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Haivision

Makito
X Series



High Quality, High Density, High Profile H.264 Encoder & Decoder

Haivision's award-winning Makito X encoder and decoder transports secure, low latency, HD video over any network at extremely low bitrates. Available as an ultra compact SDI or DVI appliance with optional fixed or removable storage, or within a high density 1RU or 4RU chassis. The Makito X is ideal for live, interactive and bandwidth constrained applications.

Highest Quality To maximize video quality over your network, the Makito X supports High Profile H.264 encoding. Tuned to excel in low bandwidth environments, the Makito X gives you twice the quality or uses half the bandwidth compared to other enterprise encoders. Matched with the Makito X Decoder to provide extremely low end-to-end latency, the Makito X delivers pristine quality at sub-2 Mbps bitrates. The Makito X is ideal for video distribution within a facility, to connect facilities or support remote video contribution, to deliver performance video over satellite connections and across the Internet.

Powerful Features With up to 2 inputs and 4 encoding engines per blade, the Makito X carries forward the strong heritage of the Makito family with features designed to address the most rigorous video applications. The excellent picture quality at low bandwidth and the lowest end-to-end latency of the industry makes the Makito X platform ideal for internal broadcast applications. Combining KLV and CoT metadata support makes the Makito X ideal for Full Motion Video (FMV) applications in government and military. Moreover, integrated features such as snapshots, logo insertion, Selective Mute™, talkback, and powerful control interfaces enable advanced video network management in medical applications. Multi-bitrate (MBR) encoding to unicast, multicast, and RTMP enables administrators to direct many unique streams groomed to specific desktop and mobile viewers, set-top boxes, recorders, and Internet destinations.

Integrated Solutions Haivision has designed specific integrated technology supporting end-to-end video applications. The Makito X includes Haivision's SRT (Secure Reliable Transport) and Forward Error Correction (FEC) for controlled media distribution throughout facilities with Calypso media management, Furnace IPTV and CoolSign digital signage systems.

Secure Reliable Transport SRT is a unique transport technology, that optimizes streaming performance across unpredictable networks, like the Internet. Included with Haivision streaming solutions, SRT features packet loss recovery, real time end-to-end network statistics, options to easily manage firewall traversal and more, for the highest quality live video over the worst networks.

Features	Benefits
Low end-to-end latency	Supports mission-critical distribution and interactive communication challenge
4 HD encoding engines	Flexible encoding & compression, adapting to different network environments & applications
Multiple destinations per stream	Target different systems, networks, users, and platforms individually
Highly efficient encoding	Up to twice the quality or half of the bandwidth, using High Profile H.264
12 HD 1080p60 channels in 1RU	Highest density available reducing cost, footprint, and energy consumption
AES 256 bit encryption	Secure unicast or multicast end-to-end video distribution
Metadata support	Insert synchronized KLV into the MPEG stream from IP, embedded, or serial data sources
SRT and FEC	Maintain video quality over unqualified networks and low cost public internet connections
Integrated with Furnace, InStream and CoolSign	Complete end-to-end video solution

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MAKITO X SPECIFICATIONS

MAKITO X (SDI ENCODERS & DECODER)

Video Inputs (single or dual input encoder only)

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

Video Outputs (decoder only - dual channel):
- HDMI 1.3
- SD-SDI / SMPTE 259M-C
- HD-SDI / SMPTE 292M & 296M & 274M
- 3G-SDI / SMPTE 424M (Level A Only) & 425M

Video Resolutions:
- 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)

Audio Inputs/Outputs:
- Available through a locking mini-DIN-8 connector:
  - Balanced stereo analog audio
  - Unbalanced stereo analog audio
  - Talkback
- Embedded Audio
  - SD-SDI SMPTE 272M
  - HD/3G-SDI SMPTE 299M
  - HDMI (Decoder only)

MAKITO X (DVI ENCODER)

Video Inputs:
- Y, Pb, Pr / RGBHV component analog
- Y, Cb, Cr / DVI component digital

Video Resolutions:
- 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
- 720x480/576p 60/59.54/50 Hz
- (interlaced shown in fields per second)

Computer Resolutions:

1920x1200 60 Hz	1680x1050 60 Hz
1600x1200 60 Hz	1600x900 60 Hz
1440x900 75/60 Hz	1400x1050 75/60 Hz
1360x768 60 Hz	1280x1024 75/60 Hz
1280x800 85/75/60 Hz	1280x768 85/75/60 Hz
1152x864 75 Hz	1024x768 85/75/60 Hz
800x600 85/75/60 Hz	640x480 85/75/60 Hz

Audio Inputs/Outputs:
- Available through a locking mini-DIN-8 connector:
  - Balanced stereo analog audio
  - Unbalanced stereo analog audio
  - Talkback
- Embedded DVI Audio

VIDEO ENCODING/DECODING

Compression Standard:
- H.264 (MPEG-4 AVC part 10)
- ISO/IEC 14496-10
- Baseline, Main, and High Profiles
- Up to Level 4.2 and lower intermediate levels
- I, IP, IBP, IBBP framing
- Configurable Group of Picture (GOP) size
- Configurable frame rate
- Region of Interest Coding

Bit Rates:
- SD/HD from 32 kbps to 25 Mbps

Rate Control:
- CBR/VBR

Latency (encoder only):
- Less than 55ms

AUDIO ENCODING/DECODING

Compression Standard:
- MPEG-2 AAC-LC ISO/IEC 13818-7
- MPEG-4 AAC-LC ISO/IEC 14496-3

