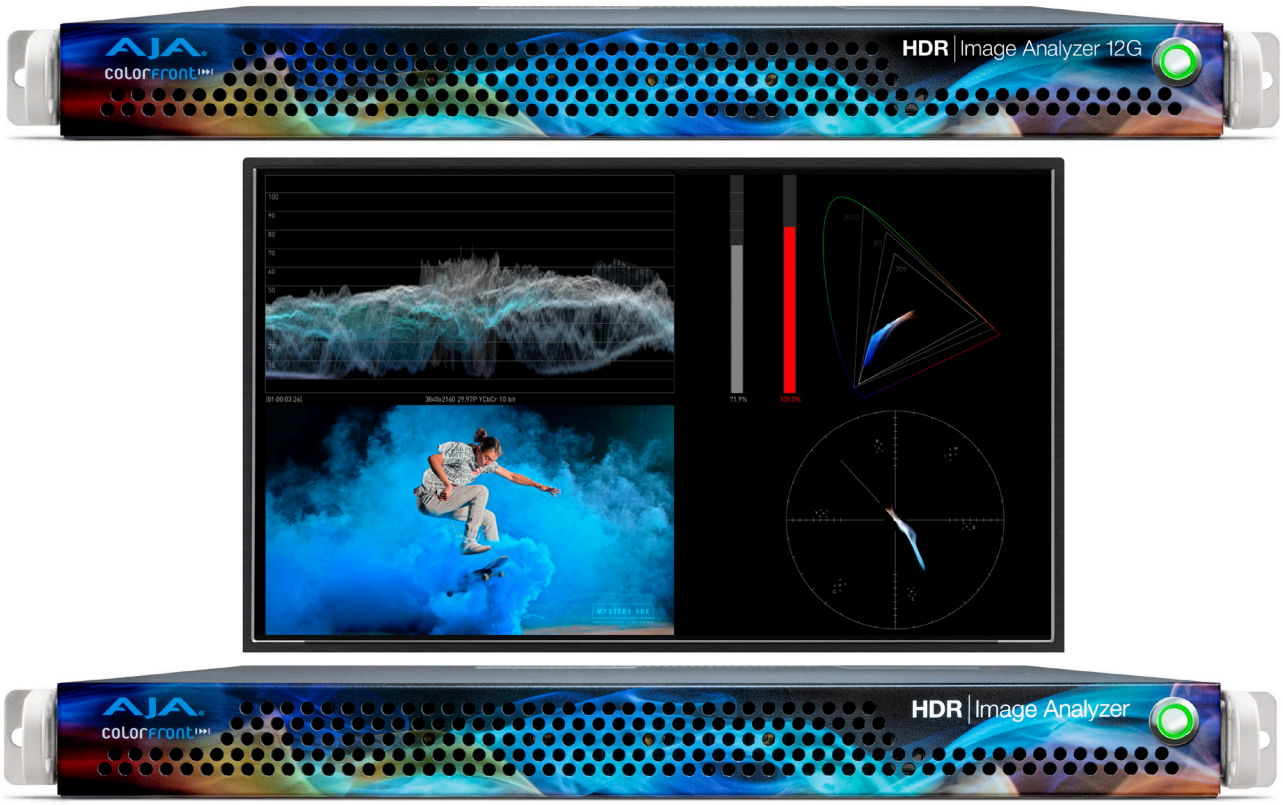
HDR Image Analyzer

HDR Monitoring Solution



Installation and Operation Guide

Version 2.0r2
Published December 6, 2022

colorfront

AJA VIDEO SYSTEMS

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Telephone	+1.530.271.3190
FAX	+1.530.271.3140
Web	https://www.aja.com
Support Email	support@aja.com
Sales Email	sales@aja.com

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Chapter 1 – Introduction

Overview

AJA's HDR Image Analyzer simplifies monitoring and analysis of SDI video HDR and WCG content in production, postproduction, quality control (QC) and mastering. Tools include waveform, histogram, and vectorscope displays, and nit-level HDR monitoring. The HDR Image Analyzer can also monitor embedded audio levels and phase.

Combining AJA's production-proven and powerful video and audio I/O with HDR analysis tools from Colorfront in a compact 1RU chassis, the HDR Image Analyzer offers a flexible solution for monitoring and analyzing HDR formats including PQ (Perceptual Quantizer), Hybrid Log Gamma (HLG) and Rec2020 for up to 8K/UltraHD2 workflows. Colorfront has exclusively licensed its Colorfront Analyzer software to AJA.

Two models of AJA's HDR Image Analyzer are available:

- HDR Image Analyzer: HDR-IMGYZR-88 (3G-SDI model)
- HDR Image Analyzer 12G: HDR-IMGYZR-12G (12G-SDI model)

Software Features

Both HDR Image Analyzer models have identical functionality, except as indicated below:

Shared HDR Image Analyzer features

- Precise, high quality UltraHD UI for native-resolution picture display
- Advanced out-of-gamut and out-of-brightness detection with error tolerance
- Support for SDR (Rec709), ST2084/PQ and HLG analysis
- CIE graph, Vectorscope, Waveform
- Color gamut, including out-of-gamut false color mode to easily spot out-of-gamut/out-of-brightness pixels
- Data analyzer with pixel picker
- Up to 8K/UltraHD2 60p over 12G-SDI inputs (HDR Image Analyzer 12G only)
- Up to 4K/UltraHD 60p over 4x 3G-SDI inputs
- SDI auto signal detection
- File base error logging with timecode
- Display and color processing look up table (LUT) support
- Line mode to focus on a single horizontal line as the region of interest
- Loop through output to broadcast monitors
- Still store
- Nit levels, audio levels, and audio phase metering
- Built-in support for colorspaces (including camera colorspaces)
- 12-bit RGB input support
- PQ display over DisplayPort for compatibility with HDR displays
- Desktop mirroring via DisplayPorts
- Web interface for configuration and control
- Remote desktop support

Unique HDR Image Analyzer 12G Features

- 12G-SDI support
- 8K and UltraHD2 support
- Four bi-directional SDI connections, configured using software
- SDI Loop through options:
  - SDI input count: 4 -> no loop through available
  - SDI input count: 2 -> SDI 1 loops to SDI 3, SDI 2 loops to SDI 4 for every supported mode
  - SDI input count: 1 -> SDI 1 loops to SDI 3

Unique HDR Image Analyzer (3G) Features

- Four uni-directional SDI connections, configured using software
- SDI Loop through options:
  - SDI In and Out Loop through available for all supported formats and transports, including quad link inputs

Hardware Features

Shared HDR Image Analyzer Hardware Features

- One RU height rack mountable chassis
- Hot swappable redundant power supplies
- Two Network Interface Cards
- Four USB connectors, two USB 3.0 and two USB 2.0
- Three year warranty

Unique HDR Image Analyzer 12G Hardware Features

- HD-BNC twist-lock SDI connectors, HD-BNC to BNC adapters included
- Three DisplayPort outputs
- One DisplayPort over USB-C output

Unique HDR Image Analyzer (3G) Hardware Features

- DIN 1.0/2.3 slide lock SDI connectors, DIN 1.0/2.3 to BNC adapters included
- Four DisplayPort outputs

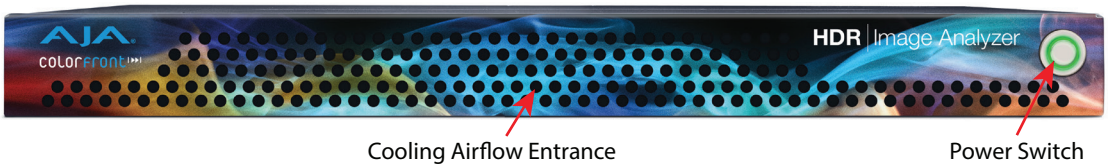
Chapter 2 – HDR Image Analyzer Hardware

Overview

AJA's HDR Image Analyzer is a 1RU hardware appliance equipped with AJA input and output. The system is designed for immediate use, automatically powering up to the Colorfront Analyzer application.

Chassis Front

Figure 1. HDR Image Analyzer Chassis Front View



Chassis Power Button

The main power switch is used to apply or remove power from the power supply to the system. Turning off system power with this button removes the main power but keeps standby power supplied to the system. Therefore, you must unplug all system power cords before servicing.

Chassis Rear

Figure 2. HDR Image Analyzer 3G Chassis Rear View

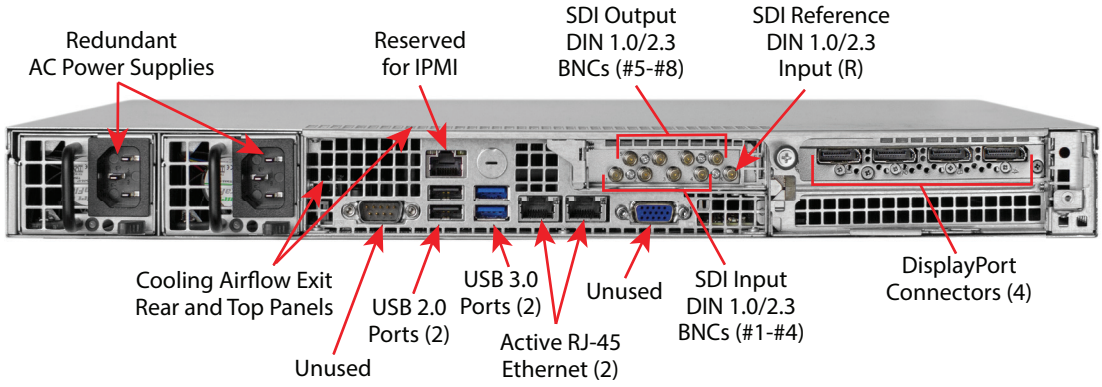
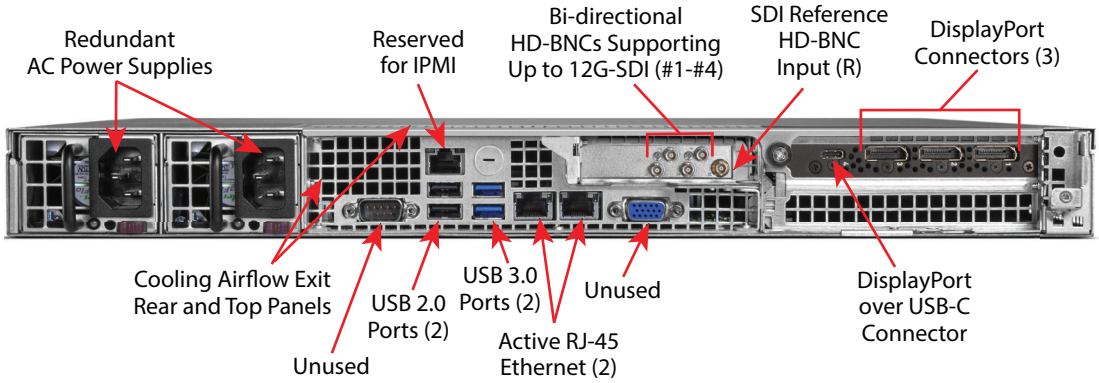


Figure 3. HDR Image Analyzer 12G Chassis Rear View



Rear Panel Power Supply LEDs

On the rear of each power supply module an LED indicates its status as follows.

- Solid Green: When illuminated, indicates that the power supply is on.
- Solid Amber: When illuminated, indicates the power supply is plugged in and turned off, or the system is off but in an abnormal state.
- Blinking Amber: When blinking, this system power supply temperature has reached 63°C. The system will automatically power-down when the power supply temperature reaches 70°C and restarts when the power supply temperature goes below 60°C.

Chapter 3 – System Installation

Installation Summary

1. Unpack the shipping box, removing the HDR Image Analyzer, two power cords, and either nine DIN 1.0/2.3 to full-size BNC adapter cables (3G model), or five HD-BNC adapter cables (12G model).
2. Mount the physical chassis as desired, using the provided sliding rails. Cooling airflow enters the chassis from the front, and exits from the rear and top panels. Do not obstruct these air vents.
3. Connect the two HDR Image Analyzer power cords to AC mains. For redundancy, use both power supplies and connect them to separate branch circuits so that the HDR Image Analyzer will continue to operate even if a circuit breaker opens on one branch.
4. Connect a computer monitor (user supplied) to one of the rear DisplayPort ports.
5. Connect a keyboard and mouse (user supplied) to available rear USB connectors.
6. Connect the BNC adapter cables to the HDR Image Analyzer inputs and output connectors.

NOTE: HDR Image Analyzer 12G BNC connections are bi-directional, configured for input and output via software control.

7. Connect the HDR Image Analyzer inputs to your video source, and outputs to your mastering display monitor, if used.
8. Power up the chassis. The system will boot up to the Analyzer application.

Hardware Installation

Shipping Box Contents

An HDR Image Analyzer is shipped with two AC power cords and BNC adapter cables. Rackmount brackets are provided as part of the chassis.

As you unpack the shipping box, carefully examine the contents. Make sure you received everything and that nothing was damaged during shipment. If you find any damage, immediately notify the shipping service and supply them with a description of the damage. AJA will repair or replace damaged items.

If you find shipping damage, contact your AJA dealer or distributor for details on how to have your HDR Image Analyzer repaired or replaced.

NOTE: Save packing materials and the shipping box. If your HDR Image Analyzer ever requires service or you move your system, use the packaging materials and box for safe shipment.

Rack Mounting the Chassis

Install the HDR Image Analyzer chassis into a standard 19-inch wide equipment rack, allowing space for cooling airflow. The chassis occupies only one vertical rack unit.

Two rack rail assemblies are included in the rack mounting kit. Each assembly consists of two sections: an inner fixed chassis rail that secures directly to the server chassis and an outer fixed rack rail that secures directly to the rack itself.

The rail assemblies are shipped with rack adapters installed for use with IT (square hole) style rack frames. For IT racks, simply slide the unit into place, as the rails will lock automatically. For use with a standard round hole rack frame, you will need to remove the adapters using a small Phillips head screwdriver.

Network Configuration

The HDR Image Analyzer ships configured for DHCP operation. If your facility uses DHCP, simply connect one of the active Ethernet RJ-45 connectors to your network.

To manually configure your HDR Image Analyzer's IP addresses, on the Analyzer application press the Tab key on the keyboard when no dropdown menu is visible to open the Settings screen, and select NETWORK.

See *"NETWORK Tab" on page 40* for more information.

Initial System Startup

On initial system startup, no login is required, but you will need to accept End User License Agreement (EULA) for Microsoft and NVidia. EULA is displayed on the first startup and after every update.

Software Update

AJA's HDR Image Analyzer ships with Colorfront's Analyzer software preinstalled with the latest version.

Updates to the software are available at:

https://www.aja.com/products/support/hdr-image-analyzer

https://www.aja.com/products/hdr-image-analyzer-12g#support

NOTE: If you update your HDR Image Analyzer from v1.0, you will need to enter the serial number of the system found on the rear of the HDR Image Analyzer chassis, below the 9-pin serial port.

Update with USB stick

To update HDR Image Analyzer software:

1. Download the .zip file and extract and copy the .ajas file to a USB stick.
2. Insert the USB stick into a rear USB port on the HDR Image Analyzer chassis.
3. Go to Help > Update Analyzer.
4. Select the downloaded .ajas file and click Select File.
5. The software will be copied to the HDR Image Analyzer, and when complete the message "Preparation Complete, please restart Analyzer" appears.
6. Click on the Analyzer > Application Restart menu item to complete the update, which can take a few minutes and might involve several system restarts.

IMPORTANT: Do not power off the system during the software update, which can take up to nine minutes.

7. When done, a "System shutdown is required to complete updates" message appears. Click on **OK** to shut down the system.
8. Power up the HDR Image Analyzer using the front panel power button. One or more end user license agreement screens will appear. Scroll down and click on the **Accept** button for each agreement.
9. The HDR Image Analyzer application will then launch, ready for operation.

Update Using Web Browser

Since v1.1, HDR Image Analyzer supports software update using a Web Browser running on a separate network connected computer.

1. Download the .zip file and extract the .ajas file to a location on a network connected computer.
2. Open a web browser on that computer and enter the IP address of your HDR Image Analyzer. A webpage will be displayed.
3. Go to the Firmware menu and click on **Choose a file...**
4. Navigate to the saved location on the computer, select the .ajas file from the list on the HDR Image Analyzer's host computer, and click **Submit**.
5. The software will be installed, which can take a few minutes and might involve several system restarts.

IMPORTANT: Do not power off the system during the software update.

6. When done, a "System shutdown is required to complete updates" message appears. Go to the HDR Image Analyzer's computer and click **OK** to shut down the system.
7. Power up the HDR Image Analyzer using the front panel power button. One or more end user agreement screens will appear. Scroll down and click on the **Accept** button for each agreement.
8. The HDR Image Analyzer application will then launch, ready for operation.

Licensing

The HDR Image Analyzer comes with an internal license already activated. No user involvement is required for licensing, other than accepting end user agreements.

Chapter 4 – HDR Image Analyzer GUI

Overview

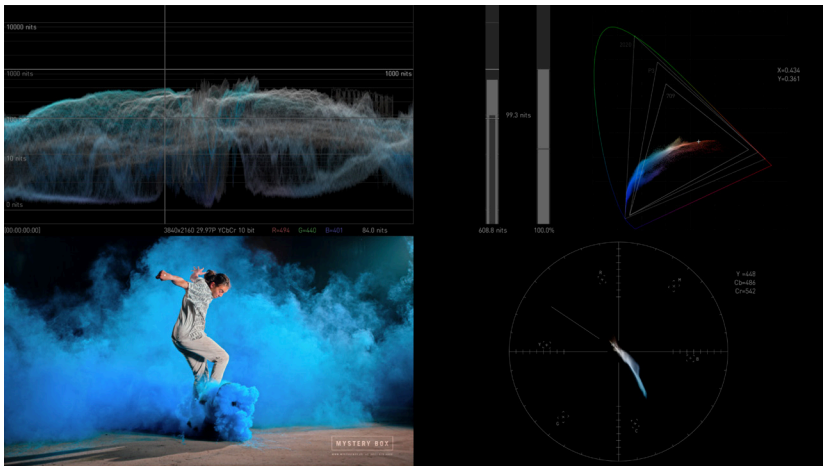
HDR Image Analyzer is a real time video analyzer for QC, Mastering, Grading and Broadcast. The simple, easy to use graphical user interface features unique options designed specifically for HDR work. When the HDR Image Analyzer hardware starts up, the GUI automatically launches.

HDR Image Analyzer interface provides a quadrant layout for viewing your tools and footage as you work. Quick key shortcuts provide pre-configured common layouts for how your tools and views are presented. For further customization, you can also choose a particular tool to be shown in any of the quadrants by either right-clicking on the quadrant itself and choosing your preferred tool, or by accessing quadrant choices from the Analyzer Mode menu

Views

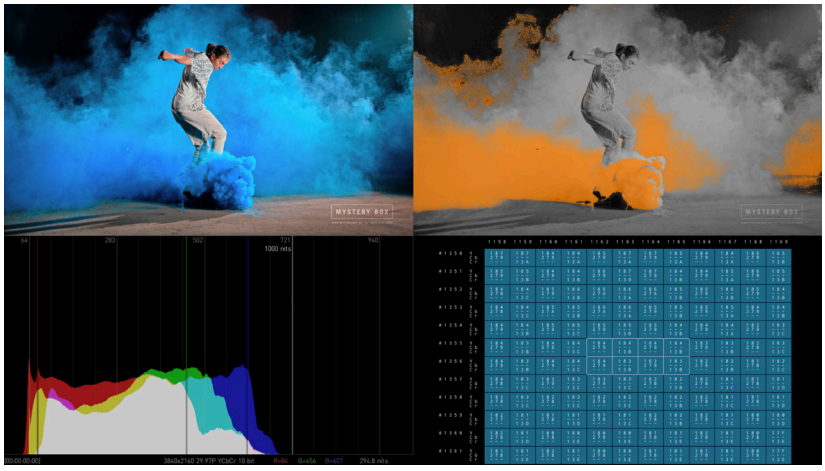
The Analyzer uses screen layouts with either a Quadrants view or Single view.

