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Haivision

# Makito™

## Compact HD H.264 Video Encoder

## User's Guide Version 2.1.0

HVS-07MAK-UG01-210
Issue 01

Intelligent IP Video

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# Safety Guidelines

Use the following guidelines when unsafe conditions exist or when potentially hazardous voltages are present:

- Always use caution and common sense.
- To reduce the risk of electrical shock, do not operate equipment with the cover removed.
- Repairs must be performed by qualified service personnel only.

## Antistatic Precautions

Electrostatic discharge (ESD) results from the buildup of static electricity and can cause computer components to fail. Electrostatic discharge occurs when a person whose body contains a static buildup touches a computer component.

The equipment contains static-sensitive devices that may be easily damaged, and proper handling and grounding is essential. Use ESD precautionary measures when installing systems or cards, and keep the parts and cards in antistatic packaging when not in use. If possible, use antistatic floorpads and workbench pads.

Improper handling and/or installation practices may VOID the warranty.



CAUTION When handling components, or when setting switch options, always use an antistatic wrist strap connected to a grounded equipment frame or chassis. *If a wrist strap is not available, periodically touch an unpainted metal surface on the equipment.* Never use a conductive tool, such as a screwdriver or a paper clip, to set switches.

## Fan Blade

Do not touch or push the fan blade with fingers or other objects. Doing so may damage the fan and/or fan bearings, which can result in a noise problem as well as accelerated failure of the mechanical part.

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# About This Guide

Welcome to the User's Guide for the Makito™ Compact HD H.264 Video Encoder, Version 2.1.0. This User's Guide describes how to install, configure, and manage the Makito to send audio, video, and data over an Ethernet-based IP network.

To access the online help, open the Web interface and click Help from the menu bar.

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## About Haivision

Haivision is a global leader in delivering advanced video networking, digital signage, and IP video distribution solutions. Haivision offers complete end-to-end technology for video, graphics, and metadata to help customers to build, manage, and distribute their media content to users throughout an organization or across the Internet. Haivision has specific expertise in the enterprise, education, medical/healthcare, and federal/military markets.

Haivision is based in Montreal and Chicago, with technical centers in Beaverton, Oregon; Austin, Texas; and Hamburg, Germany.

## Audience

This User's Guide is directed towards qualified service personnel such as technicians and network system administrators who have a basic knowledge of telecommunications equipment, and IP and LAN networking concepts and terminology.

## Reliability of Information

The information contained in this User's Guide has been carefully checked and is believed to be entirely reliable. However, as Haivision improves the reliability, function, and design of its products, the possibility exists that this User's Guide may not remain current.

If you require updated information, or any other Haivision product information, contact:

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## Obtaining Documentation

You may download the Makito firmware, Readme file, and PDF versions of the User's Guide and Quick Start Guide through Haivision's Download Center at http://www.haivision.com/download-center/.



NOTE All customers may access the Download Center; however, a login is required. If you do not have a login, select the link to create an account.

## Related Documents

In addition to this User's Guide, the following documents are also available through Haivision's Download Center (see link above):

- Makito Decoder User's Guide
- Makito v2.1 Hardening Guide

## Service Support

Haivision is committed to providing the service support and training needed to install, manage, and maintain your Haivision equipment.

For more information regarding service programs, training courses, or for assistance with your support requirements, contact Haivision Technical Support via our Support Portal on our website at: http://www.haivision.com/support/.

## Document Conventions

The following document conventions are used throughout this User's Guide.



TIP The light bulb symbol highlights suggestions or helpful hints.



NOTE Indicates a note, containing special instructions or information that may apply only in special cases.



IMPORTANT Indicates an emphasized note. It provides information that you should be particularly aware of in order to complete a task and that should not be disregarded. IMPORTANT is typically used to prevent loss of data.



CAUTION Indicates a potentially hazardous situation which, if not avoided, may result in damage to data or equipment, or minor to moderate injury. It may also be used to alert against unsafe practices.



WARNING Indicates an imminently hazardous situation which, if not avoided, could result in serious injury or death.

## Safety Information

The CAUTION and WARNING notices shown above are not only preventative measures designed to uphold the safety of both the service engineer and operator, but also enhance equipment reliability.

The definitions and symbols for CAUTION and WARNING comply with ANSI Z535.2, American National Standard for Environmental and Facility Safety Signs, and ANSI Z535.4, Product Safety Signs and Labels, issued by the American National Standards Institute.

# New Features in Version 2.1.0

Version 2.1.0 of the Makito introduces the following new features and enhancements:

## RTMP Support

The Makito now streams directly to a Flash Media Server (FMS) or Content Delivery Network (CDN) using the RTMP streaming protocol.

The supported RTMP servers are:

- FMS
- Wowza

The supported Transcoders are:

- Wowza
- KulaByte Transcoder

The supported CDN servers are:

- Akamai
- Limelight

For more information, see "CDN and Flash Interoperability" on page 94.

## NDPP 1.1 Support

Common Criteria (CC) Network Device Protection Profile (NDPP) 1.1 is now supported.

Major Features include:

- Role-based accounts support. User actions are limited and logged based on their assigned roles.
- HTTPS support allows secure access to the Makito from the Web UI.
- Syslog support allows activities on a Makito to be logged to a remote server.
- Secure Updates: Firmware updates are signed to prevent un-authorized firmware installations on the Makito.

For more information, see "Hardening" on page 31.

### Additional Resolutions

The Makito-DVI now supports the detection and encoding of SVGA resolutions (800x600p60/75/85) and VGA resolutions (640x480p60/75/85) at the DVI-A and DVI-D inputs.

For more information, see "Supported Graphic Encoding Resolutions (Makito #B-290E-DVI)" on page 263.

### iPerf Integration

The iPerf command is now installed as part of the base system to allow detailed network analysis useful for troubleshooting.

### VF FEC Stream from Web Interface

Forward Error Correction (FEC) can now be enabled from the Web Interface. FEC provides the ability to maintain a quality stream where minor network impairments exist.

For more information, see "Stream Settings" on page 88.

### Reset Encoder Button

A Reset button is now available on the Web Interface (ADMINISTRATION>STATUS page) to reset the video encoder sub-system. The Reset button is the equivalent of the CLI command `videnc 0 reset`.

For more information, see "Viewing System Status Information" on page 122.

# PART I: Installation and Setup

# CHAPTER 1: Introduction

This chapter provides a brief overview of Haivision's Makito Video Encoder, along with a description of the main hardware components and key features.



NOTE References to the "Makito" can be taken to include the Makito Compact HD H.264 Video Encoder with DVI (B-290E-DVI) and the Makito-SDI Compact HD H.264 Video Encoder with SDI (B-290E-HDSDI) unless specifically stated otherwise.

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# Product Overview

The Makito Compact HD H.264 Video Encoder is Haivision's latest video networking solution, delivering high performance H.264 in a compact and cost-effective form factor. The Makito is ideal for multichannel 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.

The Makito now supports HD up to 1080p60 (Component Analog or Digital) or computer resolutions up to 1280x1024 at 75 Hz (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 its BNC interface. The Makito-SDI also supports S-Video (for Standard Definition). Thus 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.

Figure 1-1 Front View (Single Chassis)




Figure 1-2 Sample Rear Views (Single Chassis, stacked)



## Makito Air

The Makito Air Ruggedized HD/SD H.264 Video Encoder incorporates the performance and power of the standard Makito in a ruggedized chassis and couples this with full KLV/CoT metadata capabilities. The Makito Air addresses Intelligence, Surveillance, Reconnaissance (ISR) challenges by delivering H.264 video from Standard Definition up to 1080p60 with metadata over IP. For details, see "Makito Air Interfaces and LEDs" on page 29.

## Chassis Styles

The Makito is available in four chassis styles:

- as an ultra compact appliance for single channel encoding (shown in previous section),
- within a 4U high density chassis (MB21) that can contain up to 21 Makito encoders,
- within a 1U chassis (MB6) that can contain up to six Makito encoders, and
- the Makito Air Ruggedized HD/SD H.264 Video Encoder.

The MB21 and MB6 chassis are shown in the following figures.

Figure 1-3 Multichannel Chassis - Front View (Top - MB21, Bottom - MB6)



Figure 1-4 Multichannel Chassis - Rear View (Top - MB21, Bottom - MB6-AC)



NOTE The MB6 is available with a single AC, DC, or medical grade AC power supply. For details, see "MB6 (6-Slot) Chassis" on page 51.

The Makito Dual Height Blade may be used in either the MB21 or MB6 chassis.

The Makito Air is shown in the following figure.

Figure 1-5 Makito Air - Front and Rear Views



## Applications

Typical examples of Makito applications include:

- 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.
- ISR (Intelligence, Surveillance, Reconnaissance) [Makito Air] – combining the excellent image quality and performance of 1080p60 high definition video with KLV/CoT metadata capabilities in a ruggedized chassis.

# Physical Description

Following is a description of the Makito interfaces, connectors, and LED status indicators:

## System Interfaces (Rear Panel)

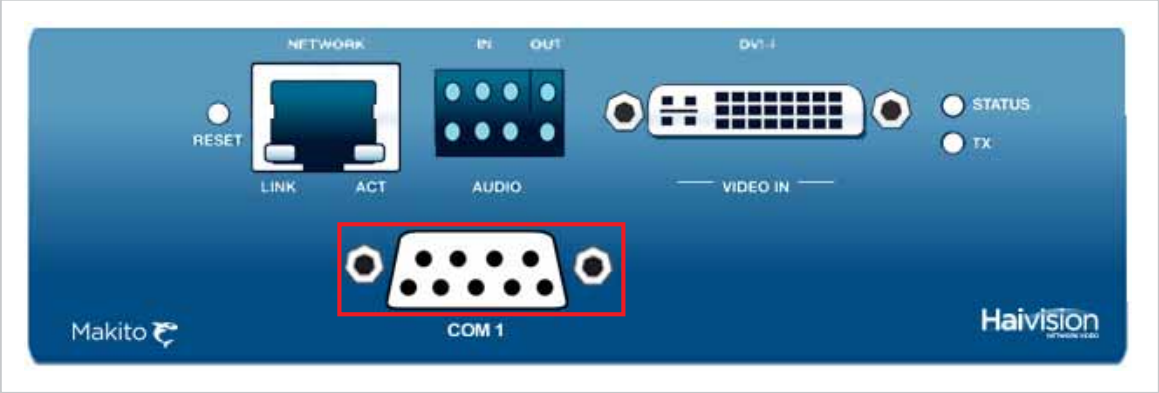
The Makito comes with a 10/100/1000 Base-T Ethernet Network interface for both traffic and management (RJ45).

Figure 1-6 Ethernet Connection (Makito #B-290E-DVI)



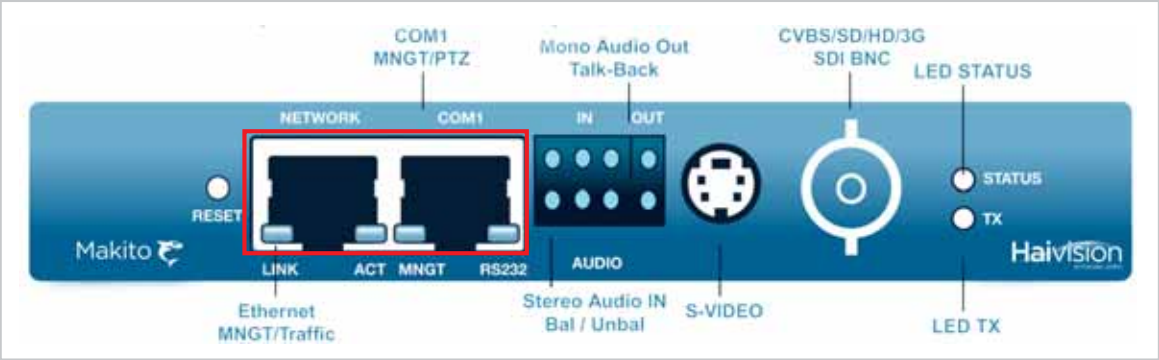

On the Makito Dual Height Blade, a computer can be connected to the COM1 serial port through its DB9 connector.

Figure 1-7 Serial Connection (Makito Dual Height Blade #B-290E-DVI-S)




On the Makito-SDI, a computer can be connected to the COM1 RS-232/422 serial port through its RJ45 connector (Serial Management adapter required).

Figure 1-8 Ethernet and Serial Connections (Makito-SDI #B-290E-HDSDI)




NOTE The COM1 port may also be used for KLV and CoT Metadata Capture and stream insertion. (This option must be installed at the factory.)

## Related Topics

- "Connecting the Encoder to the Network and a Computer" on page 34
- "Serial Interface Setup" on page 36

## Audio / Video Interfaces (Rear Panel)

NOTE The Analog Audio interface is the same for both the Makito (B-290E-DVI) and the Makito-SDI (B-290E-HDSDI).

### Makito DVI-I Input

The Makito video interface consists of a single DVI-I connector (shown below).

Figure 1-9 DVI-I Interface




The DVI-I connector supports the following inputs:

- Component Analog video (Y,Pb,Pr / RGBHV)
- Component Digital video (Y,Cb,Cr / DVI)
- SD and HD video
- Computer graphics

Only one input format – either digital or analog – is encoded at a time.

NOTE If the content is HDCP copy-protected, the stream will not be encoded.

The Makito encoder supports EDID resolution capabilities negotiation.

#### Related Topics

- “Supported Video Encoding Resolutions (Makito #B-290E-DVI)” on page 261
- “Connecting the DVI-I Interface (Makito)” on page 39

## Makito-SDI BNC / S-Video Input

The Makito-SDI video interface consists of one BNC connector and one S-Video connector (shown below).

Figure 1-10 BNC / S-Video Interface




- The 4-pin Mini-DIN connector is used for S-Video input signals.
- The 75Ω BNC connector is used for Composite (CVBS), SD-SDI (Serial Digital Interface) and HD-SDI video input signals. It is also a 3G-SDI capable interface supporting 1080p 50/60 fps video @ 3Gbps.

  In addition, the BNC connector supports auto-detection of the HD resolution and embedded digital audio.

CAUTION Be sure to use an HD video-capable coax cable. Otherwise, the video signal will be too attenuated and the encoder will not sync on it.

### Related Topics

- "Connecting the BNC/S-Video Interface (Makito-SDI)" on page 40
- "Connecting the Encoder to A/V Sources" on page 39

## Audio Interface

The Makito audio interface consists of a single 8-pin terminal block connector for two-channel balanced/unbalanced analog audio input (one stereo pair) and mono audio output.

Figure 1-11 Audio Interface




For the pinout, see "Audio Terminal Block Connector Pinout" on page 42.

An adaptor is required to interface with the audio port. An RCA female to Terminal audio dongle for unbalanced audio is included in the package. To use with balanced audio, see "Modifying the RCA-Terminal Dongle for Balanced Audio" on page 41.

### Related Topics

- "Connecting the Encoder to A/V Sources" on page 39

## LED Status Indicators (Rear Panel)

The LED colors and flashing (blinking) speed indicate the status (operational state) of the Makito Encoder.

Figure 1-12 LED Status Indicators (sample view, Makito-SDI #B-290E-HDSDI)




Table 1-1 LED Status Indicators

| Function | Color | Description | Indication |
|---|---|---|---|
| STATUS | RED/ GREEN | OFF | No power |
| | | RED Solid | Error / Fault |
| | | GREEN Blinking | Booting / Initialization |
| | | GREEN Solid | No Fault / OK |
| TX | AMBER/ GREEN | AMBER Solid | At least one of the conditions below is sufficient to turn the LED AMBER:<br>• Encoder booting<br>• Valid video input NOT detected<br>• Valid digital audio input NOT detected (if digital audio input is selected)<br>• Video Mute is applied<br>• Audio Mute is applied (regardless of the audio input selected) |
| | | GREEN Solid | When ALL the conditions below are met:<br>• Valid video input detected<br>• Valid digital audio input detected (if digital audio input is selected)<br>• No Video Mute is applied<br>• No Audio Mute is applied |

Table 1-1 LED Status Indicators (Continued)

| Function | Color | Description | Indication |
|---|---|---|---|
| Network port | | | |
| LINK | GREEN | OFF | Not Connected |
| | | GREEN Blinking once per second | Connected at 10 Mbps |
| | | GREEN Blinking twice per second | Connected at 100 Mbps |
| | | GREEN Blinking three times per second | Connected at 1000 Mbps |
| ACT | GREEN | OFF | No Activity |
| | | GREEN Intermittent | Little activity (e.g., management). The LED should be lit when there is activity |
| | | GREEN Solid | Intense Activity (e.g., transmitting video traffic) |
| COM1 port (Makito-SDI) | | | |
| MNGT | GREEN | OFF | Port Configured in Pass-through Mode (PTZ) or Metadata capture |
| | | GREEN Solid | Port Configured in Management Mode |
| RS232 | GREEN | OFF | Port Configured in either RS-422/485 |
| | | GREEN Solid | Port Configured in RS-232 |

## Related Topics

- "Powering Up the Unit" on page 47

## Makito Air Interfaces and LEDs

The Makito Air is shipped with an optional MIL connector set or cable set. Customers are responsible for assembling their own cables. Please refer to the connector pinouts included in "Connector Mapping" on page 45.

### System Interfaces (Makito Air)

The Makito Air comes with a 10/100/1000 Base-T Ethernet Network interface [port J1] (shown below) for both traffic and management.

A metadata source can be connected to the serial port [J2] for metadata capture.

Figure 1-13 Makito Air Interfaces and LEDs (Front View)




### Audio / Video Interfaces (Makito Air)

The Makito Air video interface consists of a single BNC connector [J3] for SDI/Composite input.

The Makito Air audio interface includes:

- one BNC (SDI) connector [J3] for embedded digital audio shared with the video input, and
- one Analog Audio input connector [J2] shared with the serial port.

### LED Status Indicators (Makito Air)

The Makito Air STATUS and TX LEDs function the same as the standard Makito LEDs. For the LED colors and flashing (blinking) speed indicators, see "LED Status Indicators (Rear Panel)" on page 27.

#### Related Topics

- "Installing and Connecting the Makito Air" on page 43

# Audio Talkback

The Audio Talkback feature allows two-way audio communication using the Makito encoder's Audio Output to function like an audio decoder. Audio Talkback enables the audience to "talk back" to the people taking or making the video (i.e., at the encoder). For example, students at remote classroom locations are able to ask their teacher questions, or a chief surgeon observing a surgery can collaborate.

Implementing the Audio Talkback feature requires a software player application that sends the talkback to the Makito (see "Setting up Audio Talkback" on page 277). The talkback is played out of the encoder's 8-pin terminal block connector (see "Audio Interface" on page 26).

The following picture illustrates a sample signal path from the Audio Source through the Makito's Audio Output when using the Talkback feature.

Figure 1-14 Audio Talkback Signal Path




There is no audio mixer on the Makito, so the talkback feature is "First-In/First Served", meaning that only one user can use the return audio channel at a time. It is recommended that the software player application provide "push-to-talk" functionality, which requires that the user push a button to transmit audio. The user must keep pushing the button to use the talkback channel. This prevents the user from accidentally locking and not releasing the channel.

CLI commands are used to enable and disable reception of Talkback audio, set the Talkback volume, clear talkback statistics, and display talkback information. For details, see talkback on page 247 (CLI). Talkback audio is not configurable through the Web interface or SNMP in the current release.

NOTE The Audio Talkback is uncompressed audio (using approximately 350 kbps of network bandwidth).

## Hardening

*Hardening* is a term used to describe the process of securing a networked device's various interfaces. This includes removing or limiting certain features to prevent their abuse, and securing the data hosted by the device.

Version 2.1.0 of the Makito adds features which allow the administrative interface to be secured to meet the requirements for Common Criteria (CC) 3.1 Certification at Evaluation Assurance Level 1 (EAL 1), augmented with security requirements for Network Devices Protection Profile (NDPP) assurance requirements.

These features are described in detail in the Makito v2.1.0 Hardening Guide, available from Haivision's Download Center at http://www.haivision.com/download-center/.

The Makito v2.1.0 Hardening Guide provides the procedures to install and configure Makito encoders to be in compliance with the Common Criteria NDPP. This guide is written for administrators and assumes that the reader is familiar with networks and network terminology. No encoder-specific knowledge is required. This guide also assumes that the reader is a trusted individual.



IMPORTANT You must implement the policies and procedures described in the Makito v2.1.0 Hardening Guide to make your Makito compliant with the evaluated configuration. Failure to do so will invalidate your device's Common Criteria certification and introduce security risks.

# CHAPTER 2: Installing the Encoder

This chapter explains how to set up and connect the Makito. It also includes the instructions for factory reset.

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# Setting Up the Encoder

Always read the instructions carefully and keep this User's Guide for future reference.

Please choose a suitable location for operating the encoder(s). By doing so you will preserve long lifesaving and stability of the unit(s).

Set up the encoder on a reliable and flat surface when using the single Makito chassis, or mount in a rack, when using the 1U (MB6) or 4U (MB21) chassis.



CAUTION The MB21 chassis must either be installed on a securely fastened rack shelf, or fastened directly to the rack using support brackets. For instructions on how to properly secure or support the MB21, refer to the MB21 Important Notice (provided in the package and available through Haivision's Download Center).

## Safety First

Please pay particular attention to the following points in order to help protect yourself and the encoder:

- Refer to "Safety Guidelines" on page 3.
- The Makito is an indoor appliance and should be kept in a dry, dust free environment.
- There are no user-serviceable parts inside the unit. Making unauthorized changes will void the warranty.
- Only connect the unit to a compatible power source.
- If an electrical fault occurs, disconnect the unit and contact Haivision Technical Support.
- Never try to force the connections when setting up the system as this may damage the unit.
- The MB21 and MB6-AC chassis have more than one power supply cord. Disconnect both (2) power supply cords before servicing to avoid electric shock.

# Connecting the Encoder to the Network and a Computer

## To connect the Network Interface:

1. Connect the Ethernet port to the IP network using an Ethernet UTP cable (Type Cat 5 or higher).

   This will allow you to telnet to the unit or connect via the Web interface.

Figure 2-1 Network Connector (Makito #B-290E-DVI)




## To connect the Serial Interface:

The serial interface is available on the Makito Dual Height Blade and the Makito-SDI.

1. (Optional) Connect the COM1 port to the serial port of a computer:
   - Makito Dual Height Blade: Use the DB9 connector and a null modem serial cable.
   - Makito-SDI: Use the grey RS-232 DB9 to RJ45 Serial Management Adaptor (Makito-SDI #B-290E-HDSDI) (included in the package) and a standard straight Ethernet cable.

   This will allow you to communicate directly from your computer to the Makito using a serial communication application such as HyperTerminal or Minicom. This is only required if you wish to use the Serial Management COM1 port instead of the Web interface. For more information, see "Serial Interface Setup" on page 36.

Figure 2-2 Serial Connector (Makito Dual Height Blade #B-290E-DVI-S)

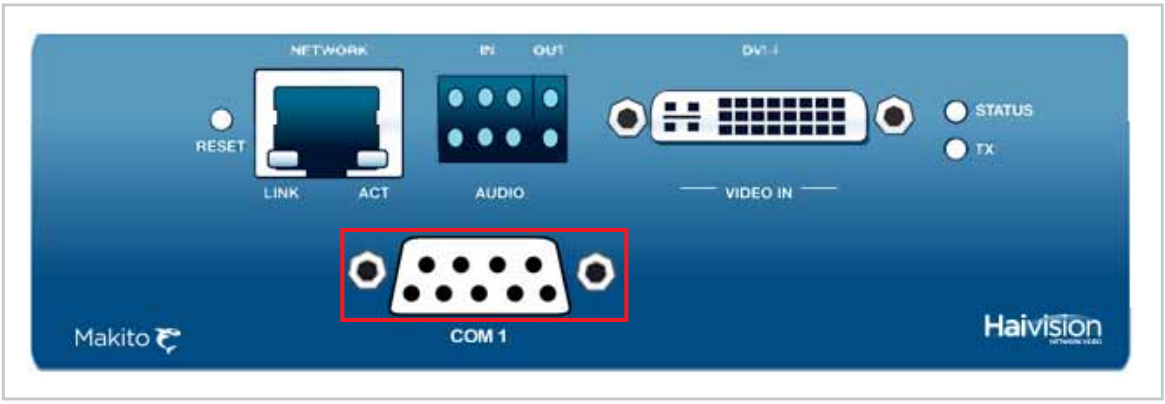



Figure 2-3 Network and Serial Connectors (Makito-SDI #B-290E-HDSDI)

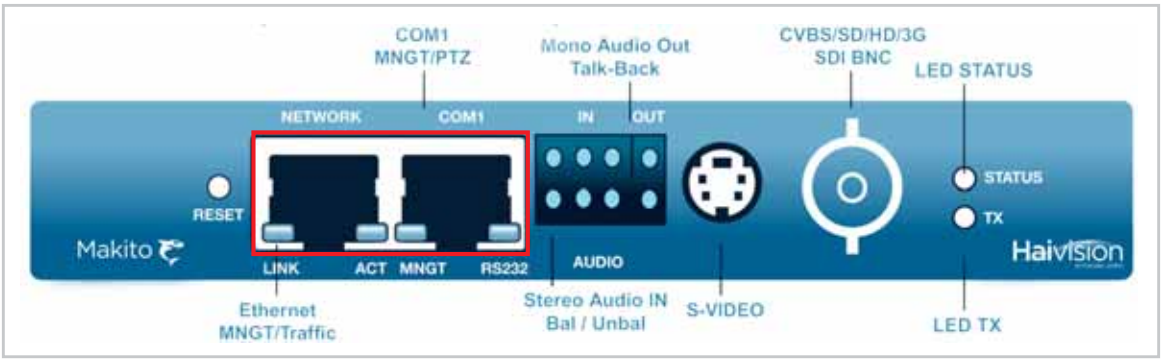
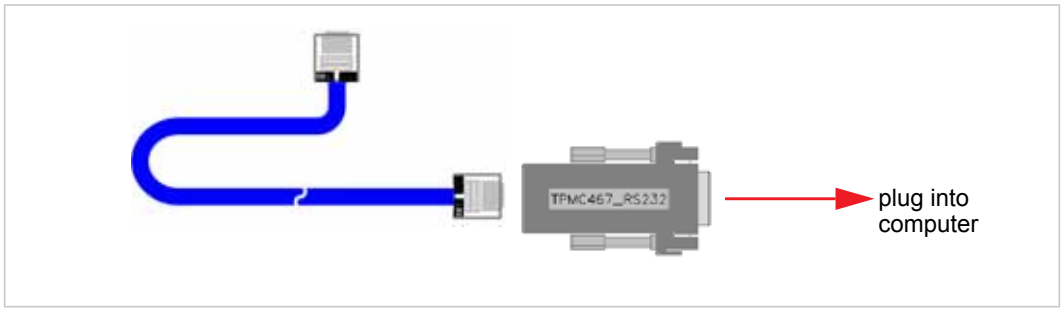



Figure 2-4 Serial Management Adaptor (Makito-SDI #B-290E-HDSDI)



CAUTION Take care not to plug the Ethernet cable from an Ethernet switch (especially a Power over Ethernet (PoE) switch) directly into the COM1 serial port as it may damage the encoder.

### Related Topics:

- For details on the connectors, see "System Interfaces (Rear Panel)" on page 22.
- To set the terminal parameters to interface with the serial COM1 port, see the following section, "Serial Interface Setup".

## Serial Interface Setup

The serial interface is available on the Makito Dual Height Blade and the Makito-SDI.

Prior to logging in to the Makito for the first time, you may wish to change the unit's default network settings to match the network in which it will be used. You can do so by connecting directly to the Makito's serial COM1 port from your computer using HyperTerminal (or other serial communication application).

Or you can (optionally) configure your system to capture CoT or KLV metadata from the serial port interface. Note that metadata capture is an optional feature and must be installed at the factory.

In either case, to get started, you must set the terminal parameters to communicate with the Makito.

### To set up the serial interface:

1. Connect the Makito's COM1 port to your computer as described in the previous section, "Connecting the Encoder to the Network and a Computer".
2. Power up the computer and start the serial communication application.
3. Set up the terminal parameters as follows:

| Parameter | Setting |
|---|---|
| baud rate | 115,200 bps |
| data bits | 8 |
| parity | None |
| stop bit | 1 |
| flow control | None |

4. Power up the Makito. (See "Powering Up the Unit" on page 47.)

5. From the serial communication application, press **Enter** to get a prompt from the Makito.

   It takes approximately two minutes for the Makito to boot. The system will request a login, or display the shell prompt if an active session is still running.



TIP You can view the COM port settings from the Web interface. For information, see "Managing the COM Port" on page 114.

We recommend that you log out from the Makito and exit from the serial communication application *before* disconnecting the COM1 port.

## COM1 Serial Port DB9 Pinout (Makito Dual Height Blade)

On the Makito Dual Height Blade, the COM1 serial port uses a DB9 connector which has the following pinout:

Table 2-1 COM1 Serial Port DB9 Pinout (Makito Dual Height Blade)

| DB9 Pin# | RS-232 Signal Name | RS-485 / RS422 Signal Name |
|---|---|---|
| 1 | N/C | N/C |
| 6 | N/C | N/C |
| 2 | COM0_RXD | COM0_RXDP |
| 7 | N/C | COM0_TXDP |
| 3 | COM0_TXD | COM0_TXDN |
| 8 | N/C | COM0_RXDN |
| 4 | N/C | N/C |
| 9 | N/C | N/C |
| 5 | GND | GND |
| N/A | N/A | N/A |

## COM1 Serial Port RJ45 Pinout (Makito-SDI)

On the Makito-SDI, the COM1 serial port uses an RJ45 connector which has the following pinout:

Table 2-2 COM1 Serial Port RJ45 Pinout (Makito-SDI)

| Pin # | Signal | Name |
|---|---|---|
| 1 | n/c | Not connected |
| 2 | n/c | Not connected |
| 3 | n/c | Not connected |
| 4 | GND | Signal Ground |
| 5 | RXD | Receive Data |
| 6 | TXD | Transmit Data |
| 7 | n/c | Not connected |
| 8 | n/c | Not connected |

An adaptor is required to interface with the serial port. A (grey) DB9 to RJ45 Serial Management adaptor (shown in Figure 2-4 on page 35) is included in the package.

# Connecting the Encoder to A/V Sources

## Connecting the DVI-I Interface (Makito)

NOTE When configuring the encoder, you *must* select the Video Input type, either Analog (Component/RGB) or Digital (HDMI/DVI). See "Video Settings" on page 72 (Web interface), or "videnc Parameters" on page 253 (CLI).

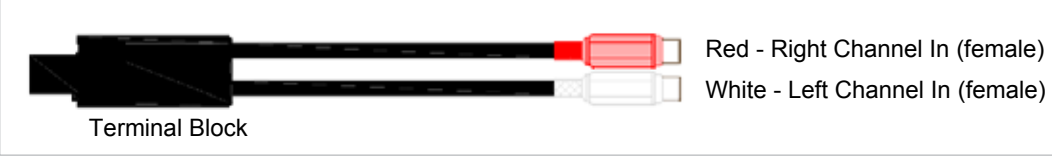
### To connect the Makito DVI-I Interface:

1. Component Analog / Digital Video / Computer Graphics: Connect your Video Source cable to the Makito DVI-I Input connector.
2. Analog Audio In: Connect your Audio Source cable to the Makito Audio 8-pin terminal block connector (shown below).
   - For unbalanced audio, use the RCA female to Terminal audio dongle (included in the package, shown below).
   - For balanced audio, see "Modifying the RCA-Terminal Dongle for Balanced Audio" on page 41.

Figure 2-5 DVI-I Input Connections




Figure 2-6 Audio RCA to Terminal Dongle (unbalanced audio)



### Related Topics

- "Modifying the RCA-Terminal Dongle for Balanced Audio" on page 41
- "Audio Terminal Block Connector Pinout" on page 42

## Connecting the BNC / S-Video Interface (Makito-SDI)

NOTE The same BNC connector is used for Composite and SDI Video Input and Embedded Digital Audio Input.

When configuring the encoder, you *must* select the Video Input type. See "Video Settings" on page 72 (Web interface), or "videnc Parameters" on page 253 (CLI).

### To connect the BNC / S-Video Interface:

1. Video In: Connect your Video Source cable to *one* of the Makito-SDI's Video Inputs, using the appropriate connector:
   - S-Video: Use the 4-pin mini-DIN connector.
   - Composite (CVBS) Video: Use the BNC connector.
   - SDI Video / Audio (either SD or HD): Use the BNC connector.
2. Analog Audio In: Connect your Audio Source cable to the Makito-SDI's 8-pin Audio terminal block connector (shown below).
   - For unbalanced audio, use the RCA female to Terminal audio dongle (included in the package, shown below).
   - For balanced audio, see "Modifying the RCA-Terminal Dongle for Balanced Audio" on page 41.

Figure 2-7 BNC / S-Video Connections



Figure 2-8 Audio RCA to Terminal Dongle (unbalanced audio)

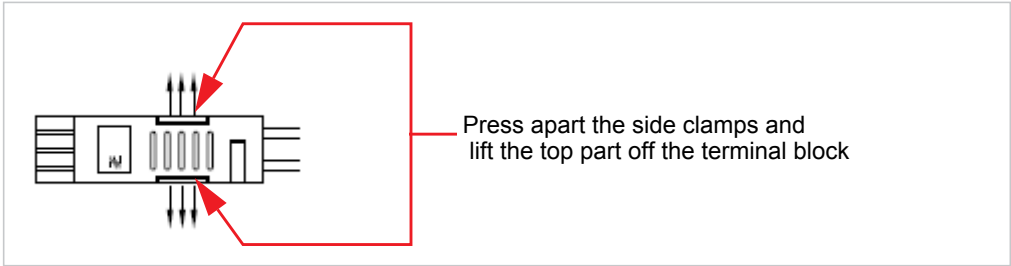



## Modifying the RCA-Terminal Dongle for Balanced Audio

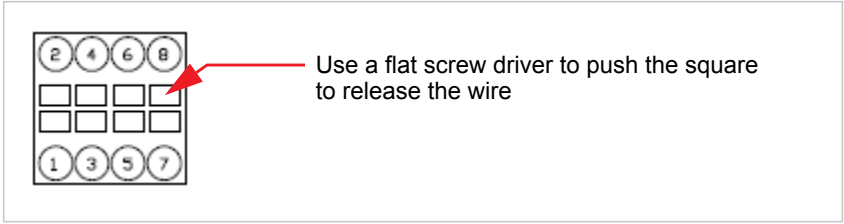
For balanced audio, you can modify the audio RCA to Terminal dongle provided in the package to re-use the terminal block connector.

### To modify the RCA-Terminal dongle for Balanced Audio:

1. Remove the cover from the terminal block connector.




2. To release each wire, use a flat screw driver and push it in the rectangular area. (The terminal block has tension clamp connections.)



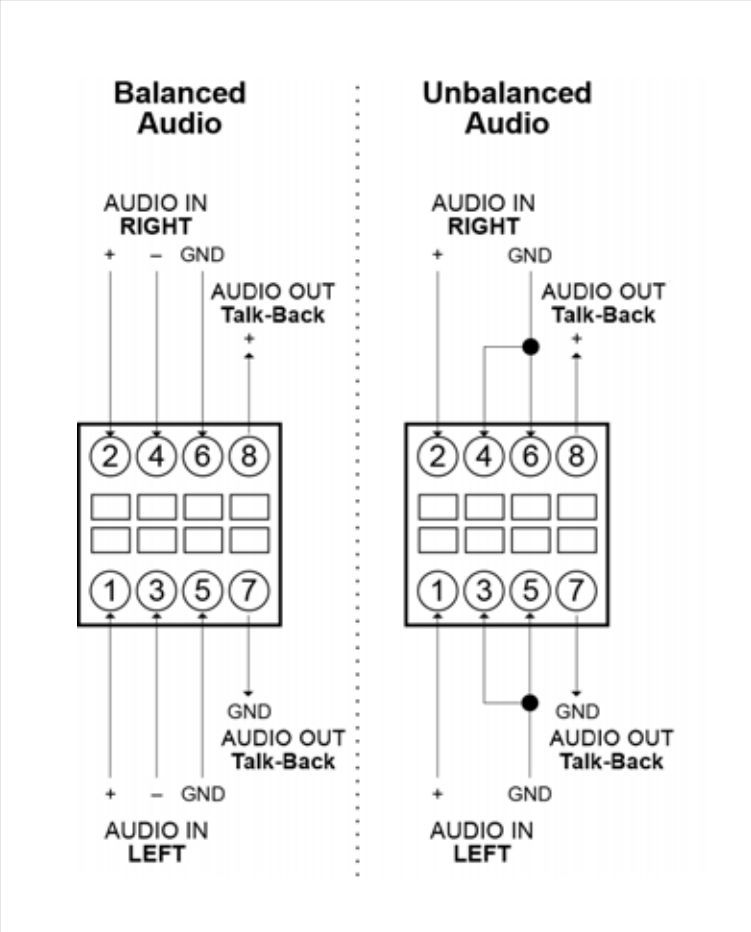

3. Pull each wire to remove it from the terminal block.
4. Prepare your new audio wires by removing about .150 inch of the wire's insulation.
5. Insert the new wires by pressing the tension clamp and then removing the screw driver to release the tension clamp.

   Refer to "Audio Terminal Block Connector Pinout" for the balanced/unbalanced audio pinout.

## Audio Terminal Block Connector Pinout

The Makito 8-pin audio terminal block connector has the following pinouts:

Figure 2-9 Balanced and Unbalanced Audio Connector Pinouts




### Related Topics

- For more information on the audio connections, see "Audio/Video Interfaces (Rear Panel)" on page 24.

# Installing and Connecting the Makito Air

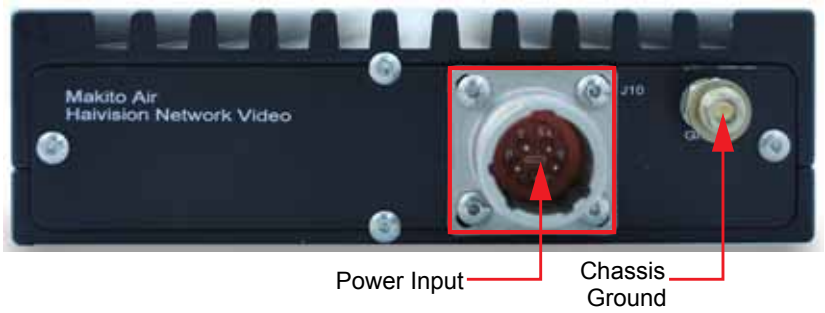
### To install the Makito Air:

1. Fasten the Makito Air to a flat surface (such as an equipment bay or rack) using the four (4) threaded mounting holes (#10-32 screws).
2. Customers are responsible for assembling their own cables. Please refer to "Connector Mapping" on page 45 for connector pinouts.

CAUTION Special care must be taken when wiring the supply. This unit is not protected against polarity reversal, and if it occurs, the unit will be damaged (servicing will be required). The cabling must be done in such a way as to maintain the safety, electrical and environmental integrity of the product.

3. Connect the DC input power cable to the power input [J10] at the rear of the unit (shown below).

Figure 2-10 Makito Air Rear View




NOTE Required supply voltage: 28VDC.

4. Connect the chassis ground wire to the ground lug at the rear of the unit.

### To connect the Makito Air to the Network and A/V Sources:

1. Connect the Makito Air's Ethernet port [J1] to the IP network using a Type Cat 5E cable.

Figure 2-11 Makito Air Front View




2. Connect the Makito Air's Serial port [J2] to the metadata source using a Serial RS-232 cable.
3. Video In: Connect the Makito Air's Video/Embedded Audio Input [J3] to your Audio/Video sources using the BNC connector and a coaxial cable, for either Composite (CVBS) Video or SDI Video/Audio.
4. Analog Audio In: Connect the Makito Air's Analog Audio port [J2] to your Audio Source cable.

NOTE For wiring unbalanced or balanced audio, see "Connector Mapping" on page 45.

## Connector Mapping

The following tables show the Makito Air connector pinouts:

Table 2-3 J1 Connector Pinout (Ethernet) (13 pin female Amphenol MIL-DTL-38999 / 20MB35SN)

| | Pin Name | Type | Description |
|---|---|---|---|
| 1 | ETH_DAP | BI | 10/100 BASE-T Transmit differential pair / Gigabit Ethernet differential pair A (bi-dir) |
| 2 | ETH_DAN | BI | |
| 3 | ETH_DBP | BI | 10/100 BASE-T Receive differential pair / Gigabit Ethernet differential pair B (bi-dir) |
| 4 | ETH_DBN | BI | |
| 5 | ETH_DCP | BI | 10/100 BASE-T (Unused) / Gigabit Ethernet differential pair C (bi-dir) |
| 6 | ETH_DCN | BI | |
| 7 | ETH_DDP | BI | 10/100 BASE-T (Unused) / Gigabit Ethernet differential pair D (bi-dir) |
| 8 | ETH_DDN | BI | |
| 9 | NC | | Not Connected |
| 10 | NC | | Not Connected |
| 11 | NC | | Not Connected |
| 12 | RESETN | IN | Hardware Reset (signal is asserted LOW) |
| 13 | GND | REF | Ground |

Table 2-4 J3 Connector Pinout (Video Coaxial) (75-ohm BNC)

| | Pin Name | Type | Description |
|---|---|---|---|
| 1 | VID | IN | SDI / Composite video signal |
| 2 | VID_GND | REF | SDI / Composite ground (Cable shield) |

Table 2-5 J2 Connector Pinout (Serial Port / Analog Audio) (13 pin female Amphenol MIL-DTL-38999 / 20MB35SA)

| Pin # | Pin Name | Type | Description |
|---|---|---|---|
| 1 | COM_TXDP | OUT | Serial Interface: RS-232/RS-422 Transmit Data [only use J2-Pin2 in RS232 mode (shaded in gray)] |
| 2 | COM_TXDN | OUT | |
| 3 | GND | REF | Shield |

Table 2-5 J2 Connector Pinout (Serial Port / Analog Audio) (13 pin female Amphenol MIL-DTL-38999 / 20MB35SA)

| Pin # | Pin Name | Type | Description |
|---|---|---|---|
| 4 | COM_RXDP | IN | Serial Interface: RS-232/RS-422 Receive Data [only use J2-Pin4 in RS232 mode (shaded in gray)] |
| 5 | COM_RXDN | IN | |
| 6 | GND | REF | Shield |
| 7 | AUD_IN_LP | IN | Analog Audio interface: LEFT channel differential pair |
| 8 | AUD_IN_LN | IN | |
| 9 | AUD_LGND | REF | Audio Ground |
| 10 | AUD_IN_RP | IN | Analog Audio interface: RIGHT channel differential pair |
| 11 | AUD_IN_RN | IN | |
| 12 | AUD_RGND | REF | Audio Ground |
| 13 | NC | | Not Connected |

Table 2-6 J10 Connector Pinout (DC Power) (5 pin male Amphenol MIL-DTL-38999 / 20MB5PN)

| | Pin Name | Type | Description |
|---|---|---|---|
| A | PWR_IN | REF | PSU +28VDC Input |
| B | PWR_GND | REF | PSU ground return |
| C | NC | | |
| D | CH_GND | REF | Chassis ground |
| E | NC | | |

# Powering Up the Unit

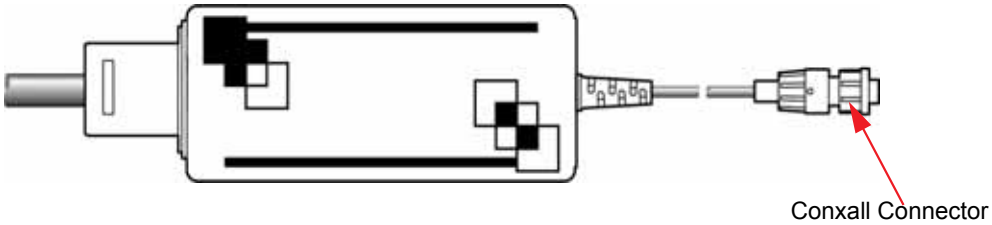
Once all the cables are in place, the Makito is ready to be powered up.

## Single Blade Chassis

Figure 2-12 Rear View (Single Chassis) showing Locking Power Connector




Figure 2-13 Single Chassis Power Adapter 5VDC with Conxall Connector




NOTE There is no power switch on the Makito appliance. The power is automatically on when the unit is plugged in. The power supply cord is used as the main disconnect device.

Ensure that the AC socket outlet is located near the equipment and is easily accessible.

### To power up the Single Blade Chassis:

1. Insert the Conxall connector on the 5V power supply into the Power input jack at the rear of the Makito.



CAUTION To prevent damage to the encoder and/or power supply, be sure to connect the power supply to the chassis *first* and then to the AC source.

Make sure the connector is properly inserted and locked to avoid intermittent power problems.

2. Connect the power cord to the power supply and plug the cord into an earthed AC power source.

   The Status LED will start blinking green, indicating that the encoder is booting up.

3. Wait until the Status LED stays solid green, indicating that the encoder is ready for operation.

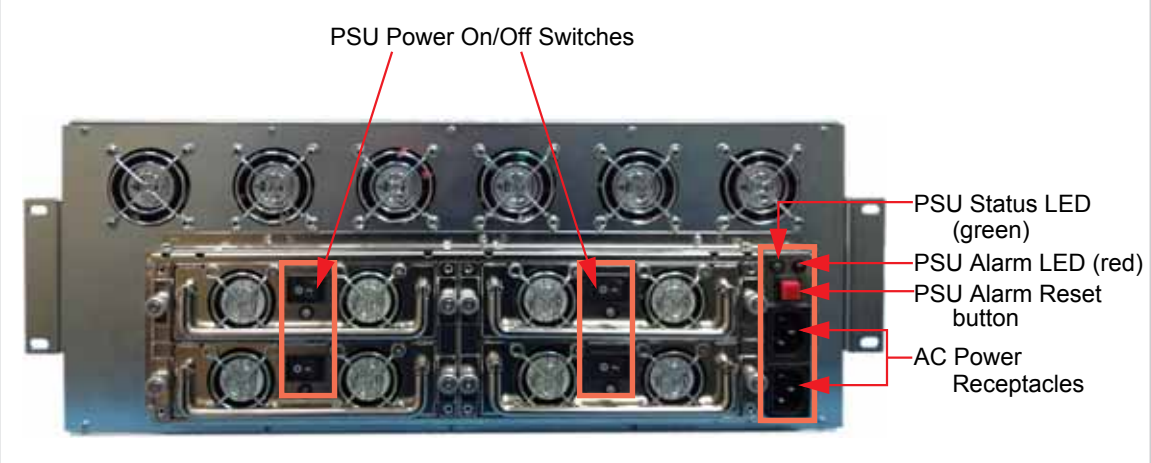
To begin configuring video streams, you can either open the Web interface, or log in to the CLI.

