DM-NVX-E760 and DM-NVX-E760C

DM NVX® 4K60 4:4:4 HDR Network AV Encoder with DM® Input

Product Manual

Crestron Electronics, Inc.

Original Instructions
The U.S. English version of this document is the original instructions.
All other languages are a translation of the original instructions.

Regulatory Model: M201910003

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Contents

Overview

Crestron® DM NVX® network AV encoders/decoders transport ultra high-definition 4K video with 60 Hz frame rates and 4:4:4 color sampling over standard Gigabit Ethernet. Using Pixel Perfect Processing technology, a video signal is encoded and then decoded to achieve imperceptible end-to-end latency of less than 1 frame.

The DM-NVX-E760 and DM-NVX-E760C are designed to function as encoders only. The devices include a DM® input for interoperability with DM 8G+® output devices and DM Lite® transmitters. Certified using HDBaseT® technology, the DM input is also compatible with third-party HDBaseT products. The DM-NVX-E760 and DM-NVX-E760C enable AV signals from the DM input to be transmitted over the network to one or many DM NVX decoders.

The DM-NVX-E760 is a surface-mountable endpoint designed to mount onto a flat surface or rack rail. The DM-NVX-E760C is designed for installation into a card slot of a DMF-CI-8 card chassis.

This manual provides information about the following:

- Physical Description (on the next page)
- Status and Configuration (on page 7)
- Troubleshooting (on page 43)

In addition, information about device discovery of a DM NVX device using Crestron Toolbox™ software is provided in the appendix of this manual. For installation information, refer to the DM-NVX-E760 Quick Start (Doc. 8211) or DM-NVX-E760C Quick Start (Doc. 8346) as appropriate. For information about designing a DM NVX system, refer to the DM NVX System Design Guide (Doc. 7977).

Physical Description

The following sections provide information about the connectors, controls, and indicators that are available on the DM-NVX-E760 (below) and DM-NVX-E760C (on page 5) encoders.

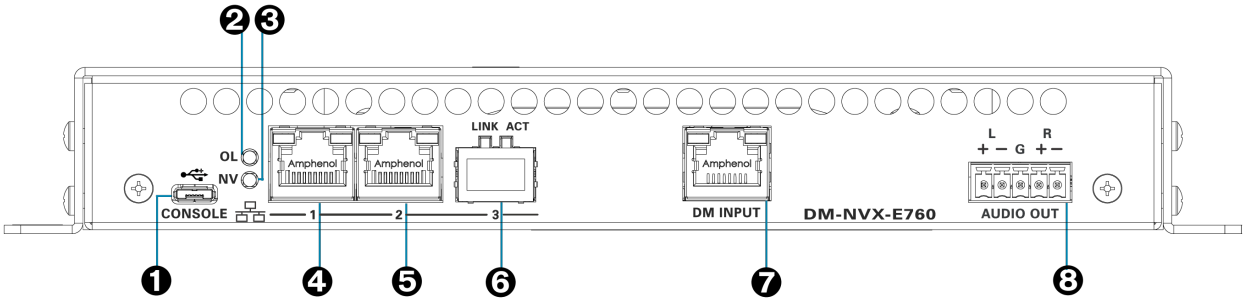
DM-NVX-E760

This section provides information about the front and rear panels of the DM-NVX-E760.

Front Panel

The following illustration shows the front panel of the DM-NVX-E760.

DM-NVX-E760 Front Panel



❶ **CONSOLE:** (1) Micro USB connector, female;
USB 2.0 computer console port (for setup)

❷ **OL:** (1) LED, green indicates an online connection to a control system via Ethernet

❸ **NV:** (1) LED, green indicates unit is encoding (transmitting) network video

❹ **Ethernet 1:** (1) 8-pin RJ-45 connector, female;
100BASE-TX/1000BASE-T Ethernet port;
PoE++ and UPOE PD (powered device) port,
IEEE 802.3bt Type 3 Class 5 (60 W/4 pair) compliant
(2) LEDs, green indicates Ethernet link status, amber indicates Ethernet activity

❺ **Ethernet 2:** (1) 8-pin RJ-45 connector, female;
100BASE-TX/1000BASE-T Ethernet port
(2) LEDs, green indicates Ethernet link status, amber indicates Ethernet activity

❻ **Ethernet 3:** (1) SFP port;
Accepts one Crestron SFP-1G Series transceiver module (sold separately)
(1) LINK LED, green indicates Ethernet link status
(1) ACT LED, green indicates Ethernet activity

❼ **DM INPUT:** (1) 8-pin RJ-45 connector, female, shielded;
DM 8G+ (HDBaseT standard compliant) or DM Lite input;
PoDM+ (HDBaseT PoE+ compatible) PSE (power sourcing equipment) port or DM Lite power port;
Connects to the DM 8G+ output of a DM® switcher, transmitter or other DM device; to the DM Lite port of a DM Lite transmitter; or to an HDBaseT device via CAT5e, Crestron DM-CBL-8G, or Crestron DM-CBL-ULTRA cable
(2) LEDs, green indicates DM link status, amber indicates video and HDCP signal presence

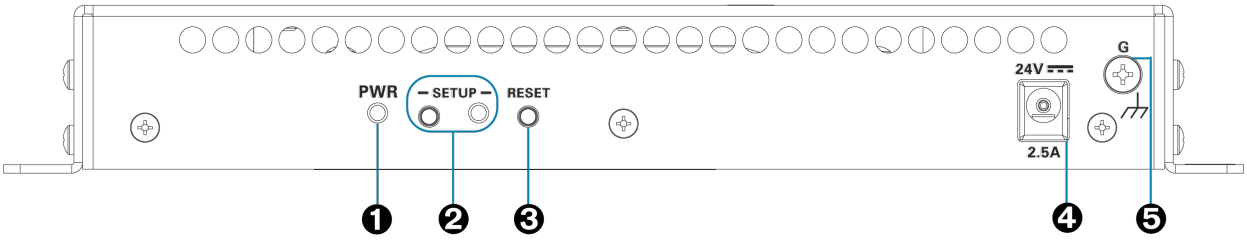
Refer to DM Input (on page 30) for information about configuring the DM INPUT port.

❽ **AUDIO OUT:** (1) 5-pin 3.5 mm detachable terminal block;
Balanced/unbalanced stereo line-level audio output, functional only when the device is receiving a 2-channel stereo input signal;
Output Impedance: 200 Ohms balanced, 100 Ohms unbalanced;
Maximum Output Level: 4 Vrms balanced, 2 Vrms unbalanced

Rear Panel

The following illustration shows the rear panel of the DM-NVX-E760.

DM-NVX-E760 Rear Panel



1. **PWR:** (1) LED, indicates operating power supplied via PoE++, UPOE, or the included power pack; illuminates amber while booting and green when operating

2. **SETUP:** (1) Red LED and (1) push button for on-screen IP address display

   NOTES:

   - If the DM-NVX-E760 encoder is connected to a DM-NVX-D30(C), DM-NVX-D80-IOAV, or DM-NVX-36x(C) decoder, pressing the **SETUP** button on the DM-NVX-E760 for less than 10 seconds displays the encoder and decoder IP addresses on the display connected to the decoder.
   - If the DM-NVX-E760 encoder is connected to a DM-NVX-35x(C) decoder, pressing the **SETUP** button on the DM-NVX-E760 for less than 10 seconds displays the IP address of the decoder on the display connected to the decoder.

