



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

Secure, low-latency, broadcast quality video encoders for live sports and news broadcasters, corporate video producers, and mission critical ISR deployments.

**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 rackmountable blade. Designed for the most demanding live video applications, the Makito X4 can ingest up to four 1080p50/60 HD inputs or a full 2160p50/60 4K UHD video source with 10-bit pixel depth, 4:2:2 chroma subsampling, as well as up to 32 channels of digital audio. Robust and reliable, the Makito X4 offers 8 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 HD or 4K for streaming over IP networks. Whether encoding with 8- or 10-bit pixel depth, the Makito X4 delivers excellent picture quality, even at low bitrates, making it ideal for a broad range of live video applications. 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.

**Ultra Low Latency Streaming** Up to 8 encoding cores can encode and stream HEVC and H.264 video 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 HEVC Encoding** Processing video from multiple cameras is challenging when physical space is limited. The Makito X4 is a compact, easily portable 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 channel density available, giving facilities up to 84 HD or 21 UHD video sources within a single 4RU rack module.

**Flexible and Future Proof** With a powerful encoding engine built on top of a programmable platform, the Makito X4 addresses a wide range of live video applications today and tomorrow, including 4K and IP-based production workflows, ensuring that your encoding workflows address today's critical needs, and are flexible enough to adapt to your future infrastructure requirements.

**Secure Content Encryption, 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, to ensure reliable and continuous streaming, even when network conditions are unpredictable, the Makito X4 Encoder adapts to fluctuating network bandwidth in real-time, limiting packet loss and ensuring uninterrupted high-quality video.

### FEATURES

### BENEFITS

#### 4K UHD Video

Efficient real-time HEVC/H.265 and H.264/AVC video encoding up to 3840x2160p 50/60 with 4:2:2 pixel depth and 10-bit pixel depth for impeccable picture quality.

#### Ultra Low Latency

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

#### High-Density Form Factor

4 inputs per appliance/blade, up to 84 inputs and 168 encoding cores per 4RU rack ideal for constrained spaces and high-density environments where Size, Weight and Power considerations are critical.

#### Flexible and Future Proof

The versatility of the Makito X4 enables future migration from HD to 4K and SDI to IP video workflows.

#### Secure, Encrypted Video

Protect valuable video content with SRT and AES-128/256 encryption.

#### SRT Protocol for Reliable Streaming

Deliver live streams without packet loss over fluctuating bandwidth networks including the internet.

**MAKITO X4 ENCODER SPECIFICATIONS**

**VIDEO INTERFACES**

(Quad BNC Inputs)

- SD-SDI SMPTE 259M-C
- HD-SDI SMPTE 292M
- SMPTE 274M
- SMPTE 296M
- 3G-SDI SMPTE 424M (Level A Only)
- SMPTE 425M
- 6G-SDI SMPTE 2081 (1 input only)
- 12G-SDI SMPTE 2082 (1 input only)

**VIDEO RESOLUTIONS**

- 3840x2160p 60/59.94/50/30/29.97/25 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
- (interlaced shown in fields per second)

**H.264/AVC VIDEO ENCODING**

- MPEG-4 AVC part 10 / ISO/IEC 14496-10
- Baseline, Main, and High Profiles up to Level 5.2 (1080p60) and lower intermediate levels
- I, IP, IBP, IBBP Framing
- 8-bit or 10-bit pixel depth
- Chroma sub-sampling 4:2:0 or 4:2:2
- Bitrates from 32 kbps to 30 Mbps

**H.265/HEVC VIDEO ENCODING**

- ISO/IEC 23008-2
- IP Framing
- Main Profile Up to Level 5.1
- 8-bit or 10-bit pixel depth
- Chroma sub-sampling 4:2:0 or 4:2:2
- Bitrates from 32 kbps to 30 Mbps

**VIDEO ENCODING**

- Configurable Group of Picture (GOP) size
- Configurable frame rate

**AUDIO INTERFACES**

Embedded Audio:

- SD-SDI SMPTE 272M HD/3D-SDI SMPTE 299M
- AUDIO ENCODING
- Compression Standard:
- MPEG-2 AAC-LC ISO/IEC 13818-7
- MPEG-4 AAC-LC ISO/IEC 14496-3

Audio Channels:

- 32 (16 stereo pairs) embedded (SDI) audio inputs

Bit Rates:

