

# Makito

HD H.264 Encoder



Intelligent IP Video

## Compact – High Performance – Affordable

### HD H.264 - Encode Once & Deliver HD Everywhere!

**Makito™** encoders revolutionize video-over-IP by enabling HD to be distributed throughout the organization without reservation. At a fraction of the price and with a significant performance advantage over competing technology, 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.

**H.264 up to 1080p60.** The Makito is perfectly suited for today's and tomorrow's challenges. The Makito is based on the highly efficient H.264 compression standard saving over 50% of the bandwidth and disk space required by MPEG-2 IP video deployments. It supports HD up to 1080p60 (component analog or digital) or computer resolutions including 1920x1080, 1280x1024, and 1024x768 at full frame rate (RGB or DVI-D) input via its DVI-I connector. The Makito SDI supports SDI, HD-SDI, 3G-SDI (the new standard for 1080p60), and composite on a single BNC. S-video for standard definition is also supported. With this array of compatibility, the Makito addresses video-over-IP encoding anywhere on a resolution/ bandwidth scale from CIF as low as 150 kbps to Full HD at 15 Mbps.

**5 times the density.** 10 times as energy efficient – much more powerful – extremely fast!!! The Makito is based on Haivision's progressive ASIC / DSP mini-blade architecture. It is available as an ultra compact appliance for single channel encoding or within a 1RU or 4RU chassis for high-density challenges. The Makito uses 1/5 of the rack space and 1/10 the power (green technology) and delivers twice the resolution of typical 1RU encoders. To complete the picture of the revolutionary power of the Makito, it encodes up to 1080p60 video into H.264 in well under 70 milliseconds.

**Makito Decoder.** Haivision also offers a mated performance decoder in the same form factor supporting HD H.264 up to 1080p60, with HDMI and HD-SDI, and delivering lower than 70-millisecond end-to-end performance.



#### IPTV DISTRIBUTION

Delivering video channels to viewers in schools, financial institutions, live event venues, control rooms, and within government organizations.



#### MEDICAL SYSTEMS

Driving controlled and secure video throughout healthcare facilities enabling education, consultation, and procedural review.



#### STREAMING SERVICES

Connecting facilities, affiliates, and event locations with real-time high definition video, simultaneously addressing streaming and distribution challenges.



**“Encode Once” technology.** The Makito marries the most advanced IP video networking features with the power and ubiquity of the H.264 standard. This allows users to address many network video destinations and delivery methods simultaneously. A single Makito can stream to many distinct network client “destinations” simultaneously, with each video stream specifically groomed. Client destinations may include local multicasts (addressing unlimited numbers of users, players, or set top boxes), remote unicast destinations (the WAN typically supports point to point unicast traffic), streams directed at specific streaming server systems (such as the powerful Wowza Media Server™ for Flash and other standards), and streams managed by Haivision’s Furnace IP video distribution system. Furthermore, the Makito supports HiLo-Streaming™ – the ability to produce both a full resolution full bandwidth stream and a reduced resolution low bandwidth stream simultaneously (perhaps, for example, HD at 8 Mbps and SD at 700 kbps). The combination of these two features allows users to encode once with the Makito and deliver the best high definition video to wherever it is needed.

**Easy.** Although the Makito is complete with the latest compression and networking features it remains an easy to use and deploy, robust appliance. Users can control the Makito through its intuitive web interface (complete with on-line help facilities). Integrators may opt to control the Makito over IP or serial port via its comprehensive command line interface or even through SNMP. Advanced encoder control is also available directly through Haivision’s Furnace system.

**Directly Integrated with the Furnace & Absolutely Secure.** The Makito also supports very advanced features such as traffic shaping, forward error correction, and encryption. Supporting AES encryption ensures that even in multicast environments your video content is absolutely secure. When combined with Haivision’s Furnace IP video distribution system and InStream™ “zero footprint” desktop player technology, you get end-to-end confidence that only those who are allowed to view specific content can access that content, and that they cannot record or copy that content directly in any way.

**Open & Standards Based.** The Makito fully supports H.264 video compression and AAC audio compression, industry standards that have been adopted by all major companies in the IP video segment. End-to-end solutions rely on seamless interoperability. Haivision’s applications team takes compliance and third party and quality assurance testing seriously. The Makito is interoperable with industry standard set top boxes, with HaiPLAY (Haivision’s open source free performance soft player), VideoLAN’s VLC player and Apple QuickTime. With the release of Haivision’s Furnace system, the Makito is also integrated with and compatible with the Furnace Portal Manager, the InStream player, and the Stingray™ set top box, providing a complete end-to-end HD H.264 IP video distribution solution.



**Makito (x-290E-DVI)**



**Makito Dual Blade (B-290E-DVI-S)**



**Makito SDI (x-290E-HDSI)**



## Specifications

### Makito (x-290E-DVI)

#### 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 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 60/59.94/50 Hz  
(interlaced shown in fields per second)

#### Computer Resolutions:

1920x1080 60 Hz  
1280x1024 75/60 Hz  
1280x768 85/75/60 Hz  
1024x768 85/75/60 Hz

#### Audio (Input):

Available through terminal block connector:  
Balanced Stereo Analog Audio  
Unbalanced Stereo Analog Audio

### Makito-SDI (x-290E-HDSOI)

#### Video (Inputs):

S-Video NTSC/PAL  
Composite NTSC/PAL  
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 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 (Input):

Available through terminal block connector:  
Balanced Stereo Analog Audio  
Unbalanced Stereo Analog Audio  
Embedded Audio  
SD-SDI SMPTE 272M  
HD-SDI SMPTE 299M