3. **RESET:** (1) Recessed push button for hardware reset

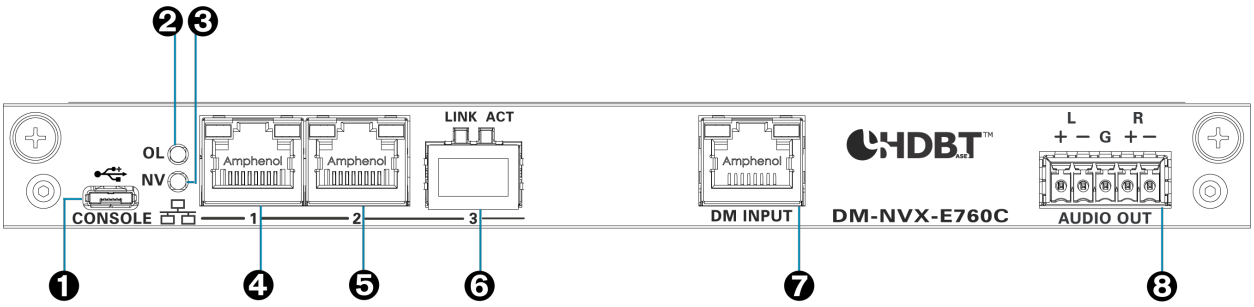
4. **24VDC 2.5A:** (1) 2.1 x 5.5 mm DC power connector;
   24 VDC power input;
   PW-2420RU power pack (included)

5. **G:** 6-32 screw;
   Chassis ground lug

DM-NVX-E760C

This section provides information about the connectors and indicators on the DM-NVX-E760C.

DM-NVX-E760C



❶ **CONSOLE:** (1) Micro USB connector, female;
USB 2.0 computer console port (for setup)

❷ **OL:** (1) LED, green indicates an online connection to a control system via Ethernet

❸ **NV:** (1) LED, green indicates unit is encoding (transmitting) network video

❹ **Ethernet 1:** (1) 8-pin RJ-45 connector, female;
100BASE-TX/1000BASE-T Ethernet port
(2) LEDs, green indicates Ethernet link status, amber indicates Ethernet activity

❺ **Ethernet 2:** (1) 8-pin RJ-45 connector, female;
100BASE-TX/1000BASE-T Ethernet port
(2) LEDs, green indicates Ethernet link status, amber indicates Ethernet activity

❻ **Ethernet 3:** (1) SFP port;
Accepts one Crestron SFP-1G Series transceiver module (sold separately)
(1) LINK LED, green indicates Ethernet link status
(1) ACT LED, green indicates Ethernet activity

❼ **DM INPUT:** (1) 8-pin RJ-45 connector, female, shielded;
DM 8G+ (HDBaseT standard compliant) or DM Lite input;
PoDM+ (HDBaseT PoE+ compatible) PSE (power sourcing equipment) port or DM Lite power port;
Connects to the DM 8G+ output of a DM switcher, transmitter or other DM device; to the DM Lite port of a DM Lite transmitter; or to an HDBaseT device via CAT5e, Crestron DM-CBL-8G, or Crestron DM-CBL-ULTRA cable
(2) LEDs, green indicates DM link status, amber indicates video and HDCP signal presence

Refer to DM Input (on page 30) for information about configuring the DM INPUT port.

❽ **AUDIO OUT:** (1) 5-pin 3.5 mm detachable terminal block;
Balanced/unbalanced stereo line-level audio output, functional only when the device is receiving a 2-channel stereo input signal;
Output Impedance: 200 Ohms balanced, 100 Ohms unbalanced;
Maximum Output Level: 4 Vrms balanced, 2 Vrms unbalanced

Status and Configuration

This section provides information about viewing or configuring the following items using the web interface or SIMPL Windows as applicable:

DMF-CI-8 Chassis Details

> **NOTE:** DMF-CI-8 chassis details apply to DM NVX cards only and do not apply to DM NVX surface-mountable endpoints.

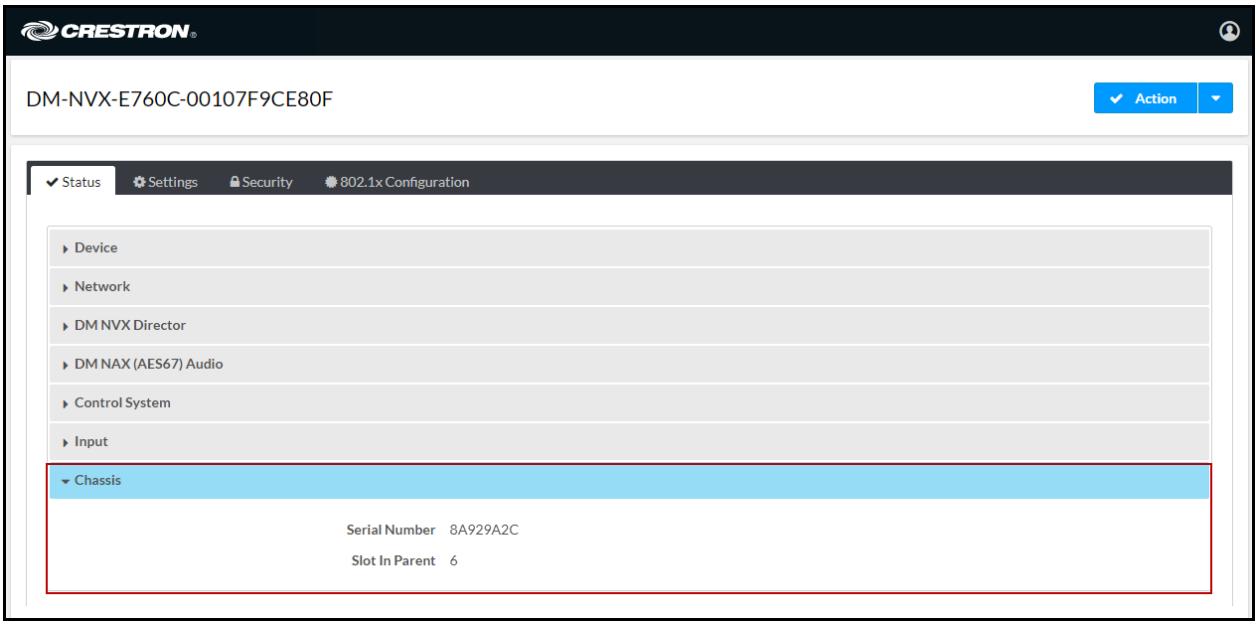
A DM NVX card occupies a card slot in a DMF-CI-8 chassis. Information about the chassis can be viewed using the web interface or SIMPL Windows.