- To use the Web interface, see "Logging In to the Web Interface" on page 64.
- To enter CLI commands, see "CLI Command Reference" on page 174.

## MB21 (21-Slot) Chassis

**WARNING** To prevent electric shock, do not remove the cover of the MB21 chassis. There are no user-serviceable parts inside. The MB21 chassis is to be installed and serviced by qualified personnel only.

Figure 2-14 MB21 Chassis Rear View showing Power Connectors




Each socket on the PDU (Power Distribution Unit) powers a pair of PSUs (Power Supply Units). Two PSUs are sufficient to power a fully loaded chassis.

The MB21 chassis is designed to tolerate the following without loss of installed card functionality:

- The loss of one AC supply (120/240V) source.

  Since there are two power inlets on the MB21 chassis, the cards in the chassis can operate with only one powered; however, the chassis would not be fully redundant.
- The loss of one or two PSUs of the four PSUs in the MB21 chassis in any combination.

### To power up the MB21 Chassis:

1. Turn all four PSU Power On/Off switches to the ON (1) position.
2. Connect the power cords to both power receptacles.
3. Plug both cords into earthed AC power sources.



TIP To ensure redundancy, each power input should be connected to a different 120/240V circuit and be isolated.

The PSU Status LED will turn green indicating that the chassis is powered up (only if all four Power On/Off switches are On).

In the front of the chassis, the Makito Status LEDs will start blinking green, indicating that the encoders are booting up.

4. Wait until the Status LEDs stay solid green, indicating that the encoders are ready for operation.



CAUTION The power supply cords are used as the main disconnect devices on the MB21 chassis. Therefore, ensure that the socket-outlet is located/installed near the equipment and is easily accessible.

The MB21 chassis has more than one power supply cord. Be sure to disconnect both (2) power supply cords before servicing to avoid electric shock.

To begin configuring video streams, you can either open the Web interface, or log in to the CLI.

- To use the Web interface, see "Logging In to the Web Interface" on page 64.
- To enter CLI commands, see "CLI Command Reference" on page 174.

## MB6 (6-Slot) Chassis

The MB6 is available in three power supply types:

- MB6-AC: Redundant AC Power supply (Dual-Input, Dual-Power supply)
- MB6-MED: Medical Grade AC power supply, Non-Redundant (Single-Input, Single power supply)
- MB6-DC: DC Power supply, Non-Redundant (Single-Input, Dual-Power supply)

WARNING To prevent electric shock, do not remove the cover of the MB6 chassis. There are no user-serviceable parts inside. The MB6 chassis is to be installed and serviced by qualified personnel only.

Figure 2-15 MB6-AC Chassis showing Power Connectors

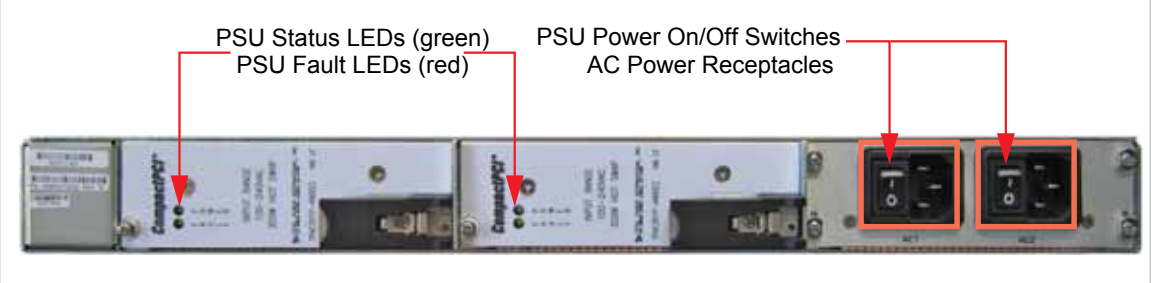



Figure 2-16 MB6-MED Chassis showing Power Connector




CAUTION The power supply cords are used as the main disconnect devices on the MB6-AC and MB6-MED chassis. Therefore, ensure that the socket-outlet is located/installed near the equipment and is easily accessible.

The MB6-AC chassis has more than one power supply cord. Be sure to disconnect both (2) power supply cords before servicing to avoid electric shock.

### To power up the MB6-AC or MB6-MED Chassis:

1. Make sure the power switch(es) on the back of the chassis are in the OFF (2) position.
2. Connect the power cord(s) to one (or both) of the power receptacles.
3. Plug the cord(s) into an earthed AC power source.
4. Turn one or both PSU Power On/Off switches to the ON (1) position.

   On the MB6-AC, the PSU Status LEDs will turn green indicating that the chassis is powered up.

   In the front of either chassis, the Makito Status LEDs will start blinking green, indicating that the encoders are booting up.
5. Wait until the Status LEDs stay solid green, indicating that the encoders are ready for operation.

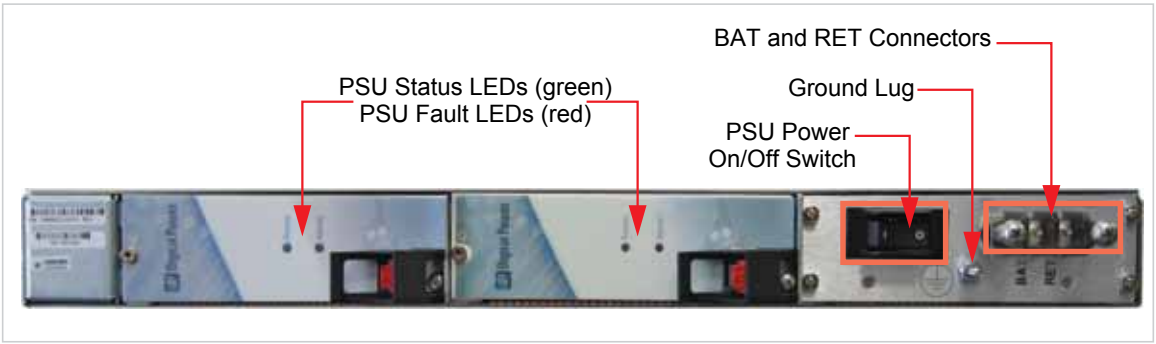
### To power up the MB6-DC Chassis:

1. Make sure the power switch is in the OFF (2) position.
2. Locate DC Power IN connectors BAT and RET on the back of the chassis.
3. Connect the chassis ground wire to the ground lug on the back of the chassis.

   Adhere to your organization's policy on the gauge of the ground wire (12 AWG, insulated, stranded) and the number of crimps on the lug.
4. Wrap each wire around the screw on the connector, and then tighten the screw firmly.

NOTE Connect the screw marked BAT to a +28 VDC power source and the screw marked RET to the neutral wire.

Figure 2-17 MB6-DC Chassis showing Power Connectors




The PSU Status LEDs will turn green indicating that the chassis is powered up.

In the front of the chassis, the Makito Status LEDs will start blinking green, indicating that the encoders are booting up.

5. Wait until the Status LEDs stay solid green, indicating that the encoders are ready for operation.

To begin configuring video streams, you can either open the Web interface, or log in to the CLI.

- To use the Web interface, see "Logging In to the Web Interface" on page 64.
- To enter CLI commands, see "CLI Command Reference" on page 174.

# Resetting the Encoder

This section describes the procedures to perform either a Power Reset or Factory Reset.

- A Power Reset is equivalent to simply powering the unit off and on.
- A Factory Reset powers the unit off and on, and returns the encoder to the same settings it originally had when shipped from Haivision, including the factory default IP address, subnet, and gateway.

  After a Factory reset, only the firmware revision, serial number, and MAC address are preserved. Everything else is wiped out (including saved configurations, added user accounts, modified passwords, and encoding settings).

### To reset the Makito:

1. With the encoder on, insert a small plastic tool into the small opening labeled Reset on the Makito faceplate.

Figure 2-18 Reset micro switch (Sample view)




### Power Reset

2. For a power reset, press the micro switch (you will feel the button depress) for at least one second and release. Be sure to release the button in less than 5 seconds.

   This resets the unit.

   -or-

### Factory Reset

3. To reset the Makito to its factory default settings, press the micro switch (you will feel the button depress) and hold for five (5) seconds.

   The Makito will reboot on its own. As soon as the lights stop blinking and the Status LED is solid green, the encoder is ready.

## Default Network Settings

After a factory reset, the Network settings should be:

| IP Address | Subnet Mask | Gateway |
|---|---|---|
| 10.5.1.2 | 255.255.0.0 | 10.5.0.1 |

# Hardware Maintenance

The following maintenance tasks are recommended for the Makito appliance.

## Cleaning the Ventilation (Intake / Outtake) and Filter

To clean the intake and outtake vents, use a dry cloth or an aspiration device approved for electronic equipment.

Maintenance should be done every 6 months (more often in a dusty environment).

## Monitoring of the Fan Operation

There is no system level monitoring of the fan operation; however, you can check to see if the fan is operating in one of two ways:

- If the appliance is easily accessible, turn the unit over and listen (an operational fan makes a humming noise).
- Use the CLI (`temperature get` command) to get information from the built-in temperature sensors. For details, see "temperature" on page 249. If the internal temperature of the unit is rising, that is an indication that the fan may not be operating properly.

# PART II: Session Configuration and Management

# CHAPTER 3: Managing the Encoder

This chapter begins with a management overview of the Makito, followed by system access control information. It then explains how to set up video encoding, as well as manage and maintain the encoder using the Web interface.

NOTE Before proceeding, make sure that the encoder is set up correctly and all necessary network and A/V connections are established. See Chapter 2: "Installing the Encoder".

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# Management Overview

All Makito interfaces and applications such as Audio/Video services and IP links may be configured, managed, and monitored through the Web interface, the Command Line Interface (CLI), or an SNMP server. All methods require access to the Makito through its Ethernet LAN port or (if applicable) the Serial Management port.

## Using the Web Interface

Managing the Makito from the Web interface requires a connection from the unit's LAN port to your network. You must then connect a PC or other workstation with a Web browser to the network to access the Web interface.

The remainder of this chapter provides information on how to configure and manage the Makito from the Web interface.

## Using the CLI

Management via the CLI is possible through a telnet session, SSH, or (if applicable) RS-232.

For a list and description of the CLI commands to configure and manage the Makito, see Appendix A: "CLI Command Reference".

## SNMP-based Management

(Simple Network Management Protocol) SNMP-based management uses Network Management Stations (NMSs) to collect data or configure devices (SNMP agents) across a TCP/IP network. The NMS communicates with the Makito through the exchange of SNMP messages.

For information on SNMP management of the Makito, see Chapter 5: "Configuring A/V Services Using SNMP".

# Accessing the Encoder

## Web Interface

### To access the encoder configuration Web page:

1. From your computer, open a Web browser.
2. Type the encoder's IP Address in the browser's address bar (see "Default Encoder IP Address" below) and press Enter.
3. Log in (see "Logging In to the Web Interface" on page 64).

### Security Steps

Only secured HTTP (HTTPS) is supported for the Web Interface; therefore, a server certificate is required. The encoder automatically generates a self-signed certificate and your browser will recommend that you do not proceed.

If you have not changed the factory defaults on the encoder, a certificate with factory default subjects exists (DNS: haivision-ace, IP: 10.5.1.2). Proceed temporarily if you can, since this default certificate will be deleted and re-generated (see below).

If you or your system administrator do not install your own certificate, a new one will be generated upon reboot the first time a non-factory IP address is detected with the configured hostname, DNS, and IP address. Accept this certificate and proceed to the Web Interface.

## CLI

### To access the encoder CLI:

1. Open a telnet session to the encoder (see "Default Encoder IP Address" below).
2. At the login prompt, type the username and password (see "Role-based Authorization" on page 62).

# Default Encoder IP Address



NOTE If you haven't changed the factory presets, and if not specified elsewhere in the shipment, the encoder's IP Address is set by default to: 10.5.1.2.

To be able to log in to the Makito Web interface, your computer has to be in the same IP Address range (subnet).

You may have to temporarily change your computer's IP Address to be in the same subnet as the encoder. Only then you will be able to access the encoder and change the encoder's IP Address, and then afterwards change your computer's IP Address back.

TIP After you change the encoder IP Address, be sure to document it somewhere or label the chassis. Otherwise if you do not know the current IP Address, you will need to reset the Makito to its factory settings, which will return the unit to the default IP address (and you will lose any saved configurations and settings). For more information, see "Resetting the Encoder" on page 54.

## Role-based Authorization

The Makito uses role-based authorization control to secure the Web Interface and CLI. As of Version 2.1.0, administrators can create new accounts and thus allocate an account to each user of the system.

The Makito provides three defined account roles to assign privileges to users:

| Role | Default Username | Default Password | Privileges |
|---|---|---|---|
| Guest | user | public | Read-only access to the system. |
| Operator | operator | supervisor | All rights to configure A/V and stream settings and reboot the system.<br>Does not include rights to upgrade the system, modify the network settings, or manage accounts. |
| Administrator | admin | manager | All access rights and Administrator privileges. |

The table below summarizes role-based access to functional modules:

| Functional Modules | Guest | Operator | Administrator |
|---|---|---|---|
| Operation | | | |
| Video Settings | Read-only | Yes | Yes |
| Audio Settings | Read-only | Yes | Yes |
| Metadata Settings | Read-only | Yes | Yes |
| Stream Settings | Read-only | Yes | Yes |
| RTSP Settings | Read-only | Yes | Yes |
| Media Effects | Read-only | Yes | Yes |
| Video Profiles | Read-only | Yes | Yes |
| Configuration Files | - | Yes | Yes |

| Functional Modules | Guest | Operator | Administrator |
|---|---|---|---|
| COM Port[1] | Read-only | Yes[2] | Yes |
| System Status | Read-only | Yes | Yes |
| Administration | | | |
| Network Settings | Read-only | Read-only | Yes |
| Firmware Upgrades | - | - | Yes |
| Services | - | - | Yes |
| Messages | - | - | Yes |
| Security | | | |
| My Account / Accounts | Yes[3] | Yes[3] | Yes[3] |
| Banner | - | - | Yes |
| Cryptographic Policies | - | - | Yes |
| Certificates | - | - | Yes |
| Security Audit | - | - | Yes |

1. Only Administrator accounts can set the COM port operation mode (i.e., Meta-data vs. Management). When the COM port is in Metadata mode, operators can configure the COM port settings but cannot change the mode.
2. If the COM port is in Metadata mode.
3. Guest and Operator accounts see “My Account” on the SECURITY submenu and can only view/change their own account settings. Administrator accounts see “Accounts” on the SECURITY submenu and can view/manage all user accounts.

All three roles provide both Web interface and CLI access to the system. These roles and their privileges are also supported using VACM (View-based Access Control Model) for SNMP access control.

Administrators can create, delete, lock, and unlock user accounts, including changing the password, from the Accounts page (see “Managing Accounts” on page 138). Operators and guests can manage their password from the My Account page (see “Changing Your Password” on page 69).

You can also change your own account password CLI using the passwd command.

Note that any changes to the default passwords, created accounts, and deleted default accounts will be lost after a Factory Reset or a firmware downgrade. Factory Reset restores the default accounts and passwords.

### Related Topics:

- CLI Access Control

# Logging In to the Web Interface

## To log in to the Makito configuration Web page:

1. From your Web browser, type the Makito's IP Address into the address field and press Enter.

   (Optional) On some systems, you will see an Advisory and Consent Banner page, as shown in the following example.




2. Review the Advisory and Consent terms as required for your system and click OK.

   The browser will now display the Login page for the Web configuration interface.

3. On the Login page, type the Username and Password and click Login (or press Enter).




The default administrative Username and Password are:

Username: admin
Password: manager

For other default Usernames and Passwords, see the previous section, "Role-based Authorization".

NOTE The first time you sign into a newly created account as well as any time your password has expired, you will see a Change Password dialog (as shown in the following example).




For information on changing the default password for your account, see "Changing Your Password" on page 69.

# Exploring the Web Interface

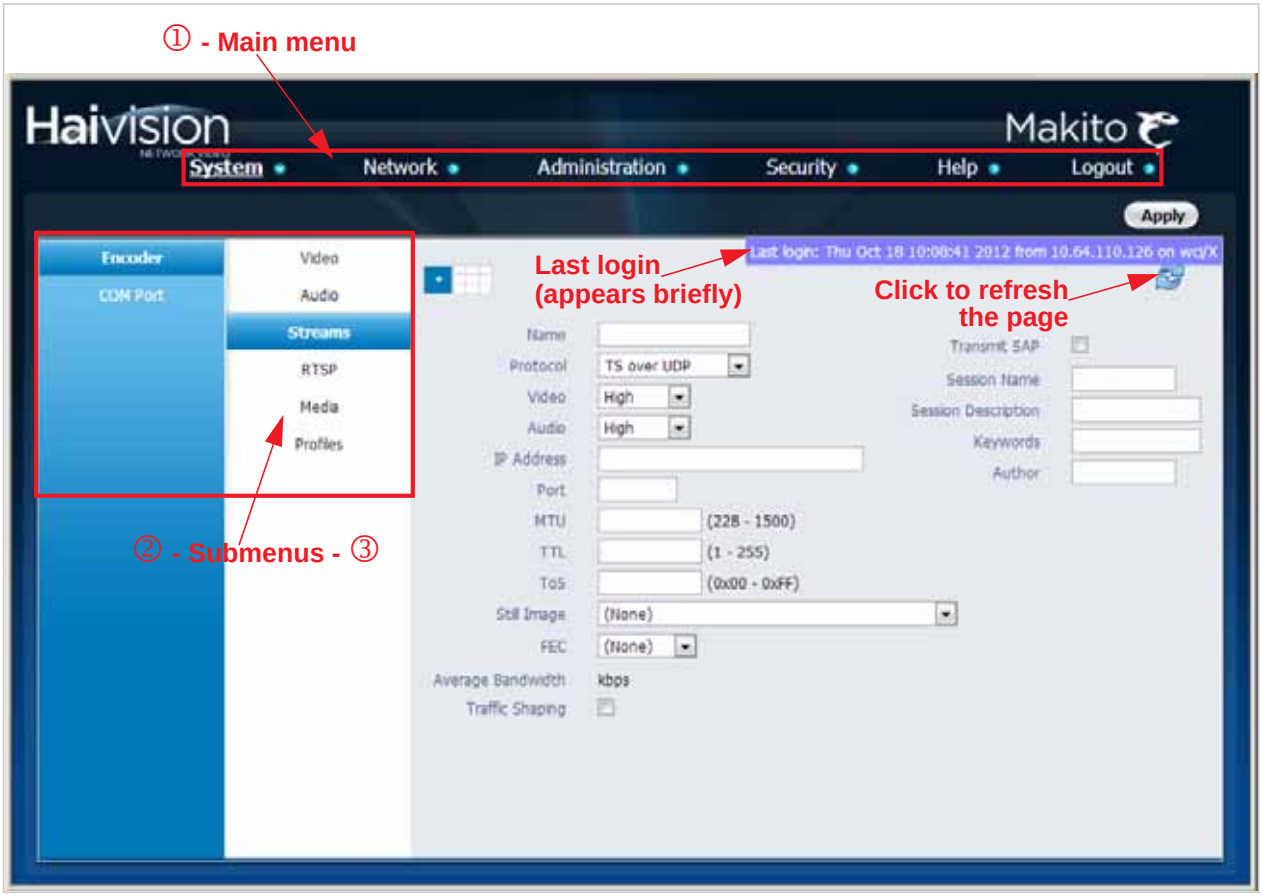
TIP Selecting Help from the menu bar will launch the online help. For more information, see "Online Help" on page 68.

After logging in to the Web configuration interface, you will have access to the encoder configuration settings. All of the settings can be adjusted via the Web browser.

## Navigational Menus

You can access the Makito configuration settings by selecting any of the following:

1. Either SYSTEM, NETWORK, ADMINISTRATION, or SECURITY from the Main Menu (along the top bar, see example below),
2. The configuration area from the submenu (for example, ENCODER or COM PORT), and
3. Where available, a further configuration level (for example, ENCODER>VIDEO, AUDIO, STREAMS, RTSP, MEDIA, or PROFILES).



## Apply and Save Buttons

On most pages, you must click the Apply or Save button in order for your changes to take effect. The table below explains the differences between Apply and Save.

Table 3-1 Apply and Save buttons

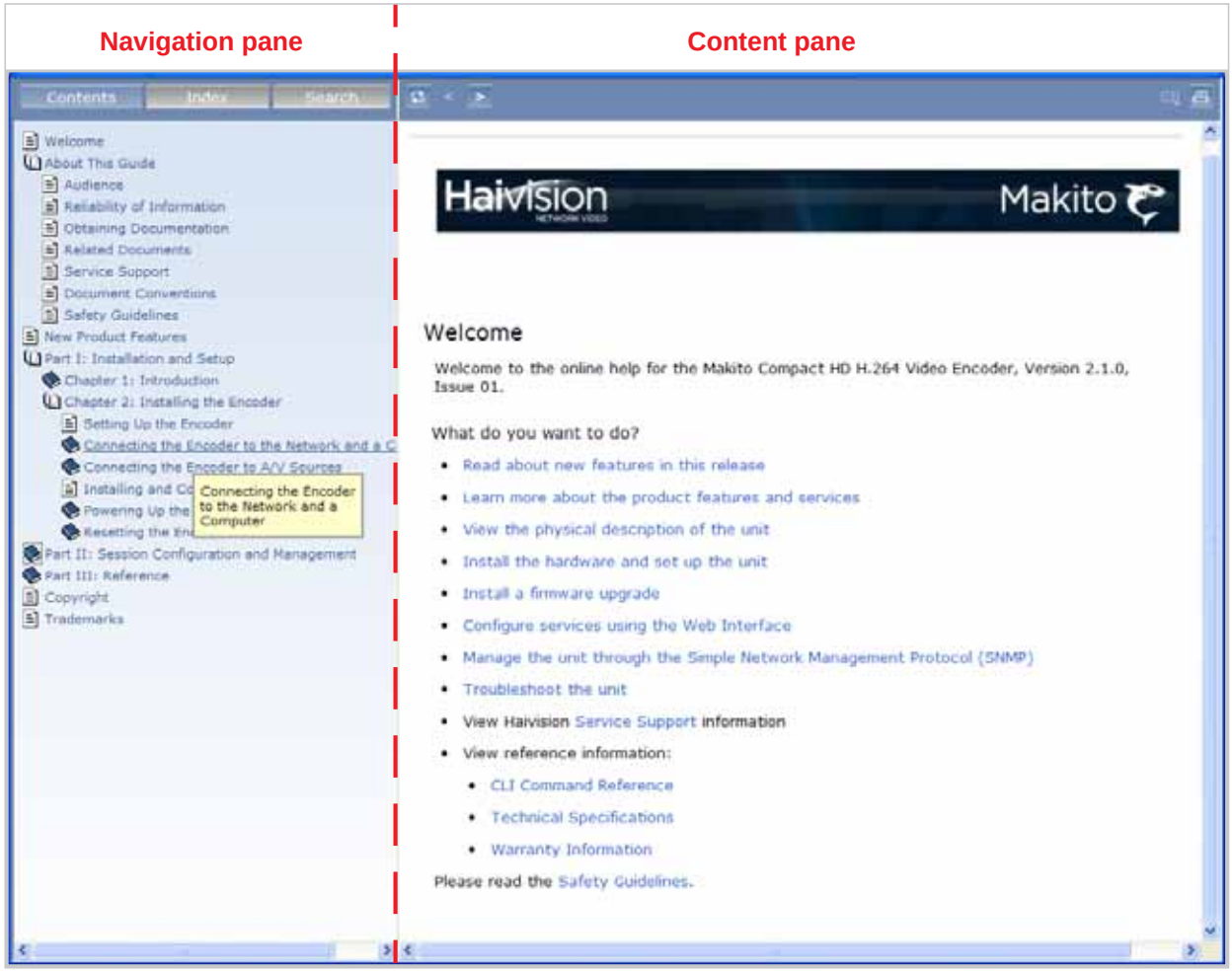
| Button | Description |
|---|---|
| Apply | Click Apply in order for your changes to take effect.<br>The encoder will then start working with the new settings, but the changes will not be saved and will be lost after a reboot. |
| Save | (Where available) Same as Apply, but the configuration settings will be applied and saved to the encoder's flash memory.<br>Saved settings will be used by the encoder even when the encoder is turned off and on or after a reboot. |



TIP You can save the current configuration (including the current VIDEO, AUDIO and STREAM settings) from the ADMINISTRATION>CONFIG page. See "Saving and Loading Configurations" on page 126.

## Online Help

Selecting Help from the menu bar will launch the online help for the Makito. The figure below shows a sample Welcome page.



# Changing Your Password

NOTE The MY ACCOUNT page is available to users assigned either Operator or Guest roles. Administrative users may change their passwords from the ACCOUNTS page.

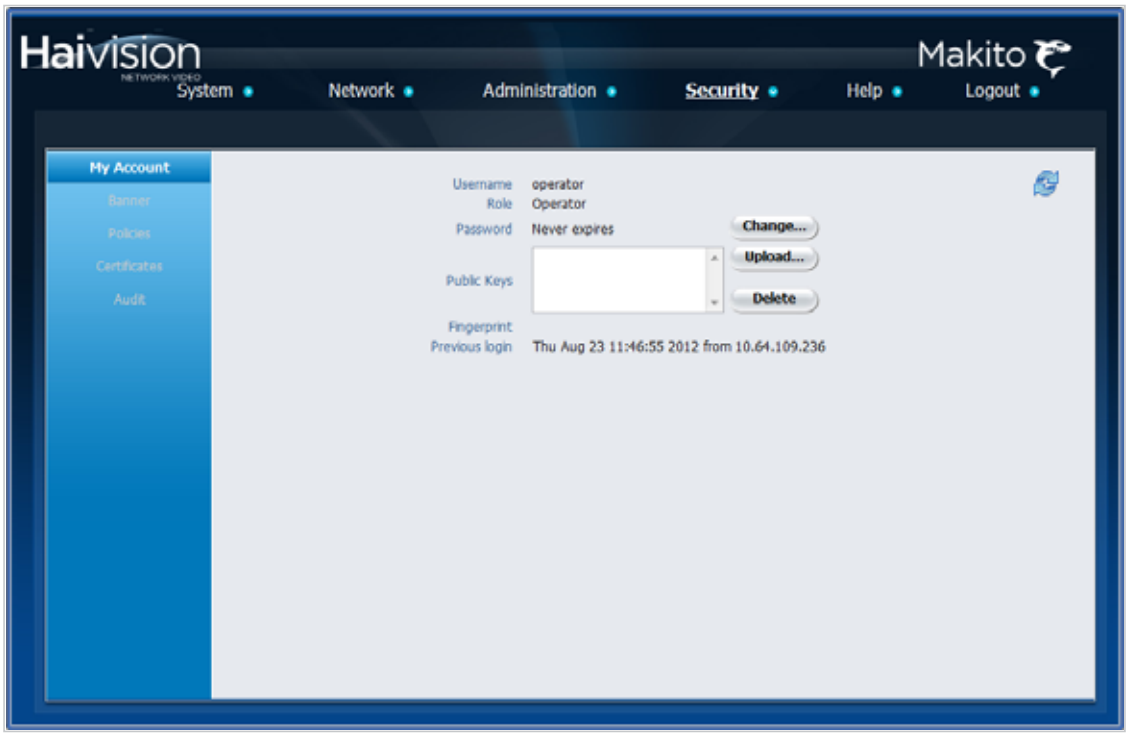
In some cases, such as the first time you sign into a new account or an account where the administrator has reset the password, you will see a Change Password dialog requiring you to change the default password.

You can also change your own password from the MY ACCOUNT page, as described in this section. This is useful to when logging into a Makito on which the factory defaults have not been changed.

### To change your password:

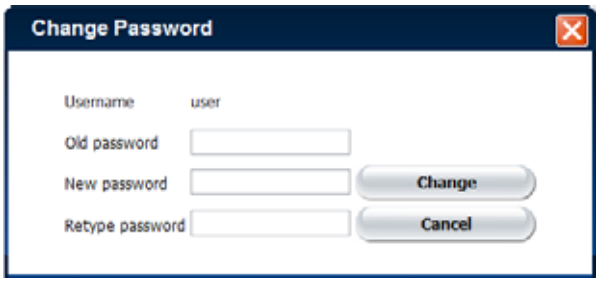
1. Click SECURITY from the main menu, and then click MY ACCOUNT from the submenu.

   The MY ACCOUNT page opens as shown in the following example.




2. Click Change… next to Password.

3. In the Change Password dialog, type your current password in the Old Password field.




4. Then type the new password in the New Password field and again in the Retype Password field.

5. Click Change.

   The new password will take effect immediately.

You can also upload and manage personal Public Key Infrastructure (PKI) keys for your account to enable public key authentication (instead of using a password). Note that in the current release, this only applies to SSH CLI access to the encoder. For more information, see "Managing PKIs" on page 143.

## Password Requirements

Passwords may be up to 80 characters and composed of any combination of upper and lower case letters, numbers, and the following special characters:

"!", "@", "#", "$", "%", "^", "&", "*", "(", ")", "~", "`", "_", "-", "+", "=", "{", "}", "[", "]", ":", ";", "", "", "<", ">", ",", ".", "?", "/", " "(space)

NOTE Basically, all printable characters of the QWERTY keyboard are supported.

Your system may have in place security policies that determine the minimum password length as well as other requirements such as minimum number of upper case characters, digits, and symbols. In this case, you will be prompted to modify your password to comply with these policies.

# Configuring the Video Settings

From the VIDEO SETTINGS page, you can define the Video Encoding properties such as the Input type, Resolution, GOP Size, and Bit Rate. Note that the available settings and resolutions vary according to the Input Format.

When configuring the Video Settings, you must select the Input type. The Makito will then auto-detect the incoming resolution and frame rate. If not detected (or outside the supported range), the Input Format field will show Unknown.

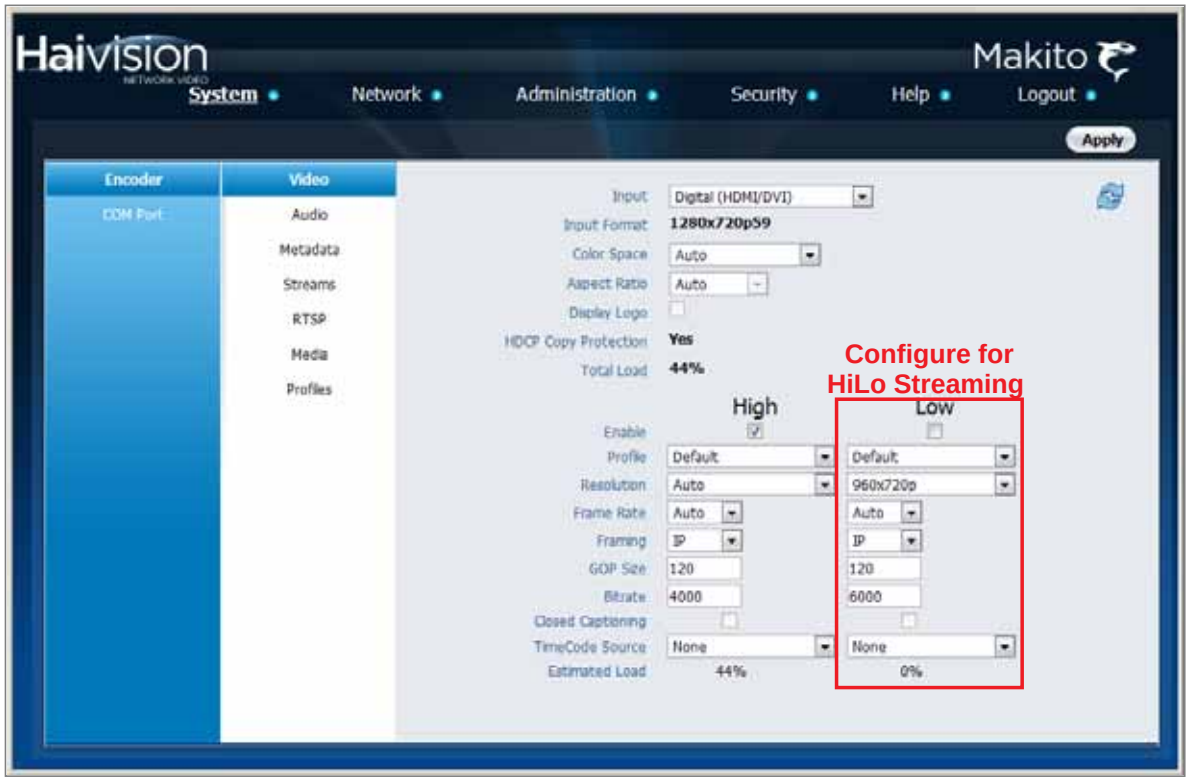
## HiLo Video Streaming

You may optionally configure the encoder for "HiLo" video streaming, in which the Makito encodes a single input and emits both high and low bandwidth streams simultaneously. A typical example is a full quality SD/HD ("High") stream and a thumbnail ("Low") sample of the same stream. To configure "HiLo" video streaming, you must define the Video Encoding properties for the second encoder instance in the "Low" column. For supported HiLo video encoding resolutions, see "Video Encoding" on page 260.

### To configure the Encoder Video Settings:

1. Click SYSTEM from the main menu, and then click ENCODER>VIDEO from the sub-menus.

   The VIDEO SETTINGS page opens, displaying the current video encoding settings (see following example).



2. Select or enter the new value(s) in the appropriate field(s). See the following section, "Video Settings".

3. To apply your changes, click Apply.

   The changes will take effect immediately but will not be saved and will be lost after a reboot.



TIP To save the current configuration, open the ADMINISTRATION>CONFIG page. See "Saving and Loading Configurations" on page 126.

## Video Settings

The following table lists the Encoder Video settings:

| Video Setting | Default | Description / Values |
|---|---|---|
| Input | | Select the type of Video Input for the encoder: |
| Makito | Digital (HDMI/DVI) | • Analog (Component/RGB)<br>• Digital (HDMI/DVI) |
| Makito-SDI | BNC (SDI) | • BNC (SDI)<br>• BNC (Composite)<br>• S-Video<br>NOTE: Only one physical connector can be selected as the video source.<br>If you select an inapplicable Input type, the Input Format becomes Unknown, since this is auto-detected by the system. |
| Input Format | n/a | This is the input signal detected from the video source. It includes the number of pixels per line, whether the video is interlaced or progressively scanned (indicated by i or p), and the number of frames per second: either 25 or 30 for interlaced, or 50 or 60 for progressively scanned.<br>This is auto-detected by the system and cannot be changed. If the signal cannot be detected (or is outside the supported range), the Input Format will be Unknown. |

| Video Setting | Default | Description / Values (Continued) |
|---|---|---|
| Color Space<br>Makito-DVI only | Auto | (Optional) Select the color space to use while capturing the content. Matching the encoder input color space to the source enhances and optimizes color reproduction. This is useful with source formats such as graphics cards outputting HDTV resolutions. Select either:<br>• Auto: The encoder determines the appropriate color space to use.<br>• YCbCr: Forces the encoder to use Y,Cb,Cr<br>• RGB (Full Range): Forces the encoder to use RGB Full Range [0..255]<br>• RGB (Limited Range): Forces the encoder to use RGB Limited Range [16..235] |
| Aspect Ratio<br>Standard Definition only | Auto | Specifies the aspect ratio of the video source and signals it into the MPEG stream:<br>• WSS / AFD: Aspect ratio is extracted from the incoming video source based on WSS (Wide Screen Signaling) or AFD (Active Format Description) if detected.<br>• Auto: Aspect ratio is derived from the incoming video source resolution.<br>• 16:9: Aspect ratio is forced to 16:9.<br>• 4:3: Aspect ratio is forced to 4:3.<br>NOTE: WSS is only supported with analog PAL video; AFD is only supported with SD-SDI video. |
| Display Logo | Disabled | (Optional) Check this checkbox to enable a pre-configured logo overlay. This option is not available if no logo has been configured.<br>NOTE: To configure the logo, see "Configuring Media Effects" on page 99. |
| HDCP Copy Protection<br>Makito only | n/a | (Read-only) Indicates whether an HDCP stream is copy-protected. If Yes, the stream will not be encoded. |
| Total Load | n/a | The usage of the video encoding processor in percentage %.<br>IMPORTANT: When configuring HiLo streaming, make sure the Total Load does not exceed 100%. For supported HiLo video encoding resolutions, see "Video Encoding" on page 260. |

| Video Setting | Default | Description / Values (Continued) |
|---|---|---|
| NOTE: To configure HiLo streaming, you must enable the High and Low Encoder instances and then configure the remaining fields for each instance: | | |
| Enable: High/Low | High: Enabled<br>Low: Disabled | Check one or both checkboxes to enable either one Encoder instance or two simultaneous instances of the video stream (i.e., the same content from a single input).<br>• High<br>• Low<br>NOTE: This must correspond to the Video: High/Low selection on the STREAM SETTINGS page.<br>With full HD 1080p 60 resolution input, the Low stream is not available since the High stream consumes all the encoding resources. |
| Profile | default.vpf | (Optional) Select a Video Profile to control the video quality for the encoder. The list provides a selection of video presets or "Profiles" defined for different contexts (e.g., ComputerGraphics, Default, Movies, News, Outdoors, Sports, and VirtualPresence).<br>NOTE: To view the quality parameter settings for each Profile as well as create "custom" Profiles, see "Configuring Video Profiles" on page 106. |
| Resolution | | This is the stream output resolution. Select the number of lines per frame and pixels per line to be encoded. Options depend on the Input Format detected.<br>NOTE: See "Video Encoding" on page 260. |
| HD | n/a | • Auto<br>• 1920x1080i (1080i)<br>• 1920x1080p (1080p)<br>• 1440x1080i<br>• 1440x1080p<br>• 960x1080i<br>• 960x1080p<br>• 1280x720 (720p)<br>• 960x720 (720p)<br>• 640x720 (720p) |

| Video Setting | Default | Description / Values (Continued) |
|---|---|---|
| RGB | n/a | • 1280x1024 (SXGA)<br>• 1280x768 (WXGA)<br>• 1024x768 (XGA)<br>• 800x600 (SVGA)<br>• 720x480 (480p)<br>• 640x480 (VGA)<br>• 352x288 (CIF) |
| SD | n/a | • 720x480i [NTSC] / 720x576i [PAL]<br>• 720x480p / 720x576p<br>• 540x480i / 540x576i<br>• 540x480p / 540x576p<br>• 352x480i / 352x576i<br>• 352x480p / 352x576p<br>• 352x288i<br>• 352x288p |
| Frame Rate | Auto | Select the video frame rate per second: |
| | | • Auto: Encodes at the same frame rate as the input<br>• 1..85 (Makito #B-290E-DVI)<br>• 1..60 (Makito-SDI #B-290E-HDSDI) |
| Framing | IP | Select the Video Compression Mode:<br>• IP: I and P frames only |
| GOP Size | 120 | Enter the Group of Pictures size for the encoded video. 1..1000<br>The GOP Size is the same for both Encoder instances. |
| Bitrate | 6000 kbps | Enter the Video Bitrate for the encoder:<br>• HD: 150..15000 kbps<br>• SD: 150..8000 kbps |
| Closed Captioning | Enabled | (Optional) Check or clear these checkboxes to enable or disable Closed Captioning on the encoder stream.<br>NOTE: For more information, see "Closed Captioning" on page 272. |

| Video Setting | Default | Description / Values (Continued) |
|---|---|---|
| TimeCode Source | None | Timecodes are used to mark video frames, mainly for editing purposes. This field either disables timecoding, or selects the source to "timecode" the encoded video frame. The following selections are available:<br>• None: No time code will be inserted in the video stream (saves bandwidth if not required).<br>• VITC: VITC is a form of SMPTE timecode extracted from the Vertical Interval TimeCode of the incoming video signal. VITC applies only to TV resolutions (i.e., not graphic resolutions).<br>• Internal System Clock: If no timecode is included in the video feed, the encoded timecode is based on the encoder's system clock. In this case, it is a good idea to enable NTP (see "Configuring Network Settings" on page 119). This applies to both TV resolutions and graphic resolutions.<br>NOTE: See "TimeCode Source" below for additional information. |
| Estimated Load | n/a | (Read-only) The video encoding processor usage of the stream instance in percentage%.<br>NOTE: The combined estimated loads should not exceed 100%. |

### TimeCode Source

The following guidelines apply to the TimeCode Source in the current release:

- The digitized version of VITC (referred to as D-VITC) is not supported. Only ATC_VITC (Ancillary Timecode) is supported.
- The presence of multiple timecodes may cause a problem. Only one timecode will be packetised/carried with the coded picture. The one to be carried is chosen based on the time difference between the timecode STC (System Time Clock) and the coded picture STC.
- Although LTC (Linear Timecode) and VITC timecodes may be present at the same time, the current release only supports VITC and LTC ancillary packets will be ignored.

# Configuring the Audio Settings

From the AUDIO SETTINGS page, you can configure Audio Encoding properties such as the Input connector and Audio Bitrate for the encoder.

## HiLo Audio Streaming

You may optionally configure the encoder for "HiLo" audio streaming, in which the Makito encodes a single input and simultaneously sends both a "High" and "Low" audio stream to two different destinations (comparable to HiLo Video Streaming). The audio Input, Sampling Rate, and Level are common to both streams, while the audio Bitrate, Channels (Mode), and AAC-LC Algorithm must be specified for the first encoder instance in the "High" column and the second encoder instance in the "Low" column.

## To configure the Encoder Audio Settings:

1. Click SYSTEM from the main menu, and then click ENCODER>AUDIO from the sub-menus.

   The AUDIO SETTINGS page opens, displaying the current audio encoding settings, as shown in the following example.




2. Select or enter the new value(s) in the appropriate field(s). See "Audio Settings" on page 78.

3. To apply your changes, click Apply.

   The changes will take effect immediately but will not be saved and will be lost after a reboot.



TIP To save the current configuration, open the ADMINISTRATION>CONFIG page. See "Saving and Loading Configurations" on page 126.

## Audio Settings

The following table lists the Encoder Audio settings:

| Audio Setting | Default | Description / Values |
|---|---|---|
| Input | Analog | Select the type of Audio Input for the encoder. |
| Makito | | • Analog |
| Makito-SDI | | • Analog<br>• SDI (1-2) - SDI Audio Group 1, Ch. 1-2<br>• SDI (3-4) - SDI Audio Group 1, Ch. 3-4 |
| Sample Rate | 48 kHz | The number of audio samples per second taken from the incoming signal. 48 kHz only. |
| 0 dBFS Audio Level | +6 dBu | (Analog Input only) Adjusts the maximum analog Audio Input level (0 dBfs) from +5dBU up to +20dBU. This is useful in applications such as broadcast and streaming to allow higher audio headroom. |
| NOTE: To configure HiLo audio streaming, you must enable the High and Low Encoder instances and then configure the remaining fields for each instance: | | |
| Enable: High/Low | High: Enabled<br>Low: Disabled | Check one or both checkboxes to enable either one Encoder instance or two simultaneous instances of the audio stream (i.e., the same content from a single input).<br>• High<br>• Low<br>NOTE: This must correspond to the Audio: High/Low selection on the STREAM SETTINGS page.<br>With full HD 1080p 60 resolution input, the Low stream is not available since the High stream consumes all the encoding resources. |

| Audio Setting | Default | Description / Values (Continued) |
|---|---|---|
| Audio Bitrate | 128 kbps | Select the Audio Bitrate for the encoder: 32, 64, 96, 128, 192, 256, or 384 kbps.<br>NOTE: At low bitrates such as 32 kbps, the audio quality may not be optimal. See Audio Channels below. |
| Audio Channels | Stereo | Select the number and type of audio channels to encode. Mono, Stereo<br>TIP: If you set the Audio Bitrate to 32 kbps, use Mono. |
| AAC-LC Algo. | MPEG2ADTS | The audio compression algorithm: |
| | | • MPEG-2 ADTS - Encodes audio using the ISO/IEC 13818-7 MPEG-2 AAC-LC algorithm with an ADTS header. (Default) |
| | | • MPEG-4 ADTS - Encodes audio using the ISO/IEC 14496-3 MPEG-4 AAC-LC algorithm with an ADTS header. |
| | | • MPEG-4 LOAS / LATM - Encodes audio using the ISO/IEC 14496-3 MPEG-4 AAC-LC algorithm with a LOAS/LATM header. |

# Configuring Metadata Capture

NOTE Metadata Capture is an optional feature and must be installed at the factory.

The Makito provides a METADATA OVERVIEW page and separate METADATA SETTINGS pages for up to eight metadata inputs, consisting of either one SDI input, one Serial input, or up to eight UDP inputs.

From the METADATA SETTINGS page, you can configure the Makito to capture either KLV (Key Length Value) or CoT (Cursor on Target) metadata and then incorporate data information within the metadata elementary stream of the standard MPEG Transport Stream.

The Makito supports three metadata input types: either from the COM1 serial port, the HD-SDI interface (Makito-SDI only), or a user definable UDP port. You can set up multiple metadata inputs to include in Transport Streams.

The available input types depend on the hardware setup of the encoder; i.e., whether the serial port or SDI video have been connected; UDP is always available.

Only one metadata stream may be included in the Transport Stream at a time, so you must select the metadata source:

- Serial port: The Makito extracts either KLV or CoT metadata packets from the serial port. From the METADATA page, you must specify the Data Format, and for CoT metadata, the Max AirCraft-SPI Delta. The CoT metadata capture option requires Serial port input.
- SDI: (Makito-SDI only) The Makito extracts KLV metadata packets from the HD-SDI interface as per MISB RP 0605.2. Only progressive scan formats are supported (i.e., 1280x720p and 1920x1080p). The Makito can capture only 4096 bytes of KLV metadata per video frame.
- UDP: The Makito encodes and converts UDP packets to KLV, and inserts them into the Transport Stream.You must specify local UDP Port on the Makito that is receiving the packets. The IP Address is only required for reception of multicast metadata, or if you only want to accept KLV messages coming from a specific sender.

When configuring the metadata input, you do not need to select the Input type. The Makito will auto-detect the hardware setup of the encoder; i.e., whether the serial port or SDI video is connected; UDP is always available.

