

ColorBox

$2241 US MSRP

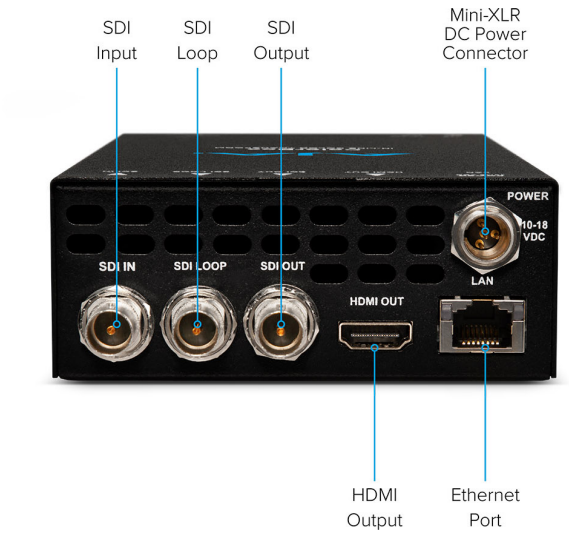
ColorBox from AJA is a compact, high performance converter for color managed workflows designed to specifically meet the conversion needs of broadcast, live events, and on-set applications. Supporting Standard Dynamic Range (SDR), High Dynamic Range (HDR), and Wide Color Gamut (WCG) signals, it utilizes 12G-SDI and HDMI 2.0 for single wire 4K/UltraHD HDR up to 4:2:2 10-bit 60p or 4:4:4 12-bit 30p with a unique color processing pipeline.

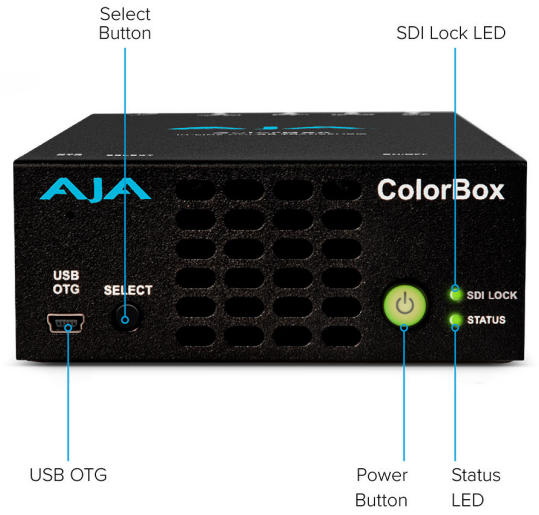
Built around a 33-point 3D LUT processor with tetrahedral interpolation, AJA Color Pipeline provides additional 4x 1D LUTs and 2x 3x3 matrices that are each individually configurable even as Proc Amps or RGB Color Correctors. Easily manage color processing options via the web user interface, which can be accessed directly from a wired Ethernet connection or through a wireless connection via a third party WiFi USB adapter.

ColorBox includes processing pipeline modes from Colorfront and NBCU LUTs, as well as the powerful AJA Color Pipeline. ColorBox also expands its capabilities by offering licensable upgrade options for advanced color managed workflows, including the Colorfront Engine, BBC HLG LUTs, and the all new ORION-CONVERT. ORION-CONVERT's unique real time floating point math approach to color transforms produces higher precision results to get "access to the colors between the colors." This enables pixel perfect color transforms and round-tripping where maintaining colors is paramount.

ColorBox also offers a sophisticated test pattern generator and frame store, bringing useful tools to your workflow, including the ability to capture up to a 4K image as a 16-bit .tiff file for the highest quality reference stills. ColorBox can even overlay information onto the image, including helpful user definable text fields and user loaded overlays. These captures can be saved locally on ColorBox or onto third party connected PCs, which can simultaneously be running applications like Pomfort's Livegrade Pro/Studio, Assimilate Live Looks, and QTAKE Video Assist software.

https://www.aja.com/products/colorbox





HDR/WCG Real Time Processor

- HDR Conversions
  - HDR to HDR
  - HDR to SDR
  - SDR to HDR
- Colorimetry
  - BT.709 and BT.2020

Video Formats

- (4K) 4096x2160p
- (UltraHD) 3840x2160p
- (2K) 2048x1080p
- (HD) 1920x1080p
- (HD) 1920x1080i
- (HD) 1280x720p