### ADVANCED FEATURES

HiLo-Streaming  
SD De-interlacing  
Built-In Downscaling  
Deblocking Filter  
EIA-608-B Closed Captioning (NTSC Line 21)  
Forward Error Correction  
AES Encryption  
Logo overlay  
Still image transmission  
SD aspect ratio configuration  
SD AFD and WSS (x-290E-HDSOI)  
Color space configuration (x-290E-DVI)

### VIDEO ENCODING

#### 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

#### Bit Rates:

SD/HD from 150 kbps to 15 Mbps

#### Rate Control:

Traffic Shaping

#### Latency (encode only):

Less than 70ms

### AUDIO ENCODING

#### 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

### 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)  
QuickTime RTSP\* (RFC 3640)  
SAP (RFC 2974)  
\* Progressive resolutions only

### MANAGEMENT INTERFACES

#### Standard:

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

#### Management:

HTTP (web browser)  
Command line over Telnet/RS-232  
FTP/TFTP  
Furnace Portal Server (VF Pilot)

### Single Blade Appliance (S-290E-HDSOI/DVI)

#### 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: -20C to 50C  
Non-operating: -40C to 50C

### 6 Blade Chassis (F-MB6-XX)

#### Dimensions:

19" rack mountable, 1RU  
44.45mm H x 438.15mm W x 425.45mm D  
1.75"H x 17.25 W x 16.75"D

#### Weight:

6 slot empty chassis – 10lbs  
Single encoder blade – 0.5lbs

#### Power – Internal Power Supplies:

AC type 90-264VAC 47Hz-63Hz  
200 Watt max.  
Medical Grade 90-264VAC 47Hz-63Hz  
300 Watt max.  
DC type 20-36 VDC  
200 Watt max.

#### Operating Temperature:

0C to 50C (32F to 122F).

#### Non-Operating Temperature:

-40C to 70C (-40F to 158F).

#### Humidity:

up to 95% Non-Condensing.

### 21 Blade Chassis (F-280-21DPS)

#### Dimensions:

19" rack mountable, 4 RU  
178mm H x 445mm W x 400mm D  
7.00"H x 17.50"W x 15.75"D

#### Weight:

21 slot empty chassis – 20lbs  
Single encoder blade – 0.5lbs

#### Power – Internal Power Supply:

90-132V and 180-240VAC 47Hz-63Hz  
400 Watt max.

#### Operating Temperature:

0C to 40C (32F to 104F).

#### Non-Operating Temperature:

-40C to 70C (-40F to 158F).

#### Humidity:

up to 95% Non-Condensing

### METADATA (Optional)

Key Length Value (KLV) or Cursor on Target  
Metadata Multiplexing per MISB RP 0604  
Synchronous Mode  
KLV per SMPTE 336M  
MISB EG0601.1  
CoT/KLV Conversion (EG0805)

**Ordering information** (please obtain complete system quotations from Haivision or an authorized Haivision integration partner)

<b>S-290E-DVI</b>	<b>Makito Encoder Appliance</b> - HD/SD H.264 IP Video Encoder – Component Analog (Y,Pb,Pr/RGBHV) and Digital Video (DVI) input over DVI-I; up to 1080p60 HD Video or 1280x1024 75Hz Computer; 150 kbps to 15 Mbps.
<b>B-290E-DVI</b>	<b>Makito Encoder Blade</b> - HD/SD H.264 IP Video Encoder – Component Analog (Y,Pb,Pr/RGBHV) and Digital Video (DVI) input over DVI-I; up to 1080p60 HD Video or 1280x1024 75Hz Computer; 150 kbps to 15 Mbps; chassis required.
<b>S-290E-HDSOI</b>	<b>Makito Encoder Appliance</b> - HD/SD H.264 IP Video Encoder - HD-SDI, SDI, Composite, S-Video, and Audio input; up to 1080p60; 150 kbps to 15 Mbps.
<b>B-290E-HDSOI</b>	<b>Makito Encoder Blade</b> - HD/SD H.264 IP Video Encoder - HD-SDI, SDI, Composite, S-Video, and Audio input; up to 1080p60; 150 kbps to 15 Mbps; chassis required.
<b>B-290E-DVI-S</b>	<b>Makito Encoder Dual Height Blade with Serial Port</b> – HD/SD H.264 IP Video Encoder - Component Analog (Y,Pb,Pr/RGBHV) and Digital Video (DVI) input over DVI-I; up to 1080p60 HD Video or 1280x1024 75Hz Computer; 150 kbps to 15 Mbps; chassis required.
<b>F-280-21DPS</b>	<b>MB21 - Makito/Barracuda 21 Slot Chassis</b> - Rackmount 4RU Chassis - Up to 21 Makito/Barracuda mini-blades, dual AC power supply.
<b>F-MB6-AC</b>	<b>MB6 - Makito/Barracuda 6 Slot Chassis</b> - Rackmount 1RU Chassis - Up to 6 Makito/Barracuda mini-blades, AC power supply.
<b>F-MB6-MED</b>	<b>MB6 - Makito/Barracuda 6 Slot Chassis</b> - Rackmount 1RU Chassis - Up to 6 Makito/Barracuda mini-blades, Medical Grade AC power supply.
<b>F-MB6-DC</b>	<b>MB6 - Makito/Barracuda 6 Slot Chassis</b> - Rackmount 1RU Chassis - Up to 6 Makito/Barracuda mini-blades, DC power supply.