (default) – Selects pro-level USA signal levels of +24dBu
- +18dBu – Selects pro-level European signal levels of +18dBu
- +15dBu – Selects pro-level German signal levels of +15dBu
- +12dBu – Selects consumer signal levels of +12dBu

NOTE: *Maximum amplitude (0 dBFS).*

NOTE: *Professional audio equipment has much higher levels than consumer equipment: a 0 VU reading corresponds to +4 dBu. Connecting a consumer device to a professional audio input typically does not have sufficient power to drive the input.*

6.1 Genlock

Applying genlock to CION is not typically needed for single-camera productions. In multi-camera productions, when signals need to be synchronized, for example when live switching camera sources, reference should be applied to the Reference Input connector.

These are the options:

- **Freerun** (default) – CION relies on its own timebase and is not locked to an external source
- Ref In – Uses the Reference Input connector as the genlock/reference/synchronizing source

8.0 TC Select

This parameter selects the timecode source that will be used.

These are the options:

- **TC Value** (default) – Uses the record run value specified in menu parameter 8.1 TC Value
- LTC – Uses the value from the LTC input
- Time Of Day/Freerun – Sets timecode to the device clock value (55.6 Time Set) and produces a freerun timecode value
- Jam Sync – Sets the timecode to the value that is initially detected and then continues counting with this value even after the source is removed

NOTE: *In the case of Jam Sync, it is advisable to re-jam the timecode when the opportunity presents itself in order to maintain accuracy. Timecode accuracy should be consistent for durations of up to 1 hour without the need to re-jam the timecode.*

8.1 TC Value

This parameter selects an hour value from which timecode begins incrementing.

These are the options:
- **01:00:00:00** (default) – Sets the timecode value to 01:00:00:00
- 00:00:00:00 to 23:00:00:00 – The value may be adjusted for whole hour values, such as 02:00:00:00, 03:00:00:00, etc.

8.2 TC Type

This parameter selects drop frame or non-drop frame timecode.

These are the options:
- **NDF** (default) – Selects Non-drop Frame timecode
- DF – Selects Drop Frame timecode

NOTE: *Drop frame timecode is not supported for 23.98, 24, 25 and 50 fps.*

NOTE: *If the menu parameter 8.0 TC In is set to LTC, the TC Type selection does not apply. TC Type only applies to the TC Value or the Time of Day value generated by CION.*

9.0 Interval Record

CION can be used to create time-lapse recordings via the 9.0 Interval Record, 9.1 Interval Frames and 9.2 Interval Time selections.

NOTE: *Menu parameters 9.1 Interval Frames and 9.2 Interval Time do not appear unless 9.0 Interval Record is enabled.*

These are the options:
- **OFF** (default) Normal recordings are produced
- ON Time-lapse recordings are produced

Example: The frame rate selected in the FPS menu Frame Rate parameter is 29.97 fps. The record button is depressed, and the recording is then stopped 90 seconds later with the following settings:
- 9.0 Interval Record > On
- 9.1 Interval Frames > 1
- 9.2 Interval Time > Second

The resulting recording would be 90 frames in duration, a frame rate of 29.97 fps and would appear to be "undercranked" or "sped up" when compared to a normally created recording.

NOTE: *Selecting an interval frame number that exceeds the incoming video frames per second will result in normal video. "Overcranking" or "slow motion" is not supported by the interval recording feature. For slow motion, refer to the FPS menu Slow Motion parameter.*

9.1 Interval Frames

Determines how many frames will be used for the time-lapse recording.   Typically, only one frame per interval time is desired, but in some cases you may wish to produce "under cranking" effects, not just time-lapse, by increasing the number of frames recorded.

These are the options:

- Incrementing Value – Sets the number of frames to use for the recording.

9.2 Interval Time

Determines the time period from which the interval frames are selected.

These are the options:

- **Second** (default) – The interval frames are selected from within a second
- Minute – The interval frames are selected from within a minute
- Hour – The interval frames are selected from within an hour

NOTE: *9.1 and 9.2 appear in the menu structure only if 9.0 is set to "ON"*

41.2 Video SG

This parameter determines the video signal output from CION's internal signal generator.

These are the options:

- **OFF** (default) – The test signal output is disabled
- BLACK – Video test signal output is color black
- 75% BARS – Video test signal output is 75% color bars
- 100% BARS – Video test signal output is 100% color bars
- 75% BARS + PLUGE – Video test signal output is 75% color bars plus pluge (picture line-up generation equipment) pattern

NOTE: *The video signal generator acts as a "substitute" for the signal from the sensor. Because of this, if the Video SG is configured for Black, 75% Bars, 100% Bars or 75% Bars + Pluge you may record these signal generators.*

NOTE: *Unlike the 23.98 through 60 fps selections, if the camera is configured for 119.88 or 120 fps and the Video SG is enabled, the camera needs to be restarted in order to produce picture again even if the menu parameter is reset to "OFF."*

41.3 Audio SG

This parameter determines the audio signal output from CION's internal test signal generator.

These are the options:

- **OFF** (default) – The audio signal output is disabled
- SILENCE – Outputs an audio test signal containing silence only
- 1 kHz – Outputs a standard 1 kHz test signal tone

NOTE: *The audio signal generator acts as a "substitute" for the audio inputs. Because of this, if the Video SG is configured for silence or 1 kHz tone, you may record these signal generators.*

50.0 LAN Settings

This parameter determines whether subsequent LAN settings are displayed in the user interface.

These are the options:
- **Display** (default) – Displays the various LAN settings of the device
- Hide – Hides the various LAN settings of the device to simplify the menu interface

NOTE: *Menu parameters 50.1 through 50.4 and 50.6 do not appear if "Hide" is selected.*

50.1 IP Config

This parameter determines the type of TCP/IP network configuration used by CION.

These are the options:
- **DHCP** (default) – Select automatic IP address assignment from DHCP server on LAN
    Note that this value cannot be edited.
- Static Address – Assign a static IP address manually
    Menu parameters 50.2, 50.3, and 50.4 will have to be entered to accomplish this.
- Default Address – Use the factory default static IP address: 10.65.74.65

NOTE: *If you change the Static IP address of the CION camera, you may need to power cycle the CION so that the host computer correctly identifies the new IP address.*

50.2 IP Address

This parameter determines the static IP address used by CION for TCP/IP networking.

Variable: Using the User Interface Control Knob, enter an IP address compatible with your LAN.

For menu parameters 50.2, 50.3, and 50.4, you will be setting IP addresses that consist of "octets" separated by a period (i.e., 10.0.181.0).

To edit these values:

1. Press in on the User Interface Control Knob and then rotate the knob until the desired number is reached.
2. Push in on the knob again to select the number.
3. Continue this process until an "Accept" prompt appears. If you want the value you have entered, press in on the User Interface Control Knob.

    If it is not what you want, rotate the User Interface Control Knob and the "Reject" prompt will appear. Push in on the knob to reject the value and begin editing the values again.

50.3 Subnet Mask

This parameter determines the subnet mask used by CION for TCP/IP networking.

Variable: Using the User Interface Control Knob, enter a subnet mask compatible with your LAN.

50.4 Static Gateway

Variable: Using the User Interface Control Knob, enter a gateway value compatible with your LAN.

NOTE: *Without a properly configured default gateway (whether you have a router/gateway or not), CION will be unable to see other CION units on the network, although you may still be able to control CION via a web browser.*

50.5 System Name

This parameter defines a name for CION and gives it a unique identifier. For example, this name is used when displaying systems via the web interface.

Variable: Using the User Interface Control Knob, enter a subnet mask compatible with your LAN.

The default System Name is CION. You may select characters to create an up to 20-character name. To edit a character:

1. Push in the User Interface Control Knob and turn it.
2. When you see the character you want, press the knob again.

The character set allowed is: **0** through **9**, **'-'**, **'.'**, **A** through **Z** (uppercase) and **a** through **z** (lowercase).

50.6 MAC Address

This parameter is an information-only field showing the MAC address of CION's ethernet adapter.

Information only display – Selecting this parameter allows you to view CION's ethernet MAC address. The MAC address is a unique value associated with the internal ethernet network adapter. MAC addresses are also known as hardware addresses or physical addresses. MAC addresses uniquely identify an ethernet adapter on a LAN. MAC address format: **MM:MM:MM:SS:SS:SS**. The value is 12-digit hexadecimal.

50.9 User Authentication

This parameter enables or disables an authentication login requirement when using the web UI. By default this parameter is set to "Disabled."

If you select "Login" via the front panel interface and then attempt to use the web UI interface, you will be asked for a login password. The web browser will present the login screen requesting that a password be entered before you can access any other parameter or configuration screen.

The password is initially set to the default value: password.

If you select Login for the User Authentication parameter via the web UI, you may enter a user-selected password. As long as the menu parameter is not changed to "Disabled," the password requirement will remain in effect. Any time the web UI is accessed, the login password will be requested before additional access to any other web UI parameter or configuration screen will be granted. If you enter a user-selected password, be aware that this password will be retained and you will need to remember the password. If the user-entered password is forgotten, contact AJA Technical Support to perform a hard factory reset.

55.4 Date Set

This parameter manually sets the calendar date of the internal CION clock. The value is defined as **MM/DD/YYYY** (month/day/year).

Variable: To edit these values:

1. Press in on the User Interface Control Knob and rotate the knob until the desired number is reached.
2. Push in on the knob again to select the number.
3. Continue this process until an "Accept" prompt appears. If you want the value you have entered, press in on the User Interface Control Knob.
4. If it is not what you want, rotate the User Interface Control Knob and the "Reject" prompt will appear. Push in on the knob to reject the value and begin editing the values again.

Hint: *You may find it simpler to configure date and time settings via the web interface compared to using the physical User Interface Control Knob.*

55.6 Time Set

This parameter manually sets the time of the internal CION clock. The value is defined as Hours: Minutes (24 hour).

Variable: To edit these values:

1. Press in on the User Interface Control Knob and rotate the knob until the desired number is reached.
2. Push in on the knob again to select the number.
3. Continue this process until an "Accept" prompt appears. If you want the value you have entered, press in on the User Interface Control Knob.

   If it is not what you want, rotate the User Interface Control Knob and the "Reject" prompt will appear. Push in on the knob to reject the value and begin editing the values again.

Hint: *You may find it simpler to configure date and time settings via the web interface compared to using the physical User Interface Control Knob.*

55.7 Time Zone

This parameter manually selects the time zone for the internal CION clock.

Table 3. CION Time Zone Options

GRASS VALLEY (default)	AZORES	KUWAIT	BEIJING
LOS ANGELES	LISBON	JEDDA	MANILA
DENVER	LONDON (GMT)	MOSCOW	TAIPEI
MEXICO CITY	MADRID	TEHRAN	SEOUL
DALLAS	PARIS	ABU DHABI	TOKYO
CHICAGO	AMSTERDAM	KABUL	GUAM
DETROIT	ROME	NEW DELHI	SYDNEY
WASH DC	BERLIN	COLOMBO	AUCKLAND
NEW YORK	VIENNA	DHAKA	HONOLULU
MONTREAL	ATHENS	BANGKOK	ANCHORAGE
BOSTON	HELSINKI	HANOI	SEATTLE
CARACAS	CAIRO	SINGAPORE	
BUENOS AIRES	TEL AVIV	JAKARTA	
RIO DE JANEIRO	BEIRUT	HONG KONG	

55.71 Daylight Savings

Determines whether or not the time settings are adjusted for Daylight Savings.

These are the options:
- **ON** (default)
- OFF

NOTE: *The Time Zone and Daylight Savings parameters allow local time to match system time. Selecting the time zone and daylight savings offsets a GMT value by an appropriate amount; this allows file creation time and the Time of Day timecode value to match.*

70.1 Screen Saver

You may enable the screen saver to protect the life of the built-in screen. When working in a normal production environment you may want to disable the screen saver.
- **On** (AJA Logo) (default)
- Off
- System Name

70.2 Display Intensity

The intensity of the backlighting of the keys and the user interface screen may be adjusted using this parameter.

Variable: **4** (default)

(Variable 1 (dimmest) – 8 (brightest)

70.3 Fan Speed

This parameter determines the speed of CION's internal cooling fan.

- **Quiet Auto** (default) – The fan runs at normal speed until recording begins then the fan ramps down to a slower speed for optimum quiet
- Normal – The fan runs at a fixed speed for optimum cooling in normal temperature conditions
- High Temp – The fan runs at a higher fixed speed for optimum cooling in high temperature conditions
- High Temp Auto – The fan runs at variable speeds for optimum cooling in high temperature conditions

NOTE: *High temperature conditions include not only high ambient temperature (above 40C/104F), but also high altitude (5000 ft./1524M or greater of elevation) or direct sun exposure which may result in greater than normal operational temperatures. In high temperature conditions, if the unit is not properly cooled, an over temperature alarm will appear. If the over temperature alarm appears, be sure to adjust this menu parameter to the High Temp setting before continuing to record. If the unit should experience an extended over temperature, it will shut down to protect itself from damage.*

80.1 Serial Number

This parameter is an information-only field displaying CION's unique serial number.

80.2 SW Version

This parameter is an information-only field displaying CION's software version level.

91.1 Recall Preset

This parameter allows the recall of a previously saved preset (stored using parameter 92.1).

To select a preset:

1. Press in on the User Interface Control Knob and rotate the knob until the desired number is reached.
2. Push in on the knob again to select the number.
3. Rotate the knob again until the "Accept" prompt appears. If you want the value you have entered, press in on the User Interface Control Knob.

   If it is not what you want, rotate the User Interface Control Knob and the "Reject" prompt will appear. Push in on the knob to reject the value and begin editing the values again.

92.1 Store Preset

This parameter allows a preset to be stored (recall a preset using parameter 91.1).

To save a preset:

1. Press in on the User Interface Control Knob and rotate the knob until the desired number is reached.
2. Push in on the knob again to select the number.
3. Rotate the knob again until the "Accept" prompt appears. If you want the value you have entered, press in on the User Interface Control Knob.

    If it is not what you want, rotate the User Interface Control Knob and the "Reject" prompt will appear. Push in on the knob to reject the value and begin editing the values again.

99.0 Factory Reset

To reset to CION's factory default settings, select this parameter then press and hold the User Interface Control Knob for two seconds.

NOTE: *Recalling factory defaults does not reset:*

- IP Config
- IP Address
- Subnet Mask
- Default Gateway
- System Name
- Date and Time

Helpful Hint: To reset a specific parameter to the factory default value, depress and hold the User Interface Control Knob for 3 continuous seconds.

MEDIA Menu Parameters

The MEDIA Menu contains configuration options for:

- Encoding type
- Clip naming
- Playback settings

Press the MEDIA Menu Button to enter the MEDIA menu parameters.

NOTE: *The default parameter in the following menus is highlighted by bold typeface.*

12.1 Media State

This parameter applies to using the CION to transfer data.

These are the options:

- **Record-Play** (default) – Use media to record and play video
- Data-LAN – LAN data may be uploaded/downloaded to/from CION

For normal video operation, select Record-Play. For data transfer using an Ethernet LAN, choose Data-LAN. The Data Media State allows valid media to be copied to or from the CION.

If the state is designated as Data, the transport functions are locked— media cannot be recorded or played back as video.

You can still access MEDIA menu parameters, however, so you can reset the parameter. If you attempt to playback or record while in the Data mode, a "CHANGE MEDIA STATE" prompt alerts you that you cannot use the transport functions. Additionally, the front panel UI states that the unit is in a "DATA MEDIA STATE" in an obvious way as opposed to presenting the typical clip, reel, timecode, etc. usually seen on the front panel.

After you select the data state, you can connect CION to a host computer via the LAN connection. The DATA MEDIA STATE does not survive reboots or power cycles of the device. After such an event, it returns to the default Record-Play mode.

When CION is in the Media State and the Data - LAN selection is used, only the web UI for control and configuration of CION may be used for data transfer. The web UI will present "Upload+" and "Download+" buttons in the All Clips portion of the UI. If the Data- LAN state is not active, these buttons do not appear in the web UI.

14.1 Encode Type

This parameter defines the Apple ProRes encoding method. The Encode Type is impacted by the 23.2 Frame Rate selection in the FPS menu.

These are the options:
- ProRes 444 (default for up to 30fps) – Records Apple ProRes 444 files
- ProRes 422 (HQ) – Records Apple ProRes 422 (HQ) files
- ProRes 422 (default for 50+ fps) – Records Apple ProRes 422 files
- ProRes 422 (LT) – Records Apple ProRes 422 (LT) files
- ProRes 422 (Proxy) – Records Apple ProRes 422 (Proxy) files

NOTE: *The Encode Type selections will update automatically based on the 23.2 Frame Rate selection and only supported encoding types will be offered for a given frame rate.*

15.1 Play Media

This parameter determines behavior during playback of recordings.

