DATASHEET

ALCHEMIST LIVE
Motion Compensated Frame-rate Conversion
for Live Media Streams

Alchemist, now in its seventh generation, is recognized throughout the world as the undisputed gold standard of motion compensated frame-rate standards conversion.

Alchemist Live from Grass Valley builds on this legacy and offers the very best motion compensated frame-rate conversion, providing transparent, artifact-free conversion for seamless global distribution of live media.

Available in two operational modes: as a single channel for 4K UHD conversions or three channels for HD/3G conversions, Alchemist Live can also support either SDI workflows or IP SMPTE ST 2110/2022-6 applications with 10/40 GbE or 25/100 GbE interfaces. Supported IP features include PTP timing to SMPTE ST 2059, single stream 4K HD, SMPTE ST 2110-20 narrow sender with RS-FEC, SMPTE ST 2110-30/31, SMPTE ST 2110-40, and NMOS ISO/05 device discovery. SMPTE ST 2110-30/31 audio support includes a configurable output channel count, 4x SMPTE ST 2110-30/31 input audio streams, and 125 µs, 250 µs, 500 µs and 1 ms packet times supported at the input and output.

Along with 4K UHD, HDR mapping is also included with built-in HDR conversion algorithms supporting HLG, PQ and S-Log3 transfer functions and BT.709 and BT.2020 color gamuts, plus a custom LUT loading feature for using .cube tables, and a range of user-configurable gamma, SDR/HDR range, clip and gain controls.

Alchemist Live will process up to 16 channels of audio with a delay to match the processing, and gain, shuffling and extended delay controls. A Dolby® E Transcoding option is also available to handle embedded Dolby E streams ensuring that the guard band is maintained.

Supplied as a certified COTS turnkey solution, Alchemist Live has a number of remote control and monitoring options from GV Orbit, a built-in HTML5 web interface, SNMP integration for third-party network management systems and Alchemist Live IP now supports NMOS.
**Key Features**

- World-class motion compensated frame-rate conversion — new technology optimized to deliver stunning image quality, however complex the source
- Supports live IP or SDI media streams, either 1x 4K UHD channel or 3x HD/3G channels
- SD, HD, 1080p, 4K UHD & 4K DCI native support
- IP support for SMPTE ST 2110-20/30/31/40, SMPTE ST 2022-6/7, PTP timing to SMPTE ST 2059, RS-FEC support, NMOS IS04/05 device discovery and connection management (Alchemist Live IP only)
- SMPTE ST 2110-30/31 support includes 4x SMPTE ST 2110-30/31 input audio streams, configurable output channel count, and 125 µs, 250 µs, 500 µs and 1 ms packet times
- HDR handling for HLG, PQ and S-Log3, including custom LUTs
- Video processing including frame synchronizer, ARC control, logo insertion, proc amp and legalizer
- Graphics-friendly low Ph.C mode, and Ph.C Mask feature to exclude Ph.C motion processing from defined screen areas during processing
- Closed caption support and ancillary data bridge
- 16-channel audio processing with gain, shuffling and delay
- Dolby E Transcoding option to maintain Dolby guard-band protection
- HTML5 web control interface, along with native support for Grass Valley’s GV Orbit, SNMP and NMOS
- Certified turnkey solution
### Specifications

**SDI Supported Video Formats**
- **SD:** 525, 625
- **HD:** 720 50/59.94/60p, 1080i 25/29/30, 1080p 23/24/25/29/30
- **3G:** 1080 – 50/59.94/60p
- **4x 3G:** UHD 3840x2160, 4K 4096x2160 – 23/24/25/29/30/50/59.94/60p

**IP Supported Video Formats**
- **SD:** 525, 625 (SMPTE ST 2110 only)
- **HD:** 720 50/59.94/60p, 1080i 25/29/30, 1080p 23/24/25/29/30
- **3G:** 1080 – 50/59.94/60p
- **4x 3G:** UHD 3840x2160, 4K 4096x2160 – 23/24/25/29/30/50/59.94/60p
- **4K UHD Single Stream:** UHD 3840x2160, 4K 4096x2160 – 23/24/25/29/30/50/59.94/60p

**Processing Channels**
- 1 channel of 4K UHD and 4K DCI conversion
- 3 channels of 1080p conversion

**Conversion Modes**
- Motion Compensated Interpolation
- Low Ph.C Motion Compensated
- Linear
- Synchronous

**Stream Inputs and Outputs (for IP Version)**
- Dual 40 GbE and single 100 GbE native interfaces, Dual 10 GbE and 25 GbE interfaces with adapters
- **Video:** SMPTE ST 2110-20 and SMPTE ST 2022-6
- **Audio:** SMPTE ST 2110-30 and SMPTE ST 2110-31 (AES67), 48 kHz, 24-bit PCM, up to 16 audio processed channels. Synchronization and timestamp realignment with video stream. Supported packet timing: 125 μs, 250 μs, 500 μs, 1 ms
- **Metadata:** SMPTE 2110-40
- **NMOS IS-04/05 IP device discovery, registration and connection management**
- **SMPTE ST 2022-7 Packet redundancy and re-ordering**

