

Chroma 4K Solutions Brief

Executive Summary

Designed for contribution, production and collaboration, the Streambox Chroma 4K advanced performance encoder/decoder provides near lossless video quality, and enables secure, real-time, remote, collaborative workflows. Chroma 4K supports up to DCI 4K and UHD resolutions at 30p and 60p frame rates, along with High Dynamic Range color standards to create streaming content for broadcasting, post-production and live events by providing low latency video in HD, UHD, and DCI 4K/2K formats over public and private IP networks.

The software-defined Streambox Chroma 4K Encoder / Decoder rackmount with its modular design offers flexibility and upgradability, minimal latency, and integrated reliable LDMP media transport technology that simplifies streaming workflows over Internet and MPLS networks. Real-time transport assures an efficient solution for broadcast contribution, post-production collaboration, and streaming live events.



Overview

Streambox Chroma 4K systems provide simplified workflows with real-time transport and creation of 4K DCI and UHD content even with HDR and full range of color 4:4:4 RGB 12-bit encoding as a comprehensive streaming solution applicable for post-production collaboration and video production.

Chroma provides optimized performance using the unique Streambox Advanced Compression Technology Level 3 and Level 5 (ACT L3/L5) profile codec that supports the most advanced color profiles, color spaces, and color depths, along with 16 channel and 5.1/7.1 surround sound audio.

Specialized Low Delay Multi-Path Protocol (LDMP) integrated into Chroma provides intelligent utilization of available network paths to achieve higher rates of

transport and playback with minimal end-to-end latency even over public internet networks.

Workflow integration includes delivery of content to Streambox NODE, Pro, and Mobile Media Players for real-time collaboration, as well as sending to Enterprise Server and Streambox Cloud Services for contribution, archiving, and playing of live streams to and from remote locations.

End-to-end encryption with a symmetric key, forms a protective shield around the transport of valuable video content with no increase in stream latency and permits playout on various software and hardware media players.



Streambox[®] Chroma[™]

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Benefits

- **Lower OpEX Networking Costs**
Use Reliable Low Cost Public Internet and/or Fiber Networking for Remote Sessions
- **Ease of Use**
Web Interface for 30 Minute Networking Setup and Use for Payout Management
- **Secure**
End to End Content Security with Encryption
- **Production Transparency**
Low Latency, Real-Time Communications and Collaboration
- **Modular Rackmount**
Software Upgradable from HD, 2K, 4K, & Multi-Channel

Challenges

Post-Production

Post-production facilities and personnel need real-time remote color grading, editorial review and content approvals, which is enabled by Chroma. Post professionals can share, view and listen to content with the necessary detail to make informed decisions from multiple remote locations such as screening rooms and digital cinema theaters.

High-quality 12-bit 4:4:4 RGB/XYZ color video in various formats such as 4K HDR has to be accessible over standard public IP networks, which is achieved with Chroma and can include Streambox Cloud Services transport.

Broadcast

Broadcasters and content providers need to capture and preserve the highest possible quality video when acquiring content from news, sports, and other live events. Chroma provides the ability to process SD, HD, and UHD HDR signals along with up to 16 channels of audio, and then transport at high speed and with minimal latency over a variety of existing networks or by using integrated Streambox Cloud Services.

Impact

- Performance requirements are met with superior quality, and support for a range of advanced formats and standards used in production.
- Achieving high rates of transport and playback with minimal end-to end latency even over public internet networks between locations that enables production transparency and helps reduce operating expenses.
- System grows with changing requirements by providing upgrade paths to add more functionality, and helps manage capital expenditures.
- Reliable network integration makes playing of live streams to and from remote locations easy and cost-effective.
- Robust security protects valuable content for payout on various software and hardware media players.
- Flexible connectivity enables one-to-one or one-to-many connections with Streambox Cloud Services via public and private networks for simple operations.