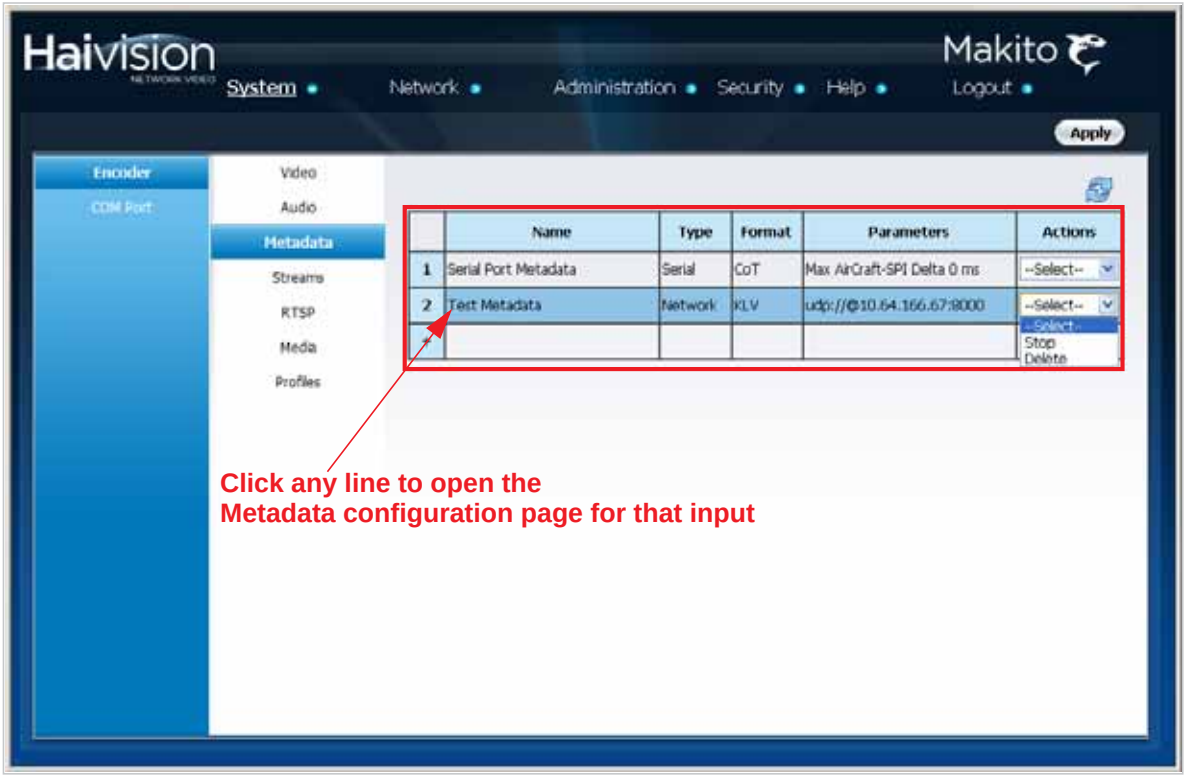
## Metadata Overview Page

The METADATA OVERVIEW page displays a summary of defined metadata inputs for the encoder. The METADATA OVERVIEW page displays the Name, Type, Format, Parameters, and Action status for each stream. It also provides an option for you to either Start, Stop, or Delete the input.

### To open the Metadata Overview:

1. Click SYSTEM from the main menu, and then click ENCODER>METADATA from the submenus.

   The METADATA OVERVIEW page opens, as shown in the following example, displaying the defined metadata inputs for the encoder.




2. To view input details or add an input, click a line in the table to open the METADATA SETTINGS page.
3. To change the Action status for an existing input, click --Select-- (under Actions) and select either Start, Stop or Delete.
4. To apply your changes, click Apply.

   The changes will take effect immediately but will not be saved and will be lost after a reboot.

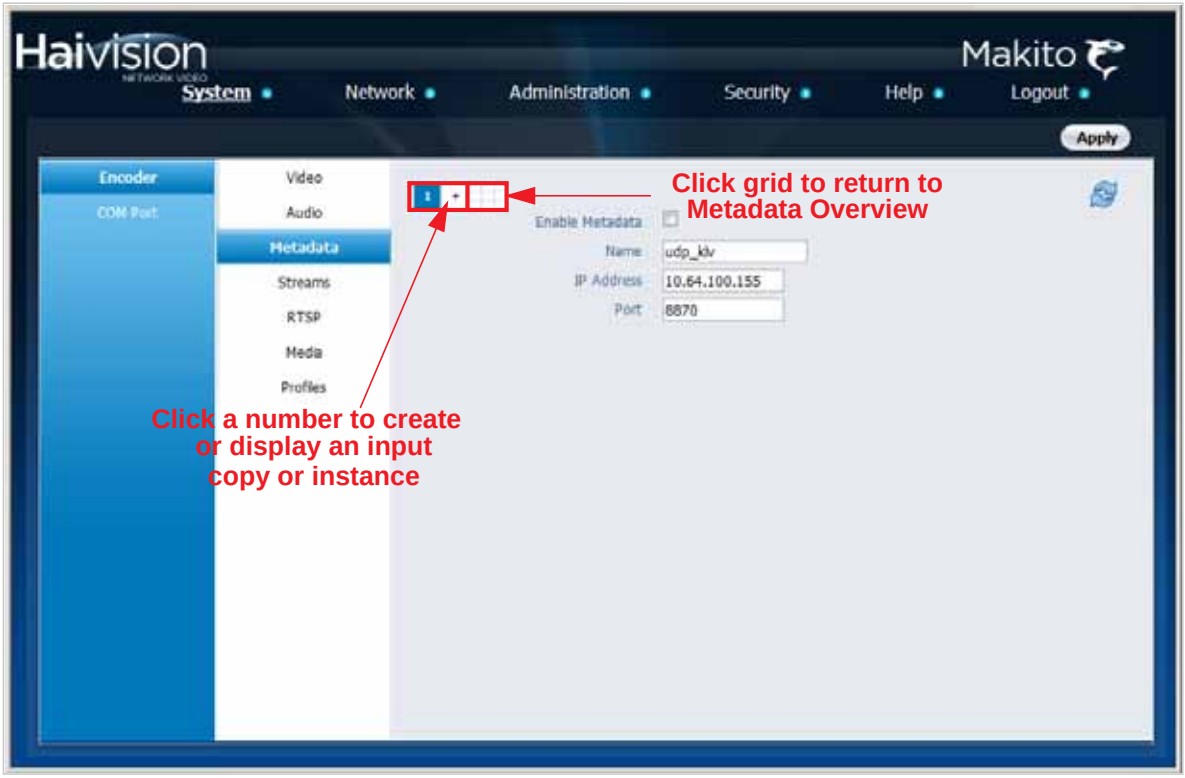
TIP To save the current configuration, open the ADMINISTRATION>CONFIG page. See "Saving and Loading Configurations" on page 126.

## Metadata Settings Page

### To configure the Metadata Settings:

1. From the METADATA OVERVIEW page, click an input or click any line in the table.

   The METADATA SETTINGS page opens, as shown in the following example.




2. Check the Enable Metadata checkbox.
3. Type in the Name for the input, and select or enter the remaining value(s). For details on the Metadata fields, see "Metadata Settings" on page 83.
4. To apply your changes, click Apply.

   The changes will take effect immediately but will not be saved and will be lost after a reboot.

TIP To save the current configuration, open the ADMINISTRATION>CONFIG page. See "Saving and Loading Configurations" on page 126.

## Metadata Settings

The following table lists the Encoder Metadata settings:

NOTE The fields depend on the hardware setup of the encoder; i.e., whether the serial port or SDI video is connected; UDP is always available.

| Metadata Setting | Default | Description / Values |
|---|---|---|
| Enable Metadata | Disabled | Check this checkbox to enable Metadata Capture.<br>NOTE: Only available if the Metadata Capture option has been installed at the factory. |
| Name | n/a | Enter a unique name for the input. |
| Data Format | KLV | (Serial input only) Select the data format for the metadata.<br>• KLV (Key Length Value) or<br>• CoT (Cursor on Target).<br>NOTE: To configure Serial input, the COM Port Mode must first be set to Metadata (see "Mode" on page 115).<br>CoT must be specified upon purchase. For details, refer to the *Makito CoT Addendum*. |
| Max AirCraft-SPI Delta | 0 ms | (Serial> CoT input only) Specifies the maximum delta between SPI and Aircraft message time-stamps for them to be considered a valid pair that can be converted to KLV. 0..1000 ms<br>NOTE: Only available if CoT has been installed at the factory. |

| Metadata Setting | Default | Description / Values (Continued) |
|---|---|---|
| IP Address | n/a | (UDP input only, optional) The address is only required for reception of multicast metadata. In this case, you need to provide the multicast IP address to which the data is being sent.<br>You can also specify the address if you only want to accept KLV messages coming from a specific sender. |
| Port | n/a | (UDP input only, required) Specifies the local UDP port on the Makito that is receiving the packets. |

NOTE KLV Metadata over SDI is only used with HD-SDI, and no Closed Captioning services are presently available on HD-SDI Makito.

# Configuring the Stream Settings

The Makito provides a STREAM OVERVIEW page and separate STREAM SETTINGS configuration pages for up to eight streams. From the STREAM SETTINGS pages, you can manage the settings for each Encoder stream, start and stop the streams, as well as pause and resume streams (see "Selective Video Mute" on page 93).

The Makito supports two types of stream configurations:

- Unicast – Enter a unicast destination IP address.
- Multicast – Enter a multicast destination IP address.

---

NOTE You can specify up to eight active streams (or 16 active RTSP streams). The supported total stream bitrate is up to:

- 30 Mbps audio/video bitrate (TS over UDP or Direct-RTP),
- 25 Mbps audio/video + metadata (TS over UDP), or
- 16 Mbps audio/video bitrate with VF AES and FEC enabled.

---

To configure "HiLo" Video and/or Audio streaming, you must create an encoder stream for each encoder instance. For more information on HiLo streaming, see "HiLo Video Streaming" on page 71 and "HiLo Audio Streaming" on page 77.

You can also enable or disable SAP network announcements. Session Announcement Protocol (SAP) is a protocol for advertising multicast or unicast session information. SAP periodically multicasts session description information on an industry standard multicast address and port. When received by remote participants, these announcements can be used to generate playlists and facilitate the viewing of streams by eliminating the need for user configuration. For example, they may be used to automatically create program listings to allow streams to easily be located, selected and viewed.

## Stream Overview Page

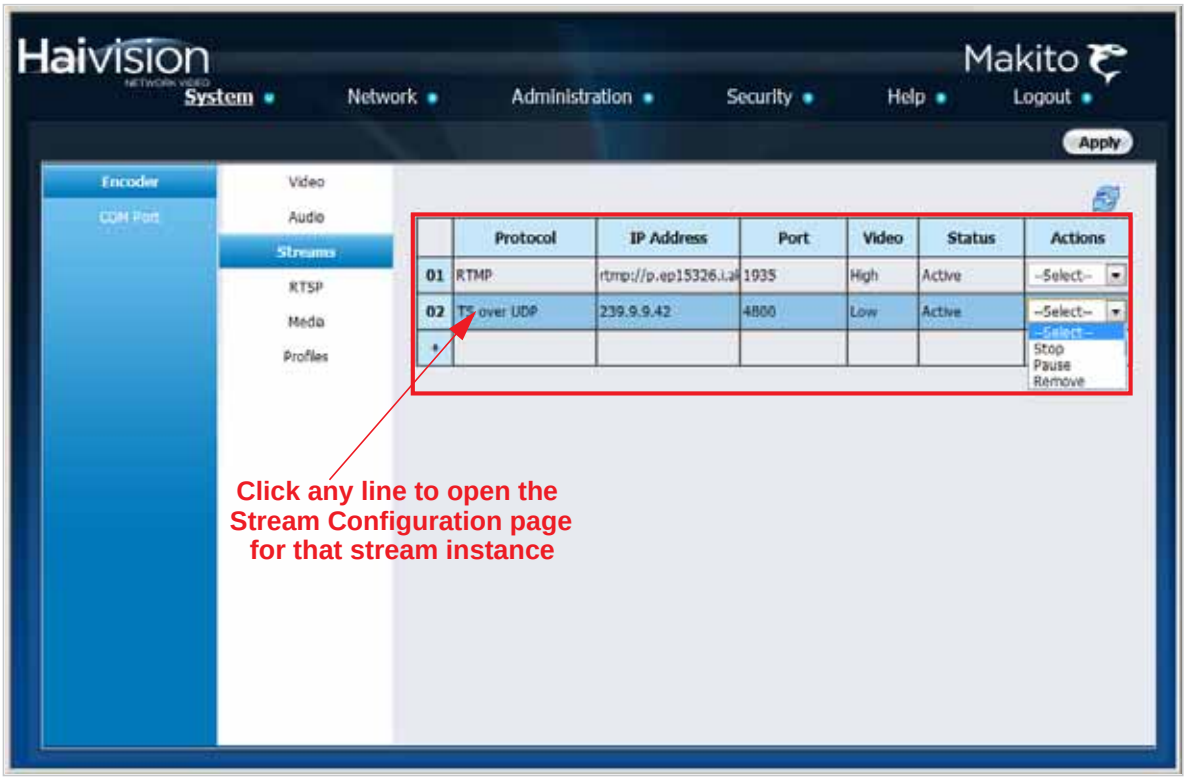
The STREAM OVERVIEW page displays a summary of defined streams for the encoder. The STREAM OVERVIEW page displays the Stream Protocol, IP Address, Port, Video Mode (i.e., "High" or "Low" stream instance), and selectable Actions for each stream. It also provides an option for you to either restart (Active), Stop or Remove the stream. Multiple streams can be either Multi-stream copies or HiLo stream instances or both.

This table includes streams defined using either the Stream Settings Page or the RTSP Settings Page.

### To open the Encoder Stream Overview:

1. Click SYSTEM from the main menu, and then click ENCODER>STREAMS from the sub-menus.

   The STREAM OVERVIEW page opens, as shown in the following example, displaying the defined streams for the encoder.




2. To view stream details or add an encoder stream, click a line in the table to open the STREAM SETTINGS page.
3. To change the Action status for an existing stream, click Active (under Actions) and select either Start or Stop, Pause or Remove.
4. To apply your changes, click Apply.

   The changes will take effect immediately but will not be saved and will be lost after a reboot.

---

TIP To save the current configuration, open the ADMINISTRATION>CONFIG page. See "Saving and Loading Configurations" on page 126.

---

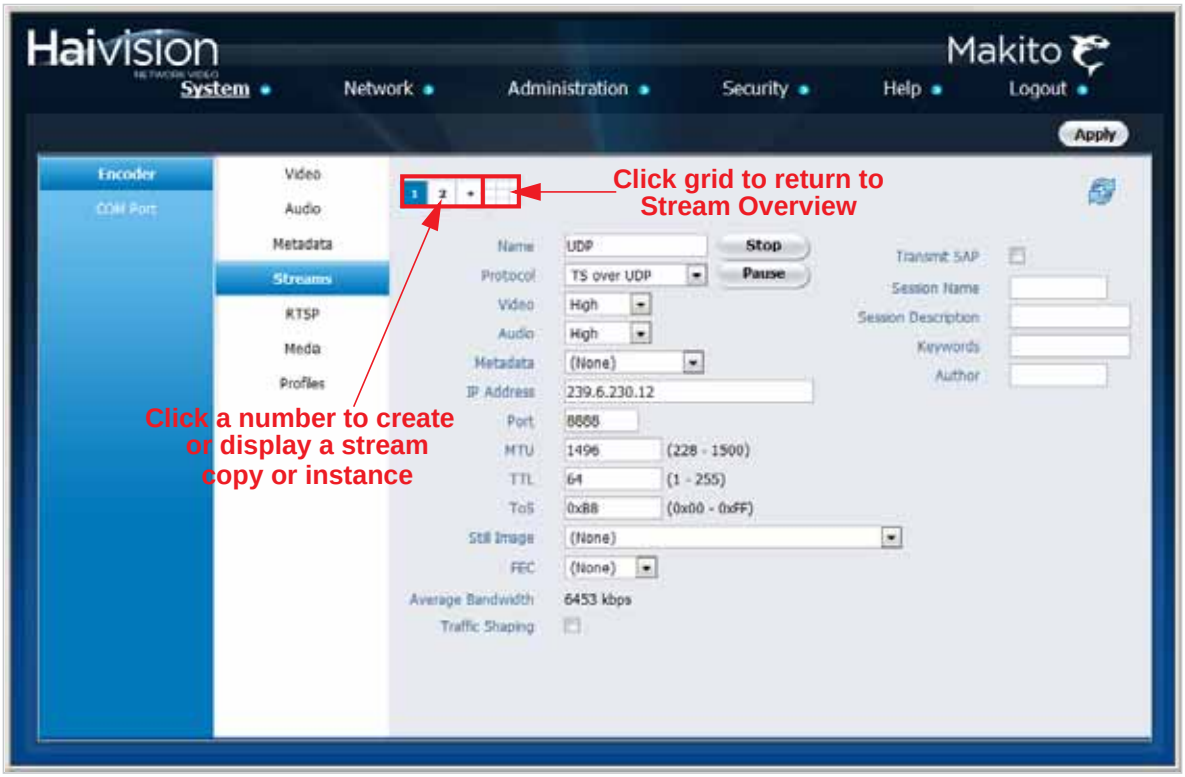
## Stream Settings Page

NOTE To configure the encoder to interoperate with RTSP-based software players such as QuickTime, VideoLan VLC, or Wowza Server (Flash), see "Configuring the RTSP Server" on page 97.

### To configure the Encoder Stream Settings:

1. From the STREAM OVERVIEW page, click a stream or click any line in the table.

   The STREAM SETTINGS page opens. Following is an example of the STREAM SETTINGS page for Encoder instance #1.




2. Select or enter the new value(s) in the appropriate field(s). See "Stream Settings" on page 88.

3. To apply your changes, click Apply.

   The changes will take effect immediately but will not be saved and will be lost after a reboot.

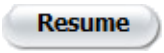
TIP To save the current configuration, open the ADMINISTRATION>CONFIG page. See "Saving and Loading Configurations" on page 126.

If you are creating a stream, it will start streaming and the Stop and Pause buttons will appear.

4. To refresh the page, click .

   You will now see an Average Bandwidth for the stream. This indicates that the encoder is streaming properly.

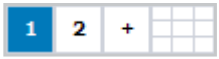
5. (Optional) To pause the stream, click . (See "Selective Video Mute" on page 93.)

6. When you are ready to resume the stream, click .

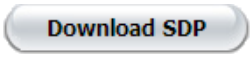
NOTE The Multicast address range is from 224.0.0.0 to 239.255.255.255. Multicast addresses from 224.0.0.0 to 224.0.0.255 are reserved for multicast maintenance protocols and should not be used by streaming sessions. We recommend that you use a multicast address from the Organization-Local scope (239.192.0.0/14).

## Stream Settings

The following table lists the Encoder Stream controls and settings:

| Stream Setting | Default | Description / Values |
|---|---|---|
|  | | Click a number to display the STREAM SETTINGS page for an existing stream, or + to create a new stream.<br>Click the grid to display the STREAM OVERVIEW page. |
| Name | n/a | (Optional) Enter a unique name for the stream. |

| Stream Setting | Default | Description / Values (Continued) |
|---|---|---|
| Protocol | TS over UDP | Select the Protocol Type for the encoded stream.<br>• TS over UDP: MPEG2 transport stream over UDP (no RTP header)<br>• TS over RTP: MPEG2 transport stream over RTP<br>• Direct-RTP: RFC3984<br>• QuickTime: Sends video as per RFC 3984 and audio as per RFC 3640, with video and audio sent on different UDP ports. See "QuickTime SDP and Interoperability" on page 95.<br>• RTMP: Streams to a Flash Media Server or Content Delivery Network. See "CDN and Flash Interoperability" on page 94. |
| Video: High/Low | High | To configure HiLo streaming, you must create a stream for each Video encoder instance and specify the settings for each stream. In this field, select the stream instance to configure:<br>• High<br>• Low<br>NOTE: This must correspond to the Enable: High/Low selection on the VIDEO SETTINGS page. |
| Audio: High/Low | High | To configure HiLo streaming, you must create a stream for each Audio encoder instance and specify the settings for each stream. In this field, select the stream instance to configure:<br>• High<br>• Low<br>NOTE: This must correspond to the Enable: High/Low selection on the VIDEO SETTINGS page. |

| Stream Setting | Default | Description / Values (Continued) |
|---|---|---|
|  | n/a | This button becomes available when you create a session with QuickTime as the Encapsulation Type.<br>Click to generate an SDP (Session Description Protocol) file which you can then download to your computer or a streaming server.<br>TIP: Since there could be multiple unicast streams with the same QT format, be sure to give each SDP file a unique name in order to associate it to a specific stream.<br>NOTE: For more information, see "QuickTime SDP and Interoperability" on page 95. |
|  | n/a | These buttons become available to control a stream once it has started streaming.<br>• Click Stop to stop a stream. You can later restart it or clear it.<br>• Click Pause to pause the stream. If a Still Image has been configured, it will be displayed. You can later resume the stream or stop it.<br>See "Selective Video Mute" on page 93. |
| Metadata | None | (Only available if the Metadata Capture option has been installed at the factory) To enable metadata, select one of the defined inputs.<br>NOTE: For more information, see "Configuring Metadata Capture" on page 80. |
| IP Address | n/a | Enter the destination IP address in dotted-decimal format.<br>For multicast addresses, see NOTE on page 88. |
| Port(s) | n/a | Enter the destination UDP port(s). Enter a number in the range 1025..65,535. Note that RTP streams use *even numbers only* within this range.<br>NOTE: Direct-RTP and QuickTime streams require different UDP ports for video and audio. You must specify the second port number. |

| Stream Setting | Default | Description / Values (Continued) |
|---|---|---|
| MTU | 1496 | (Maximum Transmission Unit) Specifies the maximum allowed size of IP packets for the outgoing RTP data stream.<br>228..1500 |
| TTL | 16 | (Time-to Live for stream packets) Specifies the number of router hops the Stream packet is allowed to travel/pass before it must be discarded. 1..255 |
| ToS | 184 or 0xB8 | (Type of Service) Specifies the desired quality of service (QoS). This value will be assigned to the Type of Service field of the IP Header for the outgoing streams.<br>Range = 0..255 (decimal) or 0x00..0xFF (hex)<br>Default = 0xB8<br>NOTE: A DiffServ or DSCP (Differentiated Services Code Point) value must be converted to a ToS precedence value. For example, AF41 or DSCP 34 becomes ToS 136. For more information, see RFC2474. |
| Still Image | None | (Optional) Select a pre-configured static image file to display when the stream is paused. (See "Selective Video Mute" on page 93.)<br>This feature may be used for applications such as blocking out sensitive content or delivering announcements.<br>NOTE: To configure the static images, see "Still Image Streaming" on page 102. |
| VF Encryption | Off | (Read-only/Only shows if enabled) Indicates whether Advanced Encryption Standard (AES) encryption has been enabled through the Furnace Server interface (VF Station Editor). |
| FEC | None | (Optional) Enable Forward Error Correction (FEC). Select either:<br>• (None)<br>• VF<br>NOTE: The VF FEC is a proprietary FEC and is not interoperable with devices outside of the Haivision family. |
| Average Bandwidth | n/a | (Read-only) The average transmit bandwidth for the unit in kbps. |

| Stream Setting | Default | Description / Values (Continued) |
|---|---|---|
| TS over UDP/RTP only | | |
| Traffic Shaping | Disabled | Check or clear this checkbox to enable or disable Traffic Shaping for the stream.<br>For some limited networks such as satellites or some dedicated network pipes, it may be necessary to enable Traffic Shaping to smooth the traffic and respect the absolute upper limit configured.<br>NOTE: Using Traffic Shaping on streams above 7Mbps may create audio/video artifacts (default configuration with medium to heavy movement video content). |
| Idle Cells | Disabled | (Traffic Shaping must be enabled) When enabled, Idle TS cells will be inserted into a TS stream when necessary. |
| Ceiling % | 15% | (Traffic Shaping must be enabled) Specifies the percentage of network bandwidth beyond the average rate that the encoder is allowed to use if needed. This is used to set the Ceiling Bandwidth range. 0..100%<br>NOTE: To configure the ceiling percentage for CBR streams with metadata, see "Ceiling Percentage for CBR Streams with Metadata" on page 93. |
| Ceiling Bandwidth | n/a | (Traffic Shaping must be enabled, Read-only) The absolute bandwidth limit that the encoder will not exceed. The bitrate produced will not exceed this value. |
| Transmit SAP | Off | Check or clear this checkbox to enable or disable SAP announcements. |
| Session Name | n/a | If SAP is enabled, enter a unique name for the Session. |
| Session Description | n/a | (Optional) Enter an expanded description of the Session. |
| Keywords | n/a | (Optional) Enter one or more keywords to associate with the Session. Keywords can serve as filters. |
| Author | n/a | (Optional) Enter the name of the program's author. |

| Stream Setting | Default | Description / Values (Continued) |
|---|---|---|
| RTMP only | | |
| URL | n/a | (RTMP protocol must be selected as the stream type.) Enter a Fully Qualified Domain Name (FQDN) for the application endpoint.<br>NOTE: For more information, see "CDN and Flash Interoperability" on page 94. |
| Username | n/a | Enter the CDN login username. |
| Password | n/a | Enter the CDN login password. |

## Selective Video Mute

Pausing and then resuming a stream allows you to selectively and temporarily "mute" the video. For example, if you have several High and Low streams going to different destinations, you can choose to mute one or some of the streams (i.e., by pausing them). Also, if a still image has been configured, the encoder will send this image to replace the encoded video stream when the stream is paused. (See "Still Image Streaming" on page 102.)

When the video is "unmuted" (i.e., resumed), the decoder will immediately display the video stream again. In effect, this provides a "privacy mode" and avoids delays that may occur when starting and stopping a stream and waiting for a decoder to start decoding again.

## Ceiling Percentage for CBR Streams with Metadata

For CBR streams with Traffic Shaping enabled, metadata may cause the stream to exceed the Ceiling Bandwidth (audio and video bitrate + ceiling percentage). Therefore, when configuring the Ceiling Percentage, you need to take into account how much metadata is being generated.

Metadata is not part of the minimum bandwidth calculation used for CBR streams (because it is application dependent). The bandwidth for it is presumed to fit within the Ceiling Bandwidth limit which is specified at stream creation.

For example:

```
ceiling percentage = ( metadata_bitrate / ( video_bitrate + audio_bitrate ) )
  * 100
```

The minimum Ceiling Percentage value should be no less than 5.

For example, where metadata_bitrate = 500 Kbps, video_bitrate = 1000 Kbps, and audio_bitrate = 128 Kbps:

```
ceiling percentage = ( 500 / ( 1000 + 128 ) ) * 100 = 44
```

## CDN and Flash Interoperability

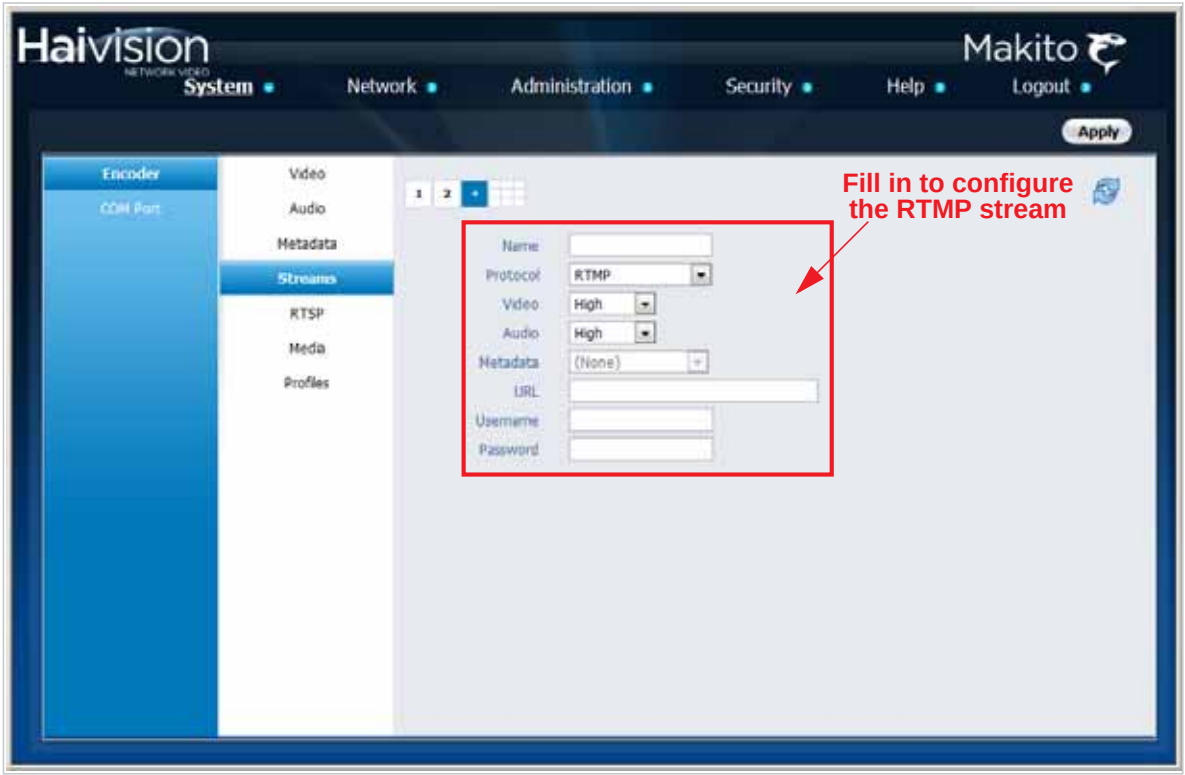
The Makito can now stream directly to a Flash Media Server (FMS) or Flash-based Content Delivery Network (CDN) using the Real Time Messaging Protocol (RTMP).

- The supported RTMP servers are FMS and Wowza.
- The supported Transcoders are Wowza and Haivision's KulaByte Transcoder.
- The supported CDNs are Akamai and Limelight.

This section provides the steps to set up an RTMP stream.

### To stream to a Flash Media Server or Flash-based CDN:

1. From the STREAM OVERVIEW page, set the Stream Protocol Type to RTMP (as shown in the following example).




2. Type in a unique name to identify the stream.

NOTE You can optionally configure "HiLo" video streaming or either Metadata capture. For information on either of these, see "Video Settings" on page 72 or "Configuring Metadata Capture" on page 80.

3. Type in a Fully Qualified Domain Name (FQDN) for the application endpoint of the FMS or CDN server.

4. Type in the username and password for the CDN server.

5. Click Apply to start the stream.

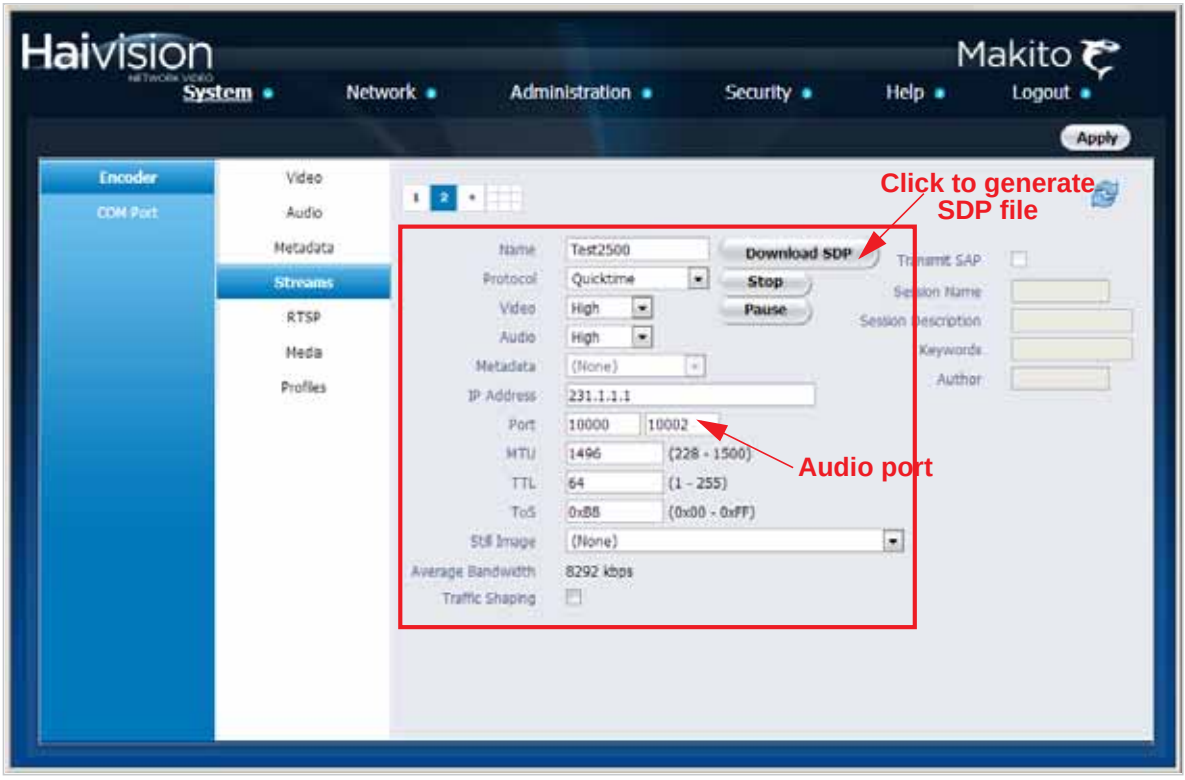
## QuickTime SDP and Interoperability

The Makito supports QuickTime and Flash interoperability (through a Flash gateway) using an SDP (Session Description Protocol) file.

From the STREAM SETTINGS page, you can select QuickTime as the Stream Protocol (as per RFC 3640 for audio and RFC 3984 for video), and then when the session starts, you can download the SDP file to your computer or a streaming server.

### To manually set up the SDP method:

1. From the STREAM OVERVIEW page, set the Stream Protocol Type to QuickTime (as shown in the following example).




2. Select or enter the value(s) to configure the stream. For more information, see "Stream Settings" on page 88.

TIP Remember to specify the second (audio) port.

3. Click Apply to start the stream.
4. Once the stream has started, click Download SDP.
5. Save the SDP file to your computer in a location that the QuickTime player can access. For example:

   QTSS/Library/QuickTimeStreamingServer/Movies

6. Start your software decoder and open the SDP file to start playing the stream.

### SDP File Example

The SDP file is compliant to RFC 2327 and contains both video and audio attributes, as shown in the following example:

```
v=0
o=- 1 1 IN IP4 127.0.0.1
s=RTP session
e=NONE
c=IN IP4 231.1.1.1/128
b=RR:0
t=0 0
m=video 10000 RTP/AVP 96
a=rtpmap:96 H264/90000
a=control:trackID=0
a=fmtp:96 packetisation-mode=1; sprop-parameter-sets=
  Z0IAIIxoBQBbv/AAEAARAAADA+kAAdTAhAAAAAAAAAA=,aM48gAAAAAA=
m=audio 10002 RTP/AVP 97
a=rtpmap:97 mpeg4-generic/90000/2
a=control:trackID=1
a=fmtp:97 streamType=5;profile-level-id=22;mode=AAC-hbr;sizelength=
  13;indexlength=3;indexdeltalength=3;config=1190
```

# Configuring the RTSP Server

From the RTSP SETTINGS page, you can configure the Makito to interoperate with Real-Time Streaming Protocol (RTSP)-based software players such as HaiPLAY, QuickTime, VideoLan VLC, or Wowza Server (Flash) for real-time streaming.

NOTE The number of RTSP clients (i.e., players) is limited to 16. This applies whether using unicast or multicast IP addressing.

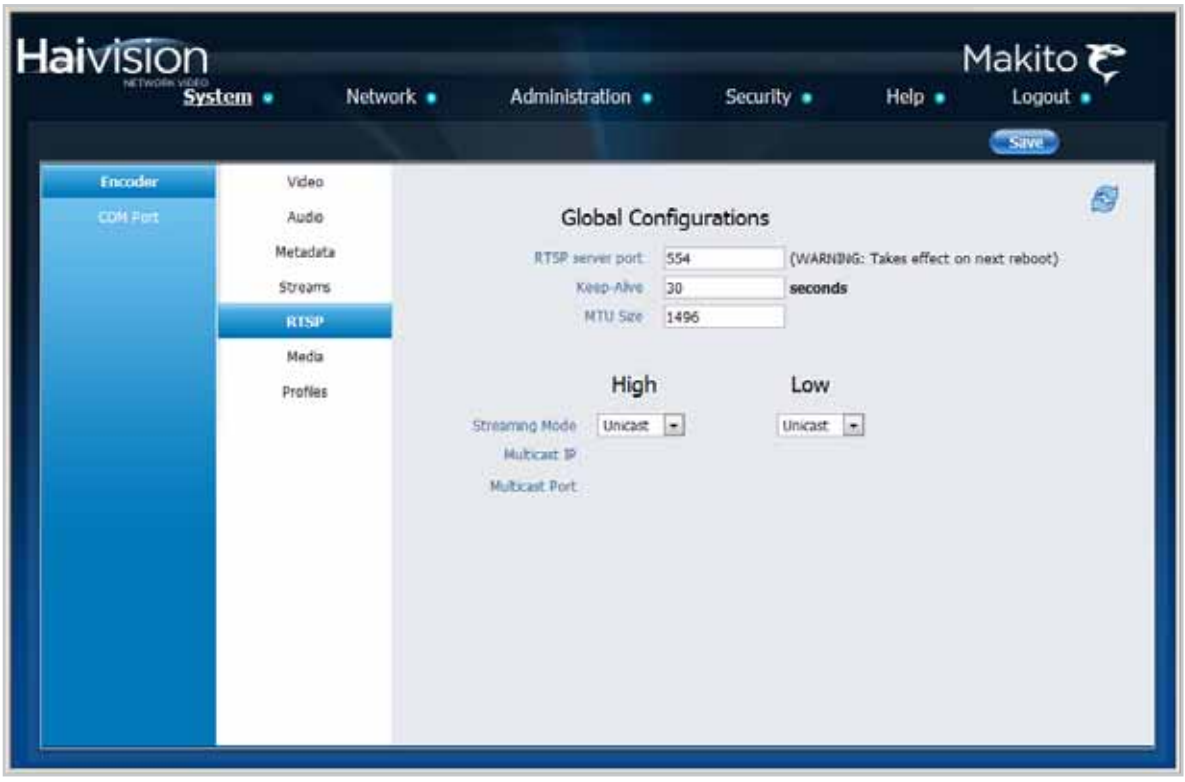
To configure “HiLo” streaming, you must define the RTSP settings for the second encoder instance in the “Low” column.

To generate the SDP (Session Description Protocol) file to download to your computer or server to interoperate with QuickTime or a Streaming Server, see “CDN and Flash Interoperability” on page 94.

### To configure the RTSP Settings:

1. Click SYSTEM from the main menu, and then click ENCODER>RTSP from the sub-menus.

   The RTSP SETTINGS page opens, as shown in the following example.



2. Select or enter the new value(s) in the appropriate field(s). You may specify the following RTSP Settings:

| RTSP Setting | Default | Description / Values |
|---|---|---|
| RTSP Server Port | 554 | The UDP port# of the RTSP Server Port. |
| Keep Alive | 30 | Keep-alive is a timeout for the TCP/IP connection of the RTSP session, to prevent streaming if the client becomes unresponsive or offline. The range is: 10..900000 (seconds). |
| MTU Size | 1496 | (Maximum Transmission Unit Size) Specifies the maximum allowed size of IP packets for the outgoing data stream. 228..1500. |
| NOTE: To configure HiLo streaming, you must configure the remaining fields for the High and Low instance. | | |
| Streaming Mode | Unicast | The Streaming Mode for the RTSP stream:<br>• Unicast<br>• Multicast |
| Multicast IP | n/a | If the Streaming Mode is Multicast, type in a multicast IP Address. |
| Multicast Port | n/a | If the Streaming Mode is Multicast, type in a UDP Port #. |

3. To apply and save your changes, click Save.

NOTE To access the High or Low stream from the decoder, you must specify the correct RTSP URL. Type either:

rtsp://<Makito IP Address>/high

-or-

rtsp://<Makito IP Address>/low

# Configuring Media Effects

From the MEDIA SETTINGS page, you can configure media effects such as a logo overlay in the encoded video and a static image to replace the encoded video stream when the stream is paused. You can also take snapshots of your video input.

NOTE The maximum file size for logo and still image files is 10 MB.

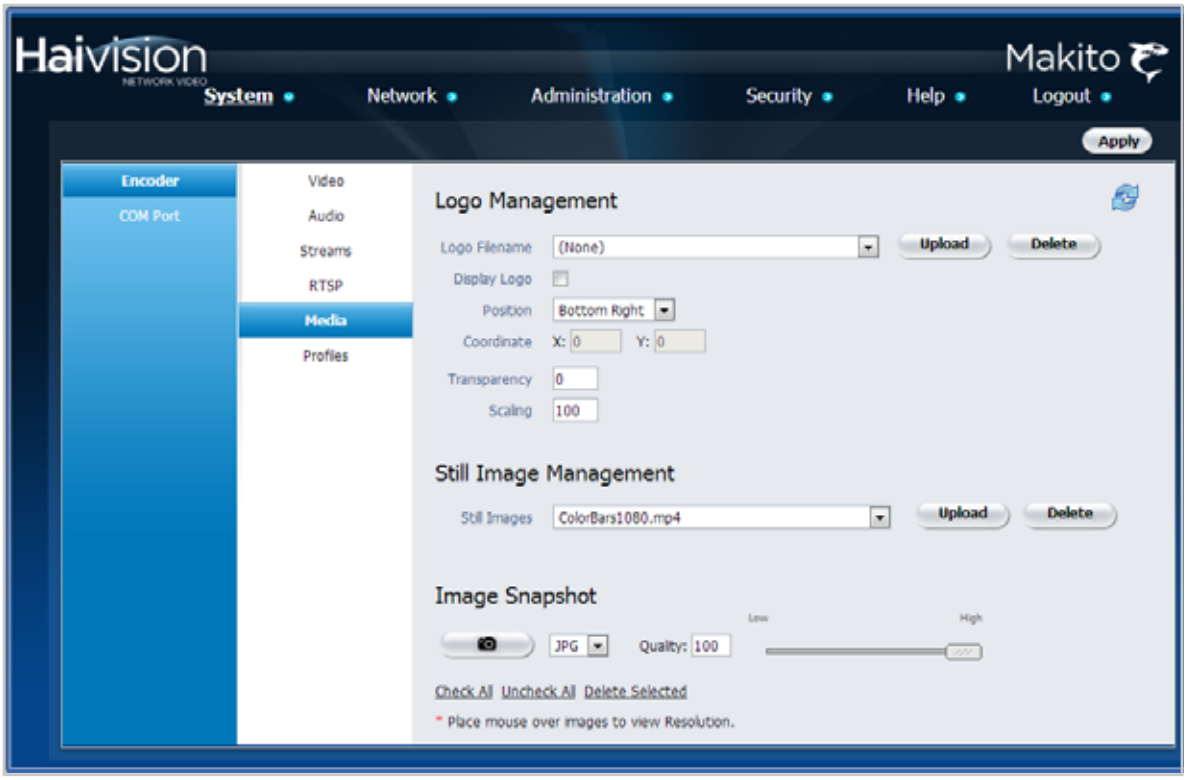
## Logo Insertion / Overlay

You can configure the Makito to display a graphic file as a logo overlay in the encoded video. There can be one logo per Makito. The image file can be uploaded in either BMP, JPEG, PNG, or GIF format. The logo position can either be relative (top left, top right, centered, etc.) or absolute (positioned at the exact X and Y coordinates specified).

### To configure a logo overlay:

1. Click SYSTEM from the main menu, and then click ENCODER>MEDIA from the sub-menus.

   The MEDIA SETTINGS page opens, as shown in the following example.



2. To upload a new image file in either BMP, JPEG, PNG, or GIF format, click Upload next to the Logo Filename field.
3. In the Logo file dialog, click Browse to select the image file and then click Upload.




By default, the encoder will be temporarily stopped; however, you may uncheck this box to allow the encoder to continue streaming.

The image file will be converted to Haivision's image overlay (.oly) format and will be included on the Logo Filename drop-down list.

4. To configure a logo overlay, select or enter value(s) in the appropriate field(s). See "Logo Settings" on page 101.
5. To delete an image file from the list of available Logo Filenames, click Delete next to the Logo Filename field.
6. To apply your changes, click Apply.

NOTE Logos are stored on the Makito file system in the folder /usr/share/haivision/logos.

## Logo Settings

The following table lists the Logo controls and settings:

| Logo Setting | Default | Description / Values |
|---|---|---|
| Logo Filename | None | Select the name of the logo image file to display.<br>NOTE: You can upload more than one image file; however, you must select one logo for the Makito. |
| Display Logo | Disabled | Check this checkbox to display the selected file as a logo overlay.<br>NOTE: This duplicates the Display Logo checkbox on the Video Settings page. |
| Position | Bottom Right | Select the position for the logo overlay:<br>• Absolute<br>• Top Left<br>• Top Right<br>• Bottom Left<br>• Bottom Right<br>• Centered<br>NOTE: In Absolute mode, the logo will be positioned at the exact X and Y coordinates specified. |
| Coordinate X,Y | 0, 0 | Specifies the position of the logo on the X and Y axes. (The origin is the top left corner of the display area.)<br>NOTE: Only takes effect if Position is set to Absolute. |
| Transparency | 0 | Specifies the percentage of transparency for the logo:<br>• 0 = no transparency (i.e., a completely solid/opaque logo)<br>• 100 = fully transparent (i.e., a completely transparent/invisible logo) |
| Scaling | 100 | Specifies the scale factor (percentage) for the logo:<br>• 25% = 1/4 size<br>• 100% = no scaling<br>• 400% = 4x |

## Still Image Streaming

When creating a stream, you can specify a static image that will be used to replace the encoded video stream when the stream is paused. This feature may be used, for example, to block out sensitive content or deliver announcements and other messages. (See "Selective Video Mute" on page 93.)

The supported source formats for the static image are BMP, JPEG, PNG, and GIF.

The supported output resolutions are 1920x1080, 1280x720, 720x480 (NTSC), and 720x576 (PAL).

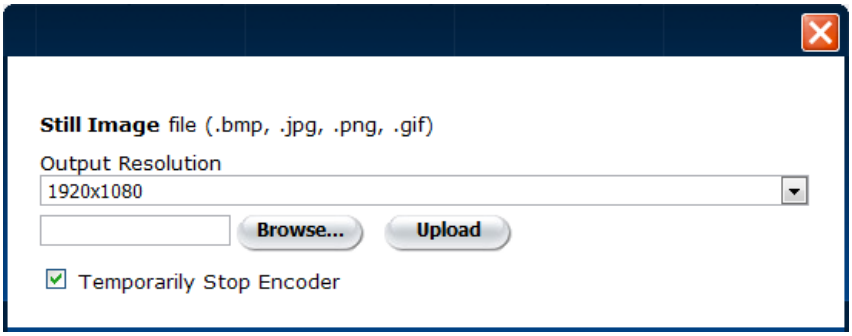
TIP For best results, the input file resolution must be the same or greater than the output resolution.

### To configure a static image:

1. Click SYSTEM>ENCODER>MEDIA to open the MEDIA SETTINGS page.
2. To upload a still image file, click **Upload** next to the Still Images field.




