

# Haivision

Makito™ Decoder

Compact HD H.264 Video Decoder

User's Guide Version 1.3

HVS-ID-UG-MAKD-130

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 Decoder, Version 1.3. This user's guide describes how to install, configure, and manage the Makito to receive 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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Or visit our website at: <http://www.haivision.com>

## Obtaining Documentation

You may download the Decoder 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 User's Guide
- Makito X2 User's 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 1.3

Version 1.3 of the Makito Decoder introduces the following new features and enhancements:

## VF FEC Support from the WCI and SNMP

The Makito Decoder now supports Forward Error Correction (FEC) configuration from the Web Interface and via SNMP, in addition to the existing CLI configuration. FEC provides the ability to maintain a quality stream where minor network impairments exist. In order to work, FEC must be enabled on both end-points.

For more information, see [“FEC”](#) on page 61.

## iPerf and tcpdump Integration for Use from the CLI

The iPerf and tcpdump utilities are now installed as part of the base system to allow detailed network analysis useful for troubleshooting.

- iPerf may be used to determine characteristics (such as bitrate, network latency, and jitter) of the link between two end-points such as a Makito Encoder and Makito Decoder. iPerf is used by Haivision Technical Support to debug field issues. In order to work, the iPerf package must be present on both end-points.
- tcpdump is used by Haivision Technical Support to confirm the reception of network packets at the decoder.

Both packages were added to the Makito Encoder in Version 2.1.

## KLV/SDI Insertion into the Output Video Stream

The Makito Decoder now supports extraction of KLV (Key Length Value) metadata from a MPEG-2 TS stream and insertion into the VANC space of the SDI interface. This feature is intended for users who require end-to-end transport of KLV over SDI. Previous releases of the Makito Decoder discarded any KLV data.

Note that the KLV will be re-inserted into the same video frame as it was extracted from at the source. The PTS time-stamps on the video and KLV will be used for synchronizing the KLV with the video.

No user interface selections are required. If KLV metadata is available, it will be inserted to the SDI stream.

### Closed Captioning: CC608 and CC708 Re-insertion into an SDI Interface

The Makito Decoder now supports streams that contain Closed Captioning (CC) coded as defined in ATSC A/72 (for 608 and 708 captions) and ATSC A/65 (for 708 captions). The Decoder will extract the CC information and re-insert it into the SDI interface (not HDMI) as a ANC packet formatted as defined in SMPTE 334-1 and 334-2.

This feature was designed to meet regulatory requirements in the USA that require Closed Captioning carriage on all devices that process broadcast video (including internet streamed video).

No user interface selections are required. If CC is available, it will be inserted to the SDI pixel VANC.

### AFD Extraction and Re-insertion into an SDI Interface

Active Format Description (AFD) allows the display to determine the aspect ratio of the source video. AFD is coded as per ATSC A/7 and is extracted from the video Elementary Stream. If available, AFD will be inserted into the SDI bit-stream as specified in SMPTE 2016-1 and 2016-2.

No user interface selections are required.

### ATC\_VITC (Timecode) Re-insertion into an SDI Interface

The Makito Decoder now extracts the timecode from the Scene Enhancement Information (SEI) pic\_struct NAL (Network Abstraction Layer) within the video Elementary Stream (defined in H.264). It then packetizes the ATC\_VITC as per SMPTE 12-1 and inserts it into the SDI VANC (Vertical Ancillary).

No user interface selections are required.

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# Part I: Installation and Setup

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# CHAPTER 1: Introduction

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

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## Product Overview

The Makito Compact HD H.264 Video Decoder is an IP video appliance designed to be paired with the Makito Encoder. The Makito Decoder delivers SDI and HDMI digital video with embedded digital and separate analog audio. Both SDI and HDMI interfaces support all SD, HD and 3G standards up to 1080p60. The HDMI output also supports the decoding and display of computer resolution sources encoded by the Makito, including 1024x768, 1280x1024, and 1920x1080. The Makito Decoder also supports balanced and unbalanced analog audio output.



**NOTE** In this guide, “SDI” refers to any of the SD, HD and 3G variants. The actual standard used by the Decoder is determined by the resolution and frame rate of the received video stream.

The Makito Decoder supports Advanced Encryption Standard (AES) decryption of unicast or multicast signals to provide end-to-end secure video. The Makito Decoder also supports Forward Error Correction (FEC) error recovery and fine grained control of its IP receive buffers to enable the capture of streams that may have traversed impaired IP networks. Both these services are available when a Makito Decoder and Makito Encoder are used in conjunction with Haivision’s Furnace IP Video System.

Figure 1-1 Front View (Single Chassis)



Figure 1-2 Sample Rear Panel (Single Chassis)





## Chassis Styles

The Makito Decoder is available in three chassis styles:

- as an ultra compact appliance for single channel decoding (shown in previous section),
- within a 4U high density chassis (MB21) that can contain up to 21 Makito encoders and/or decoders, and
- within a 1U chassis (MB6) that can contain up to six Makito encoders and/or decoders.

The MB21 and MB6 chassis styles 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 \(Six-Slot\) Chassis”](#) on page 37.

The Makito Decoder Dual Height Blade provides a serial port and may be used in either the MB21 or MB6 chassis (occupying two adjacent slots).

## Applications

Typical examples of Makito Decoder applications include:

- [IPTV Distribution](#) – delivering video channels to viewers in schools, financial institutions, live event venues, 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.

## Physical Description

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

### System Interfaces (Rear Panel)

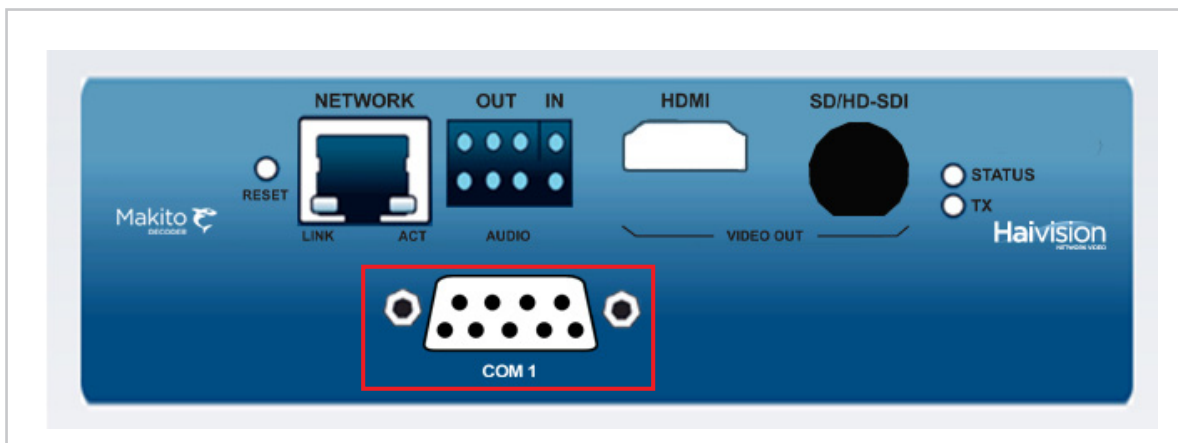
The Makito Decoder comes with a 10/100/1000 Base-T Ethernet Network interface for both traffic and management (RJ45).

Figure 1-5 Ethernet Connection (Makito Decoder #B-290D)



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

Figure 1-6 Serial Connection (Makito Decoder Dual Height Blade #B-290D-S)



### Related Topics

- [“Connecting the Decoder to the Network and a Computer”](#) on page 26
- [“Serial Interface Setup”](#) on page 27

## Audio/Video Interfaces (Rear Panel)

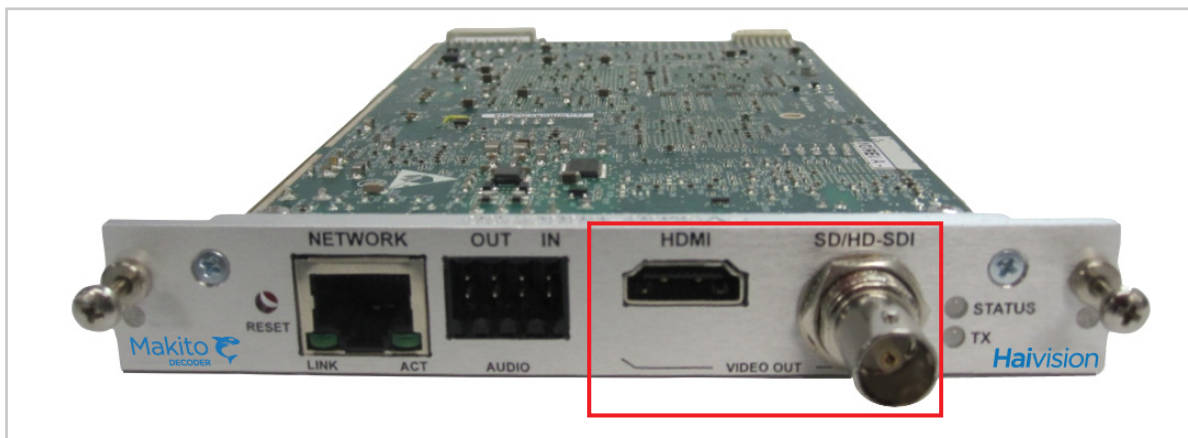
**i** **NOTE** All Video and Audio Output connectors are active. This means that the Decoder is capable of simultaneously outputting analog and digital audio as well as both SDI and HDMI digital video.

### Video Out

The Makito Decoder video interface consists of one BNC and one HDMI connector (faceplate shown below).

- The BNC connector is used for the SD/HD/3G-SDI video signals. A 75Ω coaxial cable connects from Video Out to a video monitor.
- The HDMI connector is used for High Definition audio/video output signals. An HDMI Type-A cable connects from HDMI Out to a video monitor. Note that HDCP content protection is not applied to the HDMI output.

Figure 1-7 Video Output Connections (Makito Decoder #B-290D)

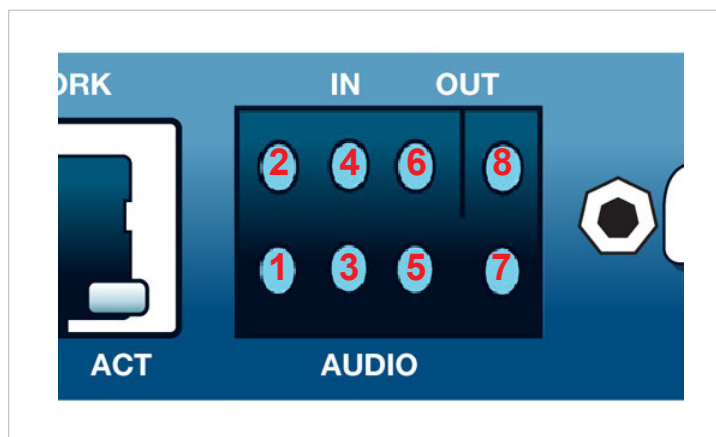


## Audio Out

The Makito Decoder audio interface consists of a single 8-pin terminal block connector and one HDMI connector (faceplate shown in [Figure 1-7](#) on page 20).

- The 8-pin terminal block connector is used for two-channel balanced/unbalanced analog audio output (one stereo pair) and a mono audio input (future release).
- The HDMI connector supports embedded digital audio signals. One HDMI Type-A cable connects from HDMI Out to a receiver or other sound system.

Figure 1-8 Audio Interface



For the pinout, see [“Audio Terminal Block Connector Pinout”](#) on page 31.

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, order an XLR male to Terminal audio dongle from Haivision, or see [“Modifying the RCA-Terminal Dongle for Balanced Audio”](#) on page 30.

## Related Topics

- [“Connecting the Decoder to A/V Displays”](#) on page 29

## LED Status Indicators (Rear Panel)

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

Figure 1-9 LED Status Indicators (sample view, Makito Decoder #B-290D)

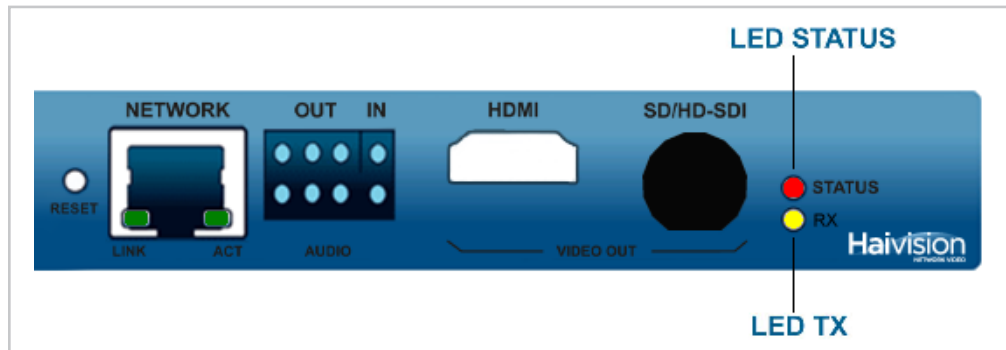


Table 1-1 LED Status Indicators

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: <ul style="list-style-type: none"> <li>• Decoder booting</li> <li>• NO video stream is being decoded</li> <li>• NO audio stream is being decoded</li> </ul>
		GREEN Solid	When ALL the conditions below are met: <ul style="list-style-type: none"> <li>• A video stream is being decoded</li> <li>• An audio stream is being decoded</li> </ul>
<b>Network port</b>			
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

Table 1-1 LED Status Indicators (Cont.)

Function	Color	Description	Indication
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)

### Related Topics

- [“Powering Up the Unit”](#) on page 33

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# CHAPTER 2: Installing the Decoder

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

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## Setting Up the Decoder

Always read the instructions carefully and keep this user's guide for future reference.

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

Set up the decoder on a reliable and flat surface when using the single Makito chassis, or mount in a rack, when using the 1U or 4U chassis.

### Safety First

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

- Refer to [“Safety Guidelines”](#) on page 3.
- The Makito Decoder 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.

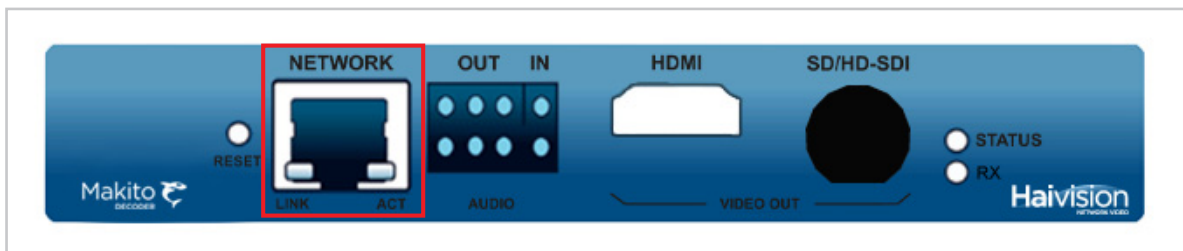
## Connecting the Decoder to the Network and a Computer

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 Decoder #S-290D)



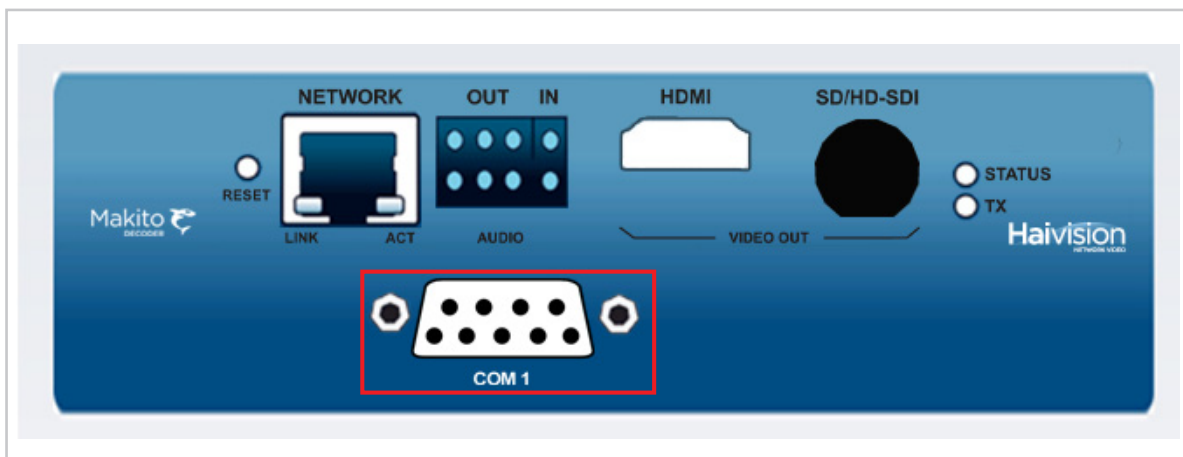
To connect the Serial Interface:

The serial interface is available on the Makito Decoder Dual Height Blade.

