XOS Advanced Media Processor
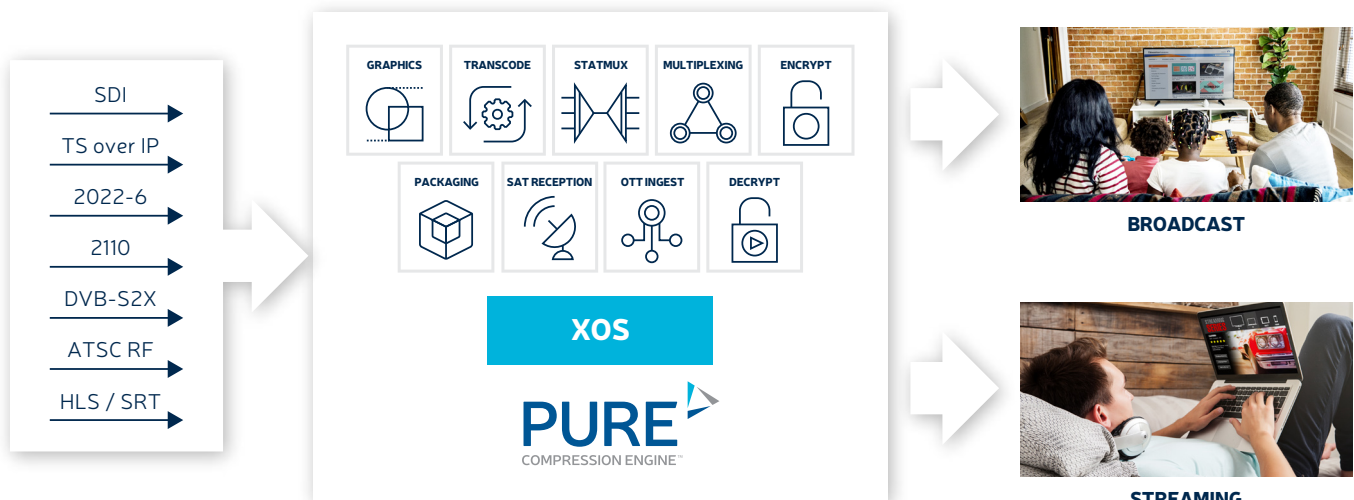
The XOS Advanced Media Processor is a high performance live media processor for broadcast and streaming applications.

Key Business Benefits

Application versatility

The XOS Advanced Media Processor is the latest generation of Harmonic software-based video appliances. XOS can be used for either broadcast or streaming applications, and is adapted to multiple deployment environments. Classic infrastructures are supported with SDI, ASI, and satellite RF interfaces. Full-IP architectures are also supported: XOS handles MPEG compressed formats, as well as the latest SMPTE ST 2022-6 and SMPTE ST 2110 standards.
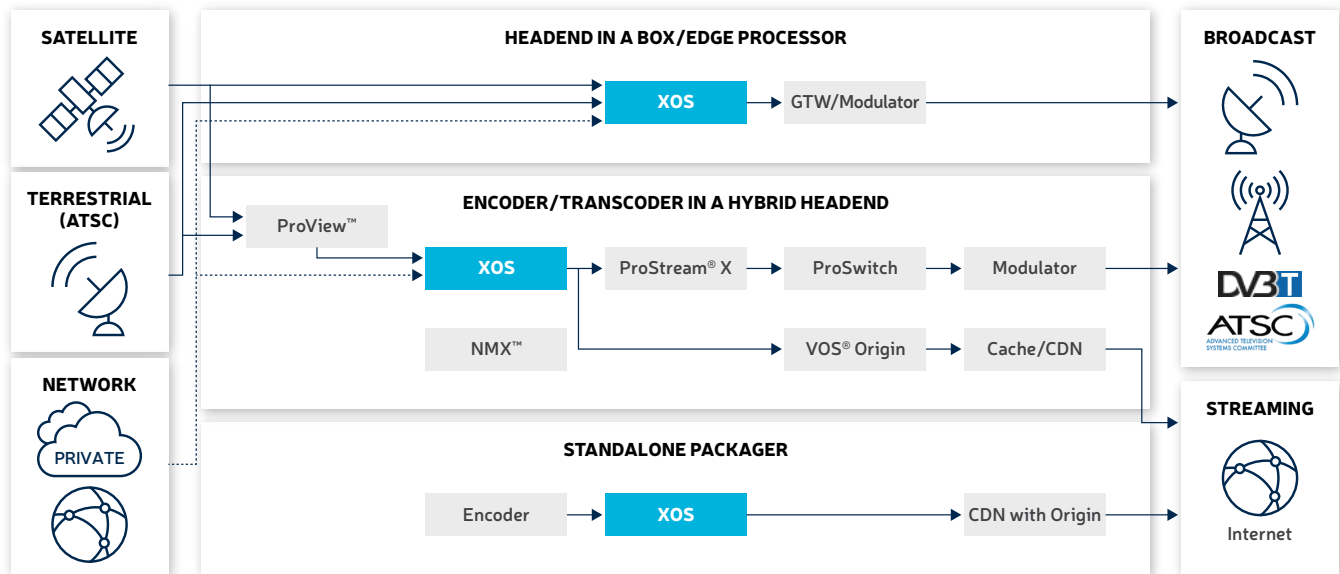