Figure 4. Quadrants View Example



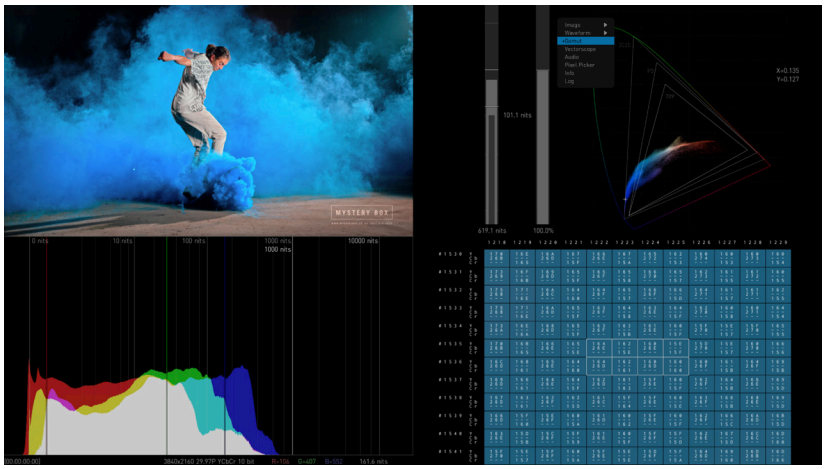
Each screen quadrant can be configured to display the image being examined, or any of the available measurement tools.

Figure 5. Quadrants View Example, Alternate Configuration



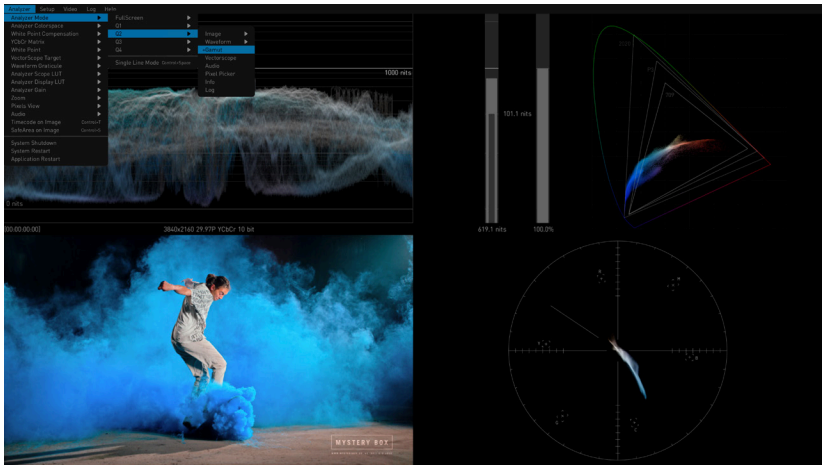
The tool or image in each quadrant can be selected by right-clicking on that quadrant to open a drop-down selection menu for that quadrant (*Figure 6*).

Figure 6. Quadrants View Example, Right-click Configuration



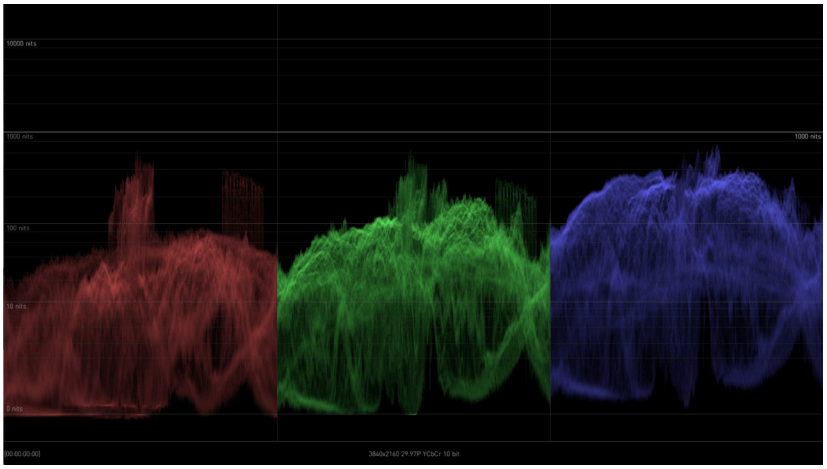
Quadrants can also be configured using the top menu bar's Analyzer Mode drop-down (*Figure 7*).

Figure 7. Quadrants View Example, Analyzer Mode Drop-Down Configuration



In Single View, the image being examined, or some of the selected measurement tools, can be displayed full screen.

Figure 8. Single View Example, Waveform RGB Color

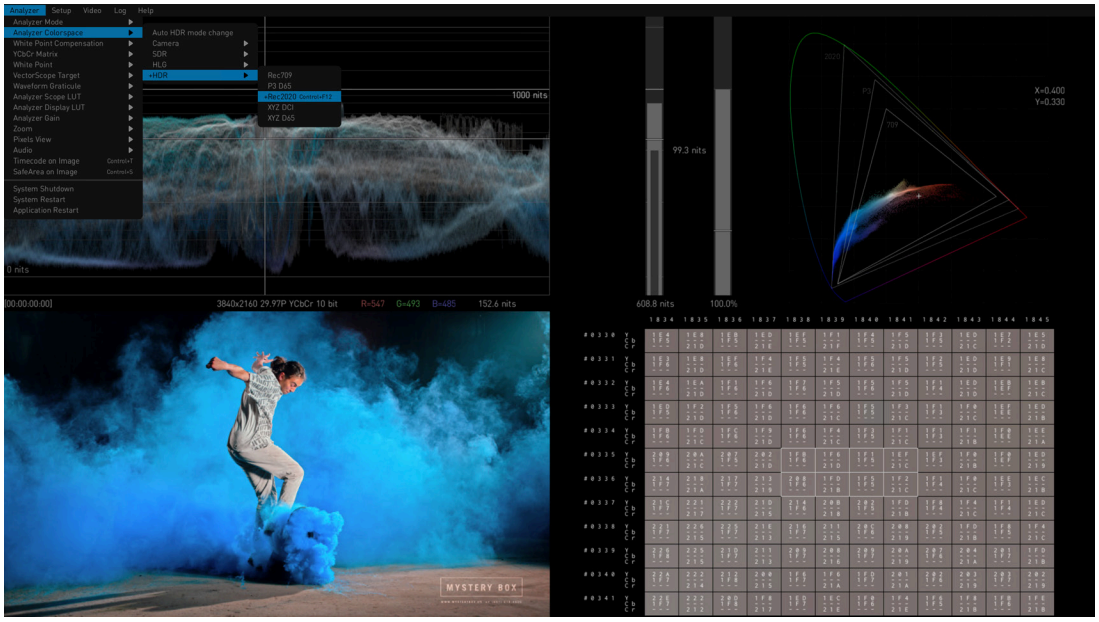


Drop-Down Menu Navigation

A top menu bar appears when the cursor is moved to the top of the screen. These menus can be used to select layouts and configure settings. Clicking on a menu name opens that menu.

Pressing the ESC key also displays the drop-down menus.

Figure 9. Selecting Colorspace Using Drop-Down Menu



When a drop-down menu is displayed:

- The currently selected setting is indicated with a (+) in front of that menu item.
- The left and right arrow keys can be used to move to an adjacent menu, or open an additional parameter menu for the current menu selection.
- The up and down arrow keys moves the selection up or down that drop-down menu.
- Pressing the TAB key selects the next drop-down menu to the right. Shift+TAB moves the drop-down menu selection to the left.

NOTE: When the menu bar is not displayed, the TAB key opens the Settings screen. See "Settings Screen" on page 37 for more information.

Selecting Views with Keyboard

When a drop-down menu is not open, computer keyboard function keys can also be used to activate the layouts.

Table 1. Analyzer Mode Shortcuts

Function Key	Activated Layout
F1	Show Single View video Image. Press again to return to Quadrants view.
F2	Show Single View Waveform. Press again to return to Quadrants view.
F3	Show Single View Gamut. Press again to return to Quadrants view.
F4	Show Single View Vectorscope. Press again to return to Quadrants view.
F5	Cycles only Q1 through Image, Waveform, Gamut, Vectorscope, and Audio views.
F6	Cycles only Q2 through the five views above
F7	Cycles only Q3 through the five views above
F8	Cycles only Q4 through the five views above

The following shortcuts, using the CTRL key, also affect the current view.

Shortcut	Waveform/Histogram Display
CTRL+F5	Cycles Q1 tool variant. The Image display cycles through Brightness and Gamut tools, and the Waveform display cycles through Luminance and Color tools.
CTRL+F6	Cycles Q2 tool variant as above.
CTRL+F7	Cycles Q3 tool variant as above.
CTRL+F8	Cycles Q4 tool variant as above.

In addition, the following useful shortcuts are available:

Shortcut	Colorspace Setting
CTRL+F10	Sets Colorspace to SDR Rec 709
CTRL+F11	Sets Colorspace to HLG Rec 2020
CTRL+F12	Sets Colorspace to HDR Rec 2020
CTRL+space	Toggles Single Line Mode ON and Off

Keystrokes for each shortcut are listed in the drop-down menus. See *"Chapter 7 Menu Reference"* for a complete listing of all keyboard shortcuts.

Analyzer Modes

The waveform, histogram, and vectorscope are a form of oscilloscope and are used to monitor video brightness, contrast, hue, and color saturation.

- The waveform displays the luminosity or brightness and contrast of the pixels in the video frame, with the top of the y-axis indicating a high luminosity level, and the bottom indicating a low luminosity level.

NOTE: Waveform views can be magnified 4x using the Waveform Zoom control. Use the mouse to move up and down the display.

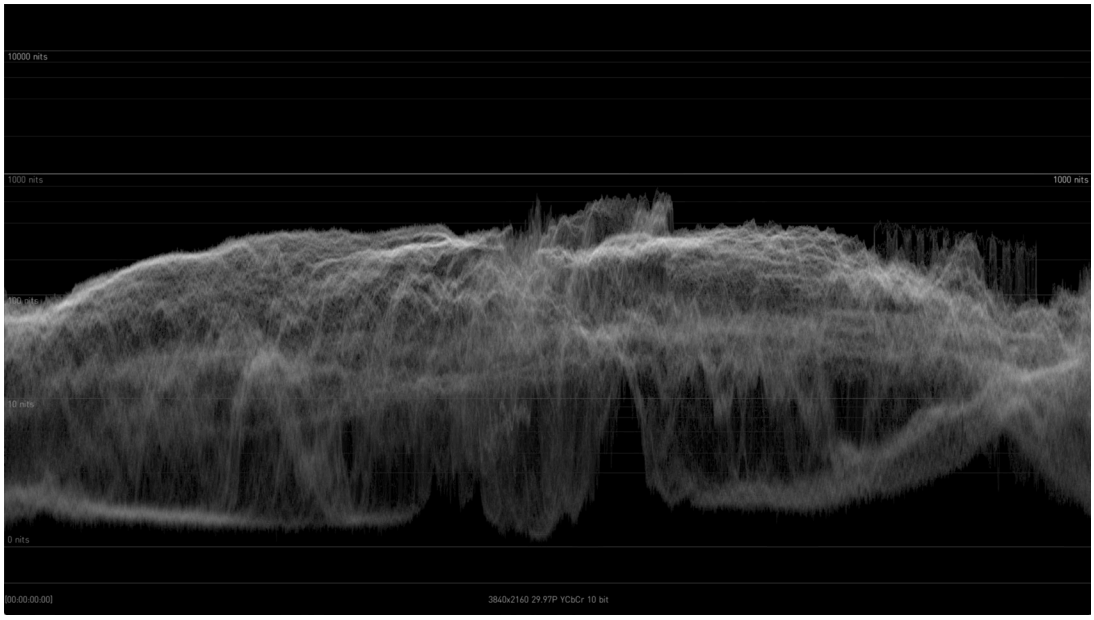
- The histogram shows the number of pixels in relation to a given list of luminance, or colors in a specific colorspace.
- The vectorscope displays values for hue and color saturation. The color saturation of each pixel in the video frame is shown, with the middle of the circle indicating a lower saturation level, and the edge of the circle indicating a higher saturation level. Hue is represented by placement in the 360 degree angle of the circle.

NOTE: The Vectorscope view can be displayed at either a 75% or 100% size (the percentage changes the graticules on the Vectorscope, not the rasterized image), and can be magnified with the Vectorscope Zoom control.

- The gamut screen shows a CIE xy gamut graph reporting the color values present in the image, with a graticule showing the limits for various standards (709, P3, 2020).

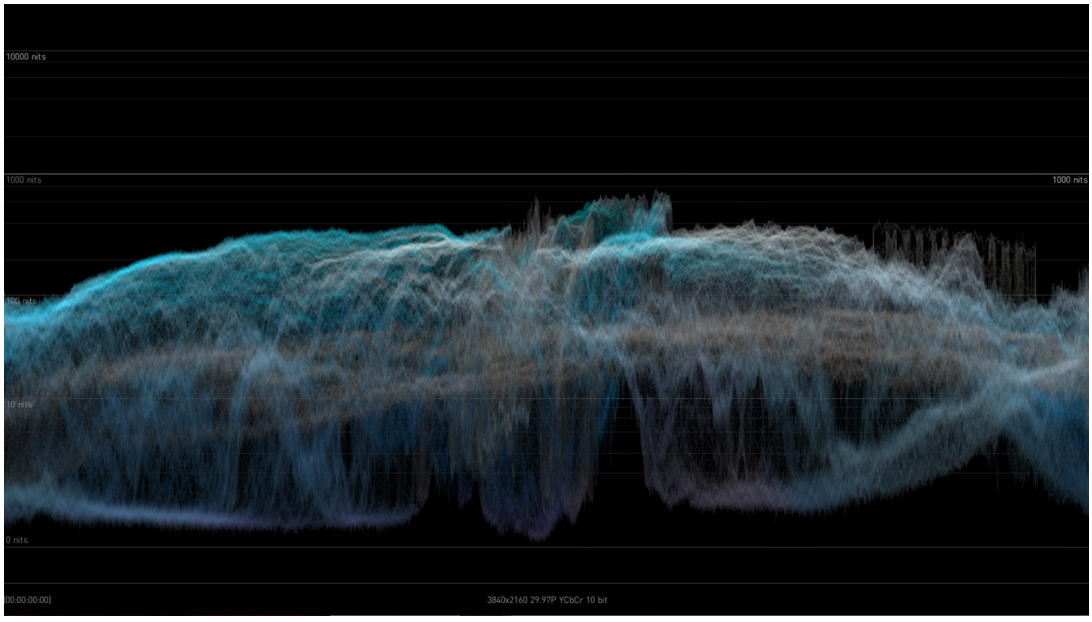
Several Analyzer view modes are available.

Figure 10. Waveform Luminance Mode



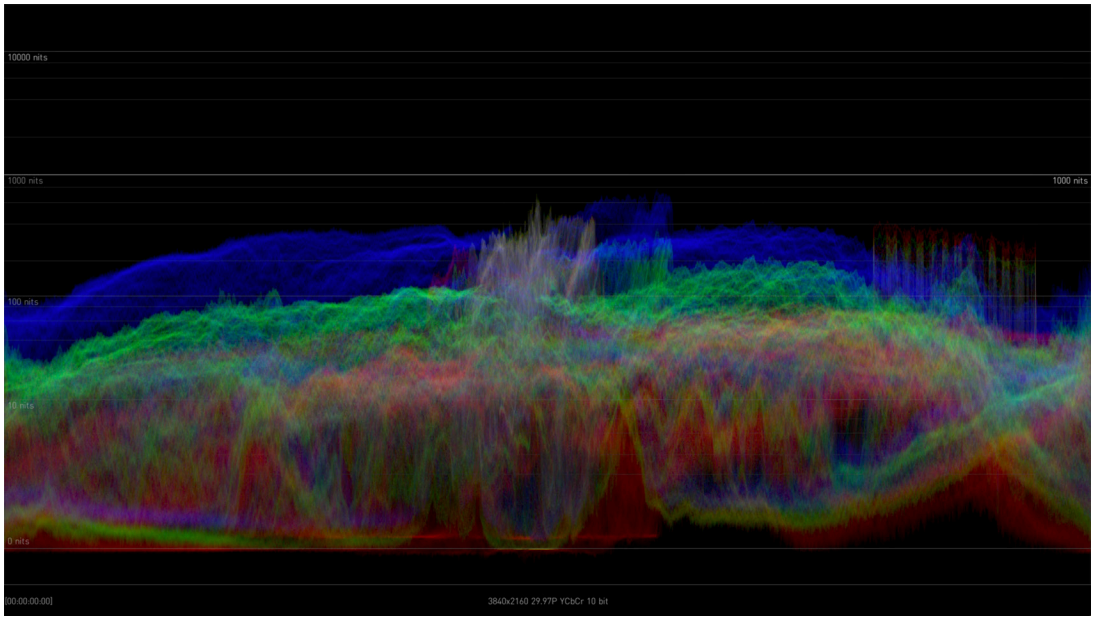
Waveform showing only luminance (Y) and no color information. Each pixel on the graph shows the frequency of the corresponding luminance value in the given column. Higher luminance value means lighter image content, lighter pixel means higher frequency of that luminance value.

Figure 11. Waveform Lumi Color Mode



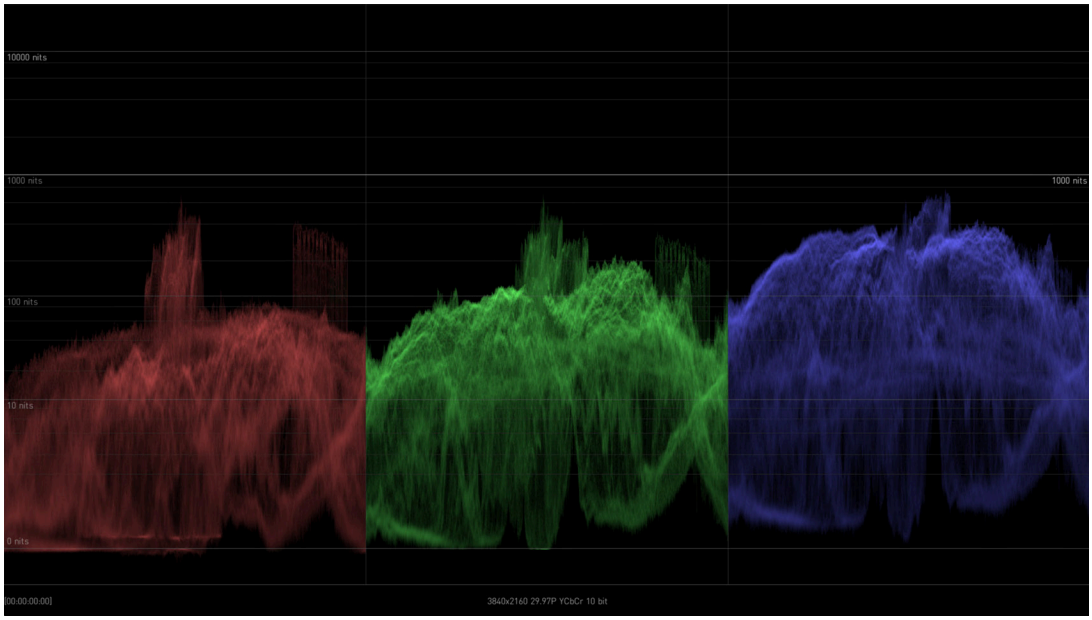
Waveform showing both luminance and color information. Here, in addition to the Waveform Luminance mode, the graph is colored according to color information. The hue and saturation of a pixel shows the sum of the dominant colors having the corresponding luminance value.