3. On the Still Image file dialog, select the Output Resolution for the image.




4. Click Browse to select the image file and then click **Upload**.

   By default, the encoder will be temporarily stopped; however, you may uncheck this box to allow the encoder to continue streaming.

   The static image is encoded into a single H.264 GOP sequence and will be used to replace the "real" video stream when the stream is paused.

5. To delete an image file from the list of available Still Images, click Delete next to the Still Image field.

6. To apply your changes, click Apply.

NOTE The resulting still image files are stored on the Makito file system in the folder /usr/share/haivision/still_images.

## Image Snapshot Capture

NOTE Snapshot Capture is an optional feature which may be disabled at the factory. The following section is only applicable if snapshots are enabled.

From the MEDIA SETTINGS page, you can take a snapshot of your video input and save it to either .jpg or .yuv image format. With .jpg snapshots, you can also specify the image quality.

When you take a snapshot, a unique snapshot name will be generated based on the current time if NTP (Network Time Protocol) is enabled, or a simple index such as snap-1.jpg if NTP is not enabled.

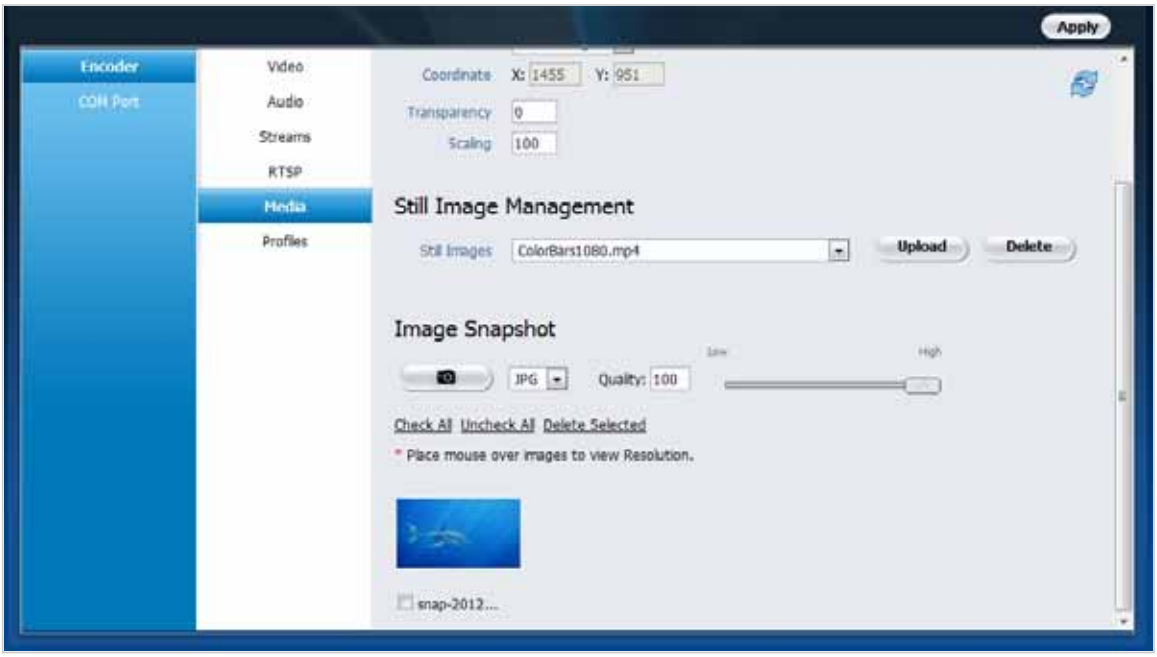
Thumbnails of the snapshots are displayed below the configuration fields for you to view and optionally save.

Note that the encoder must have a valid Input Format. To verify the Input Format detected by the system, see "Configuring the Video Settings" on page 71.

NOTE Snapshot files are stored on the Makito file system under /usr/share/haivision/snapshots.

### To take an image snapshot:

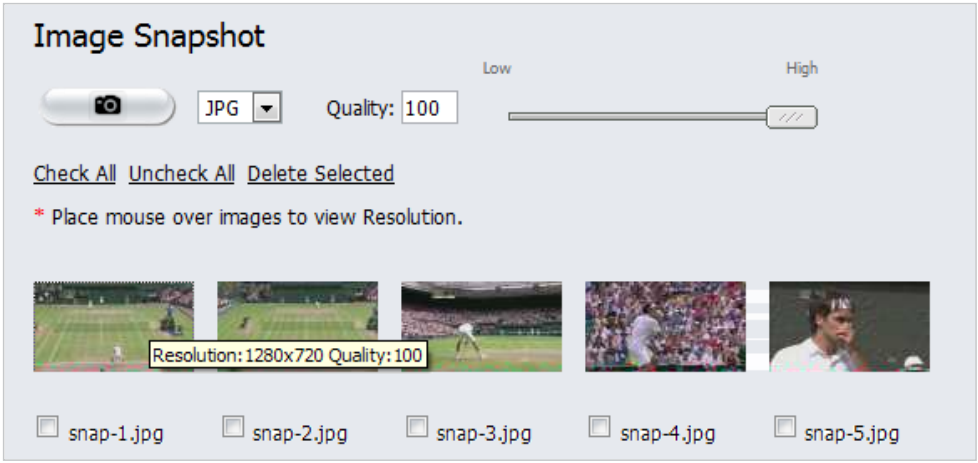
1. Click SYSTEM>ENCODER>MEDIA to open the MEDIA SETTINGS page.
2. Scroll down to the Image Snapshot portion of the page (shown in the following example).
3. Select the format for the image, either .jpg or .yuv color space (color model).




4. (.jpg format only) To adjust the image quality, either type in a value between 1 and 100 in the Quality field, or move the slider to the desired value.
5. To apply your changes, click Apply.

   This sets the system defaults for the preferred snapshot format and quality.
6. To take the image snapshot, click .

   Once a snapshot has been taken, a new thumbnail is displayed below the configuration fields (as shown in the following example).




### [.jpg Snapshots]

7. To view a full-size image of a snapshot in .jpg format, click the thumbnail.

   A full-size snapshot opens in a new browser window.

8. To save a snapshot in .jpg format, right-click either the thumbnail or the full-size image, and select Save Picture As…

### [.yuv Snapshots]

9. To save a snapshot in .yuv format, click the thumbnail and select the filename and location in the Save As dialog.

10. To delete one or multiple snapshots, check the checkbox below the snapshot (or click Check All) and click Delete Selected.

# Configuring Video Profiles

To help you manage the video quality parameters, the Makito provides a selection of video presets or “Profiles” defined for different contexts, such as computer graphics, movies, news, outdoors, sports, or “talking heads” (Virtual Presence).

From the PROFILES page, you can view the list of available video Profiles on your system and the parameter settings for each Profile. You can also create custom Profiles in which you configure each quality parameter independently, for example, to optimize efficiency of MPEG-4 encoding on your system.

Any newly created Profiles are added to the list of Profiles available for you to select from when specifying the Video Encoding properties (see “Profile” on page 74).

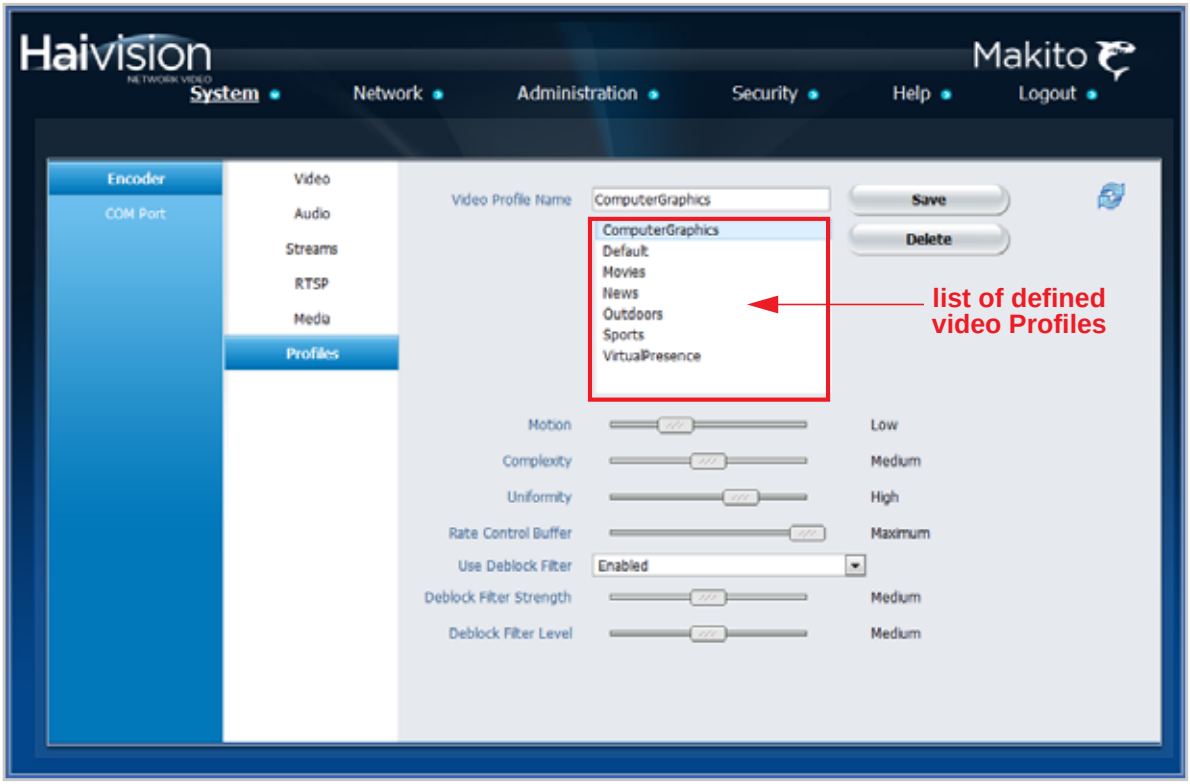
Profiles combine the following video quality parameters: Motion, image Complexity, Uniformity, Rate Control Buffer Size, and Deblock Filter (including Filter Strength and Level).

NOTE Each parameter has a different impact on video quality. Some have a great visual impact, while others have more subtle impact but are nonetheless important to the overall video quality. For more information, see “Video Quality Parameters” on page 109.

### To view and configure video profiles:

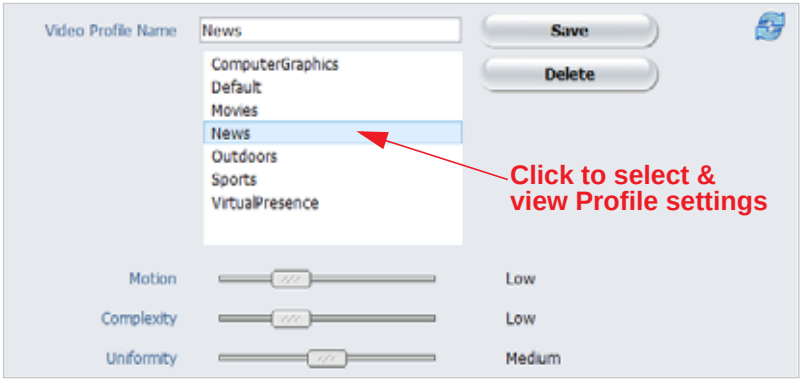
1. Click SYSTEM from the main menu, and then click ENCODER>PROFILES from the submenus.

   The PROFILES page opens displaying the list of available video Profiles for the encoder, as shown in the following example.



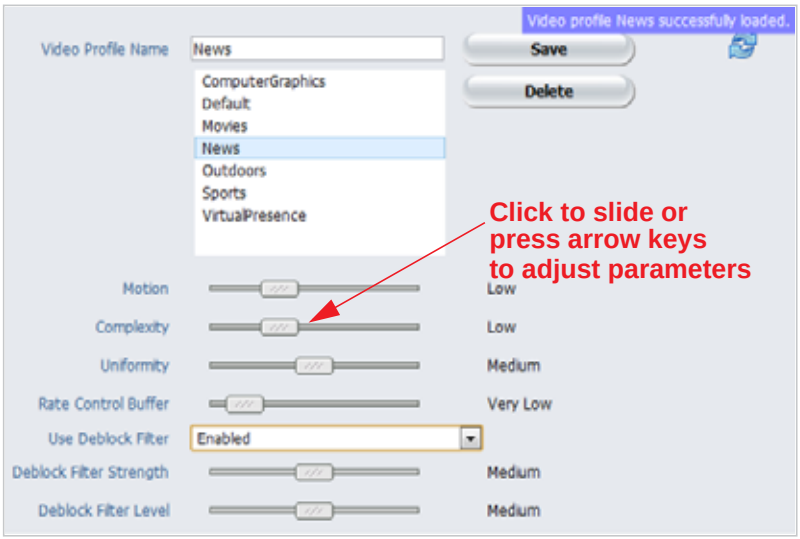

NOTE To view the list of video Profiles supplied with the Makito, refer to "Default Profiles" on page 113.

2. To view the parameter settings associated with a particular Profile, click the Profile name in the selection list, for example, "News".




The selected Profile will load onto the page and the settings will be displayed, as shown in the example below.

3. To modify the parameter settings for the Profile, you can click and drag the sliders to adjust the settings. For a description of these parameters and the slider value ranges, see "Video Quality Parameters" on page 109.




TIP You can also use the arrow keys on the keyboard to adjust the parameter settings. Simply click the slider to select the parameter and then press the arrow keys until it reaches the desired setting.

4. You can either modify the existing Profile or create a new Profile:
   - To save your changes to the existing Profile, simply click **Save**.
   - To create a new Profile, type the new name in the text box and click **Save**.

NOTE When creating a new Profile based on one of the default Profiles, it's a good idea to make a copy and save your modifications under the new name. If you do modify one of the default Profiles and wish to return to the default values, refer to "Default Profiles" on page 113 for the original settings.

5. To delete a Profile, select the Profile name in the selection list and click **Delete**.

TIP The video Profiles are designed to allow you to experiment with adjusting the settings to get the best output picture quality for your application. Adjusting these parameters has no other impact on encoding, audio, etc., just visual.

## Video Quality Parameters

The following table summarizes the video quality parameters, the selectable values and the impact on video quality for each parameter.

| Video Quality Parameter | Description | Selectable Values | Impact on Video Quality |
|---|---|---|---|
| Motion | Describes the average motion in the picture. Applies a weighting factor to other video quality parameters.<br>In general, when the Motion setting is greater, the weighting factor tends to be less. It is assumed that quality is more critical when there is less motion because your eyes can focus on the details. | Minimum<br>Very Low<br>Low<br>Medium<br>High<br>Very High<br>Maximum | Minor |
| Image Complexity | Describes the amount of details in the picture. Details in the image are generally caused by object boundaries. For example, a picture consisting of a grass field with flowers will present a lot of detail, while a picture of a person in a meeting room will present less detail.<br>A higher Complexity setting allows greater variation in video quality inside the same picture (i.e., in different regions of the picture).<br>When there is a somewhat constant video quality across the picture and video frames (i.e., the complexity is lower), the step usually remains small. | Minimum (2)<br>Very Low (4)<br>Low (6)<br>Medium (8)<br>High (10)<br>Very High (12)<br>Maximum (15) | Moderate |

| Video Quality Parameter | Description | Selectable Values | Impact on Video Quality |
|---|---|---|---|
| Image Uniformity | Describes the allowed reaction speed of the rate control subsystem. This affects the video quality improvement / degradation in the picture and across pictures.<br>• If the Uniformity setting is low (i.e., the picture quality is not uniform), the rate control subsystem will react more quickly.<br>• If the Uniformity setting is high (i.e., the picture quality is more uniform), the rate control subsystem will react more slowly.<br>The recommended value is in the range from Minimum to Medium. Higher Uniformity values should only be used with higher bitrates. | Minimum (0)<br>Very Low (1)<br>Low (1.5)<br>Medium (2)<br>High (3)<br>Very High (3.5)<br>Maximum (5) | Major<br>*see NOTE on page 112 |
| Rate Control Buffer | Controls the rate control subsystem buffer size. This has an impact on video quality.<br>Generally, a larger buffer will provide a higher video stream quality and result in less degradation of the picture.<br>NOTE: The values are a multiplication factor for the default buffer size. | Minimum (150)<br>Very Low (300)<br>Low (600)<br>Medium (900)<br>High (1200)<br>Very High (1500)<br>Maximum (2000) | Moderate |

| Video Quality Parameter | Description | Selectable Values | Impact on Video Quality |
|---|---|---|---|
| Use Deblock Filter | The Deblock Filter removes the blocking effect from the reconstructed frame before it is sent to memory.<br>In general, the reconstructed frame will contain more blocks when the bitrate is small in comparison to the picture size (i.e., resolution).<br>• The Deblocking filter should always be enabled in case of HD video; otherwise there will be a noticeable reduction in quality if you turn off the filter in HD.<br>• The Deblocking filter should generally be disabled in case of SD video because it can cause false motion estimation.<br>The Deblocking filter is somewhat adaptive so it will filter more if there is more blocking effect and less if the picture is already detailed. | Enabled (0)<br>Disabled (1) | Moderate |
| Deblock Filter Strength | (Use Deblock Filter must be enabled)<br>Deblocking filter strength affects the overall amount of deblocking to be applied to the reconstructed frame.<br>Higher values deblock more effectively, but also destroy more details and cause the entire image to be softened (blurry).<br>The default value of 0 is almost always sufficient to get rid of most blocking, but leaves the picture noticeably blurrier. | Minimum (-3)<br>Very Low (-2)<br>Low (-1)<br>Medium (0)<br>High (1)<br>Very High (2)<br>Maximum (3) | Minor |

| Video Quality Parameter | Description | Selectable Values | Impact on Video Quality |
|---|---|---|---|
| Deblock Filter Level | (Use Deblock Filter must be enabled)<br>The Deblocking filter level determines whether the blocks get filtered or not.<br>A higher filter level value allows more blocks of the reconstructed frame to be filtered. The blocks that are filtered lose details according to the filter strength parameter.<br>NOTE: The default value of 0 is almost always sufficient to get rid of most blocking. | Minimum (-3)<br>Very Low (-2)<br>Low (-1)<br>Medium (0)<br>High (1)<br>Very High (2)<br>Maximum (3) | Minor |

NOTE Keep in mind that the Bitrate remains the main determiner of video quality.

For example, even with a huge Buffer size, minimum Uniformity, and very high Complexity, if your Bitrate is “low”, you will get the low quality you specified. However, if your content is rich and hard to encode, then a larger Buffer size will help achieve a better quality for the same Bitrate.

## Default Profiles

The following table lists the parameter settings for the default Video Profiles supplied with your Makito. Each Profile is specific to a type of content.

| | Default Video Profiles | | | | | | |
|---|---|---|---|---|---|---|---|
| Video Quality Parameters | Computer Graphics | *Default | Movies | News + ticker | Outdoors | Sports | Virtual Presence |
| Content Motion | Low | Medium | High | Low | High | High | Low |
| Image Complexity | Medium | Very High | Low | Low | Very High | High | Very Low |
| Image Uniformity | High | Very Low | Medium | Medium | Minimum | Low | Medium |
| Rate Control Buffer | Maximum | Very Low | Medium | Very Low | Very Low | Low | Low |
| Deblock Filter | Enabled | Disabled | Enabled | Enabled | Enabled | Enabled | Enabled |
| Deblock Filter Strength | Medium | Medium | Medium | Medium | Medium | Medium | Medium |
| Deblock Filter Level | Medium | Medium | Medium | Medium | High | Medium | Medium |

NOTE *The “Default” Profile provides the same effect as the previous Makito release (v1.4.0) in terms of video quality.

# Managing the COM Port

NOTE The COM PORT page is only accessible to administrators.

The Makito Dual Height Blade and the Makito-SDI provide a serial interface which you can use to connect to a computer for management of the encoder. The COM PORT page displays the settings for the COM port.

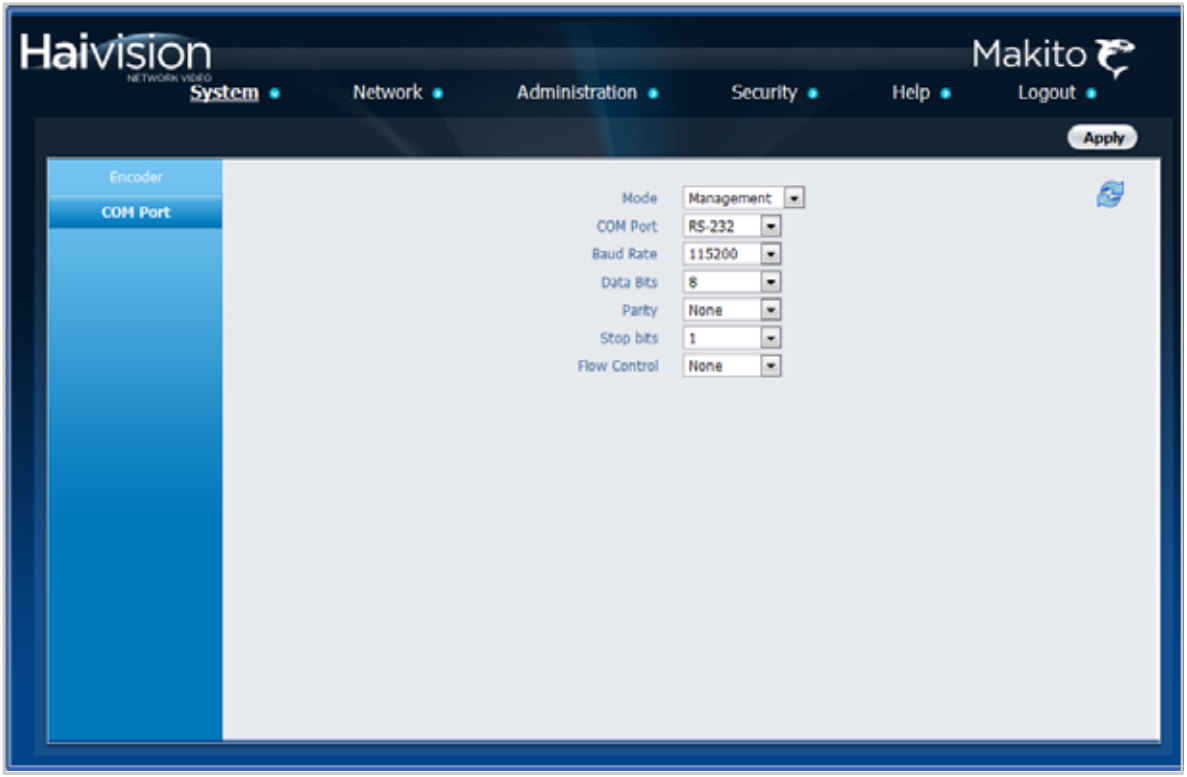
Also, on systems with the Metadata Capture option installed, you can use the serial port interface to capture either KLV (Key Length Value) or CoT (Cursor on Target) metadata, which will then be incorporated within the metadata elementary stream of the standard MPEG Transport Stream. For more information, see "Configuring Metadata Capture" on page 80.

Before you can configure the Metadata settings, you will need to set the COM Port Mode to Metadata and then reboot the encoder.

### To display the COM Port Settings:

1. Click SYSTEM from the main menu, and then click COM PORT from the submenu.

   The COM PORT SETTINGS page opens, as shown in the following example.



The COM Port Settings are as follows:

| COM Port Setting | Default | Description / Values |
|---|---|---|
| Mode | Management | Specifies the type of activity:<br>• Management or<br>• Metadata (required in order to configure the Metadata settings)<br>NOTE: You must reboot the encoder when you change the Mode. |
| COM Port | RS-232 | Specifies the type of serial interface:<br>• RS-232 or<br>• RS-422 (only available if the Metadata Capture option is installed). |
| Baud Rate | 115200 | The COM Port bitrate: 115200 |
| Metadata Capture only | | Set the COM Port bitrate to match the protocol for connected RS-232/422 equipment. Choose from: 1200, 2400, 4800, 9600, 19200, 38400, 57600 or 115200. |
| Data Bits | 8 | The COM Port databits: 8 |
| Parity | None | The COM Port parity: None |
| Stop Bits | 1 | The COM Port stopbits: 1 |
| Flow Control | None | The COM Port flow control: None |

2. To apply your changes, click Apply.

   The changes will take effect immediately but will not be saved and will be lost after a reboot.

For information on connecting a computer to the COM1 port, see "Connecting the Encoder to the Network and a Computer" on page 34.

## Logging Out

After you finish using the Makito, be sure to log out. To do so, select LOGOUT from the Main Menu.

Logging out prevents misuse and unauthorized access to the encoder.

# CHAPTER 4: Managing Users and Security

This chapter explains how to set up accounts and configure security settings for the encoder using the Web interface.

NOTE The Security menu provides the options to configure Makito v2.1.0 encoders to be "hardened" in compliance with the Common Criteria Network Devices Protection Profile (NDPP). For more information, see "Hardening" on page 31.

The Security features are described in detail in the Makito v2.1.0 Hardening Guide, available from Haivision's Download Center at http://www.haivision.com/download-center/.

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# Configuring Network Settings

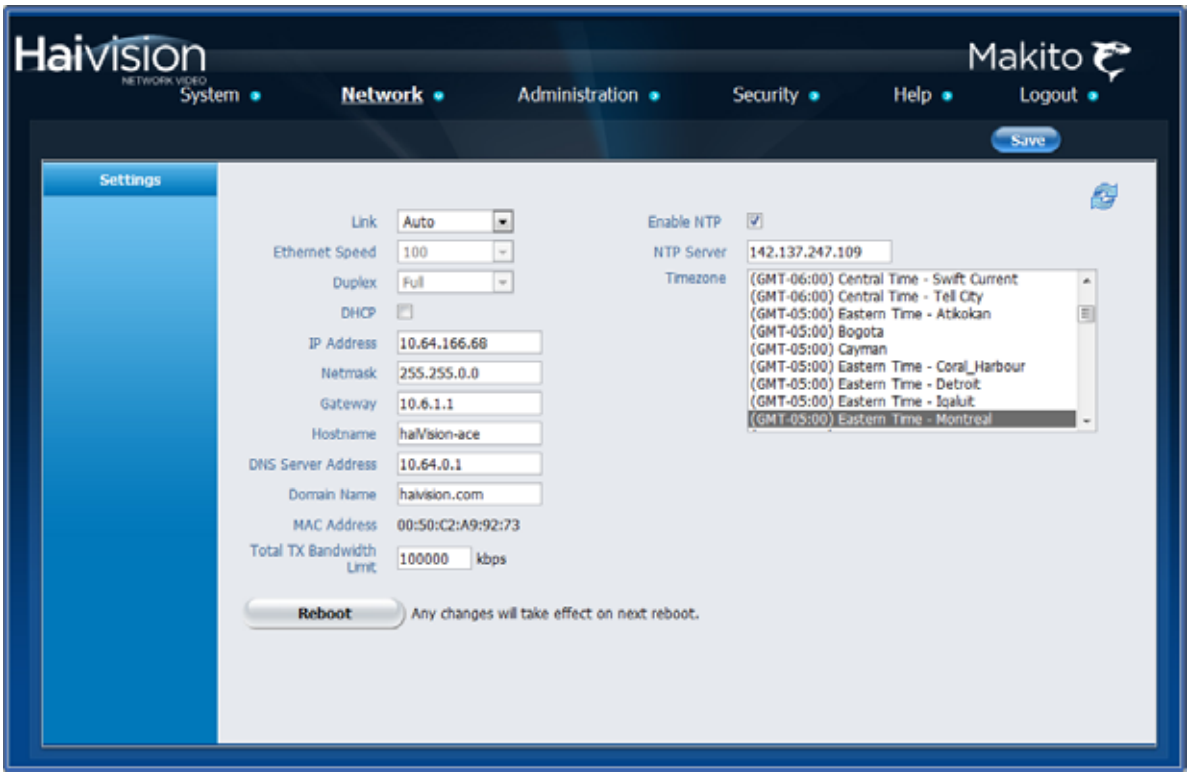
From the NETWORK SETTINGS page, you can modify the network interface settings for the encoder, including the unit's IP Address. You can also configure Network Time Protocol (NTP) support to synchronize the encoder clock with the selected time zone.

CAUTION When you make changes to the Network Settings, be sure to write down the new encoder IP Address or label the chassis. After you save your changes and reboot, you will have to redirect the browser to the new IP address and log in again in order to access the encoder.

## To view and configure the Network Settings:

1. Click NETWORK from the main menu.

   The NETWORK SETTINGS page opens, as shown in the following example.




2. Select or enter the new value(s) in the appropriate field(s). See "Network Settings" on page 120.

3. To save your changes, click Save.

   You must reboot the system for the changes to take effect.

4. To apply your saved changes, click Reboot.

   The encoder will reboot and you will be returned to the Login page.

## Network Settings

The following table lists the Encoder Network settings:

| Network Setting | Description / Values |
|---|---|
| Link | Determines whether the Ethernet parameters are set automatically or manually (i.e., enables or disables autonegotiation):<br>• Auto - The system will match the Ethernet Speed and Duplex Mode to the Ethernet hub to which it is connecting:<br>• Manual - These values must be set manually. See following settings.<br>NOTE: Always use Auto with Gigabit Ethernet (GigE) speed (1000 Mbps). |
| Ethernet Speed | If Link is set to Auto, the actual value for the Ethernet Speed (read-only).<br>-or-<br>If Link is set to Manual, select the Ethernet Speed (in Mbps):<br>• 1000<br>• 100<br>• 10 |
| Duplex | If Link is set to Auto, the actual value for the Duplex Mode (read-only).<br>-or-<br>If Link is set to Manual, select the Duplex Mode:<br>• Full<br>• Half |
| DHCP | Check or clear this checkbox to enable or disable the Dynamic Host Configuration Protocol.<br>NOTE: When DHCP is enabled, the encoder will get an IP Address from a DHCP server on the network. When it is disabled, you must manually enter the encoder's IP Address, Netmask & Gateway Address. |
| IP Address | Displays the IP Address for the Makito. This is a unique address that identifies the unit in the IP network.<br>NOTE: If DHCP is disabled, you may enter an IP address in dotted-decimal format. |

| Network Setting | Description / Values (Continued) |
|---|---|
| Netmask | Displays the Subnet Mask for the Makito. This is a 32-bitmask used to divide an IP address into subnets and specify the network's available hosts.<br>NOTE: If DHCP is disabled, you may enter a Netmask in dotted-decimal format. |
| Gateway | Displays the gateway address of the network (typically the address of the network router).<br>NOTE: If DHCP is disabled, you may enter a gateway address in dotted-decimal format. |
| Hostname | You may, optionally, enter a unique name for the Makito. |
| DNS Server | (Optional) Enter the DNS server address for your network. |
| DNS Name | (Optional) Enter the domain for the Makito. |
| MAC Address | (Read-only) The Media Access Control address assigned to the Makito. |
| Total TX Bandwidth Limit | The maximum transmit bandwidth for the unit in kbps. Specifies the bandwidth "ceiling" for the Ethernet port. |
| Enable NTP | Check this checkbox to connect to an NTP (Network Time Protocol) server to synchronize the encoder clock. |
| NTP | If NTP is enabled, enter the IP address of the NTP server. |
| Timezone | Select the desired time zone and corresponding city.<br>NOTE: The times are based on hours added to or subtracted from Greenwich Mean Time (GMT). |

# Viewing System Status Information

From the STATUS page, you can view status information about the Makito, such as the operating system up time, along with information about the hardware and software components. The page displays a "snapshot" of the encoder faceplate that shows the A/V interface.

The STATUS page displays the Card Status, Card Type, Part Number, Serial Number, System Uptime, Encoding Chipset Load (%), Firmware Version, Firmware Date, Hardware Version, and Boot Revision for the encoder.

You can also reboot the encoder and take a system snapshot from the STATUS page.

The STATUS page is available Operator and Guest users as well as Administrators.

## To view status information:

1. Click ADMINISTRATION from the main menu and then click STATUS from the submenu.

   The STATUS page opens, as shown in the following example.




   The STATUS settings are read-only. For details, see the following section, "Status Settings".

2. To reset the video encoder, click Reset (see "Reset" on page 123).

3. To reboot the encoder, see "Rebooting the Encoder" on page 124.

4. To display a snapshot of system information, see "Taking a System Snapshot" on page 124.

## Status Settings

The following table lists the Status settings and controls. Status information can be useful for troubleshooting and may be forwarded to Haivision Technical Support if you are requesting technical support.

| Status Setting | Description / Values |
|---|---|
| Card Status | OK (or error message if applicable). |
| Card Type | The type of encoder, e.g., Makito-DVI Encoder. |
| Part Number | The Haivision part number for the encoder, e.g., B-290E-DVI or B-290E-HDSDI |
| Serial Number | The serial number for this encoder appliance or card. |
| Firmware Version | The firmware version of the encoder, e.g., v2.1.0-33 |
| Firmware Date | The firmware release date. |
| Firmware Options | (If applicable) Firmware options installed at the factory, e.g., SW-290E-KLV-COT (Metadata Capture KLV & COT). For more information, see "Configuring Metadata Capture" on page 80. |
| Hardware Version | The hardware version of the encoder. |
| Hardware Compatibility | A1 (basic card assembly). |
| CPLD Version | The CPLD firmware version of the encoder. |
| Boot Version | The Boot version of the encoder. |
| System Uptime | The length of time (mm:ss) the encoder has been "up" and running. |
| Encoding Chipset Load | The combined video encoding processor usage in percentage% (combining both Hi and Lo streams). |
| Reboot | Reboots the encoder. See the following section, "Rebooting the Encoder". |
| System Snapshot | Displays a snapshot of system information in a new window. See "Taking a System Snapshot" on page 124. |
| Reset | Resets the video encoder. Performs the equivalent of the CLI command `videnc 0 reset`.<br>NOTE: This is *not* equivalent to a Hardware Reset (see "Resetting the Encoder" on page 54). |

## Rebooting the Encoder

### To reboot the Encoder:

1. Click ADMINISTRATION>STATUS to open the STATUS page.
2. Click Reboot.

   The encoder will reboot and you will be returned to the Login page. Any active streaming sessions will be momentarily disrupted.



TIP You can also reboot the encoder from the NETWORK SETTINGS page. See "Configuring Network Settings" on page 119.

## Taking a System Snapshot

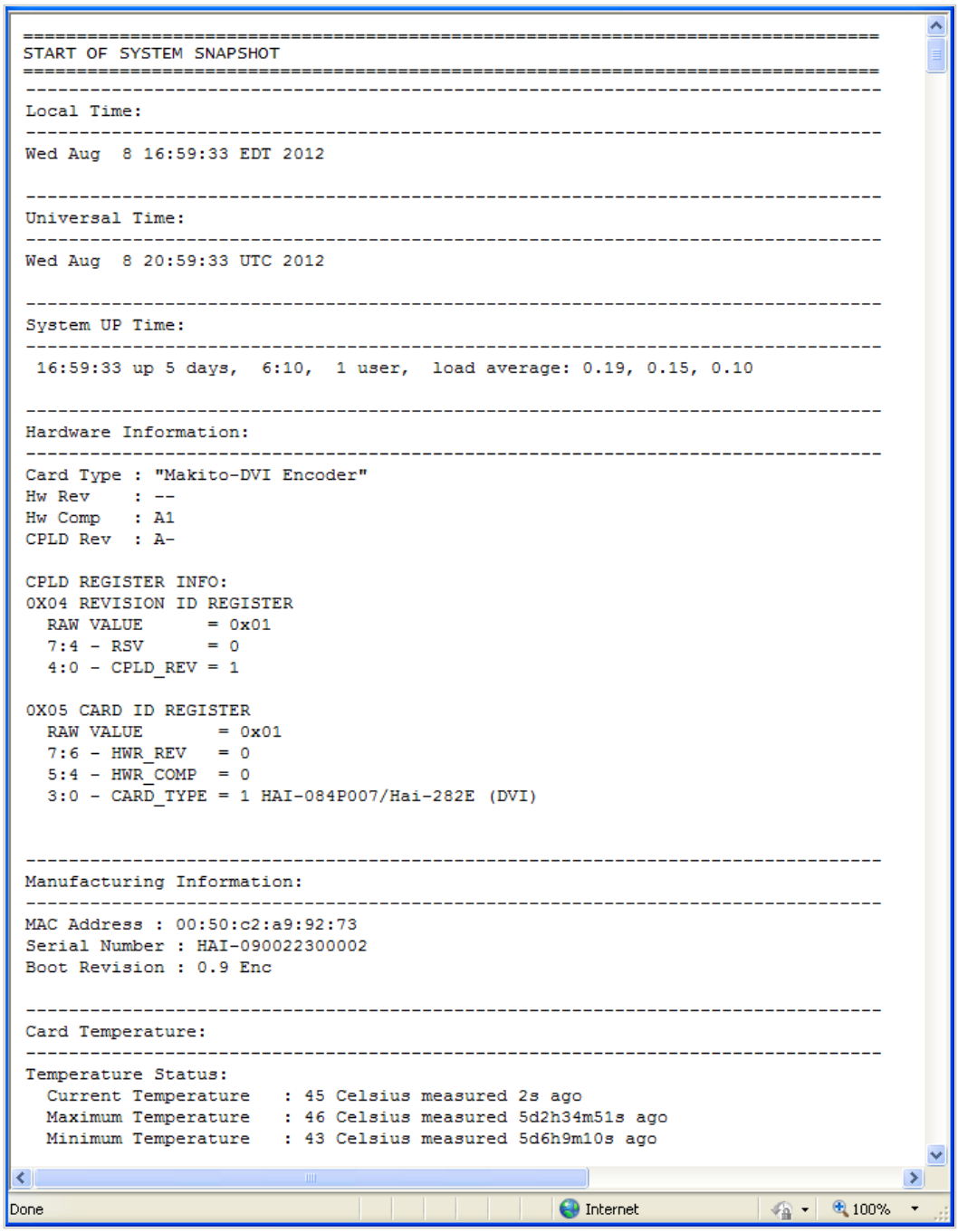
Taking a system snapshot can be useful for troubleshooting and may be forwarded to Haivision Technical Support if you are requesting technical support.

The system snapshot lists information such as component versions, network settings, loaded modules, running processes, system traces, configured streams and stream status checks, configured video encoders and status checks, configured audio encoders and status checks, startup config file contents, global settings file contents, debug logging settings file contents, downloaded software packages, last software update log, and OS statistics.

### To take a system snapshot:

1. From the STATUS page, click System Snapshot.

   The system will display a snapshot of system information in a new window, as shown in the example on the following page:



```
================================================================================
START OF SYSTEM SNAPSHOT
================================================================================
--------------------------------------------------------------------------------
Local Time:
--------------------------------------------------------------------------------
Wed Aug  8 16:59:33 EDT 2012

--------------------------------------------------------------------------------
Universal Time:
--------------------------------------------------------------------------------
Wed Aug  8 20:59:33 UTC 2012

--------------------------------------------------------------------------------
System UP Time:
--------------------------------------------------------------------------------
 16:59:33 up 5 days,  6:10,  1 user,  load average: 0.19, 0.15, 0.10

--------------------------------------------------------------------------------
Hardware Information:
--------------------------------------------------------------------------------
Card Type : "Makito-DVI Encoder"
Hw Rev    : --
Hw Comp   : A1
CPLD Rev  : A-

CPLD REGISTER INFO:
0X04 REVISION ID REGISTER
  RAW VALUE      = 0x01
  7:4 - RSV      = 0
  4:0 - CPLD_REV = 1

0X05 CARD ID REGISTER
  RAW VALUE       = 0x01
  7:6 - HWR_REV   = 0
  5:4 - HWR_COMP  = 0
  3:0 - CARD_TYPE = 1 HAI-084P007/Hai-282E (DVI)


--------------------------------------------------------------------------------
Manufacturing Information:
--------------------------------------------------------------------------------
MAC Address : 00:50:c2:a9:92:73
Serial Number : HAI-090022300002
Boot Revision : 0.9 Enc

--------------------------------------------------------------------------------
Card Temperature:
--------------------------------------------------------------------------------
Temperature Status:
  Current Temperature   : 45 Celsius measured 2s ago
  Maximum Temperature   : 46 Celsius measured 5d2h34m51s ago
  Minimum Temperature   : 43 Celsius measured 5d6h9m10s ago
```



TIP You can also take a system snapshot from the CLI using the system_snapshot.sh command.

# Saving and Loading Configurations

NOTE The CONFIG page is only accessible to administrators.

## Configuration Management

Each Makito is configured by users' selecting and setting values of applicable system settings, such as Encoder settings and the stream destination. Although these configuration settings are not automatically saved, you can save a list of text-based configuration directives in a file which is stored in the encoder's flash memory. Saved configuration settings will continue to be used after a reboot, or when the unit is turned off and on.

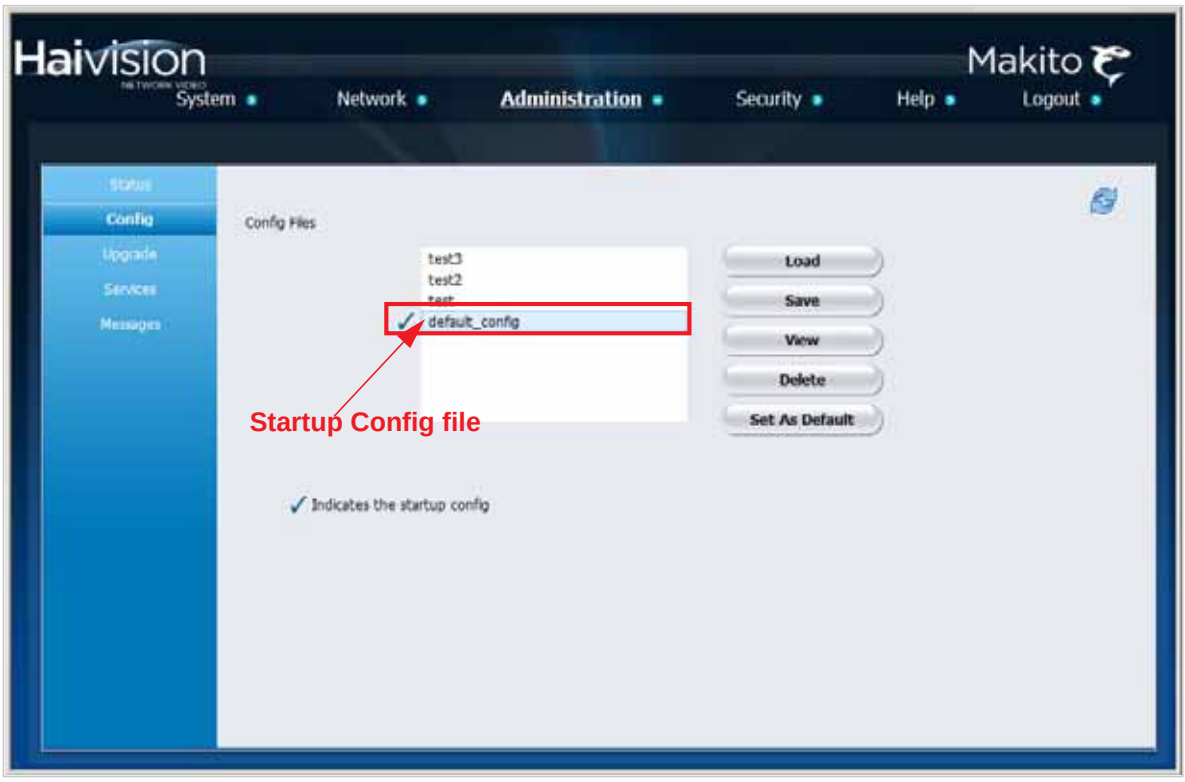
You can then direct the system to read this configuration file to restore these settings when the system startup process performs the configuration autoload.

From the CONFIG page, you can view the list of saved configurations, load a saved configuration, and save the current settings as a configuration file. You can also view the contents of a configuration file, delete configurations, and select the configuration file to load at startup.

### To view and manage configurations:

1. Click ADMINISTRATION from the main menu and then click CONFIG from the submenu.

   The CONFIG page opens displaying the list of saved configurations for the encoder, as shown in the following example.




The selected configuration is highlighted in blue, and the startup configuration is indicated with a checkmark.

2. To load a different configuration into the current session, select the filename from the list of Config Files and click Load.

3. To save the current settings as a configuration file, click Save and type a new filename in the Save Config text box.




To select this Config File to load at startup, check the Set as default config checkbox.

4. To set the default configuration (i.e., to set the configuration file to load at startup), select the filename from the list of Config Files and click Save.

   The selected configuration will be saved as the startup configuration and will be loaded into the current session as well.

5. To view the details of a configuration file, select the filename from the list of Config Files and click View. (See "Viewing Configuration File Details".)

6. To delete a configuration file, select the filename from the list of Config Files and click Delete.

## Viewing Configuration File Details

### To display a detailed view of a configuration file:

1. From the CONFIG page, click the configuration file to view.
2. Click View to display a list of the current configuration settings in a new window, as shown in the example on the following page:

```
[HD Video Encoder 0]
Profile=/usr/share/haivision/video_profiles/Default.vpf
VideoBitRate=500
EncodedResolution=720x480i
VideoFormat=Auto-Detect
PTSOffset=50
EncodedPictureRate=0
GopSize=120
VideoInput=DVI
AspectRatio=Auto
ColorSpace=Auto
TimeCode=None
ClosedCaption=Off
AutoStart=Yes

[HD Video Encoder 1]
Profile=/usr/share/haivision/video_profiles/Default.vpf
VideoBitRate=6000
EncodedResolution=960x1080i
VideoFormat=Auto-Detect
PTSOffset=50
EncodedPictureRate=0
GopSize=120
VideoInput=DVI
AspectRatio=Auto
ColorSpace=Auto
TimeCode=None
ClosedCaption=Off
AutoStart=No

[Audio Encoder 0]
AudioBitRate=128
PTSOffset=0
AudioInput=Analog
AudioSampleRate=48
AudioMode=Stereo
AudioAlgorithm=MPEG2-AAC-LC-ADTS
Capture=No
MaxCaptureSize=8000
AudioLevel=6
AutoStart=Yes

[Audio Encoder 1]
AudioBitRate=128
PTSOffset=0
AudioInput=Analog
AudioSampleRate=48
AudioMode=Stereo
AudioAlgorithm=MPEG2-AAC-LC-ADTS
Capture=No
MaxCaptureSize=8000
AudioLevel=6
AutoStart=No
```

# Installing Firmware Upgrades

NOTE The UPGRADE page is only accessible to administrators.

When you first receive the Makito, the necessary firmware is pre-installed on it. Upgrades of the firmware are issued through Haivision's Download Center on our website at: http://www.haivision.com/download-center/.

Please note that you may download the latest firmware and documentation by registering via the Haivision Support Portal.

When a firmware upgrade becomes available, you can easily install it from the Web interface. You will first need to copy the upgrade file to your local computer or network.

