

# L013AEv1

2x 10GbE RJ45, 1x SD/HD/3G-SDI, 1x LTC



## PHYSICAL

<b>Dimensions (W x H x D)</b>	26.67 cm x 4.45 cm x 24.13 cm 10.50 in x 1.75 in x 9.50 in
<b>Weight</b>	2 kg (Unit) 3.05 kg (Gross)
<b>ECCN</b>	4A994
<b>USHTS Code</b>	8471.50.0150

## ELECTRICAL

<b>Max Potential Power</b>	150 Watts (Max)
<b>Heat Dissipation</b>	511.82 BTU/hr (Max)
<b>Line Frequency</b>	50 - 60 Hz
<b>Input Voltage</b>	100 - 240 VAC

**NOTE:** All L013AE shipped before 11/27/2019 are version 1

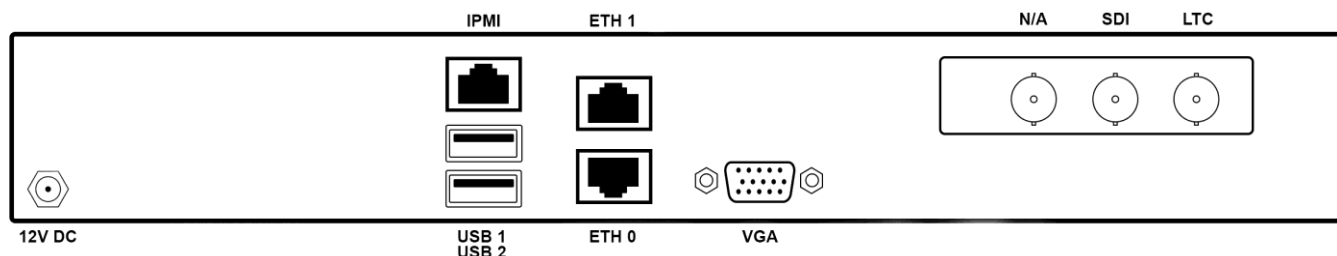
## ENVIRONMENTAL

<b>Operating Conditions</b>	0 to 40 °C (32 to 104 °F) 8% to 90% RH (non-condensing)
<b>Storage Conditions</b>	-40 to 70 °C (-40 to 158 °F) 5% to 95% RH (non-condensing)
<b>Noise Level</b>	62 dB (Max)
<b>Electromagnetic Compliance</b>	FCC Class B, EN 55024/32, EN 6100-3-2/3-3, CISPR 32, VCCI V-3
<b>Safety Compliance</b>	CSA/EN/IEC/UL 60950-1 Compliant, CSA Listed, CE Mark

## SYSTEM

<b>System Management</b>	IPMI 2.0
<b>Storage Capacity</b>	240GB SSD
<b>Interfaces</b>	2x 10GbE RJ45 1x SD/HD/3G-SDI 1x LTC

## PORT CONFIGURATION



# L013AEv2

4x 1GbE RJ45, 2x 10GbE RJ45, 2x SFP+ Ports, 1x SD/HD/3G-SDI, 1x LTC



## PHYSICAL

<b>Dimensions (W x H x D)</b>	26.67 cm x 4.45 cm x 24.13 cm 10.50 in x 1.75 in x 9.50 in
<b>Weight</b>	2 kg (Unit) 3.05 kg (Gross)
<b>ECCN</b>	4A994
<b>USHTS Code</b>	8471.50.0150

## ELECTRICAL

<b>Max Potential Power</b>	150 Watts (Max)
<b>Heat Dissipation</b>	511.82 BTU/hr (Max)
<b>Line Frequency</b>	50 - 60 Hz
<b>Input Voltage</b>	100 - 240 VAC