Figure 12. Waveform Color Mode



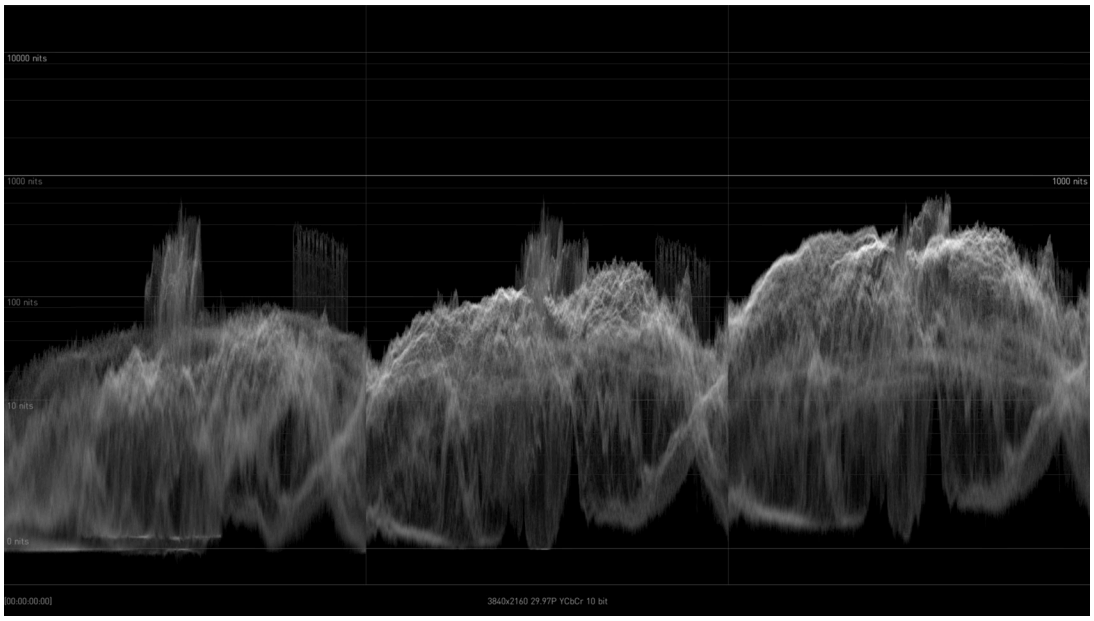
Waveform showing the RGB channels superposed in one graph.

Figure 13. Waveform RGB Color Mode



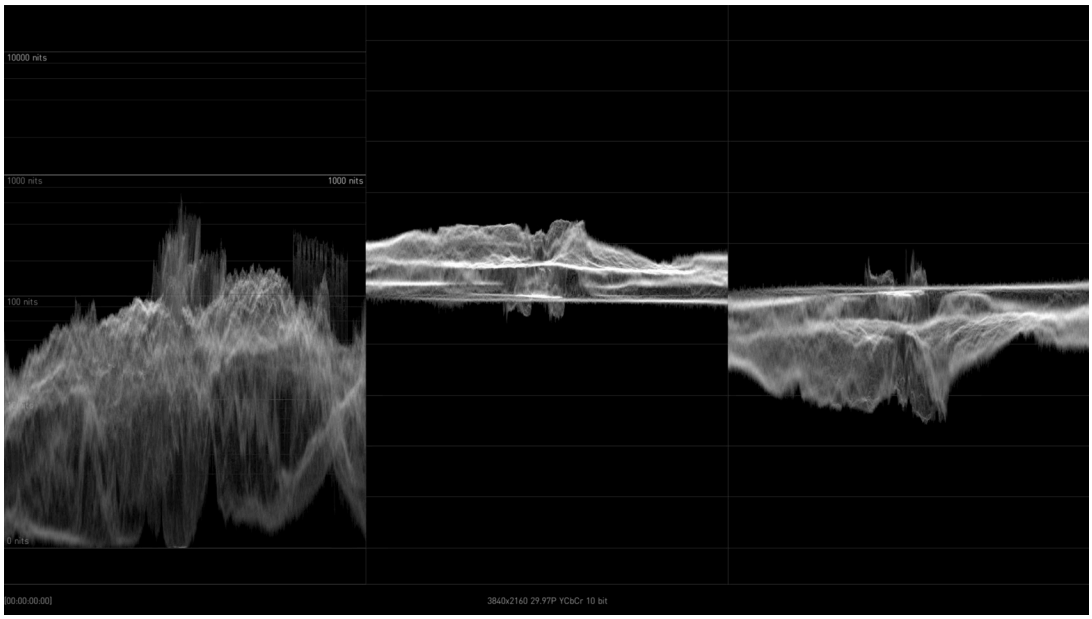
Waveform showing the RGB channels in a split view, where each graph is shown in its respective color.

Figure 14. Waveform RGB Mode



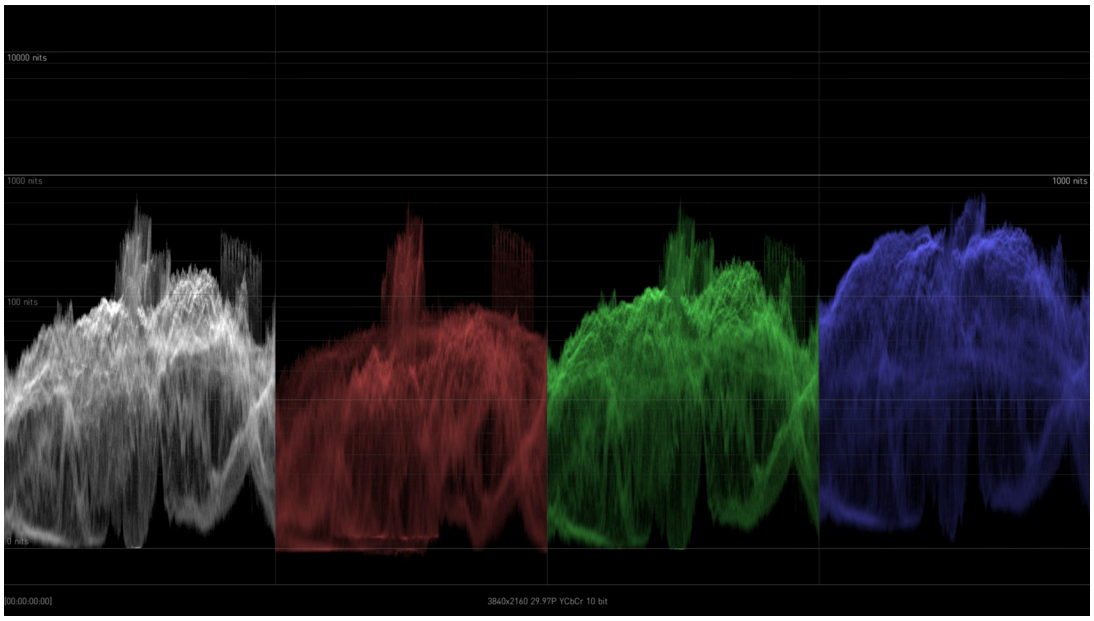
Waveform showing the RGB channels in a split view, where each graph is shown in monochrome.

Figure 15. Waveform YCbCr Mode



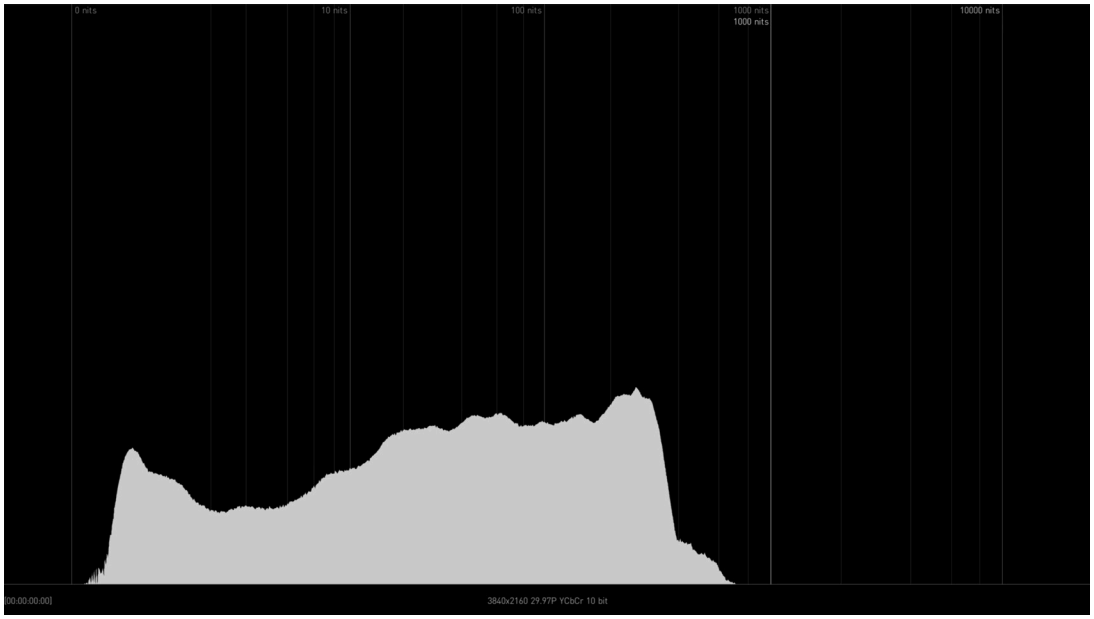
Waveform showing luma (Y), blue minus luma (Cb), and red minus luma (Cr) in a split view.

Figure 16. Waveform YRGB Mode



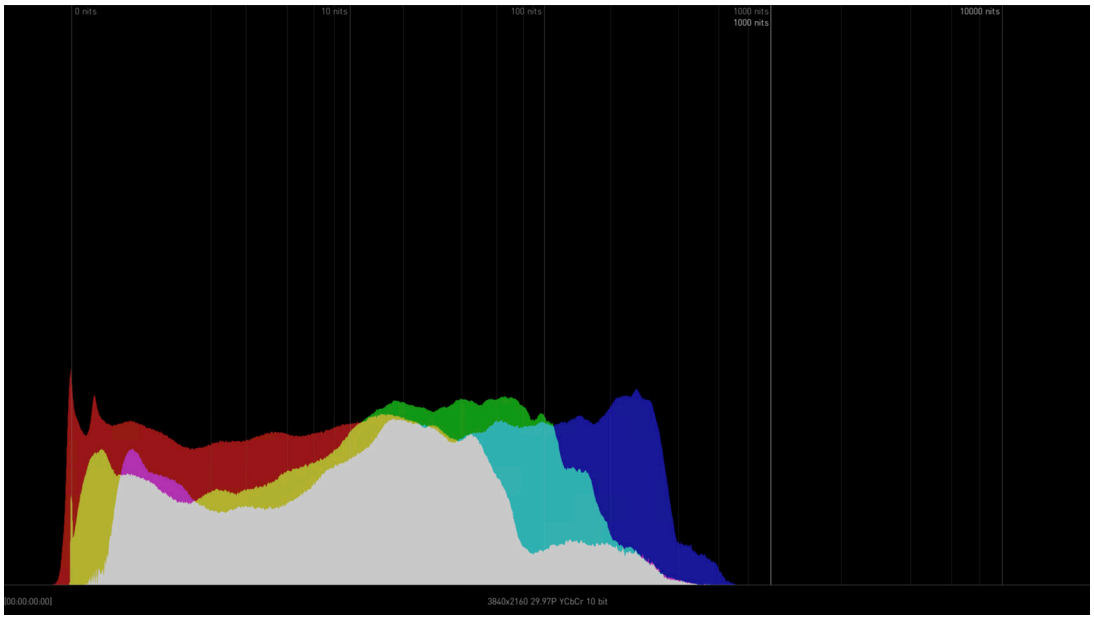
Waveform showing luminance and RGB channels in a split view, where each color channel graph is shown in its respective color.

Figure 17. Histogram Luminance Mode



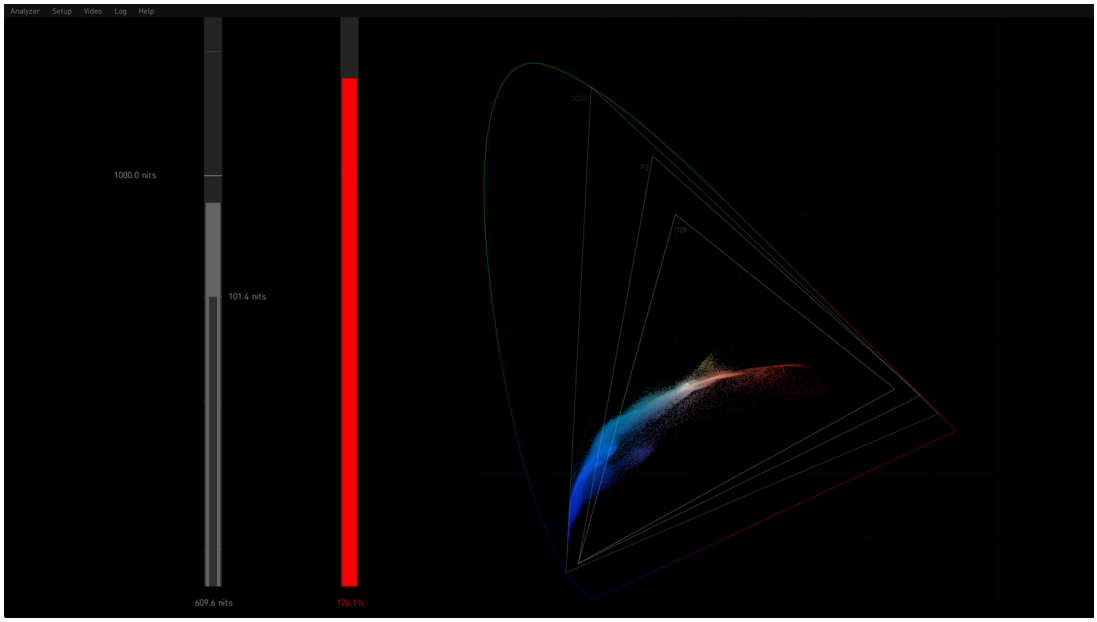
Histogram Luminance is showing the frequency of luminance values throughout the current image content. Left-hand part is for darker, right-hand part is for lighter image content.

Figure 18. Histogram Color YCbCr Mode



Histogram Color showing the frequency of RGB channel values throughout the current image content, superposed. For each channel, the left-hand part represents image content for “0” or Black, while right-hand part represents image content for "1" and White. The 0-1 range is a scale, also represented as code values: (0 = 0,0,0 and 1 = 1023,1023,1023) in 10 bit code value for R, G & B.

Figure 19. Gamut Mode (CIE xy Graph) with Gamut Error

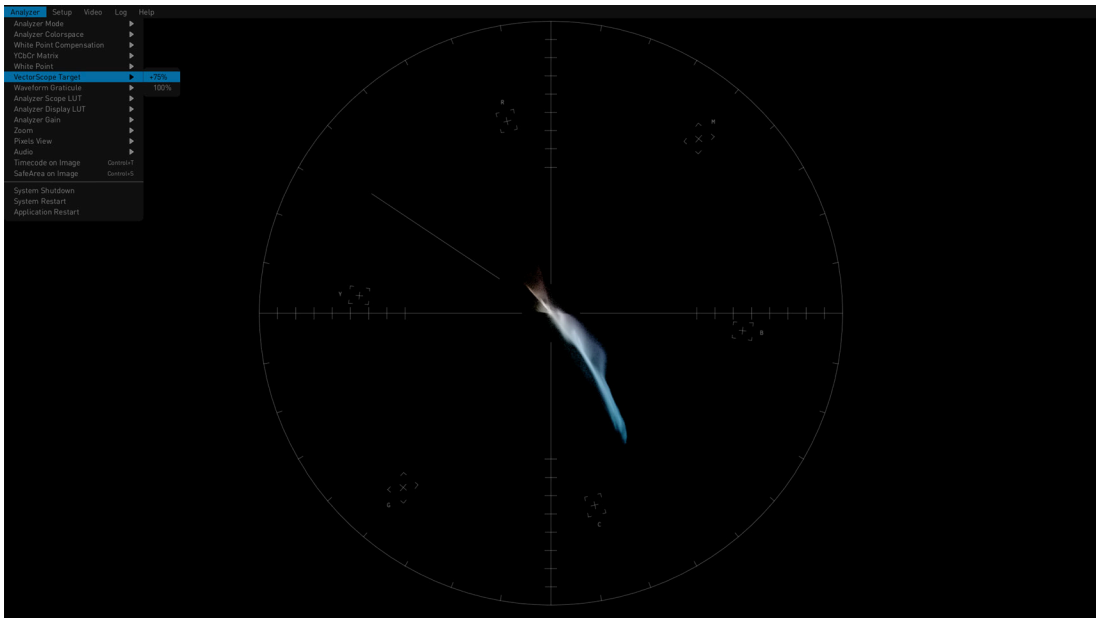


This mode displays a CIE xy Gamut, showing various output referred color gamut standard limits, and also has Brightness and Gamut bars.

Brightness and Gamut Bars

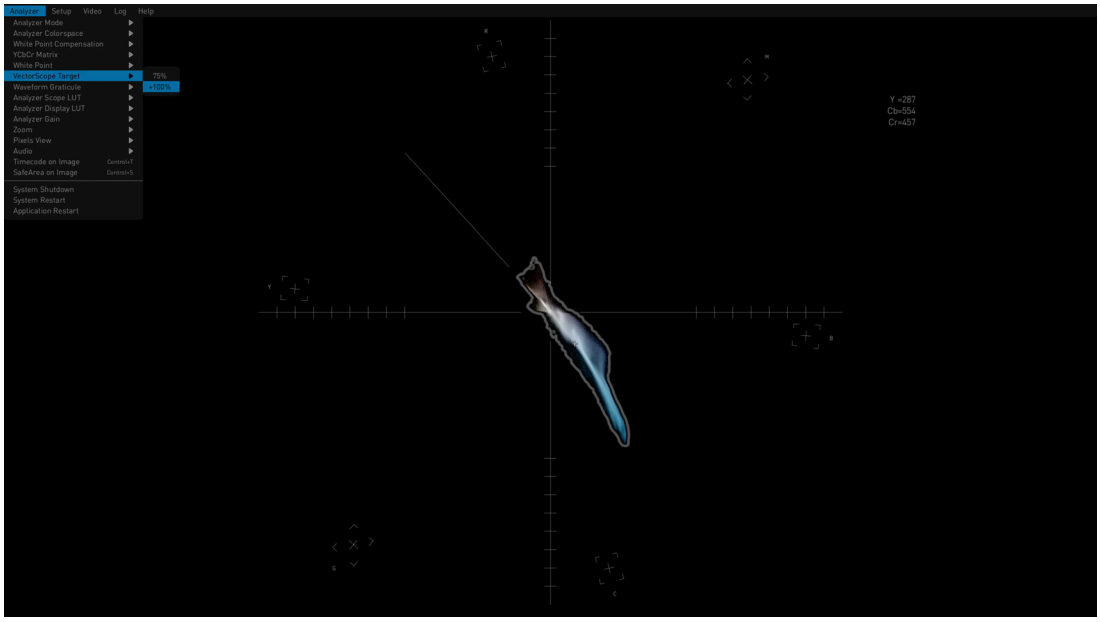
This view also contains two bars: the brightness bar on the left indicates the brightest pixel detected, the gamut bar on the right shows if the colors are within the legal color gamut. See *"CIE xy Gamut View" on page 31* for more information.

Figure 20. Vectorscope with markers indicating 75% values



Vectorscope is showing the hue and saturation of all pixels throughout the current image content. The middle of the circle indicates a lower level of saturation, while the edge of the circle indicates a higher level of saturation. The brightness of the graph shows the frequency of the respective color in the image content.

Figure 21. Vectorscope with markers indicating 100% values, Vectorscope Aid



Skin Tone Line

A skin tone line is also available on the Vectorscope graticule, adjustable using the Skin Tone X and Y controls in the Settings menu.

Vectorscope Aid

A Vectorscope Aid feature is available in the Settings menu, which draws a grey bounding area around the chroma on the Vectorscope, which can be useful when trying to examine individual pixels.

Framing Guides

HDR Image Analyzer supports two framing guides, Safe Title and Safe Action. Enabling "Safe Area on Image" displays the guides configured in the SAFEAREA sub-page of the Settings screen. You can display either the Safe Title, Safe Action, or both boundaries. The CTRL+s hotkey combination enables and disables the framing guide display.

Figure 22. Framing Guides



Timecode on Image

The timecode is captured from several areas including the SDI and may be displayed on the image by selecting the Window › Timecode on Image menu option.