Using the Web Interface

View DMF-CI-8 chassis information by clicking the **Status** tab and then clicking **Chassis**. The **Chassis** section displays the following information:

- Serial number of the chassis
- Number of the slot into which the card is installed

Status Tab - Chassis



Using SIMPL Windows

Using the top-level programming slot for the DM NVX card, program the **<ChassisSerialNumber_F>** serial output join to report the serial number of the chassis in which the card is installed. Program the **<CardSlotInfo_F>** serial output join to report the slot number in which the card is installed in the chassis.

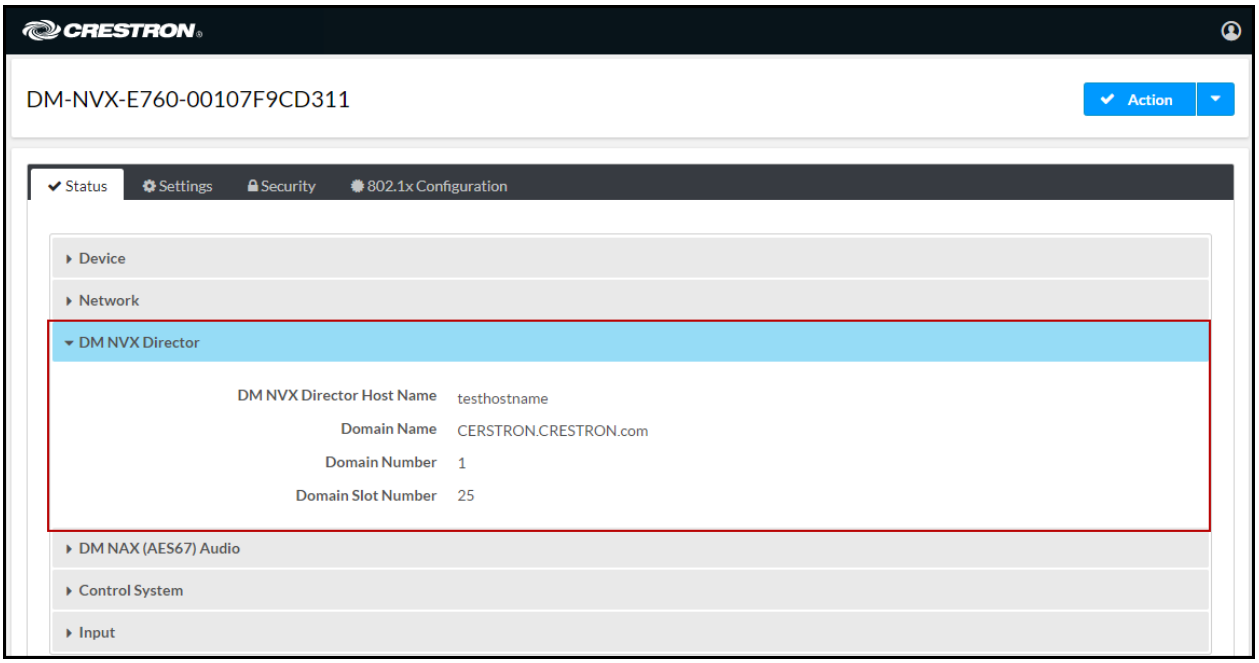
DM NVX Director Virtual Switching Appliance

If a DM NVX device is managed by a DM NVX Director® virtual switching appliance, information about the appliance can be viewed using the web interface.

View DM NVX Director appliance information by clicking the **Status** tab and then clicking **DM NVX Director**. The DM NVX Director section displays the following information:

- DM NVX Director host name
- Domain name, domain number, and domain slot number to which the DM NVX device is assigned

Status Tab - DM NVX Director



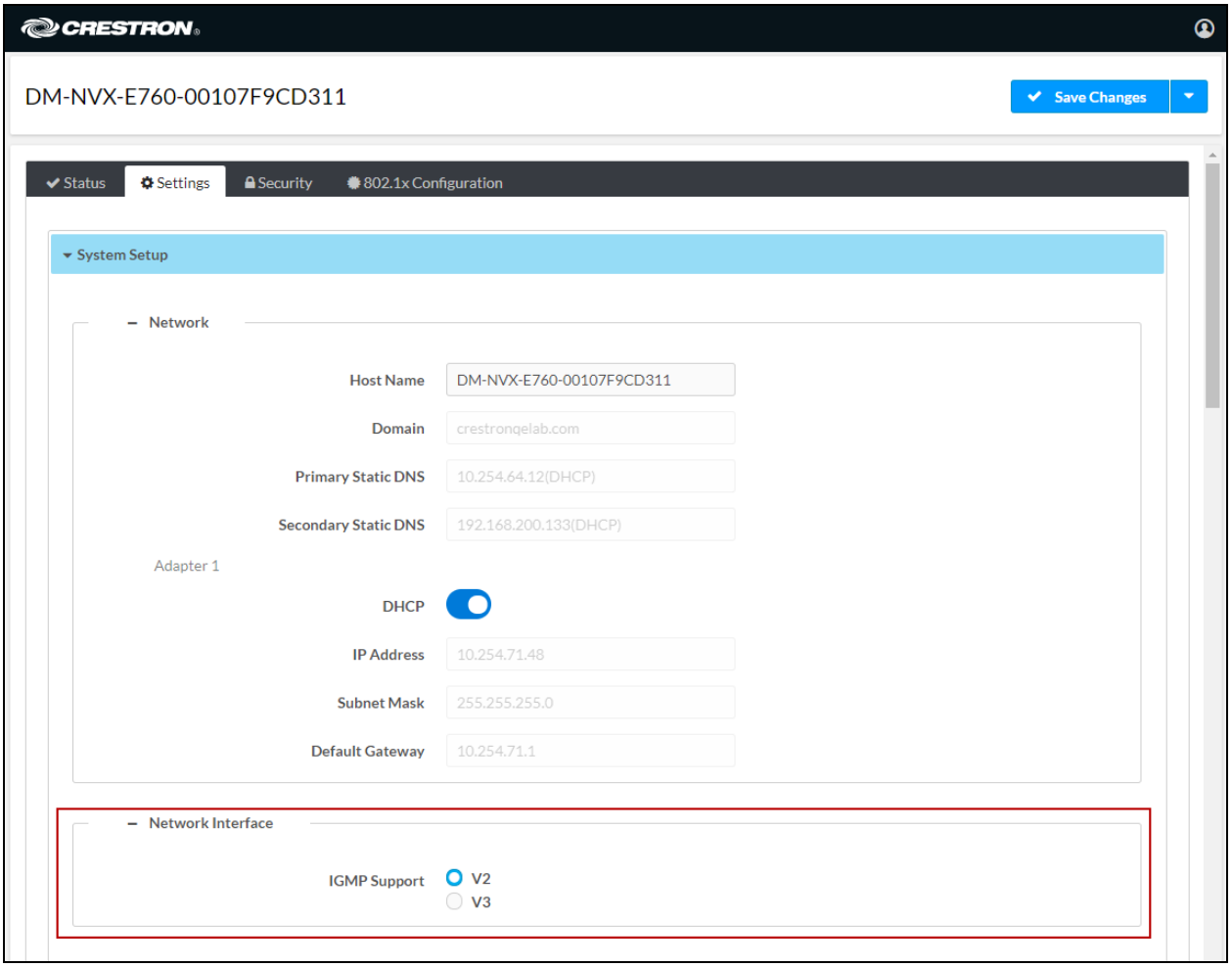
IGMP Snooping

A DM NVX device sends IGMP join and leave messages.

