

Streambox[®] Chroma[™] X

Chroma X Solutions Brief

Executive Summary

Designed for Contribution, Production, and Collaboration, Chroma X advanced performance compact encoder/decoder provides near lossless video quality, and secure, real-time, remote, collaborative workflows. Chroma X supports HD resolutions, along with High Dynamic Range color standards to create streaming content for broadcasting, enterprises, and post production by providing low latency video in HD formats over public and private IP networks.



The software-defined Streambox Chroma X Encoder / Decoder is an economical palm size device, providing minimal latency, and integrated reliable LDMP media transport technology that simplifies streaming workflows over Internet and MPLS networks. Chroma provides high-quality, superb color, low-bandwidth video that can be seamlessly transported where mission critical media is required. Real-time transport assures an efficient solution for feature editors to stream into the cloud where producers and directors can perform live review sessions, commercial advertising producers can implement review and edit meetings, and broadcasters can set up video contribution between locations and network centers.

Overview

Chroma X is a software defined encoder and decoder packaged as a small form factor device made available as a Hardware as a Service (HaaS) or Infrastructure as a Service (IaaS) offering. The Chroma X device is based on an Intel NUC computer with an i5 processor using the same Linux software base as Chroma rackmount systems.

Two HD 1080p Chroma X device packages are available with a 12 month rental. The Standard Package provides 4:2:2 HDR 10-bit video and 8 channel audio. The Premium Package provides 4:4:4 RGB HDR 12-bit video, and 16 channel audio.

Streambox Chroma X systems provide simplified workflows with real-time transport and creation of HD content even with HDR for broadcasters, enterprise organizations, and post-production professionals. In addition to high quality contribution, the minimal latency characteristics of the system offers reliable media streaming and collaboration over different types of IP networks.

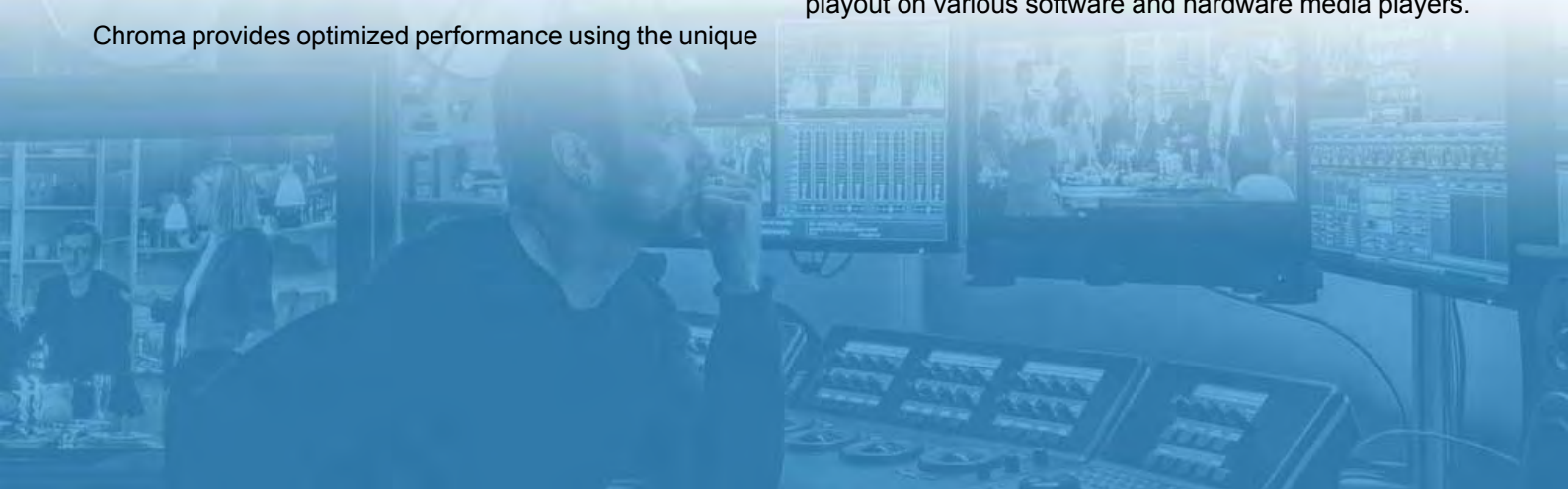
Chroma provides optimized performance using the unique

Advanced Compression Technology Level 3 and Level 5 (ACT L3/L5) profile codec that can support the most advanced color profiles, color spaces, and color depths, along with up to 16 channels of 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 Chroma X, 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.