Figure 23. Timecode on Display Image (Lower Right Corner)



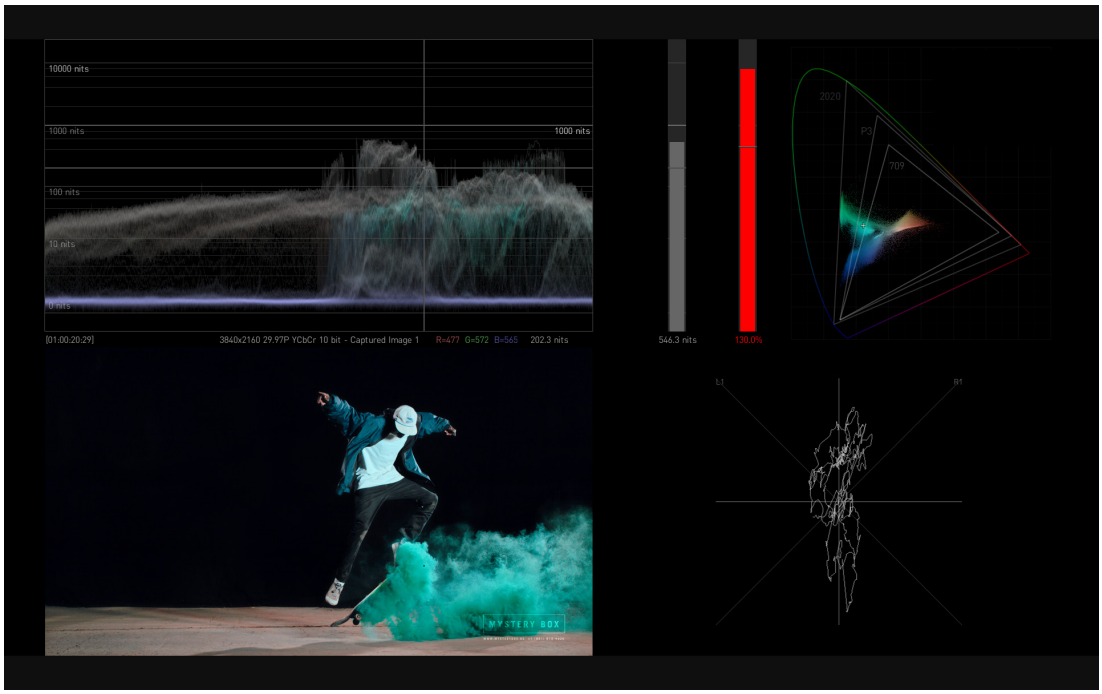
Audio Monitoring

Any quadrant of the HDR Image Analyzer GUI can display one of the audio monitoring screens. In the following examples the various tools are shown in the lower right quadrant (Q4).

Audio Phase Meter

Analyzer supports an audio phase meter which can be configured to display either two channel (stereo) or eight channel (surround) audio. When configured to display two channels, channels 1-2, 3-4, 5-6, or 7-8 may be displayed. When configured to display 8 channels, channels 1-8, or 9-16 may be displayed.

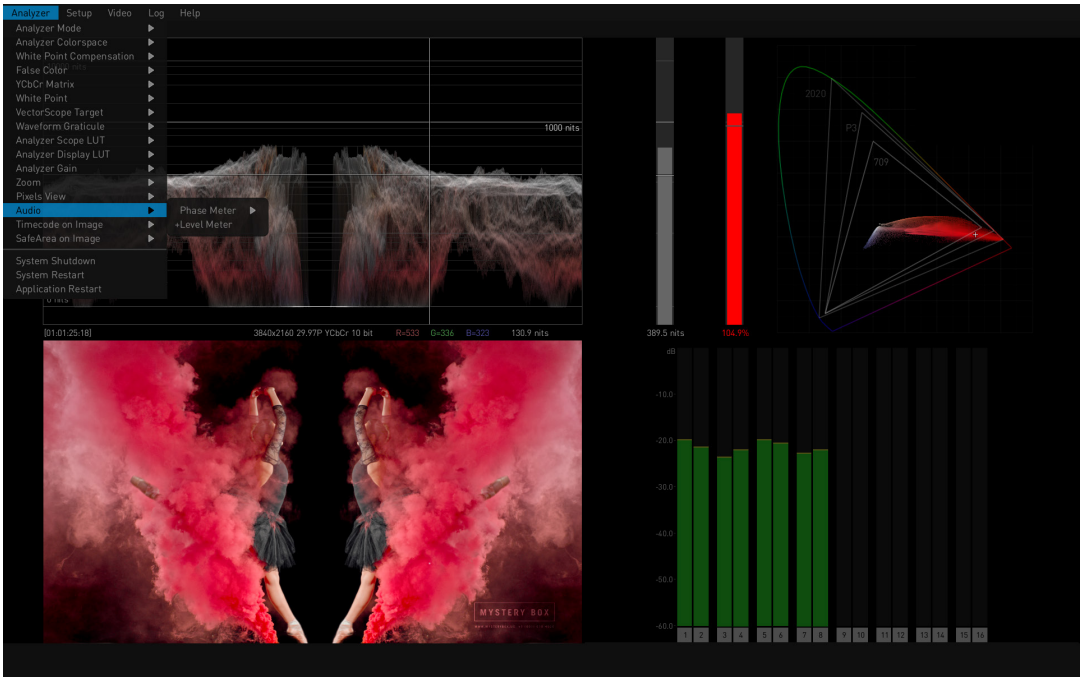
Figure 24. Audio Phase Meter



Audio Level Meter

Analyzer supports an audio level meter with up to 16 channels which can be used to monitor audio levels and also display peak dB levels.

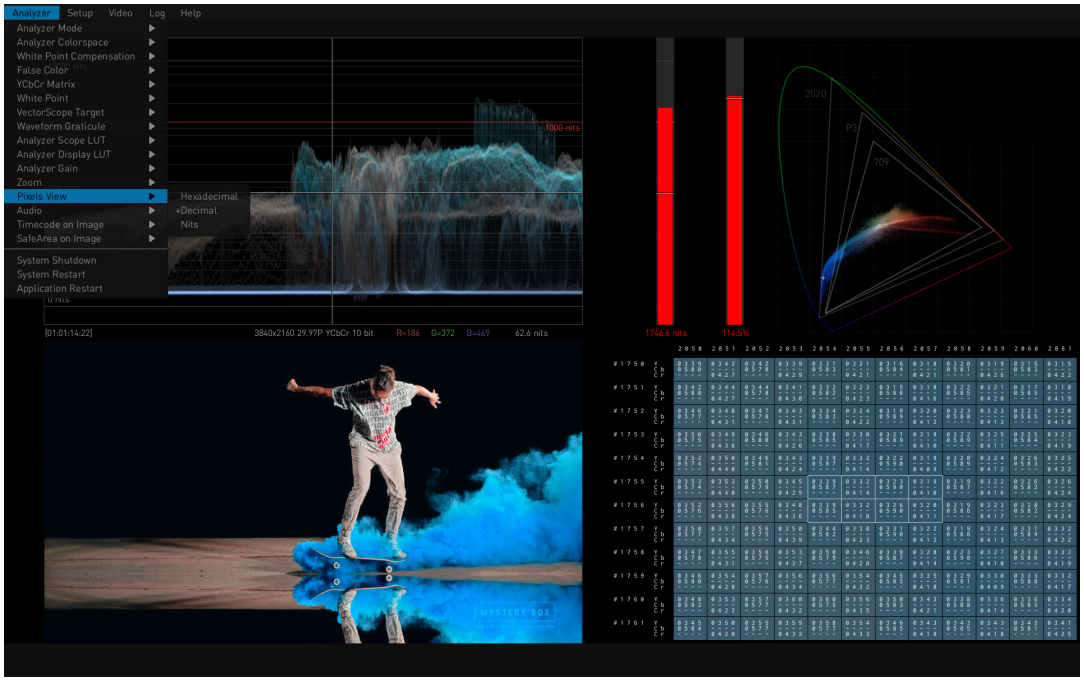
Figure 25. Audio Level Meter



Pixel Picker

The HDR Image Analyzer GUI can display Pixel Picker information. See *"Pixel Picker" on page 34* for more information.

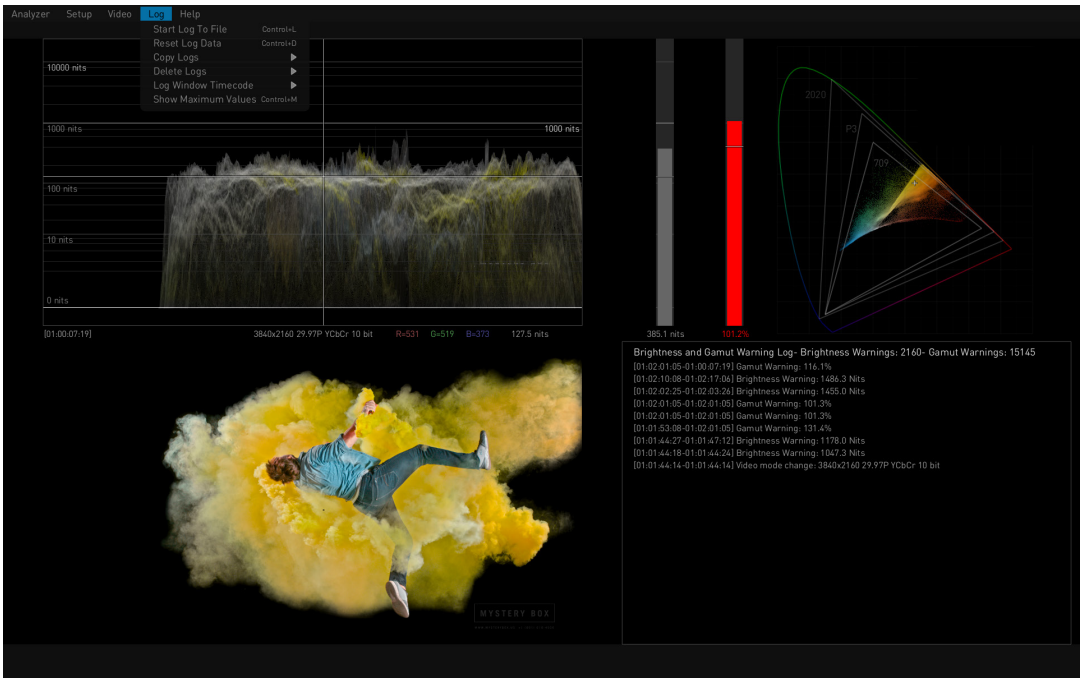
Figure 26. Pixel Picker Quadrant View



Log Data

When Log is selected for a quadrant, the current log data is displayed. This information can be saved to log files. See *"Logging" on page 37* for more information.

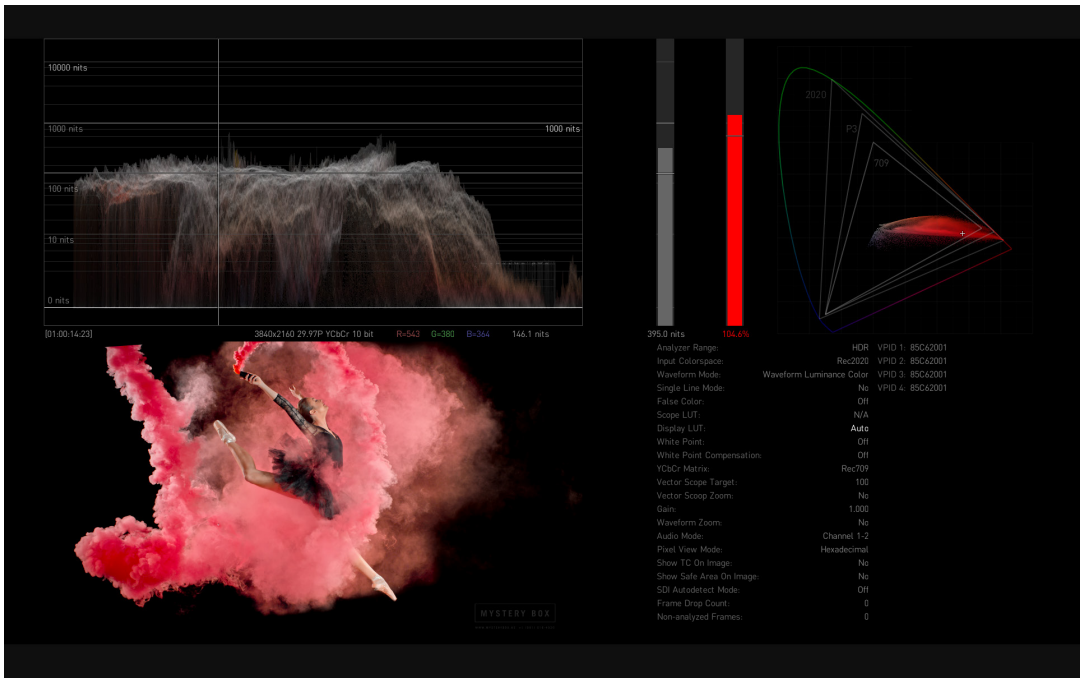
Figure 27. Log Data Quadrant View



Info Page

When Info is selected for a quadrant, useful information about the current HDR Image Analyzer settings is displayed.

Figure 28. Info Page Quadrant View



Other Features

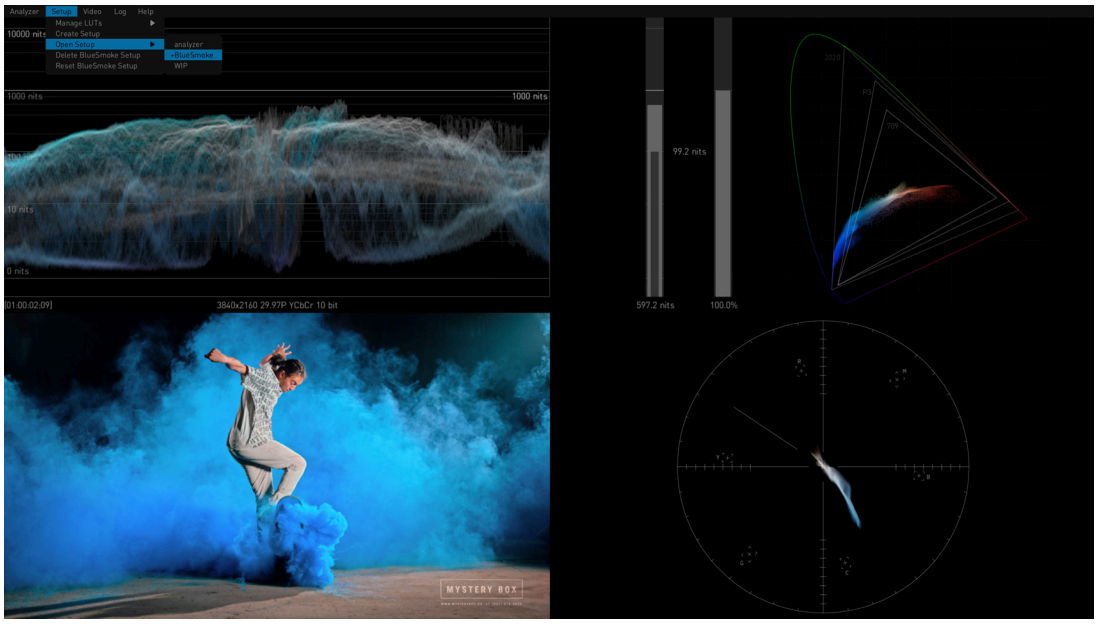
Other configuration options are available in the various HDR Image Analyzer menus. See *"Chapter 7 Menu Reference"* for additional information.

Chapter 5 – Using HDR Image Analyzer

HDR Image Analyzer Setups

The Setup menu of the top menu bar is used to create, select, and save Setups of views and parameter settings.

Figure 29. Setup Menu



An opened Setup is updated with any changes made to the HDR Image Analyzer's current settings. This ensures whenever a Setup is loaded, the last configuration that was used for that Setup will be restored.

If you want to save a "snapshot" of the current settings, after opening or creating a Setup and creating the configuration you wish to save, simply create or load a new Setup. Any subsequent parameter changes will be made to the new Setup, and the "snapshot" of settings for that earlier Setup will be recalled later when that earlier Setup is opened.

Create Setup

Opens a window to name and create a setup of the current settings.

Open Setup

Displays a list of the current setups for selection.

Delete Setup

When a Setup has been opened, you can delete it with this choice. The default “analyzer” setup then gets loaded.

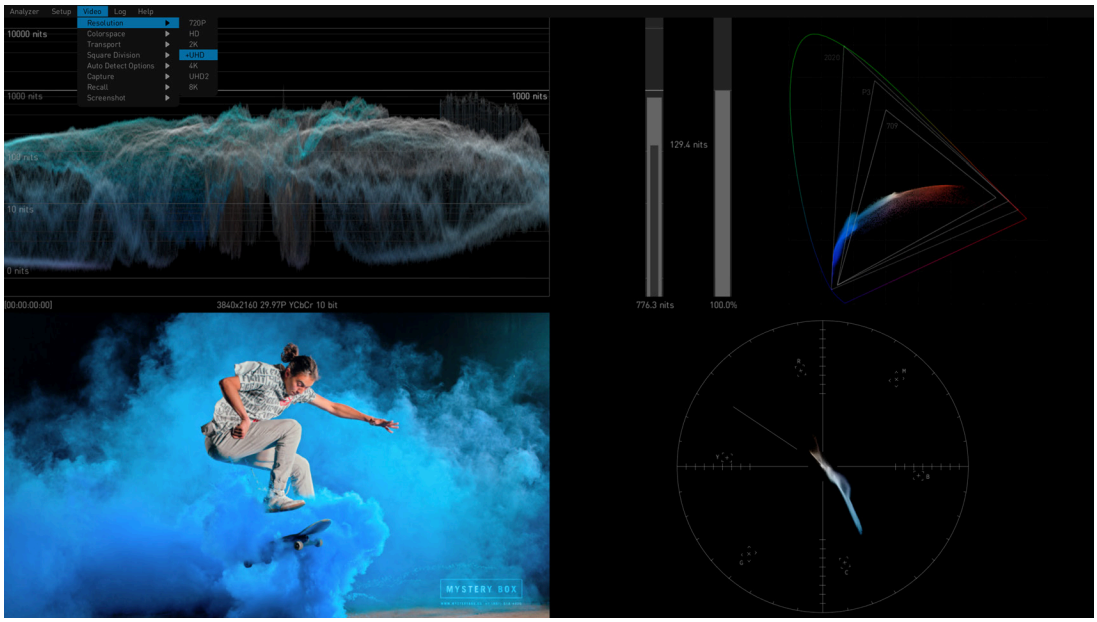
Reset Setup

Resets the current Setup to factory default values.

Video Menu

The Video drop-down menu of the top menu bar is used to define the characteristics of the video signal being analyzed, and can be used to capture and recall still video images for detailed analysis.

Figure 30. Video Menu



NOTE: If Auto Detect is On, the HDR Image Analyzer will automatically select (if possible) the incoming video's Resolution, Colorspace, Transport, and Square Division settings.

Resolution

A drop-down menu permits selecting a resolution to manually match the incoming video being analyzed. Select from:

- 720p
- HD
- 2K
- UHD
- 4K
- UHD2 (12G model only)
- 8K (12G model only)

Colorspace

A drop-down menu permits selecting from YCbCr 10 bit, RGB 10 bit, or RGB 12 bit colorspaces to manually match the incoming video being analyzed. Select from:

- YCbCr 10 bit
- RGB 10 bit
- RGB 12 bit

Transport

A drop-down menu permits selecting the SDI transport to manually match the incoming video being analyzed. Select from:

- Single Link
- Dual Link
- Quad Link

Square Division

A drop-down menu permits selecting the pixel mapping of incoming video. Select from:

- SQD - Square Division
- 2SI - Two Sample Interleave

2SI LFR and HFR Input

For LFR (Low Frame Rate) 2SI video the Analyzer only uses SDI input 1 and 2 (four wire LFR 2SI is not supported at this time).

For HFR (High Frame Rate) 2SI video all 4 SDI inputs are used.

Auto Detect Options

The Auto Detect Options setting is used to make the HDR Image Analyzer automatically select the number of incoming video signals to be used depending on the detected video, or to force the use of only the first BNC input connector, or to force the use of all four input connectors. The auto detection is based on the VPID video payload identifier (SMPTE 352M).

Auto Detect - HDR Image Analyzer automatically detects incoming video and uses either one link, or four links as appropriate.

Forced 1x SDI Connection Mode - Forces use of only BNC input connector one.

Forced 4x SDI Connection Mode - Forces use of all four input BNC connectors.

Allow Loop Through (12G model only) - Activates loop through BNC outputs, if output connectors are available.

Capture

Captures the current video frame. Up to four frames can be captured.

NOTE: Captured images are volatile, and will be lost when the HDR Image Analyzer is turned off.

Recall

Recalls the selected captured video frame for display and detailed analysis.

Screenshot

The Screenshot menu lets you capture the current Analyzer UI screen displayed on the connected computer. Screenshots are saved as .png files to the local host computer, and can then be copied into a different folder (for example an attached USB flash drive).

Save Screenshot

Captures the current Analyzer UI screen. You can also use the CTRL+e hotkey.