1. (Optional) Connect the COM1 port to the serial port of a computer using the DB9 connector and a null modem serial cable.

This will allow you to communicate directly from your computer to the Makito using a serial communication application such as HyperTerminal or other serial communication application. This is only required if you wish to use the serial management COM1 port.

Figure 2-2 Serial Connector (Makito Decoder Dual Height Blade #B-290D-S)



### Related Topics:

- For details on the connectors, see [“System Interfaces \(Rear Panel\)”](#) on page 19.
- 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 Decoder Dual Height Blade.

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).

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 Decoder 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 33.)
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 62.

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 Decoder Dual Height Blade)

On the Makito Decoder 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 Decoder 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



**NOTE** No hardware flow control is allowed.

## Connecting the Decoder to A/V Displays



**NOTE** Both of the Decoder's Video Output connectors are active, and both Analog Audio and Embedded Digital Audio are active.

To connect the Decoder Outputs to A/V Displays:

1. **Video Out:** Connect one or both of the Decoder's Video Outputs to a plasma or other video display(s), using the appropriate connector(s):
  - **SDI Video with Embedded Audio:** Use the BNC connector.
  - **HDMI Video with Embedded Audio:** Use the HDMI connector. (See [Figure 2-6](#) on page 32 for the [HDMI Connector Pinout](#).)
2. **Analog Audio Out:** Connect the Decoder's Audio Output to the audio sound system/speakers, using the Audio 8-pin terminal block connector (shown in [Figure 2-3](#)).
  - For unbalanced audio, use the RCA female to Terminal audio dongle (included in the package, shown in [Figure 2-4](#)).
  - For balanced audio, see "[Modifying the RCA-Terminal Dongle for Balanced Audio](#)" on page 30.

Figure 2-3 Decoder Output Connectors

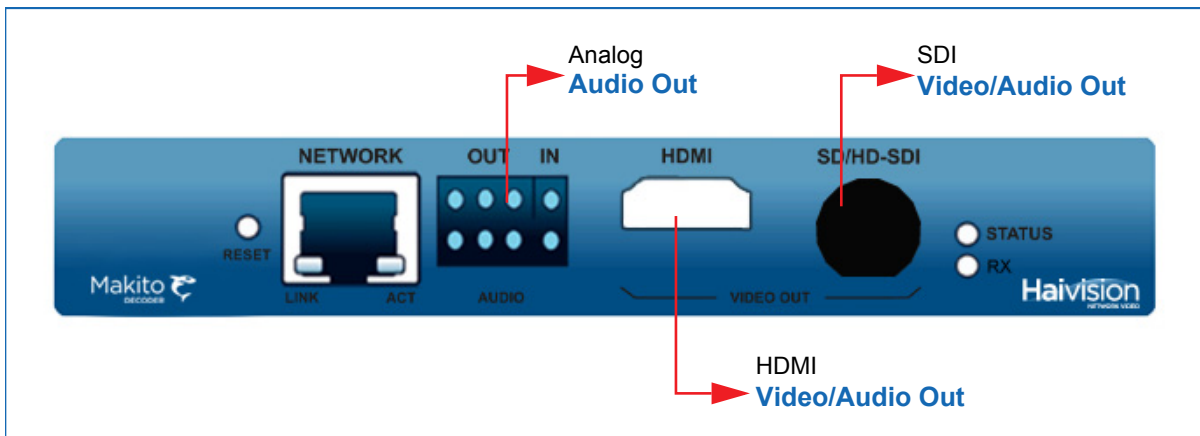
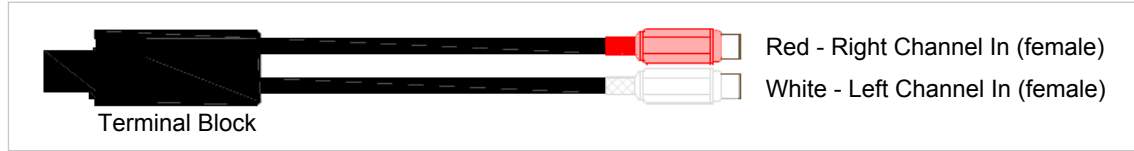


Figure 2-4 Audio RCA to Terminal Dongle (unbalanced audio)

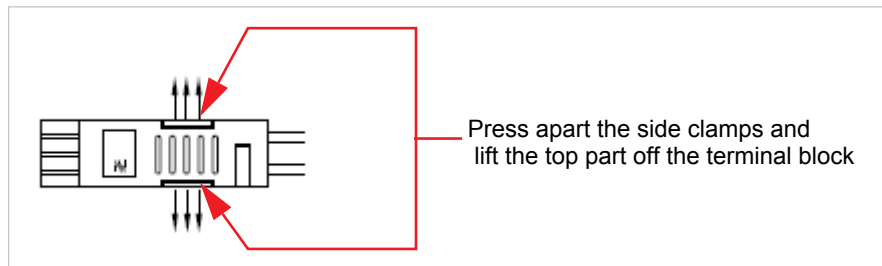


## Modifying the RCA-Terminal Dongle for Balanced Audio

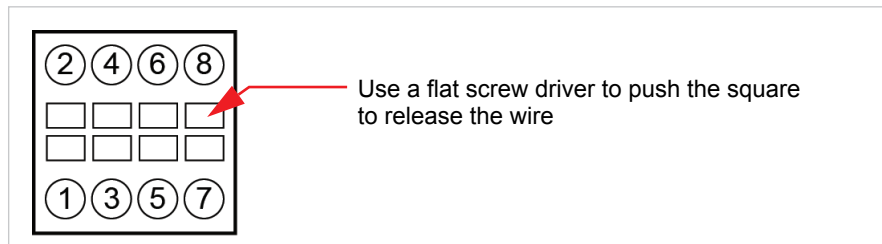
For balanced audio, you can modify the audio RCA to Terminal dongle provided in the package to re-use the terminal block connector.

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.)



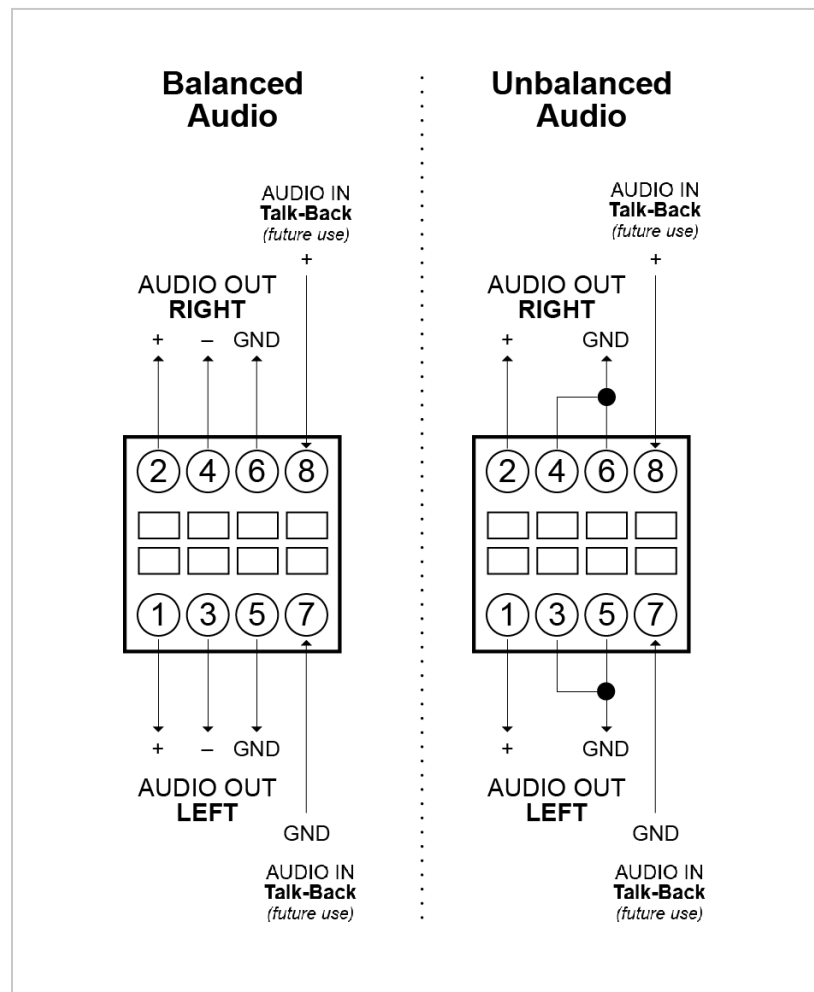
3. Pull each wire to remove it from the terminal block.
4. Prepare your new audio wires by removing about .150 inch of the wire's insulation.
5. Insert the new wires by pressing the tension clamp and then removing the screw driver to release the tension clamp.

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 2-5 Balanced and Unbalanced Audio Connector Pinouts



### Related Topics

- For more information on the audio connections, see [“Audio/Video Interfaces \(Rear Panel\)”](#) on page 20.

## HDMI Audio/Video Output Connector Pinout

The Type A 19-pin HDMI audio/video output connector has the following pinout:

Figure 2-6 HDMI Connector Pinout

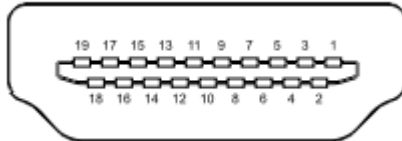


Table 2-2 HDMI Connector Pinout

HDMI Pin #	Description
1	TMDS Data2+
2	TMDS Data2 Shield
3	TMDS Data2-
4	TMDS Data1+
5	TMDS Data1 Shield
6	TMDS Data1-
7	TMDS Data0+
8	TMDS Data0 Shield
9	TMDS Data0-
10	TMDS Clock+
11	TMDS Clock Shield
12	TMDS Clock-
13	Reserved (N.C. on device)
15	SCL
16	SDA
17	DDC/CEC Ground
18	+5 V Power
19	Hot Plug Detect



## Powering Up the Unit

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

### Single Blade Chassis

Figure 2-7 Rear Panel (Single Chassis) showing Locking Power Connector

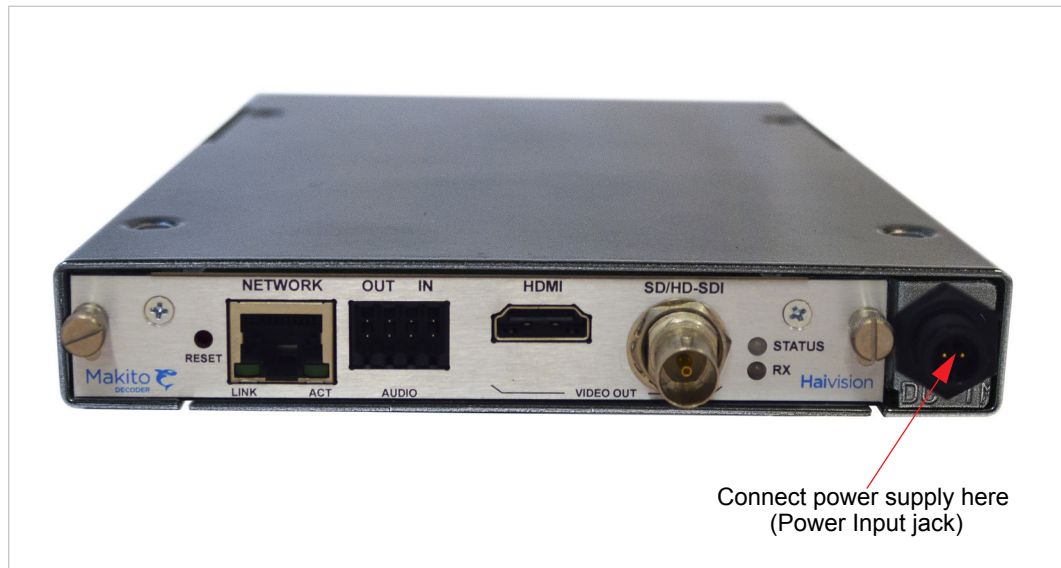
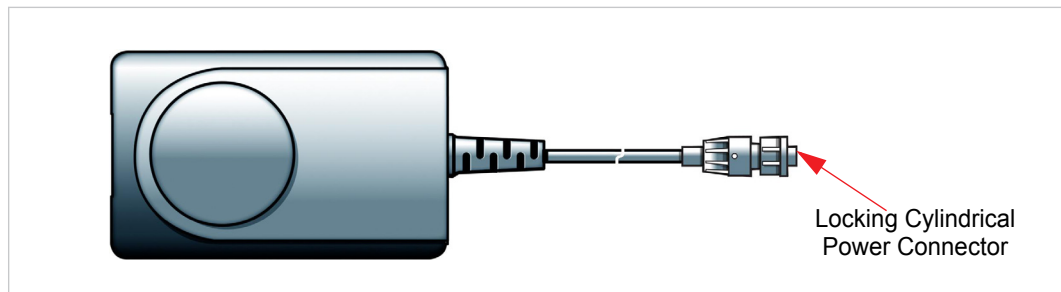


Figure 2-8 Single Chassis Power Supply



**NOTE** There is no power switch on the Makito. 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 power outlet is located near the equipment and is easily accessible.

### To power up the Single Blade Chassis:

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



**CAUTION** To prevent damage to the decoder 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 AC power source.

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

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

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

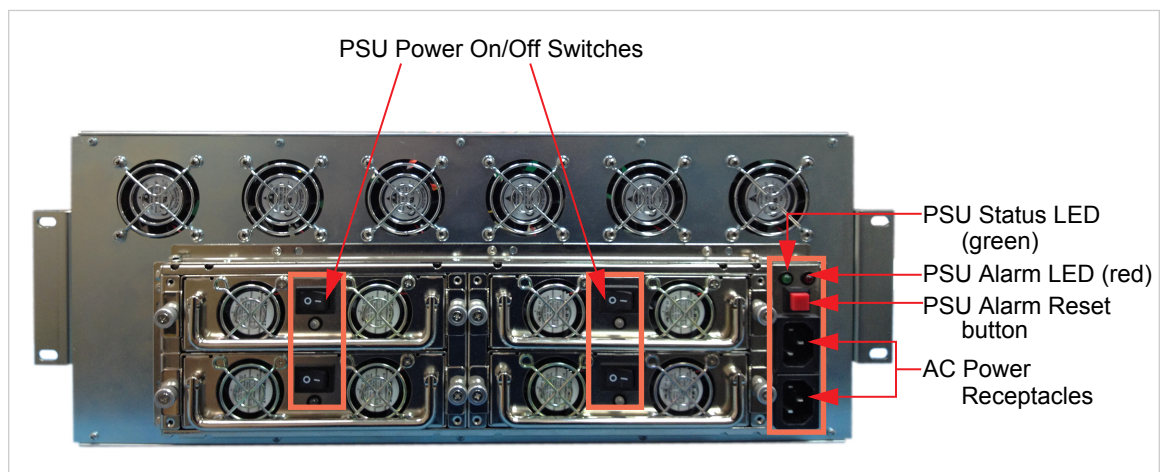
- To use the Web interface, see [“Logging In to the Web Interface”](#) on page 48.
- To enter CLI commands, see [“CLI Command Reference”](#) on page 93.

