FS | HDR

Real-time HDR/WCG Conversion with Colorfront Engine™ Video Processing

HDR colorfront

AJA VIDEO SYSTEMS

FS | HDR

$7,995 US MSRP*

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FS-HDR is a HDR to SDR, SDR to HDR and HDR to HDR universal converter/frame synchronizer, designed specifically to meet the HDR (High Dynamic Range) and WCG (Wide Color Gamut) needs of broadcast, OTT, post and live event AV environments.

FS-HDR offers two modes for comprehensive HDR/WCG conversion and signal processing. Single channel mode provides a full suite of 4K/UltraHD processing and up, down, cross-conversion to and from 2K, HD or SD. Four channel mode offers 4x 2K/HD/SD channels of simultaneous processing and conversion.

Real time HDR Conversion for 4K/UHD/2K/HD

4-Channel 2K/HD/SD or 1-Channel 4K/UltraHD HDR and WCG frame synchronizer and up, down, cross-converter

Bulletproof reliability. Incredible Conversion Power.

FS-HDR is your real world answer for up/down/cross conversions and realtime HDR transforms, built to AJA's high quality and reliability standards.

Powered by Colorfront Engine, FS-HDR's extensive HDR and WCG processing support enables real time processing of a single channel of 4K/UltraHD/2K/HD including down-conversion to HD HDR or up to four channels of 2K/HD simultaneously. FS-HDR also enables the conversion of popular camera formats from multiple vendors into the HDR space, plus conversion to-and-from BT.2020/BT.709, critical for the widespread deployment of HDR alongside SDR in broadcast and OTT workflows.

4K/UltraHD delivery, processing and synchronization is fast becoming the next standard, and FS-HDR gets you there with a wealth of digital video connectivity including 4x 3G-SDI with fiber options**, as well as 6G-SDI and 12G-SDI over copper or fiber**.

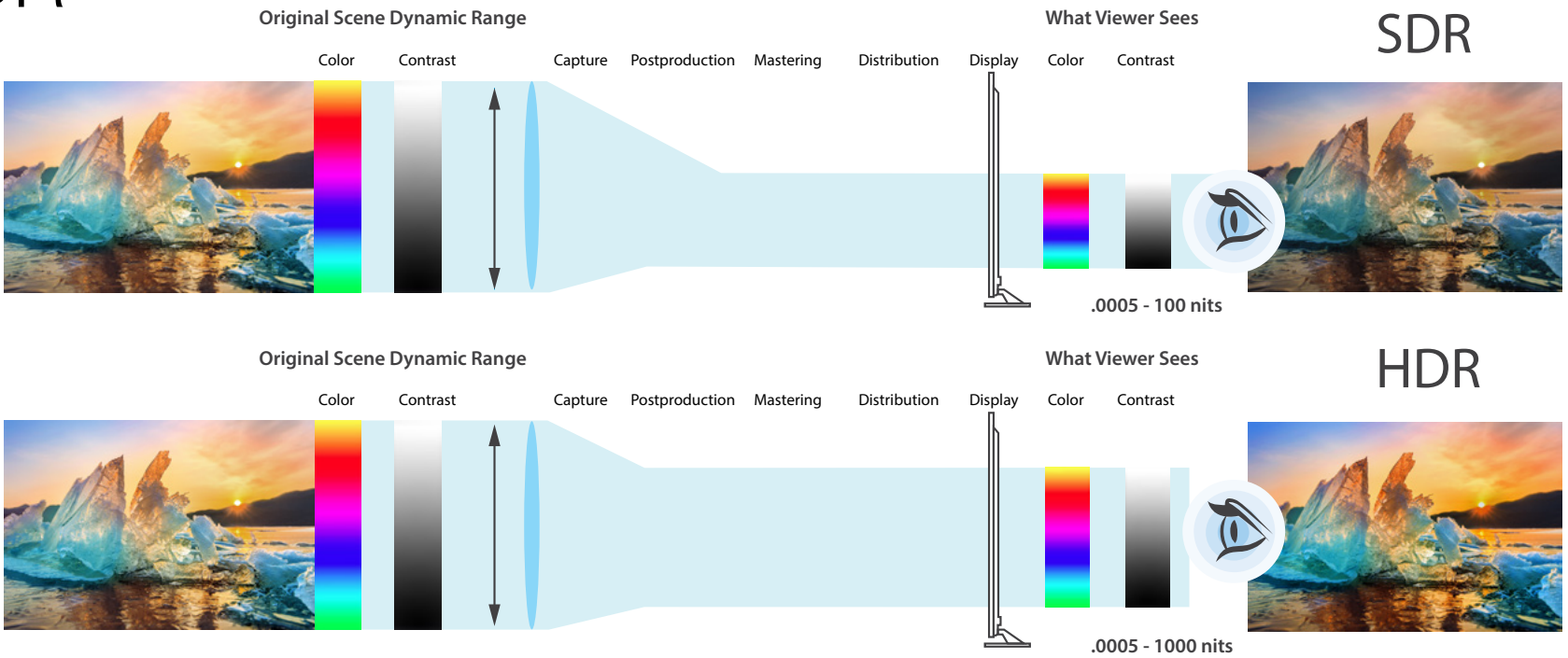
In single channel mode, FS4 will up scale your HD or SD materials to 4K/UltraHD and back, with a huge array of audio channels over SDI, AES, and MADI for an incredible 272 x 208 matrix of audio possibilities. In four channel mode, independent transforms can be applied to each 2K/HD or SD channel.