Copy Screenshots

Copy All Screenshots - Opens a file browser window allowing you to select the drive and folder into which all the currently captured screenshots will be copied.

Copy Today's Screenshots - Copies only the screenshots captured today.

Copy All Except Today's Screenshots - Copies all captured screenshots except those captured today.

Delete Screenshots

Delete All Screenshots - Deletes all currently captured screenshots. Does not affect screenshot files that have been copied into another folder.

Delete Today's Screenshots - Deletes only the screenshots captured today.

Delete All Except Today's Screenshots - Deletes all captured screenshots except those captured today.

Analyzer Colorspace and Range

You can find the analyzer range configuration options in Analyzer > Analyzer Colorspace menu.

The Analyzer supports Camera Log, and SDR and HDR (HLG and PQ) colorspace modes. Select the appropriate option from the Analyzer > Analyzer Colorspace menu that matches the current image.

Auto HDR Mode Change

This parameter can be used to make the HDR Image Analyzer automatically configure the Transfer Characteristic and Colorspace settings, based on the VPID of the incoming SDI signal.

Camera Log Analysis

Several original camera log curves are supported for processing media in the original capture colorspace. Supported formats are the following:

- ARRI LogC WideGamut
- CanonLog2
- CanonLog3
- Panasonic VLog/VGamut
- Red WideGamut/Log3G10
- Sony SLog3/BT2020
- Sony SLog3/SGamut3
- Sony SLog3/SGamut3Cine
- ACEScct

For scene referred input (Camera Log colorspace modes) CIE xy Gamut Graph values are clipped to the primaries of the colorspace.

In these modes, the waveform graticules are displayed in camera stops. To set up the base level and the warning level, adjust the following settings in the QC section of the Settings page (open with Tab):

CameraBaseGrey - Base grey level in nits; the 0 exposure line will be drawn at this level

CameraWhiteStopsOverGrey - Brightness warning level; it stops over base level

SDR Analysis

For working with SDR gamma encoded broadcast or cinema signal, set the Analyzer Range to SDR. Possible color primary options are the following:

- Rec709
- P3 DCI
- P3 D65
- Rec2020
- XYZ DCI

HLG Analysis

HLG mode supports the variable Hybrid Log-Gamma color encoding. In this mode, code values range from 0 to 1 and pixels do not have a specific nit level interpretation. Possible color primary options are the following:

- Rec709
- Rec2020 (with gamut warning for colors outside of P3)

NOTE: The settings QC tab has a Gamut Warning parameter that allows setting when the HDR Image Analyzer will trigger out-of-gamut warnings. You can choose Rec 709, P3, Rec2020 or none.

HDR Analysis

HDR mode supports High Dynamic Range analysis. Peak brightness values above the maximum allowed nit level are indicated in red on all graphs.

Possible color primary options are the following:

- Rec709
- P3 D65

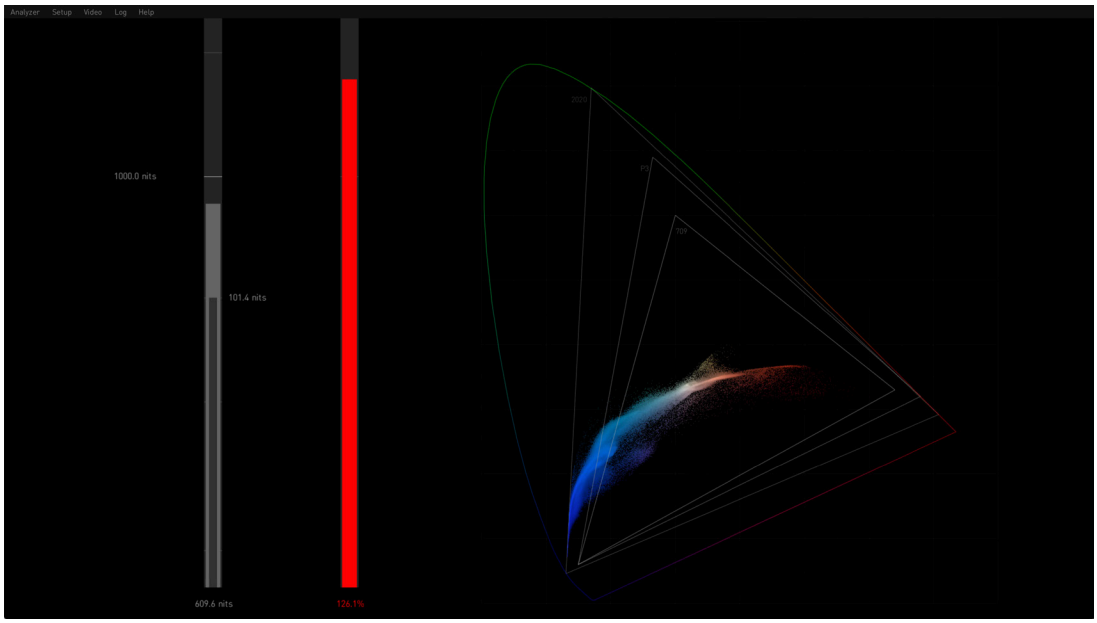
NOTE: By default, the peak brightness threshold is set to 1000 nits according to the HDR10 standard. When working with PQ masters of higher peak brightness, the corresponding maximum brightness needs to be adjusted on the QC section of the Settings page (open with Tab).

- Rec2020 (with gamut warning for colors outside of P3)
- XYZ DCI
- XYZ D65

CIE xy Gamut View

The CIE xy Gamut View can be used to check the encoded colors on a standard CIE xy graph, and to see if they are within the valid color range in case a specific gamut constrain is to be enforced. This is relevant when working in the Rec2020 colorspace, so the operator can identify that the colors are outside of the P3 gamut. This is a requirement for several currently popular delivery formats.

Figure 31. CIE xy Graph with Brightness and Gamut Bars



This view also contains two bars. Illegal colors are indicated when a bar is colored red.

The bar on the left is the brightness bar that indicates the brightest pixel detected on the actual frame. When properly configured, an inner vertical bar on the left with a nits value shows the Frame Average Light Level (FALL) of the current frame, which allows the operator to inspect the average brightness of the image.

The bar on the right is the gamut bar that shows if the colors of the actual frame are within the legal color gamut (P3 in case of Rec2020 input colorspace).

The maximum values are calculated using the Tolerance parameters available in the Settings Screen. The P3 colorspace is the limit. HDR Image Analyzer uses thresholds when detecting these extremes, so using the default settings a few pixels are allowed to exceed the legal limits without triggering a warning.

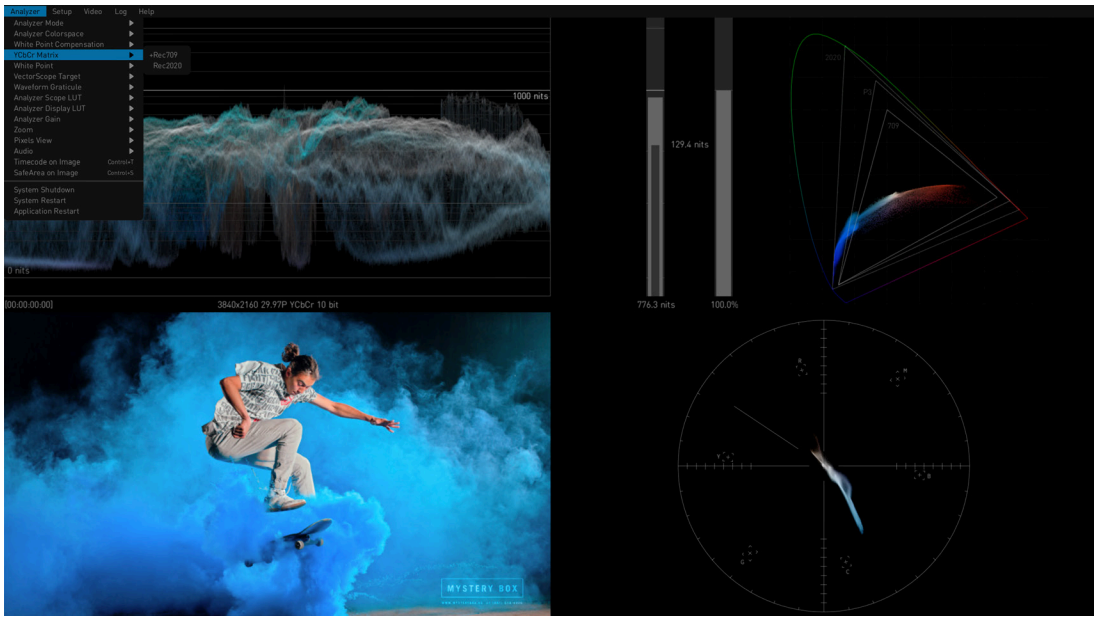
NOTE: Cumulative maximum values can be displayed on the Brightness and Gamut bars using the Log > Show Maximum Values parameter.

YCbCr Matrix

For the purpose of showing YCbCr components in various graphs (such as the vectorscope or the waveform YCbCr), the result image is converted to the YUV space. Select from the following formats for the specific matrix transformation:

- Rec2020
- Rec709

Figure 32. Signal Analysis with CIE xy Gamut Graph and Vectorscope



NOTE: The above settings will be reflected in the CIE xy graph and the gamut meter.

White Point Compensation

White point is a marker on the CIE graph. White point compensation D65, however, is an option to change processing. Thus, if you are in XYZ Gamma2.6 colorspace (Digital Cinema), you can change the Vectorscope and Waveform processing so that the balanced white would be D65 instead of DCI. By default, DCI white would be in the center of the Vectorscope, and DCI white would have the same level in the three channels of the waveform. If you turn on White Point Compensation to D65, then D65 white would be in the center of the Vectorscope, and D65 white would have the same level in the three channels.

- The **White Point Compensation** parameter in the Analyzer menu turns compensation On and Off, which will change the analysis of the incoming video.
- The **White Point** parameter simply displays a box for either D65 or DCI on the CIE graph, and does NOT alter the analysis of the incoming video.

False Color

You can check for illegal or near-illegal brightness and gamut levels by enabling the False Color mode. The available False Color display modes are the following:

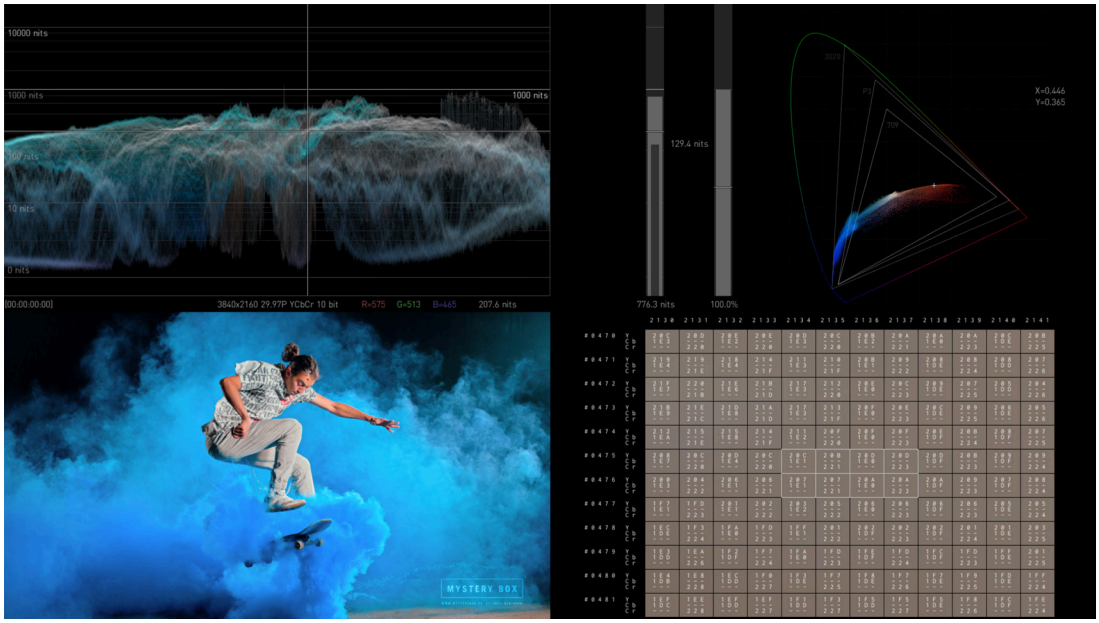
- Brightness
- Brightness Warning
- Gamut
- Gamut Warning

In the Warning modes, pixels that are too bright or out-of-gamut are colored red. Values at 90% of threshold are orange. The rest of the pixels are displayed in grayscale.

Pixel Picker

The Pixel Picker is always active. With a left click of the mouse you can pick any pixel on the image (Full Screen or Lower Left Quadrant.) The Pixel Picker view provides an extra precision view with per-pixel granularity.

Figure 33. Pixel Picker



Pixel Picker Modes

From the menu the operator can choose how to inspect the pixel color values. The options are:

Hexadecimal mode - Displays the hex code values of the pixels.

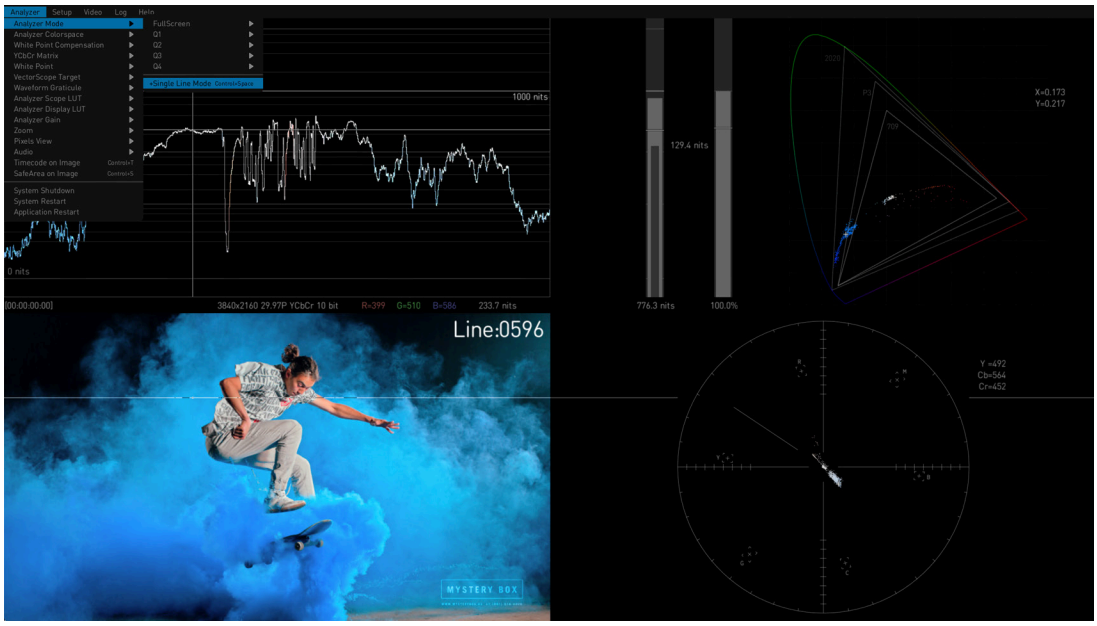
Decimal mode - Displays the decimal code values of the pixels.

Nit value mode - Displays the pixel brightness in nit level.

Single Line Mode

Single Line Mode limits the analysis to a single horizontal line of video. This mode can be used by a QC operator to verify blanking.

Figure 34. Single Line Mode



The line being analyzed is indicated with a contrastingly colored line, and the number of the line is shown on the upper right.

Single Line Mode is turned on and off with the Analyzer Mode menu, or with the CTRL+space hotkeys. Additionally the hotkey CTRL + Up/Down Arrow moves the single line mode up and down one line at the time.

LUTs

Overview

Lookup Tables (LUTs) allow the mapping of colors between colorspaces.

The HDR Image Analyzer allows external Lookup Tables (LUTs) to be used for two different purposes:

- A Display LUT is only applied to the image being shown and does not affect the actual analysis of the pixel values. This can allow an operator to look at a correct image on a display device that does not match the current video signal type.
- A Scope LUT is applied to the video signal being processed, so all scopes, waveforms etc. will be based on the remapped image.

No external LUTs are provided with the HDR Image Analyzer. Users can create and load custom LUTs, if desired, provided they are formatted as either a *.cube or *.3dmesh LUT file.

LUT files are loaded into and deleted using the Setup > Manage LUTs menu (*Figure 35 on page 36*), but are not active until selected for use as either an Analyzer Scope LUT or an Analyzer Display LUT (*Figure 36 on page 36*), using the Analyzer menu selections.

Figure 35. Manage LUTs Menu

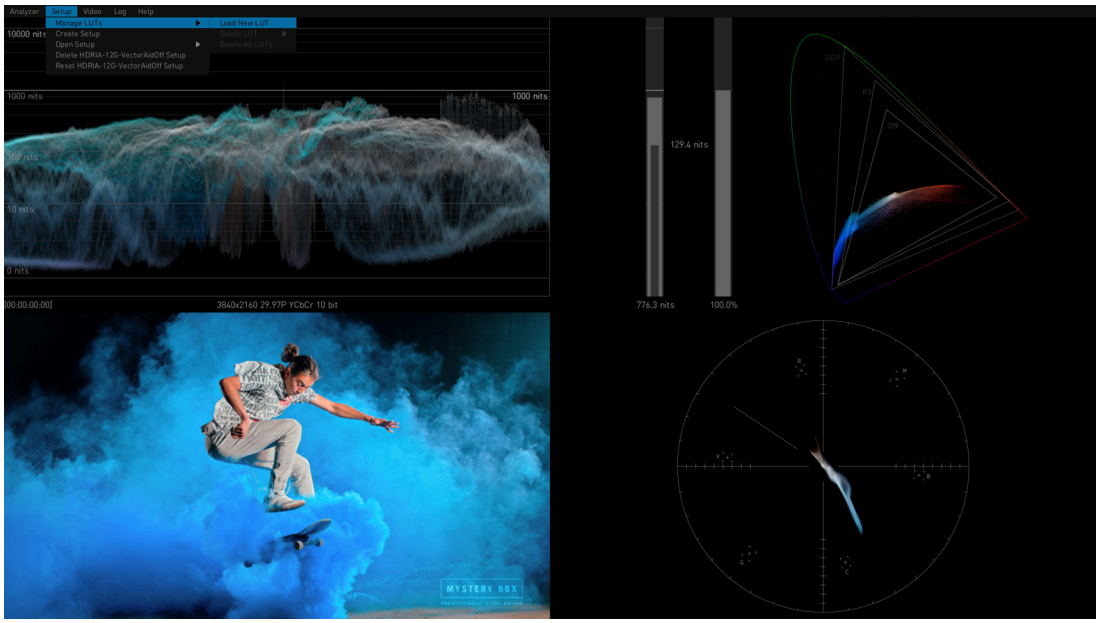
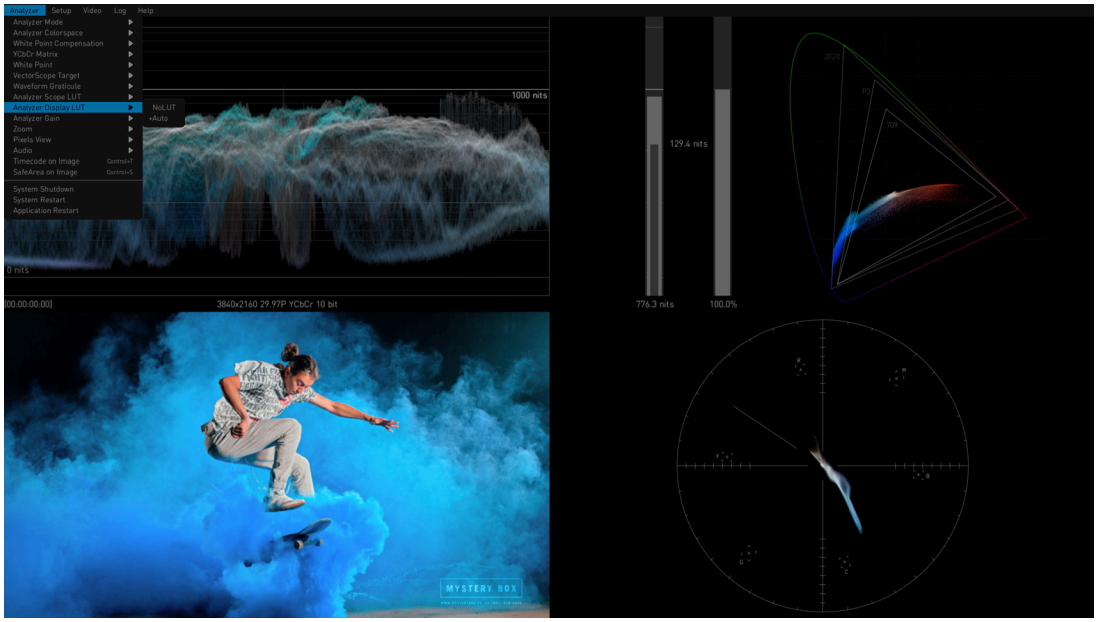


Figure 36. Analyzer Display LUT Menu



Analyzer Scope LUT

Generally the **No LUT** Analyzer Scope LUT setting should be used to maintain the correct color analysis.