## MB21 (Twenty-One Slot) Chassis



**WARNING** To prevent electric shock, do not remove the cover of the 21-slot chassis. There are no user-serviceable parts inside. The 21-slot chassis is to be installed and serviced by qualified personnel only.

Figure 2-9 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 decoders are booting up.

4. Wait until the Status LEDs stay solid green, indicating that the decoders 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 the decoder, 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 48.
- To enter CLI commands, see [“CLI Command Reference”](#) on page 93.

## MB6 (Six-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 2-10 MB6-AC Chassis showing Power Connectors

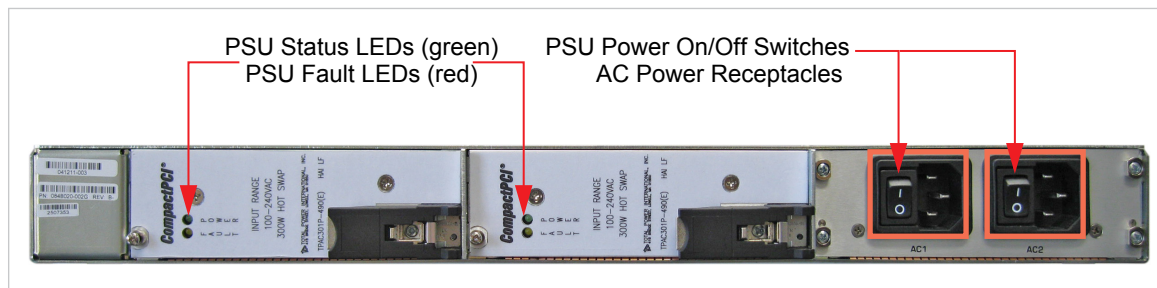
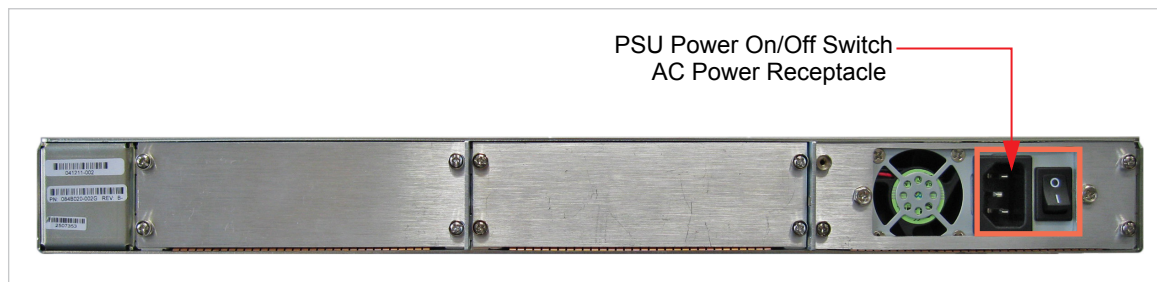


Figure 2-11 MB6-MED Chassis showing Power Connector



**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.

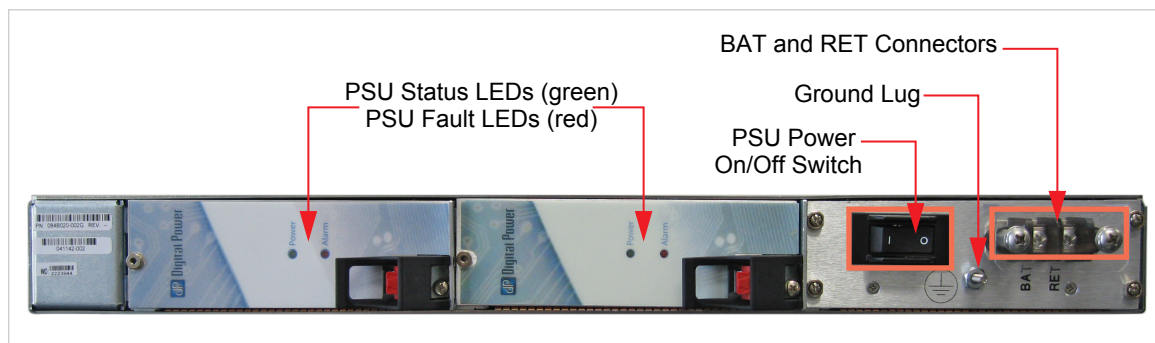
Adhere to your organization's policy on the gauge of the ground wire (12 AWG, insulated, stranded) and the number of crimps on the lug.

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 2-12 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 the decoder, 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 48.
- To enter CLI commands, see [“CLI Command Reference”](#) on page 93.

## Resetting the Decoder

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 decoder to the same settings it originally had when shipped from Haivision, including the factory default IP address, subnet, and gateway.

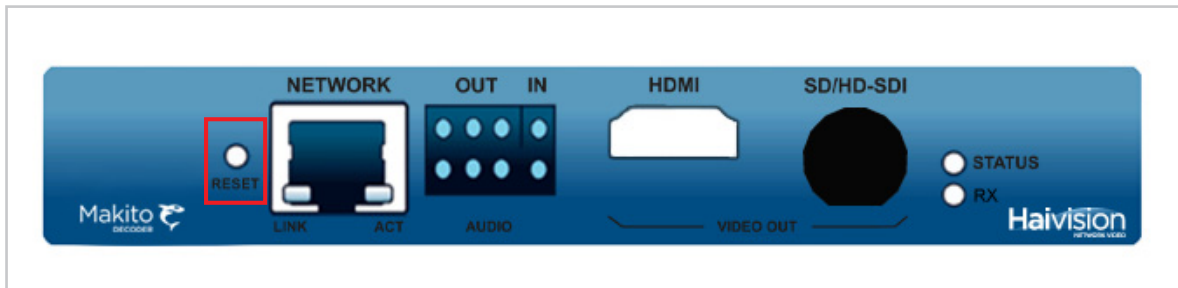
After a Factory reset, only the firmware revision, serial number, and MAC address are preserved. All other data is deleted (including saved configurations, modified passwords, and encoding settings), and all settings are returned to their factory preset conditions (including the IP address).

### Hardware Reset

To reset the Makito:

1. With the decoder on, insert a small tool such as a straightened paper clip into the small opening labeled **Reset** on the Makito faceplate.

Figure 2-13 Reset micro switch (Sample view)



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.

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 decoder is ready.



## Default Network Settings

After a factory reset, the Network settings are reset to:

IP Address	Subnet Mask	Gateway
10.5.1.2	255.255.0.0	10.5.0.1

---

## PART II: Session Configuration and Management

# CHAPTER 3: Managing the Decoder

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



**NOTE** Before proceeding, make sure that the decoder is set up correctly and all necessary network and A/V connections are established. See [Chapter 2: “Installing the Decoder”](#).

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<a href="#">Default Decoder IP Address</a> .....	46
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## Management Overview



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**NOTE** Most Audio/Video settings are defined at the Encoder end, and the Decoder adjusts to the settings embedded in the received stream.

---

All Makito Decoder 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 Decoder from the Web interface requires a connection from the unit's LAN port to your network. You must then connect a computer 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 Decoder, 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 Decoder through the exchange of SNMP messages.

For information on SNMP management of the Makito Decoder, see [Chapter 4: “Configuring A/V Services Using SNMP”](#).

## Accessing the Decoder

### Web Interface

To access the decoder configuration Web page:

1. From your computer, open a Web browser.
2. Type the decoder's IP Address in the browser's address field (see [“Default Decoder IP Address”](#) below) and press Enter.
3. Log in (see [“Logging In to the Web Interface”](#) on page 48).

### CLI

To access the decoder CLI:

1. Open a telnet session to the decoder (see [“Default Decoder IP Address”](#) below).
2. At the login prompt, type the username and password (see [“Access Control”](#) on page 47).

## Default Decoder IP Address



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

---

To be able to log in to the Makito Decoder 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 decoder. Only then you will be able to access the decoder and change the decoder's IP Address, and then afterwards change your computer's IP Address back.



---

**TIP** After you change the decoder 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 Decoder”](#) on page 40.

---

## Access Control

The Makito Decoder provides the following pre-defined user groups with different privilege levels.

- The user account provides read-only access to the system.
- The operator account provides all rights to configure A/V and stream settings and reboot the system. However, it does not include rights to upgrade the system, modify the network settings, or manage accounts.
- The admin account provides all access rights.

Group	Default Username	Default Password	System Upgrade	Account Mgmt	Network Settings	Decoder/Stream Settings	System Reboot
Admins	admin	manager	Yes	Yes	Yes	Yes	Yes
Operators	operator	supervisor	No	No	No	Yes	Yes
Users	user	public	No	No	No	No (Read-only)	No

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

You can change the password for these accounts from the CLI using the [passwd](#) command.

Note that any changes to the default passwords will be lost after a Factory Reset or a firmware downgrade.

### Related Topics:

- [CLI Access Control](#)

## Logging In to the Web Interface

To log in to the Makito Decoder configuration Web page:

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

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



2. Type the Username and Password and click [Login](#) (or press Enter).

The default Web interface Username and Password are:

Username: admin  
Password: manager

The default password may be changed from the CLI. For information on the pre-defined user groups for the Makito Decoder, see the previous section, [“Access Control”](#).



**NOTE** Selecting [Help](#) from the menu bar will launch the online help. For more information, see [“Online Help”](#) on page 51.



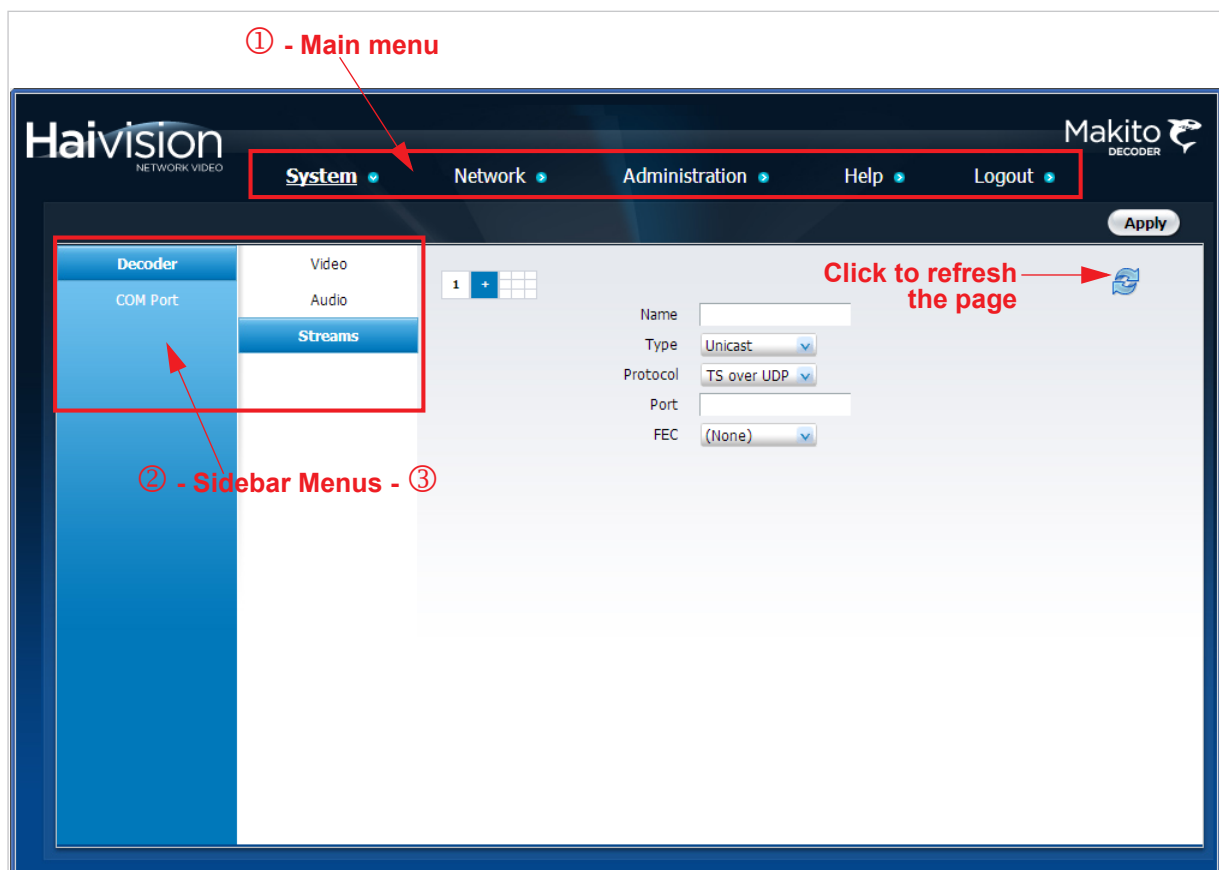
## Exploring the Web User Interface

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

### Navigational Menus

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



1. Either **SYSTEM**, **NETWORK**, or **ADMINISTRATION** from the Main Menu (along the top bar, see example below),
2. The configuration area from the sidebar menu (for example, **DECODER** or **COM PORT**), and
3. Where available, a further configuration level (for example, **DECODER>VIDEO**, **AUDIO**, or **STREAMS**).



## Apply and Save

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

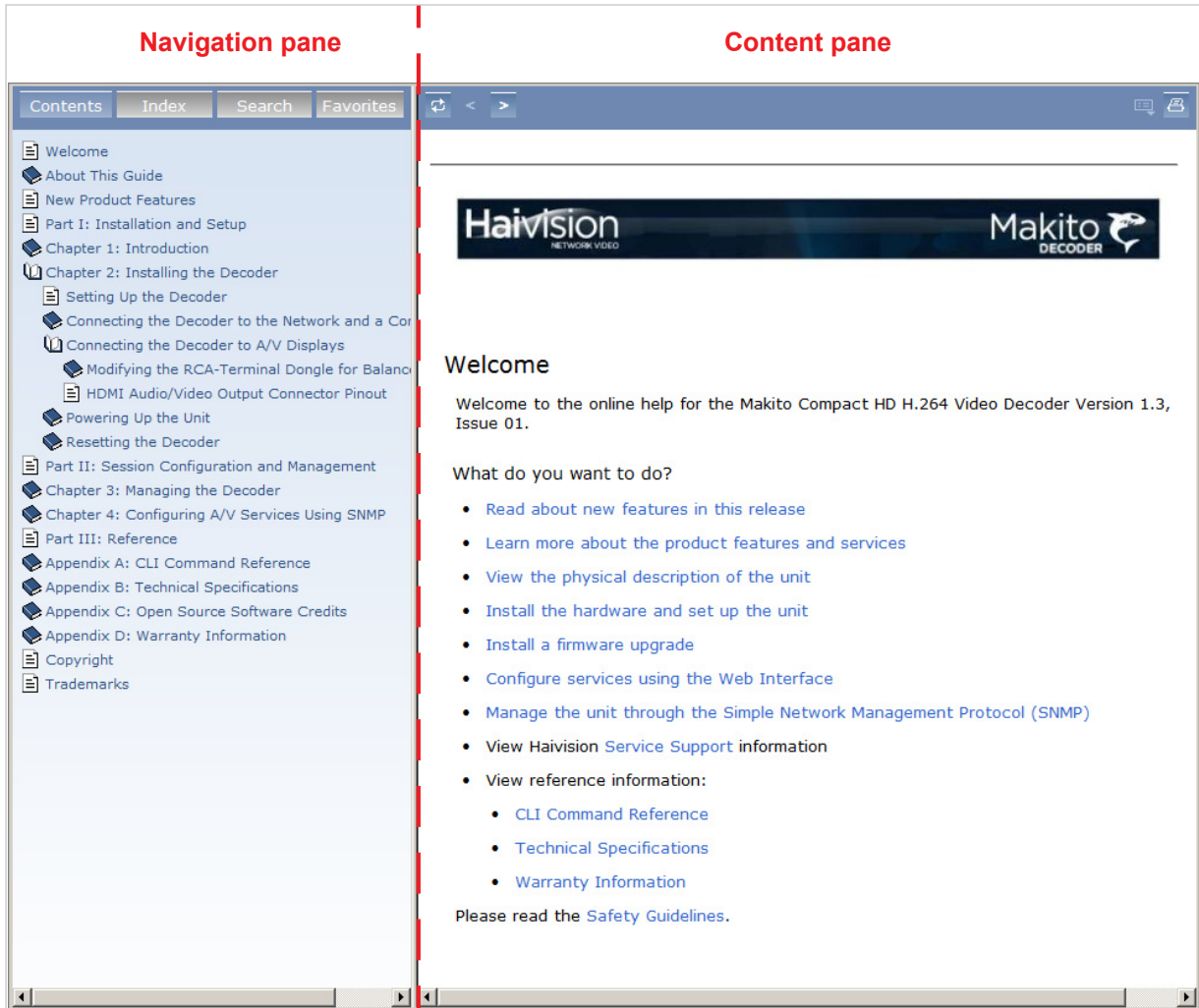
Button	Description
	<p>Click <a href="#">Apply</a> in order for your changes to take effect. The decoder will then start working with the new settings, but the changes will not be saved and will be lost after a reboot.</p>
	<p>(Where available) Same as <a href="#">Apply</a>, but the configuration settings will be applied and saved to the decoder's flash memory. Saved settings will be used by the decoder even when the decoder is turned off and on or after a reboot. In the current release, pages such as <a href="#">COM PORT</a>, <a href="#">NETWORK SERVICES</a> and <a href="#">WEB CONFIG</a> provide <a href="#">Save</a> options.</p>



**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 71.

## Online Help

Selecting [Help](#) from the menu bar will launch the online help for the Makito Decoder. The figure below shows a sample Welcome page.