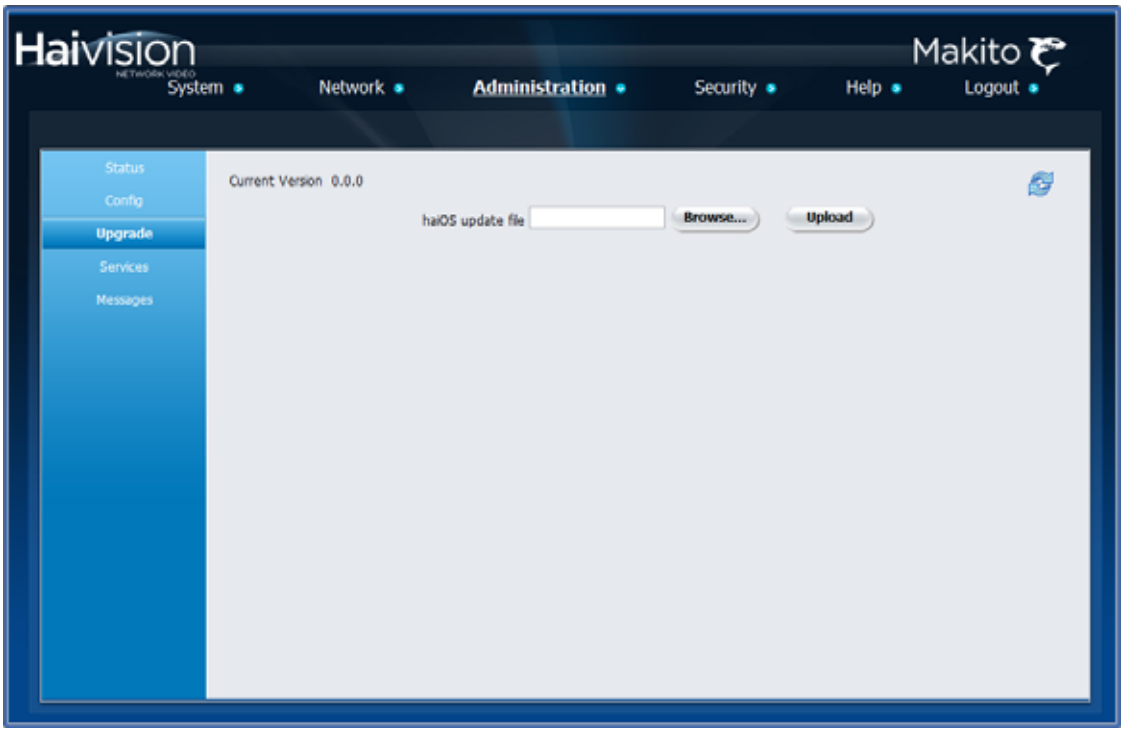
The firmware upgrade comes in the form of a file with the extension .hai, which when loaded will replace the application on your Makito. The firmware upgrade components are digitally signed, and these signatures are all verified before performing the installation.

This section provides instructions to install a firmware upgrade from the Web interface.

### To install a firmware upgrade:

1. Click ADMINISTRATION from the main menu, and then click UPGRADE from the sub-menu.

   The UPGRADE page opens displaying the currently installed firmware version, as shown in the following example.



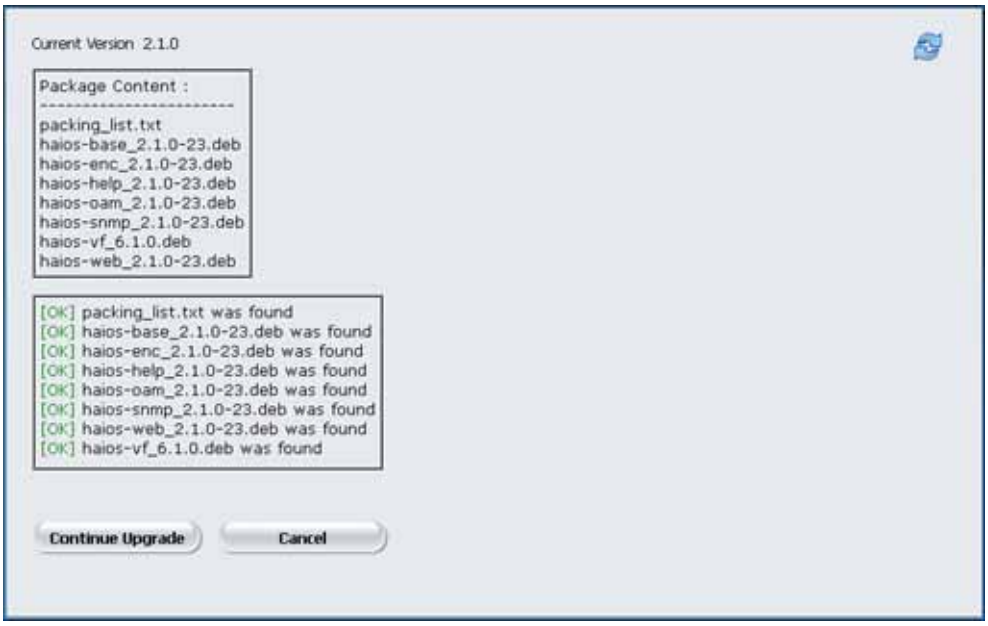

2. Click Browse to select the file.
3. Click Upload.

   The Uploading File page opens, followed by the Verifying and the Syncing file system pages.

IMPORTANT Wait for the file to be uploaded and verified and the file system synced. Remain on this page and do *not* click anything else in the Makito Web interface during the upload.

If any of the package components has been modified or is not signed by a valid certificate, the verification will fail and the downloaded package will be discarded.

When the file is uploaded and verified successfully, you will see a confirmation page listing the package contents and release date and files (as shown in the following example).




4. Click Continue Upgrade.

   Next the Unpacking Firmware page opens.

CAUTION You must remain on this page until the system completes the process of unpacking the firmware. Failure to do so could result in damage to your system.

When the firmware is unpacked, the caution will be replaced by a confirmation message and a Reboot button.

5. Click Reboot.

   While the unit is rebooting, the Status LEDs will flash, and you will see a warning page.

CAUTION Do not proceed or shut down the system while the Status LEDs are still flashing. Failure to wait could result in damage to your system.

Once the unit has rebooted, the browser will display the Login page for the Web interface (depending on your Web browser and settings). If not, reload the Login page.

6. Type the Username and Password and click Login (or press Enter).

NOTE You can verify the result of the installation on the MESSAGES page. One of the following messages will be listed:

Tue Sep 4 17:16:37 EDT 2012: Failed to install software package haios_enc_v2.1.0-22.hai. Check /var/log/bootupdate.log

Wed Sep 5 15:50:41 EDT 2012: Software package haios_enc_v2.1.0-23.hai was successfully installed.

TIP As a firmware maintenance step, we recommend that you periodically delete old copies of unused firmware. To do so, use the CLI package command (list and delete options). See "package" on page 221.

# Enabling and Disabling Network Services

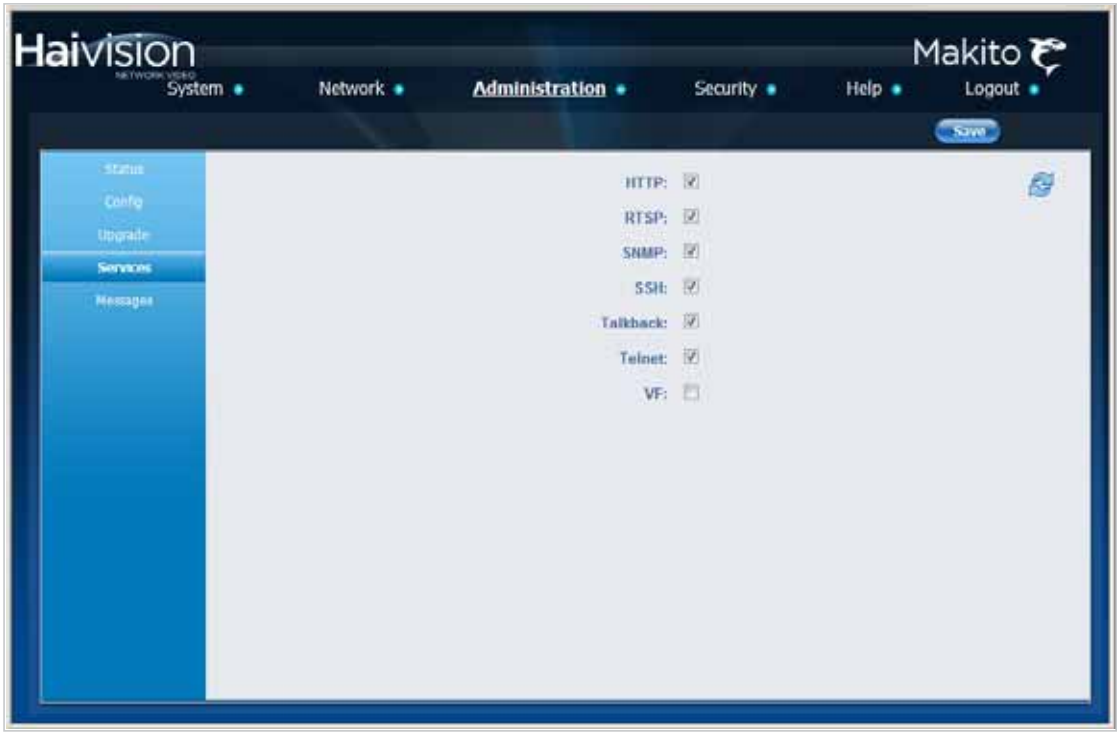
NOTE The SERVICES page is only accessible to administrators.

For security purposes, an administrator may need to stop one or more network services from accessing the Makito. From the Services page, you can enable and disable the following network services: HTTP, RTSP, SNMP, SSH, Talkback, Telnet, and VF.

## To enable or disable network services:

1. Click ADMINISTRATION from the main menu, and then click SERVICES from the sub-menu.

   The SERVICES page opens displaying the current status of network services, as shown in the following example.




2. To enable or disable a service, check or uncheck the associated checkbox. See the following section, "Service Settings".

3. To save your changes, click Save.

   The service(s) will be stopped or started immediately.

IMPORTANT If the COM1 serial port is used for metadata capture, and HTTP, Telnet, SNMP, and SSH services are disabled, the only way to re-enable these services will be by a Factory Reset. (For details, see "Resetting the Encoder" on page 54.) Once the serial port is dedicated for metadata capture, it is no longer usable for CLI management.

## Service Settings

The configurable Services are as follows:

| Service | Description |
|---|---|
| HTTP | Hypertext Transfer Protocol, used for Web browsers acting as a client.<br>NOTE: Only secured HTTP (HTTPS) is supported. See "Managing Certificates" on page 150 to manage HTTP TLS certificates. |
| RTSP | Real Time Streaming Protocol, a network control protocol used to control streaming media servers. |
| SNMP | Simple Network Management Protocol, a network protocol used mostly in network management systems to monitor network-attached devices. |
| SSH | Secure Shell, a network protocol that allows data to be exchanged using a secure channel between two networked devices. |
| Talkback | Audio Talkback (a Makito feature) allows the audience to "talk back" to the people taking or making the video (i.e., at the encoder). The talkback is played out of the encoder's 8-pin terminal block connector (see "Audio Interface" on page 26). |
| Telnet | Telnet, a network protocol used on the internet or local area networks to provide a bidirectional communications via a virtual terminal connection. |
| VF | Any Furnace servers that may be communicating with the encoder. Note that VFPilot provides access to encoder configuration settings. |

# Managing Messages

The MESSAGES page displays a limited number of important administrator actions recorded such as installation of a software package, failure to establish or maintain connectivity with a remote syslog server, Power-On Self Test (POST) errors, and other noteworthy events.

These events will result in a message being displayed at the next administrative Web Interface or CLI login.

The log of the actions recorded includes the following:

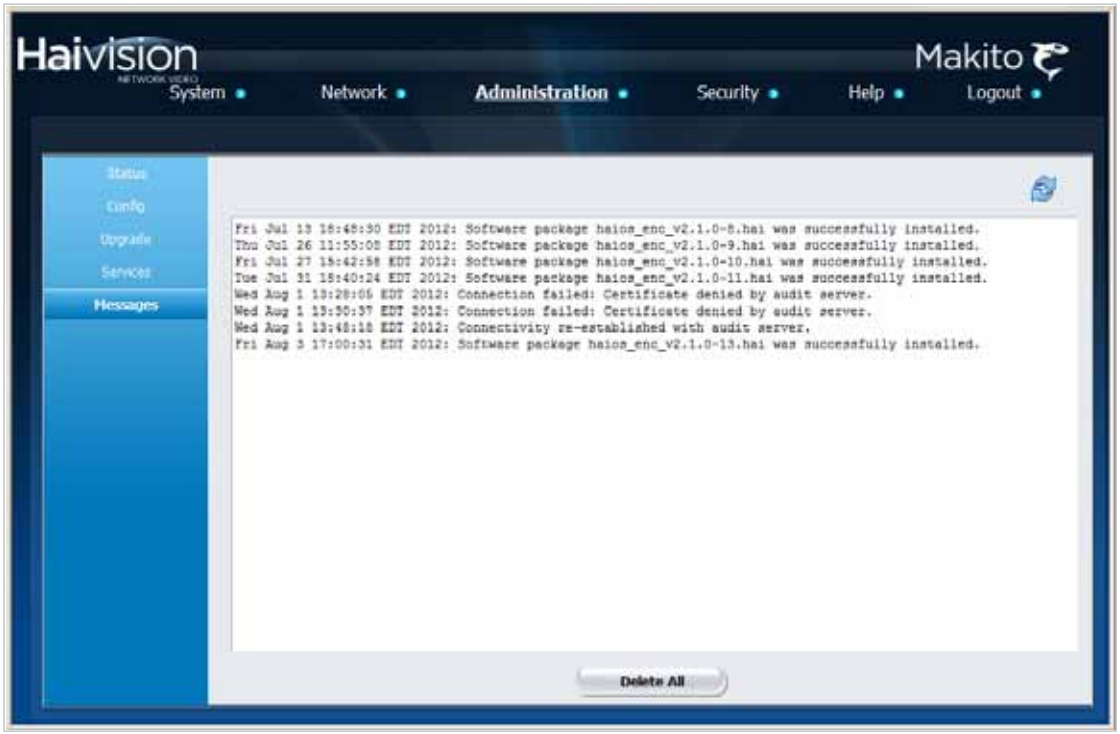
- The user initiating the action and the action being initiated.
- The time of the action.
- The results of the action (success/failure).

NOTE Messages starting with “POST” are Power-On Self Test events. If you repeatedly get POST errors, the cryptographic module of the encoder may be compromised, and it is recommended to re-installed the firmware.

### To view the messages:

1. Click ADMINISTRATION from the main menu, and then click MESSAGES from the sub-menu.

   The MESSAGES page opens displaying the log as shown in the following example.



2. To delete the messages, click Delete All.

   The messages will be deleted immediately.

# Managing Accounts

NOTE The ACCOUNTS page is available to administrators only (i.e., users assigned Administrator role). From here, administrators can create and manage user accounts for the Makito (including their own accounts).

The MY ACCOUNT page is available to users assigned either Operator or Guest roles to change their own account passwords. For information, see "Changing Your Password" on page 69.

From the ACCOUNTS page, administrators can create, delete and modify user accounts for the Makito.

An account can now be allocated to each user of the system so that the identity of the user can be uniquely determined. The Makito provides three defined account roles to assign privileges to users: Administrator, Operator and Guest. For details, see "Role-based Authorization" on page 62.

Using system-wide parameters, administrators can configure the allowable password strength and composition (i.e., to force the selection of strong passwords), as well as the periodic change of passwords. For details, see "Managing Security Policies" on page 147.

The Makito can also be configured for WCI and CLI account sessions to log out after an idle session timeout period. The session timeout period is selectable via a system-wide parameter. For details, see "Managing Security Policies" on page 147.

From the ACCOUNTS page, administrators can also upload and manage personal Public Key Infrastructure (PKI) keys for accounts to enable Public Key authentication (instead of using a password). Note that in the current release, this only applies to SSH CLI access to the encoder.

## Managing User Accounts

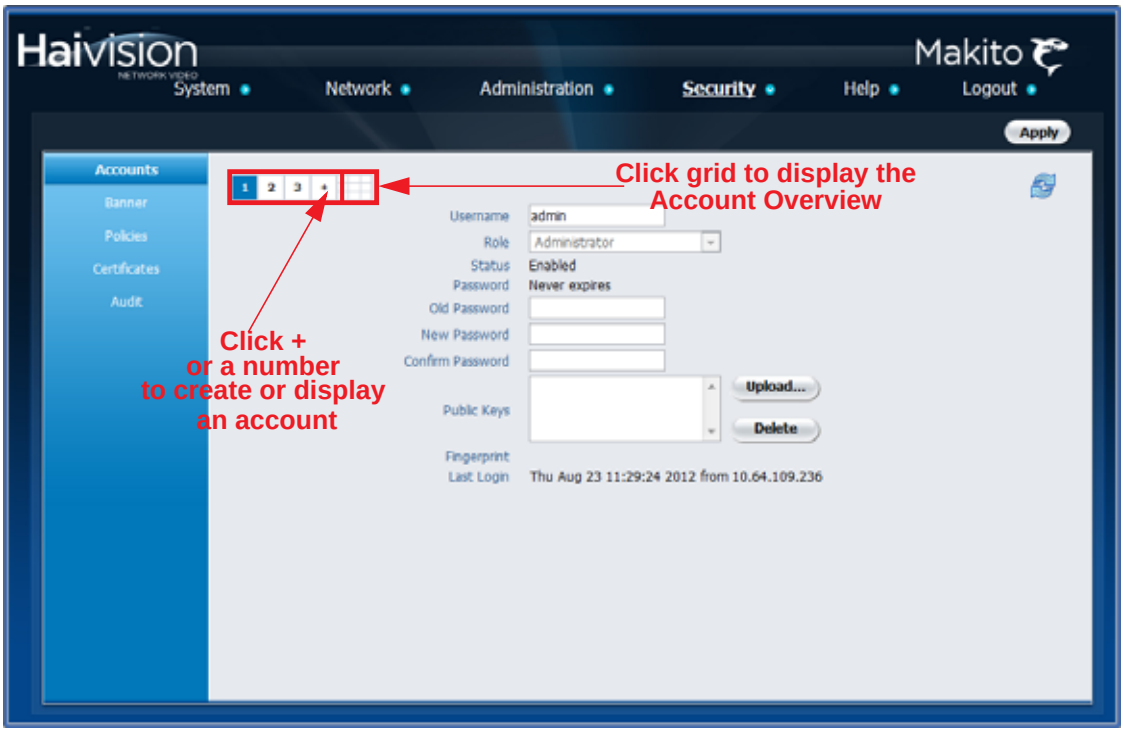
TIP It is recommended to set the Policies for your system first before creating users.

The Password Policies do not apply to administrators creating user accounts or setting passwords for accounts other then their own.

### To view, add or edit an account:

1. Click SECURITY from the main menu, and then click ACCOUNTS from the submenu.

   The ACCOUNTS page opens as shown in the following example.




2. To view details for a different user, click the numbers to browse through the user accounts.
3. To create a new user, click the +.
4. To view a summary of defined user accounts for the encoder, click the grid.

   This opens the ACCOUNT OVERVIEW page. For details, see page 142.
5. To change your password, type the current password in the Old Password field, type the new password in the New Password field and again in the Confirm Password field. For the allowed characters, see "Password Requirements" on page 70.

   -or-

   To change the password for another account (not your own), type the new password in the New Password field and again in the Confirm Password field.
6. To apply password changes, click Apply.

   The new password will take effect immediately.

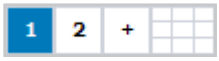
NOTE New users must change their passwords the first time they log in as well as when the administrator resets the password of an existing account.

7. To upload a Public Key for the account, follow the steps in "Managing PKIs" on page 143.
8. To get the fingerprint for a Public Key, select the Public Key in the list.

   For more information, see "Account Settings" on page 140.

## Account Settings

The following table lists the Accounts controls and settings:

| Account Setting | Default | Description / Values |
|---|---|---|
|  | | Click a number to display the ACCOUNT SETTINGS page for an existing account, or + to create a new account.<br>Click the grid to display the ACCOUNT OVERVIEW page. |
| Username | n/a | (Read-only for existing accounts) Displays the user name for the account.<br>(New account) Type in a unique name for the account, meeting the following requirements:<br>• Maximum length = 20 characters.<br>• All characters must be lowercase.<br>• The first character cannot be a number.<br>- Can start with [a-z]<br>- After the first character, can contain [a-z 0-9] |
| Role | n/a | (Read-only for existing accounts) Displays the Role assigned to the account.<br>(New account) Select the Role for the user account, either:<br>• Administrator<br>• Operator<br>• Guest<br>For details on roles, see "Role-based Authorization" on page 62. |

| Account Setting | Default | Description / Values (Continued) |
|---|---|---|
| Status | n/a | Displays the account status, either Enabled or Locked.<br>To change this, see "Account Overview Page" on page 142. |
| Password | n/a | The expiry status for the current password, either:<br>• Never expires<br>• Expired on <date><br>• Expires on <date><br>NOTE: Password Policies are defined for the system. For details on roles, see "Managing Security Policies" on page 147. |
| Old Password | n/a | (Your own account only) Type in your current password.<br>NOTE: This is not required for other accounts since an administrator is frequently asked to change the password by users who have forgotten their passwords. |
| New Password | n/a | Type in the new password.<br>For the allowed characters, see "Password Requirements" on page 70. |
| Confirm password | n/a | Re-type the new password. |
| Public Keys | n/a | Lists any Public Key files that have been uploaded for this account.<br>To add a Public Key, click Upload.<br>To delete a Public Key, select it from the list and click Delete. See "Managing PKIs" on page 143. |
| Fingerprint | n/a | Displays the fingerprint for the selected Public Key (when you click a filename in the Public Keys list). Shows (null) if you click in the text box when no Public Keys have been uploaded.<br>TIP: A Public Key fingerprint is a short sequence of bytes which you can copy and use to identify or look for a Public Key. |
| Last Login | n/a | (Existing account) Displays the date and time of the previous login. |

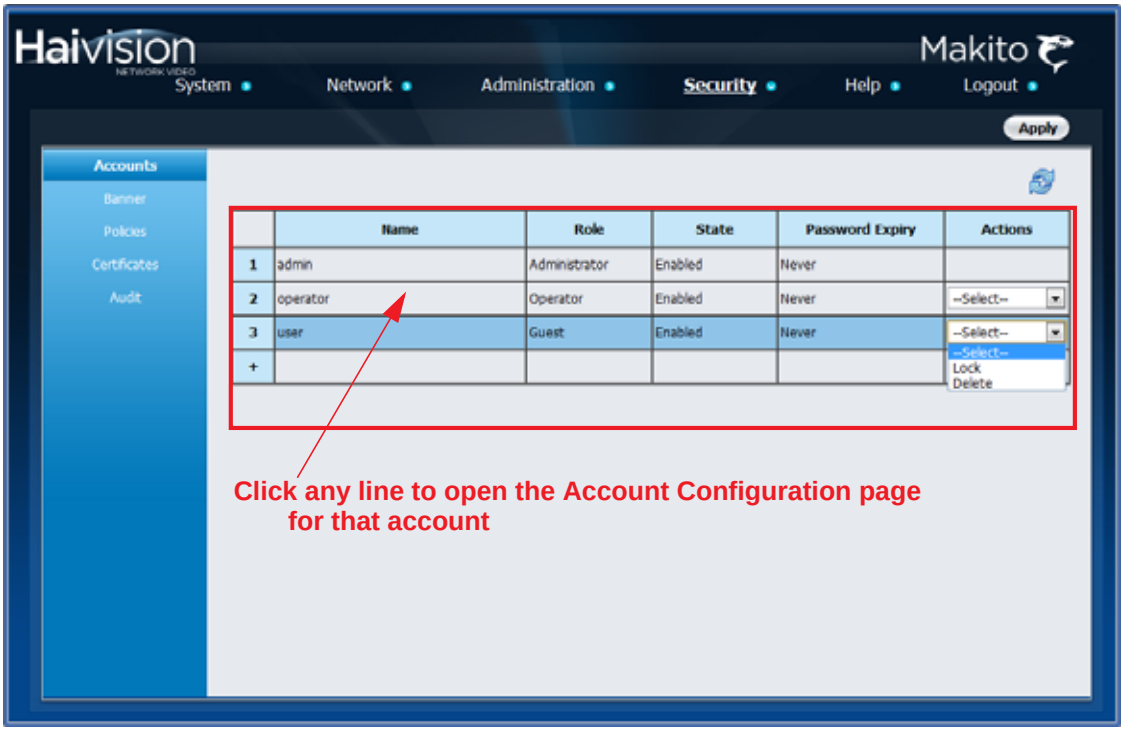
## Account Overview Page

The ACCOUNT OVERVIEW page displays a summary of defined user accounts for the encoder, including the Name, defined Role, State (Enabled or Locked), and Password Expiry Status for each account. It also provides an option to lock/unlock or delete an account.

### To open the Account Overview:

1. From the ACCOUNTS page, click the grid to display the ACCOUNT OVERVIEW page.

   The ACCOUNT OVERVIEW page opens as shown in the following example.




2. To view account details or add an account, click a line in the table to open the ACCOUNT SETTINGS page.
3. To lock/unlock an account, click --Select-- (under Actions) and select either:
   - Lock (if the current State is Enabled) or
   - Unlock (if the current State is Locked).
4. To delete an account, click --Select-- (under Actions) and select Delete.
5. To apply your changes, click Apply.

## Managing PKIs

In order to use a Public Key Infrastructure (PKI) key for account authentication (instead of a password), you must first get the Public Key of your SSH client. Note that in the current release, this only applies to SSH CLI access to the encoder.

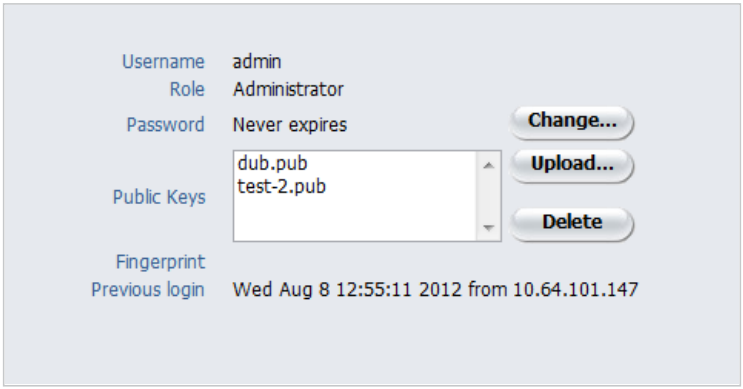
### To upload a Public Key file for your account:

1. To upload a new Public Key file (with a .pub extension), click Upload….



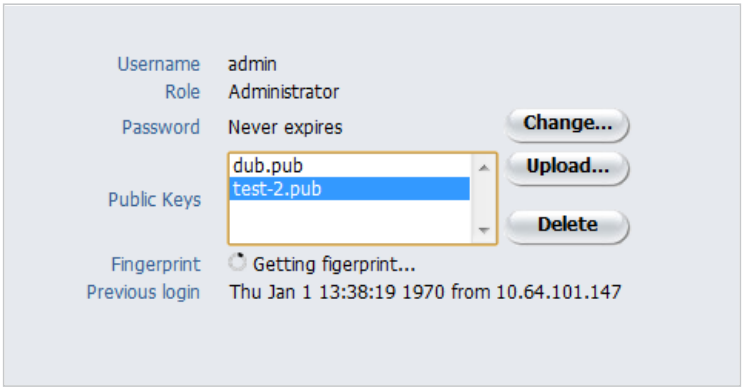

2. Click Browse to select the file.

   The file is then added to the list of Public Keys (as shown in the example below).




3. To get the fingerprint for the key (e.g., for identification purposes), select the filename in the list.

   You will see a progress message (as shown in the example below) and then the key will be displayed.



4. To delete a previously uploaded Public Key file, select the filename in the list and click Delete.



TIP You can now access the CLI interface from you SSH client without providing your account password. You may have to provide a password to decrypt your private key but this is done by your SSH client. If you no longer use password-based authentication to access your account, it is recommended to set a very long password.

# Managing Banners

NOTE The BANNER page is only accessible to administrators.

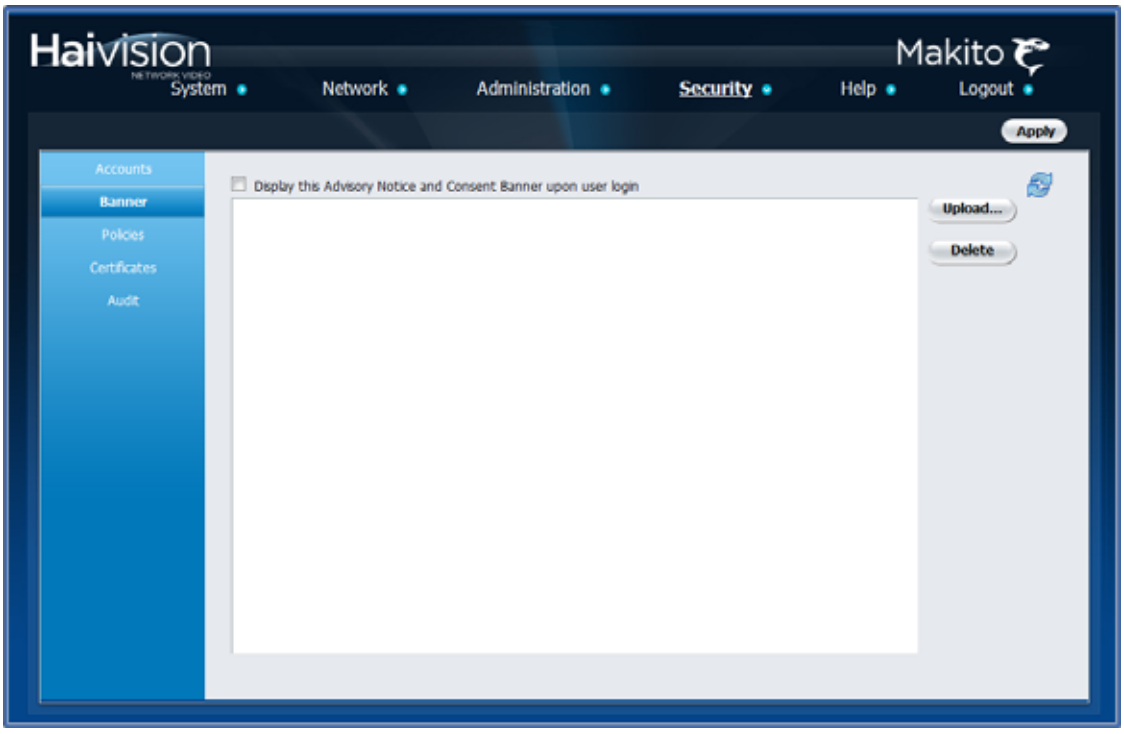
From the BANNER page, administrators can upload a text file for the Advisory and Consent Banner page. The banner is typically an advisory/warning notice to be displayed before the Login page.

NOTE In the current release, only ASCII file format is supported for the banner file; the banner is a single text file with a maximum file size of 4KB.

## To upload a text file for the Banner page:

1. Click SECURITY from the main menu, and then click BANNER from the submenu.

   The BANNER page opens, displaying the current banner text (if enabled), as shown in the following example.




2. To upload a new text file for the banner, click Upload….
3. On the banner dialog, click Browse to select the file.




4. Click Upload.

NOTE If the banner is enabled, the time when the banner actually gets displayed may vary with the service in use (such as SSH, Telnet, serial port, or Web Interface) and how the services are configured. For example, in some cases, the banner will be displayed right after the login and before the password is entered, whereas with the Web Interface, the banner will be displayed before the user gets to the Login page.

# Managing Security Policies

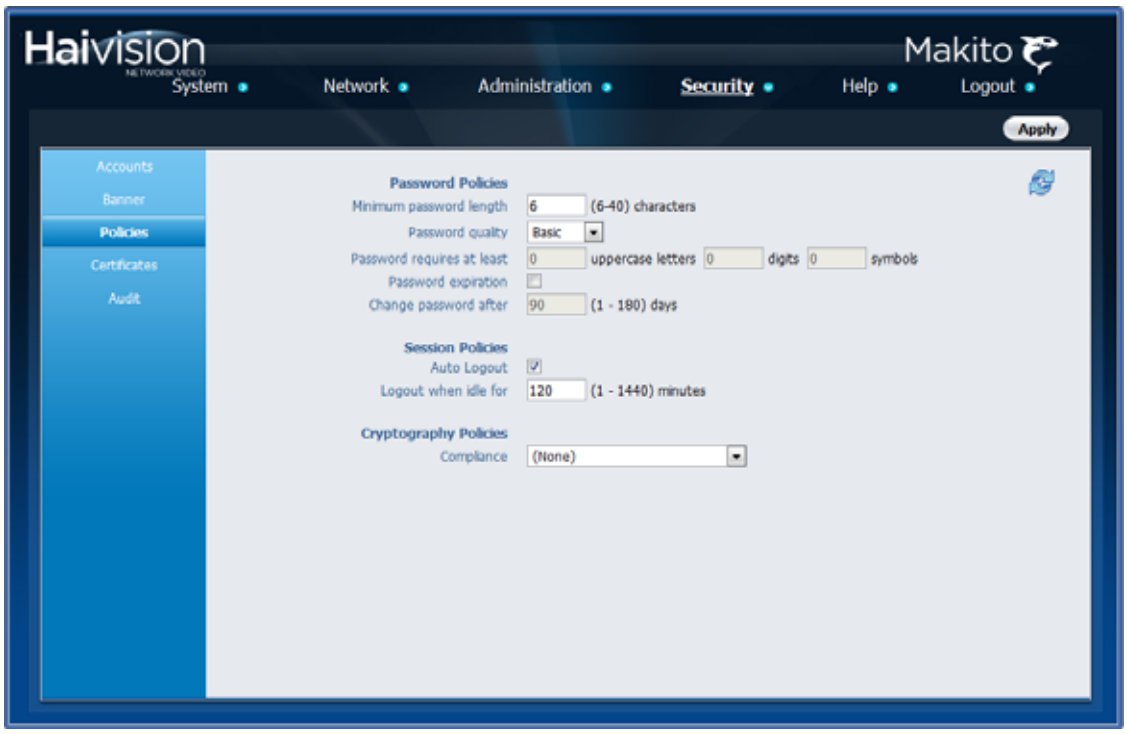
NOTE The POLICIES page is only accessible to administrators.

From the POLICIES page, administrators can set policies for passwords, session timeout, and cryptographic strength for Makito user accounts. These policies will apply to all user accounts; therefore, it is recommended to set the policies before beginning to create accounts.

## To view and manage the Security policies for the encoder:

1. Click SECURITY from the main menu, and then click POLICIES from the submenu.

   The POLICIES page opens as shown in the following example.




2. Select or enter the new value(s) in the appropriate field(s). See "Policy Settings" on page 148.
3. To apply your changes, click Apply.

## Policy Settings

The following table lists the Policy settings for the encoder:

| Policy Setting | Default | Description / Values |
|---|---|---|
| Password Policies | | |
| Minimum password length | 6 characters | Type in the minimum password length (from 6-40 characters).<br>NOTE: Passwords can be up to 80 characters. |
| Password quality | Basic | Select the required password quality; works in conjunction with Password requires at least below:<br>• Basic: Sets the minimum password length as the only requirement to accept a new password.<br>• Strong: Adds more strict requirements to the password structure. Checks for minimum length as well as other criteria such as minimum number of required upper case characters, digits, and symbols. |
| Password requires at least | n/a if Basic<br>0 characters if Strong | (Password quality must be Strong) Specify the minimum required number of:<br>• uppercase letters<br>• digits<br>• symbols<br>The range is from 0 to 40 for all 3. |
| Password expiration | Disabled | To enable Password expiration, check the checkbox. |
| Change password after | n/a if Disabled<br>90 days if Enabled | (Password expiration must be enabled) Type in the number of days after which users must change their passwords (from 1-180 days). |
| Session Policies | | |
| Auto Logout | Disabled | To enable Auto Logout, check the checkbox.<br>See the following section, "Auto Logout". |
| Logout when idle for | n/a if Disabled<br>15 minutes if Enabled | (Auto Logout must be enabled)<br>Type in the maximum length of time the system may be idle before the user will be logged out (from 1 - 1440 minutes). |

| Policy Setting | Default | Description / Values (Continued) |
|---|---|---|
| Cryptography Policies | | |
| Compliance | None | Specifies the required cryptographic compliance, either:<br>• None<br>• Makito 2.1 Security Target<br>In order to bring the encoder to the Common Criteria evaluated configuration, cryptographic security must be activated. This will reinforce security for all management functions of the encoder in terms of cryptography. To do so, select Makito 2.1 Security Target. This setting will take effect upon the next reboot.<br>NOTE: For more information, see "Hardening" on page 31. |

## Auto Logout

Systems that are left logged on may represent a security risk for an organization. Therefore, you can configure the Makito to automatically log the user out after a specified period of idle time. If the user has been inactive for longer than this period of time, then the user is automatically logged out and redirected to the Login page.

# Managing Certificates

NOTE The CERTIFICATES page is only accessible to administrators.

The CERTIFICATES page shows the list of Identity and CA certificates installed on the Makito.

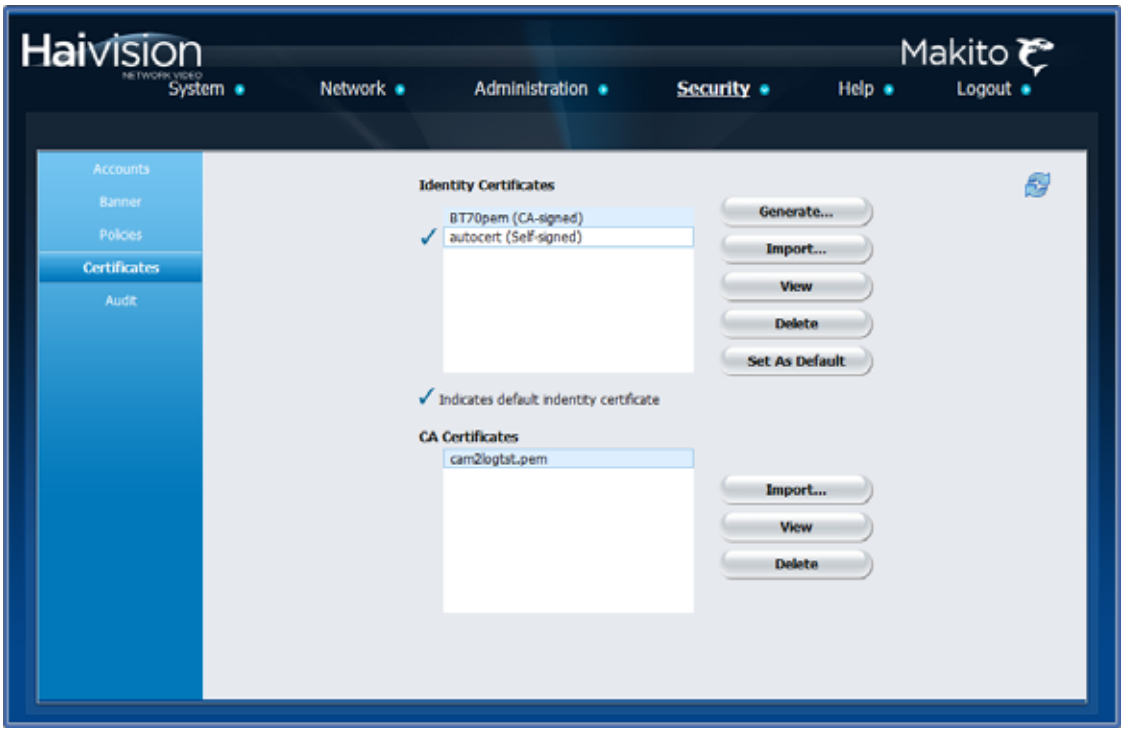
- An Identity Certificate identifies the Makito during the authentication process when trying to establish a TLS connection in Audit or HTTPS session startup. Its Common Name or Alternate Subject Names must match the encoder's IP address and/or its FQDN (Fully Qualified Domain Name) if DNS is used.
- A CA Certificate is normally a root certificate from a certificate authority that is generally widely known and trusted. CA Certificates are stored on the encoder so they can be used to authenticate CA-signed certificates from audit servers. You will need to import the root certificate from the CA that signed the certificate of the configured remote audit server. It is also recommended to import the root certificate of the CA that signed your Makito identity certificate in order to increase your list of trusted root certificates.

From the CERTIFICATES page, you can generate, import, view, and delete Identity Certificates, as well as select the default Identity Certificate. You can also import, view, and delete CA Certificates.

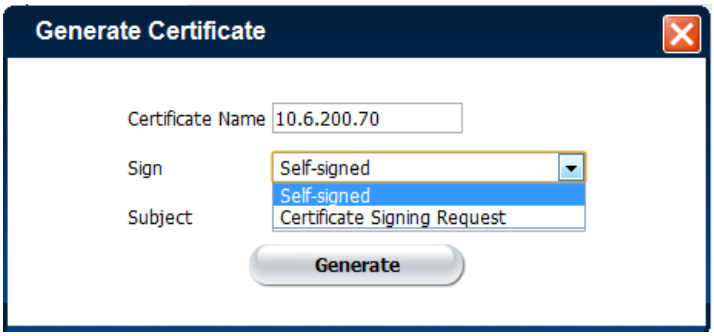
### To manage system certificates:

1. Click SECURITY from the main menu, and then click CERTIFICATES from the submenu.

   The CERTIFICATES page opens as shown in the following example.




2. To generate a Certificate Signing Request, click Generate.
3. Select either Self-signed or Certificate Signing Request from the drop-down list.




For more information, see "Sign" on page 154.

4. For the subject, type in information about the device that the Identity Certificate represents.




For more information, see "Subject" on page 155.

5. Click Generate.

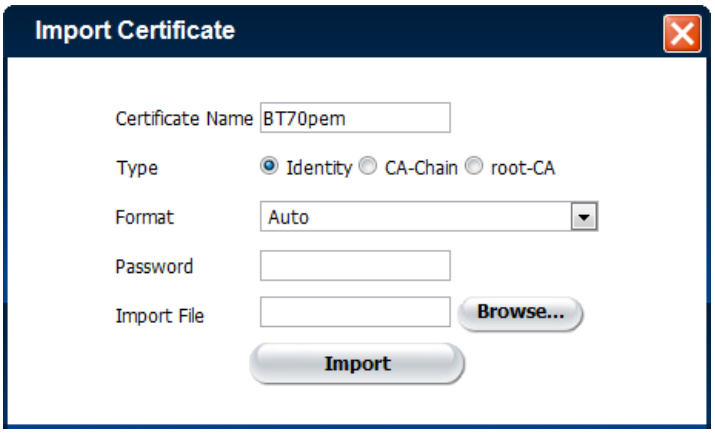
If the Certificate Signing Request was selected, the generated CSR file needs to be sent to a Certificate Authority to be signed. A copy of it is saved in the current administrator's home directory, or it can be copied and pasted from the CSR view. You can import it back later by clicking on the Import button (using the same name as the request).

---

NOTE Keep in mind that there is a difference between importing a new certificate (that was generated externally) and importing a newly signed certificate whose request was previously generated on the Makito and exported for signing.

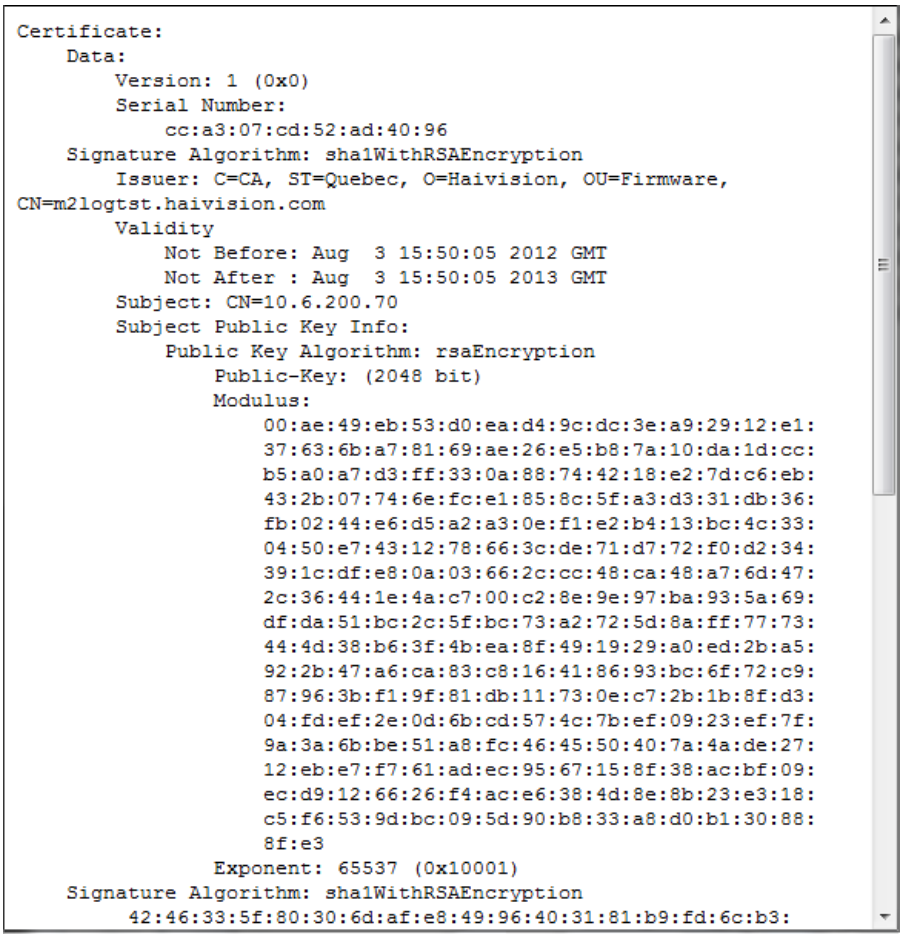
---

6. To import an Identity Certificate, click Import.




7. Select or enter the new value(s) in the appropriate field(s). See the following section, "Certificate Settings".

8. To view the details of a certificate file, select the certificate name from the list of Identity Certificates and click View. (See following example.)



```
Certificate:
    Data:
        Version: 1 (0x0)
        Serial Number:
            cc:a3:07:cd:52:ad:40:96
    Signature Algorithm: sha1WithRSAEncryption
        Issuer: C=CA, ST=Quebec, O=Haivision, OU=Firmware,
CN=m2logtst.haivision.com
        Validity
            Not Before: Aug  3 15:50:05 2012 GMT
            Not After : Aug  3 15:50:05 2013 GMT
        Subject: CN=10.6.200.70
        Subject Public Key Info:
            Public Key Algorithm: rsaEncryption
                Public-Key: (2048 bit)
                Modulus:
                    00:ae:49:eb:53:d0:ea:d4:9c:dc:3e:a9:29:12:e1:
                    37:63:6b:a7:81:69:ae:26:e5:b8:7a:10:da:1d:cc:
                    b5:a0:a7:d3:ff:33:0a:88:74:42:18:e2:7d:c6:eb:
                    43:2b:07:74:6e:fc:e1:85:8c:5f:a3:d3:31:db:36:
                    fb:02:44:e6:d5:a2:a3:0e:f1:e2:b4:13:bc:4c:33:
                    04:50:e7:43:12:78:66:3c:de:71:d7:72:f0:d2:34:
                    39:1c:df:e8:0a:03:66:2c:cc:48:ca:48:a7:6d:47:
                    2c:36:44:1e:4a:c7:00:c2:8e:9e:97:ba:93:5a:69:
                    df:da:51:bc:2c:5f:bc:73:a2:72:5d:8a:ff:77:73:
                    44:4d:38:b6:3f:4b:ea:8f:49:19:29:a0:ed:2b:a5:
                    92:2b:47:a6:ca:83:c8:16:41:86:93:bc:6f:72:c9:
                    87:96:3b:f1:9f:81:db:11:73:0e:c7:2b:1b:8f:d3:
                    04:fd:ef:2e:0d:6b:cd:57:4c:7b:ef:09:23:ef:7f:
                    9a:3a:6b:be:51:a8:fc:46:45:50:40:7a:4a:de:27:
                    12:eb:e7:f7:61:ad:ec:95:67:15:8f:38:ac:bf:09:
                    ec:d9:12:66:26:f4:ac:e6:38:4d:8e:8b:23:e3:18:
                    c5:f6:53:9d:bc:09:5d:90:b8:33:a8:d0:b1:30:88:
                    8f:e3
                Exponent: 65537 (0x10001)
    Signature Algorithm: sha1WithRSAEncryption
         42:46:33:5f:80:30:6d:af:e8:49:96:40:31:81:b9:fd:6c:b3:
```

9. To delete a certificate file, select the certificate name from the list of Identity Certificates and click Delete.

10. To set the default Identity Certificate (i.e., to set the Identity Certificate that is used to represent the device during Audit and HTTPS authentication), select the certificate name from the list of Identity Certificate and click Set As Default.

