Executive Summary

Designed for Playout and Production, the Chroma multi-channel advanced performance decoder provides near lossless video quality, multi-sync audio, and secure, real-time, remote, collaborative workflows. Chroma supports HD resolutions, along with High Dynamic Range color standards to play streaming content for broadcasting, and enterprise organizations by providing low latency video in HD formats over public and private IP networks.

The software-defined Streambox Chroma multi-channel HD decoder rackmount with its modular design offers flexibility, 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 with audio that can be seamlessly played out where mission critical media is required. Real-time transport assures an efficient solution for video playout, multi-location video distribution, and remote offline and online editorial collaboration.

Overview

Streambox multi-channel decoder systems provide simplified workflows with real-time playback and transport of HD content even with HDR for broadcasters and enterprise organizations. In addition to high quality playout, the minimal latency characteristics of the system offers reliable media streaming over different types of IP networks.

The Chroma multi-channel decoder is a specially packaged version of the Chroma HD system that includes a Quad Link I/O that enables up to 4 HD simultaneous decodes.

The 8, or optionally 16, channels of audio per video channel are configurable to play out all channels synchronized to a single video channel from content created for applications such as multi-camera broadcasts.

Chroma provides optimized performance using the unique 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 from Chroma encoders, Streambox mobile encoders, and Streambox software encoders for real-time collaboration, as well as sending from Enterprise Server and Streambox Cloud Services for playing of live streams 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 when playing out media.
Benefits

- **Audio Synchronization**
  Play content with all audio channels synchronized to a single master video channel
- **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
- **Secure**
  End to End Content Security with Encryption
- **Production Transparency**
  Low Latency, Real-Time Communications and Collaboration

Challenges

**Live Event Playback**
Broadcasters and content providers need to play back with the highest possible quality video when showing content from news, sports, and other live events. The Streambox Chroma multi-channel decoder is ideal for IP-based HD including HDR support video playback in studios, bureaus, and affiliates over low cost Internet networks. Users can stream secure live media from field locations with automated routing.

**Live News Production**
For critical application such as a live two-way interview, reliable performance is crucial. Chroma offers high quality HD video along with up to 16 channels of audio, coupled to robust, high speed transport 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 helps reduce operating expenses.
- Reliable network integration makes playing of live streams from remote locations easy and cost-effective.
- Robust security protects valuable content for playout.
- Flexible connectivity enables one-to-one or one-to-many connections with Streambox Cloud Services via public and private networks for simple operations.
Chroma Multi-Channel Decoder Solutions Brief

Features

ACT-L3/L5 Codec for Superior Video Quality and Delivery
- High-quality 8/10-bit 4:2:2 video over public and private IP networks with 12G-SDI input
- 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 decoding
- Streaming bitrates from 4 to 80 Mbps
- 8 or option for 16 channels of uncompressed audio

Security for Protection of Content
- A protective shield around the transport of valuable media content
- One-to-one or one-from-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

Simplified Workflows and Playout
- Low Delay Multi-path Protocol (LDMP) reliable video transport
- Integration with Streambox Enterprise Server and Cloud Services for video routing of live streams
- Supports file-based streaming from Streambox mobile encoders, software encoders, Enterprise Server or Cloud Services
- Stream high quality live video over Internet connections and MPLS networks

Upgrade Options
- AES 128-bit encryption
- 16 channels of audio per video channel
Chroma Multi-Channel Decoder Solutions Brief

**VIDEO INTERFACE**
- Video Out: 4 channel Quad Link SDI
- 10-bit HD with embedded 8 channel SDI audio
- Up to 4 channel decoder operation
- 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
- Bit Depth: 10, 8

**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

**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

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

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