## Configuring the Video Settings

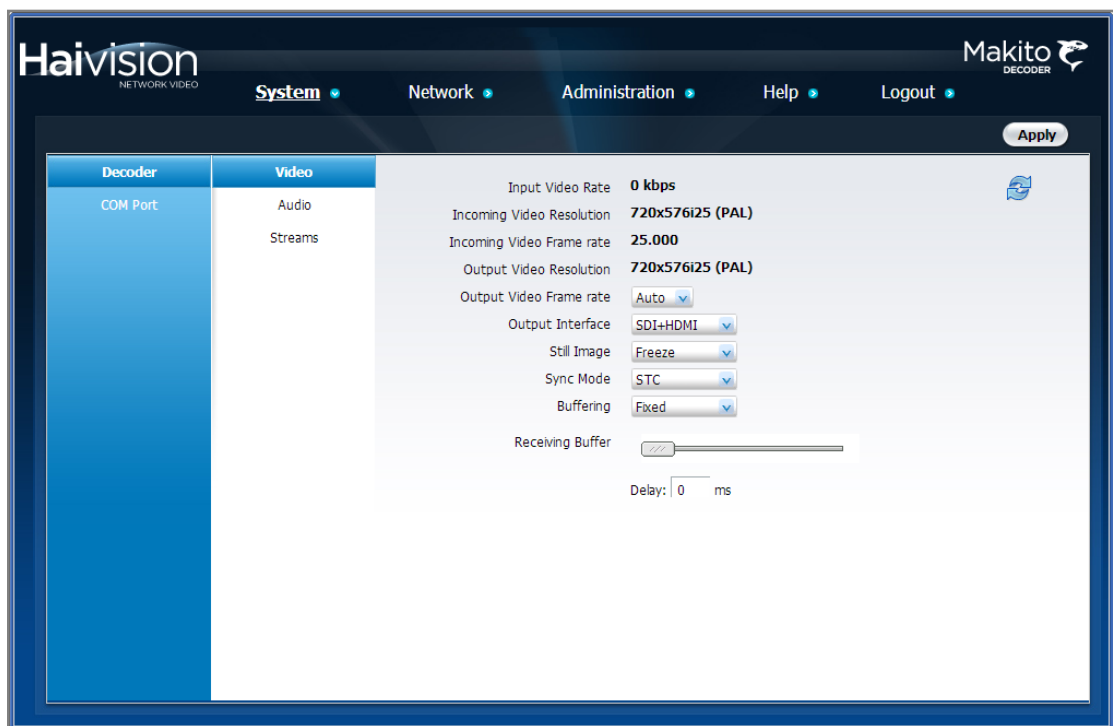
From the [VIDEO](#) page, you can view Video Encoding properties such as the Input Video Rate and the Incoming Video Resolution and Frame Rate. You can configure properties such as the Output Video Frame Rate, Sync Mode, Buffering type, and Receiving Buffer (Delay).

You can also select a still image such as a black screen that the decoder will insert on the output display ports if the decoder is no longer receiving video (for example, if the encoder stream has stopped or the network connection is lost).

To display the Decoder Video Settings:

1. Click [SYSTEM](#) from the main menu, and then click [DECODER>VIDEO](#) from the sidebar menus.

The [VIDEO](#) 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.

4. To save the current configuration, open the [ADMINISTRATION>CONFIG](#) page. See [“Saving and Loading Configurations”](#) on page 71.

## Video Settings

The following table lists the Decoder Video settings:

Video Setting	Default	Description/Values
Input Video Rate	n/a	The Video Bitrate of the incoming video stream in kilobits per second. This is auto-detected by the system and cannot be changed.
Incoming Video Resolution	n/a	The input signal detected from the incoming video stream. 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: for example, 25 or 30 for interlaced, or 50 or 60 for progressively scanned. This is auto-detected by the system and cannot be changed.
Incoming Video Frame rate	n/a	The frame rate per second of the incoming video stream. This is auto-detected by the system and cannot be changed.
Output Video Resolution	n/a	The number of lines per frame to send to the display, with an indicator (i or p) whether the video is interlaced or progressively scanned. Includes the number of frames per second: for example, 25 or 30 for interlaced, or 50 or 60 for progressively scanned. See <a href="#">Output Video Frame rate</a> below.
Output Video Frame rate	Auto	Selects the frame rate generated for the displays: <a href="#">Auto</a> , <a href="#">23</a> , <a href="#">24</a> , <a href="#">25</a> , <a href="#">29</a> , <a href="#">30</a> , <a href="#">50</a> , <a href="#">59</a> , <a href="#">60</a> , <a href="#">75</a> or <a href="#">85</a> <b>NOTE:</b> If <a href="#">Auto</a> is selected, the actual frame rate generated will be the next highest valid frame rate supported by the SDI and HDMI interface, plus the one that gives the best decimation factor. For example, 30Hz could be chosen instead of 29.970 Hz. Values set which are impossible to implement will be treated as <a href="#">Auto</a> . Reasons for not supporting the selection can range from “Display does not support the frame rate” or “Frame rate is undefined for the detected input resolution”.

Video Setting	Default (Cont.)	Description/Values (Cont.)
Output Interface	SDI + HDMI	The type of video output connector for the Decoder: <b>SDI + HDMI</b> only <b>NOTE:</b> <i>Both</i> of the Decoder's Video Output connectors are active.
Still Image	Freeze	Selects the type of static image to display when the decoder is not receiving a video stream (subject to the <a href="#">Still Delay</a> specified below). <ul style="list-style-type: none"> <li>• <b>Freeze:</b> continues to display the last decoded video frame.</li> <li>• <b>Black:</b> displays a black screen.</li> <li>• <b>Blue:</b> displays a blue screen.</li> <li>• <b>Color Bars:</b> displays a series of vertical color bars across the width of the display.</li> <li>• <b>Mute:</b> disables the video output.</li> </ul> <b>NOTE:</b> When the still image is substituted on the display outputs, the video frame rate and resolution will be maintained. When the video decoder receives a new video stream, it will wait until it receives a new IDR frame and will re-start the display with that IDR frame.
Still Delay	3 seconds	The delay in seconds before the <a href="#">Still Image</a> will be displayed: <b>2 - 60</b> seconds
Sync Mode	STC	The mode of synchronization of sound and picture for the decoded stream: <ul style="list-style-type: none"> <li>• <b>STC:</b> Synchronizes with the Encoder system clock by comparing the packet timestamp with the reference clock.</li> <li>• <b>Fixed:</b> Decodes packets without comparing the packet timestamp to synchronize video and audio. This may result in A/V sync issues, but may be required in circumstances where network performance hinders synchronization.</li> </ul>

Video Setting	Default (Cont.)	Description/Values (Cont.)
Buffering	Adaptive	<p>(<a href="#">Sync Mode</a> must be <a href="#">STC</a>) The type of buffering to use. A jitter buffer temporarily stores arriving packets in order to remove the effects of jitter from the decoded stream.</p> <ul style="list-style-type: none"> <li><b>Adaptive:</b> Allows the system to evaluate the latency required to absorb the jitter. Adjusts its size dynamically in order to optimize the delay/discard tradeoff. In <a href="#">Adaptive</a> mode, the <a href="#">Receiving Buffer (Delay)</a> is not applied.</li> <li><b>Fixed:</b> Uses the <a href="#">Receiving Buffer (Delay)</a> to control the latency required to absorb jitter. Each arriving packet will be buffered for a short interval before playing it out. Maintains a constant size.</li> </ul>
Receiving Buffer (Delay)	0 ms	<p>The delay in ms when using <a href="#">STC Sync Mode</a> with <a href="#">Fixed</a> buffering. 0...1000 ms delay</p> <p>Slide the slider bar or type in the delay value in the text box.</p>

## Makito X2 Interoperability

The Makito Decoder does not support B frames in the video elementary stream. This affects interoperability between the Makito Decoder and the Makito X2 encoder. The following video encoder settings are recommended when configuring the Makito X2 to interoperate with the Makito Decoder.

Relevant Video Encoder Parameters	Recommended Setting(s)
EntropyCoding	CAVLC only
Partitioning	Off only
GopStructure	I and IP only
Bitrate	150..15000

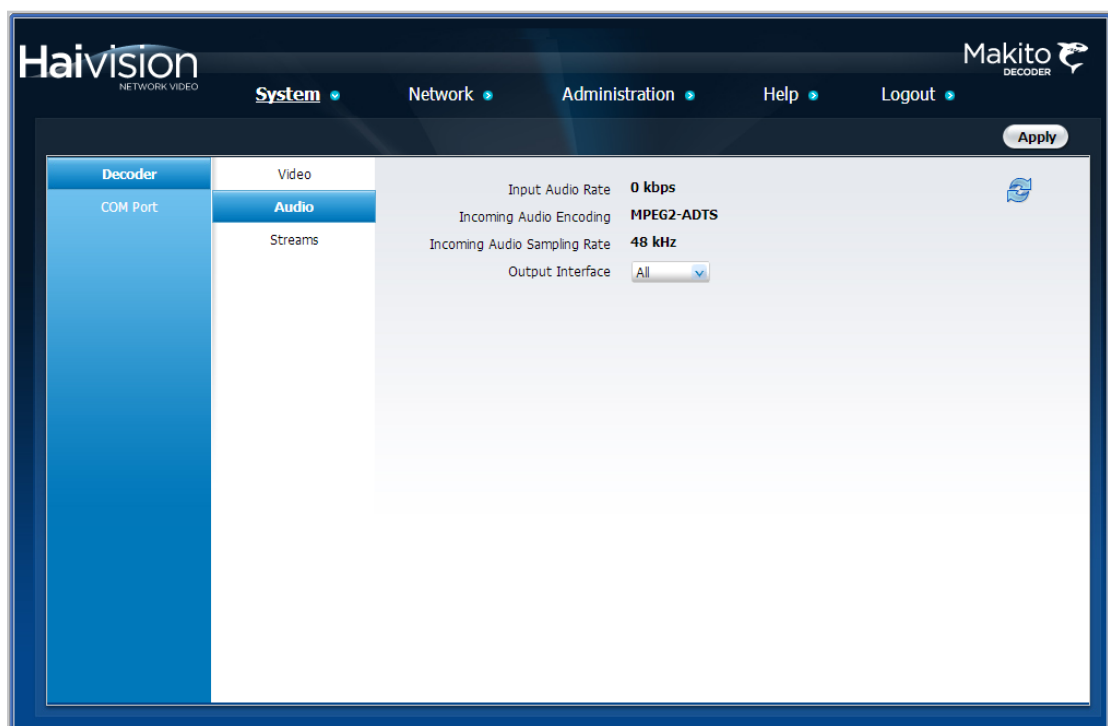
## Managing the Audio Settings

From the [AUDIO](#) page, you can view Audio Encoding properties such as the Input Audio Rate, Incoming Audio Encoding Algorithm, and Audio Sampling Rate.

To display the Decoder Audio Settings:

1. Click [SYSTEM](#) from the main menu, and then click [DECODER>AUDIO](#) from the sidebar menus.

The [AUDIO](#) page opens, displaying the current audio encoding settings, as shown in the following example.



For details, see [“Audio Settings”](#) on page 57.



## Audio Settings

The following table lists the Decoder Audio settings:

Audio Setting	Default	Description/Values
Input Audio Rate	n/a	<p>The Audio Bitrate for the incoming stream in kilobits per second.</p> <p>This is auto-detected by the system and cannot be changed.</p>
Incoming Audio Encoding	n/a	<p>The audio compression algorithm for the incoming stream:</p> <ul style="list-style-type: none"> <li>• <b>MPEG-2-AAC-LC-ADTS</b>: Encoded audio using the ISO/IEC 13818-7 MPEG-2 AAC-LC algorithm with an ADTS header. (Default)</li> <li>• <b>MPEG-4-AAC-LC-ADTS</b>: Encoded audio using the ISO/IEC 14496-3 MPEG-4 AAC-LC algorithm with an ADTS header.</li> <li>• <b>MPEG-2-AAC-LC-LOAS</b>: Encoded audio using the ISO/IEC 14496-3 MPEG-4 AAC-LC algorithm with a LOAS/LATM header.</li> </ul> <p>This is auto-detected by the system and cannot be changed.</p>
Incoming Audio Sampling Rate	n/a	<p>The sampling frequency of the incoming audio signal.</p> <p>This is auto-detected by the system and cannot be changed.</p>
Output Interface	All	<p>(read-only) The type of audio output connector for the Decoder:</p> <p><b>NOTE:</b> <i>Both</i> Analog Audio and Embedded Digital Audio are active.</p>

## Configuring the Stream Settings

The Makito Decoder provides a [STREAM OVERVIEW](#) page and separate [STREAMS](#) pages for configuring up to 25 streams. From the [STREAMS](#) pages, you can manage the settings for each Decoder stream and start and stop the streams.

### Stream Overview Page

The [STREAM OVERVIEW](#) page displays a summary of defined streams for the decoder. The [STREAM OVERVIEW](#) page displays the Stream Name, Protocol, IP Address, Port, State (i.e., “Active”, “Listening” or “Stopped”), and selectable Actions for each stream.

To open the Decoder Stream Overview:

1. Click [SYSTEM](#) from the main menu, and then click [DECODER>STREAMS](#) from the sidebar menus.

The [STREAM OVERVIEW](#) page opens, as shown in the following example, displaying the defined streams for the decoder.

The screenshot shows the Haivision Makito Decoder interface. The top navigation bar includes 'System', 'Network', 'Administration', 'Help', and 'Logout'. The left sidebar has 'Decoder' and 'COM Port' options. The main content area shows a table of streams. A red box highlights the table, and a red arrow points to the 'Stream4' row. A red text box below the table says: 'Click a line to open the Stream configuration page for that stream instance or click + to add a stream'.

	Name	Protocol	IP Address	Port	State	Actions
01	Stream1	TS over UDP	Unicast	7200	Stopped	--Select--
02	Stream2	TS over UDP	Unicast	7000	Active	--Select-- Start Delete
03	Stream3	TS over UDP	Unicast	7100	Stopped	--Select--
04	Stream4	Direct RTP	10.64.100.96	6800 / 6840	Stopped	--Select--
+						

2. To view stream details or add a decoder stream, click a line in the table to open the [STREAM](#) page.
3. To change the Action status for an existing stream, click [--Select--](#) (under [Actions](#)) and select either Stop or Stop, or Delete.



