



Haivision

Makito X4 Series

Makito X4 solutions from Haivision provide the following:

- Real-time video encoding, streaming and decoding
- Up to 4K UHD video resolutions
- Quad HD video encoding and decoding with stream synchronization
- 4:2:2 chroma subsampling and 10-bit pixel depths
- 12G-SDI, 6G-SDI, 3G-SDI and HD-SDI inputs and outputs
- Native support for SRT streaming
- Rack-mounting in high density 1RU or 4RU chassis for up to 84 HD/21 UHD channels
- Compact, ruggedized and fanless options

	Makito Encoders			Makito Decoders
	X1 Rugged	X4	X4 Rugged	X4
CHANNELS				
SD/HD	1	4	4	4
4K UHD		1	1	1
VIDEO INPUTS & OUTPUTS				
	ENCODER INPUTS		DECODER OUTPUTS	
ANALOG				
Composite NTSC/PAL/PAL-M	•		•	
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		•	•	•
12G-SDI				
SMPTE 2082		•	•	•
UHD/4X3G-SDI				
SMPTE 425-5 (2SI)		•	•	•
VIDEO RESOLUTIONS				
4K UHD				
3840x2160p 60/59.94/50 Hz		•	•	•
3840x2160p 30/29.97/25/24/23.98 Hz		•	•	•
HD 1080				
1920x1080p 60/59.94/50 Hz	•	•	•	•
1920x1080p 30/29.97/25/24/23.98 Hz	•	•	•	•
1920x1080i 60/59.94/50 Hz	*	*	*	*
HD 720				
1280x720p 60/59.94/50 Hz	•	•	•	•
1280x720p 30/29.97/25 Hz	•	•	•	•
SD				
720x480i 60/59.94 Hz	*	*	*	*
720x576i 50 Hz	*	*	*	*

* HEVC only.

	Makito Encoders			Makito Decoders
	X1 Rugged	X4	X4 Rugged	X4
VIDEO ENCODING				
VIDEO COMPRESSION				
H.265/HEVC (ISO/IEC 23008-2)	•	•	•	•
H.264 (MPEG-4 AVC part 10 / ISO/IEC 14496-10)	•	•	•	•
High Profiles		•	•	•
Baseline & Main Profiles	•	•	•	•
Up to Level 5.2 (UHD) and lower intermediate levels		•	•	•
Up to Level 4.2 and lower intermediate levels	•	•	•	•
Up to Level 4 (1080p60) (HEVC)	•	•	•	•
8-bit pixel depth	•	•	•	•
10-bit pixel depth		•	•	•
4:2:0 chroma sub-sampling	•	•	•	•
4:2:2 chroma sub-sampling		•	•	•
I, IP, IBP, IBBP framing	•	•	•	•
IBBBP, IBBBBP framing		•	•	•
Configurable Group of Picture (GOP) size	•	•	•	
Configurable frame rate	•	•	•	•
Bit Rates (SD/HD) H.264	32 kbps - 15 Mbps	32 kbps -30 Mbps	32 kbps -30 Mbps	
Bit Rates (SD/HD) HEVC	32 kbps - 15 Mbps	32 kbps - 60 Mbps	32 kbps - 60 Mbps	
Rate Control	CBR/VBR	CBR/VBR	CBR/VBR	
Encoder Latency	<55ms H.264, <45ms HEVC	<55ms H.264, <45ms HEVC	<55ms H.264, <45ms HEVC	
AUDIO I/O				
EMBEDDED AUDIO				
SD-SDI SMPTE 272M	•	•	•	•
HD/3G-SDI SMPTE 299M	•	•	•	•
AUDIO ENCODING/ DECODING				
COMPRESSION STANDARD:				
MPEG-2 AAC-LC ISO/IEC 13818-7	•	•	•	•
MPEG-4 AAC-LC ISO/IEC 14496-3	•	•	•	•
AUDIO CHANNELS:				
32 embedded audio per blade		•	•	•
8 embedded audio per blade	•	•	•	•
BIT RATES:				
From 56 to 320 kbps per audio pair	•	•	•	
FREQUENCY RESPONSE:				
From 20 Hz to 22 kHz	•	•	•	•

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	X1 Rugged	X4	X4 Rugged	X4
METADATA (OPTIONAL)				
INPUT METADATA				
KLV over SD-SDI/HD-SDI/3G-SDI	•	•	•	•
KLV or CoT over serial RS-232/422	•		•	
KLV or CoT over UDP/IP	•	•	•	
METADATA PROCESSING				
CoT to KLV conversion	•	•	•	
CoT Relay	•	•	•	
Insertion and KLV edits	•	•	•	
CC 608/708 pass-through	•	•	•	•
SMPTE 336M compliant	•	•	•	•
MISB 0601.14 compliant	•	•	•	•
MISB 0604.2 compliant	•	•	•	•
Asynchronous & synchronous modes as per MISB 0604.2	•	•	•	•
High precision timecode insertion as per MISB 0604.2	•	•	•	•
IP NETWORK INTERFACES				
STANDARD				
Ethernet 10/100/1000 Base-T,auto-detect, Half/Full-duplex	•	•	•	•
Static IPv4/IPv6/DHCPv4/v6	•	•	•	•
Unicast streaming	•	•	•	•
Multicast streaming	•	•	•	•
Multiple unicast streaming	•	•	•	•
Path Redundancy - SRT across multiple networks		•	•	
STREAMING PROTOCOLS				
MPEG Transport Streamover UDP / RTP	•	•	•	•
SAP (RFC 2974)				
Secure Reliable Transport (SRT)	•	•	•	•
RTSP (For specified devices)	•			
Network Connector RJ45		•		•
MANAGEMENT INTERFACES				
STANDARD				
RS-232 Serial Interface	•		•	
Ethernet	•	•	•	•
MANAGEMENT				
HTTPS (web browser)	•	•	•	•
Command line over SSH/Telnet/RS-232	•	•	•	•
SFTP/TFTP/SCP	•	•	•	•
SNMP v3	•	•	•	•
Haivision EMS	•	•	•	•
ONVIF API	•	•	•	