    The selected certificate will be saved as the default certificate, and its effect will be directly applied to the Audit but does not apply to HTTP until the next service restart or system reboot.

## Certificate Settings

The following table lists the Certificate controls:

| Certificate Setting | Default | Description / Values |
|---|---|---|
| Generate Identity Certificate | | |
| Certificate Name | n/a | Type in a unique name under which the certificate will be stored on the Makito as well as listed on the Certificate page. |
| Sign | Self-signed | Select the Signature Type:<br>• Self-signed: The certificate will be generated and signed by the system, and the name will be added to the list of Identity Certificates.<br>• Certificate Signing Request: A request will be generated, and its name will be added to the list of Identity Certificates. The request will be located in your home directory (accessible through the CLI), or you may export it by clicking on the View button and copying the content into a new file in a text editor.<br>In its generated form, this certificate is still a request and cannot be used as an Identity Certificate before it is signed by a CA, and imported back. |

| Certificate Setting | Default | Description / Values (Continued) |
|---|---|---|
| Subject | | The Subject identifies the device being secured, in this case, the Makito.<br>The special value “auto” used with Generate sets the Subject Common Name to the device’s FQDN if DNS is set, or the IP address otherwise. Also, for self-signed certificates, the Subject Alternative Name extension is also set to FQDN, hostname, and IP Address of the device (there is no other method to set the Subject Alternative Name).<br>Type in the subject in the form: "/C=US/ST=Maine..."<br>where the most common attributes are:<br>• /C Two Letter Country Name<br>• /ST State or Province Name<br>• /L Locality Name<br>• /O Organization Name<br>• /OU Organizational Unit Name<br>• /CN Common Name<br>TIP: For successful authentication, the Common Name in the certificate should be the IP address (by default) or domain name of the device. |
| Import Identity or CA Certificate | | |
| Certificate Name | n/a | The Certificate Name is the name under which the certificate will be stored on the device.<br>• If the certificate is a new certificate generated outside of the Makito, the file should also contain the certificate Private Key, and its chosen name should be one that isn't already installed on the device.<br>• If the certificate is a newly signed one that was sent as a certificate signing request and is returned by the CA, the certificate name should be the same as its CSR (Certificate Signing Request) counterpart in the list. |

| Certificate Setting | Default | Description / Values (Continued) |
|---|---|---|
| Type | | Select the type of the imported certificate:<br>• Identity: If you are importing an identity certificate.<br>• CA-Chain: If the import is a chain of certificate authorities leading to the root certificate authority. The imported CA-chain can contain one or more certificates linking its associated identity certificate to the root-CA and may or may not include the root-CA itself (that will only be trusted if imported as a root-CA).<br>• root-CA: If you are importing a root CA certificate.These certificates are the anchor of trust of the certificate authorities you decide to trust and are generally publicly available from the CA Web sites. They are used by the device when validating the chain of trust of an identity certificate and its CA-chain.<br>NOTE: Even though you can see the Type buttons if you click Import in either the ID or CA sections:<br>- If you select CA-root in import from ID, you'll get an error.<br>- If you select Identity or CA-chain in import from ca-root, you might get an error. |
| Format | Auto | Select the file format for the Certificate (the formats differ in the way the file is encrypted)☐<br>• Auto: detected from the file extension<br>• pem: Privacy Enhanced Mail Base64 encoded DER certificate<br>• der: Distinguish Encoding Rules<br>• pkcs #7<br>• pkcs #12<br>• pfx |
| Password | n/a | Password: if the imported certificate contains a password protected private key, type its password in this field.<br>Leave this field empty if the file is not password-protected. |
| Import File | n/a | Click Browse to select the file. |



TIP Importing a CA Certificate is the same as importing an Identity Certificate, except that you need to select the Import, View and Delete buttons in the CA Certificate section.

# Managing Audits

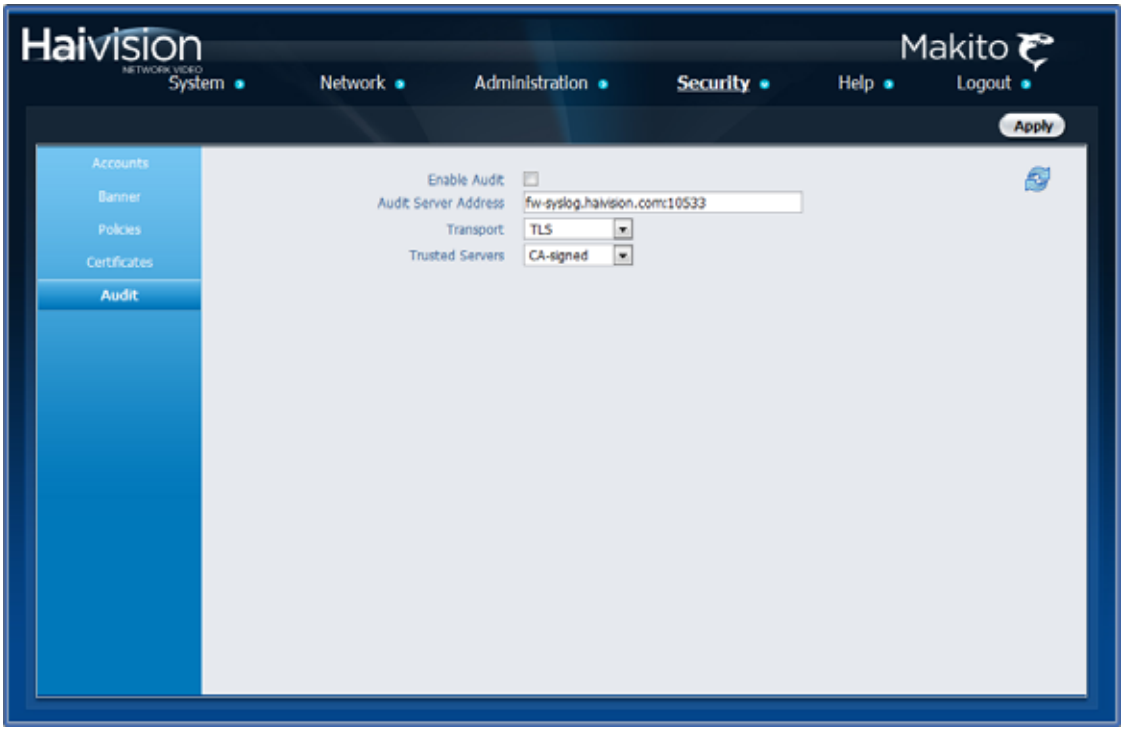
NOTE The AUDITS page is only accessible to administrators.

From the AUDITS page, administrators can set up logging to an Audit server for the Makito.

### To configure an Audit server:

1. Click SECURITY from the main menu, and then click AUDIT from the submenu.

   The AUDIT page opens as shown in the following example.




2. Check the Enable Audit checkbox to start logging to the audit server.
3. Type the audit server address and port in the Audit Server Address field. See "Audit Settings" on page 159 for more details.

   The server address must be the Common Name or one of the Subject Alternative Names in the server's certificate for successful authentication if TLS and CA-signed trusted server is set.
4. Set the type of transport protocol that will be used to send the logs to the audit server. See details in "Audit Settings" on page 159.
5. If TLS is selected as Transport, choose the type of audit server to be accepted as a trusted server: either All (no server authentication), CA-signed or Self-signed.

If Trusted Servers is set to CA-signed, the root-CA certificate of the audit server certificate chain must be imported in the encoder (see "Managing Certificates" on page 150) for the TLS connection to succeed.

6. If Trusted Servers is set to Self-signed, fill in the Fingerprint field to identify the certificate trusted for this TLS connection.




The fingerprint should be that of the certificate that belongs to the audit server which was set in "Audit Server Address".

7. To apply your changes, click Apply.

## Audit Settings

The following table lists the Audit controls and settings:

| Audit Setting | Default | Description / Values |
|---|---|---|
| Enable Audit | disabled | Check or clear this checkbox to enable or disable audits for the system. |
| Audit Server Address | n/a | Type in the address and port of the remote server, in one of the following formats:<br>• fqdn[:port]<br>• ipaddr[:port]<br>• hostname[:port]<br>If the port is not provided, the default port for the chosen transport will be used: |
| Transport | UDP | Select the Transport Type from the drop-down list:<br>• UDP (default port: 514)<br>• TLS (Transport Layer Security, default port: 6514) |

| Audit Setting | Default | Description / Values (Continued) |
|---|---|---|
| Trusted Servers | ALL | (TLS must be selected for Transport). Select the type of certificate exchange:<br>• All: Server authentication is disabled. Any server that is set in the Audit Server Address field will be accepted as a trusted server, and the authentication step is skipped.<br>• CA-signed: Enables server authentication during the startup of audit. The encoder will only accept connection with the set server if its presented certificate is signed by a trusted Certificate Authority (i.e., The certificate of that certificate authority is present in the Makito's CA Certificates list).<br>• Self-signed: Enables server authentication. The set server will be accepted if its certificate is self-signed, but its fingerprint matches the one configured on the Makito. |
| Fingerprint | n/a | (Only appears if Self-signed is selected for Trusted Servers) Enter the certificate fingerprint of the server certificate.<br>The fingerprint should be the SHA-1 or MD5 fingerprint of the certificate that belongs to the audit server which was set in Audit Server Address. |

# CHAPTER 5: Configuring A/V Services Using SNMP

This chapter provides information required to manage the Makito through the Simple Network Management Protocol (SNMP). SNMP-based management uses Network Management Stations (NMSs) to collect data or configure devices (SNMP agents) across an IP network.

## Audience

This chapter is intended for users who are familiar with SNMP-based management and who will be developing applications such as provisioning services, or creating and modifying existing network management systems to manage the Makito.



TIP To develop new SNMP applications, see the list of "Supported MIBs" on page 163.

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## Overview

To support management of the Makito by third party Network Management Stations (NMSs), the system includes an SNMP agent that may be used to configure and control the system's Audio/Video services and streams. This SNMP agent answers requests and issues traps (event notifications) to NMSs that are allowed to access the system.

NOTE The Makito uses Net-SNMP Version 5.5 and supports SNMP v1, v2c, and v3.

The Makito supports a number of SNMP commands used to set or get Management Information Base (MIB) objects on the local host or on other SNMP agents reachable over the IP networks. For details, see "SNMP Utilities" on page 170.

## Supported MIBs

The Makito SNMP agent supports the MIB-II (RFC 1213) standard and its updates, SNMPv3 MIBs, as well as the Haivision proprietary Enterprise MIB. The following table lists the supported MIBs:

| Supported MIBs | Standard | Description |
|---|---|---|
| • RFC1213-MIB.txt<br>• SNMPv2-MIB.txt<br>• IP-MIB.txt<br>• IF-MIB.txt<br>• TCP-MIB.txt<br>• UDP-MIB.txt | MIB-II (RFC 1213) | Defines the general objects for use with a network management protocol in TCP/IP internets and provides general information about the unit. |
| • SNMP-USER-BASED-SM-MIB.txt<br>• SNMP-USM-AES-MIB.txt<br>• SNMP-VIEW-BASED-ACM-MIB.txt | SNMPv3 | Supports SNMPv3 User-based Security Model (USM) and View-based Access Control (VACM). |
| • HAI-VISION-MIB.txt<br>• HAI-AVT-STREAM-MIB.txt<br>• HAI-HDC-MIB.txt | Haivision Enterprise | Supports configuration, status, and statistics. |
| • HAI-MAKITO-ENC-CAPS.txt | Haivision Enterprise | This MIB formally specifies the capabilities of the MAKITO (encoder) SNMP AGENT. It specifies which object groups from the listed MIB files are implemented, and furthermore, it specifies implementation constraints and deviations from the MIB OBJECT specification such as differences in ranges. |

# SNMP Agent Components

This section provides key information for system administrators responsible for setting up SNMP-management on the Makito.

## snmpd

snmpd is an SNMP agent that binds to a port and listens for requests from SNMP management software. Upon receiving a request, it performs the requested operation, either retrieving information or configuring the system. When finished processing the request, the agent sends a response to the sender with the requested information or the status of the configuration operation.

snmpd is located in the directory /usr/sbin.

When you start an SNMP agent on a Makito using the snmpd command, it loads the management database with the MIB files in the directory /usr/share/snmp/mibs and configures the agent with the files /usr/share/snmp/snmpd.conf and /usr/share/snmp/snmpd.local.conf.

For more information, enter the snmpd command with the -h (or --help) argument.

## snmpd.conf

snmpd.conf is the configuration file that defines how the SNMP agent works. You may need to edit this file to specify the location of the Network Management System (NMS) and to set up traps. However, for most settings, it is preferable to use the nmcfg configuration script. On the Makito, the snmpd.conf file includes:

- access control setup (i.e., community and user privileges),
- system information setup (e.g., system location, services and contact),
- trap destinations (i.e., the trap sink community to use).

snmpd.conf is located in the directory /usr/share/snmp.

For a detailed description, see the snmpd.conf file.

## snmpd.local.conf

snmpd.local.conf is the configuration file that defines the VACM (View-based Access Control Model) views modeling the privilege levels of the Makito user groups: admins, operators, and users. These groups can be used for v1/v2c communities and v3 USM users.

Unless you need to modify the access control model, there is no need to edit this file. Access groups are used in place of the traditional ro (read-only) and rw (read-write) permissions when setting communities' and users' access with the nmcfg configuration script.

### SNMP Community Names

Following are the default SNMP community names and their privileges for accessing the Makito MIBs.

| SNMP Community Name | Access Rights |
|---|---|
| admin | Read and write permission from local network and local host |
| public | Read-only permission from local network |

### SNMP Traps

Traps are SNMP messages that the SNMP agent sends to management stations when events, alarms or faults occur in the system or on the network. The Makito generates trap messages and sends them to active management stations that are identified as the `trapcommunity` in the Trap Destinations section in the `snmpd.conf` file.

The following traps are generated by the Makito:

| SNMP Trap | Description |
|---|---|
| coldStart | A coldStart trap indicates that the sending protocol entity (i.e., the Makito) has re-initialized itself and is ready to operate.<br>The coldStart trap is generated when the Makito is powered on.<br>It is developed in accordance with RFC 1215 - MIB. |
| linkDown or linkUp | A linkDown trap signifies that the sending protocol entity (i.e., the Makito) recognizes a failure in one of the communication links represented in the SNMP agent's configuration.<br>A linkUp trap signifies that the sending protocol entity recognizes that one of the communication links represented in the SNMP agent's configuration has come up.<br>These traps are generated when the Ethernet interface goes down or up.<br>These traps are developed in accordance with RFC 1215 - MIB. |

## nmcfg

`nmcfg` is the configuration script that helps the configuration of the SNMP agent. It is particularly useful for the creation and management of SNMPv3 users of the User-based Security Model (USM) and the assignment of VACM (View-based Access Control Model) access rights to communities and users. The script interacts with the `/var/net-snmp/snmpd.conf` persistent data file, which maintains the USM user database and other

SNMP agent persistent information. The script also performs snmpget commands to display the list of USM users, which is not available in a human readable form in any configuration file.

The script also reads and modifies the snmpd.conf configuration file to manage system parameters (contact, location), community-based (v1/v2c) security, and user access control. Used without parameters, it displays a summary of the SNMP agent configuration: system parameters, access control, and SNMPv3 USM users.

Following is an example of the nmcfg configuration script output:

```
# nmcfg
system parameter            value
--------------------------- ----------------------------------------
engineid                    0x80001f88030050c2c611ad
contact                     "john doe <jdoe@example.net>"
location                    "QA lab"

model   perm/group     level       user/community      source
------- -------------- ----------- ------------------- -----------
usm     guest          auth        guest               -
usm     administrator  priv        johndoe             -
v2c     administrator  noauth      admin               localhost
v2c     administrator  noauth      admin               localnet
v2c     guest          noauth      public              localnet
v2c     rw             noauth      tech                any

auth protocol           priv protocol      user
------- ------------  ---------------------  -------------------
MD5                   DES                admin
MD5                   nopriv             guest
SHA                   AES                johndoe
# nmcfg help
usage: nmcfg
      nmcfg help
      nmcfg access help
      nmcfg access usm permit <uname> {<group>|ro|rw}
   [{noauth|auth|priv}]
      nmcfg access usm delete <uname>
      nmcfg community help
      nmcfg community permit <community> {<group>|ro|rw} [<host>]
      nmcfg community delete <community> [{<group>|ro|rw} [<host>]]
      nmcfg system help
      nmcfg system define <param> "<value>"
      nmcfg system delete <param>
      nmcfg user help
      nmcfg user define <uname> [{MD5|SHA} "<apwd>" [{DES|AES}
    ["<ppwd>"]]]
      nmcfg user delete <uname>
```

### Related Topics

- “nmcfg” on page 216

## SNMPv3

For SNMPv3, the definition of a user and its access permission are separate steps, whereas for v1/v2c community-based security, a single configuration line (e.g., rwcommunity admin) defines both.

The following command creates the user "johndoe" and defines its authentication protocol and password, and its privacy (encryption) protocol and password. (Note that you can type nmcfg user help to view the supported protocols and pass phrase restrictions.)

```
# nmcfg user define johndoe SHA "password" AES "pass phrase"
```

The new user has no permissions until a rouser or rwuser line is added in the snmpd.conf configuration file. The command below shows that read and write permission is granted if the user issues authenticated requests. Note that encryption (privacy) implies authentication.

```
# nmcfg access usm permit johndoe rw auth
```

The following line is added by the above command in the snmpd.conf configuration file:

```
rwuser johndoe auth
```

To assign Makito user group privileges instead of the read-only or read-write permissions (to the whole MIB), the ro or rw parameter of the nmcfg access command can be replaced by the access group admins, operators, or users. These groups provide to SNMP v1/v2c communities and SNMPv3 USM users access privileges modeled on the Makito CLI and Web interface privilege levels.

```
# nmcfg access usm permit johndoe operator auth
```

The following line is added by the above command in the snmpd.conf configuration file, using a VACM group defined in snmpd.local.conf:

```
group _operators_auth_ usm johndoe
```

### Examples

The following examples show how the v3 parameters are used with the SNMP commands.

The following get command has the required security level (authentication) and succeeds.

```
# snmpget –v3 –u johndoe –a SHA –A "password" –l authNoPriv localhost
  sysName.0
SNMPv2-MIB::sysName.0 = STRING: razor
#
```

The following get command provides no security (no authentication, no privacy) and fails.

```
# snmpget -v3 -u johndoe -l noAuthNoPriv localhost sysName.0
Error in packet
Reason: authorizationError (access denied to that object)
#
```

The following set command provides the highest security level (authentication and privacy), even if access policy only required authentication, and succeeds.

```
# snmpset -v3 -u johndoe -a SHA -A "password" -x AES -X "pass phrase" -l
  authPriv localhost haiAvtStreamEncapsulation.1 i directRtp
HAI-AVT-STREAM-MIB::haiAvtStreamEncapsulation.1 = INTEGER:
  directRtp(1)
#
```

## SNMP Utilities

The following table summarizes the SNMP commands which can be used to set values or request information from the MIB objects on the local host or on other SNMP agents reachable over the IP networks.

| To do this... | Use this command... |
|---|---|
| To retrieve the value of an object from a network entity. | snmpget |
| To set information on a network entity. | snmpset |
| To retrieve management information from a network entity. | snmpstatus |
| To send an SNMP notification to a manager. | snmptrap |
| To retrieve the values of *all* objects under a particular location in the MIB object hierarchy tree. Use to obtain the values of all the objects under the system and interfaces nodes.<br>NOTE: The retrieval of a complete subtree is referred to as "walking the MIB." | snmpwalk |

The SNMP utilities are located in the directory /usr/bin.

For more information on an SNMP command, enter the command with the -h (or --help) argument.

# SNMP Syntax for Setting Up Streams

The Haivision Audio/Video Transport Stream MIB (HAI-AVT-STREAM-MIB) is composed of multiple tables described below.

| Table | Index | Description |
|---|---|---|
| haiAvtStreamNewID.0 | none | Next available stream ID |
| haiAvtStreamInverseTable | IP address type<br>IP address<br>Port | Table to retrieve the stream ID from the IP address and port |
| haiAvtStreamTable | Stream ID | Stream configuration and status |
| haiAvtStreamStatsTable | Stream ID | Stream statistics |
| haiAvtStreamPgmTable | Stream ID<br>Program Index | Transport Stream programs. Only SPTS (Single Program Transport Stream) supported. Not present for non Transport Streams (directRTP, QuickTime). |
| haiAvtStreamContentTable | Stream ID<br>Program Index<br>Content Index | Contents (video, audio, and/or metadata). Elementary Streams (ES) for Transport Stream. Only one entry for non-TS in which case Program Index is 1. One to three entries exist for Transport Streams. |

MIB object names and values are similar to their CLI parameter counterparts while following MIB syntax (for example, haiAvtStreamPort for port, directRtp for direct-RTP).

Streams are created and deleted using the SNMPv2 RowStatus object (haiAvtStreamRowStatus). All RowStatus values are supported (active, notInService, notReady, createAndGo, createAndWait, destroy). See the description in the SNMPv2-TC.txt file of the MIBs directory. Stream writable objects can only be set at creation time (RowStatus is createAndGo or createAndWait) or while the stream is not active (RowStatus is notInService or notReady).

Objects from the haiAvtStreamPgmTable and haiAvtStreamContentTable cannot be set before the corresponding haiAvtStreamTable row is created and can only be set when the stream entry is not active (haiAvtStreamRowStatus is not active).

The haiAvtStreamPgmTable entry for a given stream only exists if the corresponding stream in the haiAvtStreamTable is a Transport Stream (TS). The default number of haiAvtStreamContentTable entries at creation time is 2 (video, audio) for TS-based encapsulation, and 1 for non TS-based encapsulation. An already created stream for which

Encapsulation is changed from non-TS to TS will only have one content entry defined. The number of haiAvtStreamContentTable entries is controlled by the haiAvtStreamPgmNbContents object.

The example below, using netsnmp CLI commands on the Makito, creates a streaming session to IP Address 198.51.100.106 at port 2000, and starts streaming immediately. The Stream ID 0 (haiAvtStreamTable index) is used to create a stream; this value will be set to the first available Stream ID (>=1) on createAndGo or when set to active after createAndWait:

```
snmpset -v2c -c admin localhost haiAvtStreamAddr.0 d 198.51.100.106
    haiAvtStreamPort.0 u 2000 haiAvtStreamRowStatus.0 i createAndGo
```

The example below shows the same command, using the prefix (-IS) and suffix (-Is) options to remove repetition:

```
snmpset -v2c -c admin –IS haiAvtStream –Is .0 localhost Addr d 198.51.100.106
    Port u 2000 RowStatus i createAndGo
```

To retrieve the Stream ID of the stream just created, the haiAvtStreamInverseTable is used:

```
snmpget -v2c -c admin localhost
    haiAvtStreamInverseID.ipv4.4.198.51.100.106.2000
HAI-AVT-STREAM-MIB::haiAvtStreamInverseID.ipv4.”198.51.100.106”.2000 =
    HaiAvtStreamID: 5
```

To create a Stream with a known ID, the haiAvtStreamNewID.0 object reports the next available Stream ID. In the example below, the Transport Stream Program number is set to 7 and the video encoder 1 is selected for the video content. Note that createAndWait is used so the program and content table can be set after stream creation.

```
snmpget -v2c -c admin localhost haiAvtStreamNewID.0
HAI-AVT-STREAM-MIB::haiAvtStreamNewID.0 = HaiAvtStreamID: 5
snmpset -v2c -c admin –IS haiAvtStream –Is .5 localhost Addr d
  198.51.100.106
    Port u 2000 Encapsulation i tsUdp RowStatus i createAndWait
snmpset -v2c -c admin –IS haiAvtStream localhost
    PgmNumber.5.1 i 7 PgmNbContents.5.1 i 2
    ContentType.5.1.1 i video ContentToolID.5.1.1 i 1
    ContentType.5.1.2 i audio ContentToolID.5.1.2 i 0
snmpset -v2c -c admin localhost haiAvtStreamRowStatus.5 i active
```

# PART III: Reference

# APPENDIX A: CLI Command Reference

This alphabetical command reference lists and describes the available Makito Command Line Interface (CLI) commands and their parameters.

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## Syntax Conventions

The following syntax conventions are used in this appendix:

| Convention | Description |
|---|---|
| MS Sans Serif font | Indicates command names and options, filenames and code samples. |
| italic font | Indicates variables or placeholders that you replace with a user-defined value or name. |
| < > | Same as italics. Variables are enclosed in angle brackets in contexts that do not allow italics. |
| [ ] | Square brackets indicate optional items or parameters. |
| x \| y | A vertical bar separates items in a list of options from which you must select one. If options are not separated by \|, you may use combinations. |
| { x \| y \| z } | Items separated by vertical bars and enclosed in braces indicate a choice of required elements. |
| [ x { y \| z } ] | Vertical bars and braces within square brackets indicate a required choice within an optional element. |



TIP Parameter names and enumerated values are case-insensitive and can be abbreviated.

# Command Summary and Usage Information

The Makito CLI commands are divided into two main groups: operation and administration:

- Operation Commands are used to manage the Audio/Video data path, processing, and features, including audio/video/metadata content selection, logo, audio/video encoding, H.264 streaming, and image snapshots. Operation command effects are immediate but not persistent (i.e., between reboots) unless the current operating configuration is explicitly saved (using the config command).
- Administration Commands address the security and network configuration. Their effects are persistent but not always immediate; some require system reboot to take effect. Administration commands are divided into two subgroups: Network and Management and Security.

## Operation Commands

Table A-1 Operation Commands

| Command | Description |
|---|---|
| videnc | Use to manage video encoding parameters, including starting and stopping encoding of the video input. |
| audenc | Use to manage encoder audio acquisition settings, including starting and stopping encoding of the audio input. |
| stream | Use to create and manage audio/video streams. |
| metadata | Use to manage metadata sources to capture metadata (either KLV or CoT) and then incorporate data information within the MPEG Transport Stream. |
| logo | Use to manage logo overlays (i.e., a graphic file to display as a logo overlay in the encoded video). |
| mklogo | Use to convert a graphic file to Haivision's overlay image format (.oly) in order to display the image as a logo overlay. |
| mkstill | Use to convert a static picture into a file containing an encoded single H.264 GOP sequence. This is required in order to configure a Makito stream with a static image that will replace the "real" video stream when streaming is paused. |
| profile | Use to display the list of the available video Profiles, as well as the parameter settings for a specified Profile. |
| snapshot | Use to take and manage snapshots from the video input. |
| still | Use to manage still image files on the Makito file system. Static images are used to replace the "real" video stream when streaming is paused. |
| talkback | Use to manage audio talkback settings to allow two-way audio communication using the encoder's Audio Output. |
| date | Use to view the current date. |
| temperature | Use to display the current temperature of the unit. |

## Administration Commands

Table A-2 Administration Commands

| Command | Description |
|---|---|
| Network and Management | |
| haiversion | Use to display the Firmware Build ID, Build Time, and serial number for the Makito. |
| package | Use to view and manage software packages, including firmware upgrades. |
| config | Use to manage configurations on the Makito. |
| ethercfg | Use to view, manually control, and save the Ethernet configuration parameters. |
| ipconfig | Use to set and view the parameters that specify the networking context for the Makito, including the IP settings, hostname, and DNS. |
| nmcfg | Used by system administrators or GUI/Web Interface applications in the configuration of SNMP for the Makito. |
| service | Use to enable and disable network services, including HTTP, RTSP, SNMP, SSH, Telnet, and VF. |
| system_snapshot.sh | Use to take a system snapshot for the purpose of troubleshooting, which may be forwarded to Haivision Technical Support if you are requesting technical support. |
| dtconfig | Use to set the date and time on the encoder. |
| tzconfig | Use to configure the timezone on the encoder. |
| passwd | Use to change the password for a user account. |
| pubkey | Use to manage the user's own authorized SSH Public Keys. |
| reboot | Use to halt and restart the Makito |
| Security | |
| account | Use to manage user accounts for the encoder. |
| audit | Use to enable remote logging of security and administrative events and configure the remote audit (syslog) server connection. |
| banner | Use to manage the Advisory Notice and Consent Banner. |

Table A-2 Administration Commands

| Command | Description (Continued) |
|---|---|
| certificate | Use to manage the TLS certificates for the Web interface HTTPS server and the secured TLS connection to the remote audit server. |
| messages | Use to view and manage administrative login messages. |
| policy | Use to manage security policy settings. |

# CLI Access Control

Below is a list of CLI commands and other functionalities supported by the system and the privileges for each role.

| Command | Administrator | Operator | Guest |
|---|---|---|---|
| Web access | Yes | Yes | Yes |
| Telnet to/from Encoder | Yes | Yes | Yes |
| Serial access to Encoder | Yes | Yes | Yes |
| Operation | | | |
| videnc | Yes | Yes | "get" only |
| audenc | Yes | Yes | "get" only |
| stream | Yes | Yes | "get" only |
| metadata | Yes | Yes | "get" only |
| logo | Yes | Yes | "get" and "list" only |
| mklogo | Yes | Yes | No |
| mkstill | Yes | Yes | No |
| profile | Yes | Yes | "get" only |
| snapshot | Yes | Yes | "get" and "list" only |
| still | Yes | Yes | "list" only |
| talkback | Yes | Yes | Yes |
| date | Yes | Yes | Yes |
| temperature | Yes | Yes | "get" only |
| Network and Management | | | |
| haiversion | Yes | Yes | Yes |
| package (for upgrade) | Yes | No | No |
| config | Yes | Yes | "list" only |
| ethercfg | Yes | No | No |
| ipconfig | Yes | "display" only | "display" only |
| nmcfg | Yes | No | No |
| service | Yes | No | No |

| Command (Continued) | Administrator | Operator | Guest |
|---|---|---|---|
| system_snapshot.sh | Yes | Yes | Yes |
| dtconfig | Yes | No | No |
| tzconfig | Yes | No | No |
| passwd | Yes | Yes | Yes |
| pubkey | Yes | Yes | Yes |
| reboot | Yes | No | No |
| iperf | Yes | Yes | Yes |
| ping | Yes | Yes | Yes |
| traceroute | Yes | Yes | Yes |
| Security | | | |
| account | Yes | No | No |
| audit | Yes | No | No |
| banner | Yes | No | No |
| certificate | Yes | No | No |
| messages | Yes | No | No |
| policy | Yes | No | No |

For an overview of system access control on the Makito, see “Role-based Authorization” on page 62.

# account

## SYNOPSIS

```
account uname create [role=admin]
account uname/all get
account uname/all list
account uname passwd
account uname pubkey add|remove keyfile
account uname pubkey list
account uname lock
account uname unlock
account uname delete
```

## DESCRIPTION

The account command is used to create, delete and modify administrative user accounts for the Makito.



NOTE The account command can only be used by the Administrator.

## ACTIONS

| | |
|---|---|
| create | Creates a new user account.<br>See account Parameters below for roles.<br>You will be prompted to enter and confirm the initial password. |
| get | Displays the account information for the user or the Makito, including account name, role, state, password expiry status, and Public Key(s). |
| list | Lists the account information for the user or the Makito in table format. |
| passwd | Modifies the user account password.<br>You will be prompted to enter and confirm the password (which the user will have to change upon first login). For the allowed characters, see "Password Requirements" on page 70. |

| | |
|---|---|
| pubkey add\|remove keyfile | Adds or removes a Public Key to the user account.<br>See "Managing PKIs" on page 143 for more information. |
| pubkey list | Lists any Public Key files that have been uploaded for this account. |
| lock | Locks the user account (if Enabled). |
| unlock | Unlocks the user account (if Locked). |
| delete | Deletes the user account. |

### ACCOUNT PARAMETERS

| Parameter | Default | Description / Values |
|---|---|---|
| role | | Use with account create command to specify the role for the user account, either:<br>• Admin<br>• Operator<br>• Guest<br>For details on roles, see "Role-based Authorization" on page 62. |

### ACCOUNT EXAMPLES

```
#$ account all list
name       role           state    pwd expiry     pubk
---------- -------------- -------- -------------- ----
admin      Administrator  Enabled  never          No
fdfdf      Guest          Enabled  never          No
mrmichel   Operator       Enabled  by admin       No
operator   Operator       Locked   never          No
user       Guest          Enabled  never          No
$
```

### SEE ALSO

- Managing Accounts on page 138

# audenc

## Synopsis

```
audenc ID start
audenc ID stop
audenc ID set parameter=value [parameter=value …]
audenc ID get [config, stats, all]
```

## Description

The audenc command is used to manage encoder audio acquisition settings. The audenc start and audenc stop commands can be used to start and stop encoding of the audio input.

ID is either the Encoder ID (0 or 1) or all. (Note that 0 corresponds to "High" and 1 corresponds to the "Low" stream. See "HiLo Audio Streaming" on page 77.) By default, the High audio encoder is activated.

## Actions

| | |
|---|---|
| start | Activates encoding of the audio input.<br>For HiLo audio streaming (i.e., to send "High" and "Low" bitrate streams to two different destinations), you need to manually start the Low audio encoder (audenc 1 start) because it is disabled by default. |
| stop | Stops (mutes) encoding of the audio input. |
| set | Modifies encoder audio parameter(s).<br>A series of one or more parameter=value pairs can be specified at once. See audenc Parameters below. |
| get | Displays encoder audio status information.<br>You can specify configuration, stats, or all audio information. |
| help | Displays usage information for the audenc command. |

## audenc Parameters

| Parameter | Default | Description / Values |
|---|---|---|
| input | Analog | The type of Audio Input for the encoder: |
| Makito | | • Analog |

| Parameter | Default | Description / Values (Continued) |
|---|---|---|
| Makito-SDI | | • SDI1CH12 - SDI Audio Group 1, Ch. 1-2<br>• SDI1CH34 - SDI Audio Group 1, Ch. 3-4<br>• Analog |
| level | 6 | The maximum analog Audio Input level from +5dBU up to +20dBU.<br>NOTE: Only applies to Analog Audio Input. |
| mode | stereo | The number and type of audio channels to encode. mono, stereo<br>TIP: If you set the bitrate to 32 kbps, use mono. |
| algorithm | mpeg2adts | The audio compression algorithm: |
| | | • [mpeg2]adts - Encodes audio using the ISO/IEC 13818-7 MPEG-2 AAC-LC algorithm with an ADTS header. (Default) |
| | | • mpeg4adts - Encodes audio using the ISO/IEC 14496-3 MPEG-4 AAC-LC algorithm with an ADTS header. |
| | | • loas - Encodes audio using the ISO/IEC 14496-3 MPEG-4 AAC-LC algorithm with a LOAS/LATM header. |
| | | • raw - Encodes audio using the ISO/IEC 14496-3 MPEG-4 AAC-LC algorithm without any encapsulation. |
| bitrate | 128 kbps | The Audio Bitrate for the encoder. 32..448 kbps.<br>NOTE: At low bitrates such as 32 kbps, the audio quality may not be optimal. See mode above. |
| SampleRate | 48 kHz | (Read-only) The number of audio samples per second taken from the incoming signal. 48 kHz only. |

NOTE If you are using HaiPLAY as the decoder, you will need to change the default audio algorithm parameter setting to mpeg4adts, because HaiPLAY only supports MPEG4 ADTS encapsulated audio.

## AUDENC EXAMPLES

| | |
|---|---|
| # audenc 0 set input=SDI1CH12 | Sets the Audio Input Type to SDI1CH12 |
| # audenc 0 set bitrate=128 | Sets the Audio Bitrate to 128. You will receive the following confirmation:<br>Audio encoder configured successfully |
| # audenc 0 set algorithm= mpeg4adts | Changes the default Audio Algorithm to MPEG4 ADTS encapsulated audio (required when using HaiPLAY as the decoder). |
| # audenc 0 get<br>-or-<br># audenc 0 get config | Returns audio configuration information for the encoder, such as:<br>Encoder ID : 0<br>Name : "Audio Encoder 0"<br>Configuration:<br>Audio Input : SDI1CH12<br>Audio Bitrate : 128 kbps<br>Audio Samplerate : 48 KHz<br>Audio Mode : Stereo<br>Audio Algorithm : ADTS |
| # audenc 0 get stats | Returns audio status information for the encoder, such as:<br>Encoder ID : 0<br>Name : "Audio Encoder 0"<br>Statistics:<br>State : WORKING<br>Encoded Frames : 22,396<br>Encoded Bytes : 7,644,453<br>Encoder Errors : 0<br>Encoder PTS: 0x03a1db3cb |

## SEE ALSO

- Configuring the Audio Settings on page 77

# audit

## SYNOPSIS

```
audit start
audit stop
audit set parameter=value [parameter=value ... ]
audit get [config|stats|all]
```

## DESCRIPTION

The audit command is used to enable remote logging of system events and configure the remote audit (syslog) server connection.

NOTE The audit command can only be used by the Administrator.

## ACTIONS

| | |
|---|---|
| start | Establishes a connection from the encoder to a remote audit server and enables logging to it. |
| stop | Disables the connection to the remote audit server. |
| set | Modifies the audit parameters.<br>A series of one or more parameter=value pairs can be specified at once. See audit Parameters below. |
| get | Displays audit configuration and connection status information. |

## AUDIT PARAMETERS

| Parameter | Default | Description / Values |
|---|---|---|
| server | n/a | The server IP address. Enter an IP address in one of the following formats: |
| | | • fqdn[:port] |
| | | • ipaddr[:port] |
| | | • hostname[:port] |

| Parameter | Default | Description / Values (Continued) |
|---|---|---|
| transport | | The transport protocol, either: |
| | | • UDP (User Datagram Protocol): Default UDP port = 514 |
| | | • TLS (Transport Layer Security): Default TLS port = 6514 |
| trusted | | The type of server authentication: |
| | | • All: No server authentication |
| | | • CA-signed: Root-CA certificate imported |
| | | • Self-signed: Fingerprint |
| fingerprint | | If trusted is fingerprint, specify the type: |
| | | • md5-fingerprint: |
| | | • sha1-fingerprint: |

### AUDIT EXAMPLE

| | |
|---|---|
| #$ audit get | Configuration:<br>Audit server address : syslog.haivision.com:10533<br>Transport : TLS<br>Trusted servers : CA-signed |

### SEE ALSO

- Managing Audits on page 158

# banner

## SYNOPSIS

```
banner enable
banner disable
banner install <bannerfile>
banner get
banner delete
```

## DESCRIPTION

The banner command is used to manage the Advisory Notice and Consent Banner. This is a single text file that will be displayed to users who log in for interactive sessions on the Makito.



NOTE The banner command can only be used by the Administrator.

In the current release, only ASCII file format is supported for the banner file; the maximum file size for the banner is 4KB.

## ACTIONS

| | |
|---|---|
| enable | Enables display of the installed Advisory and Consent Banner page at login (a banner must be installed). |
| disable | Disables display of the current Advisory and Consent Banner page at login. |
| install | Installs a text file as the Advisory and Consent Banner page.<br>NOTE: On CLI the text file must be locally stored on the device before it's installed. |
| get | Displays banner status information. |
| delete | Deletes the banner file from the system. |

## BANNER PARAMETERS

| Parameter | Default | Description / Values |
|---|---|---|
| bannerfile | n/a | The name of the .txt file to display as the Advisory Notice and Consent Banner for the encoder. |

## BANNER EXAMPLES

| | |
|---|---|
| #$ banner get | The Advisory Notice and Consent Banner is disabled.<br>If enabled, the following banner is displayed upon user login:<br>----------<br>**********<br>* Hello user! *<br>**********<br><br>Welcome to Makito SDI #4.<br><br>**********<br>* Haivision Systems - Creating IPTV Intelligent Systems *<br>********** |

## SEE ALSO

- Managing Banners on page 145

# certificate

## SYNOPSIS

```
certificate name/all get
certificate name/all list
certificate name view
certificate name create [sign=self] [subject=query]
certificate name delete [type=id]
certificate name import infile=<certfile> [type=id] [fmt=auto]
certificate name select
certificate name verify
```

## DESCRIPTION

The certificate command is used to manage the system's certificates that are used to establish TLS connections to the audit server as well as secure HTTPS sessions.

---

NOTE The certificate command can only be used by the Administrator.

The autocert file is a default certificate file, generated when the IP address is changed from factory settings, or when an audit or an HTTPS session starts with no selected certificate.

---

## ACTIONS

| | |
|---|---|
| get | Displays the information for the specified certificate or all certificates, including certificate name, type, signature, subject, issuer, expiration, and fingerprint. |
| list | Lists the specified certificate or all certificates installed on the encoder, including the type and name. |
| view | Displays the content of the named certificate file. |
| create | Generates a Self-signed certificate or a Certificate Signing Request. The sign and subject can be specified. See certificate Parameters below. |

| | |
|---|---|
| delete | Deletes the selected certificate.<br>The type can be specified. See certificate Parameters below.<br>NOTE: The type specification may be added to specify the deletion of the Identity certificate, the chain associated with it, or the CA certificate with the given name. |
| import | Imports a certificate to be installed on the device.<br>The infile, i.e., the file to import the certificate from, must be provided. The file's type and format can also be specified. See certificate Parameters below. |
| select | Selects the certificate used when establishing a TLS connection with the audit server or starting an HTTPS session.n. |
| verify | Verifies the validity of the specified certificate. |

### CERTIFICATE PARAMETERS

| Parameter | Default | Description / Values |
|---|---|---|
| sign | self | The signature type for the certificate:<br>• self: Creates a self-signed identity certificate.<br>• Request: Creates an identity Certificate Signing Request (CSR) |
| subject | query | Sets the certificate's distinguished name parameters:<br>• auto: Automatically gets the subject Common Name which is HOSTNAME.DOMAIN if DNS is configured, or IPADDR otherwise. The subject Alt Name is set to DNS:HOSTNAME.DOMAIN, DNS:HOSTNAME,IPAddress:IPADDR<br>• query: Prompts the user for Distinguished Name (DN) attributes<br>• DN: Distinguished Name in the form: "/C=US/ST=Maine..."<br>where the most common attributes are:<br>/C Two Letter Country Name<br>/ST State or Province Name<br>/L Locality Name<br>/O Organization Name<br>/OU Organizational Unit Name<br>/CN Common Name |

| Parameter | Default | Description / Values (Continued) |
|---|---|---|
| type | id | The type of certificate to either import or generate:<br>NOTE: Only ID certificates can be generated. Chain and CA certificates can only be imported.<br>• id: Identity certificate (for HTTPS service and audit)<br>• chain: Identity certificate CA chain (Import only)<br>• ca: Certificate Authority Certificate (for peer certificate validation, Import only) |
| fmt | auto | The format in which the certificate is encrypted:<br>• auto: Detects the certificate format based on file extension when importing.<br>• pem: Privacy Enhanced Mail Base64 encoded DER certificate<br>• p7: PKCS#7<br>• p12: PKCS#12<br>• pfx: PKCS#12<br>• der: Distinguish Encoding Rules |
| infile | n/a | The name of the file to import.<br>NOTE: The administrator has previously downloaded/uploaded the certificate file to import in its home directory (using SCP, for example). |

## See Also

- Managing Certificates on page 150

# config

## SYNOPSIS

```
config save [cfgname] [startup=yes,no]
config load [cfgname]
config delete [cfgname]
config list
```

## DESCRIPTION

The config command is used to manage configurations on the Makito. This includes saving the current configuration, loading a saved configuration, and specifying the configuration file to load at startup.

## ACTIONS

| | |
|---|---|
| save | Saves the current configuration. Saves every parameter in the system, including encoder settings and stream destination and status (excluding the system IP address).<br>All configuration files are stored in /usr/share/haivision/config. |
| load | Loads a previously saved configuration identified by <cfgname>. Reassigns every parameter in the system, including Encoder settings and stream destination and status (excluding the system IP address). |
| delete | Deletes a previously saved configuration identified by <cfgname>.<br>If no filename is specified, the system deletes the default configuration (haistartupcfg.ini). |
| list | Displays a list of the available configuration files. |
| help | Displays usage information for the config command. |

## CONFIG EXAMPLES

| | |
|---|---|
| # config save Class430 startup= yes | Saves the current configuration under the name “Class430” and sets it to be the startup configuration |
| # config load Class430 | Loads a previously saved configuration identified by the name “Class430” (located in the active (local) directory). |

### See Also

- Saving and Loading Configurations on page 126

# date

## SYNOPSIS

```
date
```

## DESCRIPTION

The `date` command is used to view the current date.