**SD Inputs and Outputs (for SDI version)**
- 8x 75Ω SD/HD serial digital interface with 16 channels of embedded audio
- 3 Gb/s HD-SDI SMPTE ST 424/425 Quad link / Square division / ZSI
- 1.5 Gb/s HD-SDI SMPTE ST 292 / SMPTE ST 299
- 270 Mb/s SD-SDI SMPTE ST 259

**Supported Audio Format**
- 16 PCM pass-through channels of audio (for IP version)
- 16 PCM pass-through channels of embedded audio (for SDI version)
- Dolby E Transcoding, of up to 3 Dolby E streams (licensed option)

**Control & Monitoring**
- GV Orbit control interface
- GV Orbit logging and reporting
- HTML5 web control interface
- **NMOS:** Discovery and registration (IS04), and Connection Management (IS05) — (Alchemist Live IP only)

**Form Factor**
- 4 RU
- 2000W dual redundant PSU @240V AC (1000W @ 120 VAC)
- Power consumption: 850W

**Connectivity**
- 2 x RJ45 GbE LAN ports
- 1 x RJ45 dedicated IPMI LAN port
- 1 x VGA (console)

**Video Utilities**
- Color space conversion (REC601 / BT709 / BT2020)
- Alias Suppression — Horizontal & vertical
- RGB Legalization (700 / 721 / 735 / Custom)
- Aperture — Sharp / Normal / Anti-alias
- VANC bypass
- Pattern Generator
- Logo Inserter
- Caption overlay
- Ph.C Protect Area — 3x adjustable areas to exclude Ph.C motion processing

**HDR Processing**
- HDR (PQ / S-Log3 / HLG) to SDR
- HDR (PQ / S-Log3 / HLG) to HDR (PQ / S-Log3 / HLG)
- SDR to HDR (PQ / S-Log3 / HLG)
- Custom LUTs

**Reference Input**
- **SDI version:** SD Bisync, HDTV Trisync
- **IP version:** Clock Locked NTP/PTP/System Clock

**Latency**
- High framerate conversion, 210 ms – 320 ms (actual value depends on standards & genlock mode)
- Low framerate conversion, 420 ms – 630 ms (actual value depends on standards & genlock mode)

**Mechanical**
- **Temperature range:** 0 to 35°C (32 to 95°F) operating
- **Cooling:** Front to rear
- **Weight:** Gross weight 28.1 kg (62 lbs.)
- **Case type:** 4 RU freestanding or rackmount
- **Dimensions:** 462 mm x 673 mm x 172 mm (18.2 x 26.5 x 6.8 in.)

* Alchemist Live SDI: all three inputs must be the same framerate and all three outputs must be the same framerate.
Get the Most from Alchemist Live with GV Care Prime

Built on 50 years of experience and service excellence, GV Care provides access to the worldwide technical and operational support that you need to help keep your products running smoothly so that you can focus on business.

GV Care Prime provides a highly skilled 24x7 technical help desk, committed response times, knowledge base access, software maintenance support, and fast access to spare parts with our high-performance Advance Exchange service.

**Dolby E Option**

**ALCLIVE-DBE**
Dolby E single-channel Dolby E transcoding license – enables 1 channel of Dolby E transcoding in 4K UHD mode, or in a single SD/HD/3G video channel in HD mode (assignable 1 per video channel). Note: maximum of three Dolby E transcodes permitted per Turnkey unit.

**IP Upgrade**

**9822250**
Alchemist Live (SDI to SMPTE ST 2110 IP upgrade) (Software licenses and hardware changes)
Motion compensated frame-rate conversion for live SMPTE ST 2110 IP media streams. 1x 4K UHD channel or 3x 1080p channels.

**IP Options**

**FCQ-100GE-SR**
100GBASE-SR short range QSFP for MMF (Note: Single QSFP support only)

**FGAN FCQ-ADPT-10**
Ethernet adapter 40 Gb/s to 10 Gb/s QSFP to SFP+

**FGAN FCQ-ADPT-25**
Ethernet adapter 100 Gb/s to 25 Gb/s QSFP28 to SFP28

**Mandatory Maintenance**

**Conver-Prime**
Mandatory 1-year annual maintenance — includes hardware and software support and in-version software updates.