Maintaining Perceptual Integrity.

FS-HDR's HDR/WCG capabilities leverage video and color space processing algorithms within Colorfront Engine™, specially-licensed by AJA from Colorfront, and developed by Colorfront's Academy Award winning team of color scientists.

** Pricing is for US only. International pricing will vary. Please contact a local AJA Reseller for pricing details.*
*** with optional SFP modules*

FS | HDR



Comprehensive HDR Conversions

Modern cameras are inherently HDR capable with their wide dynamic ranges available from the sensor on, and for live events and broadcasts, it's crucial to translate their Log and Gamut capabilities to the accepted standards now being employed for HDR delivery. With support for leading cameras on input, and output to (Perceptual Quality) PQ which is at the heart of HDR 10 as well as support for widely accepted (Hybrid Log Gamma) HLG, FS-HDR takes the pain out of HDR conversion and makes realtime camera to HDR workflows instantly possible. With SDR to HDR conversion, you can even bring in your current materials and upgrade them to match your live HDR programming output. For live event large LED displays utilize FS-HDR for HDR to HDR conversion, and for enriching your SDR sources, SDR to HDR conversion.

In: Dynamic Range/Color Gamut

Input Formats:

- SDR BT.709 100 Nits
- PQ BT.2020 1000 Nits
- PQ P3D65 1000 Nits
- Hybrid Log Gamma BT.2100
- Sony S-Gamut3/S-Log3
- ARRI Log C Wide Gamut
- Panasonic V-Log
- RED Log3G10 Wide Gamut
- Canon Log 2
- Canon Log 3

Out: Dynamic Range/Color Gamut

Output formats:

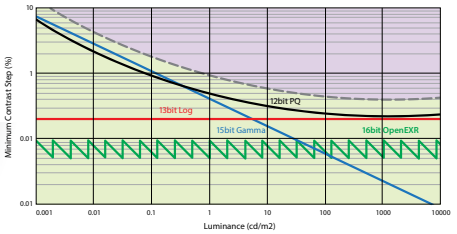
- SDR BT.709 100 Nits
- PQ BT.2020 1000 Nits
- Hybrid Log Gamma BT.2100
- Sony S-Gamut3/S-Log3

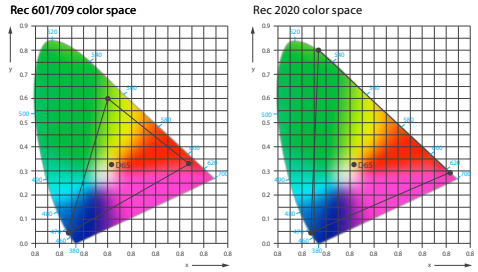
HDR Workflows for UltraHD/HD

FS-HDR opens a range of exciting possibilities for the integration of HDR within a range of workflows:

- Converting from a house HDR standard to a delivery HDR standard.
- Converting from a camera OETF to a house HDR standard.
- Converting from a HDR standard to SDR for delivery or monitoring.
- Converting SDR camera output to a house HDR standard.
- Converting SDR sources to HDR for integrating into an HDR program
- Converting HD SDR BT.709 sources to UHD HDR BT.2020
- Converting UHD HDR BT.2020 sources to HD SDR BT.709
- Converting source inputs to Sony S-Gamut3/S-Log3

FS | HDR





Realtime Camera Log Conversions

SDR equates to around 6-stops of dynamic range, HDR expands that to around 15 stops, greatly increasing both dynamic range and an expanded color gamut, producing a much richer and fuller image, closer to what cameras today are intrinsically capable of and closer to the ultimate goal, the HVS (Human Vision System).