## DATE EXAMPLE

| | |
|---|---|
| `# date` | Displays the current date, e.g.:<br>`Tue Aug 28 11:23:56 EDT 2012` |

## SEE ALSO


- dtconfig on page 198
- tzconfig on page 250

# dtconfig

## SYNOPSIS

```
dtconfig YYYYMMDDhhmm[.ss]
```

## DESCRIPTION

The dtconfig command is used to set the date and time on the encoder.

NOTE Setting the encoder to a date in the past (compared to the current date) may cause the encoder to reboot.

## DTCONFIG EXAMPLE

| | |
|---|---|
| # dtconfig 201208201100 | Sets the encoder clock to Monday August 20 11:00:00 EDT 2012 |

## SEE ALSO


- date on page 197
- tzconfig on page 250

# ethercfg

## SYNOPSIS

```
ethercfg [-a on|off] [-s 10|100|1000] [-d half|full] [-c bandwidth] [-w yes| no]
```

## DESCRIPTION

The ethercfg command is used to view, manually control, and save the Ethernet configuration parameters.

When the Makito boots up, it automatically initializes and configures the Ethernet interface to match the settings on the Ethernet switch to which it is connecting. However, you may need to disable autonegotiation, and manually force settings such as the Ethernet interface line rate and duplex mode.

If no options are specified, the system displays the current settings, for example:

```
$ ethercfg
        Speed: 100Mbs
        Duplex: Full
        Auto-negotiation: on
        Link detected: yes
```

## OPTIONS

| | | |
|---|---|---|
| -a | --autoneg | Enables or disables autonegotiation |
| -s | --speed | If autonegotiation is disabled, sets the speed |
| -d | --duplex | If autonegotiation is disabled, sets the duplex mode |
| -c | --ceiling | Puts a “ceiling” (in kbps or Mbps) on the bandwidth available to the Ethernet port |
| -w | --write | Skips the save settings prompt |



NOTE Always enable autonegotiation with Gigabit Ethernet (GigE) speed (1000 Mbps).

## ETHERCFG EXAMPLE

| | |
|---|---|
| # ethercfg -s 100 | Sets the line speed to 100 Mbps (and in doing so, disables autonegotiation, see example below). |

```
$ ethercfg -s 100
Autonegotiation disabled to permit speed/duplex mode configuration.
        Speed: 100mbps
        Duplex: Full
        Auto-negotiation: off
        Link detected: yes
Do you wish to save these settings ? (y,n): y
Settings saved successfully.
$
```

### See Also

- Configuring Network Settings on page 119

# haiversion

## SYNOPSIS

haiversion

## DESCRIPTION

The haiversion command is used to display status information about the Makito. Status information can be useful for troubleshooting and may be forwarded to Haivision Technical Support if you are requesting technical support.

## HAIVERSION EXAMPLE

| | |
|---|---|
| # haiversion | Displays information about the hardware and software components. |

```
$ haiversion
Card Type                : "Makito-DVI Encoder"
Part Number              : B-290E-DVI
Serial Number            : HAI-100009770087
Firmware Version         : 2.1.0-33
Firmware Date            : "Sep 25 2012"
Firmware Options         : None
Hardware Version         : A-
Hardware Compatibility   : A1
CPLD Version             : C-
Boot Version             : "1.1 Enc"
$
```

## SEE ALSO

- Viewing System Status Information on page 122

# ipconfig

## SYNOPSIS

```
ipconfig [configure | display]
```

## DESCRIPTION

The ipconfig command is used to set and view the parameters that specify the networking context for the Makito, including the IP settings, hostname, and DNS. It may also be used to set the Network Time Protocol (NTP) server address and Time Zone.

As shown in the following example, when you enter the ipconfig configure command, the system displays the current IP settings and takes you through a series of prompts enabling you to change the IP settings, optionally enable DHCP, and change the hostname, DNS settings, NTP settings, and/or Time Zone setting.

You must reboot for any changes to take effect.

The ipconfig display command returns the current IP settings.

## IPCONFIG EXAMPLES

| | |
|---|---|
| #ipconfig configure | Prompts you as follows to modify current settings:<br>Current IP Settings:<br>ip address : 10.5.1.2<br>network mask : 255.255.0.0<br>gateway : 10.5.0.1<br>Change IP settings: (Y,N): y<br>Use DHCP to obtain IP address automatically: (Y,N): n<br>Enter ip address: 192.0.2.42<br>Enter netmask: 255.255.255.0<br>Enter default gateway: 192.0.2.24<br><br>Current hostname: Makito<br>Change hostname? (Y,N): y<br><br>Current DNS settings:<br>domain: haivision.com<br>server: 192.0.2.46<br>Change DNS settings? (Y,N): n |

| | |
|---|---|
| #ipconfig configure (continued) | Current NTP settings:<br>server : 10.5.0.1<br>timezone : "America/Chicago"<br>Change NTP settings? (Y,N): n<br><br>Current Time Zone settings:<br>America/Chicago<br>Change system Time Zone? (Y,N): n |
| # ipconfig display | Returns current IP settings for encoder configured to use DHCP:<br>Current IP Settings:<br>ip address : Obtained via DHCP<br>hostname : Makito<br>Current NTP Settings:<br>server : 192.0.2.100<br>timezone : "America/Montreal" |
| # ipconfig display | Returns current IP settings for encoder that does not use DHCP:<br>Current IP Settings:<br>ip address : 192.0.2.42<br>network mask : 255.255.255.0<br>gateway : 192.0.2.24<br>hostname : Makito<br>Current NTP Settings:<br>server : 192.0.2.100<br>timezone : "America/Montreal" |

## See Also

- Configuring Network Settings on page 119

# logo

## SYNOPSIS

```
logo enable
logo disable
logo set parameter=value [parameter=value ...]
logo get
logo list
logo delete
```

## DESCRIPTION

The logo command is used to manage logo overlays. You can configure a graphic file to display as a logo overlay in the encoded video. There can be one logo per Makito.

The logo position can either be relative (top left, top right, centered, etc.) or absolute (positioned at the exact X and Y coordinates specified). You can also specify the scaling and transparency display settings.

The graphic file can be uploaded in either BMP, JPEG, PNG, or GIF format.

---

NOTE You can upload the graphic file either using the mklogo command, or from the Web interface (MEDIA SETTINGS page, see "Logo Insertion/Overlay" on page 99).

---

## ACTIONS

| | |
|---|---|
| enable | Displays the logo when configured properly. |
| disable | Hides the logo. |
| set | Configures logo settings.<br>A series of one or more parameter=value pairs can be specified at once. See logo Parameters below. |
| get | Displays information on the logo. |
| list | Lists the available logo files.<br>Logos are stored on the Makito file system in the folder /usr/share/haivision/logos. |
| delete | Deletes a logo file from the list. |

### LOGO PARAMETERS

| Parameter | Default | Description / Values |
|---|---|---|
| filename | n/a | The name of the .oly file to display as a logo overlay.<br>NOTE: The file must be in Haivision's overlay image (.oly) format. See mklogo on page 213. |
| display | Off | Enables the display of the specified file as a logo overlay. On, Off |
| opacity | 100 | Specifies the opacity percentage of the logo. 0..100%<br>NOTE: 0 = an invisible logo, and 100 = a solid logo. |
| transparency | 0 | Alternatively, you can specify the visibility of the logo by its transparency percentage. 0..100%<br>NOTE: 0 = no transparency (i.e., completely solid/opaque logo); 100 = fully transparent (i.e., completely transparent/invisible logo) |
| scaling | 100 | Specifies the scale factor (percentage) for the logo:<br>• 25 = logo is 1/4 its original size<br>• 100 = no scaling<br>• 400 = logo is 4 times its original size |
| relative | Off | If enabled, keeps the logo in proportion to the display area regardless of the input resolution. On, Off<br>NOTE: The original scaling is vis-à-vis a 1920x1080 grid. |
| positioning | BottomRight | Specifies the position for the logo:<br>• BottomRight<br>• TopRight<br>• BottomLeft<br>• TopLeft<br>• Centered<br>• Absolute: Uses the exact X and Y coordinates.<br>• Relative: Uses the X, Y coordinates in relation to a 1920x1080 display area. |

| Parameter | Default | Description / Values (Continued) |
|---|---|---|
| x | | Horizontal coordinate used to position the top left point of origin in Absolute or Relative positioning modes.<br>When using Absolute positioning, this is the exact horizontal position of the logo's top left point of origin. |
| y | | Vertical coordinate used to position the top left point of origin in Absolute or Relative positioning modes.<br>When using Absolute positioning, this is the exact vertical position of the logo's top left point of origin. |

### LOGO EXAMPLE

| | |
|---|---|
| logo set filename= HaivisionLogoTransparent.oly opacity= 65 positioning=bottomright display=on | Configures the file HaivisionLogoTransparent.oly to display as a logo on the system. |

### SEE ALSO

- mklogo on page 213
- "Logo Insertion/Overlay" on page 99

# messages

## SYNOPSIS

```
messages add <msgtext>
messages get
messages delete
```

## DESCRIPTION

The messages command is used to manage administrative login messages. This is a log of a limited number of important events recorded such as installation of a software package, failure to establish or maintain connectivity with a remote audit server, Power-On Self Test (POST) errors, and other noteworthy events that require the administrator's attention.

These events will result in a message being sent directly to all logged-in administrators and will appear on their terminals. The message will also be displayed at the next administrative Web Interface or CLI login.



NOTE The messages command can only be used by the Administrator.

Messages starting with "POST" are Power-On Self Test events. If you repeatedly get POST errors, the cryptographic module of the encoder may be compromised, and it is recommended to re-installed the firmware.

## ACTIONS

| | |
|---|---|
| add <msgtext> | Adds the message text to the log.<br>This could be used to send messages to other administrators. |
| get | Displays messages. |
| delete | Deletes the messages. |

## SEE ALSO

- "Managing Messages" on page 136

# metadata



IMPORTANT Metadata capture is an optional feature and must be installed at the factory.

## SYNOPSIS

```
metadata ID start
metadata ID stop
metadata create port=udpport [addr=ipaddr] [name=text]
metadata ID delete
metadata ID set parameter=value [parameter=value ...]
metadata ID get
metadata ID clear
enable_metadata_on_serial_port
enable_console_on_serial_port
```

## DESCRIPTION

The metadata command is used to manage metadata sources. This command configures the Makito to capture either KLV (Key Length Value) or CoT (Cursor on Target) metadata and then incorporate data information within the metadata elementary stream of the standard MPEG Transport Stream.

The Makito supports three metadata input types: either from the COM1 serial port, the HD-SDI interface (Makito-SDI only), or a user definable UDP port. Only one metadata stream may be included in the Transport Stream at a time, so you must specify the metadata source ID in the stream command (datasrc): either 0 (serial port), 1 (HD-SDI), or 2 (UDP).

## ACTIONS

| | |
|---|---|
| start | Starts the metadata source. |
| stop | Stops the metadata source. |
| create | Creates a new UDP metadata source.<br>A series of one or more parameter=value pairs can be specified at once. See metadata Parameters below. |
| delete | Deletes a UDP metadata source. |

| | |
|---|---|
| set | Configures metadata source settings.<br>A series of one or more parameter=value pairs can be specified at once. See metadata Parameters below. |
| get | Displays information on the metadata source.<br>You can specify configuration, stats, or all metadata information. |
| clear | Clears the metadata source's statistics. |

| | |
|---|---|
| enable_metadata_on_serial_port | Enables metadata capture from the serial port. |
| enable_console_on_serial_port | Enables console management from the serial port. (default) |

### METADATA PARAMETERS

| Parameter | Default | Description / Values |
|---|---|---|
| General parameters: | | |
| name | n/a | (optional) A name of up to 63 characters. |
| Network Source (UDP) specific parameters: | | |
| port | n/a | Specifies the UDP source for a network metadata source. When creating a UDP metadata source, you must specify the port on which to listen for KLV messages.<br>1025..65,535 |
| addr | n/a | (optional) The address is only required if you need to receive messages from a source that is multicasting. In this case, you need to provide the multicast IP address to which the data is being sent.<br>You also specify the address if you only want to accept KLV messages coming from a specific sender. |
| Serial Source specific parameters: | | |
| format | KLV | Selects the data format for the metadata.<br>• KLV<br>• CoT<br>NOTE: CoT is only available from the serial port. For details on setting up CoT, refer to the *Makito CoT Addendum*. |

| Parameter | Default | Description / Values (Continued) |
|---|---|---|
| delta | 0 | (CoT input only) Specifies the maximum delta between SPI and Air Craft message time-stamps for them to be considered a valid pair that can be converted to KLV. |
| standard | RS232 | Specifies the transceiver mode for the metadata capture:<br>• RS232<br>• RS422<br>NOTE: Only valid for the serial port. |
| baudrate | 115200 | Specifies the baud rate for the serial port:<br>• 115200, 57600, 38400, 19200, 9600, 4800, 2400, 1200<br>NOTE: Only required when configuring the encoder for metadata capture. |

### Example #1: Creating a Stream with Serial Metadata [Source ID=0]

1. Set the baud rate for the serial port to 115,200 using the following command:

   ```
   #metadata 0 set baudrate=115200
   ```

2. Start the serial metadata encoder instance:

   ```
   #metadata 0 start
   ```

3. Create a stream with video, audio and metadata using the following syntax:

   ```
   #stream create addr=<IPaddr> port=<UDPport> vid=0 aud=0 data=0
   ```

4. Verify the metadata encoder stats:

   ```
   # metadata 0 get all
   ```

   The system will return the metadata information:

   ```
   Metadata ID          : 0
   Name                 : (None)
   Configuration:
     Type               : serial
     Format             : KLV
     Device             : "/dev/tts/0"
     Standard           : RS-232
     Baud Rate          : 115200
   Statistics:
     State              : STOPPED
     Rx Bytes           : 0
     Rx OK Messages     : 0
     Rx Corrupt Messages : 0
   ```

### Example #2: Creating a Stream with SDI Metadata [Source ID=1]

1. Start the SDI metadata encoder instance using the following command:

   #metadata 1 start

2. Create a stream with video, audio and metadata using the following syntax:

   #stream create addr=<IPaddr> port=<UDPport> vid=0 aud=0 data=1

3. Verify the metadata encoder stats:

   # metadata 1 get all

   The system will return the metadata information:

```
Metadata ID          : 1
Name                 : (None)
Configuration:
  Type               : HD-SDI
  Format             : KLV
Statistics:
  State              : STOPPED
  Rx Bytes           : 0
  Rx OK Messages     : 0
  Rx Corrupt Messages : 0
```

### Example #3: Streaming with UDP Metadata [Source ID=2]

1. Create a UDP metadata encoder instance using the following syntax:

   metadata create [addr=<IP source>] port=<dest port>

   Ex: # metadata create port=8500

   The system will return the following message, including the UDP metadata ID:

   Metadata source created successfully - ID: 2.

2. Start the UDP metadata encoder using the following syntax:

   # metadata <ID> start

   Ex: # metadata 2 start

3. Create a stream with video, audio and metadata using the following syntax:

   stream create [addr=<dest IP>] port=<dest port> vid=<id> aud=<id> data=<id>

   Ex: # stream create port=2222 vid=0 aud=0 data=2

4. Verify the metadata encoder stats using the following syntax:

   # metadata <ID> get all

   Ex: # metadata 2 get all

The system will return the metadata information:

```
Metadata ID          : 2
Name                 : (None)
Configuration:
  Type               : Network
  Format             : KLV
  Address            : 0.0.0.0 (Any)
  UDP Port           : 8500
Statistics:
  State              : WORKING
  Rx Bytes           : 0
  Rx OK Messages     : 0
  Rx Corrupt Messages : 0
  Source Address     : 0.0.0.0
```

### SEE ALSO

- "Configuring Metadata Capture" on page 80

# mklogo

## SYNOPSIS

```
mklogo <infile>
```

where:

| | |
|---|---|
| infile | is the name of the image file to convert into a logo. |

## DESCRIPTION

In order to display an image as a logo overlay on the Makito, you need to copy a still image file to the Makito file system and then convert the file to Haivision's overlay image format (.oly). The image file can be in either BMP, JPEG, PNG, or GIF format.

The mklogo command is used to convert the graphic file to .oly format.

The Makito supports logos up to a maximum of 256 x 256 pixels. If you supply a larger image file, the converter will scale it down, while keeping the aspect ratio.

Logo files are stored on the Makito file system under /usr/share/haivision/logos.

The .oly file can then be configured to display as a logo overlay in the encoded video. There can be one logo per Makito.

## MKLOGO EXAMPLE

| | |
|---|---|
| # mklogo mylogo.jpg | Converts the file mylogo.jpg to mylogo.oly. |

## SEE ALSO

- logo on page 204
- "Logo Insertion/Overlay" on page 99

# mkstill

## SYNOPSIS

```
mkstill <infile> resolution
```

where:

infile — is the name of the image file to convert into a still image.

## DESCRIPTION

The mkstill command is used to convert a static picture into a file containing an encoded single H.264 GOP sequence. This is required in order to configure a Makito stream with a static image that will replace the “real” video stream when streaming is paused.

The supported source formats for the static image are BMP, JPEG, PNG, and GIF. The supported output resolutions are 1920x1080, 1280x720, 720x480 (NTSC), and 720x576 (PAL).



NOTE The maximum size of the source image is 2048x2048 pixels.

The resulting still image files are stored on the Makito file system under /usr/share/haivision/still_images.

## MKSTILL PARAMETER

| Parameter | Default | Description / Values |
|---|---|---|
| resolution | n/a | Specifies the desired resolution of the still image. Supported values are:<br>• 1080 for 1920x1080<br>• 720 for 1280x720<br>• 480, NTSC for 720x480<br>• 576, PAL for 720x576<br>• VGA for 640x480<br>• SVGA for 800x600<br>• WXGA for 1280x768<br>• SXGA for 1280x1024 |

### MKSTILL EXAMPLE

| | |
|---|---|
| # mkstill myimage.jpg resolution=1080 | Converts the image file myimage.jpg into a 1920x1080 still image. |

### SEE ALSO

- still on page 237
- "Still Image Streaming" on page 102
- "Selective Video Mute" on page 93

# nmcfg

NOTE You must be logged in with administrative privileges to enter nmcfg commands.

## SYNOPSIS

```
nmcfg help
nmcfg access help
nmcfg access usm permit <uname> {<group>|ro|rw} [{noauth|auth|priv}]
nmcfg access usm delete <uname>

nmcfg community help
nmcfg community permit <community> {<group>|ro|rw} [<host>]
nmcfg community delete <community> [{<group>|ro|rw} [<host>]]

nmcfg system help
nmcfg system define <param> "<value>"
nmcfg system delete <param>

nmcfg user help
nmcfg user define <uname> [{MD5|SHA} "<pwd>" [{DES|AES} ["<pwd>"]]]
nmcfg user delete <uname>
```

## DESCRIPTION

The nmcfg (Network Management Configuration) command is used by system administrators or GUI/Web Interface applications in the configuration of SNMP for the Makito. The nmcfg script reads and edits the standard SNMP configuration files, and then restarts the SNMP agent (snmpd) to apply the new settings.

The nmcfg script supports the configuration of v1/v2c community-based security model and v3 USM (User-based Security Model). The script supports the traditional access permissions (read-only, read-write) and VACM (View-based Access Control Model) views modeling the Makito user groups (administrator, operator, and guest).

Note that traps are not supported by the nmcfg script.

A detailed help, describing the options is available for each command option (for example, nmcfg access help or nmcfg user help).

For more information, see "nmcfg" on page 165 (in "SNMP Agent Components").

### OPTIONS

| | |
|---|---|
| access | Defines the access permissions granted to the v1/v2c communities and USM (v3) users. Only the USM security model option is shown in the summary help. The v2c security model, a different format for community configuration, is only displayed in the access detailed help. Note that the v2c security model also applies to SNMP v1. |
| community | Defines community-based (v1v/2c) security configuration for the Makito. |
| system | Defines contact and location system parameters. |
| user | Defines user-based (v3) security configuration for the Makito. |

### ACTIONS

| | |
|---|---|
| define | Acts as both create and update. If an object does not exist, it is added. If it exists, it is replaced or updated with the new settings. It is then not necessary to delete an existing object to change its settings. All required settings of an object are specified when defining/changing an object. It is not possible to set settings individually. |
| permit | Defines the access permissions for the community or the user.<br>NOTE: Access permissions may be additive. For example, permitting a new source for an existing community adds to the existing one if it complements it. |
| delete | Deletes the specified object. |
| help | Displays usage information for the command, or if specified, the option. |



NOTE nmcfg settings persist after reboots, unlike other Makito settings which are lost when the unit is rebooted unless saved as a configuration.

### EXAMPLE #1: INITIALIZING A COMMUNITY-BASED (V1 / V2C) SYSTEM

In the example below, a system with default settings is configured to add a distant host access (198.51.100.122) to the existing localhost and localnet accesses of the admin community. Note that the localnet source is a special keyword that translates at runtime to the network settings of the LAN interface. System parameters are also defined.

```
# nmcfg
parameter             value
--------------- ----------------------------------
contact               <undefined>
location              <undefined>

perm/group            community          source
------------- -------------------- ---------------------
rw                    admin                localhost
rw                    admin                localnet
ro                    public               localnet
# nmcfg system define contact "myname <myname@example.org>"
# nmcfg system define location "Media Lab"
# nmcfg community permit admin rw 198.51.100.122
#
```

### EXAMPLE #2: CREATING AN SNMPV3 USER

Two commands are required to create a USM (v3) user and define its access:

```
# nmcfg user define johnsmith SHA "arfds23dsjs" AES "2394urscxkvn"
# nmcfg access usm permit johnsmith operator
```

### EXAMPLE #3: INITIALIZING A USM-ONLY (SNMPV3) SYSTEM

In the example below, system security is enforced by completely disabling SNMPv1/v2c access, and by requiring v3 USM authentication only for users group-based access, and encryption for admins and operators group-based access.

```
# nmcfg
system parameter    value
------------------- ----------------------------------
contact             <undefined>
location            <undefined>

perm/group          community           source
------------------ -------------------- --------------------
rw                  admin               localhost
rw                  admin               localnet
ro                  public              localnet

# nmcfg agent stop
# nmcfg system define contact "joe net <jnet@example.org>"
# nmcfg system define location "Media Lab"
# nmcfg community delete admin
# nmcfg community delete public
# nmcfg user define joenet SHA "arfds23dsjs" AES "2394urscxkvn"
nmcfg: snmp agent is not running, user settings will apply when started
# nmcfg user define johnsmith SHA "89ss5dkj" AES "jfdsf78998sd"
nmcfg: snmp agent is not running, user settings will apply when started
# nmcfg user define guest MD5 "nososecret"
nmcfg: snmp agent is not running, user settings will apply when started
# nmcfg access usm permit joenet administrator priv
# nmcfg access usm permit johnsmith operator priv
# nmcfg access usm permit guest guest
# nmcfg agent start
# nmcfg

system parameter     value
---------------- ----------------------------------
engineid             0x80001f88802054a68b4b75388e
contact              "joe net <jnet@example.org>"
location             "Media Lab"

model         perm/group  level   user/community      source
------------- ----------- ------- -------------------- ---------
usm           guest       auth    guest                -
usm           administrator priv  joenet               -
usm           operator    priv    johnsmith            -
```

```
auth protocol          priv protocol  user
---------------------- -------------- -----------
MD5                    nopriv         guest
SHA                    AES            joenet
SHA                    AES            johnsmith
#
```

## See Also

- “nmcfg” on page 165 (in “SNMP Agent Components”)

# package

## SYNOPSIS

```
package list
package info [<pkgfile>.hai]
package verify <pkgfile>.hai
package install <pkgfile>.hai
package download <pkgfile>.hai <tftpipaddr>
package delete <pkgfile>.hai | all
package cancel <pkgfile>.hai
```

## DESCRIPTION

The package command is used to view and manage software packages.

NOTE The package command can only be used by the Administrator.

When package is entered without any actions or parameters, the system displays usage information for the command.

Package files are digitally signed to ensure integrity and authenticity. Package component signatures and their certificate validity are verified when downloading, manually with the verify action, and when actually performing the installation upon reboot.

If the verification fails after downloading, an error message is reported by the download command and the downloaded package is discarded. If verification fails while actually installing upon reboot, installation is cancelled and a package install failure notice is added to the messages displayed to the Administrators (see messages CLI command). A successful package installation notice is added to the messages upon successful installation.

### Example #1: Package Download and Installation

```
$ package download haios_enc_v2.1.0-22.hai mytftp.example.com
1/5) Temporarly pausing encoder(s)...
2/5) Downloading package haios_enc_v2.1.0-22.hai from
  mytftp.example.com...
3/5) Verifying integrity of downloaded package... Package verified
  successfully.
4/5) Synching file system...
5/5) Resuming encoder(s)...
Package downloaded successfully.
$ package install haios_enc_v2.1.0-22.hai
Package haios_enc_v2.1.0-22.hai will be installed on next boot sequence.
You must REBOOT to complete the update process!
$
```

### Example #2: Package Download Verification Failure

```
$ package download haios_enc_v2.1.0-22.hai mytftp.example.com
1/5) Temporarly pausing encoder(s)...
2/5) Downloading package haios_enc_v2.1.0-22.hai from
  mytftp.example.com...
3/5) Verifying integrity of downloaded package... Package verification failed!
Try downloading the package again.
$
```

### Actions

| | |
|---|---|
| list | Displays a list of downloaded packages. |
| info | Displays information about the currently installed package.<br>If a filename is specified, displays information about the package. |
| verify | Verifies the authenticity and integrity of the specified package. |
| install | Installs the specified package. The package will be automatically verified before installation. |
| download | Downloads the specified package file using TFTP and then verifies it. |
| delete | Deletes a previously downloaded package file.<br>You can specify the package file or all. |
| cancel | Cancels installation of a package scheduled for the next reboot. |

### PACKAGE EXAMPLES

| | |
|---|---|
| # package info haios_v1_2_0.hai | Displays information about the package |
| # package install haios_v1_2_0.hai | Installs the package |

# passwd

## SYNOPSIS

passwd

## DESCRIPTION

The passwd command is used to change the user's own password.



NOTE To modify the password for other users' accounts, see the account command on page 183.

## EXAMPLES

| | |
|---|---|
| # passwd | Changes the password for the current user account. The system prompts you to enter the old password and then the new password.<br>NOTE: Passwords can be up to 80 characters long. See "Password Requirements" on page 70 for the supported character set. Password policies set by the administrator may enforce the selection of strong passwords. |

## SEE ALSO

- "Role-based Authorization" on page 62
- Managing Accounts on page 138

# policy

## SYNOPSIS

```
policy password  set [quality=basic] [minlen=6] [minuppers=0] [mindigits=0]
   [minsymbols=0] [expiry=yes] [lifetime=90]
policy session   set [autologout=yes] [idletimeout=15]
policy crypto    set [compliance=None]
policy pname/all get
```

## DESCRIPTION

The policy command is used to configure and manage security policy settings. Policies are needed to define security criteria such as the required quality, length and composition of passwords. The security policies are: Password, Session, and Cryptographic Strength.

Security policies may be applied to bring the encoder to its CC evaluated configuration. During the hardening procedure, it is important for the administrator to set the policies before creating accounts.



NOTE The policy command can only be used by the Administrator.

## ACTIONS

| | |
|---|---|
| policy password set | Modifies the password policy parameters.<br>A series of one or more parameter=value pairs can be specified at once. See password under policy Parameters below. |
| policy session set | Modifies the session policy parameters.<br>A series of one or more parameter=value pairs can be specified at once. See session under policy Parameters below. |
| policy crypto set | Specifies the cryptographic policy.<br>The compliance parameter can be specified. See crypto under policy Parameters below. |
| policy pname/all get | Displays the policy information for either the policy (i.e., password, session, or crypto) or the encoder. |

### POLICY PARAMETERS

| Parameter | Default | Description / Values |
|---|---|---|
| crypto | | |
| compliance | None | Specifies the required cryptographic compliance, either:<br>• None<br>• Makito21ST<br>IMPORTANT: In order to bring the encoder to the Common Criteria evaluated configuration, cryptographic security must be activated. This will reinforce security for all management functions of the encoder in terms of cryptography. To do so, select Makito21ST (Makito 2.1 Security Target). This setting will take effect upon the next reboot.<br>NOTE: For more information, see "Hardening" on page 31. |
| password | | |
| quality | Basic | Specifies the required password strength, either:<br>• Basic<br>• Strong |
| minlen | 6 | Specifies the minimum password length:<br>• 6..40 |
| minuppers | n/a if Basic<br>0 if Strong | (Password quality must be Strong) Specifies the minimum number of uppercase letters:<br>• 0..40 |
| mindigits | n/a if Basic<br>0 if Strong | (Password quality must be Strong) Specifies the minimum number of digits:<br>• 0..40 |
| minsymbols | n/a if Basic<br>0 if Strong | (Password quality must be Strong) Specifies the minimum number of symbols:<br>• 0..40 |
| expiry | No | Enables or disables password expiration:<br>• Yes, No |
| lifetime | 90 days | (Password expiry must be Yes) Type in the number of days after which users must change their passwords:<br>• 1..180 days (password expiration) |

| Parameter | Default | Description / Values (Continued) |
|---|---|---|
| session | | |
| autologout | No | Enables or disables Auto Logout:<br>• Yes, No |
| idletimeout | 15 minutes | (autologout must be Yes) Specifies the maximum length of time the system may be idle before the user will be logged out:<br>• 1..1440 minutes (inactivity timeout) |

## POLICY EXAMPLES

| | |
|---|---|
| #policy crypto set compliance= Makito21ST | |
| #policy password set quality= strong minlen=10 minuppers=1 minsymbols=1 expiry=yes lifetime=30 | Sets the password policy for the encoder to be Strong, requiring passwords to be at least 10 characters in length, with one uppercase letter, one symbol. Passwords will expire in 30 days. |

## SEE ALSO

- Managing Security Policies on page 147

# profile

## SYNOPSIS

```
profile list
profile <profilename> get
```

## DESCRIPTION

To help you manage the video quality parameters, the Makito provides a selection of video presets or “Profiles” defined for different contexts, such as computer graphics, movies, news, outdoors, sports, or “talking heads” (Virtual Presence).

The profile command is used to display the list of the available Profiles on the encoder, as well as the parameter settings for a specified Profile.

You can modify the settings and create new Profiles from the Web Interface. For information on the video quality parameters and the default Profiles supplied with your Makito, see “Configuring Video Profiles” on page 106.

To create a new Profile, you can (optionally) make a copy of an existing Profile and edit the settings using a text editor. Profile files should be saved with *.vpf extension.



NOTE The profile command is for information only. You must apply the quality Profile when specifying the Video Encoding properties, using the videnc set command. For example, videnc 0 set profile=Outdoors.

## ACTIONS

| | |
|---|---|
| list | Displays a list of available Profiles on the Makito.<br>Profiles are stored on the Makito file system in the folder /usr/share/haivision/video_profiles. |
| get | Displays the settings for the named profile. |

## EXAMPLES

| | |
|---|---|
| # profile list | Displays the list of default Profiles. |
| # profile Sports get | Displays the following output for the Sports Profile:<br>Parameters:<br>Motion : High<br>Complexity : High<br>Uniformity : Low<br>RateControlBuffer : Low<br>UseDeblockFilter : Enabled<br>DBFStrength : Medium<br>DBFLevel : Medium |

## SEE ALSO

- "Configuring Video Profiles" on page 106
- "Video Quality Parameters" on page 109
- "Default Profiles" on page 113

# pubkey

## SYNOPSIS

```
pubkey add <KEYFILE.pub>
pubkey remove <KEYFILE.pub>
pubkey list
```

## DESCRIPTION

The pubkey command is used to manage your account's authorized SSH Public Keys.

You must first get the Public Key of your SSH client. Note that in the current release, this only applies to SSH CLI access to the encoder.



NOTE The pubkey command can only be used by the Administrator.

## ACTIONS

| | |
|---|---|
| pubkey add | Uploads a new Public Key file (with a .pub extension). |
| pubkey remove | Removes the specified Public Key file from the encoder. |
| pubkey list | Lists the Public Key files currently loaded on the encoder. |

## PUBKEY EXAMPLES

| | |
|---|---|
| #pubkey add makito.pub | Uploads the Public Key file makito.pub to the encoder. |
| #pubkey list | Lists all Public Key files currently loaded on the Encoder along with their fingerprints. In this example, there is one Public Key file:<br>makito.pub : rsa[1024]<br>b7:ae:79:92:0d:86:f9:8d:2d:ee:99:fc<br>:ff:24:95:87:e e:78:1d:fd |

### See Also

- Managing Accounts on page 138

# reboot

## SYNOPSIS

```
reboot
```

## DESCRIPTION

The `reboot` command is used to is used to halt and restart the Makito. Any unsaved configurations will be lost. The encoder will restart with the saved startup configuration.

## EXAMPLE

| | |
|---|---|
| `# reboot` | Reboots the Makito.<br>NOTE: While the unit is rebooting, you will lose your connection to the CLI. This will take approximately two minutes. Once the unit has rebooted, you can reconnect to the unit and log in again. |

## SEE ALSO

- Rebooting the Encoder on page 124

# service

## SYNOPSIS

```
service name action
```

where:

| | |
|---|---|
| name | can be: all, http, rtsp, snmp, ssh, telnet, vf |

## DESCRIPTION

For security purposes, you may need to stop one or more network services from accessing the Makito. The service command is used to enable and disable the following network services: HTTP, RTSP, SNMP, SSH, Telnet, and VF.



IMPORTANT If the COM1 serial port is used for metadata capture, and HTTP, Telnet, SNMP, and SSH services are disabled, the only way to re-enable these services will be by a Factory Reset. (For details, see "Resetting the Encoder" on page 54.) Once the serial port is dedicated for metadata capture, it is no longer usable for CLI management.

## ACTIONS

| | |
|---|---|
| start | Activates the service immediately and configures the unit so that the service will be started automatically when the unit is rebooted. |
| stop | De-activates the service immediately and configures the unit so that the service will be disabled when the unit is rebooted. |
| status | Displays the current status of the service, i.e., if it has been started or stopped. |

## EXAMPLES

| | |
|---|---|
| # service telnet stop | Stops telnet connection to the Makito. |
| # service all stop | Stops all network connections to the Makito. |

## SEE ALSO

- Enabling and Disabling Network Services on page 134

# snapshot

NOTE Snapshot Capture is an optional feature which may be disabled at the factory. The following section is only applicable if snapshots are enabled. See "Disabling Snapshots" on page 236.

## SYNOPSIS

```
snapshot take [format=value] [<filename>] [quality=value]
snapshot set [format=value] [quality=value] [maxsize=value]
snapshot get
snapshot list
snapshot delete [<filename>, all]
```

## DESCRIPTION

The `snapshot` command is used to take and manage snapshots from your video input. You can save the snapshots in either .jpg or .yuv format, and for .jpg you can also specify the image quality.

When taking a snapshot of the current video input, the file name is optional. If none is specified, a unique name will be generated based on the current time if NTP is enabled, or a simple index such as `snap-1.jpg` if NTP is not enabled.

You can specify different formats and quality per snapshot in the `snapshot take` command. You can also set system-wide defaults for the preferred snapshot format and quality via the `snapshot set` command.

## ACTIONS

| | |
|---|---|
| `take` | Takes a snapshot from the current active video. You can optionally specify the format and image quality per snapshot, as well as the filename. |
| `set` | Sets system-wide defaults for the preferred snapshot format and quality. |
| `get` | Displays the current format and quality defaults for the snapshot utility. |

| | |
|---|---|
| list | Displays the available snapshots on the system along with the resolution.<br>Snapshot files are stored under /usr/share/haivision/snapshots. |
| delete | Deletes either the snapshot specified by <filename> or all snapshots stored under /usr/share/haivision/snapshots. |

### SNAPSHOT PARAMETER

| Parameter | Default | Description / Values |
|---|---|---|
| format | jpeg | Specifies the image format: yuv, jpg<br>When saving in jpg format, you can specify the desired image quality.<br>YUV snapshots always have the best possible quality but take the most amount of space. |
| quality | 100 | Specifies the desired image quality can be specified from 1 (lowest) to 100 (highest).1..100<br>NOTE: This setting only applies for jpg snapshots. |

### SNAPSHOT EXAMPLE

| | |
|---|---|
| # snapshot take format=jpg filename=mysnapshot.jpg quality=80 | Takes a single image snapshot (immediately) in .jpg format at 80% image quality and stores it under the filename mysnapshot.jpg. |
| # snapshot set format=jpg quality=80 | Sets the system-wide defaults for the preferred snapshot format to jpg at 80% image quality. |
| #snapshot set maxsize=0 | An admin user can disable snapshots by setting the maximum size to 0. |
| # snapshot get | Returns the current system-wide settings for the snapshot format, for example:<br>Current Defaults:<br>Format : JPEG<br>Quality : 100<br>Max Storage : 20,480 KBytes |

| | |
|---|---|
| # snapshot list | Lists the contents of the snapshot folder:<br>Snapshot Files (in /usr/share/haivision/snapshots/):<br>snap-1.jpg (1280x720)<br>snap-10.jpg (1280x720)<br>snap-2.jpg (1280x720)<br>snap-3.jpg (1280x720)<br>snap-4.jpg (1280x720)<br>snap-5.jpg (1280x720)<br>snap-6.jpg (1280x720)<br>snap-7.jpg (1280x720)<br>snap-8.yuv (1280x720)<br>snap-9.jpg (1280x720)<br><br>10 snapshot files are available. |

## Disabling Snapshots

The Snapshot capability can be disabled to prevent captured content from being stored on the Makito. Disabling Snapshots is typically done at factory staging when the feature request is part of the P.O. Any Snapshot related functionality (such as Web Interface buttons or CLI command options) is greyed-out, made unavailable, or removed when Snapshots are disabled. The functionality will remain disabled after a firmware upgrade, factory reset, power cycle, or reboot.

Makito Air systems are shipped with Snapshots disabled by default.

Snapshots can only be disabled by an admin user from the CLI, by setting the maximum size to 0. Users are prevented from re-enabling Snapshots for security reasons.

### See Also

- “Image Snapshot Capture” on page 103

# still

## SYNOPSIS

```
still list
still delete <filename>
```

## DESCRIPTION

The still command is used to manage available still image files on the Makito file system.

Static image files must already have been converted into files containing encoded single H.264 GOP sequences and be located the folder /usr/share/haivision/still_images on the Makito file system.

Static images may be used to replace the "real" video stream when streaming is paused. You can then configure a Makito stream with a static image using the stream set command with the parameter [stillimage=fname].



NOTE You can convert the image file either using the mkstill command, or from the Web interface (MEDIA SETTINGS page, see "Still Image Streaming" on page 102).

## ACTIONS

| | |
|---|---|
| list | Lists the available still image files in /usr/share/haivision/still_images |
| delete | Deletes a still image file |

## STILL EXAMPLE

| | |
|---|---|
| # still delete myimage.mp4 | Deletes the image file myimage.mp4 |

## SEE ALSO

- mkstill on page 214
- stillimage on page 242
- "Still Image Streaming" on page 102
- "Selective Video Mute" on page 93

# stream

## SYNOPSIS

```
stream create addr=ipaddr port=udpport [id=number] [name=text]
    [rtcp=on [rtcpport=udpport]] [ttl=16] [tos=0xB8] [mtu=1496]
    [encapsulation=ts-rtp | ts-udp | direct-rtp | rtmp | qt] [start=yes]
    [videosrc=id/name] [audiosrc=id/name] [datasrc=id/name]
    [videopid=pid] [audiopid=pid] [datapid=pid]
    [pcrpid=pid] [pmtpid=pid]
    [program=num] [tsid=id]
    [stillimage=fname]
    [shaping=yes,no [ceiling=percentage] [idlecells=yes,no]]
    [username=uname] [password=pwd]
stream id/name start
stream id/name stop
stream id/name pause
stream id/name resume
stream id/name delete
stream id/name/all get
stream id/name clear
```

## DESCRIPTION

The stream command is used to manage audio/video streams.

## ACTIONS

| | |
|---|---|
| create | Creates a streaming session from the encoder.<br>A series of one or more parameter=value pairs can be specified at once. |
| start | Starts the specified stream ID or name.<br>NOTE: By default, a stream will start immediately since start=yes by default. To delay the start of a stream, include the parameter start=no. |
| stop | Stops the specified stream ID or name. |

| | |
|---|---|
| pause | Pauses the specified stream ID or name. See "Selective Video Mute" on page 93.<br>NOTE: If configured, a still image will be streamed instead of the configured video source. See "stillimage" on page 242. |
| resume | Resumes the specified stream ID or name. |
| delete | Deletes the specified stream ID or name. |
| get | Gets stream status information. See stream Parameters below.<br>You can specify a stream or all streams. |
| clear | Clears all active sessions on the encoder. |
| help | Displays usage information for the stream command. |

### STREAM PARAMETERS

| Parameter | Default | Description / Values |
|---|---|---|
| addr | n/a | The destination IP address. Enter an IP address in dotted-decimal format.<br>For multicast addresses, see IMPORTANT on page 243. |
| port | n/a | The destination UDP port. Enter a number in the range 1025..65,535. Note that RTP streams use *even numbers only* within this range. |
| Optional stream Parameters | | |
| id | n/a | A unique number assigned to the stream.<br>NOTE: When creating a stream, you can specify a unique id to assign to it or let the system assign one (a sequential number) for you.<br>Most commands will accept the stream id or name (see below) in order select the proper stream to manage. |
| name | n/a | (Optional) When creating a stream, you can also specify a name for the stream. 1 to 32 characters |

| Parameter | Default | Description / Values (Continued) |
|---|---|---|
| rtcp | on | (Optional) When rtcp is On, the stream is activated in RTCP mode. This causes the system to establish one RTP stream and one RTCP session for monitoring purposes.<br>RTP/RTCP is useful to collect network metrics such as network jitter, packet loss, etc. Note that this requires a remote decoder capable of supporting this feature as well. |
| rtcpport | n/a | (Optional, rtcp must be On) The destination UDP port for the RTCP session. |
| ttl | 16 | (Optional) Time to Live. The number of router hops that IP packets from this stream are allowed to traverse before being discarded. 1..255 |
| tos | 0xB8 | (Optional) (Type of Service) Specifies the desired quality of service (QoS). This value will be assigned to the Type of Service field of the IP Header for the outgoing streams.<br>Range = 0..255 (decimal) or 0..0xFF (hex)<br>Default = 184 or 0xB8<br>A DiffServ or DSCP (Differentiated Services Code Point) value must be converted to a ToS precedence value. For example, AF41 or DSCP 34 becomes ToS 136. For more information, see RFC2474. |
| mtu | 1496 | (Maximum Transmission Unit) Specifies the maximum allowed size of IP packets for the outgoing RTP data stream. 228..1500 |
| encapsulation | ts-udp | (Optional) The Encapsulation Type for the encoded stream. |
| | | • ts-rtp - MPEG2 transport stream over RTP |
| | | • ts-udp - MPEG2 transport stream over UDP (no RTP header) |
| | | • direct-rtp - RFC3984 |
| | | • qt - QuickTime (see "QuickTime SDP and Interoperability" on page 95). |
| | | • rtmp - Streams to a Flash Media Server or Content Delivery Network (see "CDN and Flash Interoperability" on page 94). |

| Parameter | Default | Description / Values (Continued) |
|---|---|---|
| start | yes | (Optional) By default, the stream will start immediately. To delay the start of a stream, specify start=no.<br>You can enter a stream start command later. |
| videosrc | 0* | (Optional) The video source. id/name<br>The id is either 0 or 1 (corresponding to "High" and "Low" in the Web interface, see "HiLo Video Streaming" on page 71).<br>NOTE: *By default, if you don't specify the source, the stream will use video encoder 0 and audio encoder 0 for a TS stream (UDP or RTP), and video encoder 0 for DirectRTP and other encapsulations.<br>Once you specify an audio or video source, you have to enter all of them explicitly. For example, even though a TS stream with no sources specified will automatically use video 0 and audio 0, if you specify that video 0 is your source, then you must enter the audio source or else the stream will not have any audio in it.<br>TIP: Combined videosrc/audiosrc/datasrc status shown under Contents in return output. |
| audiosrc | 0* | (Optional) The audio source. id/name<br>The id is either 0 or 1 (corresponding to "High" and "Low" in the Web interface, see "HiLo Audio Streaming" on page 77).<br>See also NOTE: and TIP: above. |
| datasrc | n/a | (Optional) The data (metadata) source. id/name (0=serial, 01=SDI, 2..=UDP)<br>See "metadata" on page 208. |
| videopid | 33 | (Optional) Video Packet Identifier. 16..8190 |
| audiopid | 36 | (Optional) Audio Packet Identifier. 16..8190 |
| datapid | 40 | (Optional) Data (metadata) Packet Identifier. 16..8190 |
| pcrpid | 34 | (Optional) (Program Clock Reference) Packet Identifier. Timestamp in the TS from which the decoder timing is derived. 16..8190 |
| pmtpid | 32 | (Optional) (Program Map Table) Packet Identifier. 16..8190 |

| Parameter | Default | Description / Values (Continued) |
|---|---|---|
| program | 1 | (Optional) Program Identifier used in the Program Map Table (PMT) of the TS stream. 0..65535 |
| tsid | 0 | (Optional) Transport Stream ID. Identifies the transport stream in the Program Association table (PAT) of the TS stream. 0..65535 |
| stillimage | n/a | (Optional) Specifies the filename of a static image that will replace the "real" video stream when streaming is paused.<br>NOTE: The static image file must already have been converted into a file containing an encoded single H.264 GOP sequence. You can either use the mkstill command, or the Web interface MEDIA SETTINGS page (see "Still Image Streaming" on page 102). |
| shaping | no | (Optional) To enable Traffic Shaping for the stream, specify shaping=yes.<br>For some limited networks such as satellites or some dedicated network pipes, it may be necessary to enable Traffic Shaping to smooth the traffic and respect the absolute upper limit configured.<br>NOTE: Using Traffic Shaping on streams above 7Mbps will create audio/video artifacts. |
| ceiling | n/a | (Optional, shaping must be yes) The percentage of network bandwidth beyond the average rate that the encoder is allowed to use if needed. This is used to set the ceiling bandwidth range. 0..100%, default = 15<br>NOTE: To configure the ceiling percentage for CBR streams with metadata, see "Ceiling Percentage for CBR Streams with Metadata" on page 93. |
| idlecells | no | (Optional, shaping must be yes) When enabled, Idle TS cells will be inserted into a TS stream when necessary. yes,no |
| username | n/a | (Required when streaming to a CDN using RTMP) Enter the CDN login username. |
| password | n/a | (Required when streaming to a CDN using RTMP) Enter the CDN login password. |

IMPORTANT you can specify up to eight streams – up to a maximum of 50 Mbps video bitrate (or 35 Mbps video bitrate with AES and FEC enabled).