These are the options:
- **One** (default) – Plays one clip and then stops playback
- All – Plays the current clip and then continues playing the subsequent clips on the media
- Playlist – Plays clips from a user created list
  (Playlists are created using the web UI discussed in *"Chapter 6: Web Browser Remote Control on page 66"*.)

NOTE: *With **ALL** or **Playlist** options selected, CION will play all clips back regardless of format or frame rate but you may notice the video monitor reset for format/frame rate changes. If all clips are the same format and frame rate, clips play out smoothly one after another.*

15.2 Loop Play

This parameter turns looped playback on or off.

These are the options:
- **Off** (default) – Play clips and then stop playback when complete
- On – Play clips and then loop back and repeat playback

15.3 Playlist

This parameter displays the name of the selected playlist.

Variable: The name of the selected playlist appears. If no playlist is selected via the web UI controls, then no name appears.

NOTE: *The user cannot select or create playlists from the front panel UI; these tasks are handled using the web UI.*

15.4 Dropped Frames

This parameter determines how playback handles dropped frames.

These are the options:
- **Continue** (default) – If playback of a clip begins to drop frames, playback continues
- Stop – If playback of a clip begins to drop frames, playback stops

16.1 Format Media

This parameter is used to format the media.

These are the options:
- **KEEP MEDIA** (default) – No action is taken
- FORMAT (Prompt verification) – Begins the media formatting process

1. Rotate the User Interface Control Knob until "Format" appears. Push in on the User Interface Control Knob.
2. Press and hold in the User Interface Control Knob as instructed by the prompt for two seconds (or longer) and then the formatting will begin.

NOTE: *You may select any other key to abort the format operation.*

3. CION will display formatting progress and, when done, will display a completion confirmation.

    Caution! *Be sure to have already backed up your previous recordings before formatting media. Best practice is to format media prior to each use to avoid media directory issues that may occur over time.*

16.2 Delete Clips

This parameter can be used to delete all of the clips on the media.

These are the options:
- **KEEP CLIPS** (default) – No action is taken
- DELETE ALL (Prompt verification) – Begins the deletion of clips on the media

NOTE: *Typically if you want to remove all clips from your media, formatting the media is the best practice method. In some situations, quickly deleting all clips on the media to begin recording immediately may be preferred.*

16.25 Delete Clip: <Clip name appears here>

This parameter can be used to delete a selected clip from the media.

These are the options:

- **KEEP CURRENT CLIP** (default) – No action is taken.
- DELETE (Prompt verification) – Begins the deletion of the selected clip.

Before performing the deletion of a specific clip:

1. In the default user interface mode, rotate the User Interface Control Knob to browse through the clips on the Pak media.
2. When you find the clip you want to delete, press the Stop Button.
3. Press the MEDIA menu button, navigate to the 16.25 Delete Current Clip.
4. Press in on the User Interface Control Knob, select "Delete" and press in on the knob again.
5. Follow the prompt information to delete the clip.

NOTE: *After you have deleted a clip using this method, the media will be put into "play pause" mode. This allows you to easily review other takes or clips that you may wish to delete. If you do not wish to delete any additional clips or takes, simply depress the stop button to return to the E-to-E/record standby mode.*

17.0 Preset Reel Name

This parameter determines the reel name associated with all clips generated while using this setting.

These are the options:

- 001 to 999 – Select a value between 001 to 999

The reel name is a number between 001 and 999. It is historically linked to the naming conventions used for film and tape-based media.

The Preset Reel Name parameter may also be used to determine the name of the media as it will appear when mounted on a computer as a volume if the value is set and media is formatted using the Format Media menu parameter.

17.1 Camera Name

This parameter defines a letter designation for recordings when using the 17.7 Combined Name menu parameter.

- A to Z – Selects a value between A and Z

NOTE: *The Camera Name is not part of a clip name unless the 17.7 Combined Name menu parameter is enabled.*

17.2 Clip Name

This parameter determines the clip name associated with all clips generated while using this setting. The clip name is either "Clip" or "SC".

These are the options:

- **SC** (default) – Clips generated will have filenames beginning with "SC"
- Clip – Clips generated will have filenames beginning with "Clip"

The following examples illustrate how clip names are generated.

In the example that follows, "TK" is a default append to the naming convention just prior to the auto-incrementing TK value (which can be manually overridden via parameter 17.8 Take).

CION offers these parameter choices for easy identification of the QuickTime files so that the names can logically match the shooting script and are acceptable when imported into various non-linear editors such as Final Cut Pro X's Events, Avid Media Composer's Bins, etc.

Example 1 using the factory default AJA parameter settings:

- Reel Name 001
- Clip Name SC
- Clip Number 1
- Clip Append Alpha
- Alpha Append A
- Take 1

The resulting clip would be named and displayed as: "SC1ATK1". The media would be named "001" if mounted on the OS X desktop as a volume.

17.3 Clip Number

This parameter determines the clip number, from 1 to 999, that follows the CLIP NAME, and is associated with all clips generated while using this setting.

These are the options:

- 1 to 999 – Selects a value between 1 and 999

17.4 Clip Append

This parameter is used with parameter 17.5 Alpha Append to either:

- Append a text value after the Clip Number
- Have no text appended

These are the options:

- **None** (default) – No text is appended to the Clip Name and Clip Number
- Alpha – The text value entered in Alpha Append is appended to the Clip Name and Clip Number

17.5 Alpha Append

This parameter is used with parameter 17.4 Clip Append to append a text value after the Clip Number.

These are the options:

- A to Z – Selects a value between A and Z

17.6 Take

This parameter determines the TAKE number, from 1 to 999, that follows the Clip Name and Clip Number, followed by any Alpha Append (if selected). This Take number is generated for all clips while using this setting.

These are the options:

- 1 to 999 – CION automatically generates a TAKE number, but if you want to adjust it, enter a value here.

Clip & Take Rules: CION follows these Clip and Take rules:

1. CION will not overwrite an existing clip
2. The Take number will auto-increment past existing numbers for the "prefix" as defined by
   - Clip Name
   - Clip Number
   - Clip Append
   - Alpha Append
   - Take settings
3. If the number is at "999", CION will record a clip with take 999, but then cannot auto advance. The second attempt to record will generate a "**Name In Use**" alarm. This prompts you to select new Clip Name, Clip Number, Clip Append, Alpha Append, and Take settings so that a new unique "prefix" is created. This action ensures files are unique and understandable, and that clips are never overwritten.

NOTE: *999 is the maximum take number value.*

17.7 Combined Name

This parameter combines the Camera Name, the Reel Name, Clip Name, Clip Number, Clip Append, Alpha Append and Take into a single file name.

- **Off** (default) – The combined clip name is not enabled
- On – The combined clip name is enabled
    Example: A001SC1ATK1

19.1 Use Custom Clip Name

This parameter enables or disables whether a custom clip name can be used via menu parameters 19.1, 19.2, and 19.4, or via the web UI.

These are the options:

- **OFF** (default) – Disables the ability to define a custom name for a clip
- ON – Enables the ability to define a custom name for a clip

IMPORTANT: Certain characters may not be allowed or supported if entered for a clip name. Examples include: punctuation marks (other than internal spaces or periods), special characters (like @), and non-ASCII UTF-8 characters are rejected outright.

NOTE: *Non-UTF-8 characters appear in some languages, like Chinese and Japanese, and are not supported.*

Custom clip names can be created via the front panel UI menu parameters (19.1, 19.2, and 19.4). However, using the web UI entry fields is a more efficient option. When entering characters for a custom clip name, you must scroll through all characters until you reach the end of the name space before the name is accepted.

19.2 Custom Clip Name

This parameter defines a custom clip name. The custom name is defined via the front panel select and adjust up/down arrows. The default is "CUSTOM".

These are the options:
- Variable – Using the User Interface Control Knob, enter a custom clip name
- **Default name**: CUSTOM

19.4 Custom Take

This parameter defines a custom take number.

These are the options:
- 1 to 999 – Selects a value between 1 and 999

NOTE: *999 is the maximum take number value.*

22.1 Gang Clip Name

This parameter is used when performing gang recording via multiple CION units (refer to *"Gang Recording with Multiple CIONs" on page 74*). If the desire is to have clips named the same across all CION ganged units' recordings, then use the "Master Name" selection in this parameter. If the desire is to have clips named independently on CION units, then "Slave Name" should be selected. Selecting "Slave Name" means that the recording will take its name from the individual CION's parameters and not accept the value pushed to the Slave by the Master CION unit.

These are the options:
- **Master Name** (default) – Enable clips to be named the same across all CION ganged units
- Slave Name – Name clips independently on CION units

NOTE: *Most gang controls are only available in the web user interface.*

FPS Menu Parameters

FPS contains configuration options for the format and frames per second.

Press the FPS Menu Button to enter the FPS menu parameters.

NOTE: *The default parameter in the following menus is highlighted by bold typeface.*

23.1 Format

- **4K** (default) – Configures the camera for 4K (4096x2160) progressive
    This impacts recording and video outputs.
- Ultra HD – Configures the camera for Ultra HD (3840x2160) progressive
    This impacts recording and video outputs.
- 2K – Configures the camera for 2K (2048x1080) progressive
    This impacts recording and video outputs.
- 1080p – Configures the camera for 1080 HD (1920x1080) progressive
    This impacts recording and video outputs.
- 1080i – Configures the camera for 1080 HD (1920x1080) interlaced
    This impacts recording and video outputs.

23.2 Frame Rate

- 23.98 – Recordings are 23.98 fps
- 24 – Recordings are 24 fps
- 25 – Recordings are 25 fps
- 29.97 – Recordings are 29.97 fps
- 30 – Recordings are 30 fps
- 50 – Recordings are 50 fps (14.1 Encode Type must be configured for ProRes 422 or a lower data rate ProRes version.)
- 59.94 – Recordings are 59.94 fps (14.1 Encode Type must be configured for ProRes 422 or a lower data rate ProRes version.)
- 60 – Recordings are 60 fps (14.1 Encode Type must be configured for ProRes 422 or a lower data rate ProRes version.)
- 119.88 – On-board recording of 119.88 fps is not supported

    It is for SDI RAW output only.
- 120 – On-board recording of 120 fps is not supported

    It is for SDI RAW output only.

NOTE: *23.98, 24, 50, 59.94, & 60 are not supported frame rates when 23.1 Format is configured for 1080i.*

IMPORTANT: *If the camera is powered off or re-booted, the selection of 119.88 or 120 fps is **not** maintained. The camera will re-start with the default frame rate of 23.98 if either 119.88 or 120 fps was selected prior to power cycling the camera. You must reset the camera to 119.88 or 120 fps if that is desired after every re-boot or power cycle.*

NOTE: *During frame rate value changes the UI screen and the video output will go to black. Once the frame rate value is reset, picture will reappear on the UI screen and the video outputs.*

23.3 Slow Motion

- **OFF** (default)
- 59.94>23.98 – Appears if the 23.2 Frame Rate parameter is set to 59.94. 23.98 fps slow motion files are produced
- 59.94>29.97 – Appears if the 23.2 Frame Rate parameter is set to 59.94. 29.97 fps slow motion files are produced
- 60>30 – Appears if the 23.2 Frame Rate parameter is set to 60. 30 fps slow motion files are produced
- 50>25 – Appears if the 23.2 Frame Rate parameter is set to 50. 25 fps slow motion files are produced

Helpful Hint: Be sure that the 23.2 Frame Rate is set for one of the higher frame rates to enable the Slow Motion feature. The menu parameter will not appear if a higher frame rate selection of 50, 59.94 or 60 fps has not been made.

NOTE: *Slow motion only works for ProRes 422 or a lower data rate ProRes version.*

Special Considerations for Format and Frame Rate Selections

23.1 Format, 23.2 Frame Rate, 14.1 Encode Type and 1.6 SDI Out selections all work in conjunction when configuring CION.

The following is a list of the supported combinations.

4K:
- 4K (4096x2160) progressive:
  - 23.98/24/25/29.97/30
  - 50/59.94/60
  - 119.88/120
- Apple ProRes 444 or Apple ProRes 422 (all versions) up to/including 30 frames per second.
- Apple ProRes 422 or a lower data rate ProRes versions for 50/59.94/60 frames per second.
- SDI output support for 23.98/24/25/29.97/30 frames per second (SDI 1-4 YCbCr, SDI 1-4 RGB or SDI 1 RAW)
- SDI output support for 50/59.94/60 frames per second (SDI 1-4 YCbCr or SDI 1-2 RAW)
- SDI output support for 119.88/120 frames per second (SDI 1-4 RAW)

Ultra HD:
- Ultra HD (3840x2160) progressive:
  - 23.98/24/25/29.97/30
  - 50/59.94/60
  - 119.88/120
- Apple ProRes 444 or Apple ProRes 422 (all versions) up to/including 30 frames per second
- Apple ProRes 422 or a lower data rate ProRes versions for 50/59.94/60 frames per second
- SDI output support for 23.98/24/25/29.97/30 frames per second (SDI 1-4 YCbCr, SDI 1-4 RGB or SDI 1 RAW)
- SDI output support for 50/59.94/60 frames per second (SDI 1-4 YCbCr or SDI 1-2 RAW)
- SDI output support for 119.88/120 frames per second (SDI 1-4 RAW)

2K:
- 2K (2048x1080) progressive:
  - 23.98/24/25/29.97/30
  - 50/59.94/60
- Apple ProRes 444 or Apple ProRes 422 (all versions) up to/including 30 frames per second
- Apple ProRes 422 (all versions) for 50/59.94/60 frames per second
- SDI output support for 23.98/24/25/29.97/30 frames per second (SDI 1 YCbCr, SDI 1-2 RGB, or SDI 1 RGB)
- SDI output support for 50/59.94/60 frames per second (SDI 1-2 YCbCr or SDI 1 YCbCr)

1080 HD Progressive: • 1080 HD (1920x1080) progressive:

  – 23.98/24/25/29.97/30

  – 50/59.94/60

• Apple ProRes 444 or Apple ProRes 422 (all versions) up to/including 30 frames per second.

• Apple ProRes 422 (all versions) for 50/59.94/60 frames per second

• SDI output support for 23.98/24/25/29.97/30 frames per second (SDI 1 YCbCr, SDI 1-2 RGB, or SDI 1 RGB)

• SDI output support for 50/59.94/60 frames per second (SDI 1-2 YCbCr or SDI 1 YCbCr)

1080 HD Interlaced: 1080 HD (1920x1080) interlaced:

  – 25/29.97/30

• Apple ProRes 422 (all versions) up to/including 30 frames per second.

• SDI output support up to/including 30 frames per second (SDI 1 YCbCr)

EI Menu Parameters

Press the EI Menu Button to enter the EI menu parameters.

24.1 EI

This menu parameter offers exposure index value selections. Typically, lower exposure index values are desirable for outdoor shooting or when the lowest possible noise is desired. Higher exposure index values will be more often used when there are limitations with lighting.

These are the options:

• **320** (default) – Sets the exposure index to a value that is useful when working with controlled lighting or shooting outdoors

  The EI 320 selection offers a wide range of accompanying gamma and color correction selections.

• 500 – Sets the exposure index to a value that is useful when working with controlled lighting

  The EI 500 selection offers a wide range of accompanying gamma and color correction selections.

• 800 – Sets the exposure index to a value that is useful when working with lower light conditions

  The EI 800 selection limits the use of some gamma and color correction selections.

• 1000 – Sets the exposure index to a value that is useful when working with low light conditions

  The EI 1000 selection limits the use of gamma and color correction selections.

NOTE: *During EI value changes the UI screen and the video output will go to black. Once the EI value is reset, picture will reappear on the UI screen and the video outputs.*

24.2 Shutter Type

This menu parameter determines how the shutter information will be displayed.

These are the options:

- **Angle** (default) – Values in degrees that would correspond to a physical shutter will be displayed such as 180
- Speed – Fractional time values will be displayed for the shutter such as 1/48

NOTE: *When Speed is selected, menu parameter 24.3 is displayed as Shutter Speed. When Angle is selected, menu parameter 24.3 is displayed as Shutter Angle.*

NOTE: *CION does not feature a physical shutter; shutter angle is referenced because users with a film background may find this description more accessible.*

24.3 Shutter Speed

The shutter speed values will differ depending on the frame rate.