> **NOTE:** DM NVX devices support IGMPv2 and IGMPv3 only. IGMPv1 is not supported.

The IGMP snooping support version (v2 or v3) is configurable in the web interface. The desired version can be selected under the **Settings** tab in the **System Setup - Network Interface** section. The default setting is **v2**.

Settings Tab - System Setup, Network Interface



NOTE: When a different IGMP snooping support version is selected, the DM NVX device must be rebooted in order for the change to take effect.

The network switch port that connects to a DM NVX device must be enabled with IGMPv2 or IGMPv3 snooping to prevent the switch from flooding the multicast destination address traffic to all other connected ports. The multicast destination address that is configured for the DM NVX device must be within the range of qualified addresses. An upstream device such as a layer 3 router or switch periodically sends the IGMP General Query messages to hosts in order to maintain group membership state information. These queries can be either general or group-specific queries. The host responds to queries with IGMP membership reports. The host running IGMPv2 or IGMPv3 may also send a Leave Group message to routers or switches in order to withdraw from the group.

NOTES:

- DM NVX devices do not support random-timer and source-specific queries.
- As a host, a DM NVX device configured for support of IGMPv3 is compatible with a network switch (IGMP querier) that is configured for IGMPv2.

IGMP snooping switches build forwarding lists by listening for and, in some cases, intercepting IGMP messages. Although the software processing the IGMP messages may maintain state information based on the full IP group addresses, the forwarding tables are typically mapped to link layer addresses as shown in the following example.

Example of Forwarding Table

Multicast MAC Address	Member Ports
01-00-5E-00-00-01	2, 7
01-00-5E-01-02-03	1, 2, 3, 7
01-00-5E-23-E2-05	1, 4

Because only the least significant 23 bits of the IP address are mapped to Ethernet addresses (RFC 1112), there is a loss of information when forwarding solely on the destination MAC address. For example, IP addresses 224.0.0.123 and 239.128.0.123 and similar IP multicast addresses all map to MAC address 01-00-5e-00-00-7b for Ethernet. As a result, IGMP snooping switches may collapse IP multicast group memberships into a single Ethernet multicast membership group.

In addition to building and maintaining lists of multicast group memberships, the snooping switch must also maintain a list of multicast routers. When multicast packets are forwarded, the packets should be forwarded not only on ports that have expressed joins using IGMP but also on ports to which multicast routers are attached.

NOTES:

- Do not assign reserved multicast IP addresses to a DM NVX device for streaming. For additional information, go to https://www.iana.org/assignments/multicast-addresses/multicast-addresses.txt.
- Multicast collision is a concern with IPv4. For example, multicast IPv4 addresses 224.8.7.6 and 229.136.7.6 translate to the same MAC address (01:00:5E:08:07:06).

The following items provide recommendations for configuration of a network switch for IGMP snooping:

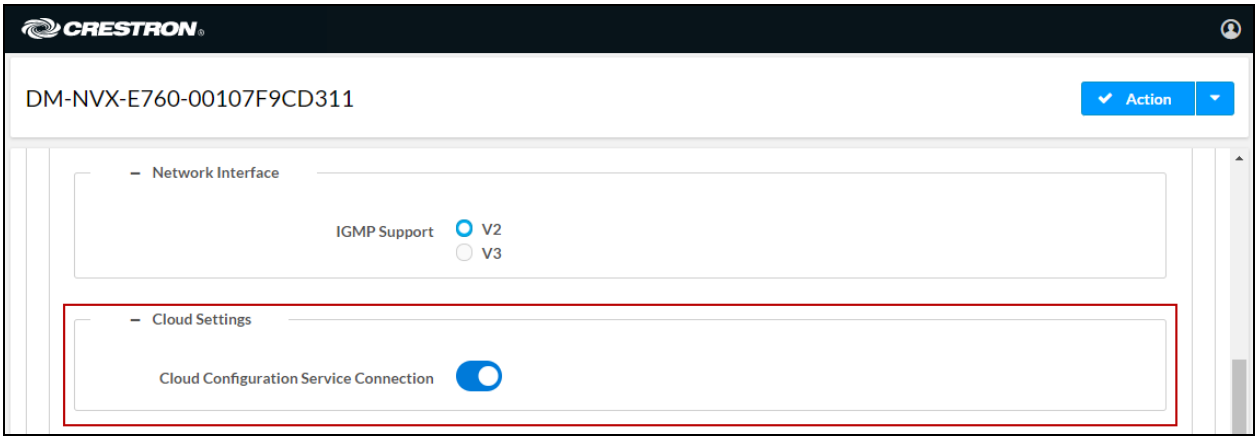
- Set the IGMP query interval to 60 seconds or 125 seconds. The recommended setting is the default setting of the network switch.
- For good network performance, ensure that there is only one IGMP querier in the network.
- Set IGMP snooping to v2 or v3.
- Enable IGMP snooping globally as well as for each specific VLAN for DM NVX connected ports.
- Configure the network switch to drop unknown multicast packets.
- If the network switch supports IGMP fast leave, enable the configuration at the port, global, or VLAN level.
- If the network switch supports PIM snooping, enable the configuration to prevent flooding IP multicast traffic toward multicast router (mrouter) ports.

Crestron XiO Cloud Service Connection

The Crestron XiO Cloud® service allows supported Crestron devices across an enterprise to be managed and configured from one central and secure location in the cloud. Connection to the Crestron XiO Cloud service can be enabled or disabled using the web interface.

Configure the connection to the XiO Cloud service by clicking the **Settings** tab and then clicking **System Setup**. By default, **Cloud Configuration Service Connection** is enabled. If **Cloud Configuration Service Connection** is disabled, enable the connection by setting the toggle switch in the On (right) position. To disable the connection, set the toggle switch in the Off (left) position.

Settings Tab - System Setup, Cloud Settings



For instructions about how to connect to the service, refer to the DM-NVX-E760 Quick Start (Doc. 8646) or DM-NVX-E760C Quick Start (Doc. 8636) as appropriate. For information about using the service, refer to the XiO Cloud Provisioning and Management Service User Guide (Doc. 8638).

Automatic Point-to-Point Connectivity

Point-to-point connectivity enables the DM-NVX-E760(C) to be connected directly to a DM NVX 4K60 4:4:4 decoder to stream video and audio. Rather than being connected to an Ethernet switch, a 1000BASE-T Ethernet port of the DM-NVX-E760(C) is connected directly to a 1000BASE-T port of the decoder. By default, point-to-point mode is enabled (set to **Auto**) and can be disabled if desired. When enabled, no additional configuration is required for the DM-NVX-E760(C) to operate in point-to-point mode.