Color Processing Pipeline

- Processes in 12-bit RGB
- 6x pipelines; AJA Color, Colorfront, ORION-CONVERT, BBC HLG LUTs, NBCU LUTs, ACES
- 7x processing nodes plus Overlay in AJA Color; 4x 1D LUTs, 2x 3x3 Matrices, 1x 3D LUT

AJA Color Pipeline (ACP)

- 7x nodes in order of processing:
  - 1D LUT, 3x3 Matrix, 1D LUT, 3D LUT, 1D LUT, 3x3 Matrix, 1D LUT, Overlay
- 3D LUT configurable as LUT or Dynamic
  - Supports custom 33-point .CUBE, .SPI3D, and .3DL format 3D LUTs*, .CLF and .CTF
- 1D LUTs configurable as LUT, Dynamic, or Color Corrector
  - Supports custom 10 and 12-bit .CUBE and .SPI1D format 1D LUTs
- 3x3 Matrices configurable as Matrix, Dynamic, or Proc Amp
  - Supports custom .SPIMTX format matrices
- Tetrahedral 3D LUT interpolation
- Configurable Color Space, Range, and Transfer Characteristic
- ARRI Alexa 35's Wireless Video Optimized LogC4 (WVO) Decoder
- Nonvolatile storage of 16x 3D LUTs, 16x 1D LUTs, and 16x 3x3 Matrices
- Overlay

*Various 3D LUT sizes are supported but will be converted to 33-point for processing

Dynamic LUT Processing

- Supports third party apps for automatic loading and display of 3D LUTs
- Reflects dynamic changes in real time from source software
- Full frame LUT processing
- Supported by
  - Pomfort Livegrade Pro and Studio
  - Assimilate Live Looks and Live Assist
  - QTAKE Video Assist

Colorfront Pipeline

- Processing Based on Human Perception Model
- Perceptually optimized color volume remapping
- Preserves the original creative intent

- TV Mode for applications such as television broadcast
- Live Mode for applications such as broadcast, OTT, A/V
- SDR to Dolby Vision Preview Mode for applications such as broadcast and postproduction
- Input Video Dynamic Range/Color Gamut (varies by mode)
  - SDR BT.709 100 Nits
  - SDR Extended BT.709
  - PQ BT.2020 1000 Nits
  - PQ P3D65 1000 Nits
  - Hybrid Log Gamma BT.2100
  - HLG Extended BT.709
  - HLG Extended BT.2100
  - Sony S-Log3 S-Gamut3
  - Sony S-Log3 S-Gamut3 Cine
  - Sony S-Log3 BT.2020
  - ARRI Log C Wide Gamut
  - ARRI LogC4 Wide Gamut 4
  - ARRI LogC4 Wide Gamut 4 WVO
  - Panasonic V-log
  - RED Log3G10 Wide Gamut
  - Canon Log 2
  - Canon Log 3
- Output Video Dynamic Range/Color Gamut (varies by mode)
  - SDR BT.709 100 Nits
  - SDR Extended BT.709
  - PQ BT.2020 1000 Nits
  - PQ BT.2020 ConstrainP3
  - PQ P3D65 1000 Nits
  - Hybrid Log Gamma BT.2100
  - HLG Extended BT.709
  - HLG Extended BT.2100
  - Sony S-Log3 S-Gamut3
  - Sony S-Log3 BT.2020
  - ARRI Log C Wide Gamut
  - ARRI LogC4 Wide Gamut 4
- TV Mode controls
- Highlight management: Brightness, Highlight, Super Highlight
  - Colorfulness control for managing the Hunt Effect
  - Color Correction: Lift, Gamma, Gain, Saturation
  - Camera Correction: Exposure, Color Temp, Tint
  - Roundtrip control ensures technical match
  - Clamp to Legal
- Live Mode controls
  - SDR Preview
  - HDR Amount
  - Ambient Light Compensation control
  - HDR Log Look
  - SDR Softness control
  - Color Correction: Lift, Gamma, Gain, Saturation
  - Camera Correction: Exposure, Color Temp, Tint
  - PQ Output Nit level: 48-4000 Nit
  - PQ Output P3 Colorspace Clamp
  - ITU-R BT.2408 Mode control
- SDR to Dolby Vision Preview controls
  - Highlights: Low, Mid, High
  - Contrast: Low, Mid, High
- Overlay