Table 4. Shutter Speeds Available (by Format)

23.98 & 24	25	29.97 & 30	50	59.94 & 60	119.88 & 120
1/24	1/25	1/30	1/50	1/60	1/120
1/48 (default)	1/30	1/50	1/60	1/100	1/200
1/50	**1/50** (default)	**1/60** (default)	**1/100** (default)	**1/120** (default)	**1/240** (default)
1/60	1/60	1/90	1/150	1/180	1/360
1/72	1/100	1/120	1/200	1/240	1/480
1/96	1/200	1/240	1/400	1/480	1/960
1/192	1/300	1/360	1/600	1/720	1/1440
1/288	1/600	1/720	1/1200	1/1440	1/2880
1/576					

24.3 Shutter Angle

The shutter angle values will differ depending on the frame rate.

Table 5. Shutter Angles Available (by Format)

23.98 & 24	25	29.97 & 30	50	59.94 & 60	119.88 & 120
360	360	360	360	360	360
180 (default)	300	216	300	216	216
172.8	**180** (default)	**180** (default)	**180** (default)	**180** (default)	**180** (default)
144	150	120	120	120	120
120	90	90	90	90	90
90	45	45	45	45	45
45	30	30	30	30	30
30	15	15	15	15	15
15					

NOTE: *In actuality, the 360 degree value is fractionally less than 360 degrees.*

Helpful Hint: If you are more familiar with still photography, you may find it useful to configure CION to display the shutter values as speeds and if you are more familiar with film or motion pictures, you may find it more useful to configure the CION to display shutter values as angles.

24.7 Gamma

This menu parameter determines whether a gamma setting will be applied to the video.

The options are:

- Disabled – No gamma curve is used
  (The image will have very high contrast when compared to the other selections where a gamma curve is applied.)

IMPORTANT: This selection should only be used when post-production color correction and image manipulation is planned; it is not intended for typical production use.

- Normal – This gamma curve produces very deep blacks and very rich colors
- **Normal Expanded** (default) – This gamma curve produces deep blacks and rich colors
  (The dynamic range is expanded when compared to the Normal selection.)

NOTE: *This selection is not available for EI 1000.*

- Video – This gamma curve produces blacks and color values more common to video production
  (The dynamic range is expanded when compared to the Normal and Normal Expanded selections.)

NOTE: *This selection is not available for EI 800 and EI 1000.*

- Expanded 1 – This is an expanded gamma curve which results in wider dynamic range

IMPORTANT: This selection should only be used when post-production color correction and image manipulation is planned.

NOTE: This selection is not available for EI 800 and EI 1000.

WB Menu Parameters

The WB menu contains configuration options for the white balance, color, and saturation settings.

25.1 White Balance

This parameter allows for the selection of preset values for color temperature or the recall of an auto white balance value.

These are the options:

- **5600K** (default) – White balance value suitable for daylight balanced lighting
- 3200K – White balance value suitable for tungsten balanced lighting
- 4500K – White balance value suitable for mixed lighting or fluorescent lighting
- AWB – The white balance value is drawn from the Auto White Balance menu parameter
- Unity – The white balance correction is disabled.

NOTE: *If an auto white balance operation fails, the white balance will default to Unity.*

25.2 Auto White Balance

This parameter allows a scene average to be used for the color balance. You may find auto white balancing to produce the best possible results in mixed lighting or in situations where the preset white balance values provided in the 25.1 White Balance menu parameter do not meet the demands of the scene.

- **OFF** (default)
- SET (Push Selection Knob)

Helpful Hint: The use of a white card for white balancing is strongly recommended in order to produce optimal results. Place the white card in front of the lens so that it is evenly illuminated with the predominant light source for best results; be sure that the white card is not clipping by reviewing the histogram. If a white card is not available, you may still perform an auto-white balance, but be aware that the result may simply not be as accurate as when a white card is used. Also be aware that if the scene does not provide a sufficient amount of illuminated information, the auto white balance operation will fail and a warning prompt will be provided. If an auto white balance fails, the white balance will default to Unity.

Shortcut: You may perform an auto-white balance operation via the shortcut method of pressing and holding in the WB menu button for three seconds; you do not need to enter the Auto White Balance menu parameter to perform this operation.

25.3 Saturation

This parameter determines the total saturation of the image where:

- the value 100 is normal, producing full saturation of colors
- the value 0 is completely desaturated, producing a monochromatic black and white image

Variable: Value varies from 100 to 0.

NOTE: *An impact to the image does not occur until you select a new value and see it appear in yellow typeface; the image does not update dynamically as the value is changed.*

25.4 Color Correction

This parameter may be used to produce in-camera "looks" via color correction matrices.

- **Normal** (default) – This selection may be used throughout the majority of gamma and white balance combinations. Note that the Normal selection favors skin tones as opposed to overall color accuracy. Also note that this "look" may vary considerably depending upon the corresponding gamma selection used.

- Flat – This selection disables the in-camera color correction matrix. Images produced with this setting may require additional color correction in post-production.

- Skin Tones – This selection may be used to produce less saturated skin tone values when compared to the Normal color correction selection. When compared to the Normal color correction selection, an overall desaturation of colors occurs.

- Video – This selection may be used to produce color values more typically associated with traditional video cameras.

STATUS Menu

STATUS is not a configuration menu. It provides status information, warnings and alarms. A unique quality of this menu is that it may be entered at any time, even during recording or playback.

Pressing the STATUS Menu Button enters the menu. The first STATUS page shows the status of the recording being made or of the playback being performed. The second page shows the timecode settings for recording as set in CONFIG parameter 8.0. The third Status page shows Interval Recording status.

Warnings and Alerts

CION has been designed to display warnings and alarms. Some alarms will automatically be shown on the display. Others will only be seen by checking the STATUS display when pressing STATUS and then rotating the User Interface Control Knob.

You will initially be alerted to an alarm condition when all backlit keys flash to full intensity for 2 seconds.

Once there is an active alarm or warning, the STATUS Button light will blink for as long as the alarm is present. This indicates that the reasons for the alarm condition are still active—you can then press the STATUS Button to determine what the alarm condition is.

If there is more than one alarm, you may scroll through them by rotating the User Interface Control Knob.

CION features a variety of alarms to help you diagnose the condition of the unit, possible configuration issues, or possible signal issues.

Here is a list of warning messages and their meaning:

"Press Stop":   May appear if you attempt to enter the menu parameters while you are recording or playing back. If you want to enter the menu parameters, you must stop recordings or playback. (The only exception to this rule is the use of the STATUS menu which may be entered even during recording or playback to evaluate settings.)

|	
"WARNING Dropped Frames":	May appear if media is under-performing and cannot keep up with the data rate required to make a recording or perform a playback. If you see this prompt during recording, recordings will stop. If this prompt appears, you might consider backing up your current recordings and formatting the Pak media. For playback, you might simply re-attempt playback.
"WARNING Media Low":	Will appear when the Pak media only has 15% of capacity remaining. Media must be switched out when it reaches 10% of capacity. With 10% of media remaining, the "WARNING Media Full" prompt will appear.
"WARNING Media Unformatted":	May appear if CION does not recognize the file system on the Pak media or the media has never been formatted.
"WARNING Storage Removed":	Will appear if the media is removed without first hitting the Media Unmount Button to properly unmount it. In the event this happens, media immediately re-inserted into the CION may show clips as "N/A" and subsequent recordings may not be possible. To resolve this issue, mount the media on an Apple computer under Mac OSX, then remove and re-insert the media into your CION. If the media does not read properly, you will need to format it. Additionally, this alarm may lead to the "Please Reboot" prompt.
"WARNING Please Reboot":	Appears if Pak media was removed without the use of the Media Unmount Button and CION cannot continue operating and must be rebooted.
"WARNING Backup and Reformat":	May appear if the media has issues being mounted by CION. As the prompt indicates, it is best to back up the media by copying it to another hard drive or disk array and then reformat the media. Some signs that the media is in a read-only state: even though clips have been recorded to the media, "N/A" appears in the clip area of the UI, "Loading" appears in the clip area of the UI but does not eventually load a clip, or hitting the record button with all settings correctly configured for CION does not result in a recording.
"WARNING Media In Use":	Appears if you attempt an operation while the media is still performing a task; if the alarm persists, you may consider powering down the CION and evaluating the media on a computer.
"WARNING Name In Use":	Appears if the clip name specified in the naming parameters already exists on the media. This happens when take 999 is reached and no more take numbers are available. CION will refuse to overwrite the clip. You will have to delete the clip or select a new name.
"WARNING No Clip Name":	Appears if you attempt to record in gang mode using a non-existent custom clip name.
"WARNING Genlock Missing":	Appears if you choose "Ref In" for 6.1 Genlock and no genlock is detected on the selected input.
"WARNING Invalid Selection":	May appear if an unsupported menu selection has been made.
"AWB Failure":	This prompt may appear if you attempt to perform an auto white balance operation and the scene isn't sufficiently illuminated or is not adequate for the white balance operation.

Chapter 6: Web Browser Remote Control
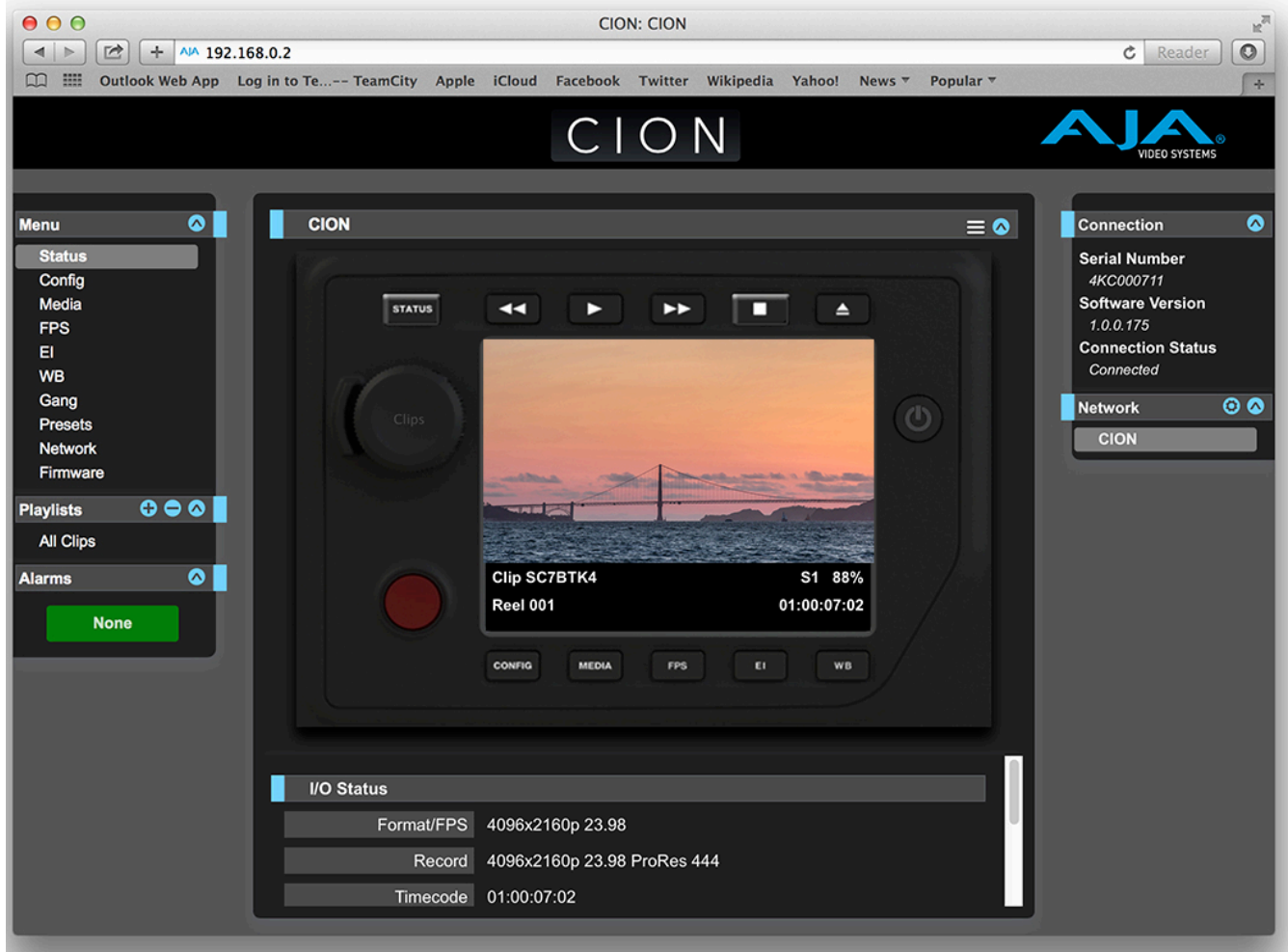
Overview

An optimized web server running on CION allows you to remotely monitor and adjust parameter settings via a a browser client running on a network wired computer. The network can be a closed local area network, a straight computer-to-CION cable connection, or even exposed through a firewall to a broadband WAN.

NOTE: *Exposing CION on a broadband WAN is not generally recommended since anyone on the internet could potentially access CION.*

The LAN connection on CION uses a standard RJ45 connector, but internally it's intelligent and communicates via standard "straight-through" CAT 5 ethernet cables or null-modem (cross-over) cables without any configuration or strapping required.

Preferred web browsers for CION control include:

- On the Mac OS
    - Safari
    - Firefox
- On the Windows OS
    - Chrome
    - Firefox

NOTE: *Other web browsers may work, but AJA cannot guarantee consistent operation for all web browsers or web browser versions. If you do experience an unexpected behavior when using a particular web browser or web browser version to interact with CION, consider using an alternate web browser and report any issues experienced to AJA Technical Support.*

To control CION remotely, connect a computer to the CION's LAN connector, an RJ45 socket, via a CAT5 ethernet cable.

To access CION, simply enter its URL in the web browser. The URL will be the IP address defined in CION's Network parameter menus (Please note that CONFIG menu parameters 50.1 through 50.4 must all be configured correctly to access CION on your network). If CION is using DHCP (the default), the IP address can be found by going to parameter 50.2 and reading it there. When CION is shipped from the AJA factory, it defaults to DHCP operation. The DHCP selection is most useful in studio settings where the camera or cameras may be connected to an existing IT infrastructure.

If 50.1 is set to DHCP, and the DHCP server on the network fails to grant an IP address, then CION's 50.2 DHCP Address menu parameter will simply display 0.0.0.0.
No connection to the device can be made with this address. Check with your network administrator if you experience issues connecting to the device over a DHCP network.