XOS Advanced Media Processor Inputs and Functionality

XOS is packed with features to address any kind of video processing application. In addition to its market-leading compression engine, XOS integrates a broad range of audio codecs, including Dolby AC-4, an advanced video pre-processing engine, a broadcast multiplexer with statmux support, and a state-of-the-art packager for streaming applications. From decoding to encoding, from HDR processing to audio loudness management, Harmonic has you covered.

Improved cost of ownership

XOS Advanced Media Processor's unparalleled function integration and performance dramatically reduce the number of appliances required for a given application, significantly improving your cost of ownership.

As a software solution, XOS is available as an appliance through the use of standard IT servers, as well as software-only Docker containers for virtualized deployments.

XOS Advanced Media Processor

SATELLITE

TERRESTRIAL (ATSC)

NETWORK
PRIVATE

HEADEND IN A BOX/EDGE PROCESSOR
XOS → GTW/Modulator

ENCODER/TRANSCODER IN A HYBRID HEADEND
ProView™
XOS → ProStream® X → ProSwitch → Modulator
NMX™ → VOS® Origin → Cache/CDN

STANDALONE PACKAGER
Encoder → XOS → CDN with Origin

BROADCAST

STREAMING
Internet

XOS Advanced Media Processor Workflow Examples

XOS can serve a wide range of applications and workflows with various computational needs. As such, XOS is offered pre-configured for multiple server platforms to ensure the right performance level at the right cost for your application.

Future-proof solution
The XOS Advanced Media Processor benefits from the latest microservices technology used in Harmonic Cloud and SaaS solutions.

XOS can be operated standalone thanks to its web-based user interface and it is also integrated into the Harmonic NMX™ Network Management System. In addition, XOS provides a feature-complete RESTful API, shared with other Harmonic Cloud and SaaS solutions, and enabling configuration, control, and monitoring from any external system. This greatly simplifies the implementation of hybrid systems where on-premise appliances are mixed with our Cloud solutions, resulting in maximum simplicity and flexibility.

Unique Features
Premium video compression
Powered by Harmonic PURE™ Compression Engine, the XOS Advanced Media Processor delivers excellent picture quality at any bitrate while optimizing CPU power consumption. XOS lowers video bitrates by using AI-based algorithms implemented for all video codecs including MPEG-2, AVC, and HEVC.

Flawless UHD
The XOS Advanced Media Processor supports multiple UHD 10-bit transcoding in a single 1-RU server. It also supports SD and HD encoding for multi-profile encoding applications. XOS performs statistical multiplexing for optimal bandwidth usage on cable, terrestrial, and satellite networks.

XOS simplifies conversions between SDR and different HDR formats and color spaces, including HDR10, HLG, BT.709, and BT.2020. It also feeds legacy networks requiring SDR from a HDR source. In addition, XOS maintains a constant output SDR/HDR format from sources with various dynamic ranges.

Innovative streaming
The XOS Advanced Media Processor uses EyeQ™ technology, which can reduce your streaming delivery costs by up to 50%, while improving viewer quality-of-experience. Harmonic EyeQ™ content-aware encoding is fully compatible with standard protocols and players. XOS simplifies streaming architectures with its built-in low-latency push packager that supports DASH and fragmented HLS, to reach standard broadcast latencies in streaming applications (CMAF).

Perfect Edge processor
With its numerous features and wide range of interfaces, the XOS Advanced Media Processor is the perfect choice for small Headends (where everything needs to be contained in a single box) and for Edge transcoding applications. The XOS Advanced Media Processor connects directly to both Cloud and Satellite networks.

