

# L815AE

4x 1Gb RJ45, 2x 25Gb Fiber Optic, 8x SD/HD/3G-SDI, 1x LTC



## PHYSICAL

<b>Dimensions (W x H x D)</b>	43.40 cm x 4.28 cm x 66.37 cm 17.09 in x 1.69 in x 26.13 in
<b>Weight</b>	16.89 kg (Unit) 21.89 kg (Gross)
<b>ECCN</b>	4A994
<b>USHTS Code</b>	8471.50.0150

## ELECTRICAL

<b>Max Potential Power</b>	351 Watts (Max)
<b>Heat Dissipation</b>	1197.66 BTU/hr (Max)
<b>AC Power Option</b>	100 - 240 VAC (Input Voltage) 50 - 60 Hz (Line Frequency)

**AC PSU Connector** C14



**DC Power Option** -48 to - 60 VDC (Input Voltage)

**DC PSU Connector** Saf-D Grid



DC option ships with two 3m length power cables with a mating Saf-D-Grid connector and terminates to bare leads

## ENVIRONMENTAL

<b>Operating Conditions</b>	10 to 35 °C (50 to 95 °F) 10% to 80% RH (non-condensing)
<b>Storage Conditions</b>	-40 to 65 °C (-40 to 149 °F) 5% to 95% RH (non-condensing)
<b>Noise Level</b>	63 dBA (Max)
<b>Electromagnetic Compliance</b>	EN 55032 EN 55024 EN 61000
<b>Safety Compliance</b>	EN 60950 EN 62311 IEC 60950

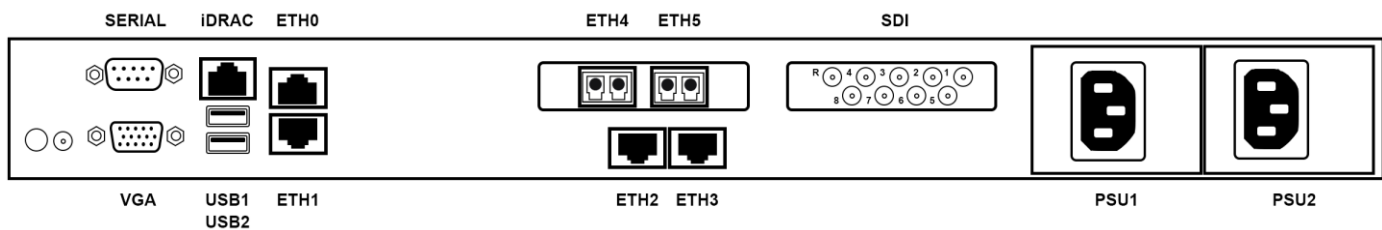
## SYSTEM

<b>System Management</b>	iDRAC9 Enterprise
<b>Storage Capacity</b>	480GB Redundant Storage
<b>I/O Interfaces</b>	2x 1Gb RJ45 8x SD/HD/3G-SDI 1x LTC 2x 10Gb SFP+ 2x 25Gb SFP28

**System ships with:**  
2x 1000BASE-T RJ45 Transceiver  
2x 25GBASE-SR Fiber Optic Transceiver

See next page for qualified SFP add-ons

## PORT CONFIGURATION



**QUALIFIED SFP ADD-ONS**

Transceiver	Form Factor	Mode	Link Distance	Spare P/N	OEM	OEM Part Number
1000BASE-T RJ45 (Default)	SFP	N/A	100 m	SP426	FS	SFP-GB-GE-T
10GBASE-LR Fiber Optic	SFP+	Single Mode	10 km	SP431	Intel	E10GSFPLR
10GBASE-SR Fiber Optic	SFP+	Multimode	300 m	SP412	Intel	E10GSFPSR
25GBASE-SR Fiber Optic (Default)	SFP28	Multimode	300 m	SP430	Mellanox	MMA2P00-AS-SP