Display Scope LUT

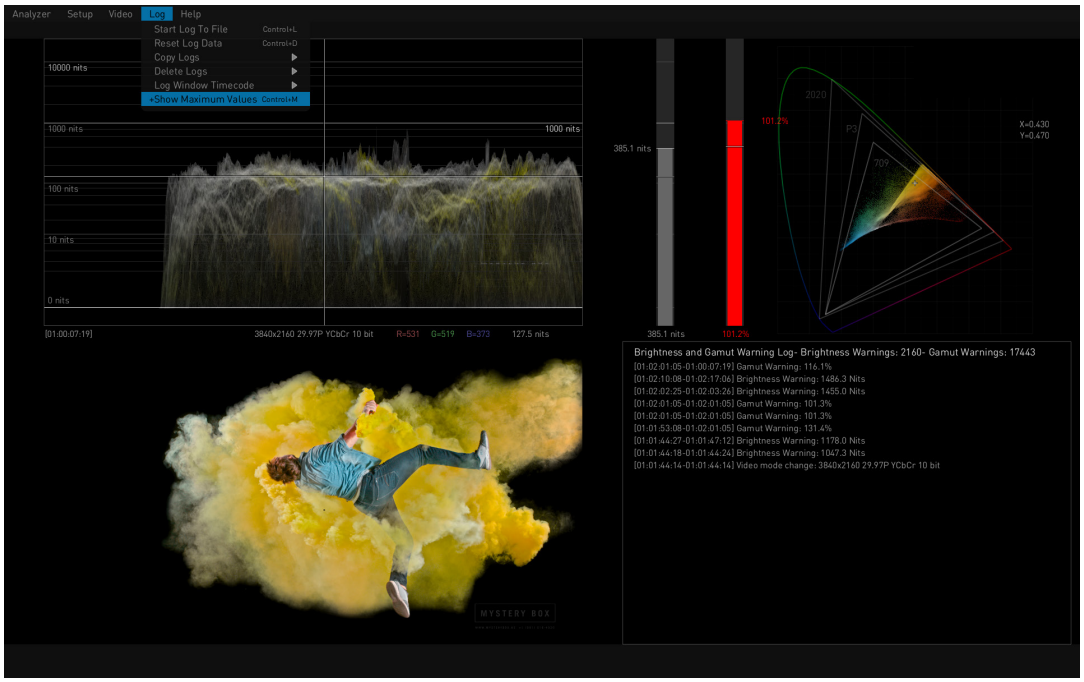
Generally the **Auto** Analyzer Display setting should be used, which enables HDR Image Analyzer to use its internal, calibrated LUTs for proper display.

Logging

Analyzer detects the events below and logs them with time stamps in a log file and on screen:

- Gamut violations of the current colorspace.
- For HDR, P3 Gamut violation if HDR Colorspace is set to Rec2020.
- For HDR, Brightness violation. Max brightness for HDR is configured in the Settings > QC tab.
- Timecode break

Figure 37. Logging with Show Maximum Values Selected.



A new log file can be created by starting a QC session from the Log drop-down menu:

- Start Log to File (CTRL+l)
- Clear Log Data (CTRL+d)

You can also select the timecode or session clock to be used in the log:

- Log Window Timecode

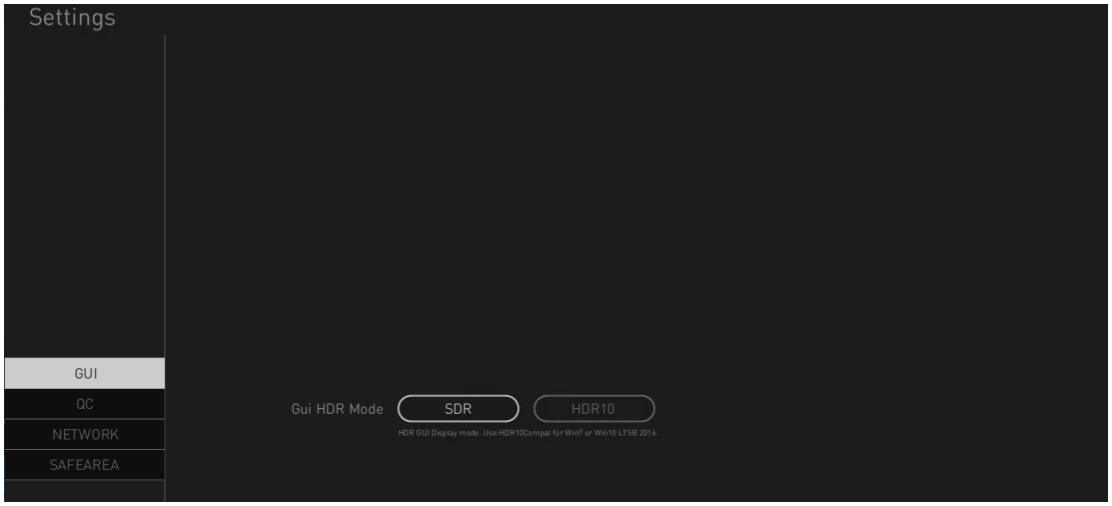
Settings Screen

Advanced features are available on the Settings screen, allowing customization of the HDR Image Analyzer GUI for special purposes. The Settings screen is accessed by pressing the TAB key when the top menu line is not displayed. Click on the desired tab to display the available parameters.

NOTE: In v2.0 and newer software, scrolling on the settings screen can be accomplished with the mouse's scroll wheel, or by holding down right-click and moving the mouse up and down. Earlier software versions support scrolling only using right-click method.

GUI Tab

Figure 38. Setting Screen, GUI Tab



GUI HDR Mode

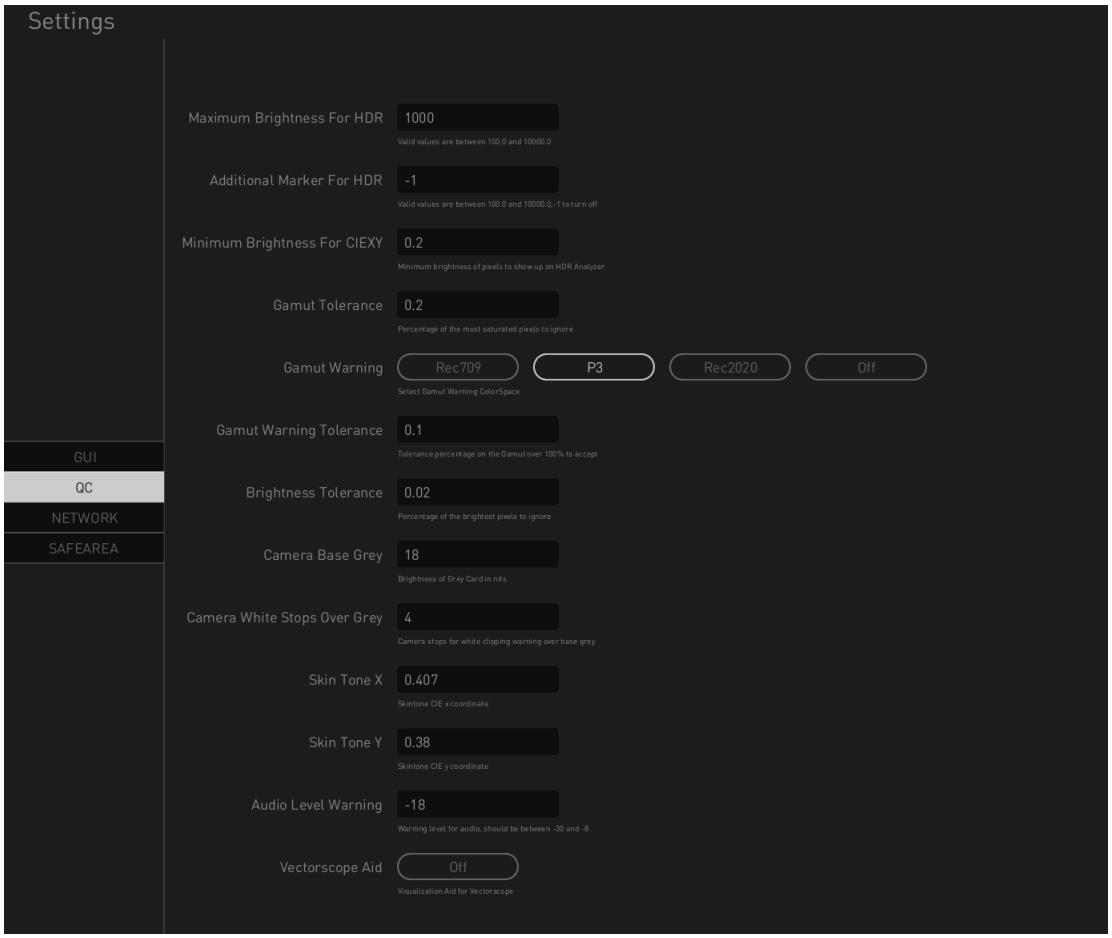
The Settings/GUI menu lets you choose between SDR and HDR10 (use HDR10 if you have an HDR enabled DisplayPort monitor).

QC Tab

These advanced settings are for experienced colorists and QC professionals, permitting customization of the values used for analysis.

The QC parameters are saved in Setups. If you Reset a Setup, all values in QC are returned to Defaults.

Figure 39. Setting Screen, QC Tab



The parameters are largely self explanatory, but the following special features are available.

Additional Marker for HDR

This control lets you add an additional custom level marker line to the Waveform view. As an example, if mastering for 600 nits Rec2020, you may want to add a “600” line for visual reference.

- Range 100.0 to 10,000.0
- Enter -1 to hide the custom level marker line

Gamut Warning

The Gamut Warning parameter allows setting when the HDR Image Analyzer will trigger out-of-gamut warnings. You can choose from:

- Rec709
- P3
- Rec2020
- Off

Skin Tone

You can adjust the location of the skin tone line on the vectorscope display by entering X and Y CIE coordinates. The default location of the skin tone line varies depending on the colorspace being used.

Audio Level Warning

Customizes the audio level warning threshold, which can vary depending on the country standard.

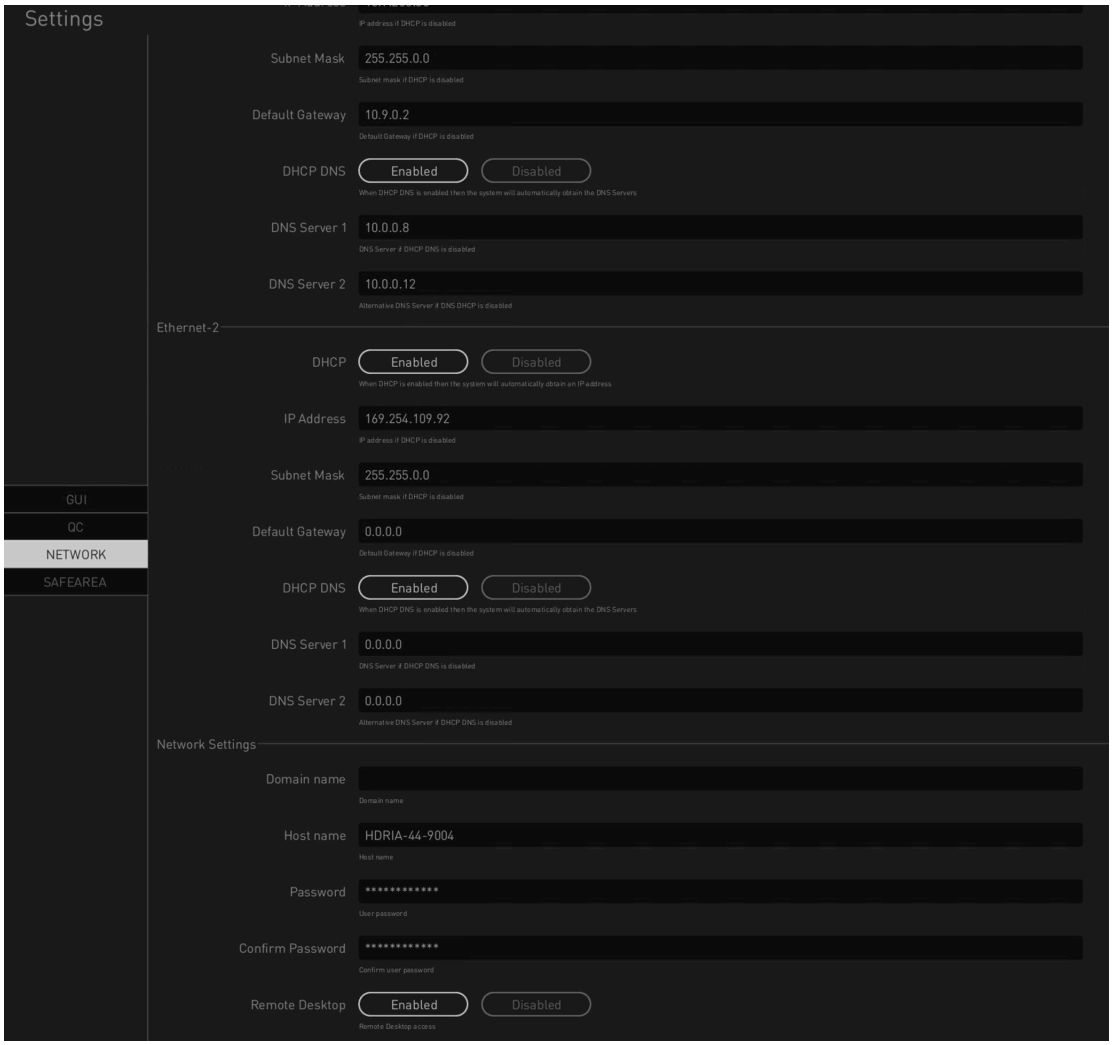
Vectorscope Aid

When On, draws a grey bounding area around the chroma on the Vectorscope, which can be useful when examining individual pixels.

NETWORK Tab

The Network settings are used to configure the two network interface cards (NICs) installed in the HDR Image Analyzer chassis.

Figure 40. Setting Screen, Network Tab



Network Settings

NOTE: The lower Network Settings parameters may not initially be visible. Scroll down the screen to see it, using the mouse's scroll wheel or by holding down right-click and moving the mouse up and down.

Domain and Host Names

By default the HDR Image Analyzer is configured for DHCP operation. If a DHCP server is found on power up, these fields will be filled in automatically. You can change these names if you need to adjust the configuration for your network environment.

NOTE: Changing the Domain Name and/or Host Name requires a system reboot.

Password Fields

IMPORTANT: On the very first HDR Image Analyzer startup, a unique password is generated when the serial number is entered in the Web UI. The password is "hdria<last four digits of serial number>" (for example, "hdria1234"). The default HDR Image Analyzer User Name is "kiosk", and it cannot be changed by the user.

The password is required for login and Remote Desktop operation. You can change the default password with these two fields.

NOTE: You must exit Setup screen (press Tab) to enable a password change. No system or application reset or reboot is required.

If a Remote Desktop connection was active when the password is changed, that connection will immediately be dropped.

Remote Desktop

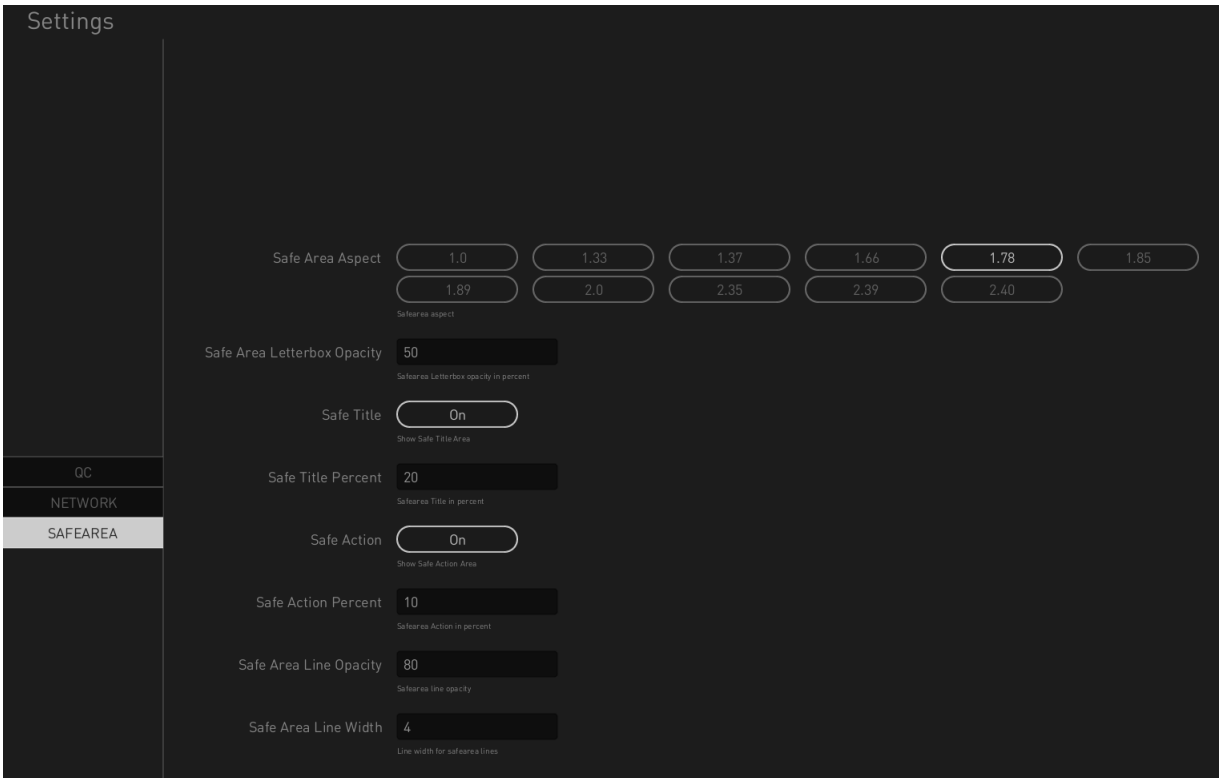
HDR Image Analyzer supports Remote Desktop, allowing control from a separate computer running an RDP client. HDR Image Analyzer supports one connection at a time. Connecting via Remote Desktop will disable the local computer's Analyzer application or any other remote connection. Control can be reacquired at any time from the local computer, or from any remote computer.

Click on the Enabled button on the local computer running HDR Image Analyzer. After launching your RDP client on a remote networked computer, simply type in the IP address of the HDR Image Analyzer and enter your login credentials.

SAFE AREA Tab

These settings are used to customize the Safe Area box displays, including the ability to choose which (or both) regions to display.

Figure 41. Settings Screen, Safe Area Tab



The Safe Area parameters are saved in Setups.