If 50.1 is set to Default Addr, the factory default static IP address 10.65.74.65 is used. So, if 50.1 is set to Default Addr, to see CION's web interface, you would type the following in the web browser:

> http://10.65.74.65

NOTE: *Your computer or network must be configured to access this IP address. You may need to make changes to your network settings on your host computer to access this IP address.*

Figure 18. Default IP Address Configuration
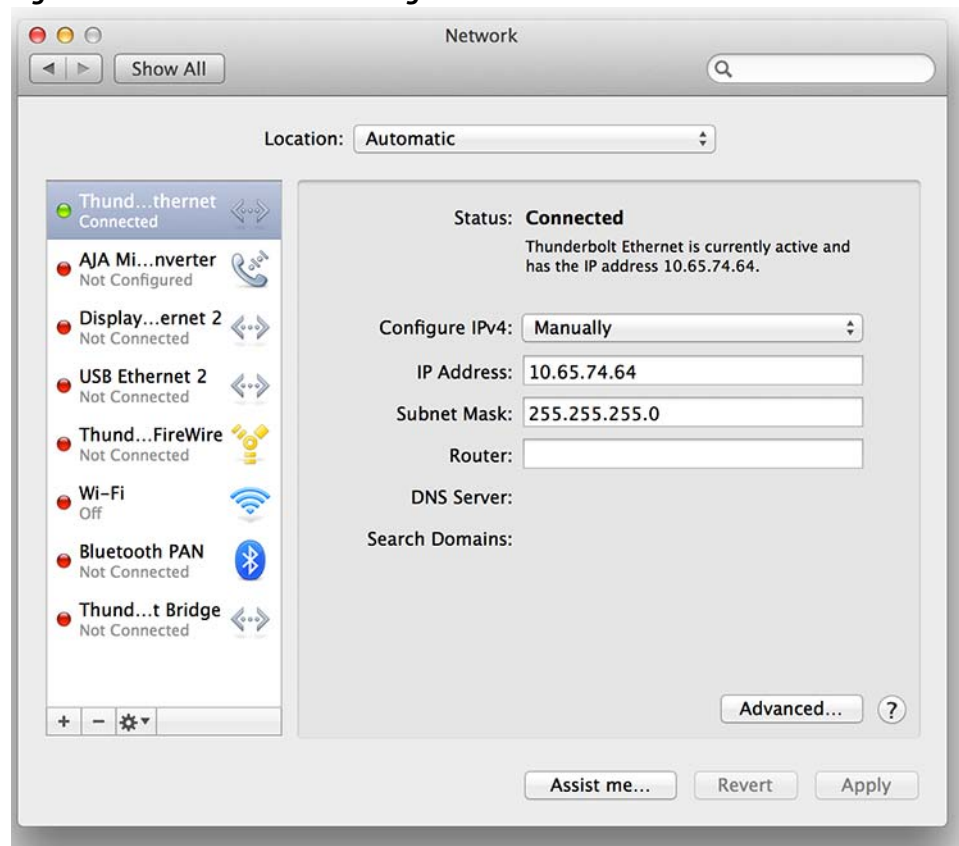
For direct connections between a computer and CION, you may elect to use the Static Addr selection. This allows you to select an IP address for CION and apply it. For example, you could enter **192.168.0.2** as an IP address. Then, to see CION's web interface, you would type the following in the web browser:

http://192.168.0.2

NOTE: *Your computer or network must be configured to access this IP address. You may need to make changes to your network settings on your host computer to access this IP address.*

NOTE: *If you change the Static IP address of the CION camera, you may need to power cycle the CION so that the host computer correctly identifies the new IP address.*

Figure 19. Static IP Address Configuration
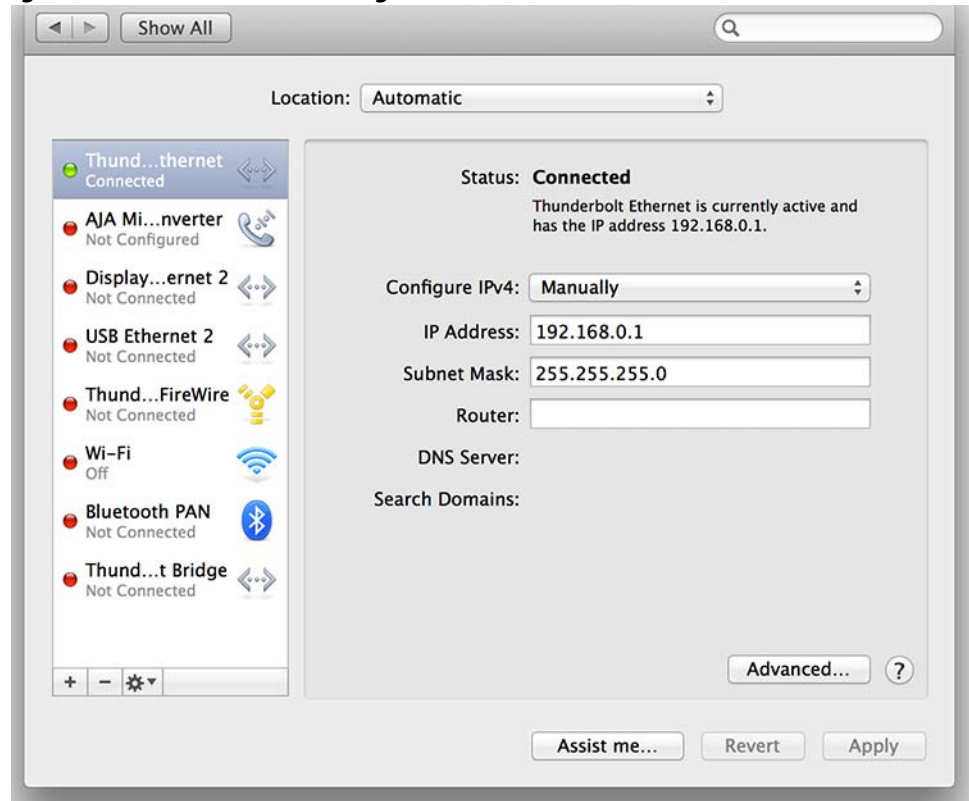
All CION web screens have certain areas in common. On the left of each screen is a Menu panel listing all the available CION screen choices. Click any of these items to jump to that screen. On the right side of each screen you'll also find a Connection panel. This area shows the connection status and CION's serial number and software version. This latter information is useful if you ever have to call AJA Technical Support to discuss a problem or get help.

Figure 20. CION Web UI CONFIG Screen
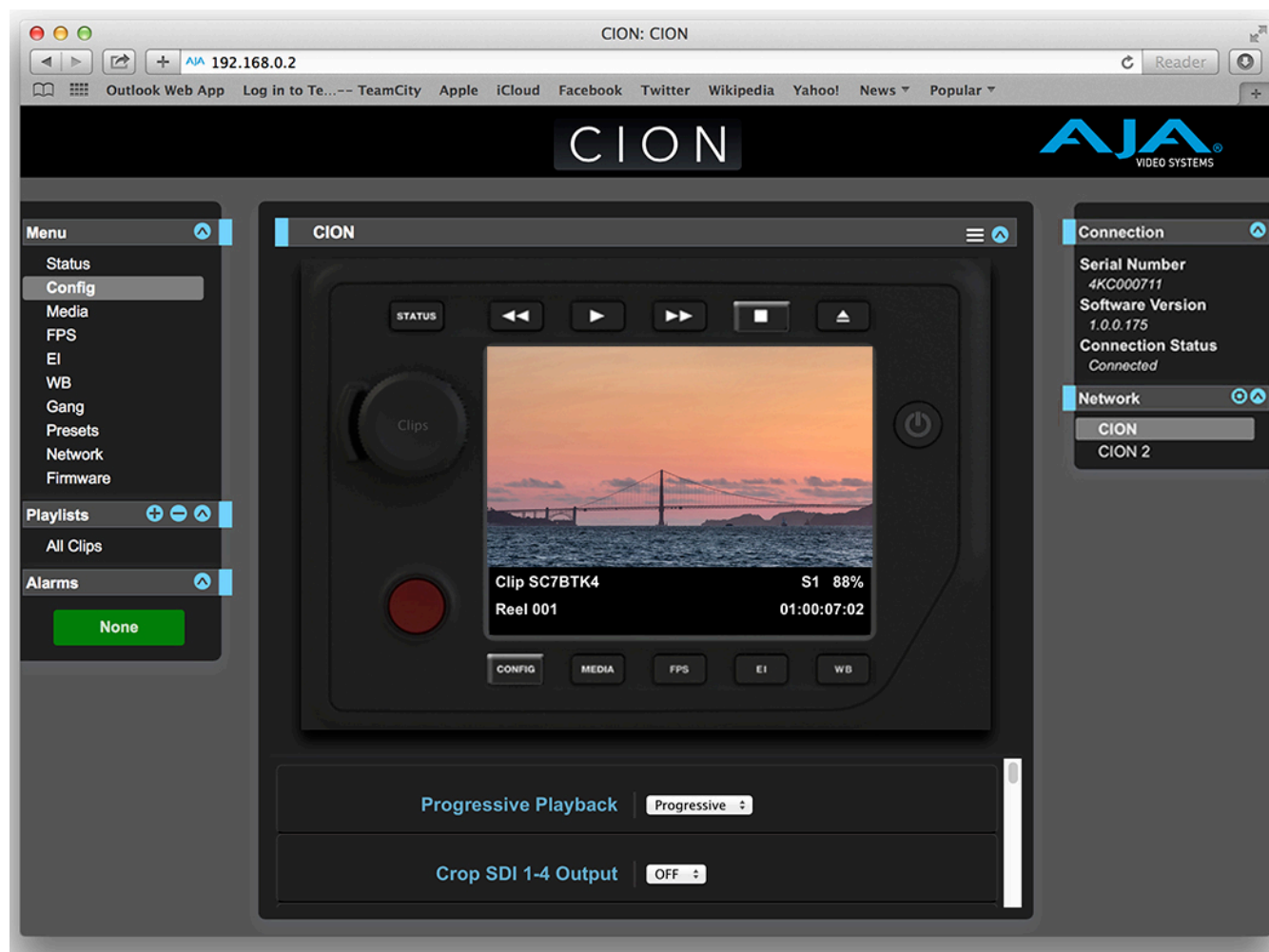
Below the Connection panel, the Network panel shows the CION systems on the network and allows you to switch control between systems. See *"Gang Recording with Multiple CIONs on page 74"* for additional information.

In the middle of each screen are menu choices and information pertaining to the subject matter of that screen. At the top of each screen is an emulation of the CION user interface.

CION web screens closely mirror the parameter menus displayed on its front panel.

If you are unsure about the operation of a menu parameter, hovering your mouse over the parameter name will bring up a tooltip for that parameter. Additionally, a pulldown menu above the emulation of the CION user interface area allows you to turn on tooltips for the buttons in this area.

The buttons in this area can also be used to access the menu parameters in the same way that the menu bar on the left hand side of the UI may be used. The transport buttons in this area may be used for clip playback operation. The UI Control Knob emulation in this area may be clicked to toggle from navigating clips to a jog playback mode. To navigate or jog, use a scroll wheel-based mouse or swipe up or down on a trackpad.

Operations Unique to the Web UI

Updating Firmware

The Update Firmware screen allows you to update your CION to later versions of software as they are issued by AJA and posted on the website. When software updates are released, they often contain new features, improvements, and bulletins that may be very useful. We suggest checking the website when you have time.

Figure 21. Update Firmware Screen
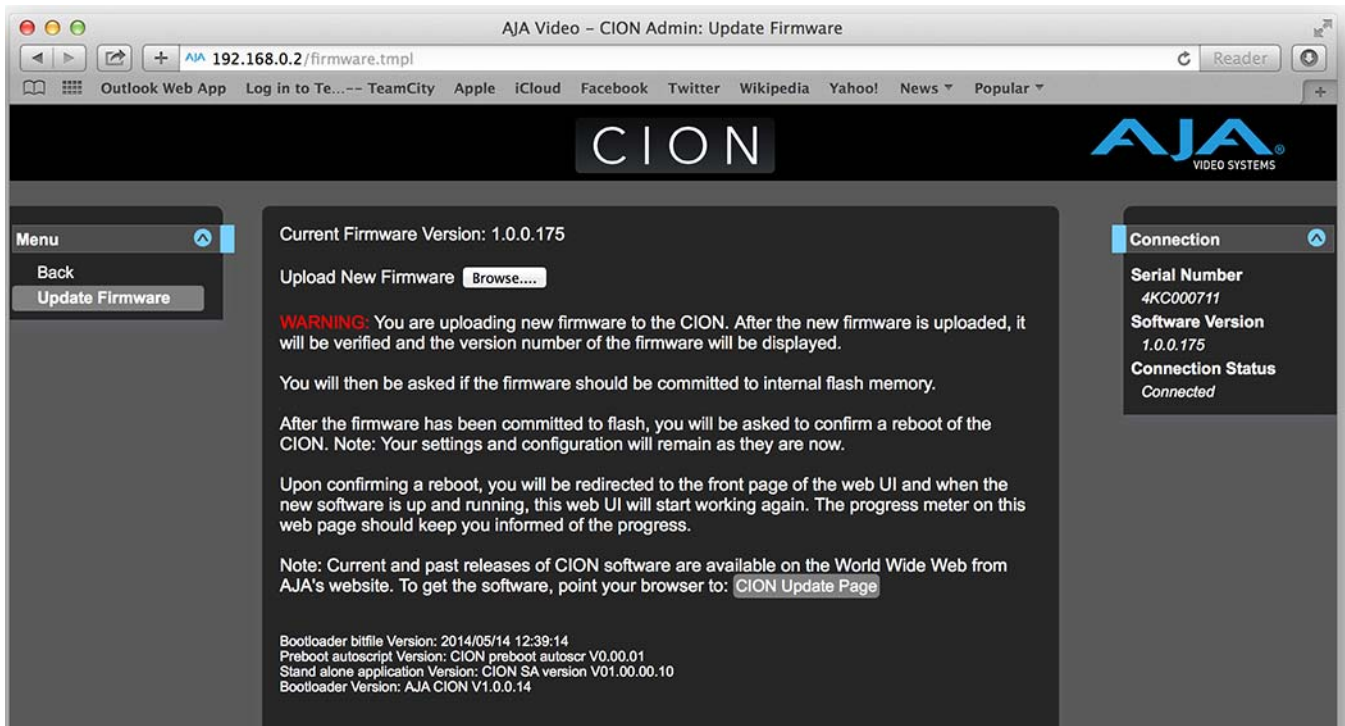
Although CION comes from the factory pre-installed with software, it may not be as up-to-date as the software currently posted on the AJA website. This topic describes the steps required to upgrade the software in your CION.

NOTE: *AJA recommends a Factory Reset under the CONFIG menu prior to updating firmware.*

1. Download the Latest CION firmware.

Current and past releases of CION firmware are available from AJA's website. To get the firmware, point your browser to:

www.aja.com/en/support/cion

Once you're at the update page, CION firmware files can be selected to download to your Mac or PC for upgrading you're CION.

2. Unpack the Software

CION software update files are "ZIP" files, which you can open with a number of standard and third-party applications. In some cases, these files may "decompress" automatically, such as when using Safari and Mac OS X. The firmware image that you'll install on CION is a file with a name like CION_1.0.0.153.bin or similar.

Depending on your PC or Mac operating system settings, the ".bin" extension may not be visible to you in a file directory.

Uploading and installing the firmware update only requires a PC or Mac that can "see" the CION via its ethernet connection. To install the firmware:

1. Be sure that you have configured your IP address information so that you can see CION with your web browser.

2. Once you have entered CION's IP address, choose the "Update Firmware" page link on the left side of any CION web page.

3. Click the "Browse..." button to select the file you previously downloaded. For example: CION_1.0.0.153.bin file.

4. When you have selected a valid CION .bin image file, click the "Upload" button in the web browser.

The file you select will upload to CION and be tested for validity. Incomplete, corrupted, or non-CION firmware files will be rejected.

5. Agree to the steps and confirmation prompts as they are presented. Wait for the procedure to complete—it will take only a few minutes.

When done, CION will prompt you to restart your machine. After restart, CION will be running the new software. Progress is shown on the front panel.

6. Once these steps are complete, CION will be running the firmware you just uploaded until the next time you upgrade it.

NOTE: *You may ensure the new software is running by bringing up the CION web page again. The software version is displayed at the top of all web screens. If for some rare reason it didn't update, you can then run through the update steps again.*

NOTE: *On some browsers, the Retry page may appear even though the firmware upgrade was successful. If this occurs, before clicking on retry, refresh the web page and check the version number. If the new version number appears at the top of the page, the firmware upgrade was successful. If the old version appears, click Retry.*

If there is a power outage or glitch during the firmware download, CION will boot the older software version and the upgrade process can then be re-started. This happens because CION has been designed with a safety feature where an internal "safe" copy of the previous software is retained in the event the updating process fails.

Caution! AJA recommends you only update the CION when on mains power, or with a fully charged battery.

Presets

The Presets screen allows you to save Preset Configurations into 20 separate memory registers and recall the presets whenever needed.