**NOTE** Only one stream can be active at a time.

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.

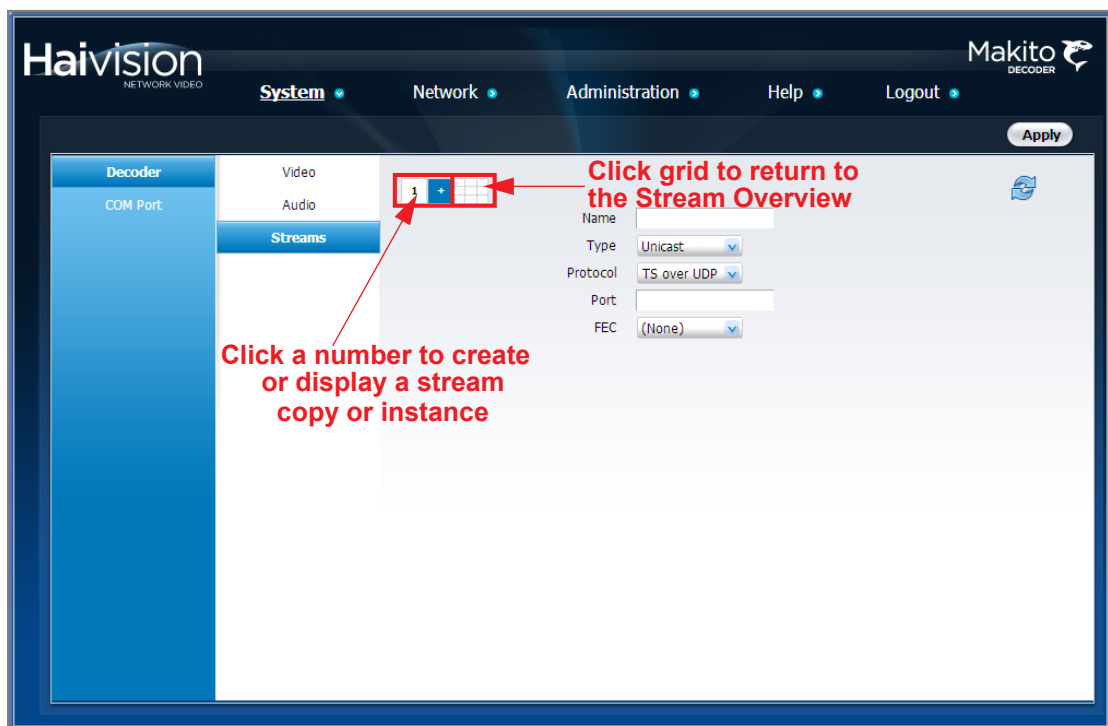
5. To save the current configuration, open the [ADMINISTRATION>CONFIG](#) page. See [“Saving and Loading Configurations”](#) on page 71.

## Streams Page

To configure the Decoder Stream Settings:

1. From the [STREAM OVERVIEW](#) page, click a stream or click any line in the table.


The [STREAMS](#) page opens. Following is an example of the [STREAMS](#) page for Decoder instance #1.



2. Select or enter the new value(s) in the appropriate field(s). See [“Stream Settings”](#) on page 60.
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 refresh the page, click .

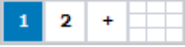

- To save the current configuration, open the [ADMINISTRATION>CONFIG](#) page. See [“Saving and Loading Configurations”](#) on page 71.



**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 Decoder Stream controls and settings:

Stream Setting	Default	Description/Values
		Click a number to display the <a href="#">STREAM</a> page for an existing stream, or to create a new stream.
		Click the grid to display the <a href="#">STREAM OVERVIEW</a> page.
Name	n/a	(Optional) When configuring a stream, you can specify a name for the stream. 1 to 32 characters
Type	Unicast	Select the Stream Type for the decoded stream. <ul style="list-style-type: none"> <li>Unicast</li> <li>Multicast</li> </ul>
Protocol	TS over UDP	Select the Encapsulation Protocol type for the decoded stream. <ul style="list-style-type: none"> <li>Direct-RTP: RFC3984</li> <li>TS over UDP: MPEG transport stream over UDP (no RTP header)</li> <li>TS over RTP: MPEG2 transport stream over RTP</li> </ul>

Stream Setting	Default (Cont.)	Description/Values (Cont.)
Port	n/a	Enter the source UDP port for the stream. Enter a number in the range 1025..65,535. Note that RTP streams use <i>even numbers only</i> within this range. <b>NOTE:</b> <a href="#">Direct-RTP</a> streams require different UDP ports for video and audio. You must specify the second port number.
Audio Port	n/a	( <a href="#">Direct-RTP</a> streams only) Enter the second source UDP port for the stream (required to transport video and audio in separate streams).
IP Address	n/a	( <a href="#">Multicast</a> streams only) Enter the multicast IP address in dotted-decimal format.
FEC	None	(Optional, <a href="#">TS over UDP</a> only) Enable Forward Error Correction (FEC). Select either: <ul style="list-style-type: none"> <li>• <a href="#">[None]</a></li> <li>• <a href="#">VF</a></li> </ul> <b>NOTE:</b> The VF FEC is a proprietary FEC and is not interoperable with devices outside of the Haivision family.

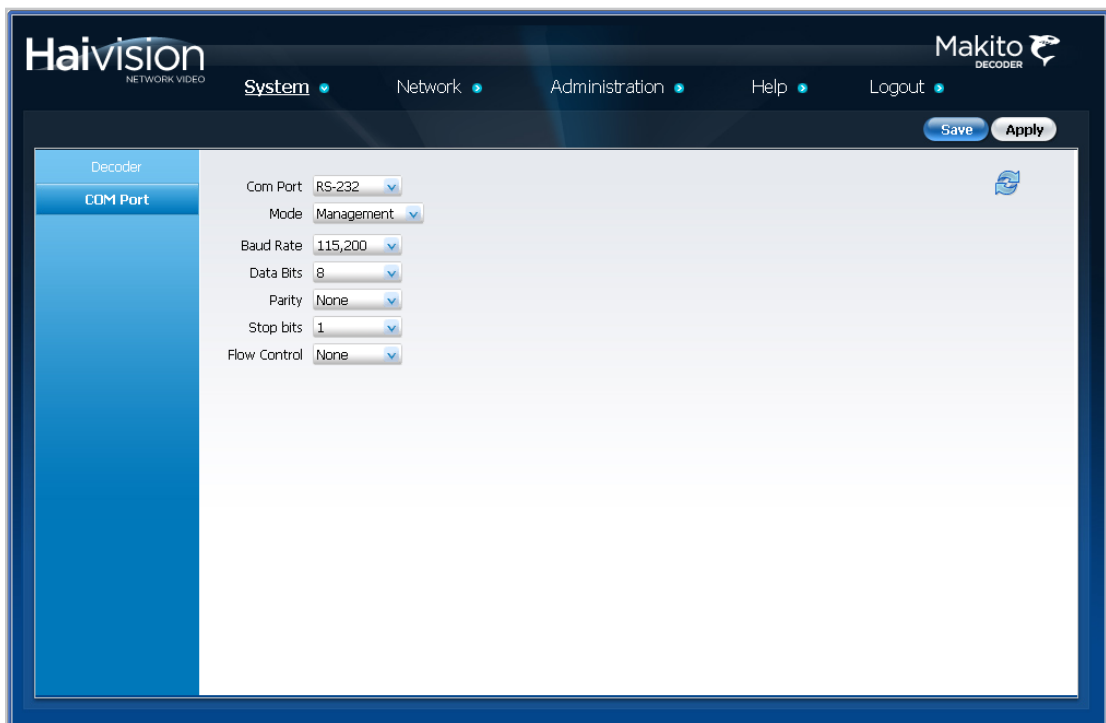
## Managing the COM Port

The Makito Decoder Dual Height Blade provides a serial interface which you can use to connect to a computer for management of the decoder. The **COM PORT** page displays the settings for the COM port.

To display the **COM Port Settings**:

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

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



The COM Port settings are as follows:

COM Port Setting	Default	Description/Values
COM Port	RS-232	Specifies the type of serial interface: RS-232 only
Mode	Management	Specifies the type of activity: Management only
Baud Rate	115200	The COM Port bitrate: 115200
Data Bits	8	The COM Port databits: 8
Parity	None	The COM Port parity: None

COM Port Setting	Default (Cont.)	Description/Values (Cont.)
Stop Bits	1	The COM Port stopbits: 1
Flow Control	None	The COM Port flow control: None

For information on connecting a computer to the COM1 port, see [“Connecting the Decoder to the Network and a Computer”](#) on page 26.

## Configuring Network Settings

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

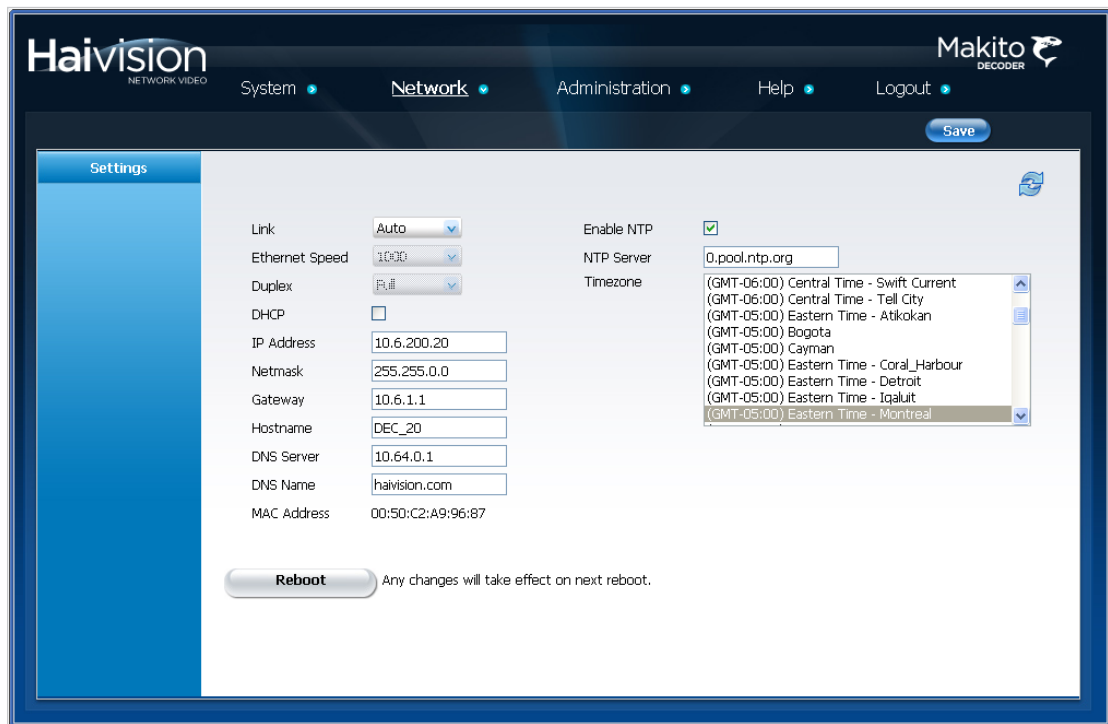


**CAUTION** When you make changes to the Network Settings, be sure to write down the new decoder IP Address or label the chassis. After you save your changes and reboot, you will have to redirect the browser to the new IP address and log in again in order to access the decoder.

To view and configure the Network settings:

1. Click [NETWORK](#) from the main menu.

The [NETWORK](#) 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 65.
3. To save your changes, click [Save](#).

You must reboot the system for the changes to take effect. The Reboot button appears after you click [Save](#).

4. To apply your saved changes, click [Reboot](#).



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

## Network Settings

The following table lists the Decoder Network settings:

Network Setting	Description/Values
Link	<p>Determines whether the Ethernet parameters are set automatically or manually (i.e., enables or disables autonegotiation):</p> <ul style="list-style-type: none"> <li>• <b>Auto</b> - The system will match the Ethernet Speed and Duplex Mode to the Ethernet hub to which it is connecting:</li> <li>• <b>Manual</b> - These values must be set manually. See following settings.</li> </ul> <p><b>NOTE:</b> Always use Auto with Gigabit Ethernet (GigE) speed (1000 Mbps).</p>
Ethernet Speed	<p>If Link is set to <b>Auto</b>, the actual value for the Ethernet Speed (read-only).</p> <p>-or-</p> <p>If Link is set to <b>Manual</b>, select the Ethernet Speed (in Mbps):</p> <ul style="list-style-type: none"> <li>• 1000</li> <li>• 100</li> <li>• 10</li> </ul>
Duplex	<p>If Link is set to <b>Auto</b>, the actual value for the Duplex Mode (read-only).</p> <p>-or-</p> <p>If Link is set to <b>Manual</b>, select the Duplex Mode:</p> <ul style="list-style-type: none"> <li>• Full</li> <li>• Half</li> </ul>
DHCP	<p>Check or clear this checkbox to enable or disable the Dynamic Host Configuration Protocol.</p> <p><b>NOTE:</b> When DHCP is enabled, the decoder will get an IP Address from a DHCP server on the network. When it is disabled, you must manually enter the decoder's IP Address, Netmask &amp; Gateway Address.</p>
IP Address	<p>Displays the IP Address for the Makito Decoder. This is a unique address that identifies the unit in the IP network.</p> <p><b>NOTE:</b> If DHCP is disabled, you may enter an IP address in dotted-decimal format.</p>

Network Setting	Description/Values (Cont.)
<a href="#">Netmask</a>	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. <b>NOTE:</b> If DHCP is disabled, you may enter a Netmask in dotted-decimal format.
<a href="#">Gateway</a>	Displays the gateway address of the network (typically the address of the network router). <b>NOTE:</b> If DHCP is disabled, you may enter a gateway address in dotted-decimal format.
<a href="#">Hostname</a>	You may, optionally, enter a unique name for the Makito.
<a href="#">DNS Server</a>	(Optional) Enter the DNS server address for your network.
<a href="#">DNS Name</a>	(Optional) Enter the domain for the Makito.
<a href="#">MAC Address</a>	(Read-only) The Media Access Control address assigned to the Makito.
<a href="#">Enable NTP</a>	Check this checkbox to connect to an NTP (Network Time Protocol) server to synchronize the decoder clock.
<a href="#">NTP Server</a>	If NTP is enabled, enter the IP address of the NTP server.
<a href="#">Timezone</a>	Select the city corresponding to the desired time zone. <b>NOTE:</b> 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 Decoder, such as the operating system up time, along with information about the hardware and software components. The page displays a “snapshot” of the decoder 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 decoder.

You can also reboot the decoder and take a system snapshot from the [STATUS](#) page.

To view status information:

1. Click [ADMINISTRATION](#) from the main menu and then click [STATUS](#) from the sidebar menu.

The [STATUS](#) page opens, as shown in the following example.



The [STATUS](#) settings are read-only.

Status Setting	Description/Values
Card Status	OK or error message if applicable.
Card Type	Makito

Status Setting (Cont.)	Description/Values (Cont.)
Part Number	The Haivision part number for the decoder, e.g. S-290D
Serial Number	The serial number for the decoder.
System Uptime	The length of time (days + hh:mm:ss) the decoder has been “up” and running.
Firmware Version	The firmware version of the decoder, e.g., v1.3
Firmware Date	The firmware release date.
Hardware Revision	The hardware version of the decoder.
Hardware Compatibility	The chipset version of the decoder.
Boot Revision	The Boot revision of the decoder.

## Rebooting the Decoder

To reboot the Decoder:

1. Click [ADMINISTRATION](#)>[STATUS](#) to open the [STATUS](#) page.
2. Click [Reboot](#).

The decoder 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 decoder from the [NETWORK](#) page.