Chapter 6 – Web Interface

Overview

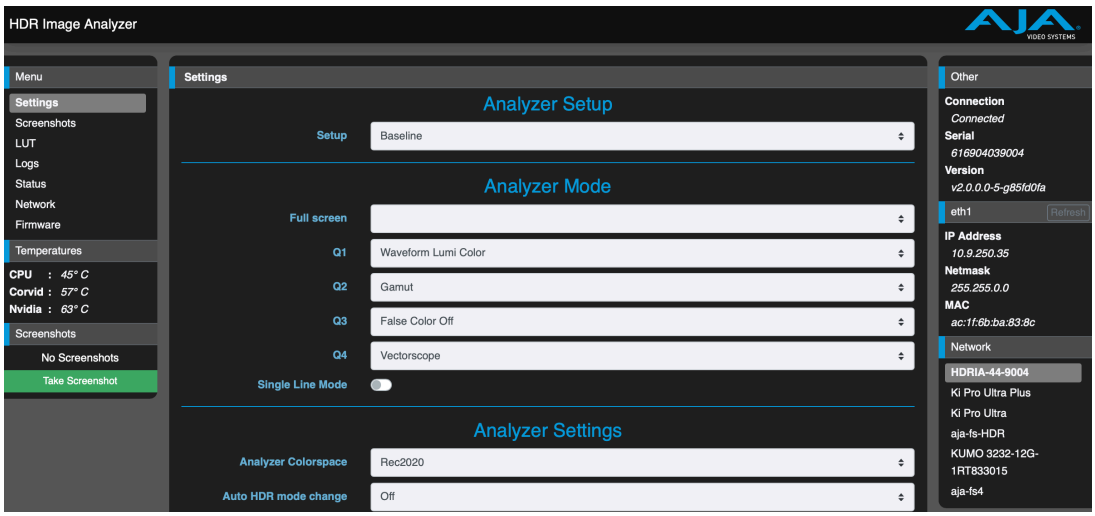
The web interface feature allows users to control the HDR Image Analyzer from a remote computer. It also allows for remote updates, log file and screenshot viewing and transfer, as well as control of all the HDR Image Analyzer's settings. The web interface also displays status information such as software and firmware versions, serial number, IP address, and current temperatures of the CPU, GPU and Corvid card.

Operation

When your HDR Image Analyzer is operating with v1.1 or newer software, simply connect it to your network via its rear panel RJ-45 connector (or directly to a computer), and enter the IP address of the HDR Image Analyzer into a browser running on your remote computer.

Web Interface Description

Figure 42. Example HDR Image Analyzer Web Interface Screen Example Menu



Menu

On the left of each screen is a navigational list of the available screens. Click any of these items to jump to that screen.

- Settings
- Screenshots
- LUT
- Logs
- Status
- Network
- Firmware

Temperatures

Current temperatures of the CPU, GPU, and Corvid card are displayed below the Menu list.

Screenshots

The last captured screenshot (if any) is displayed on the lower left side of all HDR Image Analyzer web UI screens.

Clicking on the **Take Screenshot** button captures the HDR Image Analyzer 's current local computer screen (less any displayed drop-down menus).

Main Display

In the center of each screen is the main display showing the status and menu selections for the screen you are viewing. The content of the HDR Image Analyzer web screens closely mirrors the parameter menus displayed on the local computer's HDR Image Analyzer screen.

Other

The right side of the screen lists HDR Image Analyzer system details, including connection status, system serial number, and the installed software version. This information is useful if you ever have to call AJA Technical Support for help.

eth1

Current values for Ethernet 1 are displayed, but are not edited here.

Ethernet settings for both Ethernet 1 and 2 displayed and editable using the Network screen.

Network

The right side of the screen lists AJA systems on the network. If you right-click any system in the list and select Identify, the ID LEDs on the unit will blink to identify it. Click on Identify again to stop the blinking. Another way to identify systems is to notice which system's EXT front panel LED flashes when you change any setting from a remote control device, such as the web browser.

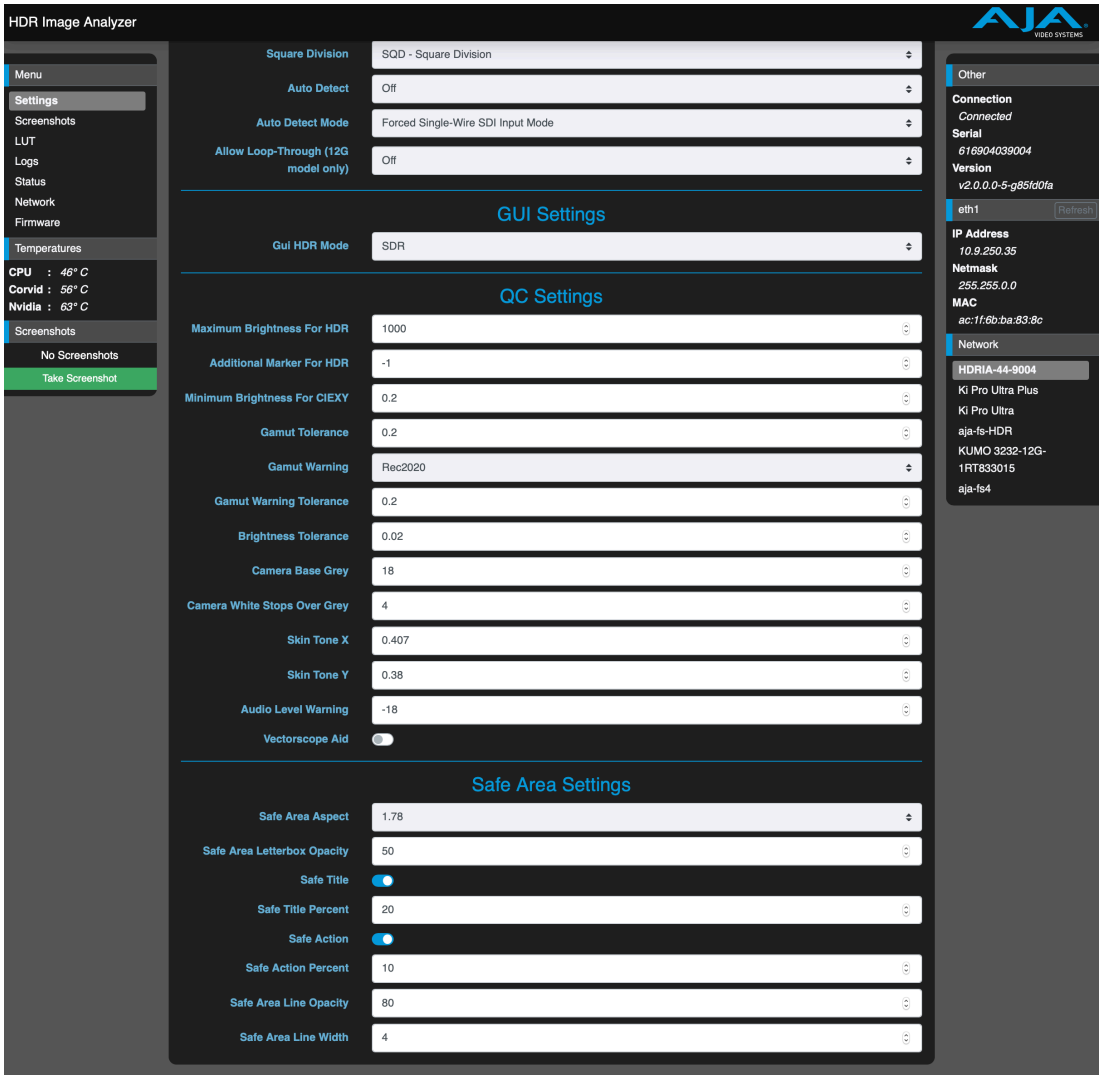
Web Interface Screens

Settings Screen

Figure 43. Web Interface Settings Screen, Top

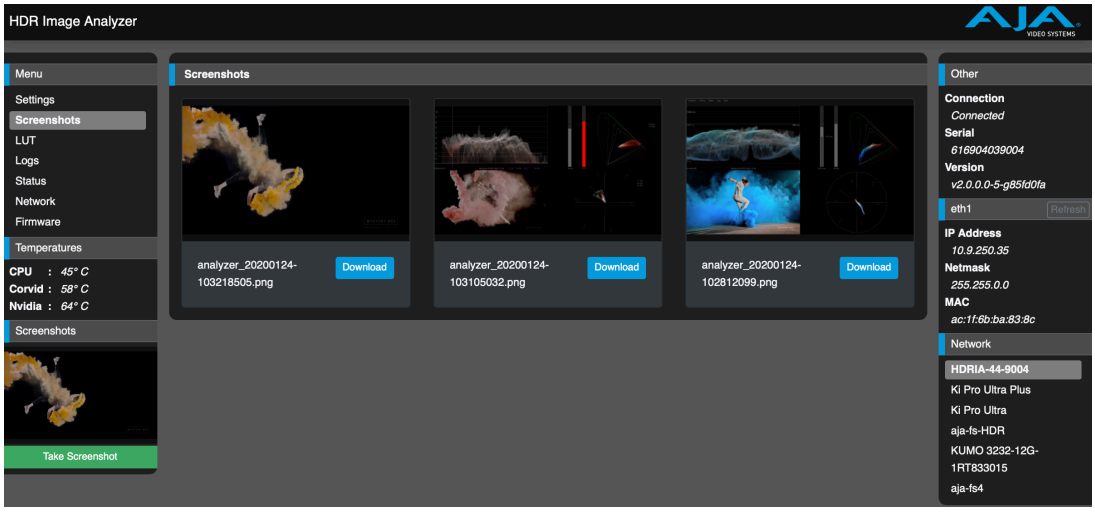


Figure 44. Web Interface Settings Screen, Bottom



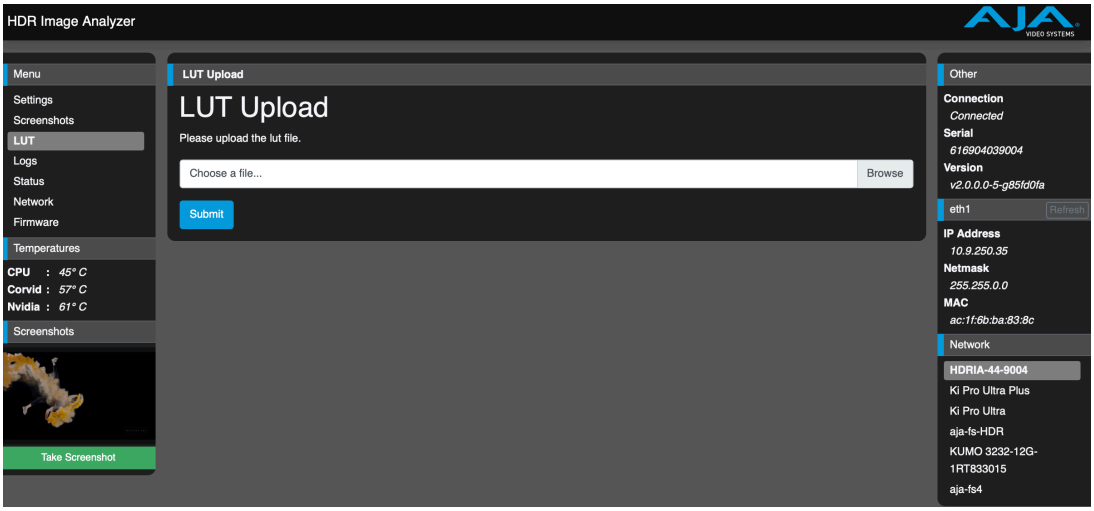
Screenshots Screen

Figure 45. Web Interface Screenshots Screen



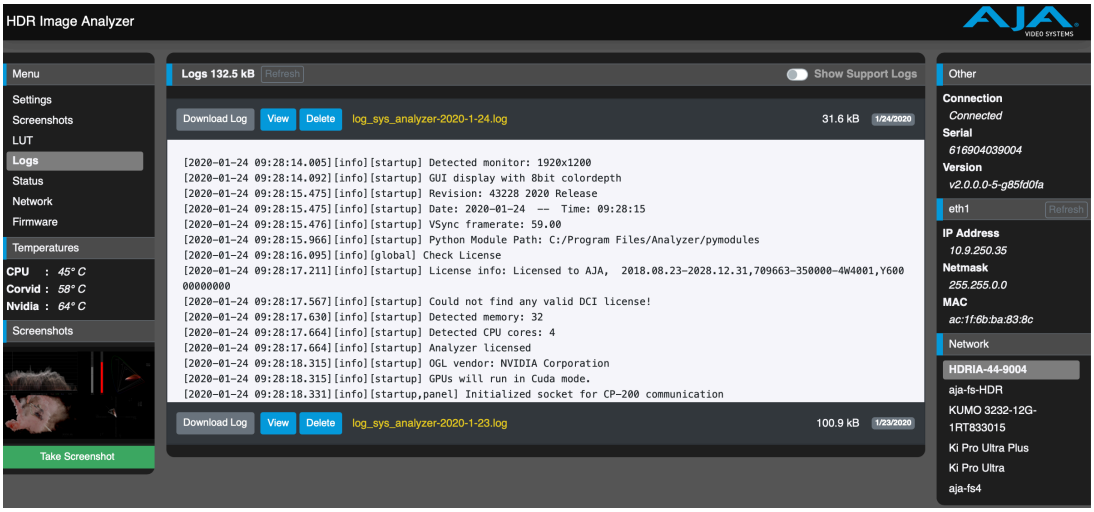
LUT Screen

Figure 46. Web Interface LUT Screen



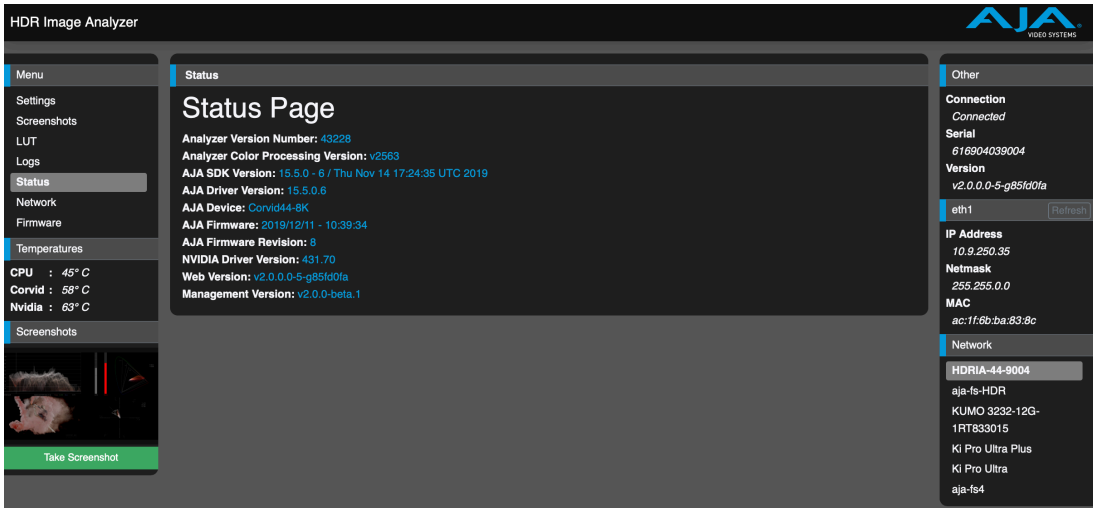
Logs Screen

Figure 47. Web Interface Logs Screen



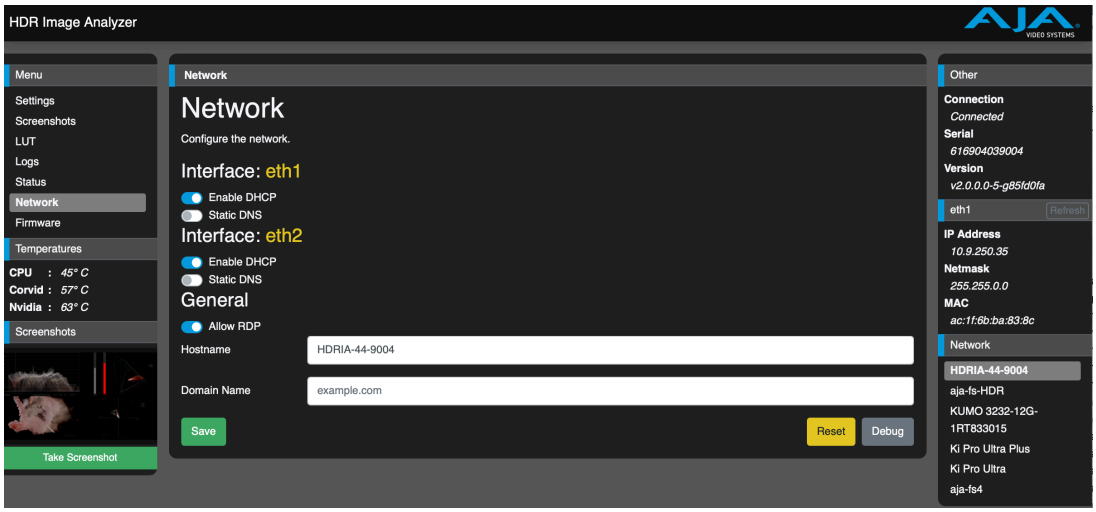
Status Screen

Figure 48. Web Interface Status Screen



Network Screen

Figure 49. Web Interface Network Screen

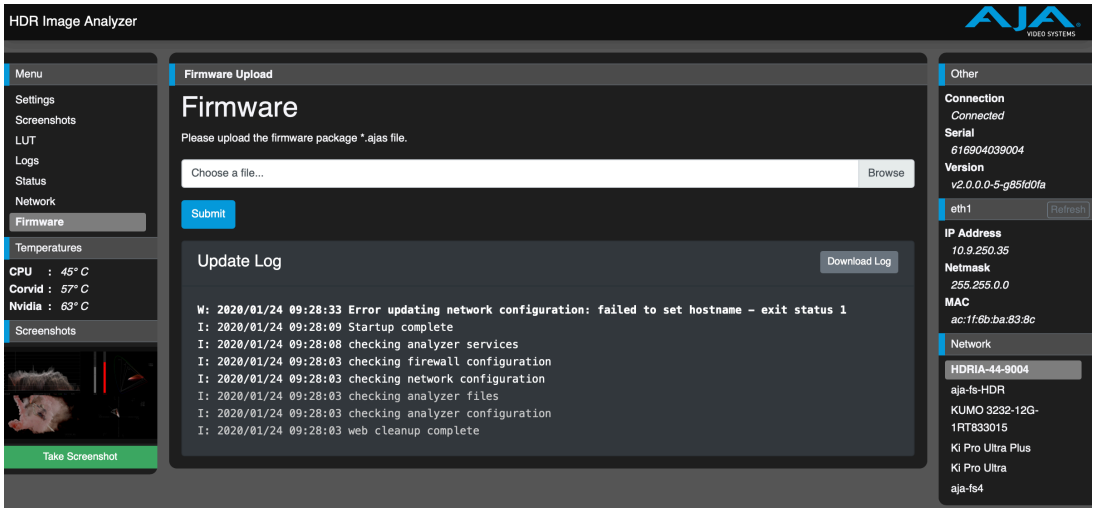


Allow RDP

Enables Remote Desktop Protocol (RDP). Turn this on if you wish to remote desktop into the unit.

