Makito X1 Rugged Encoder Installation Guide
Makito X1 Rugged Encoder

> ⓘ **Hardware Update**
>
> **The Makito X1 Rugged Encoder features an optional enhanced chassis (v2), with improved Network and DC IN & IO connectors,** to meet the MIL-STD-810 requirements for high vibrations.
>
> **See** DC IN & I/O Connector **and** Network Connector**.**

This Installation Guide provides the steps required to install and configure the Makito X1 Rugged Video Encoder to stream to your compatible decoding device. This guide covers the Makito X1 appliance (#S-MX1E-R-SDI1-ISR / #S-MX1E-R-V2-SDI1-ISR) and the Evaluation Kit (#S-MX1E-R-SDI1-DK / #S-MX1E-R-V2-SDI1-DK) available upon request at sales@haivision.com.

Please refer to the Makito X1 Rugged Encoder User's Guide for detailed configuration and operation information, as well as technical specifications.

We recommend that you familiarize yourself with this guide before installing your encoder.
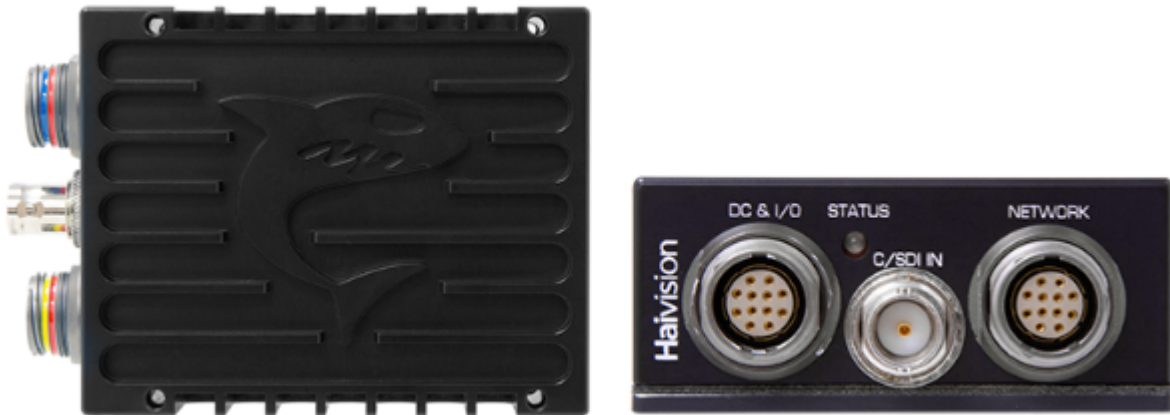
Guide Contents

Makito X1 Rugged Encoder Overview

> ⚠️ **Note**
>
> This page includes information regarding both the original Makito X1 chassis and the Makito X1 chassis v2. The Network connector and DC IN/IO connector on v2 have been changed in order to meet higher vibration requirements.

MX1 Rugged v2 (#S-MX1E-R-V2-SDI1)

MX1 Rugged (#S-MX1E-R-SDI1)

The Makito X1 Rugged is an ultra-compact H.265/HEVC and H.264/AVC low latency encoder for real-time streaming of MISB/JITC-compliant full motion video in demanding Intelligence, Surveillance and Reconnaissance (ISR) environments.

Makito X1 Rugged features include the following:

- **HEVC Encoding** – With dual encoding cores, the Makito X1 Rugged can encode HD 1080p60 or SD with H.265/HEVC and H.264/AVC compression simultaneously. On the first encoder (only), it offers independent control of scaling, cropping, and encoding parameters. It also supports Network Adaptive Encoding to provide quality streams even when network bandwidth is variable or unpredictable, for example, over constrained IP networks, line-of-sight (LOS) and satellite links.
- **Small Form Factor, Powerful Encoding** – The Makito X1 Rugged is a portable, SWaP- (Size, Weight, and Power)-optimized video encoder available as a hardened appliance or OEM board for advanced integrations.
  - The appliance is designed for deployment in portable man-wearable equipment or small platforms in harsh environments.
  - The OEM board is suited for deep integration within ISR sensor, datalink, or mission systems.
- **Ultra Low Latency for ISR and Situational Awareness** – The Makito X1 Rugged streams high-quality full-motion video at low encoding latencies suitable for the most demanding ISR applications. It ensures excellent picture quality at low bit rates to address the real-time requirements for air, ground, manned or unmanned platforms.
- **Compliant Encoding with KLV Metadata from Haivision** – The Makito X1 Rugged complies with MISB/STANAG specifications for encoding and KLV metadata. It supports selective filtering of KLV metadata parameters to ensure downstream interoperability with exploitation systems and cross-domain applications. It provides the flexibility to combine H.265/HEVC and H.264/AVC encoded video with synchronous or asynchronous KLV metadata and optimizes streaming bandwidth.

> ℹ️ **Note**
>
> For information on the OEM board, please refer to the *Makito X1 Integrator's Board Installation Guide* (available upon request at sales@haivision.com).

Getting Started

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.

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

1. Unpack the box and visually inspect the package contents for any evidence of shipping damage. See the *Important Notice* document in the box for a list of contents.
2. In addition to the contents of the box, you may need to have the following items available:
   - Four #8-32 or M4 screws for mounting (not included)
   - Haivision cabling kits (p/n CA-MX1E-R-TERM) or your own custom cables (see Makito X1 Rugged Encoder Pinouts)
   - A laptop with Web browser, Telnet client, and video player (e.g., VLC)
3. To view the output from the encoder, make sure you have a decoding device or video player that supports the UDP Transport Stream format.

> ℹ️ **Note**
>
> If the device is to be installed in a remote location (e.g., on a utility pole, or on a mobile platform), we recommend that you follow the instructions in this Installation Guide to perform an initial setup in a "staging" environment, such as a lab or control center. Once the device has been set up and is demonstrated to be operating normally, you can then move it to the remote location.

> ⚠️ **Caution**
>
> Before installing the device, please refer to Safety Guidelines. 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.

> ⚠️ **Caution**
>
> **Hot surface. Avoid contact.** The chassis can achieve a surface temperature 95°C in poorly ventilated environments, and may cause personal injury if touched. Ensure adequate thermal management (cooling).
>
> **ATTENTION Surface chaude. Eviter le contact**. Le châssis peut atteindre une température de surface de 95°C dans des environnements mal ventilés et peut causer des blessures en cas de contact.

Safety Guidelines

> **⚠ Warning**
>
> When using the AC/DC power adapter, the power cord is the main disconnect device. Ensure that the socket-outlet is located/installed near the equipment and is easily accessible.
> **ATTENTION** Quand on utilise l'adaptateur AC à DC, le cordon d'alimentation est utilisé comme interrupteur général. La prise de courant doit être située ou installée à proximité de l'équipement et être facile d'accès.

> **⚠ Warning**
>
> The installation of the equipment must comply with local and national electrical regulations.
> **ATTENTION** L'installation de l'équipement doit être conforme aux réglementations électriques locales et nationales en vigueur.

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 floor pads and workbench pads.

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

> **⚠ Caution**
>
> When handling components, 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.

EMC Warnings

Notice with respect to Class A (FCC)

Changes to equipment without the permission of Haivision may result in its failure to comply with the FCC requirements for Class A digital devices. If applicable, your rights to use the equipment may be limited by the FCC rules and you may be able to remedy, at your own expense, any interference with radio or television equipment. This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference that may occur when the equipment is used in a commercial environment. This equipment generates, uses and can radiate radio frequency energy. If not instaîled and used in accordance with the instruction manual, it may cause harmful interference to radio communications. Use of this equipment in residential areas may cause harmful interference. If necessary, users will have to resolve these issues at their own expense.

