



4K UHD and HD Video Encoder for Low Latency, Broadcast Quality Streaming

Secure, low latency, broadcast quality video encoders for live sports and news, real-time corporate communications, and mission critical defense applications.

Haivision Makito X4 is a highly versatile real-time HEVC/H.265 and AVC/H.264 video encoder available as a compact standalone appliance or as a rack mountable blade. Designed for the most demanding live video applications, the Makito X4 can encode full 2160p50/60 4K UHD or 1080p50/60 HD video sources with 10-bit pixel depth, 4:2:2 chroma subsampling, as well as up to 16 channels of digital audio. Robust and reliable, the Makito X4 offers multiple powerful encoding cores that can securely deliver simultaneous low latency multi-bitrate streams over any network, including the public internet.

4K Broadcast Quality Video Encode live video in 4K UHD or HD, up to 60 frames per second, with excellent picture quality even at low bitrates. For workflows where color precision is needed, the Makito X4 offers 4:2:2 chroma subsampling to ensure that color fidelity can be maintained, and artefacts prevented, in downstream workflows.

High Dynamic Range In addition to SDR, 10-bit pixel depths, and wide color gamut support (WCG), the Makito X4 can also encode live content for HDR workflows with HLG or PQ (ST 2084) transfer functions.

Ultra-Low Latency Streaming Versatile dual encoding cores can encode and stream HEVC and H.264 with very low latency, which makes the Makito X4 ideally suited for interactive video applications such as field contribution, live interviews, return feed confidence monitoring as well as streaming synchronized camera feeds for remote productions.

High Density 4K HEVC Encoding Processing video from multiple cameras is challenging when physical space is limited. The Makito X4 is a compact, easily portable 4K-capable appliance making it perfect to deploy in remote locations and on mobile platforms. When used in conjunction with Haivision rack-mountable enclosures, the Makito X4 offers the highest 4K channel density available, giving facilities up to 21 UHD video sources within a single 4RU rack module.

Flexible and Future Proof The Makito X4 video encoder addresses a wide range of live production applications today and tomorrow, including 4K, HDR and SMPTE ST 2110 with NMOS support, ensuring that your production workflows address today's critical needs, and are flexible enough to adapt to your future infrastructure requirements.

Secure Content, Reliable Streaming The Makito X4 can encrypt video streams with up to 256-bit AES key lengths using the SRT protocol, which is critical when sharing valuable content over the internet. Moreover, it features a secure operating system, dual network interfaces to separate streaming from management, and support for IPv6. Built with reliability at the core, the Makito X4 provides continuous streaming, even when network conditions are unpredictable, by adapting to fluctuating network bandwidth in real-time, limiting packet loss and ensuring uninterrupted pristine-quality video.

FEATURES

BENEFITS

4K UHD video

Capture and deliver pristine 4K video with rich colors and smooth motion for HDR workflows, so your audience sees every detail exactly as intended.

Ultra-low latency

Extremely low latency encoding and streaming enabling interactivity for live bi-directional interviews and field contribution.

Flexible configuration for evolving standards

The versatile, future-proof Makito X4 enables smooth migration from HD to 4K, SDR to HDR, and SDI to SMPTE ST 2110.

Secure, encrypted video

Protect valuable video content with SRT and AES-128/256 encryption, a secure operating system, dual network interfaces, and support for IPv6.

SRT protocol for reliable transport

Deliver live streams to decoders and cloud-based workflows without packet loss over unpredictable networks including the internet.

VIDEO INTERFACES

Standard Single BNC Input
 SD-SDI SMPTE 259M-C
 HD-SDI SMPTE 292-1
 SMPTE 274M
 SMPTE 296
 3G-SDI SMPTE 424
 SMPTE 425-1 Level A
 6G-SDI SMPTE 2081
 12G-SDI SMPTE 2082
 SMPTE ST 2110 (with 10G SFP+ transceiver)

VIDEO RESOLUTIONS

3840x2160p 60/59.94/50/30/29.97/25/24/23.98 Hz*
 1920x1080p 60/59.94/50/30/29.97/25/24/23.98 Hz
 1920x1080i 60/59.94/50 Hz**
 1280x720p 60/59.94/50/30/29.97/25 Hz
 720x480/576i 60/59.94/50 Hz**

VIDEO ENCODING

8-bit or 10-bit pixel depth
 Chroma sub-sampling 4:2:0 or 4:2:2
 BT.709 color space and WCG (BT.2020)
 SDR and HDR - HLG or PQ (ST 2084)
 Configurable Group of Picture (GOP) size
 I, IP, IBP, IBBP, IBBBBP, IBBBBP Framing
 Bitrates from 32 Kbps to 120 Mbps***
 Configurable frame rate
 Intra-refresh
 Slice-based video capture and encoding
 Scene-Change Detection