To enable or disable point-to-point mode, use the web interface or SIMPL Windows as discussed in the following sections.

Using the Web Interface

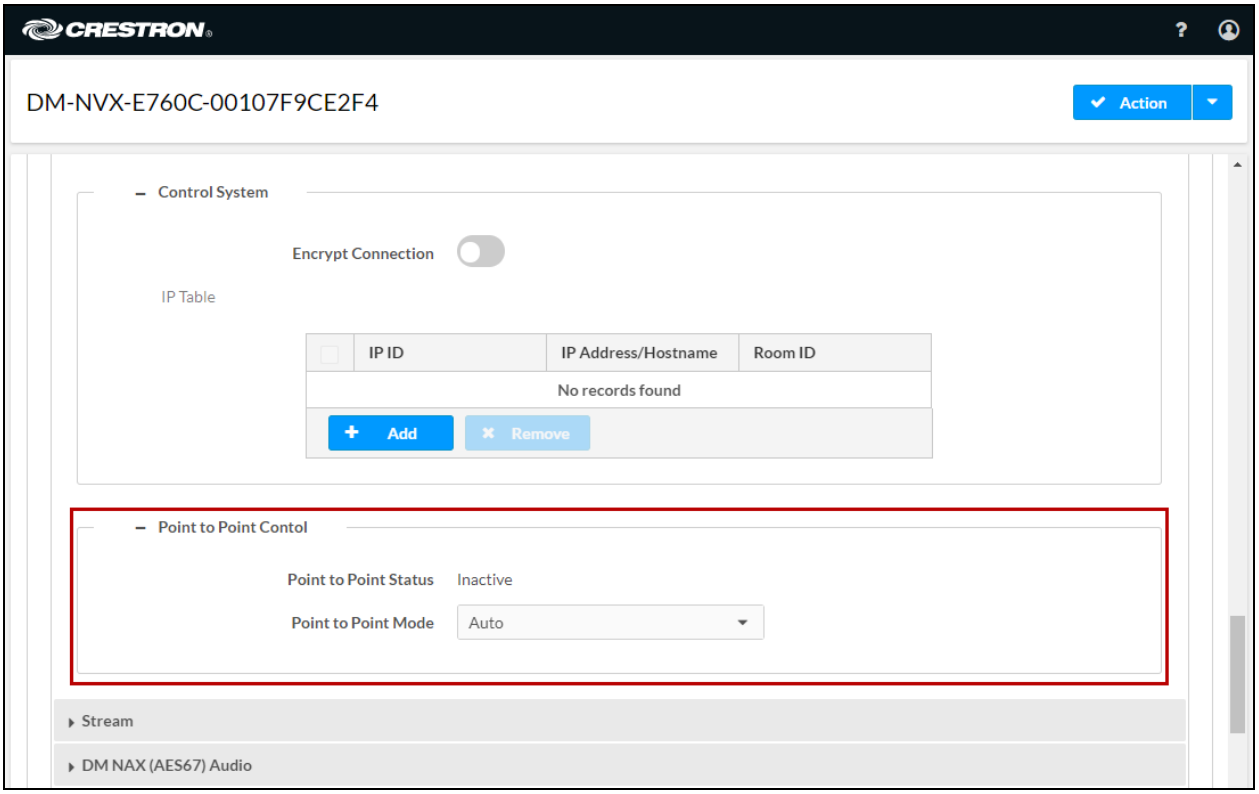
Enable or disable point-to-point mode by clicking the **Settings** tab and then clicking **System Setup**.

In the **Point-to-Point Control** section, **Point to Point Status** indicates whether point-to-point mode is **Active** or **Inactive**.

In the **Point-to-Point mode** drop-down list, select either of the following:

- **Auto:** (Default setting) A 1000BASE-T port of the DM-NVX-E760(C) detects a direct connection to a DM NVX 4K60 4:4:4 decoder or a connection to a 1000BASE-T switch. If a direct connection to a decoder is detected, point-to-point mode is automatically enabled.
- **Disable:** Disables point-to-point mode

Settings Tab - System Setup, Point-to-Point Control



Using SIMPL Windows

Using the top-level programming slot for the DM-NVX-E760(C) device, set the **<PointToPointMode>** analog input join to the desired value. For additional information, refer to the SIMPL Windows help file.