FS-HDR can take this incoming imagery from the most popular professional cameras in the world today and convert their Log output in realtime to 4K/UltraHD or multiple channels of 2K/HD and output as either HDR, SDR or both.

This greatly simplifies workflows in a mixed camera environment, as FS-HDR can take in multiple camera log formats and provides for a unified workflow output to HDR or SDR capable switchers and more.

Additionally, FS-HDR provides the ability to convert to Sony S-Gamut3/S-Log3 on output for workflows requiring a Log feed to compatible switchers and more when needed.

Colorfront Engine™

FS-HDR's HDR/WCG capabilities leverage video and color space processing algorithms within Colorfront Engine™, specially-licensed by AJA from Colorfront, and developed by Colorfront's Academy Award winning CTO Bill Feighter and Lead Engineer Tamas Perlaki.

Powered by Colorfront Engine, FS-HDR's extensive HDR and WCG processing support enables real time processing of a single channel of 4K/UltraHD/2K/HD including down-conversion to HD HDR or up to four channels of 2K/HD simultaneously.

The "secret sauce" in terms of the Colorfront Engine™ is that the emphasis is on maintaining perceptual integrity and creative intent, not "just the math" to convert between color spaces.

The algorithms available in FS-HDR results in a final image that benefits from years' worth of work on Hollywood's biggest productions; field tested, critiqued and supported by the industry's greatest artists.

PQ, HLG and Log

To facilitate the most flexibility for emerging HDR pipelines, it has to be recognized that HDR is a new toolset and standards are evolving to serve different needs while still resulting in the result desired; gorgeous, rich imagery.

FS-HDR recognizes this and provides you choice.

Preserving as much of the camera sensor detail and range as possible with support for Log inputs as well as HDR and SDR standards, FS-HDR transforms this data to the standards now being employed for HDR delivery.

FS-HDR makes your real time HDR workflows come to life in the formats you need, including PQ (Perceptual Quality) HDR 10 and HLG (Hybrid Log Gamma), or Log formats such as Sony S-Gamut3/S-Log 3, as well as BT.709 and BT. 2020 transformations.

Convert Today's SDR to HDR

To match your HDR live programming and live event feeds, you are going to need SDR to HDR conversions to match your HDR feeds and integrate legacy materials.

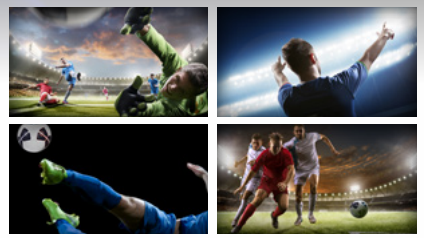
FS-HDR includes SDR to HDR conversions, allowing you to bring in your current SDR materials and upgrade them to match your live HDR programming output.

For live event large LED displays with high nit counts, utilize FS-HDR for realtime HDR to HDR, or SDR to HDR conversions, bringing your screens to rich and colorful life.

Single-Channel Mode

Single-channel mode for 4K/UltraHD or 2K/HD frame sync and conversion including HDR conversions:

- 4K/UltraHD/2K/HD/SD video processing and up, down, cross-conversion
- A full range of I/O options for 4K/UltraHD including 4x 3G-SDI, with 6G and 12G-SDI on optional SFP copper or fiber choices
- SMPTE Two Sample Interleave (2SI) mapping support for broad compatibility with 4K/UltraHD devices
- Square Division (Quadrants) and 2SI conversion, P, PsF and Interlace support