**INPUT SUPPORT****Live Input**

- Single and Multiple Program Transport Streams (SPTS, MPTS) over UDP/IP and RTP/IP with FEC and SMPTE ST 2022-7 seamless protection switching
- TR-01 with JPEG-2000 compression, PCM audio, and captions
- SMPTE ST 2110-20 (uncompressed video), 2110-30 (PCM), 2110-31 (AC3, EAC3), 2110-40 (Ancillary Data) with SMPTE 2022-7 seamless protection switching, NMOS IS-04 discovery & registration, and NMOS IS-05 device connection management
- SMPTE ST 2022-6 with SMPTE 2022-7 seamless protection switching
- SDI (uncompressed), optional: SD-SDI, HD-SDI, 3G-SDI, Quad 3G-SDI (4K), Interleave (4K)
- AWS Elemental MedicaConnect, SRT protocol (caller mode)
- Packaged network inputs: Apple HLS TS with muxed audio and video
- Video codecs:
  - H.264 up to 4:2:2 10 bit
  - H.265 up to 4:2:2 10 bit including High Dynamic Range (HDR)
  - MPEG-2
  - Apple ProRes®
  - RAW
  - JPEG-2000
- Audio codecs:
  - AC-3 (Dolby Digital)
  - EAC-3 (Dolby Digital Plus) \*
  - Dolby E \*
  - AAC
  - MPEG-1 Layer II
  - PCM

**Live Input Redundancy**

- Input integrity: Generate repeat, black, slate, or color when input is missing
- Input failover, including seamless Hot Backup up to 4K \*\* (dual decode, single encode)

**Live Input Redundancy Trigger Conditions**

- User-configurable
- Time-based errors ("Input Loss", "Video Loss", "Audio Silence", "Video Freeze", "Video Black")
- Event-based errors ("Transport Error Indicator Flag", "Continuity Counter Errors", "RTP Packet Loss")

**File Input**

- Containers: MXF (AS-02, OP-1a-c, OP-2a-c, OP-3c), QuickTime, MPEG-4
- Packaged files: HLS
- Discrete audio and caption inputs
- OP-47 captions from 436M track of input MXF files

**File Input Features**

- Separate audio and video files
- Audio delay offset
- Audio PID tracking
- Audio language tracking
- Audio track selection
- MPEG-2 deblocking
- Source file clipping
- Fast seek
- Merge multiple sources to single output
- Channel selection for multitrack inputs
- Audio only input
- Amazon S3 support
- Static image overlay per input

**Multichannel Audio Input**

- Per clip audio channel assignment
- Unlimited audio tracks

**Timecode**

- Time code source embedded
- Time code source use local system clock
- Override time code date
- Start encoding at specified timecode
- External reference connector

**Captions**

- Ancillary, DVB-Sub, SCTE-20, null, SCC, SMI, SRT, STL, Teletext, TTML, ARIB, EBU-TT-D
- Source CC channel
- 608 to 708 upconvert
- SCTE-27 pass-through support

**Ad Avail**

- ESAM
- SCTE-35 splice insert
- SCTE-35 with APOS
- SCTE-35 Pullup
- SCTE-104 digital cue tone passthrough
- Ad avail blanking
- Black-out capability

**Nielsen**

- Nielsen ID3 certification
- Nielsen RTVOD C3/C7 watermarking \*

**Notifications**

- Web callback
- Email

**Scripting**

- Pre and post processing scripts
- Blank output during ad avail

**608 Extended Data Services**

- Line 21 passthrough, rewrite, strip, insert

**Copy and Redistribution Control Packets**

- Line 21 passthrough, rewrite, strip, insert

## OUTPUT FORMATS

<b>Video</b>	<ul style="list-style-type: none"><li>- H.264 (Baseline, Main, High up to 4:2:2*), 4:2:2 High Profile Intra 10 bit *</li><li>- H.265 (Main, Main10 up to 4:2:2*) including HDR 10, HLG, and Dolby Vision HDR *</li><li>- MPEG-2</li><li>- Apple® ProRes (up to 4:2:2 10 bit)</li><li>- Frame capture to JPEG (thumbnail creation)</li><li>- I-frame only mode</li><li>- Uncompressed</li></ul>
<b>Audio</b>	<ul style="list-style-type: none"><li>- AAC-LC, AAC-HEV1, AAC-HEV2 (MPEG-2, MPEG-4, LATM/LOAS)</li><li>- Uncompressed WAV, AIFF</li><li>- AC-3 (Dolby Digital) *, AC-3 passthrough</li><li>- EAC-3 (Dolby Digital Plus) *, EAC-3 passthrough</li><li>- Dolby Atmos passthrough</li><li>- DTS Express *</li><li>- MPEG-1 Layer II</li><li>- Audio only output support (TS, HLS, MSS, RTMP)</li></ul>
<b>Multichannel Audio Output</b>	<ul style="list-style-type: none"><li>- Per clip audio channel assignment</li><li>- Unlimited audio tracks</li></ul>
<b>Multilanguage Support</b>	<ul style="list-style-type: none"><li>- Follow input type (ISO 639)</li><li>- Insert audio type (ISO 639)</li><li>- Follow language code</li><li>- Insert language code</li></ul>
<b>Output Locking</b>	<ul style="list-style-type: none"><li>- Apple HLS, Microsoft Smooth, and TS outputs</li></ul>

