Haivision

Makito
X Series

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

Extreme Encoding The Makito™ X2 dual channel H.264 encoder delivers a remarkable 12 channels of High Profile HD 1080p60 with an extremely low encoding latency of 55 milliseconds - all within a single rack unit. Available with dual input (SDI, HD-SDI, 3G-SDI, Composite), the Makito X2 encoder addresses video over IP encoding anywhere on a resolution/bandwidth scale from CIF as low as 32 kbps to full HD at up to 25 Mbps. Supporting High Profile 4:2:0 H.264, the Makito X2 delivers highly efficient encoding, yielding up to twice the quality within a given bandwidth or savings of up to half the bandwidth for the same quality level compared to industry-leading encoders. The Makito X2's stream quality is at par with broadcast-quality encoders at higher bitrates and delivers pristine quality at bitrates lower than 2 Mbps, ideal for Internet or satellite transport of HD video.

Integrated Solutions Supporting remarkable density, along with AES stream encryption and forward error correction (FEC), the Makito X2 is ideal for headend applications within enterprise, education, broadcast monitoring, medical, and military markets. Combined with Haivision's Furnace IP video system, administrators have fine-grained control over video stream access and distribution. With Furnace's InStream player, users can view up to 64 streams simultaneously with end-to-end security, access control, and reporting. The Makito X2 encoder can also be paired with the Makito decoder to achieve extremely low 85 millisecond end-to-end latency, or can be combined with Haivision's acclaimed InStream multi-view performance player technology to service desktops, laptops, and mobile devices.

Power Features With 4 internal encoding engines, the Makito X2 can encode video at up to 4 different bitrates and profiles for Multi Bit Rate (MBR) streaming to optimize video distribution. In addition, each engine can be directed to multiple network destinations (unicast, multicast, TS and RTMP) concurrently, to uniquely serve desktops, mobile devices, set-top boxes, signage players, recorders, and streaming servers. For remote installations or headends, the Makito X2 offers highly flexible configurations - available as an ultra-compact appliance for dual channel requirements or within a 1RU (6 blades) or 4RU (21 blades) chassis for high density encoding/decoding challenges.

Product Features / Product Benefits

Product **Features**	Product **Benefits**
55 millisecond encoding latency	Supports mission-critical distribution and communication challenge
4 HD encoding engines	Deliver up to 4 HD streams from 1 or 2 sources for Multi Bit Rate (MBR) streaming
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 4:2:0 H.264
12 HD 1080p60 channels in 1RU	Highest density available in the industry
AES 256 bit encryption	Secure unicast or multicast video distribution
Makito decoder support	Deliver video with 85 milliseconds of end-to-end latency

MAKITO X2 SPECIFICATIONS

MAKITO DUAL INPUT ENCODER

Video Inputs/Outputs:

Composite	NTSC/PAL/PAL-M
SD-SDI	SMPTE 259M-C
HD-SDI	SMPTE 292M
	SMPTE 274M
	SMPTE 296M
3G-SDI	SMPTE 424M
	SMPTE 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 mini-DIN-8 connector:
Balanced stereo analog audio
Unbalanced stereo analog audio
Embedded Audio
SD-SDI SMPTE 272M
HD-SDI SMPTE 299M

ADVANCED FEATURES
Multi-Bitrate (MBR) Streaming
HD/SD de-interlacing
Built-in downscaling
Deblocking filter
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
SD aspect ratio configuration
SD AFD and WSS

VIDEO ENCODING
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
Bit Rates:
SD/HD from 32 kbps to 25 Mbps
Rate Control:
CBR/VBR
Latency (encode only):
Less than 55ms

AUDIO ENCODING
Compression Standard:
MPEG-2 AAC-LC ISO/IEC 13818-7
MPEG-4 AAC-LC ISO/IEC 14496-3
Audio Channels:
2 analog per blade, 2 embedded audio per video channel
Bit Rates:
From 56 to 320 kbps per audio pair
Frequency Response:
From 20 Hz to 22 kHz

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)

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
FTP/TFTP
SNMP v3
Furnace Server

SINGLE BLADE APPLIANCE (S-292E-HDSDI2)
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 (each blade),
100-240VAC 30W external locking power supply
Temperature:
Operating: -20° to 40ºC (-4° to 104ºF)
Non-operating: -40° to 50ºC (-40° to 122ºF)

6 BLADE CHASSIS (F-MB6X-RAC, F-MB6B-MED, F-MB6B-DC)
Dimensions:
19" rack mountable, 1RU
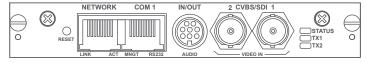43.69mm H x 434.98mm W x 420.37mm D
(1.72"H x 17.125"W x 16.55"D)
Weight:
6 slot empty chassis – 17.5 lbs.
Each blade – 0.5 lbs.
Power (internal power supply):
Redundant AC type 90-264VAC 47Hz-63Hz
300 Watt max.
Medical Grade 90-264VAC 47Hz-63Hz
300 Watt max.
DC type 20-36 VDC
300 Watt max.
Operating Temperature:
Operating: 0°C to 50°C (32°F to 122°F)
Non-Operating: -40°C to 70°C (-40°F to 158°F)
Humidity:
Up to 95% non-condensing

21 BLADE CHASSIS (F-MB21B-R)
Dimensions:
19" rack mountable, 4 RU
178mm H x 439.98mm W x 460mm D
(7.00"H x 17.125"W x 18.00"D)
Weight:
21 slot empty chassis – 38 lbs.
Each blade – 0.5 lbs.
Power (internal power supply):
90-132V and 180-240VAC 47Hz-63Hz
400 Watt max.
Temperature:
Operating: 0°C to 50°C (32°F to 122°F).
Non-Operating: -40°C to 70°C (-40°F to 158°F).
Humidity:
U p to 95% non-condensing

METADATA (OPTIONAL)
CoT to KLV conversion
KLV over serial RS-232/422
KLV over UDP and SDI
SMPTE 336M compliant
MISB 0601
MISB 0604.2 compliant
Synchronous mode as per MISB 0604.2

Makito X2

Makito Product Portfolio & Ordering Information **

Makito X2	S/B-292E-HDSDI2	Makito X2 Encoder Appliance (S) or Blade (B) HD H.264 IP video encoder supporting dual 3G-SDI, HD-SDI, SDI, Composite
6 Slot Chassis	F-MB6X-RAC	6 slot 1RU rack mount chassis for Makito, Barracuda, and Torpedo blades. Redundant AC power supply.
6 Slot Chassis (Medical)	F-MB6B-MED	6 slot 1RU rack mount chassis for Makito, Barracuda, and Torpedo blades. 60601-compliant Medical grade power supply.
6 Slot Chassis (DC)	F-MB6B-DC	6 slot 1RU rack mount chassis for Makito, Barracuda, and Torpedo blades. DC power supply.
21 Slot Chassis	F-MB21B-R	21 slot 4RU rack mount chassis for Makito, Barracuda, and Torpedo blades. Redundant AC power supply.

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