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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 Playout Management with a Streambox Media Player License Included
- **Secure**
End to End Content Security with Encryption
- **Production Transparency**
Low Latency, Real-Time Communications and Collaboration
- **High Quality, Color Accurate Video**
Limited quality color for post-production with support for HDR and 10-bit YCrCb/ RGB
- **No CapEX Investment**
Rent hardware only, or hardware with Cloud Services bandwidth, with no long term capital outlay required

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 10-bit 4:2:2 RGB/XYZ color video in HD formats has to be accessible over standard public IP networks, which is achieved with Chroma and can include Streambox Cloud Services transport. Chroma X will also down-convert 2K DCI.

Agencies

Advertising and Creative agencies that are geographically dispersed have the need to collaboratively review work in progress and finished content with clients who are located remotely. Content transferred to a Chroma encoder can be streamed to multiple locations for real-time sharing.

Live Event Contribution and Distribution

Broadcasters and content providers need to capture and preserve the highest possible quality video when acquiring content from news, sports, and other live events. The Streambox Chroma X compact encoder / decoder device is ideal for IP-based, HD with HDR support video contribution from studios, bureaus, and affiliates over low cost Internet networks. Users can stream secure live media from the field locations to multiple destinations with automated routing.



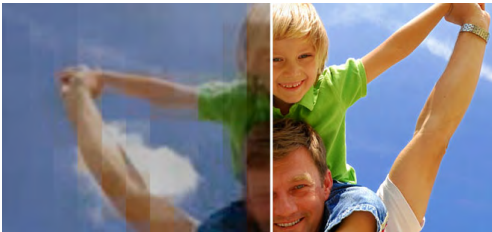
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Impact

- 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 helps reduce operating expenses.
- Reliable network integration makes playing of live streams to and from remote locations easy and cost-effective.
- Robust security protects valuable content for playout on various software and hardware media players.
- Flexible connectivity enables one-to-one or one-to-many connections or with Streambox Cloud Services via public and private networks for simple operations.

Features



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

- High-quality, up to 10-bit 4:2:2 and 12-bit 4:4:4 video with support for HDR 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 0.5 up to 80 Mbps with near lossless quality
- Adaptive bitrate encoding / decoding
- Streaming bitrates from 4 to 80 Mbps
- Conversion of 2K DCI to HD



Security for Protection of Content

- A protective shield around the transport of valuable media content
- One-to-one or one-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 with no increase in stream latency
- Playout on software and hardware Media Players



Simplified Workflows and Playout

- Low Delay Multi-path Protocol (LDMP) reliable video transport
- Workflow support from capture to playback with either a hardware decoder or media player
- Integration with Streambox Cloud Services that includes a set amount of data for video routing of live streams
- Supports file-based streaming from Streambox Enterprise Server or Cloud Services to decoder or media player
- Direct Point-to-Point and Point-to-Multi-Point connectivity
- Stream high quality live video over Internet connections and MPLS networks
- Support for video annotation to help keep track of versions and revisions during review processes



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VIDEO INTERFACE

- Video IN/OUT: BNC 6G HD-SDI, 10-bit HD with embedded 8 channel SDI audio operating as either encoder or decoder
- REFERENCE: BNC Tri-sync for HD

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

VIDEO FORMATS

- HD: 1920x1080p, 1920x1080PsF, 1920x1080i, 1440x1080i, 1280x1080i, 960x1080i, 1280x720p, 960x720p, 800x720p, 640x720p

COMPRESSION

- Audio Codec: 8-ch PCM and AAC, CELP, GSM frequency up to 48 KHz
- Bitrate: 2 to 120 Mbps
- Color: YCrCb and RGB/XYZ 4:2:2 and 4:2:0 in all modes and also 4:4:4 in all modes for Premium model
- Bit Depth: 10, 8 and also 12-bit for Premium model

ENCRYPTION

- AES 128-bit encryption with symmetric key

MANAGEMENT CONTROL

- Web UI for secure local or remote access
- Color LCD with joystick for preview, remote control opera

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

POST PROCESSING

- Advanced post filtering

OPERATING SYSTEM

- Linux

NETWORK INTERFACES

- Ethernet RJ45: 1G/100M/10M
- WiFi 2.4GB, 5GB IEEE802.11/a, b, g, n, ac; 2 internal antennas



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