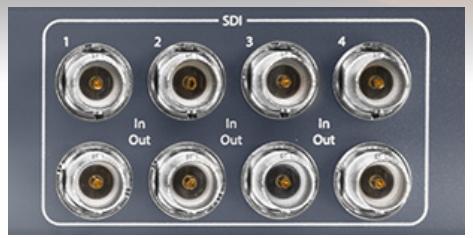


Four-Channel Mode

Four-channel mode for simultaneous independent 2K/HD/SD channels including HDR conversions:

AJA's powerful hardware conversion technology ensures the highest image quality for your productions. Key conversion features include:

- 2K/HD/SD up, down-conversion
- SD/SD aspect ratio conversion
- HD/HD cross-conversion (720p/1080i)



Incredible Digital Connectivity

FS-HDR offers the connectivity to meet the demands of your projects.

FS-HDR utilizes standard BNC as well as optional SFP inputs and outputs to integrate easily into a variety of workflows and facilities with support for SDI workflows all the way up to 12G.

FS-HDR has Coax and Fiber* inputs and outputs to accept 4K/UltraHD/2K/HD/SD resolution SDI signals in Single Channel Mode. In Four Channel mode 2K/HD/SD inputs can be be routed to multiple locations simultaneously without the need for any external signal distribution.

A looping Reference Input allows the FS-HDR to be locked to your house reference signal for rock solid stability.

Remote Configuration & Control

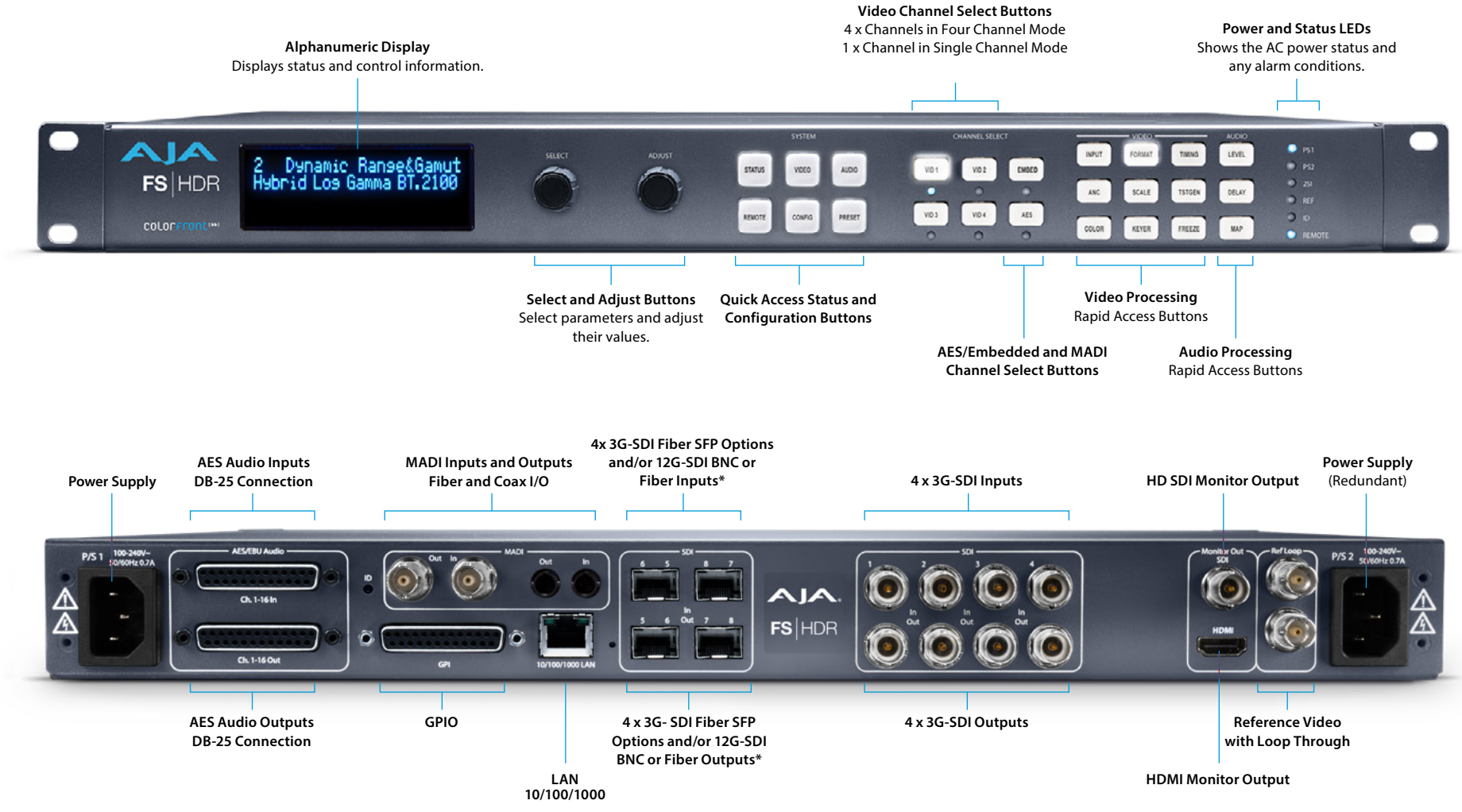
FS-HDR is network ready and supports SNMP monitoring and web-based remote control.