Avis relatif aux appareils de classe A (FCC)

Toute modification de l'équipement sans l'autorisation de Haivision peut entraîner sa nonconformité aux exigences de la FCC concernant les appareils numériques de classe A. Le cas échéant, vos droits d'utilisation de l'équipement seront susceptibles d'être limités par les règlements de la FCC et vous pourrez être amené à remédier, à vos frais, aux éventuelles interférences avec des dispositifs radiophoniques ou télévisuels. Cet équipement a été testé et jugé conforme aux limites d'un périphérique numérique de classe A en vertu de la partie 15 des règlements de la FCC. Ces limites ont pour but de fournir une protection raisonnable contre les interférences nuisibles susceptibles de se produire, lorsque l'équipement est utilisé dans un environnement commercial. Cet équipement génère, utilise et peut émettre de l'énergie radioélectrique. S'il n'est pas installé ni utilisé conformément au manuel d'instructions, il peut provoquer des interférences nuisibles aux communications radio. L'utilisation de cet équipement dans les zones résidentielles est susceptible de causer des interférences nuisibles. Le cas échéant, les utilisateurs devront résoudre ces problèmes à leurs frais.

Notification for Class A (Canada)

This Class A digital apparatus complies with Canadian ICES-003.

Notification pour les appareils de classe A (Canada)

Cet appareil numérique de Classe A est conforme à la norme NMB-003 du Canada.

Safety instructions for Class A for CISPR32

WARNING: This product is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may need to take appropriate measures.

Consigne de sécurité relative à la Classe A pour CISPR32

ATTENTION: Il s'agit d'un produit de Classe A. Dans un environnement domestique, ce produit peut entraîner des perturbations radioélectriques, auquel cas l'utilisateur devra éventuellement prendre des mesures adéquates.

Waste Electrical and Electronic Equipment (WEEE) Disposal

In accordance with the European Union (EU) WEEE Directive, Haivision products that fall within the scope of the WEEE, are labeled with the above symbol, and customers are encouraged to responsibly recycle their equipment at the time of disposal. Haivision also offers its customers the option of returning Haivision equipment to facilitate its environmentally sound disposal.

For more information, please visit our website at: https://www.haivision.com/environment.

Install the Makito X1 Rugged Encoder

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

To install the appliance:

1.
> ⚠ **Caution**
>
> The surface temperature of the chassis can reach 95°C in poorly ventilated environments. We recommend that you fasten the appliance to a metal (cold) plate to increase heat dissipation. In add cases, adequate temperature management is required to dissipate 6 Watts of power continuously.

2. Fasten the appliance to its support base with four screws (size M2.5 or 4-40, not included). Or you can use two stainless steel, harsh-environment cable ties (up to 250 mils wide), which can be passed through slots in the chassis.
3. Fasten a grounding wire (10 AWG minimum) to the grounding lug using the screw and lock washer provided.

Pan head screw M3 with tooth lock washer for GND connection
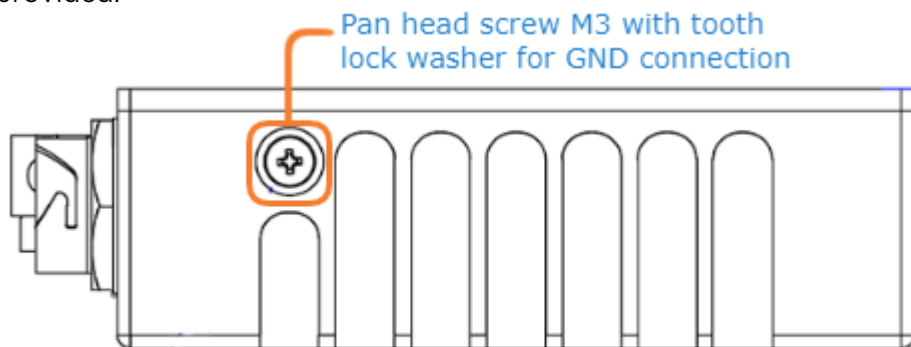
> ⚠ **Caution**
>
> The chassis must be properly grounded in order to provide protection against lightning strikes and other power surges.

Topics Discussed

- Connect to the Network and Audio/Video Sources
- Power up the Makito X1 Encoder

Connect to the Network and Audio/Video Sources

> ⚠️ **Note**
>
> This page includes information regarding both the original Makito X1 chassis and the Makito X1 chassis v2. The Network connector and DC IN/IO connector on v2 have been changed in order to meet higher vibration requirements.

MX1 Rugged v2 (#S-MX1E-R-V2-SDI1)

MX1 Rugged (#S-MX1E-R-SDI1)

The Makito X1 Rugged enclosure provides the following rugged connectors:

- **Power & I/O** connector combining these inputs:
  - **Power** (+5VDC, < 6 W)
  - **Analog Audio** Two (2) channels of analog audio – 15 Kohms input impedance
  - **Serial** Port (RS-232/422) – can be used for Management, Pass-thru or KLV or CoT metadata ingest
- **CVBS/SDI** connector – 75 Ω BNC (used for either SD-SDI (Serial Digital Interface), HD-SDI video, or Composite (CVBS) input signals, with format auto-detected)
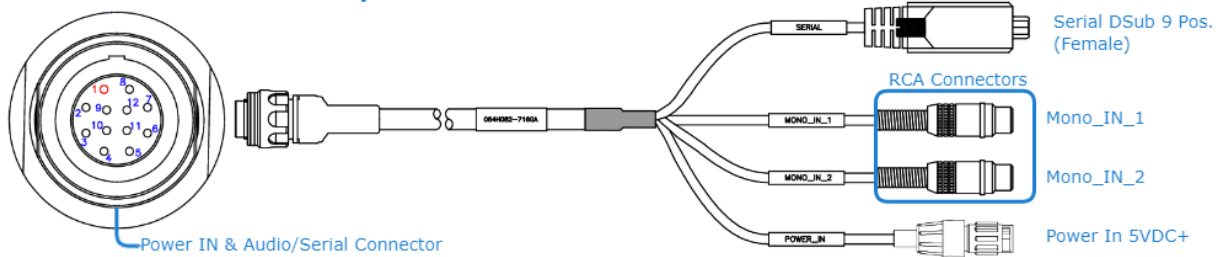- **Network** connector – 10/100/1000 Base-T Gigabit Ethernet; connector also includes a Reset line

The BNC connector is also a 3G-SDI capable interface supporting 1080p 50/60 fps video @ 3Gbps. In addition, it supports auto-detection of the HD resolution and embedded digital audio.

The Ethernet/Factory Reset and Power/Audio/Serial breakout cables (shown in the following steps) are shipped as part of the Evaluation Kit (#S-MX1E-R-SDI1-DK/#S-MX1E-R-V2-SDI1-DK).
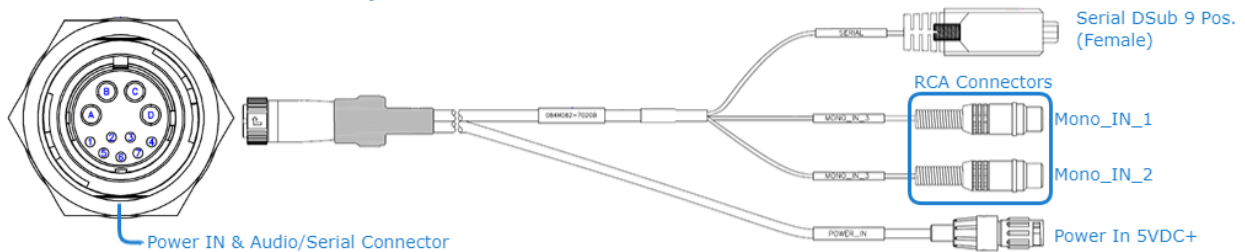
To connect the encoder to the network and A/V sources:

1. Remove the protective caps from the encoder's connectors.
2. Connect the encoder's **Network** port to the IP network using the **Ethernet/Factory Reset** breakout cable (shown following):

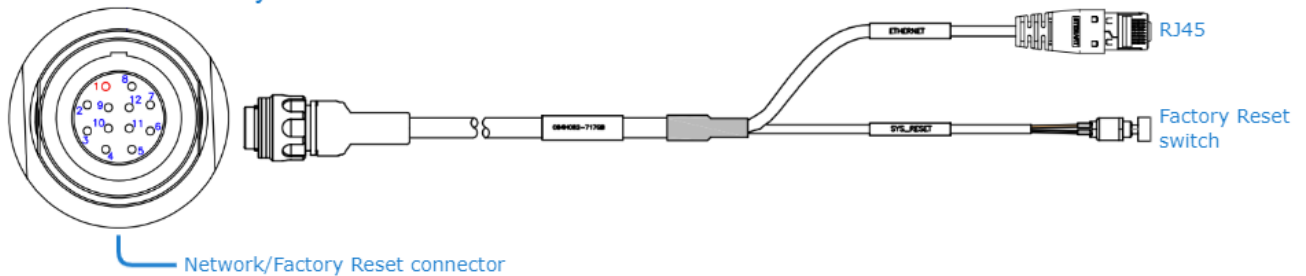**Power IN & Audio/Serial Cable Assembly v2**

Power IN & Audio/Serial Connector

Serial DSub 9 Pos. (Female)
RCA Connectors
Mono_IN_1
Mono_IN_2
Power In 5VDC+

Power IN & Audio/Serial Cable Assembly

Power IN & Audio/Serial Connector

Serial DSub 9 Pos. (Female)
RCA Connectors
Mono_IN_1
Mono_IN_2
Power In 5VDC+

3. Connect the encoder's **CVBS/SDI** video input to your video source, referring to the above image.
4. (Optional) Connect the encoder's **DC In & I/O** port to your audio source(s) using the **Power/Audio/Serial** breakout cable (shown following).