Audio Channels:
- 2 analog audio per blade
- 16 embedded audio per blade (SDI)
- 2 embedded audio per blade (DVI /HMDI)

Bit Rates:
- From 56 to 320 kbps per audio pair

Frequency Response:
- From 20 Hz to 22 kHz

METADATA (OPTIONAL)

- CoT to KLV conversion
- KLV or CoT over serial RS-232/422
- KLV or CoT over UDP
- KLV over SDI
- SMPTE 336M compliant
- MISB 0601.10 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 IP/DHCP

Connector:
- RJ45

Networking Protocols:
- Unicast streaming
- Multicast streaming (IGMP v3)
- Multiple unicast streaming
- MPEG transport stream over UDP / RTP
- RTMP
- SAP (RFC 2974)
- Direct RTP - H.264 over RTP (RFC 3984)
- SRT (Secure Reliable Transport)

ADVANCED FEATURES

- Multi-bitrate (MBR) streaming
- HD/SD de-interlacing
- Built-in downscaling
- 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 Furnace & SRT
- Aspect ratio configuration
- Active Format Description (AFD)
- Wide Screen Signaling (WSS)
- Selective Mute
- Talkback (encoder only)
- Color Space Conversion (DVI only)
- Image cropping
- Bi-directional serial passthrough

MANAGEMENT INTERFACES

Standard:
- RS-232
- RJ45 to RS-232 (DB-9 Management Cable Req'd.)
- Ethernet

Management:
- HTTPS (web browser)
- Command line over SSH/Telnet/RS-232
- SFTP/TFTP/SCP
- SNMP v3

SINGLE BLADE APPLIANCE

Dimensions:
- 24mm H x 149mm W x 202mm D (0.92"H x 5.85"W x 8.0"D)

Weight:
- 2.5 lbs.

Power:
- 12VDC, 20W
- 100-240VAC 30W external locking power supply

Temperature:
- Operating: 0º to 40ºC (32º to 104ºF)
- Non-operating: -30º to 70ºC (-22º to 158ºF)

HARSH ENVIRONMENT CHASSIS OPTION

Fanless operation for high temperature applications

Dimensions:
- 44mm H x 137mm W x 202mm D (1.73"H x 5.4"W x 8.0"D)

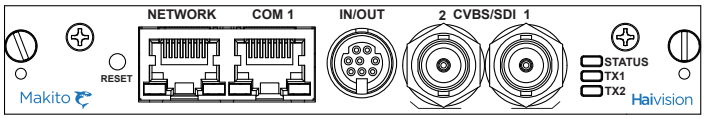
Weight:
- 4 lbs. / 1.8 kg

Power:
- 12VDC, 20W
- 100-240VAC 30W external locking power supply

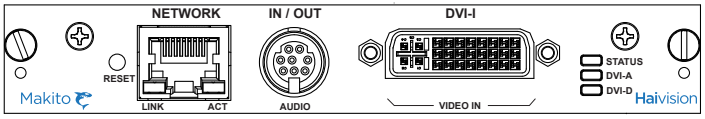
Temperature:
- Operating: 0º to 70ºC (32º to 158ºF)
- Non-operating: -40º to 85ºC (-40º to 185ºF)

MULTI-BLADE CHASSIS OPTIONS

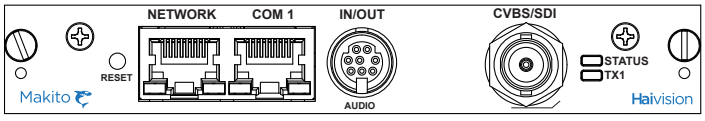
- 6 blade chassis (F-MB6X-RAC, F-MB6X-DC, F-MB6X-MED)
- 21 blade chassis (F-MB21B-R)



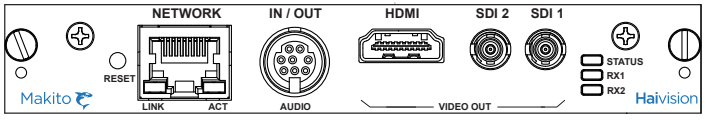
Makito X (Dual SDI)



Makito X (DVI)



Makito X (Single SDI)



Makito X Decoder

Makito X Product Portfolio & Ordering Information **

Makito X Single SDI	S/B-292E-HDSDI1	Makito X Encoder Appliance (S) or Blade (B) HD H.264 IP video encoder supporting a single 3G/HD/SD-SDI and Composite channel
Makito X Dual SDI	S/B-292E-HDSDI2	Makito X Encoder Appliance (S) or Blade (B) HD H.264 IP video encoder supporting dual 3G/HD/SD-SDI and Composite channels
Makito X DVI	S/B-292E-DVI	Makito X Encoder Appliance (S) or Blade (B) HD H.264 IP video encoder supporting a single channel DVI-I or Component
Makito X Decoder Single Channel	S/B-292D-HD1	Makito X Decoder Appliance (S) or Blade (B) HD H.264 IP Video decoder supporting single channel 3G/HD/SD-SDI and HDMI
Makito X Decoder Dual Channel	S/B-292D-HD2	Makito X Decoder Appliance (S) or Blade (B) HD H.264 IP Video decoder supporting dual channel 3G/HD/SD-SDI and HDMI

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

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