FS-HDR features unique over the network control of HDR settings from within its elegant interface available from any browser, anywhere.

Units can be connected to any Ethernet network via the built-in 10/100/1000MB Ethernet port, allowing control and configuration of multiple FS units from any web browser on a connected computer. Configurations can be saved and applied to multiple units, ensuring consistency and quick configuration in large installs.

** with optional SFP modules*

Connections

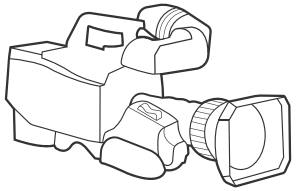


Click here For full product specifications visit www.aja.com/products/fs-hdr#techspecs

** with optional SFP modules*

HDR Workflow example: 4K/UltraHD/2K/HD/SD

Single-Channel Mode



Inputs: Dynamic Range/Color Gamut

- SDR BT.709 100 Nits
- PQ ST 2084 BT.2020 1000 Nits
- PQ P3D65 1000 Nits
- HLG BT.2100
- Sony S-Gamut3/S-Log3
- Arri LogC Arri Wide Gamut
- Panasonic Vlog
- Red Log3G10 Red Wide Gamut
- Canon Log 2
- Canon Log 3

SDI or Fiber

HDMI Monitor Out*

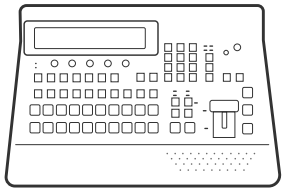
HD Monitor

Direct Control or via the LAN

SDI or Fiber

HD Monitor

SDI Monitor Out*



Outputs: Dynamic Range/Color Gamut

- SDR BT.709 100 Nits
- PQ ST 2084 BT.2020 1000 Nits
- HLG BT.2100
- Sony S-Gamut3/S-Log3