H.264/AVC Profiles:

MPEG-4 AVC part 10 / ISO/IEC 14496-10
 Baseline, Main, High, High 10 and High 4:2:2
 Profiles up to Level 5.2

H.265/HEVC Profiles:

ISO/IEC 23008-2
 Main, Main 10, Main 4:2:2 Profiles up to Level 5.1

AUDIO INTERFACES

Embedded Audio:
 SD-SDI SMPTE 272M
 HD/3D-SDI SMPTE 299

AUDIO ENCODING

Compression Standard:
 SMPTE 302M Uncompressed LPCM Pass-Through
 AC3/E-AC3 Dolby Pass-Through
 MPEG-2 AAC-LC ISO/IEC 13818-7
 MPEG-4 AAC-LC ISO/IEC 14496-3
Audio Channels:
 16 embedded audio sources
 Surround audio grouping up to 7.1
Bit Rates:
 From 14 to 576 kbps per audio pair***
Frequency Response:
 From 20 Hz to 22 kHz

METADATA

Input Metadata:
 CoT to KLV conversion
 KLV or CoT over UDP
 KLV over SDI
 SMPTE 336 compliant
 MISB 0601.10 compliant
 MISB 0604.2 compliant
 MISB 0605 compliant
 SMPTE 352 payload ID (HDR)
 SMPTE 12 timecode
 SMPTE 334 closed captioning
 SCTE 104 insertion markers
Output Metadata:
 EIA/CEA/CTA-608/708 CC pass-through
 Asynchronous & synchronous modes
 as per MISB 0604.2
 High precision timecode insertion
 as per MISB 0604.2
 KLV Metadata Processing
 SCTE 35 insertion markers

NETWORKING

Interfaces:
 1x RJ45 Ethernet 10/100/1000 Mbps
 1x SFP+ port for MSA compliant transceiver
Streaming Protocols:
 MPEG-TS over UDP
 MPEG-TS over RTP
 Secure Reliable Transport (SRT)
 RTSP/RTP
 WebRTC-HTTP Ingestion Protocol (WHIP)
 Unicast streaming
 Multicast streaming (IGMPv3)
 Multiple unicast streaming
Advanced Streaming Features:
 AES encryption 128-bit or 256-bit
 SRT Latency Control
 Forward Error Correction (FEC)
 Both IPv4 and IPv6 Support
 Dynamic Bitrate
Management:
 HTTPS (web browser)
 REST API
 Haivision EMS and Haivision Hub 360
 Command line over SSH/Telnet
 SFTP/TFTP/SCP
 SNMPv3
 ONVIF
 NMOS (IS-04, IS-05, IS-09)

SIZE, WEIGHT, POWER

(single height appliance)

Dimensions:

24mm H x 152mm W x 192mm D
 0.94" H x 5.98" W x 7.56" D

Weight:

1.08 kg (2.37 lbs)

Power:

12 VDC Nominal, 18W

Temperature:

Operating: 0° to 40°C (32° to 104°F)
 Non-operating: -30° to 70°C (-22° to 158°F)
 Humidity: 0-95% non-condensing

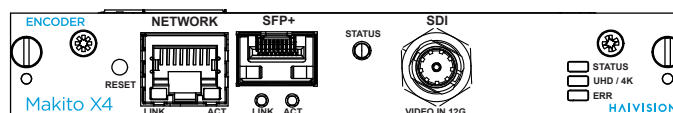
Compatible with Haivision MB6x and MB21x multi-blade chassis.

Software Version: 1.9

* SMPTE ST 2110 input up to 2160p30

** Interlaced video encoding shown in fields per second and supported in HEVC only

*** Max bitrate depends on configuration



Makito X4 Single-Channel Encoder

Makito X4 Encoder Product Portfolio & Ordering **

Makito X4 Single Encoder Blade - UHD	B-MX4E-SDI1-UHD	Makito X4 SDI Encoder Blade - H.264/AVC & H.265/HEVC IP Video Encoder - Single channel 12G/3G/HD/SD-SDI with UHD & ST 2110
Makito X4 Single Encoder Appliance - UHD	S-MX4E-SDI1-UHD	Makito X4 SDI Encoder Appliance - H.264/AVC & H.265/HEVC IP Video Encoder - Single channel 12G/3G/HD/SD-SDI with UHD & ST 2110
Makito X4 KLV and CoT Metadata	SWO-MX4-KLVCOT	Support KLV and CoT metadata - software license
Makito X4 HDR License	SWO-MX4-HDR	Support HLG and PQ (ST 2084) transfer function - software license

** For complete pricing and ordering, contact us at sales@haivision.com or your certified Haivision reseller.

DoDIN APL Certified:

Makito X4 Encoder is on the Department of Defense Information Network Approved Product List (DODIN APL) under tracking number 2118301.