Network Cable Assembly v2

Network/Factory Reset connector

RJ45
Factory Reset switch

Network Cable Assembly

Network/Factory Reset connector

RJ45
Factory Reset switch
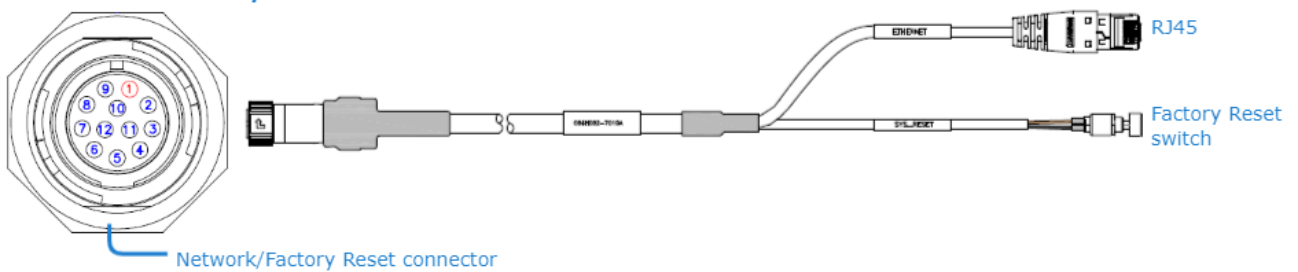
5. (Optional) If you have a KLV or CoT source that uses RS-232 or RS-422, connect the encoder's **DC In & I/O** port to the metadata source or to the serial port of a computer using the power/audio/serial breakout cable.
The **DC In & I/O** port may be used to ingest KLV/CoT, as a management port or as pass-thru for camera control.

> ⚠ **Note**
>
> The Reset button provides two options:
> - If you press and hold the button for less than 4 seconds, the system resets and loads the last saved "startup" configuration. If no configuration was previously saved as the startup preset, the default settings prevail.
> - If you press and hold the button for more than 4 seconds, the module performs a complete factory reset. It clears all of the previously configured settings, including IP, streams and encoder configurations.

6. (Optional) To capture analog audio, connect the encoder's **Audio/Serial** connector to your audio source(s) using the the audio/serial breakout cable, shown in the previous step.

> ⚠ **Note**
>
> As of Release 1.1.1, the Makito X1 Rugged supports two (2) input channels of analog audio. To configure analog audio, see Set Up a Test Stream.

Power up the Makito X1 Encoder

> ⚠️ **Note**
>
> This page includes information regarding both the original Makito X1 chassis and the Makito X1 chassis v2. The Network connector and DC IN/IO connector on v2 have been changed in order to meet higher vibration requirements.

MX1 Rugged v2 (#S-MX1E-R-V2-SDI1)

MX1 Rugged (#S-MX1E-R-SDI1)

There is no power switch on the encoder. The power is automatically on when the unit is plugged in.

> 🔴 **Warning**
>
> When using the AC/DC power adapter, the power cord is the main disconnect device. Ensure that the socket-outlet is located/installed near the equipment and is easily accessible.
> **ATTENTION** Quand on utilise l'adaptateur AC à DC, le cordon d'alimentation est utilisé comme interrupteur général. La prise de courant doit être située ou installée à proximité de l'équipement et être facile d'accès.
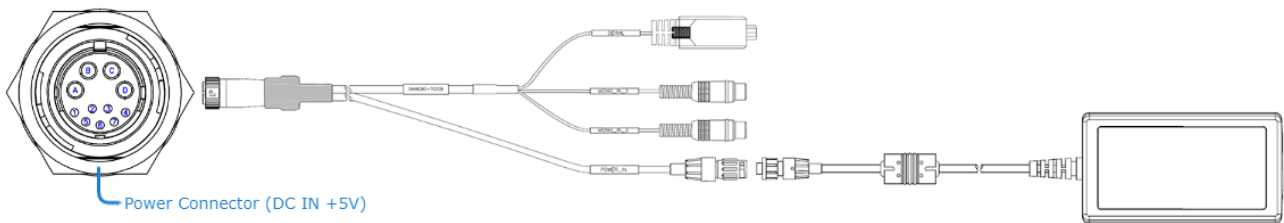
To power up the encoder:

1. (As shown under Connect to the Network and Audio/Video Sources) Insert the **Power/Audio/Serial** breakout cable connector into the encoder's the encoder's power input port (**DC In & I/O**). Both AC and DC power cables (shown following) are shipped as part of the Evaluation Kit (#S-MX1E-R-SDI1-DK/#S-MX1E-R-V2-SDI1-DK).
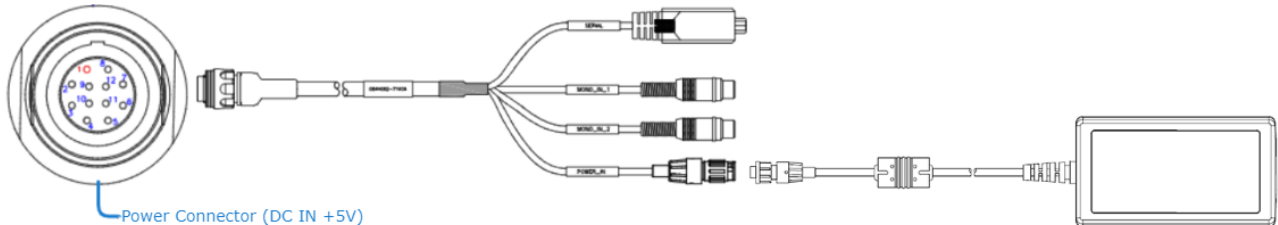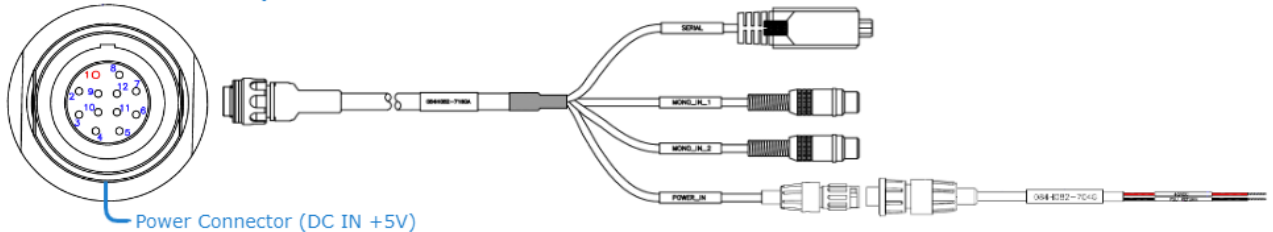

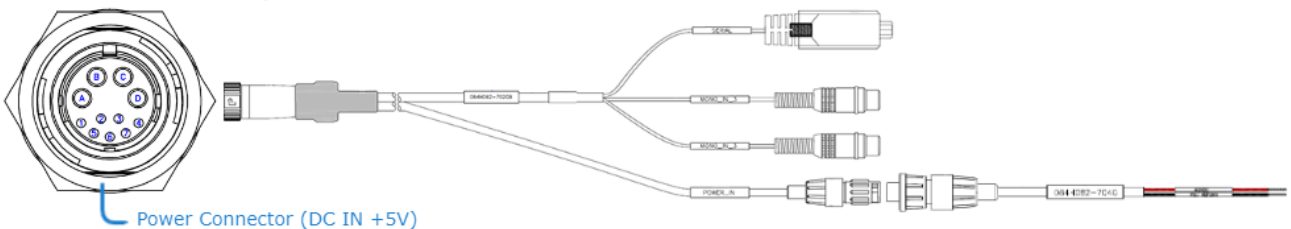2. Make sure the connector is properly inserted and locked to avoid intermittent power problems.
3. Connect the power cable to a +5V power source. (The AC PSU can be used to convert from 120V AC to 5VDC ±.25V.)
   The Status LED next to the video input will start blinking green, indicating that the encoder is booting up.
4. Wait until the Status LED stays solid green, indicating that the encoder is ready for operation.