** Mirrors HDR Transform of Output*

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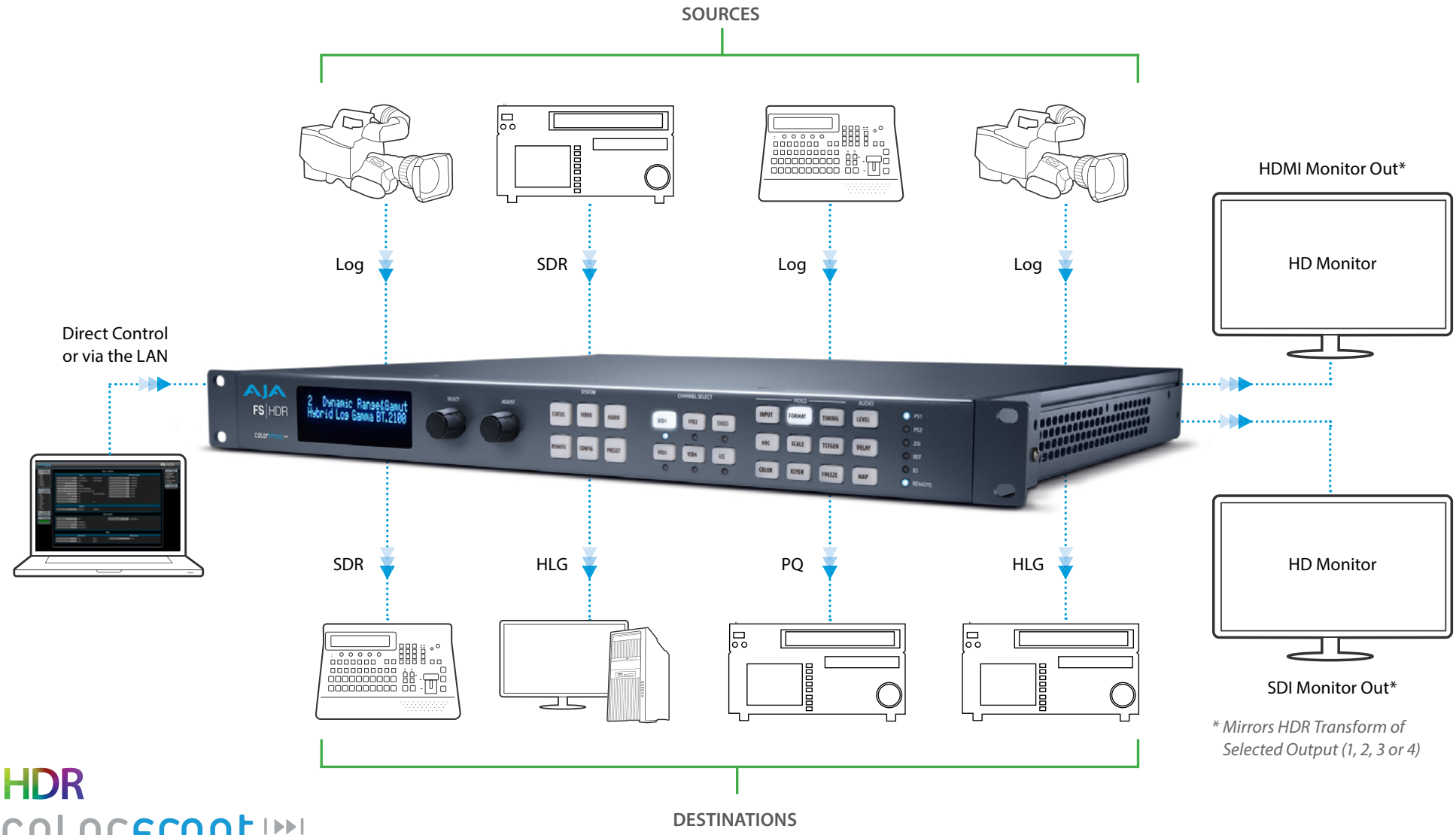
HDR Workflow example: 2K/HD

Four-Channel Mode



HDR colorfront

Tech Specs

HDR/WCG Processor with Colorfront Engine

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

Input Formats

- SDR BT.709 100 Nits
- PQ BT.2020 1000 Nits
- PQ P3D65 1000 Nits
- Hybrid Log Gamma BT.2100
- Sony S-Gamut3/S-Log3
- ARRI Log C Wide Gamut
- Panasonic V-log
- RED Log3G10 Wide Gamut
- Canon Log 2
- Canon Log3

Output Formats

- SDR BT.709 100 Nits
- PQ BT.2020 1000 Nits
- Hybrid Log Gamma BT.2100
- Sony S-Gamut3/S-Log3

HDR Conversions

- HDR to HDR
- HDR to SDR
- SDR to HDR

Colorimetry

- Supports BT.709 and BT.2020

Video Formats

- (4K) 4096 x 2160p 23.98, 24, 25, 29.97, 30, 50, 59.94, 60
- (UltraHD) 3840 x 2160p 23.98, 24, 25, 29.97, 30, 50, 59.94, 60
- (UltraHD) 3840 x 2160PsF 23.98, 24, 25, 29.97, 30
- (2K) 2048 x 1080p 23.98, 24, 25, 29.97, 30, 50, 59.94, 60
- (HD) 1920 x 1080p 23.98, 24, 25, 29.97, 30, 50, 59.94, 60
- (HD) 1920 x 1080PsF 23.98, 24, 25, 29.97, 30
- (HD) 1920 x 1080i 50, 59.94, 60
- (HD) 1280 x 720p 50, 59.94, 60
- (SD) 625i 50
- (SD) 525i 59.94
- YCbCr, 4:2:2, 10-bit