## OUTPUT CONTAINERS

<b>Live Streaming Outputs</b>	<ul style="list-style-type: none"><li>- Adobe RTMP Streaming (RTMP, RTMPS)</li><li>- Apple HTTP Adaptive Streaming (HLS)</li><li>- Microsoft Smooth Streaming (ISMV)</li><li>- MPEG DASH (ISOBMFF)</li><li>- MPEG-2 Part 1, Systems, CableLabs compliant (EBIF passthrough, EBP, PSI, RAI segmentation marker) (MPEG-TS)</li><li>- Real Time Protocol (RTP)</li><li>- Single and Multiple Program Transport Streams (SPTS, MPTS) over UDP/IP and RTP/IP with FEC</li><li>- SMPTE ST 2110-20 (uncompressed video), 2110-30 (PCM), 2110-31 (AC3, EAC3), 2110-40 (Ancillary Data) with SMPTE 2022-7 seamless protection switching, NMOS IS-04 discovery &amp; registration, and NMOS IS-05 device connection management **</li><li>- AWS Elemental MediaConnect, Zixi push protocol</li></ul>
<b>File Outputs</b>	<ul style="list-style-type: none"><li>- Apple QuickTime and ProRes (MOV)</li><li>- Sony XDCAM MXF (XDCAM)</li><li>- RAW YUV or RGB formats (Uncompressed)</li><li>- MPEG-4 Part 10 (MP4)</li></ul>

**Apple HTTP Adaptive Streaming (HLS)**

- TS or fMP4 segment types
- Byte range offset
- Single file / multiple segments
- Segment length
- Minimum segment length
- Auto upload to CDN
- Content base URL
- Manifest base URL
- Use subdirectories
- Disable caching
- Floating point manifests
- Resolution tag
- Compressed manifests
- Use Pantos 7 CODEC identifiers
- Program-Date-Time flag
- Closed-caption tag
- Ad markers - Adobe
- Ad markers - Simple
- Ad markers - SCTE-35 enhanced
- SMPTE ST 2038 ancillary data
- Alternate manifest destination
- File transfer protocols (HTTP push, Akamai, Webdav) with ULL chunked transfer

**Encryption**

- AES CBC, CTR, EBC
- Key providers - 1Mainstream, Conax, Inside Secure, Irdeto, Pikel, PlayReady, Secure media, Cisco, Verimatrix, SPEKE

**MPEG DASH (ISOBMFF)**

- Single file / multiple segments with ULL chunked transfer
- Fragment length
- Segment length
- ULL chunked encoding
- HbbTV 1.5 support
- Base URL
- Minimum buffer time

**Encryption**

- DASH-CENC
- Key providers - Widevine, Pikel, SPEKE, PlayReady

**Microsoft Smooth Streaming (ISMV)**

- Manifest level encoding (UTF-8, UTF-16)
- Collapse identical audio streams

**Encryption**

- AES CTR
- PlayReady support
- Key providers - Conax, Inside Secure, Seachange, Pikel, Irdeto, SPEKE

**Reliable TS Output**

- Deliver to AWS Elemental MediaConnect
- Zixi push protocol

**Encryption**

- AES-128, AES-192, AES-256

<b>SMPTE ST 2110 **</b>	<ul style="list-style-type: none"> <li>- SMPTE ST 2110-20 uncompressed video (SD, HD, 4K)</li> <li>- SMPTE ST 2110-30 PCM audio</li> <li>- SMPTE ST 2110-31 AC3 and EAC3 audio</li> <li>- SMPTE ST 2110-40 ancillary data</li> <li>- SMPTE ST 2022-7 seamless protection switching</li> <li>- SCTE 35 to SCTE 104 passthrough</li> <li>- Precision Time Protocol (PTP)</li> <li>- NMOS IS-04 discovery &amp; registration</li> <li>- NMOS IS-05 device connection management</li> </ul>
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## SYSTEM CONTROL

<b>CDN</b>	- Integrated CDN support: Basic PUT, WebDav, and Akamai
<b>Load Balancing</b>	<ul style="list-style-type: none"> <li>- Manual or automated load balancing options</li> <li>- Notifications and alerts</li> </ul>
<b>Monitoring</b>	- System resource and statistics monitoring
<b>User Authentication</b>	- Multiple authentication tiers, Amazon S3 public and private keys
<b>AWS Elemental Conductor Live</b>	<ul style="list-style-type: none"> <li>- Separate management system for control, monitoring and worker failure recovery in a multi-system configuration</li> <li>- Provision and operate channels using templates</li> </ul>
<b>Network Management</b>	- SNMP version 2c
<b>Real-time Controls</b>	<ul style="list-style-type: none"> <li>- Stop, pause and resume individual streams as well as archived files</li> <li>- Audio gain adjustment for real-time control of audio volume</li> <li>- Video and audio preview</li> </ul>

