

## HD H.264 Low Latency 1080p60 Decoder Less than 70 Millisecond End-to-end Latency

The **Makito Decoder** is the first IP video appliance that is dedicated to the high performance decoding challenge. Supporting H.264 streams at up to 1080p60 high definition, the Makito Decoder presents video almost immediately yielding an incredible 70 millisecond end-to-end transmission when paired with the Makito encoder.

**All Digital Video.** The Makito Decoder delivers HD digital video with embedded audio to both its 3G-SDI and HDMI interfaces. Both interfaces support all HD standards up to 1080p60. The HDMI output also supports the decoding and display of computer resolution sources encoded by the Makito, including 1024x768, 1280x1024, and 1920x1080. The Makito Decoder also supports balanced and unbalanced analog audio output.

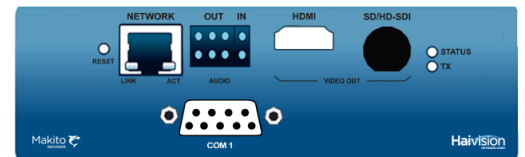
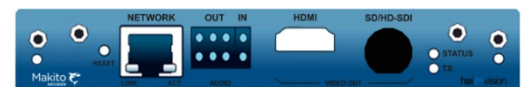
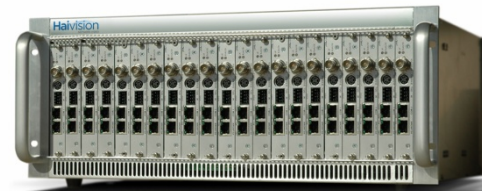
**Highest Density.** The Makito Decoder is available as a stand-alone appliance or when ordered as a single board (mini-blade) it can be used within Haivision's multi-blade chassis. The MB6 chassis holds up to 6 Makito mini-blades in a one rack unit (1RU) form factor and achieves the highest encoding/decoding density available. The MB6 is available with a single AC, DC, or Medical Grade power supply. The MB21 chassis holds up to 21 Makito mini-blades in a convenient four rack unit (4RU) form factor. Any combination of Makito Encoders and Makito Decoders are supported within these systems to accommodate any streaming environment. The Makito Decoder mini-blade is also available in a dual-blade size for serial port capability to be hosted in either the MB6 or MB21.

**Security and Error Recovery.** The Makito Decoder incorporates highly secure AES decryption of unicast or multicast signals to provide end-to-end secure video when coupled with Makito encoders and Haivision's Furnace IP Video System. This is especially important for deployments where live video is transmitted and the content needs guaranteed protection against recording. Such is the case with live professional sports where content is very valuable to the owners or within medical where patient confidentiality is paramount. The Makito Decoder also supports forward error correction (FEC) error recovery and fine grained control of its IP receive buffers to enable the capture of streams that may have traversed impaired IP networks.

**The Performance Alternative.** When considering delivery options for IP video encoded with Haivision's Makito, Barracuda, or Mako products, integrators have many options because these devices emit industry standard H.264 IP video streams (with AAC audio compression included) that are encapsulated with the ubiquitous MPEG-2 Transport Stream format. Makito streams are compatible with Haivision's Furnace end-to-end IP video system supporting the InStream player and Stingray set top box technology, with industry standard set top boxes from third party vendors, with streaming servers such as Wowza supporting Flash, and with free, open-source soft players such as VLC by VideoLAN. However, when end-to-end latency, channel density, stream security, or HD-SDI is a consideration, the Makito Decoder reigns.

### Makito Decoder Feature Details

- Ø HD H.264 decoding
- Ø 3G-SDI output to 1080p60
- Ø HDMI output to 1080p60
- Ø < 70 millisecond end-to-end latency (with Makito)
- Ø Digital and analog audio



## Specifications

### VIDEO DECODING

*Compression Standards:*

MPEG-4 Part 10 (H.264)

*Video Resolutions:*

1920x1080p 60/59.94/50 Hz  
1920x1080p 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

*Video Bit Rates (bps):*

150k to 15M

### AUDIO DECODING

*Compression Standards:*

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 NETWORKING

*Networking Protocols:*

Unicast Streaming  
Multicast Streaming  
MPEG Transport Stream over UDP / RTP / VFTP  
FEC and 128-bit/256-bit encryption support

### MANAGEMENT INTERFACES

*Standard:*

HTTP (web browser)  
Command line over Telnet  
RS-232 (optional)  
FTP/TFTP

*Video (Output) :*

SDI  
HD-SDI  
SD-SDI  
HDMI

*Audio (Output):*

Unbalanced Stereo Analog Audio  
HDMI Embedded Digital Stereo Audio

*Network:*

RJ45  
Ethernet 10/100/1000 Base-T, auto-detect,  
Half/Full-duplex  
Static IP/DHCP  
2nd Ethernet Port (RJ45) for LAN Pass-Thru

### Single Blade Appliance (S-290D)

*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 – External Power Supply:*

5VDC, 13W (each blade)  
100-240VAC 15W  
locking connector

### 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.  
Each blade – 0.5lbs.

*Power (Single Internal Power Supply):*

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.

### 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  
Each blade - 0.5lbs

*Power (Dual 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)

<b>S-290D</b>	<b>Makito Decoder Appliance - HD/SD H.264 IP Video Decoder</b> – HDMI and SDI (SDI, HD-SDI, 3G-SDI) output; up to 1080p60 HD Video or 1920X1080 60Hz Computer; 150 kbps to 15 Mbps; 2ch. embedded and analog audio output; 10/100/1000 Ethernet; 5VDC w/ 90-240 VAC External Power with Locking Connector.
<b>B-290D</b>	<b>Makito Decoder Blade - HD/SD H.264 IP Video Decoder</b> – HDMI and SDI (SDI, HD-SDI, 3G-SDI) output; up to 1080p60 HD Video or 1920X1080 60Hz Computer; 150 kbps to 15 Mbps; 2ch. embedded and analog audio output; 10/100/1000 Ethernet; chassis required.
<b>B-290D-S</b>	<b>Makito Decoder Dual Height Blade w/Serial Port - HD/SD H.264 IP Video Decoder</b> – HDMI and SDI (SDI, HD-SDI, 3G-SDI) output; up to 1080p60 HD Video or 1920X1080 60Hz Computer; 150 kbps to 15 Mbps; 2ch. embedded and analog audio output; 10/100/1000 Ethernet; chassis required.
<b>F-MB6-AC</b>	<b>MB6 – Makito/Barracuda 6 Slot Chassis</b> - Rackmount 1RU Chassis for 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 for 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 for up to 6 Makito/Barracuda mini-blades, DC power supply