

**COMPACT, HIGH PERFORMANCE, HIGH DEFINITION  
H.264 ENCODER & DECODER**

## Haivision



**Highest Performance HD H.264 Encoder/Decoder** The Makito™ HD H.264 encoder and decoder support up to 1080p60 resolution and an incredible end-to-end latency of 70 milliseconds. Available with SDI (SDI, HD-SDI, 3G-SDI, Composite, S-Video) or DVI (DVI, XGA, Component), the Makito encoder addresses video over IP H.264 encoding anywhere on a resolution/bandwidth scale from CIF as low as 150 kbps to full HD at 15 Mbps. As a perfect mate to the Makito encoder, the Makito decoder supports up to 3G-SDI and HDMI.

**Power Features** Makito encoders can output a variety of stream types (Unicast/Multicast TS, RTSP, RTMP) and multiple bitrates (MBR) to various destinations concurrently, which allows integrators to serve desktops, mobile devices, set-top boxes, signage players, recorders, and streaming servers. The Makito also includes powerful media features such as snapshots, logo application, and Selective Mute™ to enable complete control and identification of sources and destinations directly from the encoder. The Makito is ideal for multi-channel enterprise IPTV delivery, for HD signage deployments, and for mass HD distribution/record environments such as schools, medical facilities, stadiums, auditoriums, professional training, and simulation environments.

**Ultra-Compact Encoding** For remote installations or headends, the Makito offers highly flexible configurations. Available as an ultra compact appliance for single channel requirements, or within a 1RU (6 blades) or 4RU (21 blades) chassis for high-density encoding/decoding challenges, the Makito uses 1/5 of the rack space with 1/10 the power, and delivers 2x the resolution of typical 1RU encoders.

### Product Features

### Product Benefits

<b>70 Millisecond End-to-End Latency</b>	Supports mission-critical and advanced communication challenges
<b>1080p60 Resolution</b>	Highest quality HD
<b>DVI/XGA Input</b>	Stream computer displays up to 1920 x 1080
<b>High Density</b>	Reduce rack space with 6 1080p60 encoders per 1RU
<b>End-to-End Secure Video</b>	Deliver protected multicast without copy risk
<b>Selective Mute</b>	Disable viewing audiences with notice
<b>Multi-Bitrate (MBR) Streaming</b>	Stream directly to desktops, mobile devices, and set-top boxes
<b>Multi-Streaming</b>	Stream to multiple systems/audiences simultaneously
<b>Snapshots</b>	Grab full resolution images before encoding
<b>Logo Application</b>	Identify streams and burn in graphics
<b>Complete Product Range</b>	Industry-proven product family including encoders, decoders and DVB-IP gateways
<b>TalkBack™ Audio Decoding</b>	Enable bi-directional audio from InStream players
<b>Metadata Support</b>	Insert synchronized KLV into the MPEG stream from IP, embedded, or serial data sources

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**MAKITO 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:**  
 1400x1050 60 Hz      1024x768 85/75/60 Hz  
 1280x1024 75/60 Hz      800x600 85/75/60 Hz  
 1280x768 85/75/60 Hz      640x480 85/75/60 Hz

**Audio Inputs:**  
 Available through terminal block connector:  
 Balanced stereo analog audio  
 Unbalanced stereo analog audio

**MAKITO SDI ENCODER & MAKITO DECODER**

**Video Inputs (encoder only):**  
 S-Video  
 Composite (NTSC/PAL/PAL-M)  
 SD-SDI / SMPTE 259M-C  
 HD-SDI / SMPTE 292M & 296M  
 3G-SDI / SMPTE 274M & 424M & 425M

**Video Outputs (decoder only):**  
 HDMI  
 SD-SDI / SMPTE 259M-C  
 HD-SDI / SMPTE 292M & 296M  
 3G-SDI / SMPTE 274M & 424M & 425M

**Video Resolutions:**  
 1920x1080p 60/59.94/50/30/24/23.98/29.97/25 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 terminal block connector:  
 Balanced stereo analog audio  
 Unbalanced stereo analog audio  
 Embedded Audio  
 SD-SDI SMPTE 272M  
 HD-SDI SMPTE 299M  
 HDMI (Decoder only)

**ADVANCED FEATURES**

- Multi-Bitrate (MBR) Streaming
- 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
- Logo Overlay
- Selective Mute
- SD Aspect Ratio Configuration
- SD AFD and WSS (SDI only)
- Color Space Conversion (DVI only)
- Talkback (encoder only)