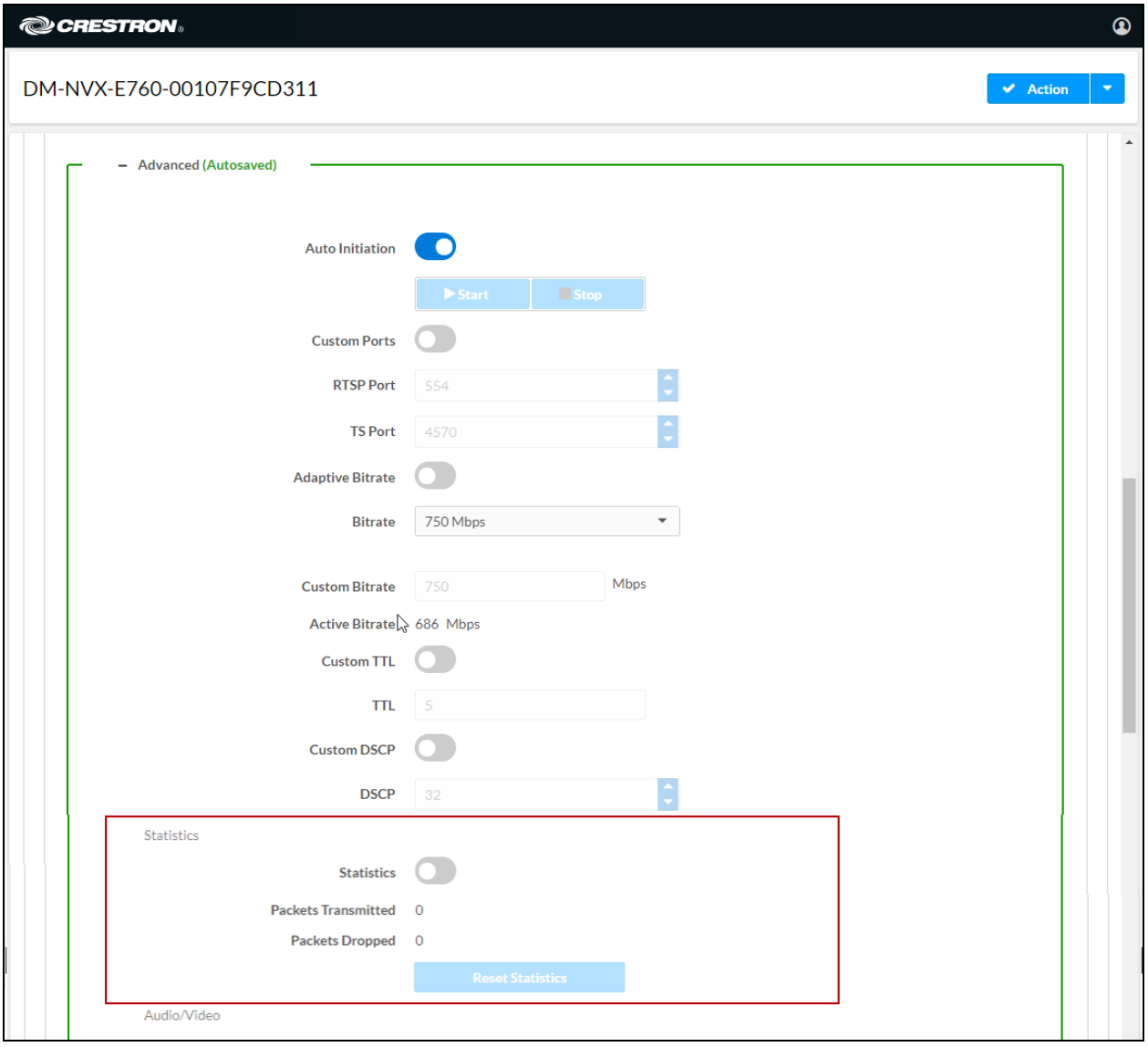
Stream Statistics

Statistics can be displayed to indicate the number of packets transmitted and dropped. To enable or disable stream statistics, use the web interface or SIMPL Windows as discussed in the following sections

Using the Web Interface

View stream statistics by clicking the **Settings** tab and then clicking **Stream**. In the **Advanced** section, enable **Statistics** by setting the **Statistics** toggle switch in the On (right) position. The default setting is in the Off (left) position. To reset statistics, click **Reset Statistics**. For additional information, refer to the online help of the web interface.

Settings Tab - Stream, Statistics



Using SIMPL Windows

Configure stream statistics in **Slot-01: Stream Transmit**. Trigger the **<StatisticsEnabled>** digital input join to enable the reporting of statistics.

To disable statistics, trigger the **<StatisticsDisabled>** digital input join. To clear the statistics, trigger the **<ResetStatistics>** digital input join. The corresponding serial joins are updated when the digital input joins are triggered. For additional information, refer to the SIMPL Windows help file.

Image Preview

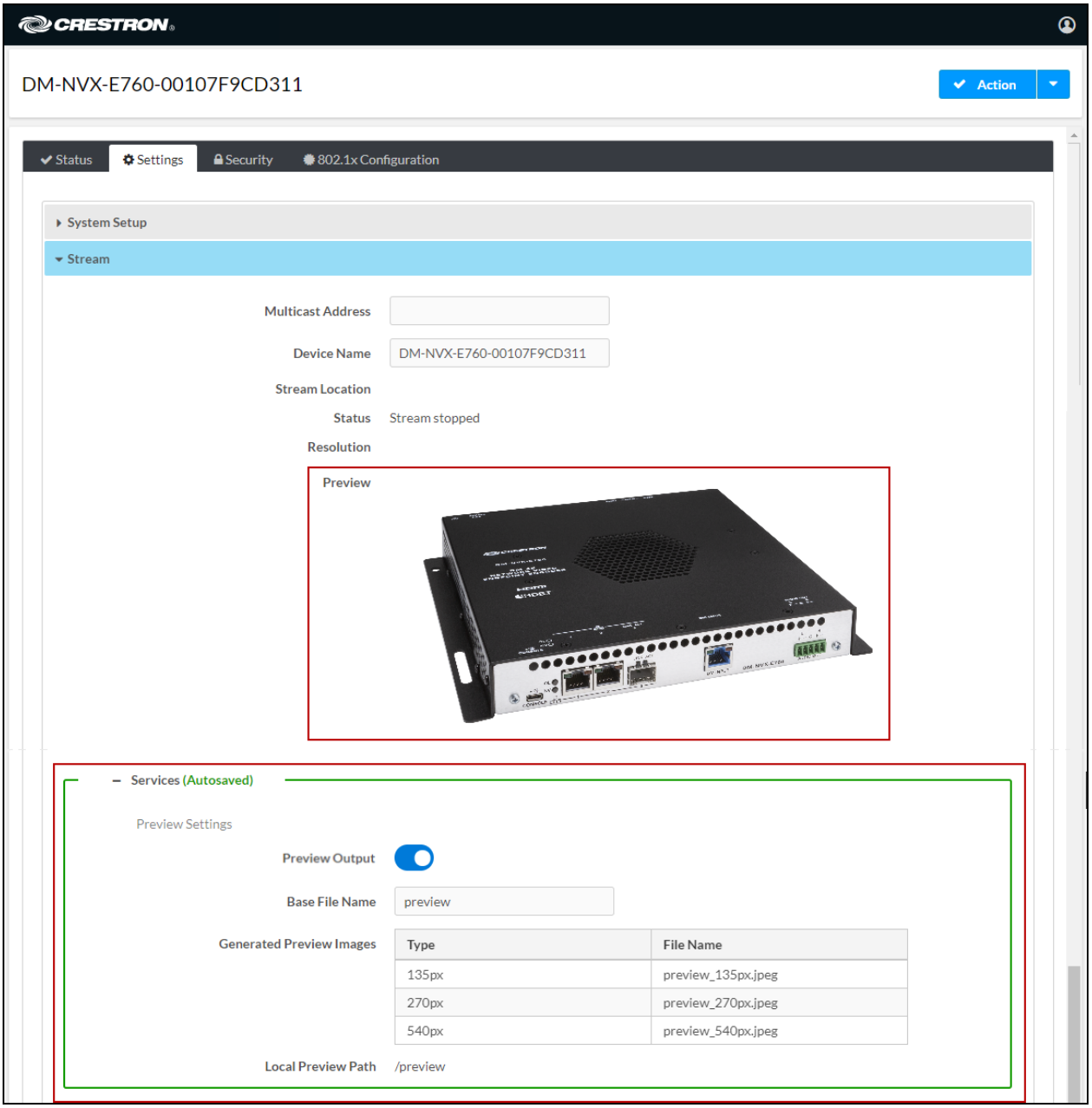
Image preview provides still images (thumbnails) that show the current video being received by the DM® input of the DM-NVX-E760 or DM-NVX-E760C. Still images are shown at one frame per second. Image preview supports the maximum resolution of the source and scales the image while maintaining the aspect ratio. Images can be previewed in the DM NVX web interface and accessed remotely using a web browser. The images can also be previewed on a Crestron touch screen or third-party interface. Image preview is supported for non-HDCP content only.

To configure image preview, use the web interface or SIMPL Windows as discussed in the following sections.

Using the Web Interface

Configure image preview by clicking the **Settings** tab and then clicking **Stream**.

Settings Tab - Stream, Image Preview (Sample Image Shown)



In the **Stream** section, do the following:

1. Under **Services**, enable **Preview Output** if it is disabled by setting the **Preview Output** toggle switch in the On (right) position (default setting). If video is present, video is displayed in the Preview window above **Services**. (Double-clicking the Preview window displays the video window full screen.)
2. Enter a base file name (prefix) to the file name of the images to be generated. The default base file name is **preview**.