Related Topics

- For pinout information, see DC IN and I/O Connector.
- To order the PSU, contact Haivision Sales at sales@haivision.com.

Access the Web Interface

1. Open a Web browser of your choice, such as Chrome, Firefox, Safari, or Internet Explorer.
2. Type the IP address for the encoder into the browser's address bar and press Enter.
   The Makito X1 comes pre-configured with the following default settings:

| IP Address	Subnet Mask	Gateway
10.5.1.2	255.255.0.0	10.5.0.1

> **ℹ Note**
>
> To access the Web interface, your computer must be in the same IP Address range (subnet). You may have to temporarily change your computer's IP Address to be in the same subnet as the encoder. Only then will you be able to access the encoder and change its IP address, and then afterwards change your computer's IP address back. For details, see Configuring Network Settings in the User's Guide.

3. The first time you try to access the Web interface from a new browser, the browser may not recognize the encoder's https connection, and you may get a Security Certificate Warning (such as "This Connection is Untrusted." or "The site's security certificate is not trusted."). You must accept the encoder's self-signed certificate in order to access the Web interface.

> **ℹ Note**
>
> The Makito X1 identity certificate and trusted root certificates may be managed from the Web interface (Certificates page) or using the CLI `certificate` command. See Managing Certificates in the User's Guide.

4. Sign in to the Web interface, using the default administrative username and password.
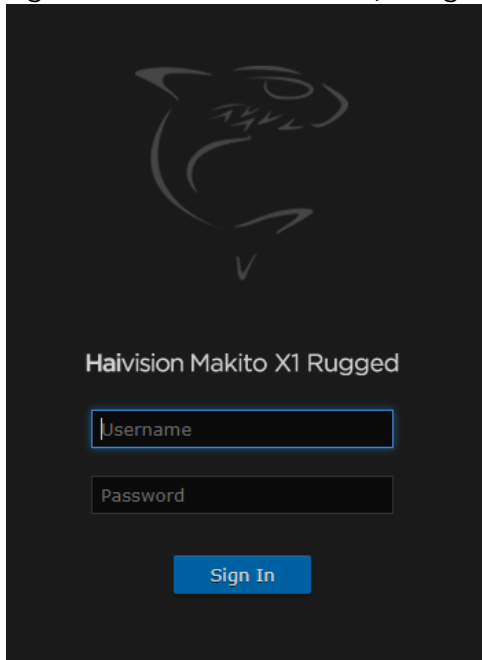
Please refer to the *Important Notice* (postcard included in the box or available from the Download Center on the Haivision Support Portal) for the default sign-in credentials.

> ℹ **Important**
>
> Makito X Series devices ship from the factory with only the `admin` account enabled. For security reasons, the two default user accounts (`user` and `operator`) are locked at the factory as well as after a factory reset. An administrator must unlock them and change the passwords to use them for the first time.

> ✅ **Tip**
>
> For security purposes, be sure to change the default passwords! See Changing Your Password in the User's Guide.

The Web interface opens to the Outputs List View.
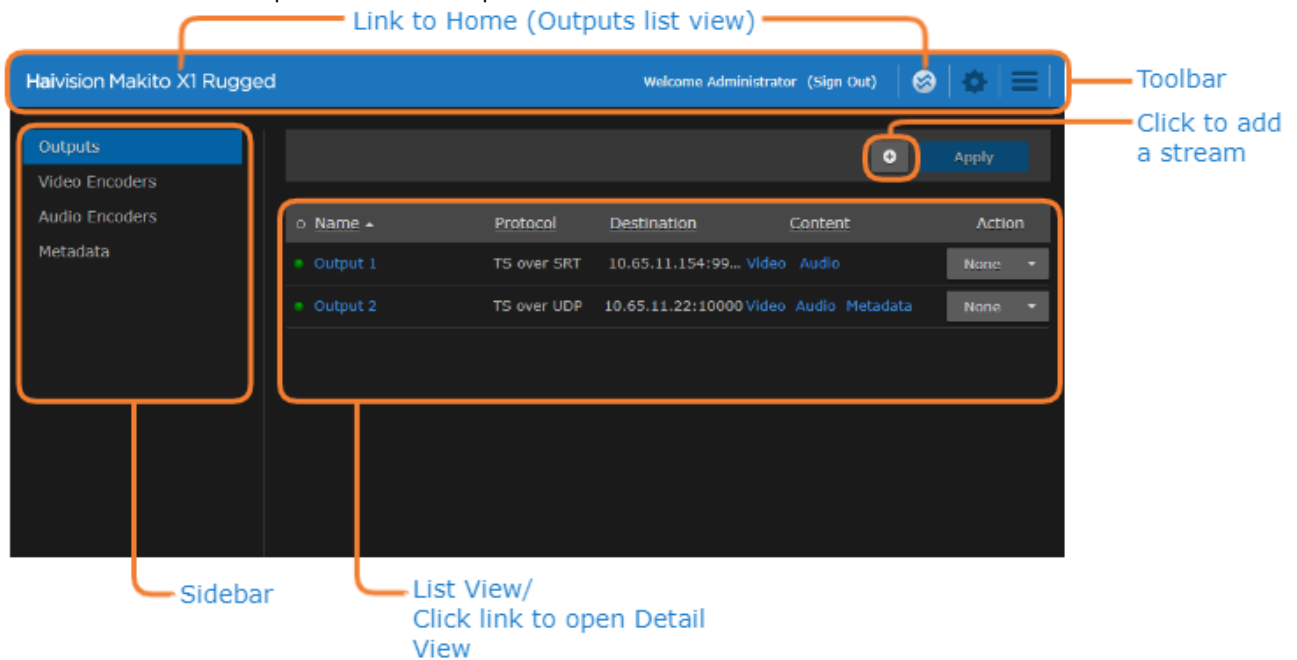
Set Up a Test Stream

Setting up a test stream requires that you have an active video source connected to the Makito X1 Encoder. You will need to configure an encoding instance based on your video source, and then configure an output stream for that encoder. For detailed information, refer to Configuring Video Encoders and Configuring Streaming Outputs (in the User's Guide).