NOTE: All L013AE shipped after 11/27/2019 are version 2

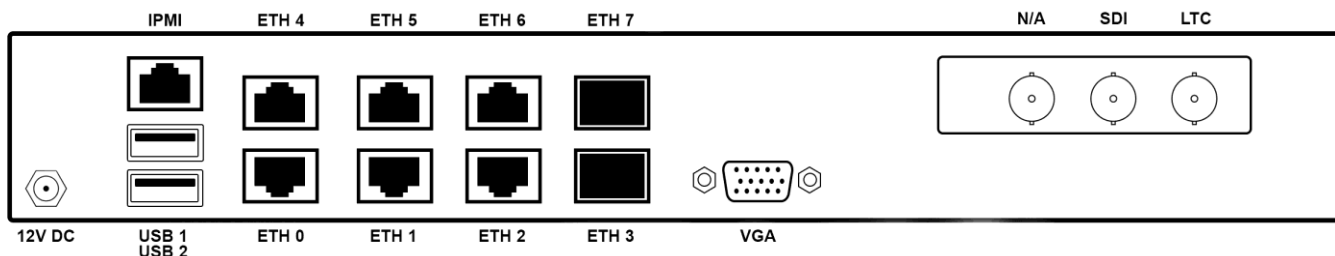
## ENVIRONMENTAL

<b>Operating Conditions</b>	0 to 40 °C (32 to 104 °F) 8% to 90% RH (non-condensing)
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## SYSTEM

<b>System Management</b>	IPMI 2.0
<b>Storage Capacity</b>	240GB SSD
<b>Interfaces</b>	4x 1GbE RJ45 2x 10GbE RJ45 2x SFP+ Ports 1x SD/HD/3G-SDI 1x LTC

## PORT CONFIGURATION



## INPUT SUPPORT

### Live Input

- Single and Multiple Program Transport Streams (SPTS, MPTS) over UDP/IP and RTP/IP with FEC or SMPTE ST 2022-7
- SDI (uncompressed): SD-SDI, HD-SDI, 3G-SDI
- 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
  - MPEG-2
  - Apple ProRes®
  - RAW
- Audio codecs:
  - AC-3 (Dolby Digital)
  - EAC-3 (Dolby Digital Plus) \*
  - Dolby E \*
  - AAC
  - MPEG-1 Layer II
  - PCM

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### Live Input Redundancy

- Input integrity: Generate repeat, black, slate, or color when input is missing

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### 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")

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### File Input

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

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### 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

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### Multichannel Audio Input

- Per clip audio channel assignment
- Unlimited audio tracks

<b>Timecode</b>	<ul style="list-style-type: none"> <li>- Time code source embedded</li> <li>- Time code source use local system clock</li> <li>- Override time code date</li> <li>- Start encoding at specified timecode</li> <li>- External reference connector</li> </ul>
<b>Captions</b>	<ul style="list-style-type: none"> <li>- Ancillary, DVB-Sub, SCTE-20, null, SCC, SMI, SRT, STL, Teletext, TTML, ARIB, EBU-TT-D</li> <li>- Source CC channel</li> <li>- 608 to 708 upconvert</li> <li>- SCTE-27 pass-through support</li> </ul>
<b>Ad Avail</b>	<ul style="list-style-type: none"> <li>- ESAM</li> <li>- SCTE-35 splice insert</li> <li>- SCTE-35 with APOS</li> <li>- SCTE-35 Pullup</li> <li>- SCTE-104 digital cue tone passthrough</li> <li>- Ad avail blanking</li> <li>- Black-out capability</li> </ul>
<b>Nielsen</b>	<ul style="list-style-type: none"> <li>- Nielsen ID3 certification</li> </ul>
<b>Notifications</b>	<ul style="list-style-type: none"> <li>- Web callback</li> <li>- Email</li> </ul>
<b>Scripting</b>	<ul style="list-style-type: none"> <li>- Pre and post processing scripts</li> <li>- Blank output during ad avail</li> </ul>
<b>608 Extended Data Services</b>	<ul style="list-style-type: none"> <li>- Line 21 passthrough, rewrite, strip, insert</li> </ul>
<b>Copy and Redistribution Control Packets</b>	<ul style="list-style-type: none"> <li>- Line 21 passthrough, rewrite, strip, insert</li> </ul>