- From 56 to 320 kbps per audio pair
- Frequency Response:
- From 20 Hz to 22 kHz

**ISR METADATA (OPTIONAL)**

Input Metadata:

- CoT to KLV conversion
- KLV or CoT over UDP
- KLV over SDI (SMPTE 336)
- SMPTE 336M compliant
- MISB 0601.10 compliant
- MISB 0604.2 compliant

Output Metadata:

- Asynchronous & synchronous modes as per MISB 0604.2
- High precision timecode insertion as per MISB 0604.2
- KLV Metadata Processing (SMPTE 336, MISB 0601, 0102 and 0605 support)
- Time Code Support (SMPTE 12M)
- Closed Captioning (SMPTE 334-1/2)

**STANDARD COMPLIANCE**

- STANAG 4609

**IP NETWORK INTERFACES**

Standard:

- Single Ethernet 10/100/1000
- Base-T, auto-detect, Half/Full-duplex
- Unicast streaming IPv4/IPv6
- Multicast streaming (IGMPv3 & IPv6)
- Multiple unicast streaming
- 10G SFP Port (future use)

H.264 Streaming Protocols:

- MPEG Transport Stream
- Secure Reliable Transport (SRT)
- TS over SRT, UDP or RTP

HEVC Streaming Protocols:

- MPEG Transport Stream
- Secure Reliable Transport (SRT)
- TS over SRT, UDP or RTP

**MANAGEMENT INTERFACES**

IP/Ethernet (IPv4 and IPv6)

Management:

- HTTPS (web browser)
- Command line over SSH/Telnet
- SFTP/TFTP/SCP
- SNMP v3

**SIZE, WEIGHT, POWER**

(single height appliance)

Dimensions:

- 21mm H x 129mm W x 196mm D
- (0.83" H x 5.1" W x 7.7" D)

Weight:

- 1.14 kg (2.55 lbs)

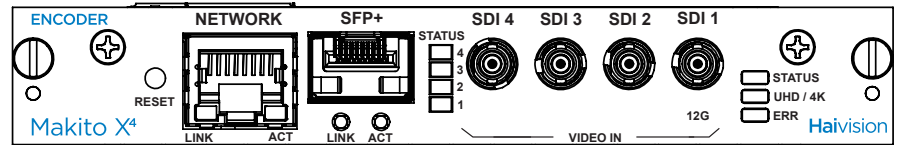
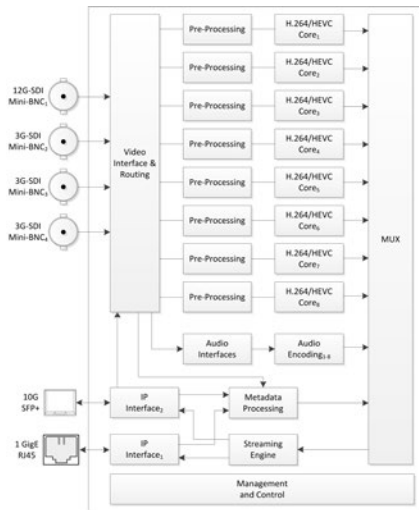
Power:

- 12 VDC Nominal, 18W

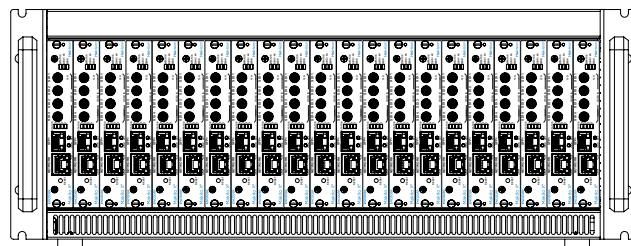
Temperature:

- 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.



Makito X4 Encoder



Compatible with Haivision MB21x multi-blade chassis

**Makito X4 Product Portfolio & Ordering Information \*\***

Makito X4 Blade	<b>B-MX4E-SDI4</b>	Makito X4 SDI Encoder Blade - H.264/AVC & H.265/HEVC IP Video Encoder - Quad channel 3G/HD/SD-SDI
Makito X4 Appliance	<b>S-MX4E-SDI4</b>	Makito X4 SDI Encoder Appliance - H.264/AVC & H.265/HEVC IP Video Encoder - Quad channel 3G/HD/SD-SDI

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