   The **Generated Preview Images** table lists the image previews. **Type** indicates the height of the image in pixels. **File Name** indicates the file name of the image in the following format:

   <base file name>_<vertical resolution>px.<extension>

   - **<base file name>** is the prefix assigned to the image preview followed by an underscore. If the default base file name of preview is changed, clicking the table updates the base name in the table.
   - **<vertical resolution>** is the height of the image in pixels (px).
   - **<extension>** is the file format of the image. The default file extension is .jpeg.

   For example, using the default base file name, which is **preview**, and a JPEG image with a vertical resolution of 240 pixels, the file name of the image preview is **preview_240px.jpeg**.

   Local Preview Path indicates the **/preview** location to which image preview files are saved to the web server of the DM NVX device. An image preview file can be accessed from a web browser on a remote device by entering the following URL:

   https://<username>:<password>@<ip address>/preview/<filename>

   - **<username>** is the user name used to access the DM NVX web server.
   - **<password>** is the password used to access the DM NVX web server.
   - **<ip address>** is the IP address of the DM NVX device.
   - **<filename>** is the file name of the image preview file.

   For example:

   https://admin:admin@172.30.160.90/preview/preview_540px.jpeg

   - **admin** is the user name used to access the DM NVX web server.
   - **admin** is the password used to access the DM NVX web server.
   - **172.30.160.90** is the IP address of the DM NVX device.
   - **preview_540px.jpeg** is the file name of the image preview file.

Using SIMPL Windows

Enable or disable image preview functionality in **Slot-1003: DM Preview Image**. Trigger the **<Enable>** digital input join to enable image preview functionality. To disable image preview functionality, trigger the **<Disable>** digital input join. For additional information, refer to the SIMPL Windows help file.

Multicast TTL (Time-to-Live)

Multicast TTL provides the ability to limit or extend the hop limit of a DM NVX stream that traverses routers. In IPv4 multicasting, routers have a TTL threshold assigned to each interface. Only multicast packets with a TTL greater than the threshold of the interface are forwarded.

Multicast TTL can be set to any value ranging from **1** to **255**. The default setting is **5**.

To set a multicast TTL value, use the web interface or SIMPL Windows.

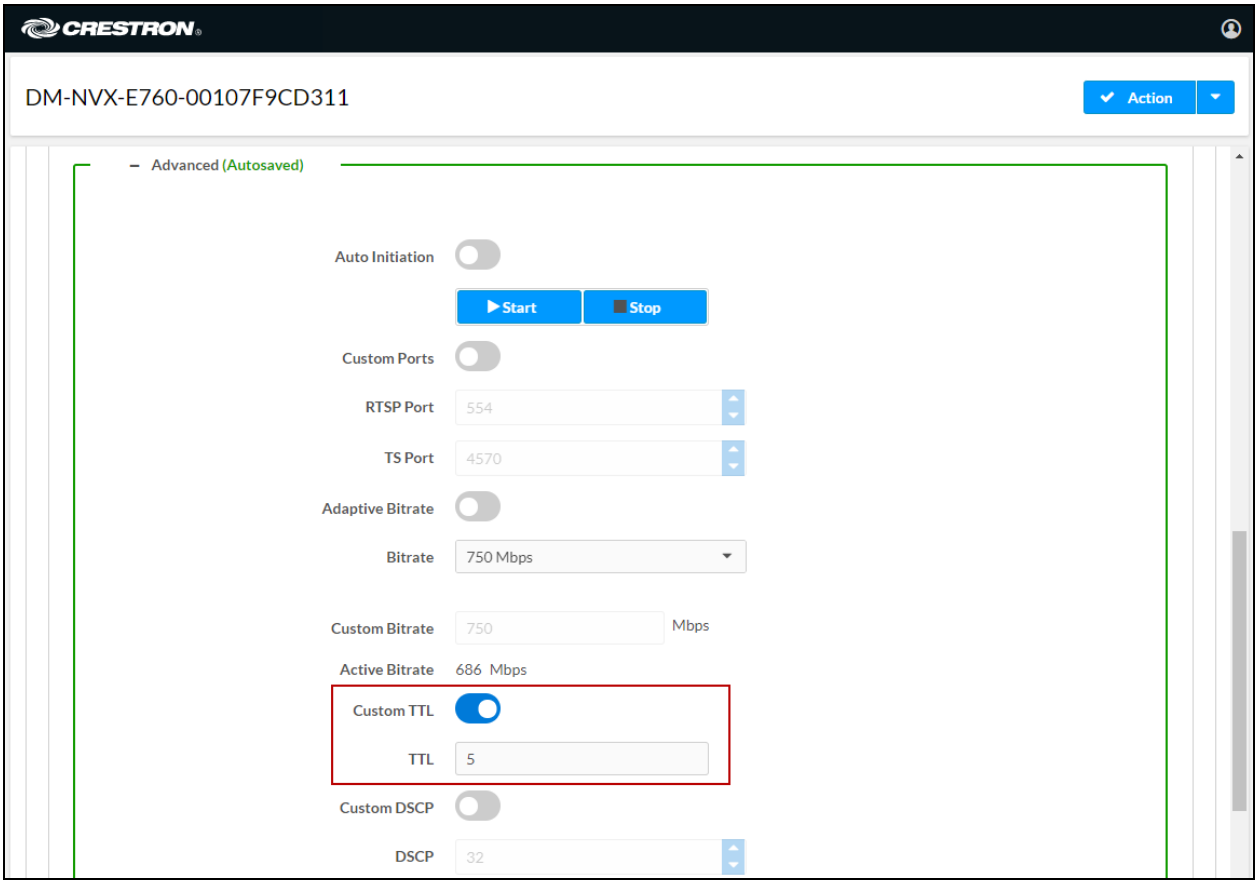
Using the Web Interface

Configure multicast TTL by clicking the **Settings** tab and then clicking **Stream**. In the **Advanced** section, set a multicast TTL value:

1. Disable **Auto Initiation** by setting the **Auto Initiation** toggle switch in the Off (left) position.
2. Stop the stream by clicking **Stop**.
3. Enable **Custom TTL** by setting the **Custom TTL** toggle switch in the On (right) position.
4. In the **TTL** text box, enter the desired TTL value (**1** to **255**). The default setting is **5**.
5. Enable **Auto Initiation** by setting the **Auto Initiation** toggle switch in the On (right) position. The stream automatically restarts.

> **NOTE:** Disabling **Custom TTL** returns the TTL value to the default setting.

Settings Tab - Stream, Custom TTL



Using SIMPL Windows

Configure multicast TTL as follows:

1. Using the top-level programming slot:
    a. Trigger the **<AutomaticInitiationDisabled>** digital input join.
    b. Trigger the **<Stop>** digital input join.
2. In **Slot-01: Stream Transmit**, set the **<MulticastTTL>** analog input join to the desired value (**1** to **255**).
3. Using the top-level programming slot, trigger the **<AutomaticInitiationEnabled>** digital input join. The stream automatically restarts.

For additional information, refer to the SIMPL Windows help file.