To configure an encoding instance:

1. Click **Video Encoders** on the sidebar.
   The Video Encoders List View opens.
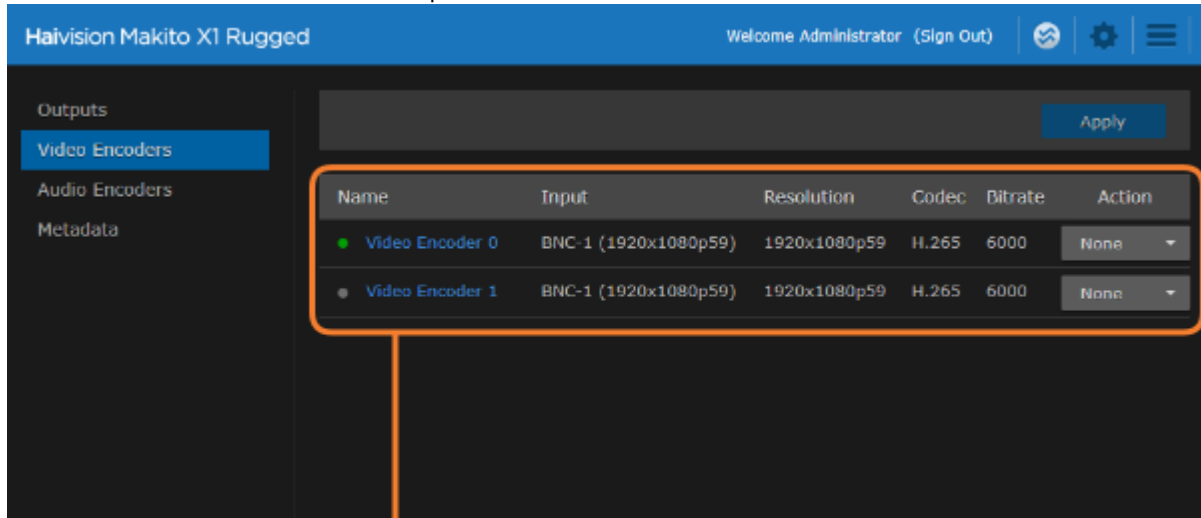
Video Encoders List View/
Click link to open Detail View

2. Click a link in the table to select the encoder.
    The Video Encoder Detail View opens, displaying the settings for the selected video encoder.
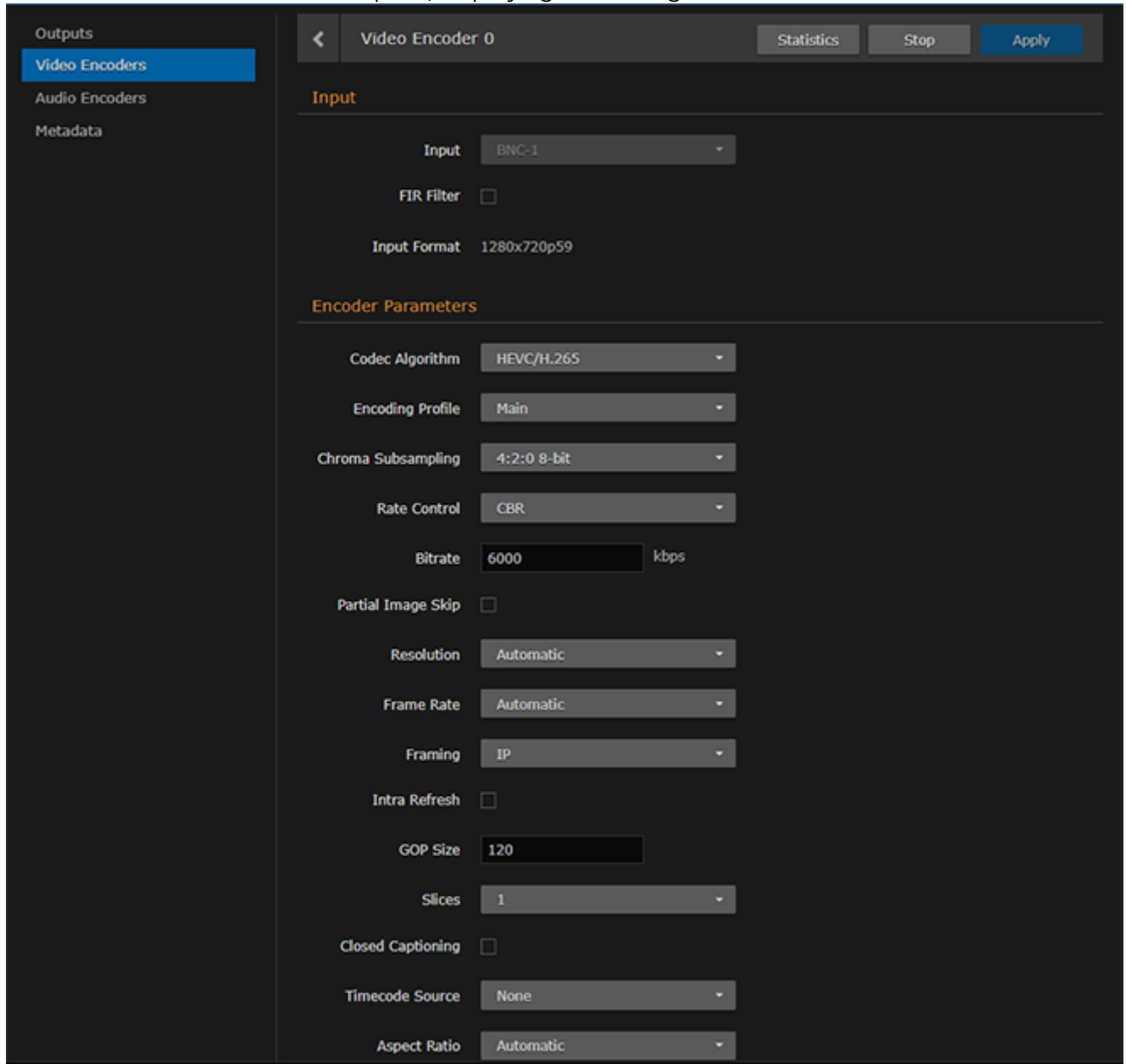
3. To configure the encoder, select or enter the new value(s) in the appropriate fields
    (see Configuring Video Encoders in the User's Guide).
4. Click **Start**, and then click **Apply**.

To configure an output stream:

1. Click **Outputs** on the sidebar.
    The Output Streams List View opens.
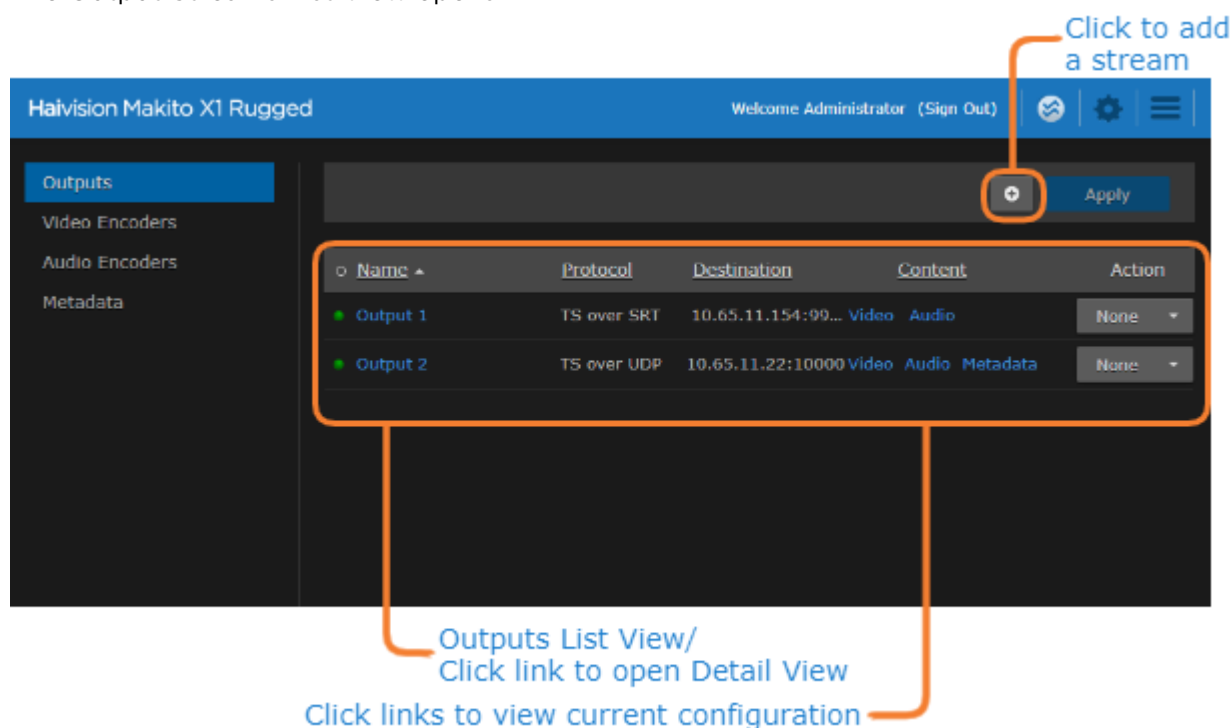
2. To add an output stream, click the ⊕ **Add** button.
   The New Stream page opens.