## OUTPUT FORMATS

<b>Video</b>	<ul style="list-style-type: none"> <li>- H.264 (Baseline, Main, High up to 4:2:0)</li> <li>- H.265 (Main, Main10 up to 4:2:0)</li> <li>- MPEG-2</li> <li>- Apple® ProRes (up to 4:2:0)</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>

## Multilanguage Support

- Follow input type (ISO 639)
- Insert audio type (ISO 639)
- Follow language code
- Insert language code

## OUTPUT CONTAINERS

### Live Streaming Outputs

- Adobe RTMP Streaming (RTMP, RTMPS)
- Apple HTTP Adaptive Streaming (HLS)
- Microsoft Smooth Streaming (ISMV)
- MPEG DASH (ISOBMFF)
- MPEG-2 Part 1, Systems, CableLabs compliant (EBIF passthrough, EBP, PSI, RAI segmentation marker) (MPEG-TS)
- Real Time Protocol (RTP)
- Single and Multiple Program Transport Streams (SPTS, MPTS) over UDP/IP and RTP/IP with FEC
- Zixi push protocol

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### File Outputs

- Apple QuickTime and ProRes (MOV)
- Sony XDCAM MXF (XDCAM)
- RAW YUV or RGB formats (Uncompressed)
- MPEG-4 Part 10 (MP4)

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### 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
- SCTE 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, Pkixel, SPEKE, PlayReady
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- 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, Pkixel, Irdeto, SPEKE
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- Reliable TS Output**
- Deliver to AWS Elemental MediaConnect
  - Zixi push protocol

- Encryption**
- AES-128, AES-192, AES-256
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## SYSTEM CONTROL

- CDN**
- Integrated CDN support: Basic PUT, WebDav, and Akamai
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- Load Balancing**
- Manual or automated load balancing options
  - Notifications and alerts
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- Monitoring**
- System resource and statistics monitoring
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- User Authentication**
- Multiple authentication tiers, Amazon S3 public and private keys
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- AWS Elemental Conductor Live**
- Separate management system for control, monitoring and worker failure recovery in a multi-system configuration
  - Provision and operate channels using templates
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- Network Management**
- SNMP version 2c
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- Real-time Controls**
- Stop, pause and resume individual streams as well as archived files
  - Audio gain adjustment for real-time control of audio volume
  - Video and audio preview

## 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>	- Motion adaptive interpolation - Motion adaptive blend - Motion adaptive interpolation with ticker
<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
<b>Scene Change</b>	- Scene change detection
<b>Look Ahead</b>	- Look ahead rate control
<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) - Apply image overlay to a single input, a single output, or globally - Specify z-order and opacity
<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

<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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## OTHER FEATURES

<b>Metadata</b>	- VBI passthrough (V-Chip, CGMS-A) - KLV Data
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<b>Caption Extraction and Passthrough</b>	- Inputs: <ul style="list-style-type: none"><li>• Embedded</li><li>• SCC</li><li>• Teletext</li></ul> - Transcaption Outputs: <ul style="list-style-type: none"><li>• CFF-TT</li><li>• DVB-sub</li><li>• Embedded</li><li>• Embedded+SCTE-20</li><li>• SCTE-20+Embedded</li><li>• SCC</li><li>• SMI</li><li>• SMPTE-TT</li><li>• SRT</li><li>• Teletext</li><li>• TTML</li><li>• WebVTT</li></ul> - Open caption support - Caption burn in - Language flag insertion
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<b>Processing</b>	- Rate control <ul style="list-style-type: none"><li>• CBR encoding</li><li>• QVBR (Quality-Defined Variable Bitrate) encoding</li><li>• VBR encoding</li></ul> - Insert / respond to AFD - Scene change detect - Minimum I-frame interval - Force interlace mode - Variable GOP support - Content-adaptive B frames - RTMP metadata insertion - EBIF passthrough - EBP, PSI, RAI segmentation marker
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<b>Mounting Option</b>	- Optional rack-mount kit available - P/N SP208
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*\* Available with Optional License*