Figure 22. Presets Screen
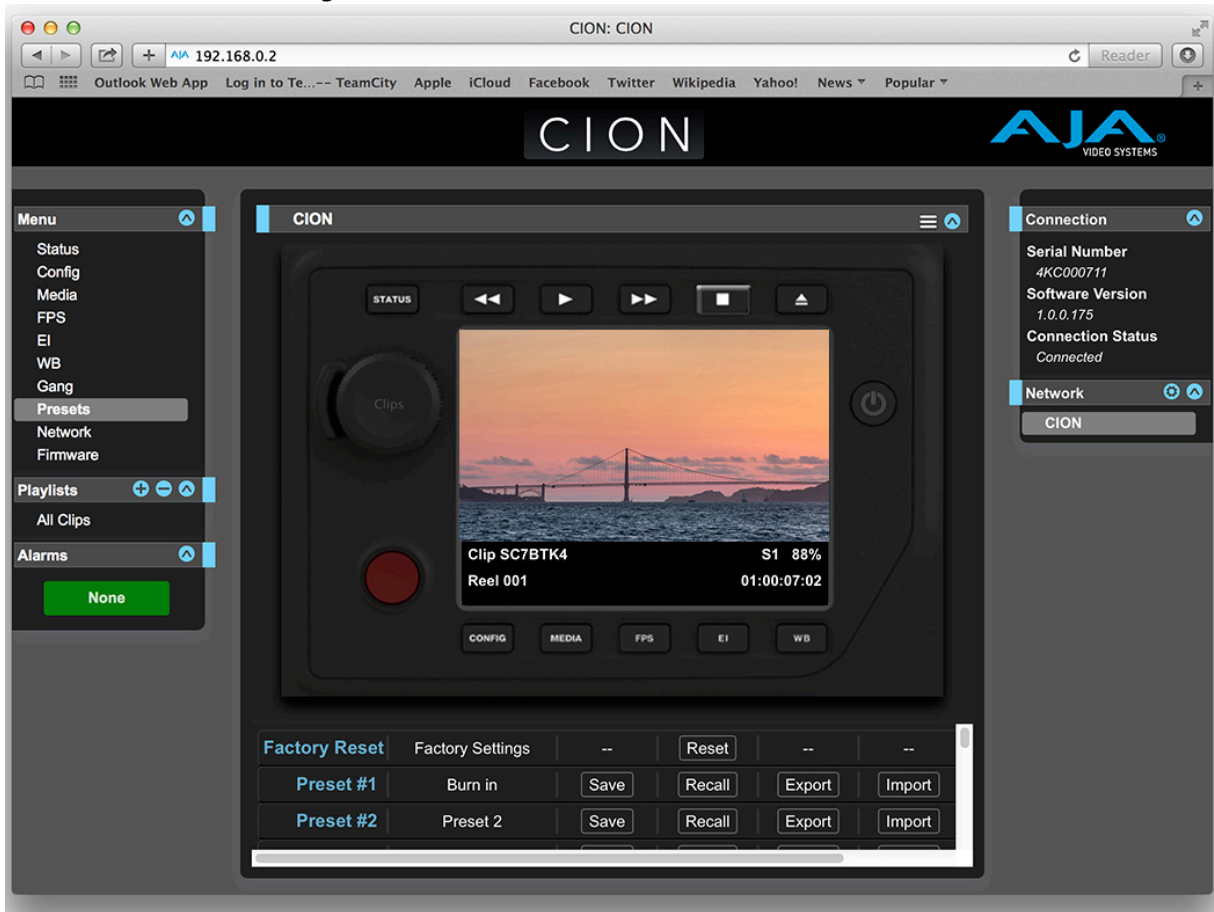
This screen also includes Export and Import functions that allow exporting one or all presets to your computer as files and importing exported preset files from your computer. A displayed message indicates successful or failed saves, recalls, exports, and imports.

Save Buttons: The Save buttons let you save the current configuration into the preset register with the associated name and number. A preset is a set of system parameters as they were set at the time the preset was stored. Only editable parameters are saved in the presets. Non-editable parameters are not saved.

To change a preset name, click in the name's text field and type a new name. Then press Enter.

When you recall a Preset Configuration, the recalled preset immediately replaces the system's existing configuration. All previous settings are lost unless you have previously stored them in another preset configuration or an exported file.

Import Buttons: The Import buttons let you browse for and import a preset file on your computer into the preset register associated with the selected button. A dialog box warns you that the operation will overwrite the current preset contents with the contents stored in the file.

Import Presets 1-20 lets you browse for and import a previously exported *all.presets* file from your computer. A dialog box warns you that the operation will overwrite all 20 current preset contents with the contents stored in the file.

Export Buttons: The Export buttons save the associated preset contents to a file on your computer. The file gets exported to the default download location specified in your browser options. The file name is the same as the preset name with the suffix *.presets*. If you export multiple files for the same preset, a number gets appended to ensure a unique file name. The file size is small, usually less than 10 kilobytes.

Export Presets 1-20 lets you save the contents of all presets to a file on your computer. The file gets exported to the default download location specified in your browser options with the name *all.presets*. If you export multiple files, a number gets appended to ensure a unique file name.

Recall Factory Preset: Recall Factory Preset recalls all editable video and audio parameters to their factory default settings. Individual presets, user preferences, and Network settings, such as the IP Address, are not affected.

Gang Recording with Multiple CIONs

At-a-glance you can see all of the CION systems that are present on the same local LAN in the Connection section of the web UI. Their system names are shown in the Network panel on the right side of the screen.

Figure 23. Gang Recording Screen
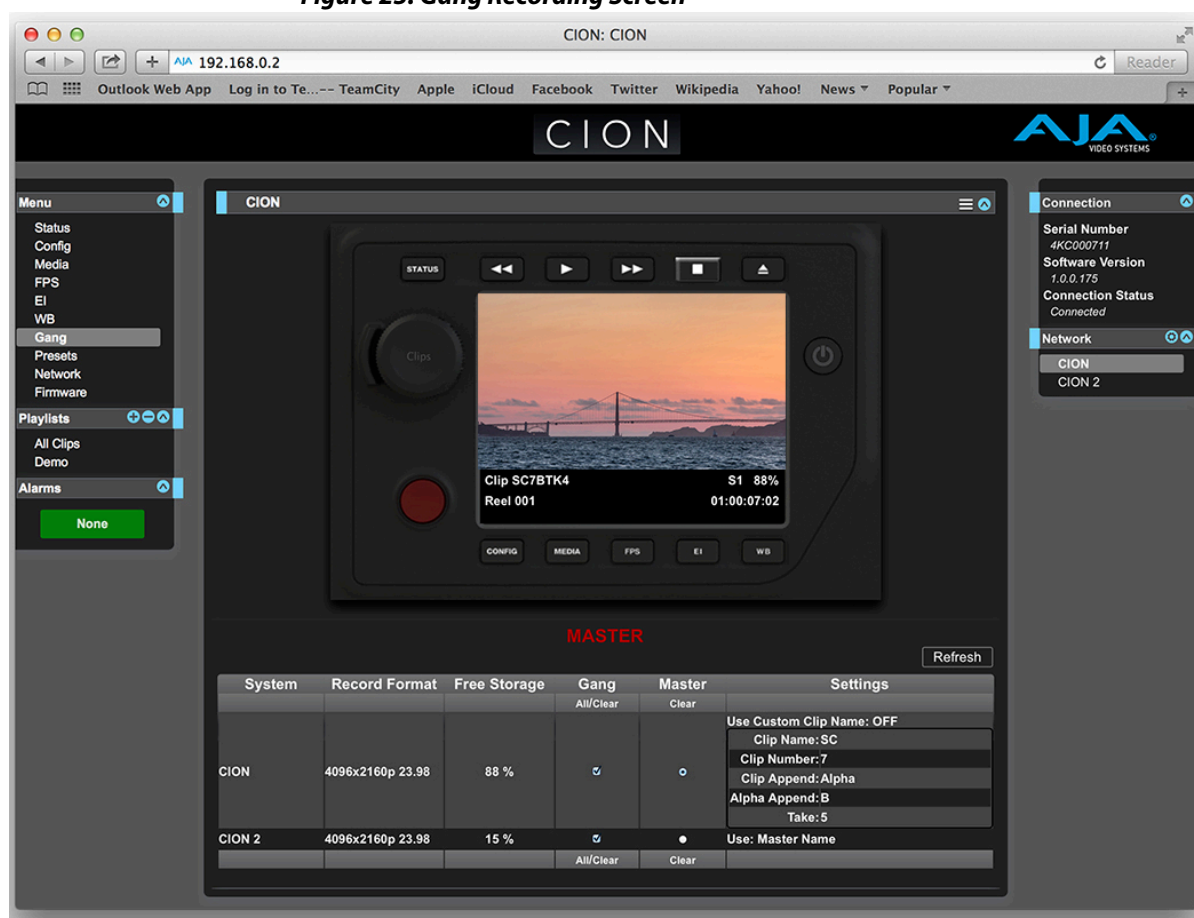
Click a system name to switch the browser to that particular CION system.

NOTE: *You must have a properly configured default gateway to see the CIONs. If the Default Gateway (parameter 50.4) is not configured properly, other CIONs will not be listed.*

Multiple CION units can be used in unison to produce recordings via the Gang Control feature. This feature is only available via the web UI when CION units have IP addresses configured under a common network and subnet mask and are connected via their LAN connections to an ethernet switch or hub to a host computer. AJA recommends that all CION units in a gang use the same firmware version.

Example: You have a CION "Master" a CION "Slave" both attached on a network where their static IP addresses are 192.168.0.2 and 192.168.0.3, both with a subnet mask value of 255.255.255.0. They are connected to a host computer with IP address 192.168.0.1 and subnet mask 255.255.255.0. The host computer uses a web browser, like Apple's Safari, to access the "Master" CION by entering 192.168.0.2 in the URL field of the browser. The CION "Master" unit web UI should appear. Locate the Gang Controls area in the user interface.

Parameters for each available CION will appear in the Gang Controls area. These include:

- System – displays CION units that may be added to a gang
- Record Format – type of video format/frame rate each system is configured to record
- Free Storage – at-a-glance view of the capacity of the media in each unit
- Gang – units can be added or removed from the gang
- Master – allows the promotion of a CION unit to the controlling role
- Settings – allows for the configuration of clip names on the Master and Slave CION units

To add a CION to a gang, simply select the check box for the unit in the Gang column. As a shortcut, if all available CION units are desired for a gang, select the All item below Gang. If you want to clear units from a gang, deselect them or use the Clear option.

There can be only one Master in a gang; typically, the IP address for the CION unit you entered and are viewing the web UI on is the one which should be promoted to the controlling role. If the unit with the IP address that is currently being viewed via the web UI is selected, a red capitalized MASTER text will appear on the webpage above the columns.

A Master CION unit can send three items to the slave CION units within a gang; a record start command, a stop command, and clip naming.

The Settings area is where the CION clip name for each unit is decided. By default, CION is configured to use the standard clip naming conventions, not the custom clip naming conventions. The first user selection is Use Custom Clip Name; if you want to use the standard clip naming convention, leave this set to OFF, but if you want to create a custom clip name, mouse click on the OFF to reveal a pulldown for OFF/ON selection then click OK. If OFF was selected, the next parameter would be Clip Name, again, clicking on the SC or Clip presented brings up the pulldown and the OK box. Clip Number must be entered manually with a valid value for CION of 1 through 999 and then the enter/return key must be hit. If the enter/return key is not entered after the selection, the value will revert to whatever was previously shown.

Clicking on the value next to Clip Append and Alpha Append both bring up a pulldown and an OK button. Take operates like the Clip Number, where a valid value of 1 to 999 can be entered and the enter/return key needs to be hit for confirmation of the value. For custom clip naming considerations, see *"19.1 Use Custom Clip Name" on page 56*.

Note that for Slave CION units, the Settings column provides a selection of either Use: Master Name or Slave Name. Clicking on the default value of Master Name pulls up a pulldown selection of Master Name or Slave Name with an OK confirmation button. If the desire is to have clips named the same across all CION units' recordings, then select Use: Master Name. If the desire is to have clips named independently on CION units, then select Slave Name. Selecting Slave Name means that the recording will take it's name from the individual CION's parameters and not accept the value pushed to the Slave by the Master CION.

NOTE: CION can initiate recordings among units quickly, but not all units will begin or end recordings precisely at the same time or the same frame. This is not really an issue if matching timecode via LTC is sent to each unit from a timecode generator via discrete outputs on the timecode generator or via a distribution amplifier for the timecode.

NOTE: CION does not provide simultaneous playback of media; only record start and stop functions are available.

Data Transfer via LAN

If the CION is configured for Media State > Data-LAN, appropriately encoded QuickTime files may be uploaded to the CION or downloaded from the CION via the All Clips portion of the interface. (For clip encoding requirements, see *"Appropriately Encoded Clips" on page 77*.)

Figure 24. Data LAN Screen
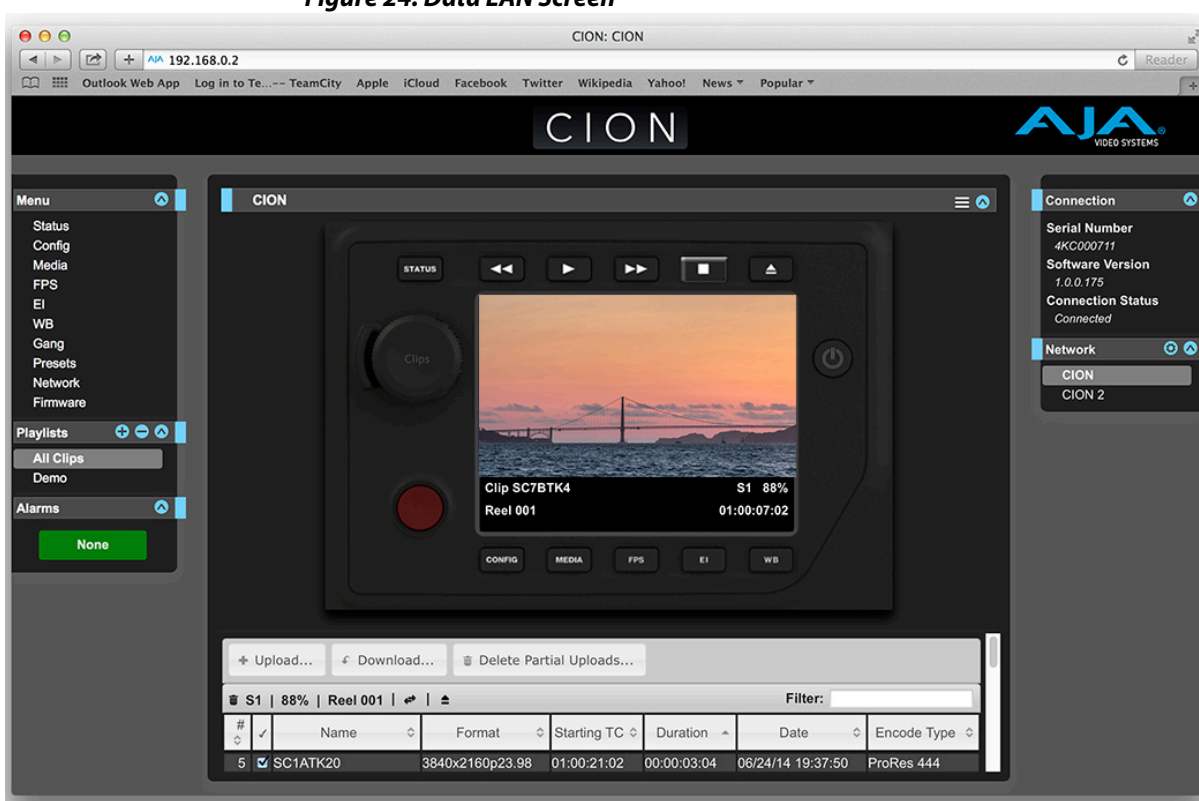
During an upload, useful information about the upload is given: the name of the file being uploaded, the size of the file being uploaded, a progress bar and a Cancel button. Additionally transfer speed information, remaining time to transfer and percentage of data transferred are shown.

To download a clip, select the Download option. Note that the file will be downloaded to the particular web browser's selected download location.

Appropriately Encoded Clips: Appropriately encoded clips must have the following properties:

• A supported codec:
  – Apple ProRes 444
  – Apple ProRes 422 (Proxy)
  – Apple ProRes 422 (LT)
  – Apple ProRes 422
  – Apple ProRes 422 (HQ)

• A supported frame size:
  – 4096x2160 (4K)
  – 3840x2160 (Quad HD)
  – 2048x1080 (2K)
  – 1920x1080 (HD)

• A supported frame rate:
  – 23.98, 24, 25, 29.97, 30, 50, 59.94 and 60 fps for 4K, Quad HD, 2K or 1080p material
  – 25 or 29.97 fps for 1080i material

• Proper interlace setting for interlaced material: for 50Hz and 59.94 Hz regions, HD interlaced material will be top field first.

• Proper sound settings:
  – Format > Linear PCM
  – Channels > Stereo (L R), 2 Discrete Channels, or 8 Discrete Channels
  – Rate > 48.000kHz
  – Sample size > 24 bits, and Little Endian

Playlists

AJA provides tools for reviewing clips and creating playlists of clips. These clip playlists can be managed on the web browser Playlists screen, which includes a default **All Clips** playlist showing all clips on the CION unit.