**VIDEO ENCODING/DECODING**

**Compression Standard:**  
 H.264 (MPEG-4 AVC part 10)  
 ISO/IEC 14496-10  
 Main Profile  
 Level 4.2 and lower intermediate levels  
 I, IP framing  
 Configurable Group of Picture (GOP) size  
 Configurable frame rate  
 Deblocking Filter

**Bit Rates:**  
 SD/HD from 150 kbps to 15 Mbps

**Rate Control:**  
 CBR/VBR

**Latency (encode 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 per video channel

**Bit Rates:**  
 From 32 to 448 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 0601.5 compliant  
 MISB 0604.2 compliant  
 Asynchronous & synchronous modes as per MISB 0604.2  
 High precision timecode insertion as per MISB 0604.2

**MANAGEMENT INTERFACES**

**Standard:**  
 RS-232 (optional for x-290E-DVI)  
 RJ45 to RS-232 (DB-9 Management Cable Req'd.)

**Management:**  
 HTTPS (web browser)  
 Command line over SSH/Telnet/RS-232  
 SFTP (Secure FTP)  
 SCP (Secure Copy)  
 SNMP v3  
 Furnace Portal Server (VF Pilot)

**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:**  
 5VDC, 13W (each blade),  
 100-240VAC 15W external locking power supply

**Temperature:**  
 Operating: -20° to 50°C (-4° to 122°F)  
 Non-operating: -40° to 50°C (-40° to 122°F)

**IP NETWORK INTERFACES**

**Standard:**  
 Ethernet 10/100/1000 Base-T, auto-detect, Half/Full-duplex

**Connector:**  
 RJ45

**Networking Protocols:**  
 Unicast streaming  
 Multicast streaming (IGMP v3)  
 Multiple unicast streaming  
 MPEG transport stream over UDP / RTP  
 Direct RTP - H.264 over RTP (RFC 3984)  
 RTP / RTCP (RFC 3550)  
 RTMP  
 Static IP/DHCP  
 QuickTime RTSP (RFC 3640) (Progressive resolutions only)  
 SAP (RFC 2974)

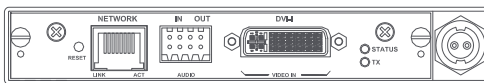
**CERTIFICATIONS**

JITC: MISP 5.5 (Makito v2.0.0-32 only)  
 Common Criteria NDPP 1.1 (Makito v2.1.1-3 only)

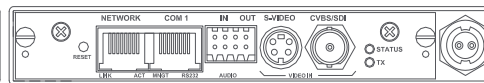


**CHASSIS OPTIONS**

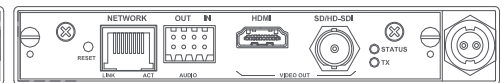
6 blade chassis (F-MB6X-RAC, F-MB6X-DC, F-MB6X-MED)  
 21 blade chassis (F-MB21B-R)  
 See Datasheet for specification details



Makito DVI Encoder



Makito SDI Encoder



Makito Decoder

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

<a href="#">Makito SDI Encoder</a>	<a href="#">S/B-290E-HSDI</a>	Makito Encoder Appliance (S) or Blade (B) – 1080p H.264 IP Video Encoder supporting 3G/HD/SD-SDI, Composite, S-Video
<a href="#">Makito SDI Encoder</a>	<a href="#">S/B-290E-SDI-M</a>	Makito Encoder Appliance (S) or Blade (B) – 720p/1080i H.264 IP Video Encoder supporting 3G/HD/SD-SDI, Composite, S-Video
<a href="#">Makito DVI Encoder</a>	<a href="#">S/B-290E-DVI</a>	Makito Encoder Appliance (S) or Blade (B) – 1080p H.264 IP Video Encoder supporting DVI-I, XGA, and Component
<a href="#">Makito DVI Encoder</a>	<a href="#">S/B-290E-DVI-M</a>	Makito Encoder Appliance (S) or Blade (B) – 720p/1080i H.264 IP Video Encoder supporting DVI-I, XGA, and Component
<a href="#">Makito Decoder</a>	<a href="#">S/B-290D-HD</a>	Makito Decoder Appliance (S) or Blade (B) – HD H.264 IP Video Decoder supporting 3G/HD/SD-SDI and HDMI
<a href="#">6 Slot Chassis</a>	<a href="#">F-MB6X-RAC/MED/DC</a>	6 slot 1RU rack mount chassis for Makito, Makito X, Barracuda, and Torpedo blades
<a href="#">21 Slot Chassis</a>	<a href="#">F-MB21B-R</a>	21 slot 4RU rack mount chassis for Makito, Makito X, Barracuda, and Torpedo blades