## IMAGE ENHANCEMENT

<b>Anti-aliasing Scaling</b>	- Reduce distortion artifacts when downscaling
<b>Lanczos Scaling</b>	- Multivariate interpolation
<b>Deblocking and Denoise</b>	- Remove common blocking and noise video artifacts
<b>Deinterlacing</b>	<ul style="list-style-type: none"> <li>- Motion adaptive interpolation</li> <li>- Motion adaptive blend</li> <li>- Motion adaptive interpolation with ticker</li> </ul>
<b>Inverse Telecine</b>	- Removes 2-3 frame format, restores original 24 fps frame rate
<b>Telecine</b>	- None, soft or hard
<b>Adaptive Quantization</b>	- Intraframe perceptual QP variation, Machine Learning driven auto Adaptive Quantization mode
<b>Scene Change</b>	- Scene change detection
<b>Look Ahead</b>	- Look ahead rate control

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<b>Gaming Optimizations</b>	- Fast complexity changes and rapid quality recovery during transitions
<b>Noise Reduction</b>	- Noise filtering capability (Bilateral, Mean, Gaussian, Lanczos, Sharpen, Conserve, Perceptual)
<b>Static Logo Insertion</b>	- Up to eight static image overlays (BMP, PNG or TGA format), SDR or HDR - Apply image overlay to a single input, a single output, or globally - Specify z-order and opacity
<b>Motion Logo Insertion</b>	- Motion graphic overlay (HTML, MOV, PNG sequence or SWF format), SDR or HDR - Overlay HTML motion graphics generated by third party authoring tools. Switch overlays on or off with SCTE-35 signals. - Using SWF and Adobe® ActionScript® code, manipulate the video for effects such as squeezeback
<b>Thumbnail Creation</b>	- Create thumbnail JPEG images for any single frame or at custom intervals
<b>Color Correction</b>	- Brightness, contrast, hue, saturation - Full swing range or passthrough - 601, 709 color space conversion - HDR to SDR down conversion
<b>MPEG-2 Error Concealment</b>	- Temporal pixel substitution
<b>Cropping</b>	- Select pixel locations to crop
<b>Timecode Burn In</b>	- Text, font size, position

## AUDIO ENHANCEMENT

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<b>Level Adjustment</b>	- Volume control
<b>Audio Loudness Management</b>	- Audio loudness monitoring and correction; results stored to file (CALM compliant) *
<b>Channel Mixing and Mapping</b>	- Manual audio remixing - Broadcaster mixed AD
<b>Rate Conversion</b>	- Adjust audio sample rate and frequency
<b>Formats</b>	- Encode multiple formats simultaneously
<b>Multiple Audio Tracks</b>	- Support for multiple audio streams for each video stream (SAP)
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<b>Formats</b>	- Encode multiple formats simultaneously
<b>Multiple Audio Tracks</b>	- Support for multiple audio streams for each video stream (SAP)

## OTHER FEATURES

### Metadata

- VBI passthrough (V-Chip, CGMS-A)
  - KLV Data
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### Caption Extraction and Passthrough

- Inputs:
    - Embedded
    - SCC
    - Teletext
  - Transcaption Outputs:
    - CFF-TT
    - DVB-sub
    - Embedded
    - Embedded+SCTE-20
    - SCTE-20+Embedded
    - SCC
    - SMI
    - SMPTE-TT
    - SRT
    - Teletext
    - TTML
    - WebVTT
  - Open caption support
  - Caption burn in
  - Language flag insertion
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### Processing

- Rate control
  - CBR encoding
  - QVBR (Quality-Defined Variable Bitrate) encoding
  - VBR encoding
  - Statmux encoding \*
- Insert / respond to AFD
- Scene change detect
- Minimum I-frame interval
- Force interlace mode
- Variable GOP support
- Content-adaptive B frames
- HDR 10 support (ST.2084, ST.2086, MaxFALL, MaxCLL)
- HLG (Hybrid Log Gamma) BT.2020
- Dolby Vision (Certified for Profile 5 and Profile 8.1) \*
- Conversion between SDR, HDR 10, and HLG
- Rec.2020 color support
- RTMP metadata insertion
- EBIF passthrough
- EBP, PSI, RAI segmentation marker

\* Available with Optional License

\*\* Hardware Dependent