3. Under Content, type a Name for the stream, and under Source, select the encoder you started in **Step #4** (above).
4. Under Broadcasting, select **TS over UDP** for the Protocol.
5. Under Destination, type in a valid multicast Address (e.g., `239.192.2.3`) and Port number (e.g., `2000`).

> ℹ **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`).

6. To add metadata to the stream, select the Metadata source, and (optionally) select the encapsulation type (Data Carriage).
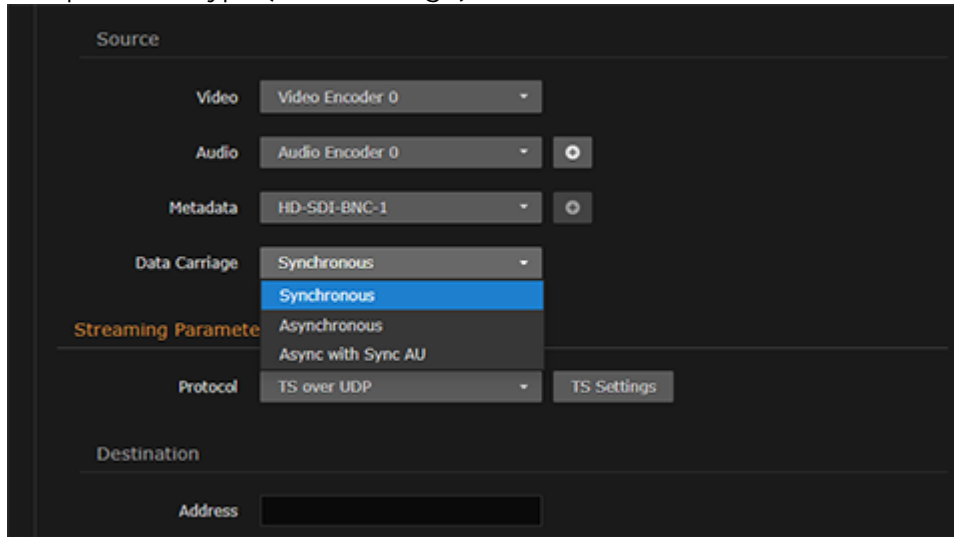
7. To apply your changes and start streaming, click **Apply**.

> ℹ **Note**
>
> The changes will take effect immediately but will be lost after a reboot. For information on saving configuration settings, refer to Saving and Loading Presets in the User's Guide.

View the Test Stream

- General Guidelines
- Streaming to VLC Player

General Guidelines

1. Make sure your decoding device (or software) supports MPEG Transport Stream format.
2. Turn the device on and connect it to a display (if applicable), or open your video player software (e.g., VLC).
3. Make sure you are on the same network segment as the encoder.
4. Tune your decoding device or software to the multicast address of the test stream coming from the encoder.

Streaming to VLC Player

The following steps show how to validate a video streaming setup using VLC as a video decoder. VLC can be operated on a Windows or Linux machine. The following example uses a Windows machine but all the steps can easily be executed on a Linux machine.

> **ⓘ Note**
>
> Unless otherwise specified, references to the "Makito X Series" or "Makito X" can be taken to include the Makito X, Makito X4, and Makito X1 family of encoders and decoders.

First, configure the encoder (see Set Up a Test Stream**).**

Then set up VLC to decode the stream (as shown in the following procedure). This will validate your setup.

1. Connect the PC with VLC on the same network as the Makito X Series Encoder. Note the IP address of the PC.
2. On the Serial connector or through an SSH connection, create a stream from the Makito X encoder to the PC.

   For example: `stream create addr={IP of the pc with VLC} port=2000 videosrc=0`
3. Once the stream is created, you can validate that the encoder has started encoding by executing either of the following commands:

   `"stream all get table"` or `"videnc all get table"`
4. On the PC, open VLC and under the "Media" tab, select *"Open Network Stream...".*
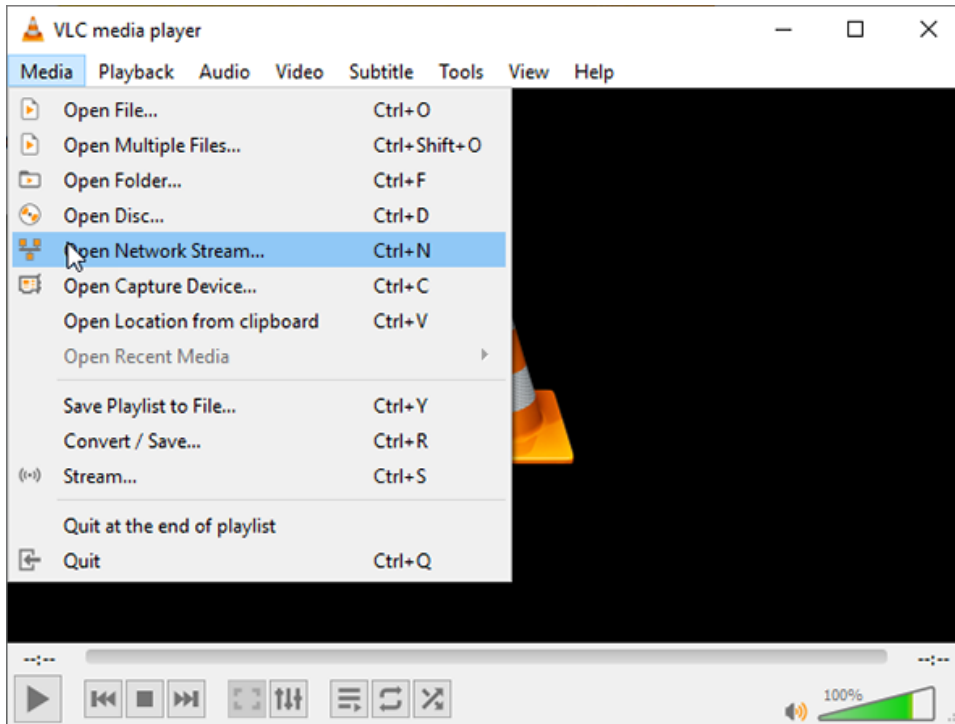
5. Under *"Please enter a network URL:"*, enter `"udp://@:2000"` and click **Play**.

The stream should start within seconds. In case of failure, replace the "@" by the actual IP address of the PC.
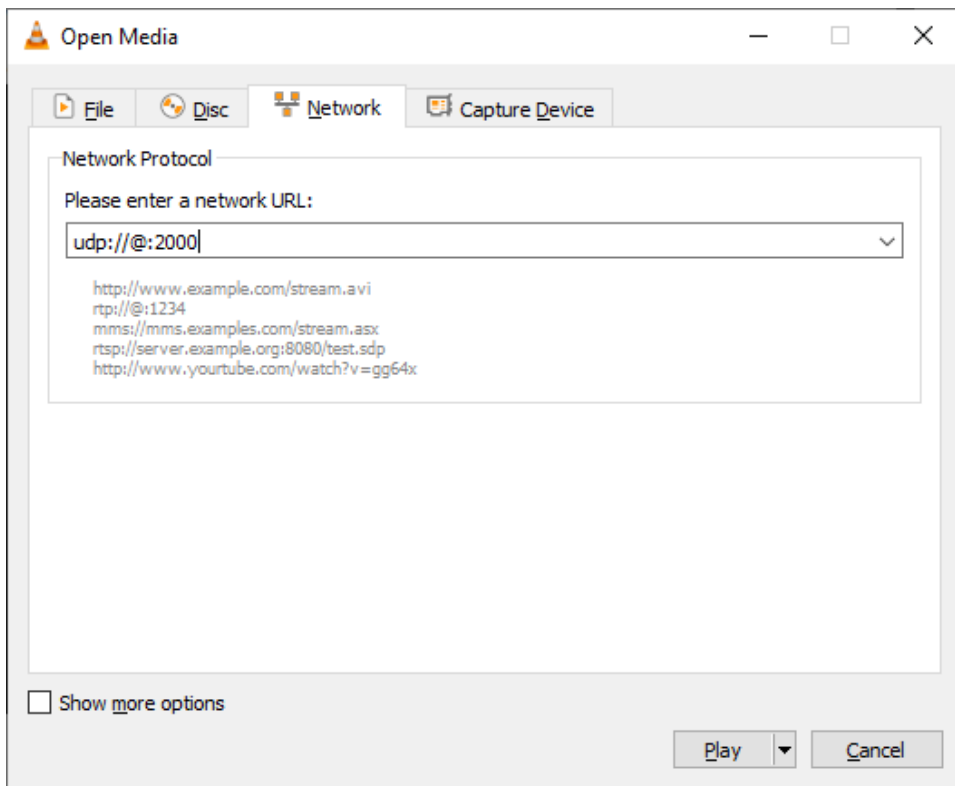
6. Repeat Steps #2 and #3 to create a stream from HD Video Encoder 2. The only difference is on the Serial or SSH connection.

