

## Compact – High Performance – Affordable

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

**MAKITO™** revolutionizes 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, and professional training and simulation environments.



**H.264 up to 1080p60!!!** The MAKITO is perfectly suited for today's challenges and for those that can be foreseen well into the future. 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. In addition, the MAKITO is equally proficient at standard definition (composite and s-video) as it is at all high definition resolutions and frame rates up to 1080p60. To accomplish this in a small form factor the MAKITO auto-detects the input of its single BNC connector and supports composite, SD-SDI, HD-SDI, and 3G-SDI (the new standard for 1080p60). Today, the MAKITO can comfortably address 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 and is available as an ultra compact appliance for single channel encoding or within



a 4U chassis that can contain up to 21 MAKITO high definition H.264 encoders 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 1U 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.

#### IPTV DISTRIBUTION

delivering video channels to viewers in schools, financial institutions, stadiums, and within government organizations.



#### MEDICAL SYSTEMS

driving video over IP architectures that enable education, consultation, review of medical procedures and even telesurgery- where accuracy and security is paramount.



#### STREAMING SERVICES

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



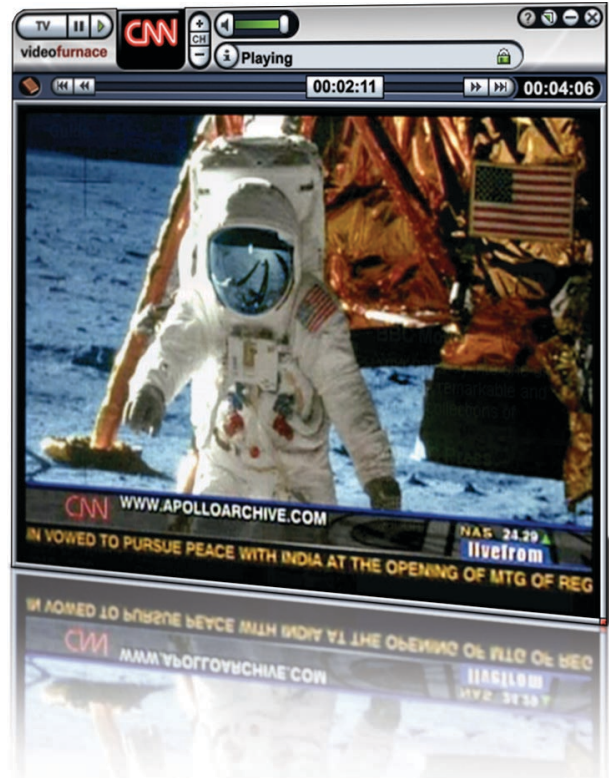
**“Encode once” technology.** The MAKITO marries the most advanced IP video networking features with the power and ubiquity of the H.264 standard. This allows users to address many network video destinations and delivery methods simultaneously. A single MAKITO can stream to many distinct network client “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



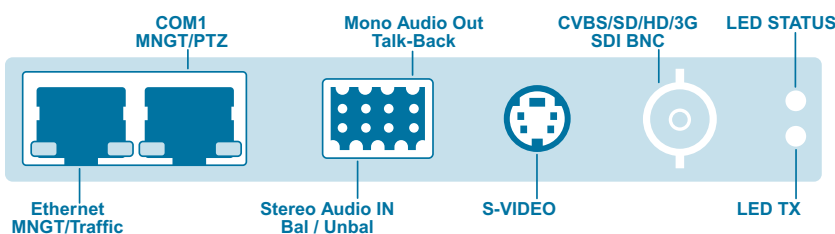
destinations (the WAN typically supports point to point unicast traffic), streams directed at specific streaming server systems (such as the powerful Wowza Media Server™ for Flash and other standards), and streams managed by HaiVision’s Video Furnace IP video distribution system.

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 2 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 as well available directly through HaiVision’s Video Furnace System 5.



**Directly Integrated with Video Furnace & Absolutely Secure.** The MAKITO as well supports very advanced features such as traffic shaping, forward error correction, and encryption (future firmware). Supporting AES encryption ensures that even in multicast environments your video content is absolutely secure. When combined with HaiVision’s Video 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.



**H.264 Compatibility.** 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 Video Furnace System 5, 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.

**VIDEO ENCODING**

**H.264 (MPEG-4 AVC part 10)**

**HD-SDI/SDI Resolution:**

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)

**Bit Rates**

HD from 150 kbps to 15 Mbps  
 SD from 150 kbps to 8 Mbps

**Traffic Shaping**

Constant (CBR)

**Latency (encode only)**

Less than 70ms

**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

**AUDIO ENCODING**

**MPEG AAC**

**Audio Channels**

2 per video channel

**Compression Standard**

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

**Bit Rates**

From 32 to 448 kbps per audio pair

**Frequency Response**

From 20 Hz to 22 kHz

**ADVANCED FEATURES**

HiLo Streaming  
 Built-In Downscaling (HD down to SD)  
 Deblocking Filter  
 EIA-608-B Closed Captioning (NTSC Line 21)  
 Forward Error Correction  
 AES Encryption  
 Audio Talk-Back (Future Release)

**AUDIO/VIDEO INTERFACES**

**Video (Input)**

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

**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

**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  
 RJ45 to RS-232 DB-9 Management Cable Req'd.

**Management**

HTTP (web browser)  
 Command line over Telnet/RS-232  
 FTP/TFTP  
 SNMP  
 VF System 5 (VF Pilot)

**MAKITO CHASSIS OPTIONS**

**Single Blade Appliance (S-290E-SDI)**

**Dimensions**

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

**Power**

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

**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)

**Power**

Dual redundant internal power supply  
 90-132V and 180-240VAC 47Hz-63Hz  
 400 Watt max.

**Ordering Information** (please obtain complete system quotations from HaiVision or an authorized HaiVision integration partner)

- S-290E-HDSDI** MAKITO Encoder Appliance - HD/SD H.264 IP Video Encoder - HD-SDI, SDI, Composite, S-Video, and Audio input; up to 1080p60; 150 kbps to 15 Mbps; 10/100/1000 Ethernet; 5VDC w/ 100-240 VAC External Power with Locking Connector.
- B-290E-HDSDI** MAKITO Encoder Blade - HD/SD H.264 IP Video Encoder - HD-SDI, SDI, Composite, S-Video, and Audio input; up to 1080p60; 150 kbps to 15 Mbps; 10/100/1000 Ethernet; chassis req'd.
- F-280-21DPS** Rackmount 4 RU Chassis for up to 21 MAKITO / BARRACUDA mini-blades, dual redundant power supply.
- CA-280-2R** MAKITO / BARRACUDA Audio Breakout Cable - Balanced, terminal block to RCA Female (INPUT), 2 Channel



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