Compact, High Performance, High Definition H.264 Encoder & Decoder

**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.

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

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

**Video Resolutions:**
- 1920x1080p: 60/59.94/50 Hz
- 1280x720p: 60/59.94/50 Hz
- 720x480i / 720x480p: 60/59.94/50 Hz
- (interlaced shown in fields per second)

**Computer Resolutions:**
- 1024x768: 85/75/60 Hz
- 800x600: 85/75/60 Hz
- 640x480: 85/75/60 Hz

**Audio Inputs/Outputs:**
- Available through terminal block connector:
  - Balanced stereo analog audio
  - Unbalanced stereo analog audio
  - Talkback (single mono channel)

**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 Hz
- 1280x720p: 60/59.94/50 Hz
- 720x480i / 720x480p: 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
  - Talkback (single mono channel)

**ADVANCED FEATURES**

- Multi-Bitrate (MBR) Streaming
- SD De-interlacing
- Built-in Downscaling
- EIA-601-B/TSC 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)
- Selective Mute
- Logo Overlay
- SD Aspect Ratio Configuration
- SD AFD and WSS (SDI only)
- Color Space Conversion (DVI only)
- Talkback (encoder only)

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**MAKITO DVI Encoder**

**Video Input:**
- Y, Pb, Pr / RGBHV component analog
- Y, Cr, Cb / Y, Pb, Pr / Y, Cr, Cb / RGBHV component digital

**Video Resolutions:**
- 1920x1080p: 60/59.94/50/30/29.97/25/24/23.98/25 Hz
- 1280x720p: 60/59.94/50/30/29.97/25 Hz
- 720x480p: 60/59.94/50 Hz
- 720x480p: 576i / 576p: 576i / 576p: 59.94/50 Hz
- (interlaced shown in fields per second)

**Computer Resolutions:**
- 1024x768: 85/75/60 Hz
- 800x600: 85/75/60 Hz
- 640x480: 85/75/60 Hz

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**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 (encoder only): Less than 55ms

**AUDIO ENCODING/DECODING**

**Compression Standard:**
- MPEG-2 AAC-LC ISO/IEC 13818-7
- ISO/IEC 14496-10

**Audio Channels:**
- 2 per video channel

**SNR:**
- From 32 to 448 kbps per audio pair

**Frequency Response:**
- From 20 Hz to 22 kHz

**MUST CONTROL:**
- CBR/VBR
- Latency (encoder only): Less than 55ms

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**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: -20º to 50ºC (-4º to 122ºF)
  - Non-operating: -40º to 50ºC (-40º to 122ºF)

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**MULTI-BLADE CHASSIS OPTIONS**

- **SD/HD from 150 kbps to 15 Mbps**
- **Ethernet 10/100/1000 Base-T, auto-detect, Half/Full-duplex**
- **100-240VAC 15W external locking power supply**
- **CBR/VBR**
- **Deblocking Filter**
- **24mm H x 149mm W x 202mm D (0.92”H x 5.85”W x 8.0”D)**

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**METADATA**

- **MPEG transport stream over UDP / RTP**
- **MPEG-2 AAC-LC ISO/IEC 13818-7**
- **ISO/IEC 14496-10**

**21 Slot Chassis**

- **800x600 85/75/60 Hz**
- **Operating:** -20º to 50ºC (-4º to 122ºF)
- **Command line over SSH/Telnet/RS-232**
- **Bit Rates:**
  - KLV over SDI
  - MISB 0601.5 compliant
- **1024x768 85/75/60 Hz**
- **Rate Control:**
  - Direct RTP - H.264 over RTP (RFC 3984)
  - High precision timecode insertion as per MISB 0604.2
- **JITC: MISP 5.5 (Makito v2.0.0-32 only)**

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**MANAGEMENT INTERFACES**

- **Standard:**
  - RTP / RTCP (RFC 3550)
- **From 32 to 448 kbps per audio pair**
- **Main Profile**
- **See MB6/MB21 for specification details**
- **Async & synchronous modes as per MISB 0604.2**
- **Common Criteria NDPP 1.1 (Makito v2.1.1-3 only)**

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**CERTIFICATIONS**

- **SRTC: MISB 5.5 (Makito v2.0.3-2 only)**
- **Common Criteria NDPP 1.1 (Makito v2.1.1-3 only)**

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**MULTI-BLADE CHASSIS OPTIONS**

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

See [MB5/MB21](#) for specification details

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**TechSpecs**

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**Makito Product Portfolio & Ordering Information**

- **Makito SDI Encoder**
  - S/B-290E-HDSDI
  - S/B-290E-SDI-M
  - S/B-290E-DVI-M
  - S/B-290E-HDSDI

- **Makito Encoder Appliance**
  - S/B-290E-HDSDI
  - S/B-290E-SDI-M
  - S/B-290E-DVI-M
  - S/B-290E-HDSDI

- **Makito Decoder Appliance**
  - S/B-290E-HDSDI
  - S/B-290E-SDI-M
  - S/B-290E-DVI-M

- **6 Slot Chassis**
  - F-MB6X-RAC/MED/DC

- **21 Slot Chassis**
  - F-MB21B-R

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