Firmware Screen

Figure 50. Web Interface Firmware Screen



Chapter 7 – Menu Reference

Analyzer Menu Guide

Table 2. Analyzer Menu > Analyzer Mode

Sub Menu	Menu Option 1	Menu Option 2	Menu Option 3 or Description	Keyboard Shortcut
Analyzer Mode	FullScreen	Image	False Color Off	F1
			Brightness	
			Brightness Warning	
			Gamut	
			Gamut Warning	
		Waveform	Waveform Luninance	
			Waveform Lumi Color	F2
			Waveform Color	
			Waveform RGB Color	
			Waveform RGB	
			Waveform YCbCr	
			Waveform YRGB	
			Histogram Luninance	
			Histogram Color	
		Gamut		F3
		Vectorscope		F4
	Q1, Q2, Q3, or Q4	Image	False Color Off	
			Brightness	
			Brightness Warning	
			Gamut	
			Gamut Warning	
		Audio	Audio tool	
		Pixel Picker	Pixel Picker tool	
		Info	Info Tool	
		Log	Log tool	
	Single Line Mode		Enable Single Line Mode	CTRL+space

Table 3. Analyzer Menu > Analyzer Colorspace, White Point Compensation, False Color, YCbCr Matrix, White Point

Menu	Menu Option 1	Menu Option 2	Description	Keyboard Shortcut
Analyzer Colorspace	Auto HDR mode change		When On, colorspace is adjusted automatically according to the SDI flagging between Rec709Rec709, HLG Rec2020 and HDR Rec.	
	Camera	Arri LogC Wide Gamut	Set Arri LogC Wide Gamut colorspace	
		Canon Log2	Set Canon Log2 colorspace	
		Canon Log3	Set Canon Log3 colorspace	
		Panasonic VLog/ Gamut	Set Panasonic VLog/Gamut colorspace	
		Red WideGamut/ Log3G10	Set Red WideGamut/Log3G10 colorspace	
		Sony SLog3/ BT2020	Set Sony SLog3/BT2020 colorspace	
		Sony SLog3/ SGamut3	Set Sony SLog3/SGamut3 colorspace	
		Sony SLog3/ SGamut3Cine	Set Sony SLog3/SGamut3Cine colorspace	
		ACEScct	Sets ACES colorspace	
	SDR	Rec709	Set SDR Rec709 colorspace	CTRL+F10
		P3DCI	Set SDR P3DCI colorspace	
		P3D65	Set SDR P3D65 colorspace	
		Rec2020	Set SDR Rec2020 colorspace	
		XYZ DCI	Set SDR XYZ DCI colorspace	
	HLG	Rec709	Set HLG Rec709 colorspace	
		Rec2020	Set HLG Rec2020 colorspace	CTRL+F11
	HDR	Rec709	Set HDR Rec709 colorspace	
		P3D65	Set HDR RecP3D65 colorspace	
		Rec2020	Set HDR Rec2020 colorspace	CTRL+F12
		XYZ DCI	Set HDR XYZ DCI colorspace	
		XYZ D65	Set HDR XYZ D65 colorspace	
White Point Compensation	Off		No white point compensation	
	D65		Apply D65 white point compensation to the analysis.	
False Color	Brightness		Apply false color to entire Brightness	ALT+F1
	Brightness Warning		Apply false color to Brightness above warning level	ALT+F2
	Gamut		Apply false color to entire Gamut	ALT+F3
	Gamut Warning		Apply false color to Gamut above warning level	ALT+F4
	Off		No false color	ALT+F5
YCbCr Matrix	Rec709		Image is converted to the YUV space, using Rec709.	
	Rec2020		Image is converted to the YUV space, using Rec2020.	
White Point	D65		Display a box on the CIE xy graph showing the D65 white point. Analysis is not affected.	
	DCI		Display a box on the CIE xy graph showing the DCI white point. Analysis is not affected.	
	Off		Hide the white point box on the CIE xy graph.	

Table 4. Analyzer Mode > Vectorscope Target, Waveform Graticule, Scope and Display LUTs, Analyzer Gain, Zoom, Pixels View

Menu	Menu Option 1	Description	Keyboard Shortcut
Vectorscope Target	75%		
	100%		
Waveform Graticule	Default		
	Code Values		
	Percentage		
Analyzer Scope LUT	NoLUT	No LUT applied to input signal.	
	(selection list)	Optionally apply a variety of LUTs to the input signal being analyzed.	
Analyzer Display LUT	NoLUT	No LUT applied to display signal.	
	Auto	The LUT is automatically selected in a way that the incoming image looks correct on a 709 SDR monitor.	
	(selection list)	Optionally apply a variety of LUTs to the displayed video image, analysis is not affected.	
Analyzer Gain	Increase Gain	Simple increase of display gain.	CTRL+NumPad Plus Sign
	Decrease Gain	Simple decrease of display gain.	CTRL+NumPad Minus Sign
	Reset Gain	Simple reset of display gain.	CTRL+ENTER
Zoom	Vectorscope Zoom	Apply a 5x magnification to the Vectorscope display.	CTRL+v
	Waveform Zoom	Apply a 4x magnification to the Waveform display.	CTRL+w
Pixels View	Hexadecimal	Color picker displays hexadecimal values	
	Decimal	Color picker displays decimal values	
	Nits	Color picker displays nits (RGB only)	

Table 5. Analyzer Mode > Audio, Timecode, SafeArea

Menu	Menu Option 1	Menu Option 2	Description	Keyboard Shortcut
Audio	Phase Meter	Channel 1-2	Show audio phase between Ch 1& 2	
		Channel 3-4	Show audio phase between Ch 3&4	
		Channel 5-6	Show audio phase between Ch 5&6	
		Channel 7-8	Show audio phase between Ch 7&8	
		Channel 1-8	Show four phase diagrams of Ch 1&2, thru Ch 7&8	
		Channel 9-16	Show four phase diagrams of Ch 9&10, thru Ch 15&16	
	Level Meter		Display Level Meter	
Timecode on Image	Enable (on/off)		Show Timecode box on the image.	CTRL+t
SafeArea on Image	Enable (on/off)		Show framing guides on the image.	CTRL+s
System Shutdown			Closes the application and powers off the system.	
System Restart			Restarts the system and automatically relaunches the application.	
Application Restart			Restarts the application without shutting down the system.	

Setup Menu Guide

Table 6. Analyzer Mode > Audio, Timecode, SafeArea

Menu	Menu Option 1	Description	Keyboard Shortcut
Manage LUTs	Load New LUT	Opens the Windows Explorer browser used to navigate to and load a 3d Mesh or a .cube LUT file.	
	Delete LUT	Opens a list of the currently loaded LUTs that you can select for deletion.	
	Delete All LUTs	Deletes all currently loaded LUTs.	
Create Setup		Opens a dialog box for naming and saving a new Setup file. This file will have the current operational settings.	
Open Setup	analyzer	Selects the "analyzer" Setup file, which is the original setup file that may have been changed.	
	(selection list)	Reloads the selected Setup file.	
Delete <name>		Deletes the currently open Setup file.	
Reset <name>		Resets the currently open Setup file to factory defaults.	

Video Menu Guide

Table 7. Video Menu Options

Menu	Menu Option 1	Menu Option 2	Description	Keyboard Shortcut
Resolution	720P		Defines a 720p input video signal.	
	HD		Defines a 1080 input video signal.	
	2K		Defines a 2K input video signal.	
	UHD		Defines an UltraHD input video signal.	
	4K		Defines a 4K input video signal.	
	UHD2 (12G model)		Defines an UltraHD2 input video signal.	
	8K (12G model)		Defines an 8K input video signal.	
Colorspace	YCbCr 10Bit			
	RGB 10 Bit			
	RGB 12 Bit			
Transport	Single-link			
	Dual-link			
	Quad-link			
Square Division	SQD		Square Division	
	2SI		Two Sample Interleave	
Auto Detect Options	Auto Detect		Toggles Auto Detect of the incoming SDI link On or Off.	
	Forced Single-Wire SDI Input Mode		Forces single link input.	
	Forced Quad-Wire SDI Input Mode		Forces four link input.	

Menu	Menu Option 1	Menu Option 2	Description	Keyboard Shortcut
Capture	Capture 1		Captures current image and stores in memory 1	ALT+NumPad 1
	Capture 2		Captures current image and stores in memory 2	ALT+NumPad 2
	Capture 3		Captures current image and stores in memory 3	ALT+NumPad 3
	Capture 4		Captures current image and stores in memory 4	ALT+NumPad 4
Recall	Show Live		Show live video signal	CTRL+NumPad 5
	Show Captured 1		Show memory 1	CTRL+NumPad 1
	Recall › Show Captured 2		Show memory 2	CTRL+NumPad 2
	Recall › Show Captured 3		Show memory 3	CTRL+NumPad 3
	Recall › Show Captured 4		Show memory 4	CTRL+NumPad 4
Screenshot	Save Screenshot		Captures a screenshot of the Analyzer UI to the host computer.	CTRL+e
	Copy Screenshots (Opens a file browser for selection of a folder to copy to.)	Copy All	Copies all captured screenshots into the selected folder.	
		Copy Today's	Copies only screenshots captured today into the selected folder.	
		Copy All Except Today's	Copies all screenshots except those captured today into the selected folder	
	Delete Screenshots	Delete All	Deletes all captured screenshots from the host computer.	
		Delete Today's	Deletes only screenshots captured today from the host computer.	
		Delete All Except Today's	Deletes all screenshots except those captured today from the host computer.	

Log Menu Guide

Table 8. Log Menu Options

Menu	Menu Option 1	Description	Keyboard Shortcut
Start Logging To A File		Creates a new log file for a new QC session on disk	CTRL+l
Reset Log Data		Clears current log data.	CTRL+d
Copy Logs (Opens a file browser for selection of a folder to copy to.)	Copy All Log Files	Copies all log files into the selected folder.	
	Copy Today's Log Files	Copies only log files captured today into the selected folder.	
	Copy All Except Today's Log Files	Copies all log files except those captured today into the selected folder	
Delete Logs	Delete All Log Files	Deletes all log files from the host computer.	
	Delete Today's Log Files	Deletes only log files captured today from the host computer.	
	Delete All Except Today's Log Files	Deletes all log files except those captured today from the host computer.	

Menu	Menu Option 1	Description	Keyboard Shortcut
Log Window Timecode	Timestamp	Comments in the Log Window to be tagged based on session clock.	
	Timecode	Comments in the Log Window to be tagged based on SDI timecode.	
	Auto Timecode/ Timestamp	Shows timecode, timestamp, or both in the Log Window if the information is present on the incoming signal.	
	Timestamp - Timecode	Show both time stamps with session clock priority.	
	Timecode - Timestamp	Show both time stamps with SDI timecode priority.	
	Set Time	Opens a window that allows you to change the time used by the local computer, which will be entered into logs.	
Show Maximum Values		Toggles maximum value display on the Gamut tool on and off.	CTRL+m

Help Menu Guide

Table 9. Help Menu Options

Menu	Description	Keyboard Shortcut
About	Displays the Application name and Version information.	ALT+Forward Slash(/)
Update Analyzer	Opens a browser allowing HDR Image Analyzer software update.	

Other Keyboard Shortcuts

Keyboard Shortcut	Description
CTRL+p	Show/Hide Performance window
CTRL + Up/Down Arrow	Moves the single line mode analysis up and down one line at the time.

Appendix A – Specifications

HDR Image Analyzer 3G Tech Specs

Video Formats

- (4K) 4096 x 2160p 23.98, 24, 25, 29.97, 30, 47.95, 48, 50, 59.94, 60
- (UltraHD) 3840 x 2160p 23.98, 24, 25, 29.97, 30, 48, 50, 59.94, 60
- (2K) 2048 x 1080p 23.98, 24, 25, 29.97, 30, 47.95, 48, 50, 59.94, 60
- (2K) 2048 x 1080PsF 23.98, 24, 25, 29.97, 30
- (HD) 1080p 23.98, 24, 25, 29.97, 30, 50, 59.94, 60
- (HD) 1080PsF 23.98, 24, 25, 29.97, 30
- (HD) 1080i 50, 59.94, 60
- (HD) 720p 50, 59.94, 60

Video Input Digital

- 4x 3G-SDI BNC
- 3G-SDI, SMPTE-259/292/296/424/425, 12-bit, 10-bit and 8-bit

Video Output Digital

- 4x 3G-SDI BNC
- 3G-SDI, SMPTE-259/292/296/424/425, 12-bit, 10-bit and 8-bit

Audio Input Digital

- 16-Channel 24-bit SDI embedded, 48 kHz synchronous

Audio Output Digital

- 16-Channel 24-bit SDI embedded, 48 kHz synchronous

Computer Monitor Output

- Display Port Output:
  - Up to UltraHD 60p

Reference Input

- Signal: Analog video sync (Blackburst or Tri-Level)

Size: (w x d x h)

- 1RU form factor
- 17.2” x 16.9" x 1.7" (436.88 x 429.26 x 43.18 mm)

Weight

- 28 lb (12.7kg) in box
- 18 lb (8.2kg) server only

Power

- 100-240 VAC 50/60 Hz (Dual, redundant power supplies)
- 190W typical, 245W Max

Environment

- Safe Operating Temperature: 5 to 35 C (41 to 95 F)
- Safe Storage Temperature (Power OFF): -40 to 60 C (-40 to 140 F)
- Operating Relative Humidity: 8-90% noncondensing
- Nonoperating Relative Humidity: 5-95% noncondensing

HDR Image Analyzer 12G Tech Specs

SDR/HDR Image Analysis Tool

HDR Waveform, Histogram and Vectorscope Monitoring

Video Formats

- (8K) 8192 x 4320p 23.98, 24, 25, 29.97, 30, 47.95, 48, 50, 59.94, 60
- (UltraHD2) 7680 x 4320p 23.98, 24, 25, 29.97, 30, 50, 59.94, 60
- (4K) 4096 x 2160p 23.98, 24, 25, 29.97, 30, 47.95, 48, 50, 59.94, 60
- (UltraHD) 3840 x 2160p 23.98, 24, 25, 29.97, 30, 48, 50, 59.94, 60
- (2K) 2048 x 1080p 23.98, 24, 25, 29.97, 30, 47.95, 48, 50, 59.94, 60
- (2K) 2048 x 1080PsF 23.98, 24, 25, 29.97, 30
- (HD) 1080p 23.98, 24, 25, 29.97, 30, 50, 59.94, 60
- (HD) 1080PsF 23.98, 24, 25, 29.97, 30
- (HD) 1080i 50, 59.94, 60
- (HD) 720p 50, 59.94, 60

Video Input/Output Digital

- 4x 12G-SDI BNC
- 12G-SDI, SMPTE-259/292/296/424/425/2081/2082, 12-bit, 10-bit and 8-bit

SDI I/O

- SDI connections are bidirectional
  - 8K/UltraHD2 with 12G-SDI, all four connections must be used for input only
  - 4K/UltraHD with 12G-SDI, input and loop out are simultaneous
  - 4K/UltraHD with 3G-SDI, all four connections must be used for input only
  - 2K/HD, input and loop out are simultaneous

Note: When connections are configured for 12G-SDI or 6G-SDI, only UltraHD2/8K/UltraHD/4K formats are supported.

Audio Input Digital

- 16-channel 24-bit SDI embedded, 48 kHz synchronous

Audio Output Digital

- 16-channel 24-bit SDI embedded, 48 kHz synchronous

Computer Monitor Output

- 4x Display Port Outputs:
  - Up to UltraHD 60p

Reference Input

- Signal: Analog video sync (Blackburst or Tri-Level)

Size: (w x d x h)

- 1RU form factor
- 17.2″ x 16.9" x 1.7" (436.88 x 429.26 x 43.18 mm)

Weight

- 28 lb (12.7kg) in box
- 18 lb (8.2kg) server only

Power

- 100-240 VAC 50/60 Hz (Dual, redundant power supplies)
- 190W typical, 245W Max

Environment

- Safe Operating Temperature: 5 to 35 C (41 to 95 F)
- Safe Storage Temperature (Power OFF): -40 to 60 C (-40 to 140 F)
- Operating Relative Humidity: 8-90% noncondensing
- Nonoperating Relative Humidity: 5-95% noncondensing

Appendix B – Safety and Compliance

Federal Communications Commission (FCC) Compliance Notices

Class A Interference Statement

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

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

FCC Caution

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

Canadian ICES Statement

Canadian Department of Communications Radio Interference Regulations

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

Règlement sur le brouillage radioélectrique du ministère des Communications

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

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

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

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

Declaration of Conformity

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

CE This equipment meets the following conformance standards:

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

IEC 62368-1: 2014 (CB Scheme Report/Certificates

Additional licenses issued for specific countries available on request.

Emissions

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

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

Immunity

EN 55035: 2017 + A11: 2020, EN 61000-4-2:2009,

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

EN 61000-4-4: 2012, EN 61000-4-5: 2014 +A1: 2017, EN 61000-4-6: 2014,

EN 61000-4-11: 2020

Environments: E2, E3 and E4

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



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

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

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

Recycling Notice



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

Korea KCC Compliance Statement

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

Taiwan Compliance Statement

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

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

Japan Compliance Statement

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

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

China Compliance Statement

This product has been tested to the following Chinese standards:

GB 17625.1-2012; GB/T 13837-2012; GB 8898-2011

This is to certify that the above mentioned product(s) complies with the requirements of certification rules of CQC12-045800-2022 under certificate number CQC2019010805151936.

Translated Warning and Caution Messages

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

 Warning Symbol  Hazard Symbol  Caution Symbol

Before Operation Please Read These Instructions



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

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

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

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

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

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



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

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

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

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

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

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



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

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

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

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

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

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



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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



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

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

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

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

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

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



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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



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

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

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

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

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

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



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

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

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

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

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

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



Hazard! High Voltage. This situation or condition can cause injury due to electric shock.

Avertissement! Tension élevée. Cette situation ou condition peut causer des blessures dues à un choc électrique.

Warnung! Hochspannung. Diese Situation oder Bedingung kann zu Verletzungen durch Stromschlag führen.

¡Advertencia! Alto voltaje . Esta situación o condición puede causar lesiones debidas a una descarga eléctrica.

Aviso! Alta Tensão . Esta situação ou condição pode causar danos devido a choques elétricos.

Avviso! Alta tensione. Questa situazione o condizione può causare lesioni a causa di scosse elettriche.



Warning! Dual Power Cord Notice—please read this. To reduce the risk of electrical shock,disconnect both power cords before servicing equipment.

Avertissement! Avis concernant la double alimentation électrique — à lire soigneusement. Pour éviter tout risque d'électrocution, débranchez les deux câbles électriques avant d'intervenir sur l'équipement.

Achtung! Hinweis auf Doppel-Netzkabel—bitte lesen. Um das Risiko eines Elektroschocks zu verringern, müssen beide Netzkabel ausgestöpselt werden, bevor die Vorrichtung gewartet wird.

Avvertenza. Avviso concernente il cavo di alimentazione doppio – leggere attentamente. Per ridurre il rischio di elettrocuzione, scollegare entrambi i cavi di alimentazione prima di eseguire la manutenzione o riparazioni di questo apparecchio.

Aviso! Aviso de Cabo Elétrico Duplo - por favor, leia isto. Para reduzir o risco de choque elétrico, desconecte ambos os cabos elétricos antes de fazer manutenção ao equipamento.

¡Advertencia! Aviso del doble cable de alimentación - leer esto por favor. Para reducir el riesgo de descarga eléctrica, desconecte ambos cables de alimentación antes de dar servicio al equipo.

Caution! To meet safety regulations for leakage current, connect the dual power supplies to separate branch circuits.

¡Advertencia! Para cumplir con las normas de seguridad para la corriente de fuga, conecte las dos fuentes de alimentación para circuitos derivados diferentes.

Attention! Pour répondre aux mesures de sécurité concernant le courant de fuite, raccorder les sources d'alimentation doubles à des circuits de dérivation distincts.

Warnung! Zur Erfüllung der Sicherheitsbestimmungen bezüglich Reststrom schließen Sie bitte die zwei Netzteile an unterschiedlichen Abzweigleitungen an.

Cuidado! Para atender aos regulamentos de segurança para correntes de fuga, conecte as fontes duplas a circuitos elétricos separados.

Attenzione! Per soddisfare le norme di sicurezza sulla corrente di perdita, collegare i doppi alimentatori a circuiti derivati separati.

Warning! Hazardous Voltages! The safe operation of this product requires that a protective earth connection be provided. This protective earth is provided by the grounding conductor in the equipment's supply cord. To reduce the risk of electrical shock to operator and service personnel, this ground conductor must be connected to an earthed ground.

Avertissement : tensions dangereuses — Pour utiliser ce produit en toute sécurité, il faut un raccordement à la terre. Ce raccordement s'effectue par l'intermédiaire du connecteur de terre dans le cordon d'alimentation de l'équipement. Pour réduire le risque d'électrocution de l'opérateur ou du personnel de maintenance, ce cordon avec conducteur de terre doit être branché sur une prise reliée à la terre.

Achtung! Gefährliche Spannungen — Sichere Bedienung dieses Geräts erfordert, dass ein Schutzleiteranschluss vorgesehen wird. Dieser Schutzleiteranschluss wird mittels der Erdungsleitung im Netzkabel der Vorrichtung vorgesehen. Um die Gefahr eines Elektroschocks für Bedien- und Wartungspersonal zu verringern, muss diese Erdungsleitung mit einer geerdeten Masse verbunden werden.

Avvertenza – Alte tensioni – Il funzionamento in sicurezza di questo prodotto richiede una presa di terra, che viene fornita dal conduttore di messa a terra presente nel cavo di alimentazione dell'apparecchio. Per ridurre il rischio di elettrocuzione per l'operatore e il personale di manutenzione, tale conduttore deve essere collegato a un punto al potenziale di terra.

Advertencia de voltajes peligrosos — El funcionamiento seguro de este producto require que se proporcione una conexión terrestre protegida. Esta protección terrestre es proporcionada por el conductor de conexión en la tierra del cable de alimentación del equipo. Para reducir el riesgo de descarga eléctrica al operador y el personal de servicio, este conductor de conexión de la tierra debe ser conectado a la misma tierra.

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FTGL - OpenGL font library 2.1.3

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

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