The Multicast address range is from 224.0.0.0 to 239.255.255.255. Multicast addresses from 224.0.0.0 to 224.0.0.255 are reserved for multicast maintenance protocols and should not be used by streaming sessions. We recommend that you use a multicast address from the Organization-Local scope (239.192.0.0/14).

### STREAM EXAMPLES

| | |
|---|---|
| # stream create addr=192.0.2.106 port=2000 start=yes | Creates a streaming session to IP Address 192.0.2.106 at port 2000; starts streaming immediately. |
| # stream create addr=192.0.2.235 port=1234 stillimage=haivision.mp4 | Creates and starts a streaming session. Specifies a static image to replace the “real” video stream when streaming is paused.<br>Returns the following confirmation and stream ID:<br>Stream created successfully - ID : 3 |
| # stream 3 pause | Pauses the stream created above, which activates the still image. |
| # stream 3 resume | Resumes the stream created above. |
| # stream create addr=192.0.2.235 port=1234 vid=0 aud=0<br># videnc 1 start<br># audenc 1 start<br># stream create addr=198.51.100.106 port=1234 vid=1 aud=1 | Creates two “HiLo” streams, the first using the High Video and Audio encoder, and the 2nd using the Low Video and Audio encoder.<br>TIP: The videnc and audenc commands are required to activate the Low Video and Audio encoder because the High encoders are activated by default. |

| | |
|---|---|
| # stream 1 get all | Returns configuration information and statistics for all encoder streams, for example:<br>Stream ID : 1<br>Name : "web1"<br>Configuration :<br>Address : 192.0.2.235<br>UDP Port : 1234<br>Encapsulation : TS-RTP<br>Contents : Video ("HD Video Encoder 0" :0), Audio ("Audio Encoder 0" :0)<br>Still Image File : (None)<br>Video PID : 33<br>Audio PID : 36<br>PCR PID : 34<br>PMT PID : 32<br>Transport Stream ID : 0<br>Program Number : 1<br>MTU : 1500<br>TOS : 0xB8<br>TTL : 18<br>Bandwidth : 6,510 kbps<br>Traffic Shaping : Off<br>AES Encryption : On<br>FEC : On<br>Persistent : No<br><br>Statistics :<br>State : STREAMING<br>Up Time : 1h16m8s<br>Sent Packets : 1,040,512<br>Sent Bytes : 1,252,450,560<br>Bitrate : 198 kbps |
| # stream 2 show stats | Returns status information for Stream #2, such as:<br>Session ID : 2<br>Name : "web1"<br>Statistics:<br>State : STREAMING<br>Up Time : 10m50s<br>SSRC : 0x94328a6a (2486340202)<br>Sent Packets : 413,274<br>Sent Bytes : 417,249,304<br>Unsent Packets : 1,214<br>Unsent Bytes : 1,272,100<br>Last Error : 11, Resource temporarily unavailable<br>Occurred : 6hr44m4s ago<br>RTCP : Off |

| | |
|---|---|
| # stream 1 del | Deletes Stream #1. |

### See Also

- "Configuring the Stream Settings" on page 85
- "Configuring the RTSP Server" on page 97

# system_snapshot.sh

## SYNOPSIS

```
system_snapshot.sh > <filename>
```

where:

`filename` is the name of the file to store the system snapshot.

## DESCRIPTION

The `system_snapshot.sh` command is used take a system snapshot for the purpose of troubleshooting and may be forwarded to Haivision Technical Support if you are requesting technical support.

The system snapshot lists information such as component versions, network settings, loaded modules, running processes, system traces, configured streams and stream status checks, configured video encoders and status checks, configured audio encoders and status checks, startup config file contents, global settings file contents, debug logging settings file contents, downloaded software packages, last software update log, and OS statistics.

## SEE ALSO

- Taking a System Snapshot on page 124

# talkback

## SYNOPSIS

```
talkback start
talkback stop
talkback set
talkback get
talkback clear
```

## DESCRIPTION

The `talkback` command is used to manage audio talkback settings.

The Audio Talkback feature allows two-way audio communication using the Makito encoder's Audio Output to function like an audio decoder.

The Talkback is sent by a software player application (such as HaiPLAY v1.4.0.4) to the Makito, where it is played out of the encoder's 8-pin terminal block connector. See "Audio Interface" on page 26.

The Talkback application receives the 16-bit audio (mono) at 22.05 kHz rate, packetizes it to 440 16-bit samples (the last 4 bytes are reserved), and transmits them to Makito UDP port 9177.



NOTE The source UDP port of sender does not matter; however, the destination has to match what is configured on the encoder (`9177` by default).

There is no audio mixer on the Makito, so the encoder handles the talkback sessions on a first-come first-serve basis. To prevent a single user from monopolizing the Makito talk-back, the software player application must provide "push-to-talk" functionality, which requires that the talkback user physically push and hold a button (for example by pressing the mouse button). When the button is released, the talkback application stops sending audio. The Makito considers the session terminated if it does not receive a packet for a duration of one second (i.e., after at least one second of inactivity). The Makito is then ready to accept the session (talk-back packets) from another device.

Talkback audio is configured and controlled using CLI commands only. It is not configurable through the Web interface, or SNMP in the current release.

## ACTIONS

| | |
|---|---|
| `start` | Starts reception of talkback audio |
| `stop` | Stops reception of talkback audio |

| | |
|---|---|
| set | Configures talkback settings |
| get | Displays talkback information (i.e., volume and UDP port).<br>You can specify configuration, stats, or all talkback information. |
| clear | Clears talkback statistics |

### TALKBACK PARAMETER

| Parameter | Default | Description / Values |
|---|---|---|
| volume | 10 | Controls the volume on the Encoder's audio output port.<br>0..10 |

### TALKBACK EXAMPLE

| | |
|---|---|
| # talkback start | Starts reception of audio talkback on the Makito. |
| # talkback set volume 6 | Sets the volume of the audio talkback to 6. |
| # talkback get | Returns audio talkback configuration, such as:<br>Volume : 10<br>UDP Port : 9177 |

### SEE ALSO

- "Audio Talkback" on page 30
- "Setting up Audio Talkback" on page 277

# temperature

## SYNOPSIS

```
temperature get
```

## DESCRIPTION

The `temperature` command is used to display the current temperature of the unit.

## ACTIONS

| | |
|---|---|
| `get` | Displays the current temperature status of the unit. |

## EXAMPLE

| | |
|---|---|
| `# temperature get` | Displays the current temperature for the unit, see example below:<br>`Temperature Status:`<br>`  Current Temperature  : 35 Celsius measured 2s ago`<br>`  Maximum Temperature  : 36 Celsius measured 5d2h9m2s ago`<br>`  Minimum Temperature  : 32 Celsius measured 5d5h34m2s ago` |

# tzconfig

## SYNOPSIS

tzconfig

## DESCRIPTION

The tzconfig command is used to configure the timezone on the encoder. tzconfig displays the current timezone and prompts you to change the timezone (Y,N).

To change the timezone, type Y and follow the prompts for information about the current location. When you have completed your selections, the encoder saves the newly configured time zone information

## TZCONFIG EXAMPLE

| | |
|---|---|
| # tzconfig | Please identify a location so that time zone rules can be set correctly.<br><br>Please select a continent or ocean.<br><br>1) Africa<br>2) Americas<br>3) Antarctica<br>...<br>$? 2<br><br>Please select a country.<br><br>1) Antigua & Barbuda 2) Anguilla 3) Netherlands Antilles 4) Argentina 5) Aruba 6) Barbados<br>7) Bolivia 8) Brazil 9) Bahamas<br>10) Belize 11) Canada 12) Chile<br>...<br>$? 11<br><br>Please select one of the following time zone regions<br><br>1) St_Johns 2) Halifax 3) Glace_Bay<br>4) Goose_Bay 5) Montreal 6) Toronto<br>...<br>$? 5 |

### See Also

- date on page 197
- dtconfig on page 198

# videnc

## SYNOPSIS

```
videnc ID start
videnc ID stop
videnc ID set parameter=value [parameter=value ...]
videnc ID get [config, stats, all]
videnc ID clear
videnc ID reset
```

## DESCRIPTION

The `videnc` command is used to manage video encoding parameters. The `videnc start` and `videnc stop` commands can be used to start and stop encoding of the video input.

`ID` is either the Encoder ID (`0` or `1`) or `all`. (Note that `0` corresponds to "High" and `1` corresponds to the "Low" stream. See "HiLo Video Streaming" on page 71.) By default, the High Video encoder is activated.

## ACTIONS

| | |
|---|---|
| `start` | Activates encoding of the video input.<br>For HiLo video streaming (i.e., to send "High" and "Low" bitrate streams to two different destinations), you need to manually start the Low video encoder (`videnc 1 start`) because it is disabled by default. |
| `stop` | Stops (mutes) encoding of the video input. |
| `set` | Modifies encoder video parameter(s).<br>A series of one or more `parameter=value` pairs can be specified at once. See videnc Parameters below. |
| `get` | Displays encoder video status information.<br>You can specify to display the configuration (`config`), `stats`, or `all`. |
| `clear` | Clears the encoder's statistics. |
| `reset` | Resets the encoder. |
| `help` | Displays usage information for the `videnc` command. |

### VIDENC PARAMETERS

| Parameter | Default | Description / Values |
|---|---|---|
| input | SDI | The type of video input for the encoder: |
| Makito | Component | • Component/RGB (Analog)<br>• HDMI/DVI (Digital) |
| Makito-SDI | BNC (SDI) | • SDI<br>• Composite<br>• SVideo |
| format<br>Makito only | Auto | The input format of the signal to be encoded. Auto-detect is sufficient for most resolutions.<br>• Auto<br>• 1080p 1920x1080p60<br>• 1080p59 1920x1080p59<br>• 1080p50 1920x1080p50<br>• 1080p30 1920x1080p30<br>• 1080p29 1920x1080p29<br>• 1080p24 1920x1080p24<br>• 1080i 1920x1080i30<br>• 1080i29 1920x1080i29<br>• 1080i25 1920x1080i25<br>• 1080i24 1920x1080i24<br>• 720p 1280x720p60<br>• 720p59 1280x720p59<br>• 720p50 1280x720p50<br>• NTSC 720x480i30<br>• 480i29 720x480i29<br>• 480p 720x480p60<br>• 480p59 720x480p59<br>• PAL 720x576i25<br>• 576p 720x576p50<br>• SXGA 1280x1024p85<br>• SXGA60 1280x1024p60<br>• WXGA 1280x768p85<br>• WXGA75 1280x768p75<br>• WXGA60 1280x768p60<br>• XGA 1024x768p85<br>• XGA75 1024x768p75<br>• XGA60 1024x768p60 |

| Parameter | Default | Description / Values (Continued) |
|---|---|---|
| colorspace<br>Makito only | | The color space to use while capturing the content. Matching the encoder input color space to the source enhances and optimizes color reproduction. This is useful with source formats such as graphics cards outputting HDTV resolutions.<br>• Auto: The encoder determines the appropriate color space to use<br>• YCbCr: Forces the encoder to use Y,Cb,Cr<br>• RGBFull: Forces the encoder to use RGB Full Range [0..255]<br>• RGBLimited: Forces the encoder to use RGB Limited Range [16..235] |
| timecode | None | Timecodes are used to mark video frames, mainly for editing purposes. This parameter either disables timecoding, or selects the source to “timecode” the encoded video frame.<br>• None: No time code will be inserted in the video stream (saves bandwidth if not required).<br>• Video: Timecode will be extracted from the Vertical Interval TimeCode of the incoming video signal. VITC applies only to TV resolutions (i.e., not graphic resolutions).<br>• System: If no timecode is included in the video feed, the encoded timecode is based on the encoder’s system clock. In this case, it is a good idea to enable NTP (see “ipconfig” on page 202). This applies to both TV resolutions and graphic resolutions.<br>NOTE: See “TimeCode Source” on page 76 for currently supported TimeCode features. |

| Parameter | Default | Description / Values (Continued) |
|---|---|---|
| aspectratio<br>Standard Definition only | Auto | Specifies the aspect ratio of the video source and signals it into the MPEG stream:<br>• Auto: Aspect ratio is derived from the incoming video source resolution.<br>• 4:3: Aspect ratio is forced to 4:3.<br>• 16:9: Aspect ratio is forced to 16:9.<br>• WSS/AFD: Aspect ratio is extracted from the incoming video source based on WSS (Wide Screen Signaling) or AFD (Active Format Description) if detected.<br>NOTE: WSS is only supported with analog PAL video; AFD is only supported with SD-SDI video. |
| bitrate | 6000 kbps | The Video Raw Elementary Stream bitrate (kbps):<br>• HD: 150..15000<br>• SD: 150..8000 |
| gopsize | 120 | The Group of Pictures size for the encoded video. 1..1000 |
| picrate | Auto | The video frame rate per second:<br>• Auto: Encodes at the same frame rate as the input<br>• 1..85 (Makito #B-290E-DVI)<br>• 1..60 (Makito-SDI #B-290E-HDSDI) |
| closedcaption | Off | This parameter enables Closed Captioning on the encoder stream. Off, On<br>NOTE: For more information, see "Closed Captioning" on page 272. |
| ptsoffset | 50 ms. | Offset video timestamps by this value in ms. -1000,,1000 |
| profile | | The name of the video quality Profile to use with this encoder.<br>NOTE: For information on the available Profiles, see "profile" on page 228. |
| resolution | n/a | The stream output resolution. Specifies the number of lines per frame and pixels per line to be encoded. Options depend on the Input Format detected.<br>• Auto (output resolution is the same as the input) |

| Parameter | Default | Description / Values (Continued) |
|---|---|---|
| HD | n/a | • 1080p, 1920x1080p (only works if input is 1080p)<br>• 1080i, 1920x1080i (only works if input is 1080i)<br>• 1440x1080p (only works if input is 1080p)<br>• 1440x1080i (only works if input is 1080i)<br>• 960x1080p (only works if input is 1080p)<br>• 960x1080i (only works if input is 1080p)<br>• 720p, 1280x720 (only works if input is 1080p or 720p)<br>• 960x720 (only works if input is 720p)<br>• 640x720 (only works if input is 720p) |
| SD | n/a | • 480p, 720x480p (only works if input is 1080p, 720p, 480p, 480i, WXGA, XGA, SVGA or VGA)<br>• 480i, 720x480i (only works if input is 1080i, 480i)<br>• 576p, 720x576p (only works if input is 1080p, 720p, 576p or 576i)<br>• 576i, 720x576i (only works if input is 1080i or 576i)<br>• 540x480p (only works if input is 480p or 480i)<br>• 540x480i (only works if input is 480i)<br>• 540x576p (only works if input is 576p or 576i)<br>• 540x576i (only works if input is 576i)<br>• 352x480p (only works if input is 480p or 480i)<br>• 352x480i (only works if input is 480i)<br>• 352x576p (only works if input is 576p or 576i)<br>• 352x576i (only works if input is 576i)<br>• 352x288p (only works if input is 480p,480i, 576p, 576i, WXGA, XGA, SVGA or VGA)<br>• 352x288i (only works if input is 480i or 576i) |

| Parameter | Default | Description / Values (Continued) |
|---|---|---|
| RGB | n/a | • SXGA, 1280x1024 (only works if input is SXGA)<br>• WXGA, 1280x768 (only works if input is SXGA or WXGA)<br>• XGA, 1024x768 (only works if input is WXGA or XGA)<br>• SVGA, 800x600 (only works if input is WXGA, XGA or SVGA)<br>• VGA, 640x480 (only works if input is WXGA, XGA, SVGA or VGA) |
| | | NOTE: See "Video Encoding" on page 260. |

### VIDENC EXAMPLES

| | |
|---|---|
| # videnc 0 set gopsize=120 | Sets the video GOP size to 120. You will receive the following confirmation:<br>Encoder configured successfully. |
| # videnc 0 set bitrate=6000 | Sets the video bitrate to 6000. |
| # videnc 0 set bitrate=6000 gopsize= 120 resolution= 1280x720 Input= SDI | Combines multiple video parameters in a single line. |
| # videnc 0 get | Returns video configuration information for the encoder:<br>Encoder ID : 0<br>Name : "HD Video Encoder 0"<br>Configuration:<br>Video Input : SDI<br>Video Bitrate : 6000 kbps<br>Video GOP Size : 30<br>Encoded Picture Rate: 60<br>Output Resolution : Input/Auto<br>Closed Captioning : On<br>PTS Offset : 50 ms |

| | |
|---|---|
| # videnc 0 get stats | Returns encoder statistics:<br>Encoder ID : 0<br>Name : "HD Video Encoder 0"<br>Statistics:<br>State : WORKING<br>Uptime : 15m22s<br>Input Present : Yes<br>Input Format : 1280x720p60<br>Proected Content : Yes<br>Output Resolution : 1280x720<br>Aspect Radio : 16:9<br>Encoded Frames : 6,748<br>Encoded NALs : 85,189<br>Encoded Bytes : 326,715,604<br>Encoded Bitrate : 5,266 kbps<br>Encoder Errors : 2<br>Encoder Resets : 2<br>Encoder PTS : 0x1708c8ce8<br>Encoder Load : 50%<br>Closed Captioning : Disabled |
| # videnc videnc 0 set profile= Outdoors | Selects the quality Profile for video encoding. |

## See Also

- Configuring the Video Settings on page 71

# APPENDIX B: Technical Specifications

This appendix lists the technical specifications for the Makito.

## Topics In This Appendix


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# Video Encoding

| VIDEO ENCODING – H.264 AVC (MPEG-4 part 10) | |
|---|---|
| HD-SDI/SDI Input Resolution | 1920x1080p 60, 59.94, 50, 30, 29.97, 25, 24, 23.98 Hz<br>1920x1080i 60, 59.94, 50 Hz<br>1280x720p 60, 59.94, 50 Hz<br>720x480/576i 60, 59.94, 50 Hz<br>720x480/576p 60, 59.94, 50 Hz<br>*Interlaced shown in fields per second.<br>NOTE: For supported video and graphic encoding resolutions, see tables on following page. |
| DVI Input Resolution / Scan Rate | 1280x1024 75, 60<br>1280x768 85, 75, 60<br>1024x768 85, 75, 60<br>800x600p 85, 75, 60<br>640x480p 85, 75, 60 |
| Video Bitrates | HD from 150 kbps to 15 Mbps<br>SD from 150 kbps to 8 Mbps |
| Maximum Throughput | 50 Mbps video bitrate (without AES and FEC)<br>35 Mbps video bitrate with AES and FEC enabled |
| Rate Control | Constant (CBR)<br>*The video encoder will generate a constant number of bits over a period of time. |
| Encoding Latency | Less than 70ms |
| Compression Standards | ITU H.264 AVC (MPEG-4 part 10) / ISO/IEC 14496-10<br>• Baseline / Main Profile<br>• Level 4.2 and lower Intermediate Levels<br>• I, IP framing only<br>• Configurable Group of Picture (GOP) size<br>• Configurable frame rate<br>• Deblocking filter |

## Supported Video Encoding Resolutions (Makito #B-290E-DVI)

Table B-1 Makito #B-290E-DVI Available Video Resolutions

| | | Y,Pb,Pr & Y,Cb,Cr TV Input Resolutions / Scan Rates | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Output Resolutions | | 1080p | | | 1080i | | 720p | | 480i | 480p | 576i | 576p |
| Name | Resolution | 60* / 30* | 50 / 25 | 24* | 30* | 25 | 60* | 50 | 30* | 60* | 25 | 50 |
| HD 1080 | 1920x1080 | High | High | High | High | High | - | - | - | - | - | - |
| 3/4 HD 1080 | 1440x1080 | High | High | High | High | High | - | - | - | - | - | - |
| 1/2 HD 1080 | 960x1080 | All | All | All | All | All | - | - | - | - | - | - |
| HD 720 | 1280x720 | High | High | High | - | - | High | High | - | - | - | - |
| 3/4 HD 720 | 960x720 | - | - | - | - | - | All | All | - | - | - | - |
| 1/2 HD 720 | 640x720 | - | - | - | - | - | All | All | - | - | - | - |
| SD 480 | 720x480 | All | - | All | All | - | All | - | All | All | - | - |
| SD 576 | 720x576 | - | All | All | - | All | - | All | - | - | All | All |
| 4SIF | 704x480 | - | - | - | - | - | - | - | - | - | - | - |
| 4CIF | 704x576 | - | - | - | - | - | - | - | - | - | - | - |
| 3/4 D1 NTSC | 540x480 | - | - | - | - | - | - | - | All | All | - | - |
| 3/4 D1 PAL | 540x576 | - | - | - | - | - | - | - | - | - | All | All |
| 2SIF | 704x240 | - | - | - | - | - | - | - | - | - | - | - |
| 2CIF | 704x288 | - | - | - | - | - | - | - | - | - | - | - |
| Half-D1 NTSC | 352x480 | - | - | - | - | - | - | - | All | All | - | - |
| Half-D1 PAL | 352x576 | - | - | - | - | - | - | - | - | - | All | All |
| SIF | 352x240 | - | - | - | - | - | - | - | - | - | - | - |
| CIF | 352x288 | - | - | - | - | - | - | - | All | All | All | All |

### Legend:

"High" resolutions can only be used for the High bandwidth stream.

Resolutions marked "All" may be used for either High or Low bandwidth streams (see NOTE below).

*Also includes 1/1.001 frame rates such as 23.98, 29.97 and 59.94.

1080p23.98 and 1080p24 resolutions are not supported in Analog Component (Y,Pb,Pr).

Support of 1600x1200 input resolution is not possible.

NOTE When configuring HiLo streaming, make sure the Total Load does not exceed 100%.

For best results, the “Low” encoder stream may be downscaled, but the “High” stream should be encoded at native resolution.

## Supported Graphic Encoding Resolutions (Makito #B-290E-DVI)

Table B-2 Makito #B-290E-DVI Graphic Resolutions

| | | RGB & RGBHV Computer Graphic Input Resolutions / Scan Rates | | | | |
|---|---|---|---|---|---|---|
| Output Resolutions | | 1280x1024 | 1280x768 | 1024x768 | 800x600 | 640x480 |
| Name | Resolution | 75 / 60 | 85 / 75 / 60 | 85 / 75 / 60 | 85 / 75 / 60 | 85 / 75 / 60 |
| HD 1080 | 1920x1080 | - | - | - | - | - |
| 3/4 HD 1080 | 1440x1080 | - | - | - | - | - |
| 1/2 HD 1080 | 960x1080 | - | - | - | - | - |
| HD 720 | 1280x720 | High | High | - | - | - |
| 3/4 HD 720 | 960x720 | - | - | - | - | - |
| 1/2 HD 720 | 640x720 | - | - | - | - | - |
| SD 480 | 720x480 | All | All | All | All | - |
| SD 576 | 720x576 | All | All | All | All | - |
| 4SIF | 704x480 | - | - | - | - | - |
| 4CIF | 704x576 | - | - | - | - | - |
| 3/4 D1 NTSC | 540x480 | - | - | - | - | - |
| 3/4 D1 PAL | 540x576 | - | - | - | - | - |
| 2SIF | 704x240 | - | - | - | - | - |
| 2CIF | 704x288 | - | - | - | - | - |
| Half-D1 NTSC | 352x480 | - | - | - | - | - |
| Half-D1 PAL | 352x576 | - | - | - | - | - |
| SIF | 352x240 | - | - | - | - | - |
| CIF | 352x288 | - | - | All | All | All |
| UXGA | 1600x1200 | - | - | - | - | - |
| WSXGA+ | 1680x1050 | - | - | - | - | - |
| SXGA+ | 1400x1050 | - | - | - | - | - |
| SXGA | 1280x1024 | High | - | - | - | - |
| | 1280x960 | - | - | - | - | - |
| | 1440x900 | - | - | - | - | - |
| WXGA | 1280x800 | - | - | - | - | - |
| WXGA | 1280x768 | High | High | - | - | - |
| XGA | 1024x768 | All | All | All | - | - |
| SVGA | 800x600 | All | All | All | All | - |
| VGA | 640x480 | All | All | All | All | All |

## Supported Video Encoding Resolutions (Makito-SDI #B-290E-HDSDI)

Table B-3 Makito-SDI #B-290E-HDSDI Available Video Resolutions

| Encoded Output Resolutions | | Input Resolutions and Frame Rates | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1080p | | | 1080i | | 720p | | 480i | 576i |
| Name | Resolution | 30* / 60* | 25 / 50 | 23.98 / 24 | 30* | 25 | 30* / 60* | 25 / 50 | 30* | 25 |
| HD 1080 | 1920x1080 | High | High | High | High | High | - | - | - | - |
| 3/4 HD 1080 | 1440x1080 | High | High | High | High | High | - | - | - | - |
| 1/2 HD 1080 | 960x1080 | All | All | All | All | All | - | - | - | - |
| HD 720 | 1280x720 | High | High | High | - | - | High | High | - | - |
| 3/4 HD 720 | 960x720 | - | - | - | - | - | All | All | - | - |
| 1/2 HD 720 | 640x720 | - | - | - | - | - | All | All | - | - |
| SD 480 | 720x480 | All | - | All | All | - | All | - | All | - |
| SD 576 | 720x576 | - | All | All | - | All | - | All | - | All |
| 3/4 D1 NTSC | 540x480 | - | - | - | - | - | - | - | All | - |
| 3/4 D1 PAL | 540x576 | - | - | - | - | - | - | - | - | All |
| 2SIF | 704x240 | - | - | - | - | - | - | - | - | - |
| 2CIF | 704x288 | - | - | - | - | - | - | - | - | - |
| Half-D1 NTSC | 352x480 | - | - | - | - | - | - | - | All | - |
| Half-D1 PAL | 352x576 | - | - | - | - | - | - | - | - | All |
| SIF | 352x240 | - | - | - | - | - | - | - | - | - |
| CIF | 352x288 | - | - | - | - | - | - | - | All | All |

### Legend:

"High" resolutions can only be used for the High bandwidth stream.

Resolutions marked "All" may be used for either High or Low bandwidth streams (see NOTE below).

Resolutions marked "-" are not supported.

* also includes 1/1.001 frame rates such as 29.97 and 59.94



NOTE When configuring HiLo streaming, make sure the Total Load does not exceed 100%.

For best results, the "Low" encoder stream may be downscaled, but the "High" stream should be encoded at native resolution.

# Audio Encoding

| AUDIO ENCODING – MPEG AAC | |
|---|---|
| Audio Channels | 2 per video channel |
| Audio Bitrates | From 32 to 384 kbps per audio pair |
| Frequency Response | From 20 Hz to 22 kHz |
| Sampling Rate | 48kHz |
| Maximum Analog Audio Input Level | +6dBU |
| Compression Standards | MPEG-2 AAC-LC ISO/IEC 13818-7<br>MPEG-4 AAC-LC ISO/IEC 14496-3 |

# Audio / Video Interfaces

| AUDIO / VIDEO INTERFACES | | | |
|---|---|---|---|
| Video (Input) - Makito #B-290E-DVI | | | |
| | Y,Pb,Pr / RGBHV | | Component Analog video |
| | Y,Cb,Cr / DVI | | Component Digital video |
| Video (Input)- Makito-SDI #B-290E-HDSDI | | | |
| | S-Video | NTSC/PAL/PAL-M | |
| | Composite | NTSC/PAL/PAL-M | RS-170A |
| | SD-SDI | SMPTE-259M-C | 270 Mbps interface |
| | HD-SDI | SMPTE-292M | 1,485 Gbps interface |
| | | SMPTE-274M | 1920 x 1080 video format |
| | | SMPTE-296M | 1280 x 720 video format |
| | 3G-SDI | SMPTE-424M | 3 Gbps interface |
| | | SMPTE-425M | 1080p 60 video format |
| Audio (Input) | 2 audio channels (analog or digital) | | |
| | Available through Terminal Block connector:<br>• Balanced Stereo Analog Audio<br>• Unbalanced Stereo Analog Audio | | |
| | Digital Embedded Audio<br>• SD-SDI: SMPTE-272M<br>• HD-SDI: SMPTE-299M | | |

# KLV Data Specifications

| KLV Data Specifications | |
|---|---|
| KLV Input | The serial KLV data is compliant to SMPTE 336M-2007.<br>A 16-byte Universal Key is used to separate successive KLV packets (messages).<br>The first 5-byte preamble (06 0E 2B 34 02) is used by the Makito to sync on the beginning of a new KLV packet. |
| | The incoming serial KLV data is also formatted as per SMPTE 336M-2007 Local Data Set Coding.<br>Examples of KLV group coding are described in MISB Engineering Guideline EG 0601.1, Section 5 UAS Datalink Local Data Set. (See NOTE below for additional implementation considerations). |
| Stream Insertion | Compressed video frames (and associated KLV data) are time-stamped as per MISB RP 0604 Section 4.2. It is assumed that users will pre-configure the Makito Internal System Clock to the desired UTC time. |
| | The KLV metadata is inserted in the MPEG stream as per MISB RP 0604, Section 6.2 – Synchronous Carriage of Metadata. |
| References | SMPTE 336M-2007 Data Encoding Protocol using Key-Length-Value |
| | MISB EG 0601.1 UAS Datalink Local Metadata Set |
| | MISB RP 0604 Time Stamping Compressed Motion Imagery |

NOTE In case the KLV serial data is transmitted from the source to the Makito over a relatively error-prone medium (such as wireless), it is up to the System Integrator to insure the integrity of the KLV packets by using data recovery mechanisms such as Forward Error Correction, etc.

Even with the recovery mechanisms provided by the System Integrator, there will still be some corrupted KLV data messages (e.g., the 5-byte key preamble is corrupted). The Makito will use serial data inactivity periods of 500ms to re-initialize the internal KLV packet framer. This is in order to minimize error propagation.

Again to minimize the chance for the Makito to not recover from potentially corrupted KLV data, the length of a KLV packet shall not exceed 500ms. Beyond this time limit, the Makito will consider that the incoming serial data was probably corrupted (it was not able to find the KLV packet boundaries) and will therefore look for the next 5-byte preamble.

# Network and Management Interfaces

| IP NETWORK INTERFACES | |
|---|---|
| Networking Protocols | Ethernet 10/100/1000 Base-T, auto-detect, Half/Full-duplex |
| | IPv4 (Internet Protocol version 4) |
| | DHCP (Dynamic Host Configuration Protocol) |
| | IGMPv3 (Internet Group Management Protocol) for IP Multicast |
| Streaming Protocols | MPEG2 Transport Stream as per ITU-T Rec. H.222.0 \| ISO/IEC 13818-1 |
| | Direct RTP - H.264 over RTP (RFC 3984) |
| | RTP / RTCP (RFC 3550) |
| | SAP (RFC 2974) |
| | SDP (RFC 2327) |
| | RTSP (RFC 2326) |
| | QuickTime Stream (RFC 3984 video encapsulation and RFC 3640 AAC-LC audio payload) |
| | RTMP (implemented according to requirements of the FMS/Wowza/CDN based on Adobe RTMP specification) |
| Connector | RJ45 |

| MANAGEMENT INTERFACES | |
|---|---|
| Management Protocols | HTTP (Web browser)<br>Command line over Telnet, SSH or RS-232 serial line<br>FTP/TFTP Client/Server<br>SNMP<br>Furnace (VF Pilot) |
| Physical Interface | RS-232<br>RJ45 to DB-9 Serial Management Adapter Required (provided with unit) |

# Chassis Options

## Single Blade Appliance

| SINGLE BLADE APPLIANCE (#B-290E-DVI / B-290E-HDSDI) | |
|---|---|
| Dimensions (H x W x D) | 24mm H x 149mm W x 202 mm D<br>(0.92” x 5.85” x 8.0”) |
| Weight | Approximately 1.13 kg [2.5 lbs.] |
| Power Requirements | 5VDC, 13W (each blade)<br>100-240VAC 15W external power supply |
| Temperature | 0° to 50° C [32° to 122° F] operating<br>-40° to 70° C [-40° to 158° F] non-operating |
| Relative Humidity | Up to 95% without condensation |

## MB6 - 6 Blade Chassis

| MB6 - 6 BLADE CHASSIS (F-MB6-XX) | |
|---|---|
| Dimensions (H x W x D) | 19” rack mountable, 1 RU<br>44.45mm (H) x 438.15mm (W) x 425.25mm (D)<br>(1.75” x 17.25” x 16.75”) |
| Weight | 4.54 kg / 10 lbs. (6 slot empty chassis)<br>230 g / 0.5 lbs. (single encoder blade) |
| Power Requirements | Single Internal Power Supply:<br>• AC type 90-264VAC 47Hz-63Hz 200 Watt max.<br>• Medical Grade 90-264VAC 47Hz-63Hz 300 Watt max.<br>• DC type 20-36 VDC 200 Watt max. |
| Temperature | 0° to 50° C [32° to 122° F] operating<br>-40° to 70° C [-40° to 158° F] non-operating |
| Relative Humidity | Up to 95% without condensation |

## MB21 - 21 Blade Chassis

| MB21 - 21 BLADE CHASSIS (F-280-21DPS) | |
|---|---|
| Dimensions (H x W x D) | 19” rack mountable, 4 RU<br>178mm (H) x 445mm (W) x 400mm (D)<br>(7.00” x 17.50” x 15.75”) |
| Weight | 9 kg / 20 lbs. (2 x PSU empty chassis)<br>8 kg / 18 lbs. (1 x PSU empty chassis)<br>230 g / 0.5 lbs. (single encoder blade) |
| Power Requirements | 400W PSU AC Input 115/230 VAC 14/7A 60/50 Hz<br>Supports voltages ranging from 90 – 132V and 180 – 264V AC. |
| Temperature | 0° to 40° C [32° to 104° F] operating<br>-40° to 70° C [-40° to 158° F] non-operating |
| Relative Humidity | Up to 95% without condensation |

## Makito Air

| Makito Air (S-290E-AIR or S-290E-AIR-COT) | |
|---|---|
| Dimensions (H x W x D) | 41mm H x 143mm W x 216mm D<br>(1.6”H x 5.6”W x 8.5”D) |
| Weight | 1.63 kg / 3.6 lbs. |
| Power Requirements | 28VDC, 17W<br>MIL-STD connector<br>MIL-STD-704 |
| Temperature | Operating: -20° to 50° C<br>Non-operating: -40° to 50° C |
| Relative Humidity | Up to 95% without condensation |

# Regulatory / Compliance

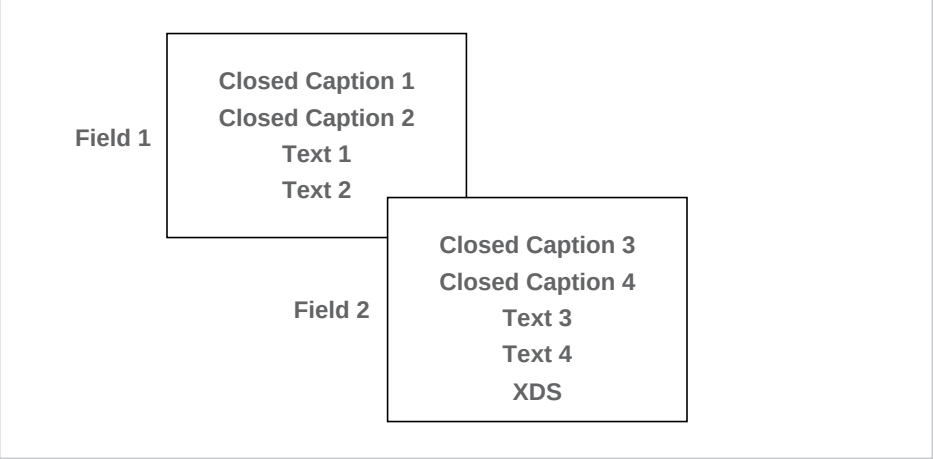
| REGULATORY / COMPLIANCE | |
|---|---|
| Certification | UL / CSA / CE |
| Compliance | Electromagnetic Compatibility: EN 55022 (Emissions) / 55024 (Immunity) |
| | Safety (Low Voltage Directives): EN 60950-1 (CSA C/US) / IEC/EN 60950-1 (International /CB Scheme) |
| | Industry Canada Warnings: Canadian ICES-003, “Electromagnetic Compatibility” /<br>Avis d’Industrie Canada: la norme NMB-003 du Canada, “La Compatibilité électromagnétique” |
| | FCC Part 15, Subpart B, Class A |
| | Makito Air: Designed for specific sections of:<br>• RTCA-DO-160F<br>• MIL-STD-810F<br>• MIL-STD-704F<br>• IEC60529:2001-02 |
| Compliance with Environmental Regulations | RoHS, European Union Directive 2002/95/EG |
| | RoHS, Marking Control for China, Regulation SJ/T 11364-2006 |

# Closed Captioning

The Makito supports capture, multiplexing and transport of Closed Captioning (CC) and other Line 21 information over Composite and S-Video (with no 7.5 IRE setup on Line 21), as well as HD/SD SDI input interfaces.

Closed Captioning data, as defined by the EIA-608-B standard, includes the following services over Line 21 Fields 1 and 2 of an NTSC analog video signal: CC1, CC2, CC3, CC4, Text1, Text2, Text3, Text4, and XDS (see Figure B-1 below). The Makito encoder supports transport of all these services. [Note that Closed Captioning as specified by EIA-608-B does not exist over PAL.]

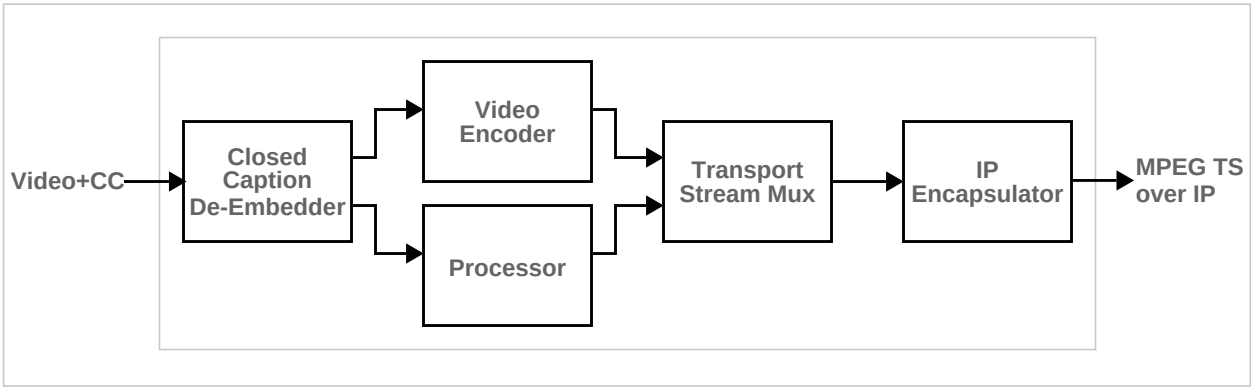
Figure B-1 EIA-608-B Line 21 Services




Line 21 of each field can contain up to 2 bytes of information, which can be used by any of the above services (not simultaneously but rather successively). With NTSC video at 30fps, the maximum EIA-608-B mandated throughput represents:

2 bytes x 2 Fields x 30fps x 8 bit/byte = 960 bps

The block diagram below shows the workflow for video and CC data into the encoder.



NOTE The extracted CC information from Line 21 is embedded in the MPEG stream as per ATSC A/72 Part 1:2008 (ATSC A/53 Part 4:2007).

Unicast and Multicast streams all carry the same CC data.

As of Version 2.0.0, the Makito Encoder supports the capture of EIA-608 and EIA-708 closed captions from the video input at the HD/SD SDI interface and encodes it in the Makito Transport Stream using the encapsulation format specified in ATSC A/72.

The Makito encoder supports the capture of EIA-608 and EIA-708 captions encapsulated in a Caption Description Packet (CDP), as described in SMPTE-334-2, within the VANC as mentioned in SMPTE 334-1. The Caption information is multiplex and transported as per ATSC A/72 in a CC SEI NAL. The caption services stored in the Caption Service Descriptor (CSD) are announced in the Program Map table (PMT) of the MPEG-2 TS as per ATSC A/65.

NOTE On the Makito, we only support a maximum of three (3) Caption active services at a time plus CC1-4 Text1-4 and XDS.

SMPTE 334-2 defines a Caption Distribution Packet (CDP) consisting of a sequence of bytes that can hold: the CEA-708 DTV caption data, CEA-608 caption data, caption service information, and SMPTE 12M-1 time code. CDP also includes the Caption Service Descriptor (CSD). As defined in ATSC A/65.

With the support of EIA-708, ATSC A/72 mandates a dedicated link bitrate of 9600 bits/sec. (1200 bytes/sec or 20 bytes per frame for a p60 SDI signal). Of the 9600 bits/sec, 960 bits/sec are reserved for EIA-608 captions. 8640 bits/s are dedicated to 708-CC. This is a dedicated channel, so it has to be filled with filler data if no captioning information is present.

Supported resolutions include 1080p, 720p, 1080i, 480i, and 576i.

# APPENDIX C: FAQ

This FAQ provides answers to some of the most frequently asked questions relating to setting up and using the Makito.

## Topics In This Appendix


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# General

## How do I check the software version?

You can check the software version from either the Web interface or the CLI.

Web: Viewing System Status Information on page 122 (System Status page)

CLI: "haiversion" on page 201 (Appendix A)

## How do I find the unit's IP Address?

You can check the unit's IP address from either the Web interface or the CLI.

Web: Network Settings on page 120 (Network Settings page)

CLI: "ipconfig" on page 202 (Appendix A)

However, if you have changed the default IP address and cannot access the unit, follow these procedures.

### Makito #B-290E-DVI

If you do not know the IP address, you can reset the unit to its factory defaults (including the original IP address). For more information, see "How do I reset the unit?" (following section).

### Makito-SDI #B-290E-HDSDI

If you do not know the IP address, you can connect via the serial management COM1 port. This will allow you to communicate directly from your computer to the encoder using a serial communication application such as HyperTerminal or Minicom. See "Connecting the Encoder to the Network and a Computer" on page 34.

## How do I reset the unit?

You can use the Reset micro-switch on the rear panel to perform either a Power Reset or Factory Reset (i.e., reset the unit to its factory defaults, including the original IP address, subnet, and gateway). For more information, see "Resetting the Encoder" on page 54.

## How do I set up the Makito to interoperate with QTSS?

The Makito has been tested with QuickTime Streaming Server (QTSS, Darwin Streaming Server, DSS).

You must use the Manual SDP method because the Automatic (Announce) method is not yet supported.

For the steps to manually set up the SDP method, see "QuickTime SDP and Interoperability" on page 95.

### What are the Power Supply and Heat Dissipation requirements for the Makito?

- The Makito power supply can support a range from 100 - 240V AC.
- The Makito @ 1080i30 requires 10.7 Watts and heat dissipation of 36.5 BTU.
- The 21-slot chassis can support voltages ranging from 90 - 132V and 180 - 264V AC.
- An unpopulated 21-slot chassis (2 power supplies) requires 53 Watts and heat dissipation of 180 BTU.

## Audio / Video

### Why can't I hear audio in HaiPLAY from the Makito?

HaiPLAY only supports MPEG4 ADTS encapsulated audio. Therefore, to use HaiPLAY as the decoder, you need to change the default audio algorithm parameter setting to mpeg4adts (from the CLI). See "algorithm" on page 186.

### What are the minimum and maximum Video Bitrate values?

- HD: 150..15000 kbps
- SD: 150..8000 kbps

### What are the minimum and maximum Audio Bitrate values?

- 32..448 kbps

## IP Video Transport

### What is RTP Protocol?

The Makito uses the Real-Time Transport Protocol (RTP) as a mechanism for encapsulating the MPEG-4 AVC Transport Stream (TS) units for video transport over IP networks. RTP encapsulation provides end-to-end network transport functions for data with real-time properties, such as interactive audio and video, over multicast or unicast network services. The RTP transport services include payload type identification, sequence numbering, time-stamping and delivery monitoring.

It is also possible to send the MPEG-4 AVC TS cells within a UDP-only packet without using the RTP protocol. This mode can be used to interoperate with MPEG-4 AVC devices that do not use RTP.

# Setting up Audio Talkback

With the Talkback feature, the Makito encoder can be configured to listen for an uncompressed PCM audio stream and output it via a mono analog audio connector.

However, the customer or system integrator must develop their own application to send the audio stream to the encoder.

Upon request, Haivision provides a reference implementation (HaiPLAY v1.4.0) to aid customer development.

Haivision's Furnace v6.x InStream Media Player provides a Talkback audio stream to the encoder. For more information, see the Furnace Administration Guide available through Haivision's Download Center.

## Talkback Audio Format Specifications

Below is the exact specification required to send Talkback audio to Haivision encoders:

1. Audio data in each payload is not compressed and is just PCM digitized audio. There is no encoding/decoding involved.
2. Transmitted over unicast UDP (right now only port # 9177) to the Makito.
3. Audio sampling rate = 22.05 kHz (44.1 divided by 2).
4. Each audio sample is a raw 16-bit PCM (LSB First).
5. Mono audio only.
6. Each UDP packet contains 440 samples.
7. UDP payload is 880 bytes minium. (Anything beyond the 880th byte is discarded.)
8. There is no audio mixing; one audio channel at a time: first in / first served. The talkback application software should be equipped with "push-to-talk" type of feature.
9. If the audio input is disconnected, the application does not need to send filler zero (silence) bytes, because talkback on the Makito inserts zeros (silence) to maintain the output audio clock.
10. Talkback audio is output over the "Audio Out" mono connector on the Makito encoder.

# APPENDIX D: Open Source Software Credits

This appendix lists the Open Source software packages used in the Makito haiOS:

## Open Source Software Credits

Haivision is grateful to the following organizations for making available their Open Source software packages:

| Package | Version | License | Organization URL | Description |
|---|---|---|---|---|
| Linux | 2.6.36 | GPL | www.kernel.org | Operating system |
| BusyBox | v1.17.3 (2012-01-30 10:59:14 EST) multi-call binary. | GPLv2 | http://www.busybox.net | Copyright (C) 1998-2009 Erik Andersen, Rob Landley, Denys Vlasenko and others. |
| netsnmp | 5.5 | Modified BSD | www.net-snmp.org | Free SNMP agent and tools |
| Iperf | 2.0.4 | Custom BSD | http://sourceforge.net/projects/iperf | Iperf performance test |
| Openssh | 6.0p1 | BSD | http://www.openssh.com | Free version of the SSH connectivity tools |
| Openssl | 1.0.1c fips-2.0 | Apache | http://www.openssl.org | Open Source toolkit implementing the Secure Sockets Layer (SSL v2/v3) and Transport Layer Security (TLS v1) protocols |
| Zlib | 1.2.3 | Custom | http://zlib.net | Compression Library (required by openssl) |

Please refer to the URLs listed above for details of each Open Source licensing agreement. Code for GPL-related components is available upon request.

For additional information, refer to http://www.fsf.org/licensing.

# APPENDIX E: Warranty Information

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If you have questions, please contact Haivision Systems Inc., 4445 Garand, Montréal, Québec, H4R 2H9 Canada.

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