   Enter the following command: `#stream create addr={IP of the pc with VLC} port=2200 videosrc=2`

> ⚠️ **Note**
>
> When changing the video input resolution on the encoder, you may need to re-initialize VLC to show the stream.

Reset the Encoder

- Default Network Settings

This section describes the steps to perform a hardware reset on the Makito X1. The Reset button (located on the Ethernet/Factory Reset cable) is used either to reset the system or to restore the factory default settings.

- **System Reset:** In some cases, if your encoder is experiencing a problem, resetting the system can return the encoder to normal operation.
- **Factory Reset:** If the problem remains after performing a reset, it may help to restore the encoder to its factory default settings. A factory reset returns the encoder to the same settings it originally had when shipped from Haivision, including the factory default IP address, subnet, and gateway.

> ⚠ **Note**
>
> After a factory reset, only the firmware revision, serial number, MAC address, and licenses are preserved. All other data is deleted (including saved presets, added user accounts, modified passwords, and encoding or decoding settings). All settings are returned to their factory preset conditions (including the IP address).
> Preset Auto-Save is enabled by default after a factory reset.

> ⓘ **Important**
>
> Do *not* perform a factory reset during bootup. This may cause the unit to enter error mode (LED flashing orange) and fail to boot.

Use one of the following methods to either reset or restore the encoder settings:

1. With the encoder on, press the button labeled **Reset** on the Ethernet/Factory Reset cable.
2. **System Reset:** Press the switch (you will feel the button depress) for at least one second and release. Be sure to release the button in less than five (5) seconds.
   -or-
   Factory Reset: Press and hold the switch for five (5) seconds.
3. Wait for the encoder to reboot. As soon as the lights stop blinking and the Status LED is solid green, the encoder is ready.

Default Network Settings

After a factory reset, the Network settings should be:

IP Address	Subnet Mask	Gateway
10.5.1.2	255.255.0.0	10.5.0.1

Related Topics

- Enclosure Front Panel (″LED Status Indicator″)

Makito X1 Rugged Encoder Pinouts

This section contains the pinout descriptions for the Makito X1 Rugged Video Encoder and the Makito X1 Rugged Video Encoder v2. This information is intended to be used in conjunction with Haivision drawings no. TIID-060 (Makito X1 Ruggedized Appliance) and no. TIID-060 GEN2 (Makito X1 Ruggedized Appliance v2).

Topics Discussed

- Enclosure Front Panel
- DC IN and I/O Connector
- Network Connector
- Video Input Connector

Enclosure Front Panel

> ⚠ **Note**
>
> This page includes information regarding both the original Makito X1 chassis and the Makito X1 chassis v2. The Network connector and DC IN/IO connector on v2 have been changed in order to meet higher vibration requirements.

The Makito X4 Rugged enclosure provides rugged connectors for connecting the encoder's Power/Audio/Serial inputs, Video input, and Network interface, located on the front panel. There is one LED that indicates the power status.

Makito X1 Rugged v2 (#S-MX1E-R-V2-SDI1-ISR)   **Makito X1 Rugged (#S-MX1E-R-SDI1-ISR)**

Makito X1 Rugged v2 (#S-MX1E-R-V2-SDI1-ISR)   **Makito X1 Rugged (#S-MX1E-R-SDI1-ISR)**

Connectors   LED Status Indicator

Connectors

Connector	Description	Number of Contacts
DC IN and I/O Connector	Hirose P/N LF13WBRB – 11S	11
DC IN and I/O Connector v2	Lemo P/N HEN.2M.312.XLNP	12
Video Input Connector	Coax BNC Jack Amphenol P/N 31-70551-12G	1
Network Connector	Hirose P/N LF10WBRB – 12S	12
Network Connector v2	Lemo P/N HEP.2M.312.XLNP	12

Connectors   **LED Status Indicator**

LED Status Indicator

Function	Description	Indication
STATUS	Off	No power
	Green fast blinking	Reset button is pressed for less than four seconds. If the Reset button is not pressed, there is a power fault.
	Green slow blinking	Booting/Initialization
	Green solid	Booting/Initialization sequence is complete (No fault/OK).
	Orange fast blinking	Reset button is pressed for more than five seconds (Factory Reset enabled). After Orange fast blinking, the LED turns off, stays off for a while, and then starts Green slow blinking towards the end of the booting up.

DC IN and I/O Connector

> ⚠ **Note**
>
> This page includes information regarding both the original Makito X1 chassis and the Makito X1 chassis v2. The Network connector and DC IN/IO connector on v2 have been changed in order to meet higher vibration requirements.

DC IN & I/O Connector v2   DC IN & I/O Connector
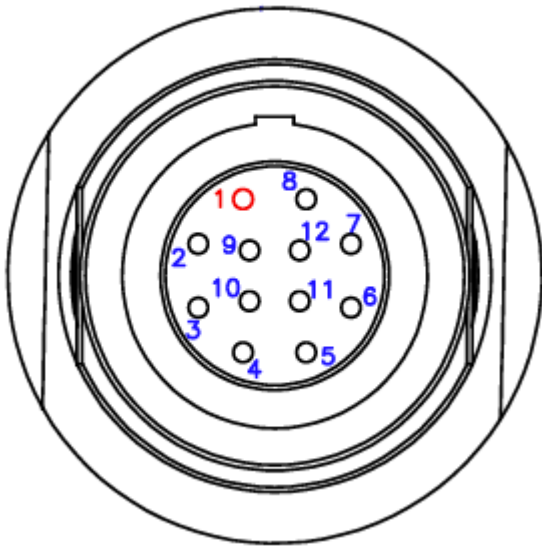
DC IN & I/O (Power, Audio & Serial) Connector v2		
	On Unit	**Mating Connector**
Manufacturer	**LEMO**	**LEMO**
Connector Type	DC IN & I/O	DC IN & I/O
Part Number	HEN.2M.312.XLNP	FGN.2M.312.XLCT

DC IN & I/O Connector v2   **DC IN & I/O Connector**
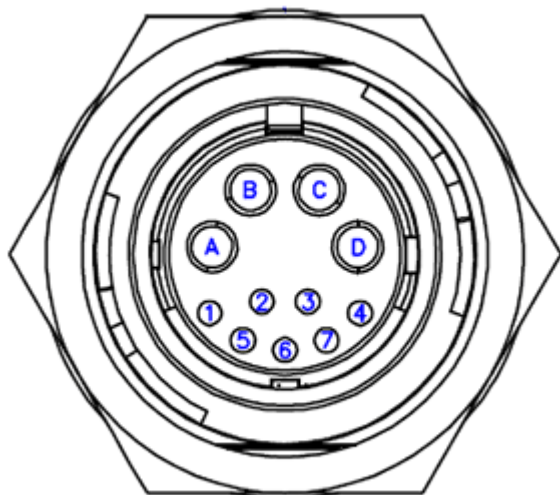
DC IN & I/O (Power, Audio & Serial) Connector

	On Unit	Mating Connector
Manufacturer	**Hirose**	**Hirose**
Connector Type	DC IN & I/O	DC IN & I/O
Part Number	LF13WBRB-11S	LF13WBP-11P

For the connector and cable, see Power up the Makito X1 Encoder .