ORION-CONVERT Pipeline

- Conversion algorithm that uses floating point math
- Pre and post transform Knee and Amount controls
- Display-Light and Scene-Light Modes
- Configurable HDR and SDR IRE Reference anchor points
- Configurable HDR Peak Nits sets system gamma for display light conversions
- Gamma Compensation
- Configurable Output Clamping
- Input Video Dynamic Range/Color Gamut
  - SDR BT.709
  - PQ BT.2020
  - HLG BT.2100
- Output Video Dynamic Range/Color Gamut
  - SDR BT.709
  - PQ BT.2020
  - HLG BT.2100
- Overlay

BBC HLG LUTs Pipeline

- Mathematical dynamic range mapping per ITU-R BT.2408
  - SDR/BT.709 Scene Referred to HLG/BT.2100 v1.7
  - SDR/BT.709 Scene Referred to HLG/BT.2100 Strict v1.7
  - SDR/BT.709 Scene Referred UpMap to HLG/BT.2100 v1.7
  - SDR/BT.709 Scene Referred UpMap to HLG/BT.2100 Strict v1.7
  - SDR/BT.709 Display Referred to HLG/BT.2100 v.1.7
  - SDR/BT.709 Display Referred UpMap to HLG/BT.2100 v1.7
  - SDR/BT.2020 Display Referred to HLG/BT.2100 v1.7
  - SDR/BT.2020 Display Referred UpMap to HLG/BT.2100 v1.7
  - PQ 1000 Nits Display Referred to HLG/BT.2100 v1.7
  - PQ 4000 Nits Display Referred to HLG/BT.2100 v1.7
  - S-Log3/BT.2020 100% Scene Referred to HLG/BT.2100 v1.7
  - S-Log3/BT.2020 200% Scene Referred(SR-Live) to HLG/BT.2100 v1.7
  - HLG/BT.2100 to SDR/BT.709 Scene Referred v1.7
  - HLG/BT.2100 to SDR/BT.709 Scene Referred Strict v1.7
  - HLG/BT.2100 to SDR/BT.709 Display Referred Color Appearance Model v1.7
  - HLG/BT.2100 to SDR/BT.709 Display Referred Super White v1.7
  - HLG/BT.2100 to PQ 1000 Nits Display Referred v1.7
  - HLG/BT.2100 to SDR/BT.2020 Display Referred Super White v1.7
  - SDR/BT.709 Scene Referred UpMap to HLG/BT.2100 to SDR/BT.709 Display Referred v1.7
- RGB Color Corrector and ProcAmp
- Overlay

NBCU LUTs Pipeline

- NBCU LUTs developed by NBCUniversal Media, LLC
  - 1-NBCU_SDR2HLG_DL_v1.1, SDR UpMap to HLG using Display Light v1.1
  - 2-NBCU_SDR2HLG_SL_v1, SDR to HLG using Scene Light v1.0
  - 3-NBCU_HLG2SDR_DL_v1.1, HLG to SDR using Display Light v1.1
  - 4-NBCU_SDR2PQ_DL_v1, SDR UpMap to PQ using Display Light v1.0
  - 5-NBCU_PQ2SDR_DL_v1, PQ to SDR using Display Light v1.0
  - 7-NBCU_HLG10002PQ_v1, HLG 1000 Nits to PQ v1.0
- RGB Color Corrector and ProcAmp
- Overlay

ACES Pipeline

- ACES Metadata File (AMF) processing
- Implementation using ACES v1.3
- Built using OpenColorIO (OCIO)
- ARRI Alexa 35's Wireless Video Optimized LogC4 (WVO) Decoder
- Nonvolatile storage of 16x AMFs
- Overlay

Video Input and Output SDI

- 1x 12G-SDI Input BNC, SMPTE-292/424/2081/2082
- 2x 12G-SDI Output BNCs, SMPTE-292/424/2081/2082
- YCbCr 4:2:2/4:4:4
- RGB 4:4:4, SMPTE or Full level
- 10 or 12-bit