Video Input Digital

- 4 x 3G-SDI inputs, 4 x BNC
- 4 x 3G-SDI inputs, 4 x Fiber or HD-BNC (optional SFP modules)
  - SFP fiber modules, 3G-SDI, dual LC, single LC, or single SC, SMPTE-297
  - SFP fiber module, 12G/6G-SDI, dual LC, SMPTE-297
  - SFP coax module, 12G/6G-SDI, dual HD-BNC
- 12G/6G/3G/HD/SD, SMPTE-259/292/424/2081/2082
  - Single Link 12G/6G-SDI (with optional SFP module)
  - Quad Link 3G-SDI Level A or B-DL (4 x 3G), SMPTE-425-5
  - Dual Link 3G-SDI Level B-DS (2 x 3G), SMPTE-425-3
  - Single Link 3G-SDI Level A, B-DL, or B-DS, SMPTE 425
  - Quad Link HD-SDI (4 x 1.5G)
  - Dual Link HD-SDI (2 x 1.5G), SMPTE-372
  - Single Link HD/SD
- Quadrant (Square Division) or 2SI (Two Sample Interleave) 4K/UltraHD input pixel mapping
- 8 x 1 selector feeds video processor(s)

Video Output Digital

- 4 X 3G-SDI outputs, 4 x BNC
- 4 x 3G-SDI outputs, 4 x fiber or HD-BNC (optional SFP modules)
  - SFP fiber modules, 3G-SDI, Dual LC, Dual LC CWDM, Single LC, or Single SC, SMPTE-297
  - SFP fiber module, 12G/6G-SDI, dual LC, SMPTE-297
  - SFP coax module, 12G/6G-SDI, dual HD-BNC
- 12G/6G/3G/HD/SD, SMPTE-259/292/424/2081/2082
  - Single Link 12G/6G-SDI (with optional SFP module)
  - Quad Link 3G-SDI Level A or B-DL (4 x 3G), SMPTE-425-5
  - Dual Link 3G-SDI Level B-DS (2 x 3G), SMPTE-425-3
  - Single Link 3G-SDI Level A, B-DL, or B-DS, SMPTE 425
  - Quad Link HD-SDI (4 x 1.5G)
  - Dual Link HD-SDI (2 x 1.5G), SMPTE-372
  - Single Link HD/SD
- Quadrant (Square Division) or 2SI (Two Sample Interleave) 4K/UltraHD output pixel mapping

Monitor Output Digital

- 1 x BNC, 1 x 3G-SDI output
  - 3G-SDI/HD/SD, SMPTE-259/292/424, 10-bits
- 1 x HDMI, 1 x HD output
  - 2K/HD/SD, HDMI v1.4a
  - No HDR Infoframe generation
- Monitored Video Processor output (video and audio) is simultaneously output on both connectors
- 4K/UltraHD down-converted to 2K/HD
- Crop control on HDMI output

Video Processing

- Motion adaptive deinterlacer
- Proc amp controls
- Color corrector
- Legalizer
- Frame rate conversion/film cadence removal/insertion (3:2, 1:2, 2:1, 2:3)
- Adjustable delay 0-6 frames with H and V timing controls in lines and pixels
- Closed Captioning conversion (CEA-608/CEA-708)
- AFD input detection, down-convert control, and output pass through or overwrite
- Freeze (manual or on input signal loss) to black or last good frame
- Matte generator for background fill
- Video test generator
- Nominal video delay HD/SD, 2 frames (LFR), 4 frames (HFR)

Format Conversion

- Convert any supported input format to any supported output format, within the same frame rate family. These three families are:
  - 59.94, 29.97, 23.98
  - 50, 25
  - 60, 30, 24

Scaling

- Supported in 2K/HD/SD formats
  - Zoom in and out
  - Reposition
  - Region of Interest (ROI)

Click here For full product specifications visit www.aja.com/products/fs-hdr#techspecs

(Tech Specs are Continued on Next Page)

Tech Specs *(Continued)*

Up-Conversion

- Hardware 10-bit
- Zoom 14:9: results in a 4:3 image zoomed slightly to fill a 14:9 image with black side bars
- Zoom Letterbox: results in image zoomed to fill fullscreen
- Zoom Wide: results in a combination of zoom and horizontal stretch to fill a 16:9 screen; this setting will introduce a small aspect ratio change