Figure 25. All Clips Playlist Screen
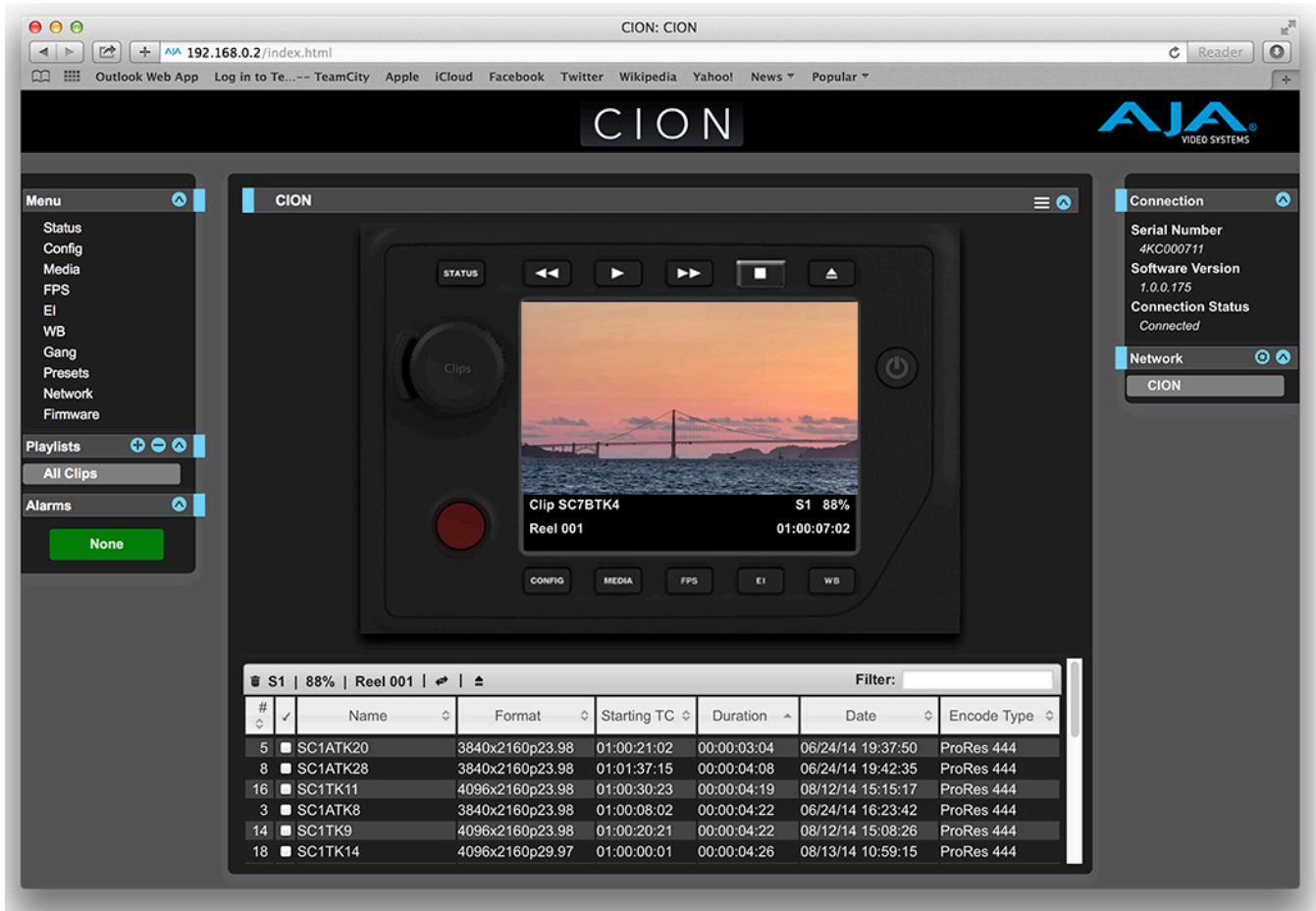
The default state of the Playlists is to list All Clips available. All Clips represents all of the recordings made on the CION or valid files transferred to the CION.

Quick Cueing: You can cue up a clip quickly for review by simply double-clicking the clip in the list. Note that once you've double-clicked a clip to select it, it will be highlighted in blue in the list and the first frame of video from that clip will appear on the output of the CION. To play back the clip, simply open the Transport page of the web UI and begin playback with the Play button. Or you can use the "mini-player" from within the playlist. You can also quickly scan material by setting the Media>Play Media>All selection so that as you highlight clips for review, they will continue playing out of the CION outputs.

Creating Playlists: In the Playlists portion of the web UI, there is a "+" symbol and a "–" symbol above the lists. The "+" symbol can be used to add a playlist. Simply click on this symbol and, when prompted, enter a name for the playlist you wish to create. To add clips to a playlist, select a blue highlighted clip from the All Clips list and click and drag the clip onto the name of the playlist you created.

Figure 26. Playlist Screen
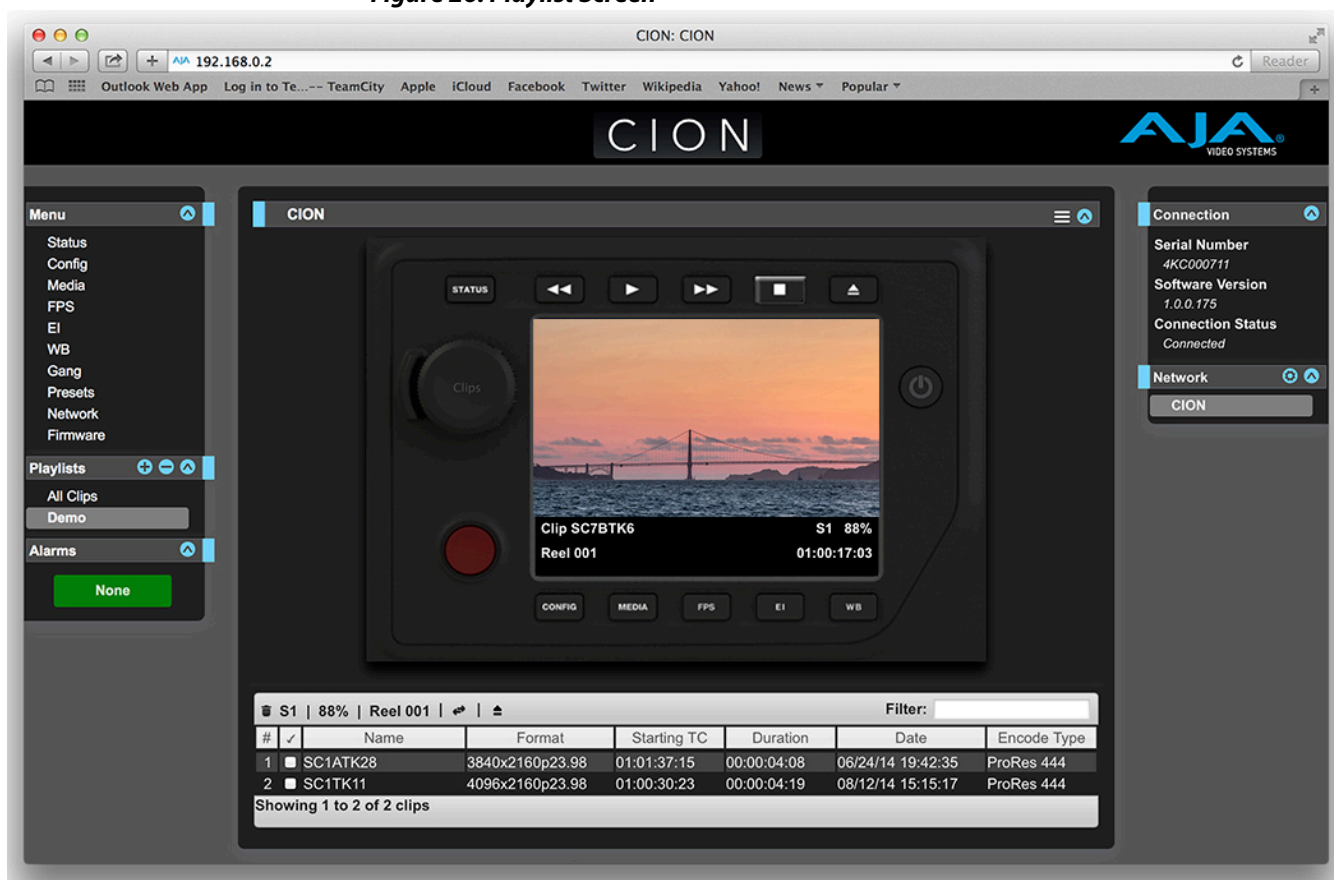
NOTE: When you select a clip and click and drag it, a filmstrip icon will appear. If you do not see this icon, then you have not selected a clip.

You can tell that a clip will be added to a playlist because the list you drag the clip to will be highlighted in green and the filmstrip icon will appear with a "+" symbol on the left side. When you release the mouse, the clip will be added to the playlist. You may select additional clips using the same method and add them to the playlist.

To move a number of clips to a playlist at once, use the column with the checkmark and tick the checkboxes of the clips prior to performing the click and drag to the list.

To review your playlist, click on the list in the Playlists area of the web UI.

Change the Order of Clips: To reorder clips within a list, just click and drag them. You will notice that the clip is selected because the filmstrip icon will appear and you will know that a reorder is happening when you see the green highlight appear.

A clip cannot be moved to the last position of the playlist. To move a clip to the last position in the playlist, move it to the next to last position in the list and move the last clip in the list above it.

You may create multiple playlists. Playlists are stored as a simple file on the CION media alongside the clips.

If you want to play a playlist you have created, first select Play Media>Playlist in the Media menu parameters.

NOTE: *Depending on whether you have been reviewing clips, you may first be prompted to "Press Stop" prior to entering the Media page to make Playlist selections; if this prompt appears, you will be led to the Transport page where you can depress stop and then enter the Media page.*

Select a playlist from the Playlist parameter in the Media menu. Once a playlist is selected, you will notice that a double arrow indication will appear next to the selected list in the Playlists portion of the web UI. If you go to the Transport portion of the web UI, you will now notice that the playlist is cued up, ready for playback of the first clip in the list. If you want to navigate within your list, you may use the fast forward and rewind buttons or the select up/down buttons. You can loop playback of a list using the Media menu parameters as well.

Management of the playlists is made possible via the web UI; creation and management of playlists from the front panel is not supported. An indication of a selected playlist is presented on the front panel UI via menu parameter 15.3 Playlist. The selection of a playlist does not survive reboots of the unit, but the playlists that are created do survive reboots.

Chapter 7: Using AJA Optional Accessories

Overview

CION's design allows a variety of accessories to be used with the device. AJA provides some of these accessories as optional items that may be purchased separately. These accessories include the following:

Back-Focus Tool

Figure 27. Back-Focus Tool
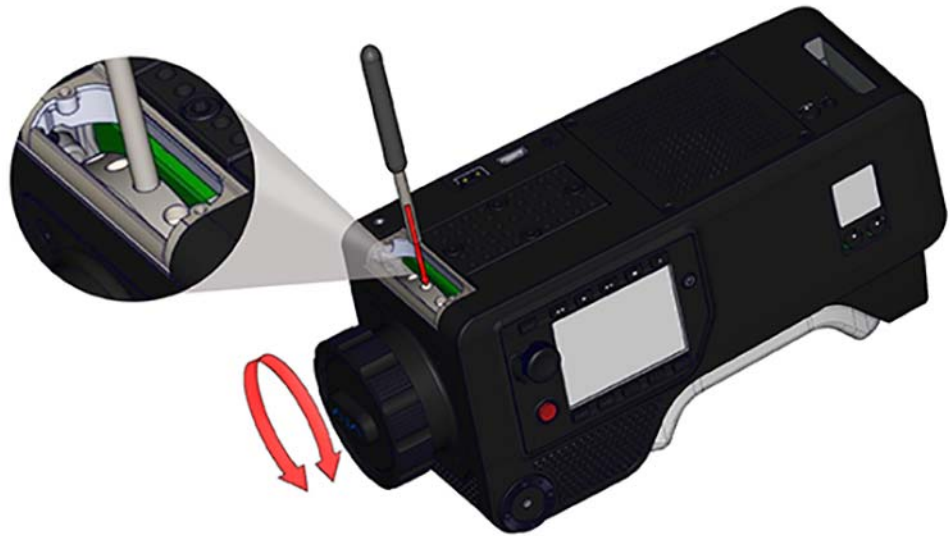
Technically the Back-Focus Tool is used to adjust the focal flange distance for CION. The Back Focus Access Door is found at the front of CION. The included Top Handle must be removed to access this door.

To remove the Top Handle, first unscrew the rod end cap at the front of the handle, then loosen the rod clamp that holds the handle in place. Remove the handle and attached LANC Collar and set these items aside.

Next, remove the 4x 1/4-20 screws that fasten the top handle base to the top cheese plate. The Back Focus Access Door is held in place by 2x Torx T10 headed screws. Remove these screws and set them aside. The Back Focus Access Door may now be removed. Set it aside and you will see the adjustment ring.

To make adjustments to the focal flange distance, insert the metal shaft of the tool into one of the round indentations found on the adjustment ring. With a suitable target placed in front of the lens to judge the adjustment. This may be a null target with Siemens star or other pattern or a dedicated calibration tool such as the Denz FDC. If these types of devices are not available, you may use medium/telephoto lens attached to the camera with the aperture wide open and perform measurement and focus checks until you achieve consistent results with the Back-Focus Tool. Note that this method assumes that the lens is properly collimated and has accurate witness marks.

Important: *Focal flange distance adjustment using the Back-Focus tool should require no more than a maximum of five turns for the calibration. If you cannot seem to make the adjustment within this number of turns, you likely have a different issue (with the collimation of the lens, the lens mount being used, etc.). Exceeding the specified number of turns can result in issues that will require the camera to be returned to the factory for service.*

After you have finished making adjustments to focal flange distance for CION, replace the Back Focus Access Door by securing it with the 2x Torx T10 screws and replace the top handle of CION by re-attaching it with the 4x 1/4-20 screws.

Front Baseplate

Figure 28. Front Baseplate

The Front Baseplate features 15mm lightweight spacing. The 15mm lightweight standard is used throughout the film and video industry to host accessories such as matte boxes and follow focuses.

To attach the Front Baseplate to the CION, use the 4x 1/4-20 screws supplied with the accessory. There are four recessed holes where the 1/4-20 screws are inserted. Be sure to align the baseplate as straight as possible so that the 15mm rods will be properly aligned with the lens and allow easy integration with other critical tolerance accessories such as matte boxes. A 4-40 guide pin is supplied on the base plate to help with alignment and proper positioning of the baseplate.

Once the Front Baseplate is secured and properly aligned, you may elect to leave it in place on the unit for future ease of use.

User-supplied 15mm rods of the desired length are inserted into the rod clamps on the Front Baseplate; use the knobs to tighten down on the rods. Note that rods may be passed all of the way through the baseplate, but this will be undesirable if you plan to use the baseplate in handheld configurations. Rods passed all the way through the Front Baseplate may be used in conjunction with the Rear Baseplate accessory.

NOTE: *The height of the Front Baseplate accessory was designed so that it may be used in conjunction with third-party baseplates or bridgeplates that use 15mm studio spacing or 19mm studio spacing.*

Rear Baseplate

Figure 29. Rear Baseplate

The Rear Baseplate features 15mm lightweight spacing like the Front Baseplate. You may use this baseplate to host rear-mounted items like lightweight monitors, battery brackets, etc.

NOTE: *To use the Rear Baseplate accessory with CION, be sure to use it with the Battery Adapter Plate that is supplied with CION.*

To attach the Rear Baseplate to the CION, slide the top of the Rear Baseplate into the slot in the bottom of the Battery Adapter Plate. Use the 2x Phillips head 1/4-20 screws supplied with the accessory to secure the accessory to the heel and use the 2x 1/-4-20 cap headed screws to secure the Rear Baseplate to the Battery Adapter Plate.

NOTE: *Be sure that the Rear Baseplate is attached to the Battery Adapter Plate, not just the heel of CION to avoid the possibility of damaging the threaded inserts of the heel.*

Upper Rod Clamp

Figure 30. Upper Rod Clamp

The Upper Rod Clamp features 15mm lightweight spacing like the Front Baseplate and the Rear Baseplate. The Upper Rod Clamp is an ideal solution for mounting:

• Third-party viewfinder brackets

• 15mm rod based lightweight support arms

• Focus/iris/zoom motors, etc.

To attach the Upper Rod Clamp, you will need to remove the handle assembly supplied with the CION. Once you have removed the handle assembly, you will place the Upper Rod Clamp between the handle assembly and the CION top cheese plate. Use the 4x 1/4-20 screws supplied with the Upper Rod Clamp to secure the handle assembly and the Upper Rod Clamp to the CION top cheese plate.