- 1x 12G-SDI
  - (4K) 4096x2160p 23.98, 24, 25, 29.97, 30, 47.95, 48, 50, 59.94, 60
  - (UltraHD) 3840x2160p 23.98, 24, 25, 29.97, 30, 50, 59.94, 60
- 1x 6G-SDI
  - (4K) 4096x2160p 23.98, 24, 25, 29.97, 30
  - (UltraHD) 3840x2160p 23.98, 24, 25, 29.97, 30
- 1x 3G-SDI (Level A or B Dual Link)
  - (2K) 2048x1080p 23.98, 24, 25, 47.95, 48, 50
  - (2K) 2048x1080PsF 23.98, 24, 25
  - (HD) 1920x1080p 23.98, 24, 25, 29.97, 30, 50, 59.94, 60
  - (HD) 1920x1080PsF 23.98, 24, 25, 29.97, 30
  - (HD) 1920x1080i 50, 59.94, 60
  - (HD) 1280x720p 50, 59.94, 60
- 1x 1.5G-SDI
  - (2K) 2048x1080p 23.98, 24, 25, 29.97, 30
  - (2K) 2048x1080PsF 23.98, 24, 25
  - (HD) 1920x1080p 23.98, 24, 25, 29.97, 30
  - (HD) 1920x1080PsF 23.98, 24, 25, 29.97, 30
  - (HD) 1920x1080i 50, 59.94, 60
  - (HD) 1280x720p 50, 59.94, 60

Note: Raster and Frame Rate Dependent, please see ColorBox Video Formats in Documents and Manual

Video Output HDMI

- 1x HDMI Type A connector*, HDMI v2.0b
- HDR infoframe generation with pass-through for Colorimetry and Transfer Characteristic
- YCbCr 4:2:2
- RGB 4:4:4, SMPTE or Full level
- 8, 10, or 12-bit (HFR 4K/UltraHD 4:4:4 limited to 8-bit)
- 4K/UltraHD/2K/HD
- 4K/2K Crop to UltraHD or HD

*If a connected monitor doesn't support HDMI protocol, the unit automatically switches to DVI protocol (which does not pass audio)
Note: Raster and Frame Rate Dependent, please see ColorBox Video Formats in Documents and Manual

Video Processing

- Nominal video delay is less than 0.5 of a video line and less than 4.5 video lines when down-converting
- Motion adaptive deinterlacer
- Proc Amp controls
- Color corrector
- Legalizer

Down-Conversion

- Hardware 10-bit
- Independent down-conversion for SDI and HDMI outputs
  - 4K to 2K or UltraHD to HD (1920x1080)

Frame Store

- Capture and Recall up to 4K/UltraHD 16-bit .TIFF
- Capture and Recall .TIFF, .PNG, .JPEG
- Capture input or output
- Nonvolatile storage of 16 images

Test Pattern Generator

- 10 or 12-bit
- 14x patterns built-in
- SDR and HDR test patterns

Ancillary Data

- All embedded ANC packets pass-through, including camera ancillary data

Overlay

- User Text
- Input and Output ancillary information, including VPID
- Timecode presence
- Closed Captioning presence
- Pipeline Configuration
- User Overlay, Recall .PNG overlay images up to 4096x2160
- Nonvolatile storage of 16 overlays

Audio Input Digital

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

Audio Output Digital

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

Network Interface

- 1x RJ-45, 10/100/1000 Ethernet
- Embedded web server for remote control
- REST Interface
- WiFi control available via third party WiFi USB adapter*

*Linksys AC1200 WUSB6300 and Netgear AC1900 A7000

USB Interface

- 1x Mini-USB for IP configuration using AJA eMini-Setup

Presets

- 10 Pipeline Presets per mode (AJA Color, Colorfront, ORION-CONVERT, BBC HLG LUTs, NBCU LUTs, ACES)
- Startup Preset

Size (w x d x h)

- 4.10" x 7.54" x 1.66" (104.1 x 191.6 x 42.1 mm)

Weight

- 1.0 lb (0.5 kg)

Power

- External power supply required
- Enclosure: 10-18VDC regulated, 4-pin mini-XLR, 16W typical 3G-SDI, 21W typical 12G-SDI, 25W max.
- AC Adapter, included: 100-240VAC, 50/60 Hz, universal input, 60W
- Optional spare AC adapter sold separately, AJA-PWR-12-60W

Environment

- Safe Operating Temperature: 0 to 50 C (32 to 122 F)
- Safe Storage Temperature (Power OFF): -40 to 60 C (-40 to 140 F)
- Operating Relative Humidity: 10-90% noncondensing
- Operating Altitude: <3,000 meters (<10,000 feet)