---

## 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 decoders and status checks, configured audio decoders 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 Jul 24 20:27:13 UTC 2013

-----
Universal Time:
-----
Wed Jul 24 20:27:13 UTC 2013

-----
System UP Time:
-----
20:27:13 up 26 min,  0 users,  load average: 0.33, 0.08, 0.09

-----
Hardware Information:
-----
Card Type   : "Makito Decoder"
Hw Rev      : A-
Hw Comp     : A1
CPLD Rev    : F-

-----
Manufacturing Information:
-----
MAC Address   : 5c:77:57:00:27:37
Serial Number : HAI-031235020005
Boot Revision  : 1.1 Dec

-----
Card Temperature:
-----
Temperature Status:
  Current Temperature: 46 Celsius measured 1s ago
  Maximum Temperature: 47 Celsius measured 24m36s ago
  Minimum Temperature: 46 Celsius measured 24m32s ago

-----
Component Versions:
-----
Card Type       : "Makito Decoder"
Part Number     : B-290D-HD
...

```

## Saving and Loading Configurations

### Configuration Management

Each Makito Decoder is configured by users' selecting and setting values of applicable system settings, such as Decoder settings and the stream source. 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 decoder's flash memory. Saved configuration settings will continue to be used after a reboot, or when the unit is turned off and on.

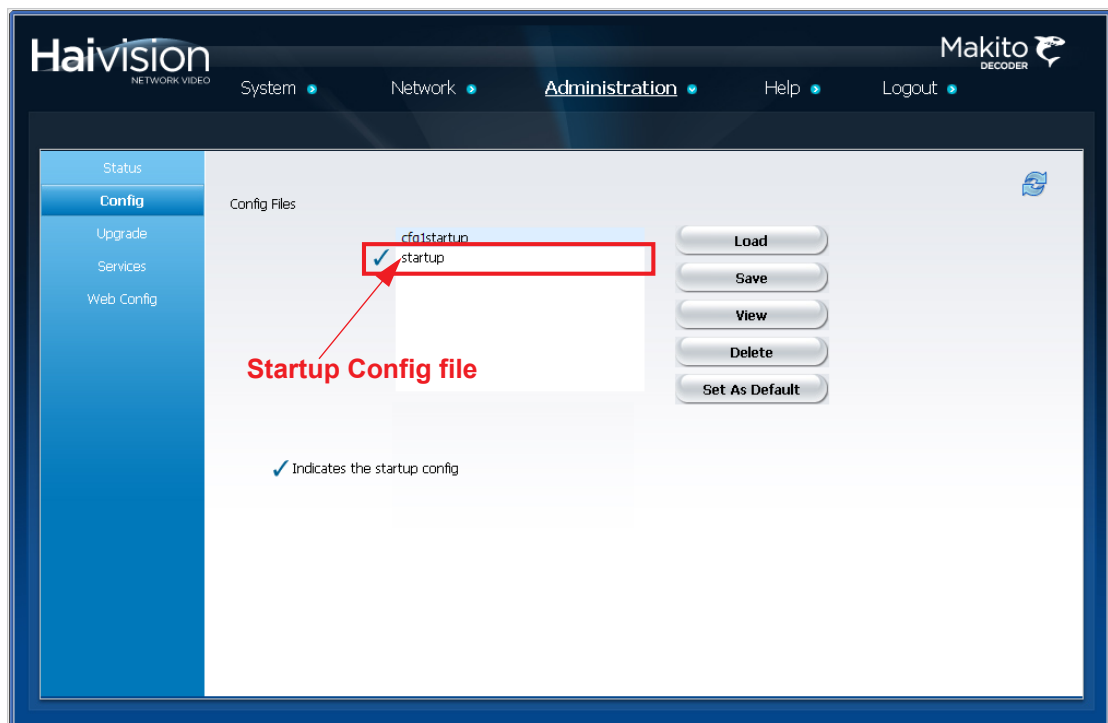
You can then direct the system to read this configuration file to restore these settings when the system start-up process performs the configuration autoload.

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 sidebar menu.

The [CONFIG](#) page opens displaying the list of saved configurations for the decoder, 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 configuration file to load at startup (i.e., to set the default configuration), 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.

The new startup configuration file will be highlighted in blue with a checkmark.

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:



```
[Video Decoder 0]
FrameRate=0
SyncMode=STC
Buffering=Adaptive
DisplayCaption=Hide
DisplayTimecode=Hide
AspectRatioMode=Auto
StillImageType=Freeze
StillImageDelay=3

[Audio Decoder 0]
AudioLevel=6
AutoStart=Yes

[STREAM_1]
ID=1
Name=zixi42
Contents=3
VideoSource=0
AudioSource=0
TOS=184
MTU=1496
TTL=64
Port=2077
Address=IPV4:10.6.210.110
Encapsulation=TS-ZIXI
RTCPEnabled=No
AutoStart=Yes
Encrypted=Yes
Key=
5A553F0EF872784C7C14181DE5767E5179140011F5647E6B735D2011E2
687E4D
FEC=No
Mode=Broadcast
```

## Installing Firmware Upgrades

When you first receive the Makito Decoder, 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.

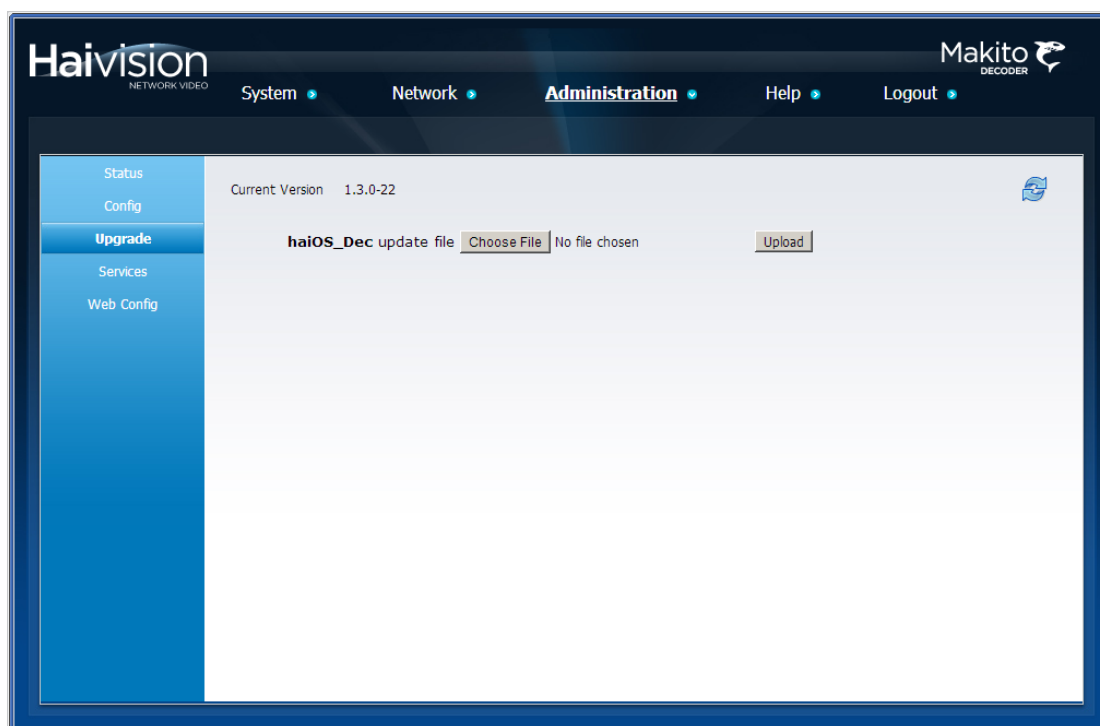
A firmware upgrade comes in the form of a file with the extension .hai, which when loaded will replace the application on your Makito.

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 sidebar menu.

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



2. Click **Choose File** and then select the .hai file to upload.
3. Click **Upload**.

The Uploading File page opens.



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

---

When the file is uploaded, you will see a confirmation page listing the package contents and release date and files.

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).

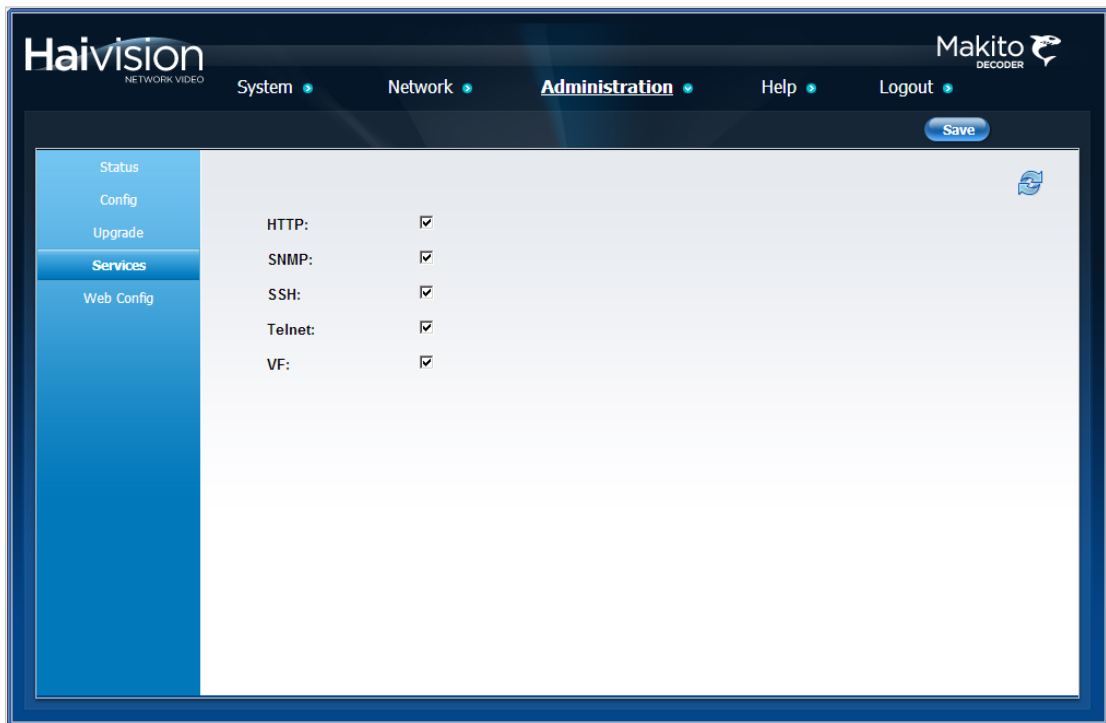
## Enabling and Disabling Network Services

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

To enable or disable network services:

1. Click **ADMINISTRATION** from the main menu, and then click **SERVICES** from the sidebar 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.

The Services are as follows:

Service	Description
HTTP	Hypertext Transfer Protocol, used for Web browsers acting as a client.
SNMP	Simple Network Management Protocol, a network protocol used mostly in network management systems to monitor network-attached devices.

Service (Cont.)	Description (Cont.)
SSH	Secure Shell, a network protocol that allows data to be exchanged using a secure channel between two networked devices.
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 decoder. Note that VF Pilot provides access to decoder configuration settings.

3. To save your changes, click [Save](#).

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

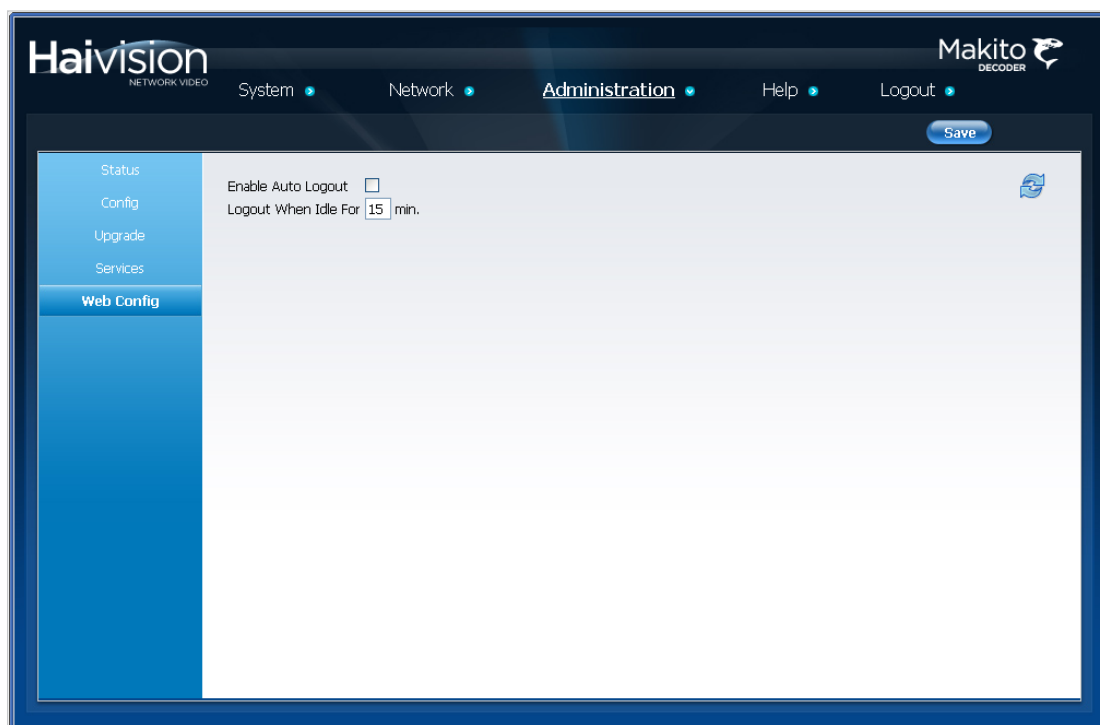
## Configuring Auto Logout

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

To enable or disable Auto Logout:

1. Click [ADMINISTRATION](#) from the main menu, and then click [WEB CONFIG](#) from the sidebar menu.

The [WEB CONFIG](#) page opens as shown in the following example.



2. To enable Auto Logout, check the checkbox.
3. Type in the maximum length of time the system may be idle before the user will be logged out. The default is 15 minutes.
4. To save your changes, click [Save](#).

## Logging Out

After you finish using the Makito Decoder, be sure to log out. To do so, select [LOGOUT](#) from the Main Menu.

Logging out prevents misuse and unauthorized access to the decoder.

# CHAPTER 4: Configuring A/V Services Using SNMP

This chapter provides information required to manage the Makito Decoder 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 Decoder.



---

**TIP** To develop new SNMP applications, see the list of [“Supported MIBs”](#) on page 82.

---

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## Overview

To support management of the Makito Decoder 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 Decoder uses Net-SNMP Version 5.5 and supports SNMP v1, v2c, and v3.

---

The Makito Decoder 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 89.

## Supported MIBs

The Makito Decoder 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
<ul style="list-style-type: none"> <li>• RFC1213-MIB.txt</li> <li>• SNMPv2-MIB.txt</li> <li>• IP-MIB.txt</li> <li>• IF-MIB.txt</li> <li>• TCP-MIB.txt</li> <li>• UDP-MIB.txt</li> </ul>	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.
<ul style="list-style-type: none"> <li>• SNMP-USER-BASED-SM-MIB.txt</li> <li>• SNMP-USM-AES-MIB.txt</li> <li>• SNMP-VIEW-BASED-ACM-MIB.txt</li> </ul>	SNMPv3	Supports SNMPv3 User-based Security Model (USM) and View-based Access Control (VACM).
<ul style="list-style-type: none"> <li>• HAI-VISION-MIB.txt</li> <li>• HAI-AVT-STREAM-MIB.txt</li> <li>• HAI-HDC-MIB.txt</li> </ul>	Haivision Enterprise	Supports configuration, status, and statistics.
<ul style="list-style-type: none"> <li>• HAI-MAKITO-DEC-CAPS.txt</li> </ul>	Haivision Enterprise	This MIB formally specifies the capabilities of the MAKITO (decoder) 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 Decoder.

### 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 Decoder 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 Decoder, 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 Decoder 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 Decoder 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 Decoder 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 Decoder:

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. The coldStart trap is generated when the Makito Decoder is powered on. 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. 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. These traps are generated when the Ethernet interface goes down or up. 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-snmplib/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  users        auth       guest           -
usm  admins       priv       johndoe         -
v2c  admins       noauth     admin           localhost
v2c  admins       noauth     admin           localnet
v2c  users        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 105 (in [Appendix A: “CLI Command Reference”](#))

## 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 Decoder 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 Decoder CLI and Web interface privilege levels.