Down-Conversion

- Hardware 10-bit
- Anamorphic: fullscreen
- Letterbox: image is reduced with black top and bottom added to image area with the aspect ratio preserved
- Crop: image is cropped to fit video output format

Aspect Ratio Conversion for SD to SD

- Letterbox: Transforms SD anamorphic material to a letterboxed image
- H Crop: Produces a horizontally stretched effect on the image; transforms anamorphic SD to full frame
- SD Pillarbox: Produces an image in the center of the screen with black borders on the left and right sides and an anamorphized image in the center
- V Crop: Transforms SD letterbox material to an anamorphic image

Audio Input Digital

- 48 kHz sample rate
- 8 x SDI embedded inputs (16-Channels each)
  - 128-Channels, 24-bit (20-bit SD), SMPTE-272/299
- 8 x balanced AES inputs (16-Channels), 1 x DB-25
  - 16-Channels, 24-bit, AES-3
- 2 x MADI inputs, 1 BNC, 1 x ST Fiber
  - 128-Channels, 24-bit, AES-10

Audio Output Digital

- 48 kHz sample rate
- 1 x SDI embedded output per Video Processor (16-Channels each)
  - 16-Channels (in single Video Processor mode), 24-bit (20-bit SD), SMPTE-272/299
  - 64-Channels (in four Video Processor mode), 24-bit (20-bit SD), SMPTE-272/299
- 8 x balanced AES outputs (16-Channels), 1 x DB-25
  - 16-Channels, 24-bit, AES-3
- 2 x MADI outputs, 1 BNC, 1 x ST Fiber
  - 128-Channels, 24-bit, AES-10

Audio Processing

- 277 x 208 mono audio matrix, route 1 to 1, 1 to many
  - Inputs: 128 embedded, 16 AES, 128 MADI, 2 stereo mixdowns, 3 tone generator
  - Outputs (Four Channel mode): 16 AES, 128 MADI, 64 embedded
  - Outputs (Single Channel mode): 16 AES, 128 MADI, 16 embedded
- Input adjustment controls for each channel
  - Gain +18 to -18 dB in 0.5 dB steps
  - Phase invert
- Input adjustment controls for each channel pair
  - Delay -16ms to +1sec in 20.8 us steps
- Two independent 5.1 or 7.1 to stereo mixdown processors with gain adjust
- High quality Sample Rate Conversion supported on all audio inputs
- SRC bypass for non-PCM audio (e.g. Dolby E, AC-3, etc)
- Audio tone generator (mute, 400 Hz, 1 kHz)

Reference Input

- External, 2 x BNC
  - Looping, nonterminating
  - Blackburst or tri-level sync

Genlock

- Lock to External Reference
- Lock to SDI input 1 thru 8
- Free run based on Temperature Compensated Crystal Oscillator

Network Interface

- 1 x RJ-45, 10/100/1000 Ethernet
- Embedded web server for remote control
- SNMP

User Interface

- Display
- Keypad with status LEDs
- Two rotary/push knobs
- Comprehensive alarm indicators

Presets

- Each mode supports 40 Presets

GPI

- 1 x 25-pin D-Connector
  - Four optically isolated GPI inputs
  - Four optically isolated GPO outputs

Size (w x d x h)

- 17.5" x 16" x 1.75" (1RU) (444.5mm x 406.5mm x 44.45mm)

Weight

- 7.9 lb (3.6 kg)

Power

- 100-240 VAC 50/60 Hz (Dual, redundant power supplies), 55W typical; 70W max.

Environment

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

Click here For full product specifications visit www.aja.com/products/fs-hdr#techspecs

Five Year Warranty

AJA Video warrants that FS products will be free from defects in materials and workmanship for a period of five years from the date of purchase.

About AJA Video Systems, Inc.

Since 1993, AJA Video has been a leading manufacturer of video interface and conversion solutions, bringing high quality, cost effective digital video products to the professional, broadcast and postproduction markets. AJA products are designed and manufactured at our facilities in Grass Valley, California, and sold through an extensive sales channel of resellers and systems integrators around the world. For further information, please see our website at **www.aja.com**

AJA Video Systems, Inc.
Grass Valley, California
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AJA® VIDEO SYSTEMS