9" Extension Arm

Figure 31. 9-inch Extension Arm

A 9-inch rosette extension arm allows items like handgrips to be placed greater distance away from the camera body. Simply use the supplied knob(s) to secure the extension arm to another rosette.

NOTE: *If you do not need to use both of the supplied knobs, simply unscrew the knob that is not needed.*

6" Extension Arm

Figure 32. 6-inch Extension Arm

A 6 inch rosette extension arm allows items like handgrips to be placed a shorter distance away from the camera body. Simply use the supplied knob(s) to secure the extension arm to another rosette.

NOTE: *If you do not need to use both of the supplied knobs, simply unscrew the knob that is not needed.*

Rod-Rosette Mount

Figure 33. Rod-Rosette Mount

The Rod-Rosette Mount allows rod-based accessories like Handgrips to be attached to rosette attachment points. Simply use the supplied knob to secure the adapter to another rosette.

VCT-WEDGE

Figure 34. VCT-WEDGE

This wedge may be used with traditional ENG quick release plates. Secure the VCT-WEDGE to the bottom of CION (or the bottom of the Front Baseplate accessory) using the supplied 2x Phillips head 1/4-20 screws.

NOTE: *The VCT-WEDGE may be used alone or with the VCT-HEEL or VCT-HEEL-RBP accessories when mounting CION to an ENG quick release plate.*

VCT-HEEL

Figure 35. VCT-HEEL

The VCT-HEEL is for use with traditional ENG quick release plates. Secure the VCT-HEEL to the bottom of CION using the two supplied 1/4-20 screws.

NOTE: *The VCT-HEEL is designed to be used with the CION without any baseplates attached. If CION Front and Rear Baseplate accessories are attached to CION, then the VCT-WEDGE and the alternate VCT-HEEL-RBP should be used.*

VCT-HEEL-RBP

The VCT-HEEL-RBP is designed for use with the VCT-WEDGE and the Rear Baseplate. If you are using the Front Baseplate and the Rear Baseplate accessories for CION, to achieve the proper spacing, the VCT-HEEL-RBP is required when interfacing with ENG quick release plates. Secure the VCT-HEEL-RBP to the bottom of the Rear Baseplate accessory using the supplied 2x 1/4-20 screws.

Viewfinder Mount

Figure 36. Viewfinder Mount

The Viewfinder Mount for CION works with a variety of third-party viewfinders or smaller lightweight on-board monitors and offers a great deal of adjustment. The L-shaped bracket may be rotated to secure the viewfinder or monitor as needed. The rosette and knob allow the angle of this bracket to be adjusted to suit the user. One of the 15mm rods allows the L-shaped bracket to be positioned further or closer to the eye. The other 15mm rod is used with the through-hole on the CION handle assembly. This rod allows the viewfinder mount to be slid closer or further away from the camera body. This can be very useful for left-eye dominant camera operators.

To secure viewfinders or small monitors to the Viewfinder Mount, simply use the supplied 1/4-20 screw.

LANC Collar

Figure 37. LANC Collar

One LANC Collar is supplied with CION. This ststop trigger may be used with additional AJA Handgrips or other 15mm rod based accessories.

Secure the LANC Collar to any 15mm rod using the thumbscrew. Any variety of LANC cables may be used with the LANC Collar including optional AJA LANC cables.

Coiled LANC Cable

Figure 38. Coiled LANC Cable

This coiled 1-to-3 ft. LANC cable with right-angle connectors is an ideal pairing for the LANC Collar accessory when a remote control handgrip is desired.

Short LANC Cable

This short, straight LANC cable with right-angle connectors is ideal for use with the Top Handle and LANC Collar supplied with CION. If you happen to lose this cable for some reason, this cable may be obtained as a replacement.

7-inch 15mm Rod

Figure 39. 7-inch 15mm Rod

The 7-inch 15mm threaded rod is a useful length when working with compact prime lenses, matte boxes, follow focuses and the Front Baseplate accessory. The rods feature 1/2"-13 threading so they are compatible with a variety of popular third-party rods, extensions, and accessories.

Handgrip

Figure 40. Handgrip

This 15mm rod-based handgrip may be used in combination with other accessories (Rod-Rosette Mount, LANC Collar, Coiled LANC Cable, and Extension Arm) to create a hand-held shooting configuration.

Appendix A: Specifications

User Interface

- 6x Dedicated Menu Buttons (STATUS, CONFIG, MEDIA, FPS, EI and WB)
- 4x Transport Buttons (Play, Fast Forward, Reverse Playback, Stop)
- 1x Media Unmount Button
- 1x Record Button
- 1x User Interface Control Knob
- 1x User Interface Screen, 320x240 LCD

Sensor Type

- CMOS, Electronic global shutter

Sensor Size

- APS-C sized, 22.5mm x 11.9mm (25.5mm diagonal)

Lens Mount

- PL (positive lock)

Filtration

- Optical Low Pass Filter (OLPF) and IR Cut Filter (combined)

Removable Storage

- AJA Pak media

Video Outputs

- 4x SDI Main Outputs (4x BNC connectors, 3G/1.485Gbps)
- 2x SDI Monitor Outputs (1x front-mounted BNC connector, 1x rear-mounted BNC connector, 3G/1.485Gbps)
- 2x HDMI Outputs (front-mounted HDMI v1.3 Type A connector, rear-mounted HDMI v1.4 Type A connector)

Audio Inputs

- 2x Balanced Analog Audio Inputs (2x 3-pin XLR connectors with line/mic/48v selection switch per input)

Audio Output

- 1x Headphone Jack (3.5mm stereo mini TRS)

Reference Input

- 1x Reference input (BNC connector, analog color black)

Timecode

- 1x LTC (BNC connector, 0.5 to 4.5Vpp)

Network Interface

- 1x LAN connector (RJ45 connector, 10/100/1000)

Format/Frame Rate/Encoding/Output Information

4K:
- 4K (4096x2160) progressive 23.98/24/25/29.97/30/50/59.94/60/119.88/120
- Apple ProRes 444 or Apple ProRes 422 (all versions) up to/including 30 frames per second.
- Apple ProRes 422 or a lower data rate ProRes versions for 50/59.94/60 frames per second.
- SDI output support for 23.98/24/25/29.97/30 frames per second (SDI 1-4 YCbCr, SDI 1-4 RGB or SDI 1 RAW)
- SDI output support for 50/59.94/60 frames per second (SDI 1-4 YCbCr or SDI 1-2 RAW)
- SDI output support for 119.88/120 frames per second (SDI 1-4 RAW)

Ultra HD:
- Ultra HD (3840x2160) progressive 23.98/24/25/29.97/30/50/59.94/60/119.88/120
- Apple ProRes 444 or Apple ProRes 422 (all versions) up to/including 30 frames per second.
- Apple ProRes 422 or a lower data rate ProRes versions for 50/59.94/60 frames per second.
- SDI output support for 23.98/24/25/29.97/30 frames per second (SDI 1-4 YCbCr, SDI 1-4 RGB or SDI 1 RAW)
- SDI output support for 50/59.94/60 frames per second (SDI 1-4 YCbCr or SDI 1-2 RAW)
- SDI output support for 119.88/120 frames per second (SDI 1-4 RAW)

2K:
- 2K (2048x1080) progressive 23.98/24/25/29.97/30/50/59.94/60
- Apple ProRes 444 or Apple ProRes 422 (all versions) up to/including 30 frames per second.
- Apple ProRes 422 (all versions) for 50/59.94/60 frames per second.
- SDI output support for 23.98/24/25/29.97/30 frames per second (SDI 1 YCbCr, SDI 1-2 RGB, or SDI 1 RGB)
- SDI output support for 50/59.94/60 frames per second (SDI 1-2 YCbCr or SDI 1 YCbCr)

1080 HD Progressive:
- 1080 HD (1920x1080) progressive 23.98/24/25/29.97/30/50/59.94/60
- Apple ProRes 444 or Apple ProRes 422 (all versions) up to/including 30 frames per second.
- Apple ProRes 422 (all versions) for 50/59.94/60 frames per second.
- SDI output support for 23.98/24/25/29.97/30 frames per second (SDI 1 YCbCr, SDI 1-2 RGB, or SDI 1 RGB)
- SDI output support for 50/59.94/60 frames per second (SDI 1-2 YCbCr or SDI 1 YCbCr)

1080 HD Interlaced:
- 1080 HD (1920x1080) interlaced 25/29.97/30
- Apple ProRes 422 (all versions) up to/including 30 frames per second.
- SDI output support up to/including 30 frames per second (SDI 1 YCbCr)

Exposure Index

- 320
- 500
- 800
- 1000

White Balance

- 3200K
- 4500K
- 5600K
- Preset/Auto White Balance

Weight

- 6.4 lbs / 2.9 kg (without top handle attached)
- 7.4 lbs / 3.4 kg (with top handle attached)

Power

- AC Range: 100-240 VAC 50/60Hz (AC adapter)
- DC Range: 12-18Vdc, 5A maximum
- (4-pin XLR connector or 2-pin input connector)
- Consumption: 38-42W typical, 45-47W maximum (Note: does not include power draw from 2-pin output connector)
- Output: 2-pin power output connector, 10W recommended maximum

Temperature Range

- Safe Operating Temperature Range: 5C to 40C
- Safe Storage Temperature Range (power OFF): -30C to 70C

Dimensions

Figure 1. CION Dimensions Top View

Top View
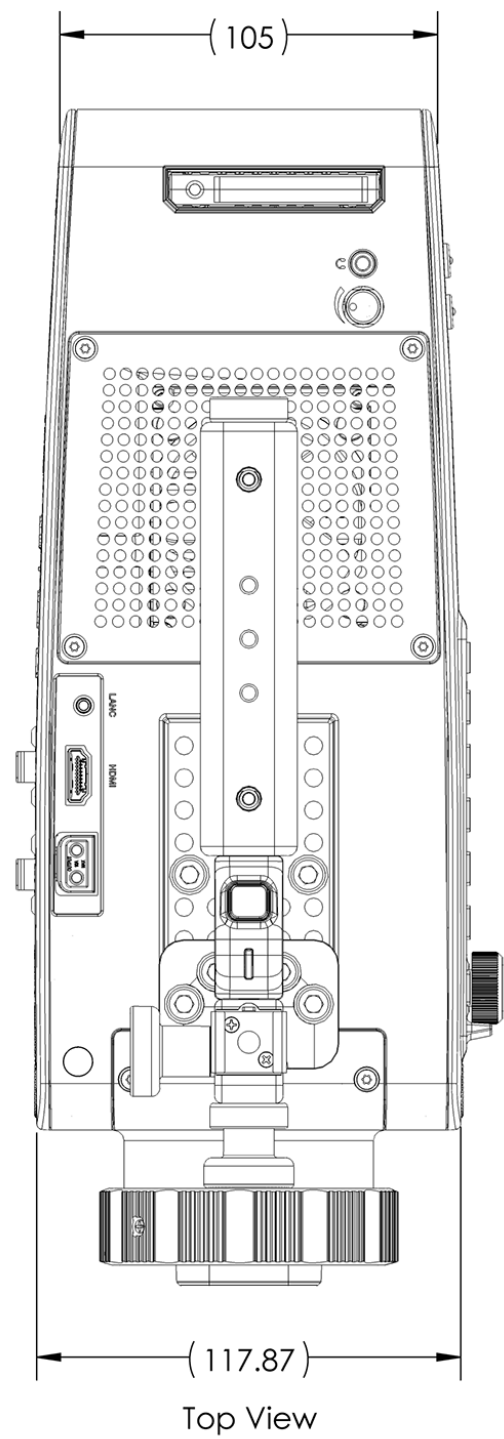
Figure 2. CION Dimensions Connector Side View
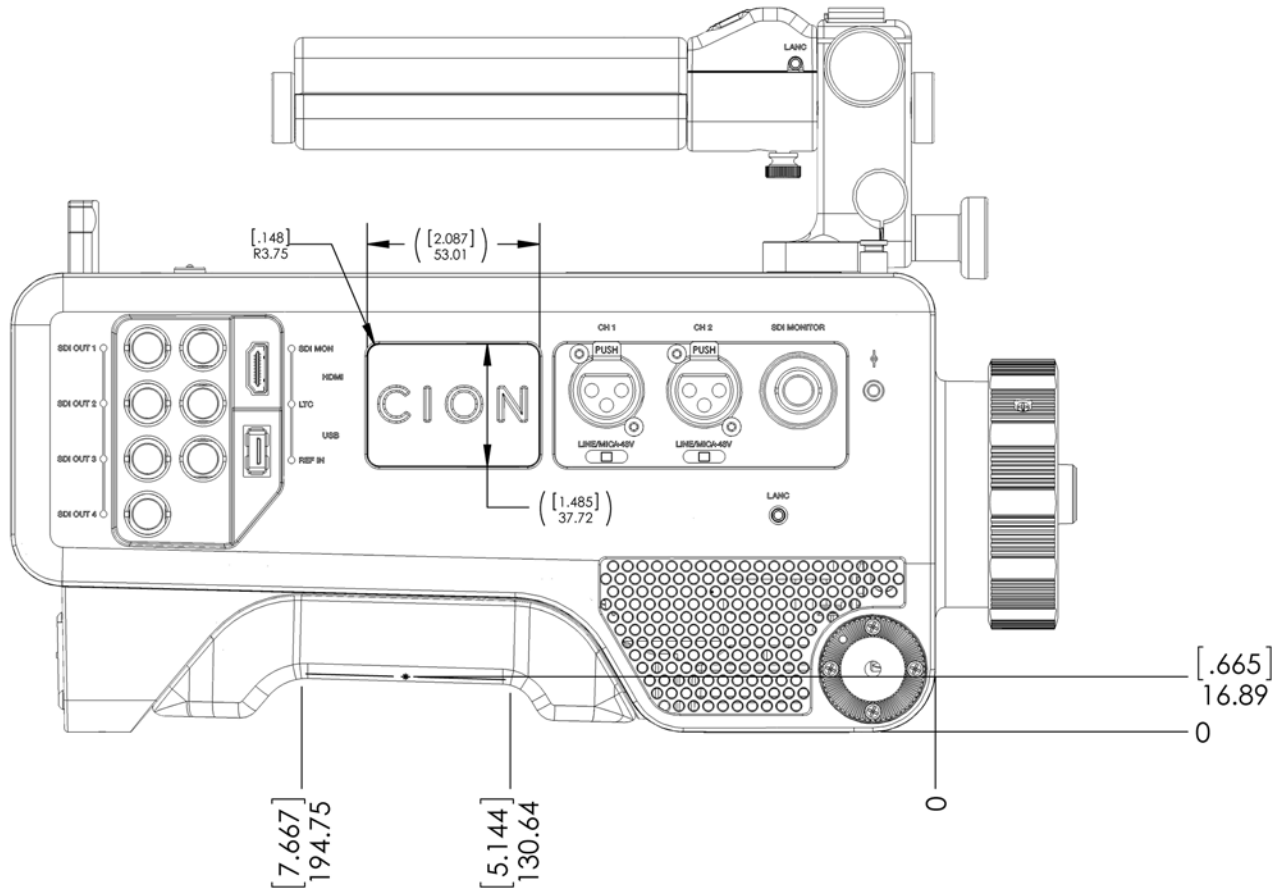
Figure 3. CION Dimensions Front View
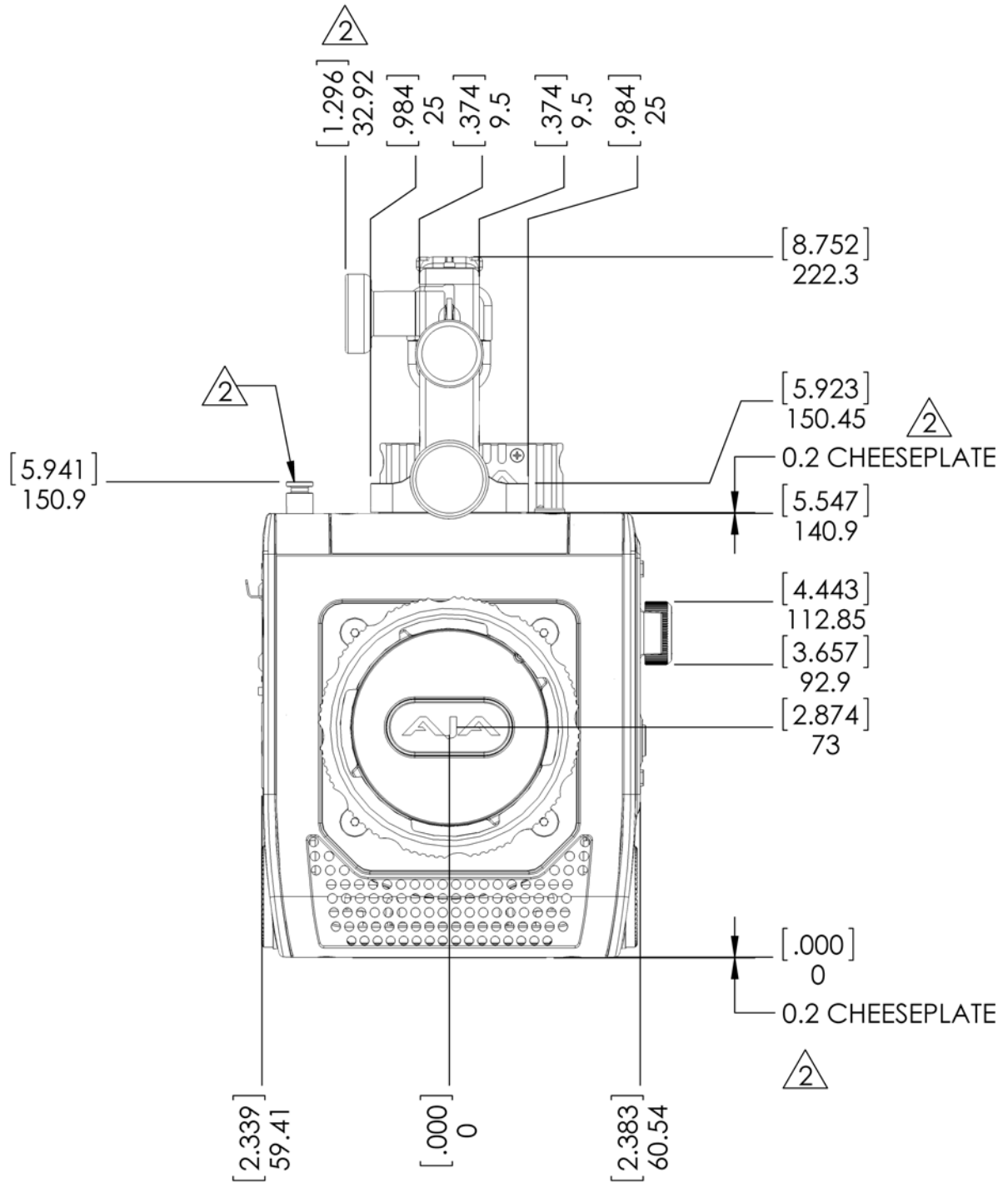
Front View