XOS Advanced Media Processor

harmonic

SPECIFICATIONS

VIDEO INPUT/OUTPUTS

Live Inputs	SDI (SD/HD/3G, UHD as 4 quadrant or 2SI) MPEG-2 TS over IP HLS SRT SMPTE 2022-6 SMPTE 2110 DVB-S2X ATSC-1.0
Broadcast Live Outputs	MPEG-2 TS over IP (2022-7 compliant) ASI SRT MPTS and SPTS Standalone Statmux Remote Statmux with ProStream X/9000
Streaming Outputs	Synchronized ABR Encoding MPEG-2 TS over IP (ATS with EBP) Apple® HLS Microsoft Smooth Streaming (MSS) MPEG DASH RTMP/RTMPS

VIDEO PROCESSING

Features	Broadcast & Mobile/Web Encoding Content-aware Encoding with EyeQ™

Encoding Profiles

MPEG-2	MP@ML MP@HL
MPEG-4 AVC	BP@L3 MP@L3 HP@L4 High 4:2:2 @ L4.1
HEVC	Main@L5.1 (main tier) Main 10@ L5.1 (main tier)

Decoding Profiles

AVS+	HD
AVS2	UHD
MPEG-2	MP@ML MP@HL
MPEG-4 AVC	MP@L3 HP@L4 High 422@L4.1
HEVC	Main @L5.1 up to 100 Mbps Main 10 @L5.1 up to 100 Mbps
Sony LLVC	HD UHD

Resolutions and Frame Rates

Frame Rate Adjustment	Up to 3840x2160p @50/60 fps Up to 1920x1080i @25/30 fps 1-60 fps
Processing Capabilities	Picture Resizing (Up/Down) Smart De-interlacing Noise Reduction Logo, Slate and Graphics Overlays Crawl Text insertion ATSC Station ID logo management Video Watermarking Frame Rate Conversion PIP and 1-SEG encoding
HDR & WCG Capabilities	HDR: HDR10, HLG, Dolby Vision, HDR10+ WCG: BT.2020, BT.709, and BT.601 Tone Mapping (HDR10/HLG → SDR) Tone Expansion (SDR → HDR10/HLG) Dynamic HDR Metadata Generation BT-2408 support

AUDIO PROCESSING

Features	Any-to-Any Audio Transcoding Stereo and Multi-Channel Support Radio encoding
Encoding Profiles	MPEG-1 Layer II AAC-LC/HE-AAC v1/v2 AC-3 (Dolby Digital®) E-AC-3 (Dolby Digital Plus™) Dolby AC-4 Dolby ATMOS
Decoding Profiles	MPEG-1 Layer II AAC-LC/HE-AAC v1/v2 AC-3 E-AC-3 Dolby E with Auto Switch
Processing Capabilities	Automatic Loudness Control Audio Pass-Through Nielsen Audio Watermarking Resampling Stereo/Mono Conversion Surround Down Mixing Static Gain Adjustment Delay Adjustment

DATA FEATURES

VANC Processing	Teletext (OP-47/SMPTE-2031) CEA-608/708 DVB Subtitles (Pass-Through, Burn-in, from Teletext) DVB TTML ARIB SMPTE-2038 SCTE-35/SCTE-104 VITC WSS/AFD

PACKAGING FEATURES

Ad Insertion	Conversion to SCTE-35 Annotations
Audio, Data, and Video Selection	Exclusion of services per packaging technology
Segmented Media Formats	HLS-TS, CMAF, DASH, MSS
Protocols	WebDAV, HTTP Post, RTMP/RTMPS
Closed Captions and Subtitles	CEA-608/708 Passthrough CEA-608/708 to WebVTT (HLS, DASH) and TTML (HSS) Teletext or Cavena P31 to WebVTT (HLS, DASH) or TTML (HSS) DVB Subtitle Conversion to SMPTE-TT (OCR)
DRM	Multi-Key Encryption CPIX API ATSC 3.0 Compatible

MANAGEMENT

User Interfaces	Harmonic NMX™ Network Management System Standalone Web-based Interface
API	RESTful API shared with VOS® SNMP ESAM GuideBuilder API for PSIP injection EAS-NET for Emergency Alerts
In-band Control	From Input TS via DMS™ Management System
Redundancy	Unit Based 1+1 N+M

DEPLOYMENT OPTIONS

Appliances	1 RU server Dual hot swappable AC PSU. Various models depending on requested processing capacity: XOS Model Small, Medium, Large, Extra Large Input/outputs via optional cards: • Up to 24 SDI ports, • Up to 8 Gb Ethernet interfaces • Up to dual 10Gb/25Gb interfaces • Up to 8 DVB-S2X tuners • Up to 12 ATSC tuners • Up to 8 ASI ports
Software Applications	Compatible with COTS servers Available as bare metal, VM, and Docker containers