```
# nmcfg access usm permit johndoe operators 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 <i>all</i> 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. <b>NOTE:</b> 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 IP address 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 Program Index	Transport Stream programs. Only SPTS (single program Transport Stream) supported. Not present for non Transport Streams (directRTP).
haiAvtStreamContentTable	Stream ID Program Index 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 `snmpset` CLI commands on the Makito Decoder, creates a streaming session with IP Multicast Address `233.252.0.106` on 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 ( $\geq 1$ ) on `createAndGo` or when set to active after `createAndWait`:

```
snmpset -v2c -c admin localhost haiAvtStreamAddr.0 d 233.252.0.106
      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 233.252.0.106
      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.ipv4.4.233.252.0.106.2000
HAI-AVT-STREAM-MIB::haiAvtStreamInverseID.ipv4."233.252.0.106".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 is set to receive video, audio and metadata. Note that `createAndWait` is used so the 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 233.252.0.106
      Port u 2000 Encapsulation i tsUdp RowStatus i createAndWait
snmpset -v2c -c admin -IS haiAvtStream localhost
      PgmNbContents.5.1 i 3 ContentType.5.1.1 i video ContentType.5.1.2 i
      audio ContentType.5.1.3 i data
snmpset -v2c -c admin -IS haiAvtStreamRowStatus.5 i active
```

---

## PART III: Reference

---

# APPENDIX A: CLI Command Reference

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

## Commands In This Appendix

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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 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.

---

## CLI Access Control

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

Command	Admins	Operators	Users
Web access	Yes	Yes	Yes
Telnet to Decoder	Yes	Yes	Yes
Serial access to Decoder	Yes	Yes	Yes
<a href="#">viddec</a>	Yes	Yes	“get” only
<a href="#">auddec</a>	Yes	Yes	“get” only
<a href="#">stream</a>	Yes	Yes	“get” only
<a href="#">haiversion</a>	Yes	Yes	Yes
<a href="#">package</a> (for upgrade)	Yes	No	No
<a href="#">config</a>	Yes	Yes	“list” only
<a href="#">ethercfg</a>	Yes	No	No
<a href="#">ipconfig</a>	Yes	“display” only	“display” only
<a href="#">nmcfg</a>	Yes	No	No
<a href="#">service</a>	Yes	Yes	“status” only
<a href="#">temperature</a>	Yes	Yes	“get” only
<a href="#">reboot</a>	Yes	Yes	No
<a href="#">passwd</a>	Yes	“operator” password only	“user” password only
Telnet from Decoder	Yes	Yes	Yes
ping	Yes	Yes	Yes
traceroute	Yes	Yes	Yes

For an overview of system access control on the Makito Decoder, see [“Access Control”](#) on page 47.

## auddec

### SYNOPSIS

```
auddec ID start
auddec ID stop
auddec ID set parameter=value
auddec ID get [config, stats, all]
auddec ID clear
```

### DESCRIPTION

The `auddec` command is used to manage decoder audio settings. The `auddec start` and `auddec stop` commands can be used to start and stop decoding of the audio input.

ID is either the Decoder ID (0) or all.

### ACTIONS

start	Activates decoding of the audio input.
stop	Stops (mutes) decoding of the audio input.
set	Modifies decoder audio parameter(s). A series of one or more <code>parameter=value</code> pairs can be specified at once. See <a href="#">auddec Parameters</a> below.
get	Displays decoder audio status information. You can specify configuration, stats, or all audio information.
clear	Clears the decoder's audio statistics.
help	Displays usage information for the <code>auddec</code> command.

### AUDDEC PARAMETERS

Parameter	Default	Description/Values
level	6	The maximum analog Audio Output level from +5dBu up to +20dBu. <b>NOTE:</b> Only applies to Analog Audio Input.



## AUDDEC EXAMPLES

<pre># auddec 0 get all -or- # auddec 0 get config</pre>	<p>Returns audio configuration information for the decoder, such as:</p> <pre>Decoder ID   : 0 Name         : "Stereo Audio               Decoder 0" Configuration: Audio Mode   : Stereo Audio Samplerate : 48 KHz Audio Algorithm : Auto-Detect Audio Output Level : 6 dBu</pre>
<pre># auddec 0 get stats</pre>	<p>Returns audio status information for the decoder, such as:</p> <pre>Decoder ID   : 0 Name         : "Stereo Audio Decoder 0" Statistics: State        : WORKING Audio Bitrate : 128 Kbps Decoded Frames : 24,921,006 Decoded Bytes : 4,211,402,592 Decoder Errors : 0 Audio Algorithm : MPEG2-ADTS Audio Channels : 2 Audio Samplerate : 48 Kbps Bits Per Sample : 16</pre>

## SEE ALSO

- [Managing the Audio Settings](#) on page 56

## 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 Decoder. This includes saving the current configuration, loading a saved configuration, and specifying the configuration file to load at startup.

All configuration files are stored in `/usr/share/haivision/config`.

### ACTIONS

save	<p>Saves the current configuration. Saves every parameter in the system, including decoder settings and stream source and status (excluding the system IP address).</p> <p>To store the current settings as the default startup configuration, use <code>config save</code> without the optional file name.</p> <p>If you do provide a file name and use the <code>startup=yes</code> option, this will save the settings as the default startup config and make a backup copy of that configuration in the specified file.</p>
load	<p>Loads a previously saved configuration identified by <code>&lt;cfgname&gt;</code>. Reassigns every parameter in the system, including Decoder settings and stream source and status (excluding the system IP address).</p>
delete	<p>Deletes a previously saved configuration identified by <code>&lt;cfgname&gt;</code>.</p> <p>If no filename is specified, the system deletes the default startup configuration.</p>
list	<p>Displays a list of the available configuration files.</p>
help	<p>Displays usage information for the <code>config</code> command.</p>

## CONFIG EXAMPLES

# config save Class200 startup= yes	Saves the current configuration under the name "Class200" and sets it to be the startup configuration
# config load Class200	Loads a previously saved configuration identified by the name "Class200" (located in the active (local) directory).

## SEE ALSO

- [Saving and Loading Configurations](#) on page 71

## ethercfg

### SYNOPSIS

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

### DESCRIPTION

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

When the Makito Decoder 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: 1000mbps
  Duplex: Full
  Auto-negotiation: on
  Link detected: yes
  Ceiling: none
```

### 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 ALSO

- [Configuring Network Settings](#) on page 64

## haiversion

### SYNOPSIS

haiversion

### DESCRIPTION

The `haiversion` command is used to display the Firmware Build ID and Build Time on the Makito Decoder. It also displays the serial number for the unit.

### HAIVERSION EXAMPLE

# haiversion	Displays the Build ID, Build Time, and Serial Number for the unit, such as. Build ID : "ace_1.1.0-18" Build Time : "Jan 12 2011 at 10:42:50" Serial Number : HAI-100043430003
--------------	--

### SEE ALSO

- [Viewing System Status Information](#) on page 67

## 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 Decoder, including the IP settings, hostname, and DNS. It may also be used to configure the Network Time Protocol (NTP) server settings.

As shown in the following example, when you enter the `ipconfig configure` command, the system prompts you to either use DHCP or specify the IP settings. Next you are prompted to optionally enter a new hostname, and then the DNS server address for your network. Finally, you are prompted to specify the NTP settings.

The `ipconfig display` command returns the current IP settings.

### EXAMPLES

#ipconfig configure	<p>Prompts you as follows to modify current settings:</p> <p>Use DHCP to obtain IP address automatically: (Y,N): n</p> <p>Current IP Settings: ip address : 10.64.1.205 network mask : 255.255.0.0 gateway : 10.64.0.1 hostname : Makito-Dec</p> <p>Change current settings: (Y,N) : y Enter ip address : 10.64.1.205 Enter netmask : 255.255.0.0 Enter default gateway : 10.64.0.1</p> <p>Configure hostname (Y,N) : y Enter new hostname : Makito</p> <p>Configure DNS (Y,N) : n</p> <p>Current NTP settings: server : 10.5.0.1 timezone : "America/Chicago"</p>
---------------------	--

#ipconfig configure (continued)	<p>Configure NTP: (Y,N): y Enter NTP server address: 10.1.4.130</p> <p>Network settings updated successfully. NTP settings updated successfully.</p> <p>To make changes to the selected timezone, use tzselect and then REBOOT for changes to take effect. If no changes to the timezone are needed, REBOOT for changes to take effect.</p>
# ipconfig display	<p>Returns current IP settings for decoder configured to use DHCP:</p> <p>Current IP Settings: ip address : Obtained via DHCP hostname : Makito</p> <p>Current NTP Settings: server : 10.1.4.130 timezone : "America/Montreal"</p>
# ipconfig display	<p>Returns current IP settings for decoder that does not use DHCP:</p> <p>Current IP Settings: ip address : 10.6.220.40 network mask : 255.255.0.0 gateway : 10.6.1.1 hostname : Makito-Dec</p> <p>Current DNS Settings: domain : www.haivision.com server : 10.64.0.1</p> <p>Current NTP Settings: server : 10.1.4.130 timezone : "America/Montreal"</p>



**NOTE** When configuring NTP, to change the selected time zone, use the utility tzselect provided with the Makito Decoder. tzselect prompts you for information about the current location, and saves the configured time zone information when the system is set up for NTP.

#### SEE ALSO

- [Configuring Network Settings](#) on page 64



## 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 Decoder. 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 Decoder user groups (admins, operators, and users).

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 84 (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 Decoder.
system	Defines contact and location system parameters.
user	Defines user-based (v3) security configuration for the Makito Decoder.

## 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 <code>delete</code> 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. <b>NOTE:</b> 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 Decoder settings which are lost when the unit is rebooted unless saved as a configuration.

---

## EXAMPLE #1: INITIALIZE 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: CREATE 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 johnsmith operators
```

## EXAMPLE #3: INITIALIZE 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 admins priv
# nmcfg access usm permit johnsmith operators priv
# nmcfg access usm permit guest users
# 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                  users      auth  guest           -
usm                  admins    priv  joenet         -
usm                  operators priv  johnsmith      -
```

auth protocol	priv protocol	user
MD5	nopriv	guest
SHA	AES	joenet
SHA	AES	johnsmith
#		

#### SEE ALSO

- [“nmcfg”](#) on page 84 (in [“SNMP Agent Components”](#))

## package

### SYNOPSIS

```
package list
package info [<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.

When `package` is entered without any actions or parameters, the system displays usage information for the command.

### ACTIONS

list	Displays a list of downloaded packages.
info	Displays information about the currently installed package. If a filename is specified, displays information about the package.
install	Installs the specified package.
download	Downloads the specified package file using TFTP.
delete	Deletes a previously downloaded package file. 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 [<name>]
```

### DESCRIPTION

The `passwd` command is used to change the password for a user account. If no name is specified, it changes the password for the current user. In the current release, it is used to change the password for one of the predefined user groups: `user`, `operator`, and `admin`.

### EXAMPLES

# passwd	Changes the password for the current user account. The system prompts you to enter the old password and then the new password.
# passwd operator	Changes the password for the <code>operator</code> account. The system prompts you to enter the old password and then the new password. Note that you must be logged in as <code>admin</code> to change the password for an account other than your current account.

### SEE ALSO

- [Access Control](#) on page 47

## reboot

### SYNOPSIS

reboot

### DESCRIPTION

The `reboot` command is used to halt and restart the Makito Decoder. Any unsaved configurations will be lost. The decoder will restart with the saved startup configuration.

### EXAMPLE

# reboot	Reboots the Makito Decoder. <b>NOTE:</b> 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 Decoder](#) on page 68



## service

### SYNOPSIS

service name action [name action] [...]

where:

name        can be: all, http, snmp, ssh, telnet, vf

### DESCRIPTION

For security purposes, you may need to stop one or more network services from accessing the Makito Decoder. The `service` command is used to enable and disable the following network services: HTTP, SNMP, SSH, Telnet, and VF.

### 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 Decoder.
# service all stop	Stops all network connections to the Makito Decoder.

### SEE ALSO

- [Enabling and Disabling Network Services](#) on page 76

## stream

### SYNOPSIS

```
stream create port=udpport [addr=ipaddr] [id=number] [name=text]
    [encapsulation=ts-udp] [start=yes]
    [videosrc=id/name] [audiosrc=id/name] [datasrc=id/name]
    [videopid=pid] [audiopid=pid] [datapid=pid]
    [fec=yes,no]
stream id/name start
stream id/name stop
stream id/name delete
stream id/name/all get
stream id/name clear
```

### DESCRIPTION

The stream command is used to manage audio/video streams.

When creating a stream you can specify a unique id to assign to it or let the system assign one for you. You can also specify a name for the stream if needed.

Most commands will accept the stream id or name in order select the proper stream to manage.

### ACTIONS

create	Creates a streaming session from the decoder. A series of one or more parameter=value pairs can be specified at once.
start	Starts the specified stream ID or name. <b>NOTE:</b> 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.
delete	Deletes the specified stream ID or name.
get	Displays stream information. See <a href="#">stream Parameters</a> below. You can specify to display the stream configuration, statistics, or all.
clear	Clears all active sessions on the decoder.
help	Displays usage information for the stream command.

## STREAM PARAMETERS

Parameter	Default	Description/Values
port	n/a	The UDP port for the Decoder. Enter a number in the range 1025..65,535. Note that RTP streams use <i>even numbers only</i> within this range.
addr	n/a	(Optional) Enter a Multicast IP address in dotted-decimal format. For multicast addresses, see <a href="#">IMPORTANT</a> on page 116.
Optional stream Parameters		
id	n/a	A unique number assigned to the stream. <b>NOTE:</b> 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. Most commands will accept the stream id or name (see below) in order to 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
encapsulation	ts-rtp	(Optional) The Encapsulation Type for the encoded stream.
		<ul style="list-style-type: none"> <li>ts-rtp - MPEG2 transport stream over RTP</li> </ul>
		<ul style="list-style-type: none"> <li>ts-udp - MPEG2 transport stream over UDP (no RTP header)</li> </ul>
		<ul style="list-style-type: none"> <li>direct-rtp - RFC3984</li> </ul>
start	yes	(Optional) By default, the stream will start immediately. To delay the start of a stream, specify <code>start=no</code> . You can enter a <code>stream start</code> command later.
videosrc	0	(Optional) The video source. id/name The <code>videosrc</code> id must be 0.
audiosrc	0	(Optional) The audio source. id/name The <code>audiosrc</code> id must be 0.
datasrc	n/a	(Reserved for future use) The data source.

Parameter	Default (Cont.)	Description/Values (Cont.)
videopid	33	(Optional) Video Packet Identifier. 16..8190
audiopid	36	(Optional) Audio Packet Identifier. 16..8190
datapid	n/a	(Reserved for future use) Data Packet Identifier.
fec		(Optional, ts-udp only) To enable Forward Error Correction (FEC), specify fec=yes. <b>NOTE:</b> The VF FEC is a proprietary FEC and is not interoperable with devices outside of the Haivision family.



---

**IMPORTANT** 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

<pre># stream create addr= 10.6.230.106 port=2000 start=yes</pre>	<p>Creates a streaming session from IP Address 10.6.230.106 at port 2000. Immediately starts decoding the specified stream.</p>
<pre># stream 1 get all</pre>	<p>Returns configuration information for decoder stream #1, such as:</p> <pre>Stream ID : 1 Name : "web1" Configuration:   Address      : 10.6.230.106   UDP Port     : 1234   Encapsulation : TS-RTP   Contents     : Video ("HD Video Decoder 0":0), Audio ("Audio Decoder 0":0)   AES Encryption : On   Key Length   : 128 bits Statistics:   State        : STREAMING   Up Time      : 8m49s   Source Address : 10.6.230.106   Video PID    : 33   Audio PID    : 36   PCR PID     : 34   PMT PID     : 32   Transport Stream ID : 0   Program Number : 1   Received Packets : 642,805   Received Bytes  : 798,469,088   Bitrate      : 9,739 kbps</pre>
<pre># stream 2 get stats</pre>	<p>Returns status information for decoder stream #2, such as:</p> <pre>Stream ID      : 2 Name          : "web_lgm02" Statistics:   State        : STREAMING   Up Time      : 1h45m40s   Source Address : 10.6.220.36   Video PID    : 33   Audio PID    : 36   PCR PID     : 34   PMT PID     : 32   Transport Stream ID : 0   Program Number : 1   Received Packets : 7,460,566   Received Bytes  : 739,969,420   Bitrate      : 12,638 kbps   RTCP        : Off</pre>

# stream 1 del	Deletes Stream #1.
----------------	--------------------

#### SEE ALSO

- [Configuring the Stream Settings](#) on page 58

## 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: Temperature Status: Current Temperature   : 35 Celsius measured 2s ago Maximum Temperature  : 36 Celsius measured 5d2h9m2s ago Minimum Temperature  : 32 Celsius measured 5d5h34m2s ago
-------------------	---

## viddec

### SYNOPSIS