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Features



ACT-L3/L5 Codec for Superior Video Quality and Delivery

- High quality, 12-bit* RGB 4:4:4, or 8/10-bit 4:2:2 video over public and private IP networks
- Low Delay Multi-path Protocol (LDMP) reliable video transport
- 0.5 to 2 second end-to-end latency over IP networks
- Scalable bitrates from 2 up to 120 Mbps with near lossless quality
- Adaptive bitrate encoding / decoding
- Streaming bitrates from 4 to 80 Mbps



Security for Protection of Content

- A protective shield around the transport of valuable media content
- One-to-one or on -to-many encrypted collaboration via private network or Streambox Cloud Services
- Optimized ACT-L3/L5 codec adds security
- End-to-end AES 128-bit video encryption (optional)
- AES 256-bit encryption is available with added restrictions (optional)
- Encryption with no increase in stream latency
- Payout on software and hardware Media Players



Simplified Workflows and Payout

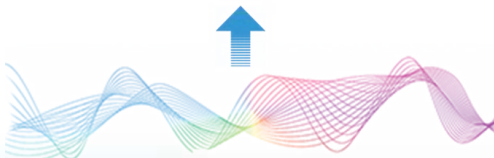
- Low Delay Multi-path Protocol (LDMP) reliable video transport
- Workflow support from capture to playback with either a hardware decoder or media player
- Integrates with Streambox Enterprise Server and Cloud Services for video routing of live streams
- Supports file-based streaming from Streambox Enterprise Server or Cloud Services to decoder or media player



Upgrade Options

- 4, 8-channel uncompressed PCM audio support
- AES 128-bit encryption
- 3G/6G/12G-SDI quad link I/O with 12-Bit, 4:4:4 RGB

* requires 12G-SDI option



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VIDEO INTERFACE

- Video IN/OUT: BNC 6G/3G/HD-SDI, 10-bit 4K, UHD, 2K or HD with up to 16-channel SDI audio
- 12G OPTION: Dual link BNC 12G/6G/3G/HD-SDI, 12/10-bit 4K, UHD, 2K or HD
- HDMI 2.0a with Rec.2020, HDR-10 Metadata support on decoder
- REFERENCE: BNC Tri-sync for 4K, UHD, or HD

VIDEO FORMATS

- 4K DCI (4096 x 2160) 23.98 and 24 fps
- UHD (3840 x 2160) 23.98, 24, 25, 29.97, 30 fps
- 2K DCI (2048x1080) for 23.98 and 24 fps
- 3D DCI 2K/1080p 23.98p, 23.98psf, 24p fps option
- 1080 (1920x1080) 23.98p, 23.98p, 24p, 24psf, 25, 29.97, 30 fps
- 720p (1280x720) 50, 60 fps
- UHD and 1080p 50, 59.94 and 60 option
- SD NTSC and PAL

ENCRYPTION

- AES 128-bit encryption with symmetric key option
- AES 192-bit and AES 256-bit options available as a restricted option
- HTTPS option for web control available

PHYSICAL

- Size: 1 Rack Unit: W48.2cm x D28.2cm x H44.0cm (19in x 11in x 1.7in)
- Weight: 4.7kg (10.5lbs)
- Power: 100-240 VAC, 160 W

OPERATING SYSTEM

- Linux

VIDEO TRANSPORT

- Streambox LDMP 2.0 with network bonding
- UDP unicast, broadcast or multicast
- Adjustable Forward Error Correction
- Embedded Metadata
- Compatible with Streambox Cloud and Enterprise Servers

COMPRESSION

- Bitrate: 2 to 120 Mbps
- Color: RGB, YUV 4:4:4* in 4K, UHD, 2K modes, 4:2:2 and 4:2:0 in all modes
- Bit Depth: 12*, 10, 8
- Audio Codec: 8-ch PCM and AAC, CELP, GSM frequency up to 48 KHz expandable up to 16-ch

* requires 12G-SDI option

MANAGEMENT CONTROL

- Web UI for secure local or remote access
- Customizable presets
- Live Video preview via Web UI
- Front LCD with keypad
- USB and video ports

POST PROCESSING

- Advanced post filtering

NETWORK INTERFACES

- Two Ethernet ports RJ45: 1G/100M/10M