DC IN & I/O Connector Pinout v2   DC IN & I/O Connector Pinout

LEMO P1 Contact #	Contact Name	RS-232 Connections	RS-422 Connections
1	AUDIO_IN2+		
2	AUDIO_IN2_GND		
3	AUDIO_IN1+		
4	AUDIO_IN1_GND		
5	COM 0_TXD+		TXD+
6	COM 0_TXD-	TXD	TXD-
7	+5VDC IN		
8	PSU RETURN		
9	N/C		
10	GND SERIAL	GND	GND
11	COM 0_RXD-	RXD	RXD-
12	COM 0_RXD+		RXD+

DC IN & I/O Connector Pinout v2   **DC IN & I/O Connector Pinout**

	Description	
Hirose P1 Contact #	**RS-232 Connections**	**RS-422 Connections**
1	RXD	RXD-

2	N/C	RXD+
3	TXD	TXD-
4	N/C	TXD+
5	COM 0_GND	
Audio / Power		
6	AUDIO IN CHANNEL 1+	
7	AUDIO IN CHANNEL 1 GND	
A	AUDIO IN CHANNEL 2+	
B	AUDIO IN CHANNEL 2 GND	
C	PSU RETURN	
D	+5VDC IN	

COM1 Management Pinout (on DB9 connector)

Contact #	Signal RS-232	Signal RS-422
8		RXD+
7		TXD+
6		
5	Ground	Ground
3	TXD	TXD-
4		
1		
2	RXD	RXD-

> ℹ️ **Note**
>
> The COM1 pins are DTE (Data Terminal Equipment) which defines the direction of the signals (IN/OUT).
> The COM1 pins are configured by default for Metadata mode but may be switched to Management mode (to connect to a computer for management of the encoder) using the `metadata` CLI command. The `metadata` command may also be used to select the transceiver mode for the metadata capture (i.e., RS-232 or RS-422). For details, see metadata in the Makito X1 Rugged Encoder User's Guide .

Network Connector

> ⚠️ **Note**
>
> This page includes information regarding both the original Makito X1 chassis and the Makito X1 chassis v2. The Network connector and DC IN/IO connector on v2 have been changed in order to meet higher vibration requirements.

Network Connector v2
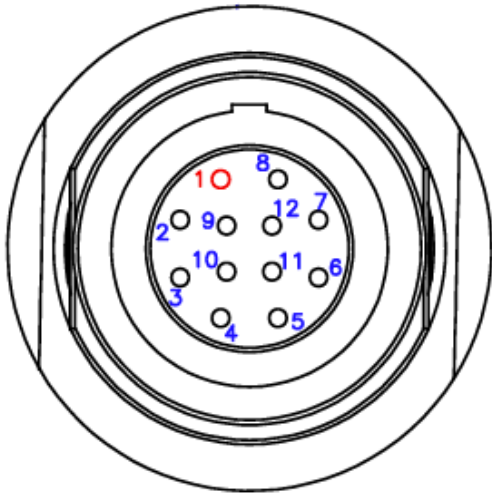
Network Connector v2		
	On Unit	**Mating Connector**
Manufacturer	**LEMO**	**LEMO**
Connector Type	Network Connector	Network Connector
Part Number	HEP.2M.312.XLNP	FGP.2M.312.XLCT

Network Connector

Network Connector		
	On Unit	**Mating Connector**
Manufacturer	Hirose	Hirose
Connector Type	Network Connector	Network Connector
Part Number	LF10WBRB-12S	LF10WBP-12P(31)

Ethernet

Network Connector Pinout v2

Contact #	Description
1	ETH B+
2	ETH B-
3	ETH C+
4	ETH C-
5	ETH D+
6	ETH D-
7	ETH A+
8	ETH A-
9	GND
10	SYS_RST#
11	N/C
12	N/C

Network Connector Pinout

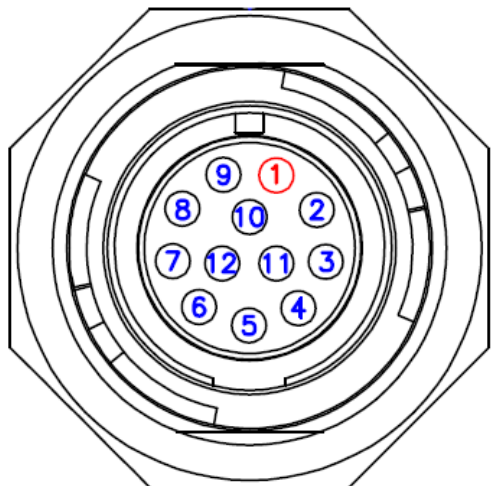| Contact #	Description
1	ETH A+
2	ETH A-
3	ETH B+
4	ETH B-
5	ETH C-
6	ETH C+
7	ETH D-
8	ETH D+
9	N/C
10	N/C
11	SYS_RST#
12	GND

Video Input Connector

> ⚠️ **Note**
>
> This page includes information regarding both the original Makito X1 chassis and the Makito X1 chassis v2. The Network connector and DC IN/IO connector on v2 have been changed in order to meet higher vibration requirements.

The Makito X1 Rugged video encoder supports a single video input. The port marked **CVBS/SDI** can support up to 3G-SDI or analog video (NTSC/PAL).

- SDI is governed by SMPTE 259M (SD-SDI), 292M (HD-SDI) and 424M (3G-SDI) standards. Each coaxial pin is 75ohm impedance (3-GHz bandwidth).
- Composite video allows for NTSC and PAL input signals among others.

MX1 Rugged v2 (#S-MX1E-R-V2-SDI1)

MX1 Rugged (#S-MX1E-R-SDI1)

The requirements for external cable assemblies are as follows (assuming the customer wants to avoid water immersion on them):

BNC Coaxial Cable Assemblies

The cable assemblies must be waterproof. We recommend using waterproof compression type BNC connectors for better reliability and mechanical properties. We suggest use of a connector such as the Belden p/n FSNS6BNCU with a cable retention force of 40 lbs. per SCTE IPS SP401.

The input impedance must be 75 Ohms.

> ⚠ **Note**
>
> We recommend that you keep the protective cap on any unused video connectors.

Terms of Service Agreement

- Copyright
- Trademarks
- Third Party License Information

Copyright

© 2015-2023 Haivision. All rights reserved.

This edition and the products it describes contain proprietary and confidential information. No part of this content may be copied, photocopied, reproduced, translated or reduced to any electronic or machine-readable format without prior written permission of Haivision. If this content is distributed with software that includes an end-user agreement, this content and the software described in it, are furnished under license and may be used or copied only in accordance with the terms of that license. Except as permitted by any such license, no part of this content may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, recording, or otherwise, without the prior written permission of Haivision Systems, Inc. Please note that the content is protected under copyright law even if it is not distributed with software that includes an end-user license agreement.

Trademarks

The Haivision logo, Haivision, and certain other marks are trademarks of Haivision. CoolSign is a registered trademark licensed to Haivision Systems, Inc. All other brand or product names identified in this document are trademarks or registered trademarks of their respective companies or organizations.

Third Party License Information

UDT4, 4.11, UDP-based Data Transfer, Permissive free software license.

Copyright (c) 2001 - 2011, The Board of Trustees of the University of Illinois. All rights reserved. Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

- Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
- Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
- Neither the name of the University of Illinois nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN

CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

expat Custom License

Copyright (c) 1998, 1999, 2000 Thai Open Source Software Center Ltd and Clark Cooper
Copyright (c) 2001, 2002, 2003, 2004, 2005, 2006 Expat maintainers.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:
The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.
THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT.
IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

libuuid Modified Licensed (Modified BSD)

Copyright (C) 1998, 1999 Theodore Ts'o
Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, and the entire permission notice in its entirety, including the disclaimer of warranties.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. The name of the author may not be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED "AS IS"' AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ALL OF WHICH ARE HEREBY DISCLAIMED. IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF NOT ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Obtaining Documentation

This document was generated from the Haivision InfoCenter. To ensure you are reading the most up-to-date version of this content, access the documentation online at https://doc.haivision.com. You may generate a PDF at any time of the current content. See the footer of the page for the date it was generated.

Getting Help

General Support	North America (Toll-Free) **1 (877) 224-5445** International **1 (514) 334-5445** *and choose from the following:* Sales - 1, Cloud Services - 3, Support - 4
Managed Services	U.S. and International 1 (512) 220-3463
Fax	1 (514) 334-0088
Support Portal	https://support.haivision.com
Product Information	info@haivision.com