```
viddec ID start
viddec ID stop
viddec ID set parameter=value [parameter=value ...]
viddec ID get [config, stats, all]
viddec ID clear
viddec ID reset
```

### DESCRIPTION

The `viddec` command is used to manage video decoding parameters. The `viddec start` and `viddec stop` commands can be used to start and stop decoding of the video input.

### ACTIONS

start	Activates decoding of the video input.
stop	Stops (mutes) decoding of the video input.
set	Modifies decoder video parameter(s). A series of one or more <code>parameter=value</code> pairs can be specified at once. See <a href="#">viddec Parameters</a> below.
get	Displays decoder video status information. You can specify to display the configuration ( <code>config</code> ), <code>stats</code> , or <code>all</code> .
clear	Clears the decoder's statistics.
reset	Resets the decoder.
help	Displays usage information for the <code>viddec</code> command.



VIDDEC PARAMETERS

Parameter	Default	Description/Values
syncmode	STC	<p>The mode of synchronization of sound and picture for the decoded stream:</p> <ul style="list-style-type: none"> <li>• <b>STC:</b> Synchronizes with the Encoder system clock by comparing the packet timestamp with the reference clock.</li> <li>• <b>Fixed:</b> Decodes packets without comparing the packet timestamp to synchronize video and audio. This may result in A/V sync issues, but may be required in circumstances where network performance hinders synchronization.</li> </ul>
buffering	Adaptive	<p>(<a href="#">syncmode</a> must be <b>STC</b>) The type of buffering to use. A jitter buffer temporarily stores arriving packets in order to remove the effects of jitter from the decoded stream.</p> <ul style="list-style-type: none"> <li>• <b>Adaptive:</b> Allows the system to evaluate the latency required to absorb the jitter. Adjusts its size dynamically in order to optimize the delay/discard tradeoff. In Adaptive mode, <a href="#">buffering</a> is not applied.</li> <li>• <b>Fixed:</b> Uses the <a href="#">buffering</a> to control the latency required to absorb jitter. Maintains a constant size.</li> </ul> <p><b>NOTE:</b> The Fixed Decoder Buffer (FDB) provides an extra buffer (or <a href="#">delay</a>) for network jitter compensation for the receiving session. The FDB is added to the minimum buffer size required for smooth video playback (with no skipped/repeat video frames). (The minimum buffer is not user configurable.)</p> <p>The FDB also directly affects the end-to-end latency; for example, 15ms of FDB will increase the end-to-end latency by an extra 15ms.</p>
delay	0 ms	<p>The delay in ms when using <b>STC</b> <a href="#">syncmode</a> with Fixed <a href="#">buffering</a>. 0..1000 ms delay</p>

Parameter	Default (Cont.)	Description/Values (Cont.)
framerate	Auto	<p>Selects the frame rate generated for the displays. Auto, 23, 24, 25, 29, 30, 50, 59, 60, 75, 85</p> <p><b>NOTE:</b> If Auto is selected, the actual frame rate generated will be the next highest valid frame rate supported by the SDI and HDMI interface, plus the one that gives the best decimation factor. For example, 30Hz could be chosen instead of 29.970 Hz.</p> <p>Values set which are impossible to implement will be treated as Auto. Reasons for not supporting the selection can range from "Display does not support the frame rate" or "Frame rate is undefined for the detected input resolution".</p>
stillimage		<p>Selects the type of static image to display when the decoder is not receiving a video stream (subject to the <a href="#">stilldelay</a> specified below).</p>
		<ul style="list-style-type: none"> <li>freeze: continues to display the last decoded video frame.</li> </ul>
		<ul style="list-style-type: none"> <li>black: displays a black screen.</li> </ul>
		<ul style="list-style-type: none"> <li>blue: displays a blue screen.</li> </ul>
		<ul style="list-style-type: none"> <li>colorbars: displays a series of vertical color bars across the width of the display.</li> </ul>
		<ul style="list-style-type: none"> <li>mute: disables the video output.</li> </ul> <p><b>NOTE:</b> When the still image is substituted on the display outputs, the video frame rate and resolution will be maintained.</p> <p>When the video decoder receives a new video stream, it will wait until it receives a new IDR frame and will re-start the display with that IDR frame.</p>
stilldelay	3 seconds	<p>The delay in seconds before the still image (<a href="#">stillimage</a>) will be displayed. 2...60</p>

VIDDEC EXAMPLES

# viddec 0 set syncmode=STC	Sets the video sync mode to STC. You will receive the following confirmation: Decoder configured successfully.
# viddec 0 set delay=600	Sets the video buffering delay to 600 ms.
# viddec 0 get	Returns video configuration information for the decoder: Decoder ID : 0 Name : "Video Decoder 0" Configuration: Sync Mode : STC Buffering : Adaptive Frame Rate : 30
# viddec 0 get stats	Returns decoder statistics: Decoder ID : 0 Name : "Video Decoder 0" Statistics: State : WORKING Up Time : 21h45m3s Input Format : 1920x1080i30 Output Format : 1920x1080i30 Video Bitrate : 1,471 kbps Decoded Frames : 745,808 Decoded NALs : 745,808 Decoder Errors : 2

SEE ALSO

- [Configuring the Video Settings](#) on page 52

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# APPENDIX B: Technical Specifications

This appendix lists the technical specifications for the Makito Decoder.

## Topics In This Appendix

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## Video Decoding

VIDEO DECODING	
Video Coded Picture Resolutions* *supported on incoming stream	1920x1080p 1..60 Hz 1920x1080i 1..30 Hz 1280x720p 1..60 Hz 720x480i 1..30 Hz 720x576i 1..25 Hz 720x480p 1..60 Hz 720x576p 1..50 Hz (interlaced shown in frames per second)
Computer Coded Picture Resolutions* *supported on incoming stream	1280x1024 1..75 Hz 1280x800 1..60 Hz 1280x768 1..85 Hz 1024x768 1..85 Hz 1152x864 1..75 Hz 800x600 1..75 Hz 640x480 1..75 Hz
Video Output Resolutions* *supported by SDI and HDMI	1920x1080p 60/59.94/50/30/29.97/25/24/23.98 Hz 1920x1080i 30/29.97/25 Hz 1280x720p 60/59.94/50/30/29.97/25 Hz 720x480i 29.97 Hz 720x576i 25 Hz (interlaced shown in frames per second)
Computer Output Resolutions (VESA DMT)* *supported only by HDMI	1280x1024 75/60 Hz 1280x800 60 Hz 1280x768 85/75/60 Hz 1024x768 85/75/60 Hz 1152x864 75/60 Hz 800x600 75/60 Hz 720x480p 59.94 Hz 720x576p 50 Hz 640x480 75/60 Hz
Video Bitrates (bps)	150k to 15M
Compression Standard	MPEG-4 Part 10 (H.264 AVC) NOTE: The Makito Decoder does not support B frames in the video elementary stream. See <a href="#">“Makito X2 Interoperability”</a> on page 55.

## Audio Decoding

AUDIO DECODING	
Audio Channels	2 per video channel
Audio Bitrates	32 to 448 kbps per audio pair
Frequency Response	20 Hz to 22 kHz
Sampling Rate	48kHz, 32kHz
Compression Standards	MPEG-2 AAC-LC ISO/IEC 13818-7 MPEG-4 AAC-LC ISO/IEC 14496-3

## Audio/Video Interfaces

AUDIO/VIDEO INTERFACES			
Video (Output)	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
	HDMI	HDMI 1.3	HDMI single link with embedded digital audio, with support for CEA-861E
Audio (Output)	2 audio channels (analog or digital)		
	Available through Terminal Block connector:		
	<ul style="list-style-type: none"> <li>• Balanced Stereo Analog Audio</li> <li>• Unbalanced Stereo Analog Audio</li> </ul>		
Digital Embedded Audio			
<ul style="list-style-type: none"> <li>• SD-SDI: SMPTE-272M</li> <li>• HD-SDI: SMPTE-299M</li> <li>• HDMI</li> </ul>			

## 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	Unicast Streaming
	Multicast Streaming
	Transport Stream over UDP / RTP / VFTP
	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)
	QuickTime Stream (RFC 3984 video encapsulation and RFC 3640 AAC-LC audio payload)
Connector	RJ45

MANAGEMENT INTERFACES	
Management Protocols	HTTP (Web browser) Command line over Telnet, SSH or RS-232 serial line FTP/TFTP Client/Server SNMP Furnace (VF Command & Control)



## Chassis Options

### Single Blade Appliance

Makito Decoder - Single Blade Appliance (S-290D)	
Dimensions (H x W x D)	24mm H x 149mm W x 202mm D [0.92" x 5.85" x 8.0"]
Weight	Approximately 1.13 kg [2.5 lbs.]
Power Requirements	12VDC, 20W (each blade)
	100-240VAC 30W external power supply
	<b>NOTE:</b> IEC 60601-1 Class I and II power supplies are available from Haivision.
Temperature	Operating: -20° to 40°C (-4° to 104°F) Non-operating: -40° to 50°C (-40° to 122° F)
Relative Humidity	Up to 95% without condensation

### MB6B - 6 Blade Chassis

MB6B - 6 Blade Chassis (F-MB6X-RAC, F-MB6X-MED, F-MB6X-DC)	
Dimensions (H x W x D)	19" rack mountable, 1 RU 43.69mm H x 434.98mm W x 420.37mm D (1.72" H x 17.125" W x 16.55" D)
Weight	6 slot empty chassis: 7.94 kg. (17.5 lbs.) Single blade: 230 g. (0.5 lbs.)
Power Requirements	Single Internal Power Supply: <ul style="list-style-type: none"> <li>• Redundant AC type:               <ul style="list-style-type: none"> <li>90-264VAC 47Hz-63Hz</li> <li>300 Watt max.</li> </ul> </li> <li>• Medical Grade:               <ul style="list-style-type: none"> <li>90-264VAC 47Hz-63Hz</li> <li>300 Watt max.</li> </ul> </li> <li>• DC type:               <ul style="list-style-type: none"> <li>20-36 VDC</li> <li>300 Watt max.</li> </ul> </li> </ul>
Temperature	Operating: 0° to 50°C (32° to 122°F) Non-operating: -40° to 70°C [-40° to 158° F]
Relative Humidity	Up to 95% without condensation

### MB21B - 21 Blade Chassis

MB21B - 21 Blade Chassis (F-MB21BB-R)	
Dimensions (H x W x D)	19" rack mountable, 4 RU 178mm H x 439.98mm W x 460mm D (7.00" H x 17.125" W x 18.00" D)
Weight	21 slot empty chassis: 17.24 kg. (38 lbs.) Single blade: 230 g. (0.5 lbs.)
Power Requirements	Single Internal Power Supply: <ul style="list-style-type: none"> <li>• 90-132V and 180-240VAC 47Hz-63Hz</li> <li>• 400 Watt max.</li> </ul>
Temperature	Operating: 0° to 50°C (32° to 122°F) Non-operating: -40° to 70°C (-40° to 158° F)
Relative Humidity	Up to 95% without condensation

## Regulatory/Compliance

Regulatory/Compliance	
EU Council Directives	Low Voltage Directive - 2006/95/EC
	EMC Directive - 2004/108/EC
	ROHS Directive - 2002/95/EC
	WEEE Directive - 2002/96/EC
Safety	CAN/CSA-C22.2 No 60950-1-07 – Safety of Information Technology Equipment
	UL 60950-1, 2nd Ed – Safety of Information Technology Equipment
	IEC 60950-1:2005 (2nd Edition) and EN 60950-1:2006
	As per posted National deviations: including the following country deviations:
	AT, CA, CH, DE, DK, ES, FI, FR, GB, IT, JP, KR, NL, PL, SE, SI, US + common modifications.
EMC	EN 55022: 2006 A1: 2007 (emissions), CLASS A
	EN 55024:1998+A2:2003 (immunity)
	FCC part 15: 2009, subpart B, CLASS A
	ICES-003 Issue 4, Class A
	EN 61000-3-2: 2006, CLASS A
	EN 61000-3-3: 2008
	AS/ NZS3548

# APPENDIX C: 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	2.6.10	GPL	<a href="http://www.kernel.org">www.kernel.org</a>	Operating system
Distribution	MV4.0.1Pro	MontaVista License Agreement	<a href="http://support.mvista.com">support.mvista.com</a>	Target Application Packages
Postgresql	7.4.6	Modified BSD/MIT	<a href="http://wiki.postgresql.org/wiki/Main_Page">http://wiki.postgresql.org/wiki/Main_Page</a>	Data Base Management System
netsnmp	5.5	Modified BSD	<a href="http://www.net-snmp.org">www.net-snmp.org</a>	Free SNMP agent and tools

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 D: Warranty Information

## Haivision One (1) Year Limited Warranty

Haivision warrants its hardware products against defects in materials and workmanship under normal use for a period of ONE (1) YEAR from the date of equipment shipment (“Warranty Period”). If a hardware defect arises and a valid claim is received within the Warranty Period, at its option and to the extent permitted by law, Haivision will either (1) repair the hardware defect at no charge, or (2) exchange the product with a product that is new or equivalent to new in performance and reliability and is at least functionally equivalent to the original product. A replacement product or part assumes the remaining warranty of the original product or ninety (90) days from the date of replacement or repair, whichever is longer. When a product or part is exchanged, any replacement item becomes your property and the replaced item becomes Haivision’s property.

### EXCLUSIONS AND LIMITATIONS

This Limited Warranty applies only to hardware products manufactured by or for Haivision that can be identified by the “Haivision” trademark, trade name, or logo affixed to them. The Limited Warranty does not apply to any non-Haivision hardware products or any software, even if packaged or sold with Haivision hardware. Manufacturers, suppliers, or publishers, other than Haivision, may provide their own warranties to the end user purchaser, but Haivision, in so far as permitted by law, provides their products “as is”.

Haivision does not warrant that the operation of the product will be uninterrupted or error-free. Haivision does not guarantee that any error or other non-conformance can or will be corrected or that the product will operate in all environments and with all systems and equipment. Haivision is not responsible for damage arising from failure to follow instructions relating to the product’s use.

This warranty does not apply:

- (a) to cosmetic damage, including but not limited to scratches, dents and broken plastic on ports;
- (b) to damage caused by accident, abuse, misuse, flood, fire, earthquake or other external causes;
- (c) to damage caused by operating the product outside the permitted or intended uses described by Haivision;
- (d) to a product or part that has been modified to alter functionality or capability without the written permission of Haivision; or
- (e) if any Haivision serial number has been removed or defaced.

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