Figure 4. CION Dimensions Back View
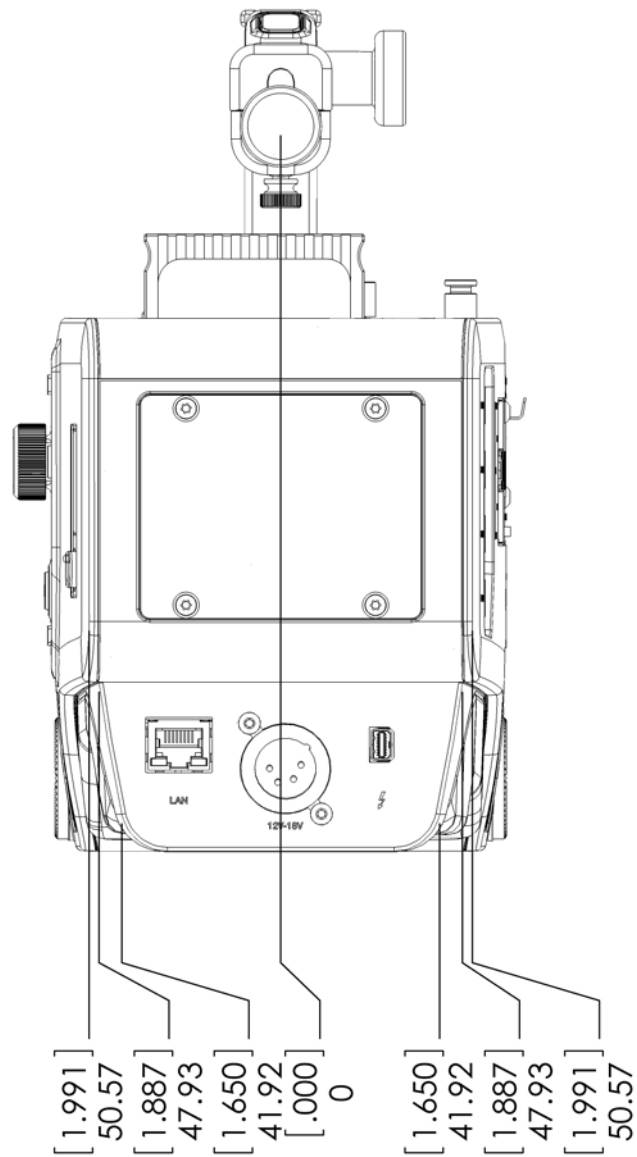
Back View

CION Dimensions Operator Side
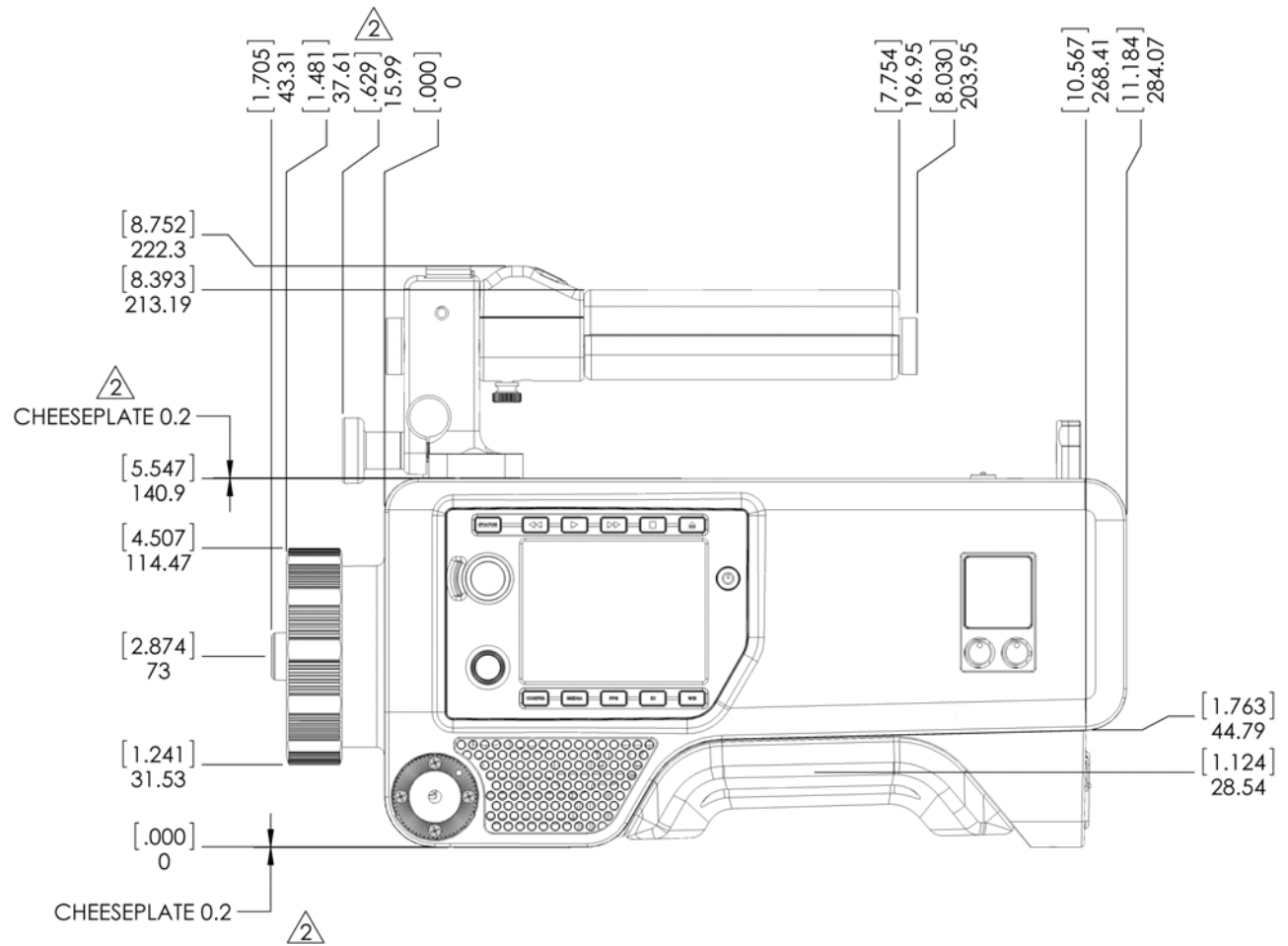
Right View

Appendix B: Safety and Compliance

Federal Communications Commission (FCC) Compliance Notices

Class B Interference Statement

This equipment has been tested and found to comply with the limits for a Class B 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 B 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 B 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 B prescrites dans le Règlement sur le brouillage radioélectrique du ministère des Communications du Canada. Cet appareil numérique de la Classe B est conforme à la norme NMB-003 du Canada.

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

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

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

Declaration of Conformity

Marking by this symbol indicates compliance with the Essential Requirements of the EMC Directive of the European Union 2004/108/EC.

CE   This equipment meets the following conformance standards:

Safety: EN 60065: 2002 + A1: 2006 + A11: 2008 + A2: 2010 + A12: 2011 (GS License)

IEC 60065: 2001 + A1: 2005 + A2: 2010 (CB Scheme Report/Certificate)

Additional licenses issued for specific countries available on request.

Emissions: EN 55103-1: 2009

EN 61000-3-2 (2009-04), EN 61000-3-3 (2008-06)

Environments: E2, E3 and E4

Immunity: EN 55103-2: 2009

EN 61000-4-2 (2008-12), EN 61000-4-3 (2010-04), EN 61000-4-4 (2011-03), EN 61000-4-5 (2005-11), EN 61000-4-6 (2008-10), EN 61000-4-11 (2004-03)

Environments: E2, E3 and E4

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

⚠️ **Warning!**

This is a Class B 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 B. 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 B. 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

<table>
<tr>
<td></td>
<td>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.</td>
</tr>
</table>

Korea KCC Compliance Statement

B급 기기 (가정용 방송통신기자재) Class B (Broadcasting Communication Equipment for Home Use)	이 기기는 가정용(B급) 전자파적합기기로서 주로 가정에서 사용하는 것을 목적으로 하며, 모든 지역에서 사용할 수 있습니다. As an electromagnetic wave equipment for home use (Class B), this equipment is intended to use mainly for home use and may be used in all areas.

Taiwan Compliance Statement

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

Japanese Compliance Statement

この装置は、クラスB情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。 　取扱説明書に従って正しい取り扱いをして下さい。　　　　ＶＣＣＩ－Ｂ

This is a Class B product based on the standard of the VCCI Council (VCCI V-4/2011.04). If this equipment is used in a domestic environment, radio interference may occur, in which case, the user may be required to take corrective actions.

Translated Warning and Caution Messages

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

Warning Symbol   Caution Symbol

Before Operation Please Read These Instructions

	Warning!
⚠	Read and follow all warning notices and instructions marked on the product or included in the documentation.
	Avertissement ! Lisez et conformez-vous à tous les avis et instructions d'avertissement indiqués sur le produit ou dans la documentation.
	Warnung! Lesen und befolgen Sie die Warnhinweise und Anweisungen, die auf dem Produkt angebracht oder in der Dokumentation enthalten sind.
	¡Advertencia! Lea y siga todas las instrucciones y advertencias marcadas en el producto o incluidas en la documentación.
	Aviso! Leia e siga todos os avisos e instruções assinalados no produto ou incluídos na documentação.
	Avviso! Leggere e seguire tutti gli avvisi e le istruzioni presenti sul prodotto o inclusi nella documentazione.

	Warning!
⚠	Do not use this device near water and clean only with a dry cloth.
	Avertissement! N'utilisez pas cet appareil près de l'eau et nettoyez-le seulement avec un tissu sec..
	Warnung! Das Gerät nicht in der Nähe von Wasser verwenden und nur mit einem trockenen Tuch säubern.
	¡Advertencia! No utilice este dispositivo cerca del agua y límpielo solamente con un paño seco.
	Aviso! Não utilize este dispositivo perto da água e limpe-o somente com um pano seco.
	Avviso! Non utilizzare questo dispositivo vicino all'acqua e pulirlo soltanto con un panno asciutto.

⚠	**Warning!** Do not block any ventilation openings. Install in accordance with the manufacturer's instructions. **Avertissement !** Ne bloquez aucune ouverture de ventilation. Suivez les instructions du fabricant lors de l'installation. **Warnung!** Die Lüftungsöffnungen dürfen nicht blockiert werden. Nur gemäß den Anweisungen des Herstellers installieren. **¡Advertencia!** No bloquee ninguna de las aberturas de la ventilación. Instale de acuerdo con las instrucciones del fabricante. **Aviso!** Não obstrua nenhuma das aberturas de ventilação. Instale de acordo com as instruções do fabricante. **Avviso!** Non ostruire le aperture di ventilazione. Installare in conformità con le istruzioni del fornitore.

⚠	**Warning!** Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat. **Avertissement !** N'installez pas l'appareil près d'une source de chaleur telle que des radiateurs, des bouches d'air de chauffage, des fourneaux ou d'autres appareils (amplificateurs compris) qui produisent de la chaleur. **Warnung!** Nicht in der Nähe von Wärmequellen wie Heizkörpern, Heizregistern, Öfen oder anderen Wärme erzeugenden Geräten (einschließlich Verstärkern) aufstellen. **¡Advertencia!** No instale cerca de fuentes de calor tales como radiadores, registros de calor, estufas u otros aparatos (incluidos amplificadores) que generan calor. **Aviso!** Não instale perto de nenhuma fonte de calor tal como radiadores, saídas de calor, fogões ou outros aparelhos (incluindo amplificadores) que produzam calor. **Avviso!** Non installare vicino a fonti di calore come termosifoni, diffusori di aria calda, stufe o altri apparecchi (amplificatori compresi) che emettono calore.

Warning!

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!**
> Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the device.
>
> **Avertissement!** Protégez le cordon d'alimentation pour que l'on ne marche pas dessus ou qu'on le pince, en particulier au niveau des prises mâles, des réceptacles de convenance, et à l'endroit où il sort de l'appareil.
>
> **Warnung!** Vermeiden Sie, dass auf das Netzkabel getreten oder das Kabel geknickt wird, insbesondere an den Steckern, den Steckdosen und am Kabelausgang am Gerät.
>
> **¡Advertencia!** Proteja el cable de energía para que no se le pise ni apriete, en especial cerca del enchufe, los receptáculos de conveniencia y el punto del que salen del equipo.
>
> **Aviso!** Proteja o cabo de alimentação de ser pisado ou de ser comprimido particularmente nas fichas, em tomadas de parede de conveniência e no ponto de onde sai do dispositivo.
>
> **Avviso!** Proteggere il cavo di alimentazione in modo che nessuno ci cammini sopra e che non venga schiacciato soprattutto in corrispondenza delle spine e del punto in cui esce dal dispositivo.

> ⚠️ **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!

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!** 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!** Only use attachments and accessories specified and/or sold by the manufacturer. **Avertissement!** Utilisez seulement les attaches et accessoires spécifiés et/ou vendus par le fabricant. **Warnung!** Verwenden Sie nur Zusatzgeräte und Zubehör angegeben und / oder verkauft wurde durch den Hersteller. **¡Advertencia!** Utilice solamente los accesorios y conexiones especificados y/o vendidos por el fabricante. **Aviso!** Utilize apenas equipamentos/acessórios especificados e/ou vendidos pelo fabricante. **Avviso!** Utilizzare soltanto i collegamenti e gli accessori specificati e/o venduti dal produttore.

Warranty and Liability Information

Limited Warranty

AJA Video Systems, Inc. (AJA Video) warrants that the product, not including hard-disk based Storage Modules (HDD), will be free from defects in materials and workmanship for a period of two years from the date of purchase. AJA Video warrants that the hard-disk based Storage Modules (HDD), will be free from defects in materials and workmanship for a period of one year from the date of purchase. If a product proves to be defective during this warranty period, AJA Video, at its option, will either repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product.

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

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

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

Limitation of Liability

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