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	X1 Rugged	X4	X4 Rugged	X4
ADVANCED FEATURES				
Network Adaptive Encoding	•	•	•	
Multi-bitrate (MBR) streaming	•	•	•	
HD/SD de-interlacing	•	•	•	
Image Scaling	•	•	•	
EIA-608-B/NTSC Line 21 closed captioning	•		•	
EIA-708-B/SDI closed captioning	•	•	•	•
Forward Error Correction (FEC)	•	•	•	•
AES encryption 128-bit or 256-bit with SRT	•	•	•	•
Aspect ratio configuration	•	•	•	
Active Format Description (AFD)	•	•	•	•
Wide Screen Signaling (WSS)	•		•	
Timecode (ATC_VITC)	•	•	•	•
Image Cropping	•	•	•	
Image Filtering	•	•	•	
Bi-directional serial passthrough	•		•	
Advanced Buffering Control				•
Still Image Insertion				•
Synchronized playback between decoders				•

Software Version

Makito X1 Rugged Encoder: **1.0**

Makito X4 Encoder: **1.2**

Makito X4 Rugged Encoder: **1.2**

Makito X4 Decoder: **1.1**

	Makito Encoders			Makito Decoders
	X1 Rugged	X4	X4 Rugged	X4
DIMENSIONS (HXWXD)				
Millimeters	30.5mm H x 72.5mm W x 90.2mm D	21mm H x 129mm W x 196mm D	68mm H x 146.2mm W x 185.7mm D	21mm H x 129mm W x 196mm D
Inches	1.20" x 2.85"W x 3.55" D	0.83x5.1x7.7	2.675" H x 5.755" W x 7.31" D	0.83" H x 5.1" W x 7.7" D
WEIGHT				
kg	0.372	1.14	1.93	1.14
lbs	0.82	2.55	4.25	2.55
POWER				
Blade/Appliance	5VDC; 6W at 70°C, 5W at 40°C	12VDC, 18W	28VDC Nominal	12VDC, 18W
APPLIANCE TEMPERATURE				
Operating (°C)	-40°C to 70°C	0°C to 40°C	-40°C to 70°C	0°C to 40°C
Non-operating (°C)	-45°C to 85°C	-30°C to 70°C	-45°C to 85°C	-30°C to 70°C
Operating (°F)	-25°F to 160°F	32°F to 104°F	-25°F to 160°F	32°F to 104°F
Non-operating (°F)	-49°F to 185°F	-22°F to 158°F	-49°F to 185°F	-22°F to 158°F
HUMIDITY				
%	up to 100% condensing	up to 95% non-condensing	up to 100% condensing	up to 95% non-condensing

Rackmount Chassis

	6 Blade			21 Blade
	F-MB6X-RAC	F-MB6X-DC	F-MB6X-MED	F-MB21X-R
DIMENSIONS (H X W X D)				
Rackmount Units	19" 1RU	19" 1RU	19" 1RU	19" 4RU
Millimeters	44.07x 440.004 x 420.4	44.07x 440.004 x 420.4	44.07x 440.004 x 420.4	177.29 x 441.35 x 461.92
Inches	1.735 x 17.323 x 16.55	1.735 x 17.323 x 16.55	1.735 x 17.323 x 16.55	6.980 x 17.376 x 18.186
WEIGHT - EMPTY CHASSIS				
kg	7.94	7.94	7.94	14.52
lbs	17.5	17.5	17.5	32
POWER				
Internal Power Supply	90-264 VAC 47Hz-63Hz 300 Watt max	20-36 VDC 300 Watt max	90-264 VAC 47Hz-63Hz 300 Watt max	100-240 VAC 47Hz-63Hz 600 Watt max
APPLIANCE TEMPERATURE				
Operating (°C)	0°C to 50°C	0°C to 50°C	0°C to 50°C	0°C to 50°C
Non-operating (°C)	-40°C to 70°C	-40°C to 70°C	-40°C to 70°C	-40°C to 70°C
Operating (°F)	32°F to 122°F	32°F to 122°F	32°F to 122°F	32°F to 122°F
Non-operating (°F)	-40°F to 158°F	-40°F to 158°F	-40°F to 158°F	-40°F to 158°F
HUMIDITY				
%	up to 95% non-condensing			up to 95% non-condensing