DSCP (Differentiated Services Code Point)

To implement Quality of Service (QoS), IP networks use the DSCP value. Within an IP packet header, the DSCP defines a value from 0 to 63 that maps to a certain traffic classification. Based on IT department policies, DSCP values are used within a network to determine the treatment of packets in router queues, the routes of traffic flows, and per-hop behavior. By default, DSCP is set to **32**.

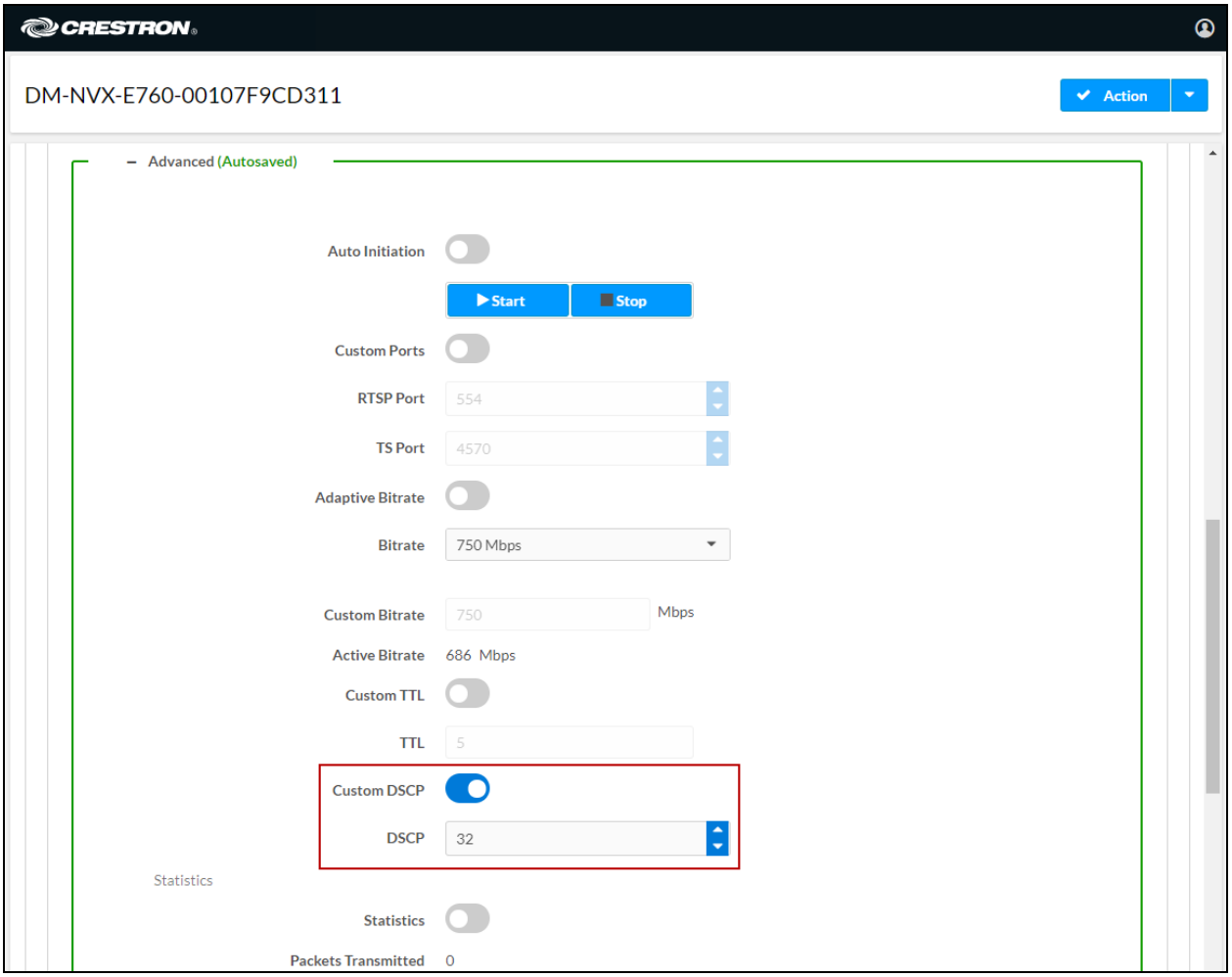
> **NOTE:** Change the DSCP default setting of **32** only if required by IT department policies.

Configure DSCP by clicking the **Settings** tab and then clicking **Stream**. In the **Advanced** section, set a DSCP value:

1. Disable **Auto Initiation** by setting the **Auto Initiation** toggle switch in the Off (left) position.
2. Stop the stream by clicking **Stop**.
3. Enable **Custom DSCP** by setting the **Custom DSCP** toggle switch in the On (right) position.
4. In the **DSCP** text box, enter the desired DSCP value (**0** to **63**).
5. Enable **Auto Initiation** by setting the **Auto Initiation** toggle switch in the On (right) position. The stream automatically restarts.

> **NOTE:** Disabling **DSCP** returns the DSCP value to the default setting.

Settings Tab - Stream, Custom DSCP



Fixed, Adaptive, or Variable Bit Rate

For a DM NVX 4K60 4:4:4 encoder, the bit rate of a stream can be set to fixed, adaptive, or variable:

- A fixed bit rate, also referred to as Constant Bit Rate (CBR), is user specified and can be set to a value ranging from 200 Mbps to 950 Mbps.
- Adaptive bit rate (ABR) enables the encoder to automatically set a fixed bit rate based on the input resolution of the stream. For example, the adaptive bit rate for a common resolution such as 1920x1080p@60Hz (1080p60) would automatically be set to 400 Mbps. Adaptive bit rate makes better use of the available bandwidth than a user-defined fixed bit rate.

  The following table lists common resolutions and the associated adaptive bit rate setting.

  Resolution and Associated Adaptive Bit Rate Setting

RESOLUTION	PIXELS PER SECOND	ADAPTIVE BIT RATE (Mbps)
720x480@60 Hz (480p60)	20,736,000	302.777778
1280x720@50 Hz (720p50)	46,080,000	326.543210
1280x720@60 Hz (720p60)	55,296,000	335.185185
1920x1080@50 Hz (1080p50)	103,680,000	380.555556
1920x1080@60 Hz (1080p60)	124,416,000	400
3840x2160@24 Hz (4k24)	199,065,600	470
3840x2160@25 Hz (4k25)	207,360,000	477.777778
3840x2160@30 Hz (4k30)	248,832,000	516.666667
3840x2160@50 Hz (4k50)	414,720,000	672.222222
3840x2160@60 Hz (4k60)	497,664,000	750
4096x2160@50 Hz (DCI50)	442,368,000	698.148148
4096x2160@60 Hz (DCI60)	530,841,600	781.111111

- Variable bit rate (VBR) enables the encoder to automatically vary the bit rate based on the content and input resolution of the stream. The bit rate can vary from less than 150 Mbps to 750 Mbps. A variable bit rate results in the use of less bandwidth to produce the same image quality as a user-specified fixed bit rate or an adaptive bit rate.

Set the bit rate type using the web interface or SIMPL Windows.

Using the Web Interface

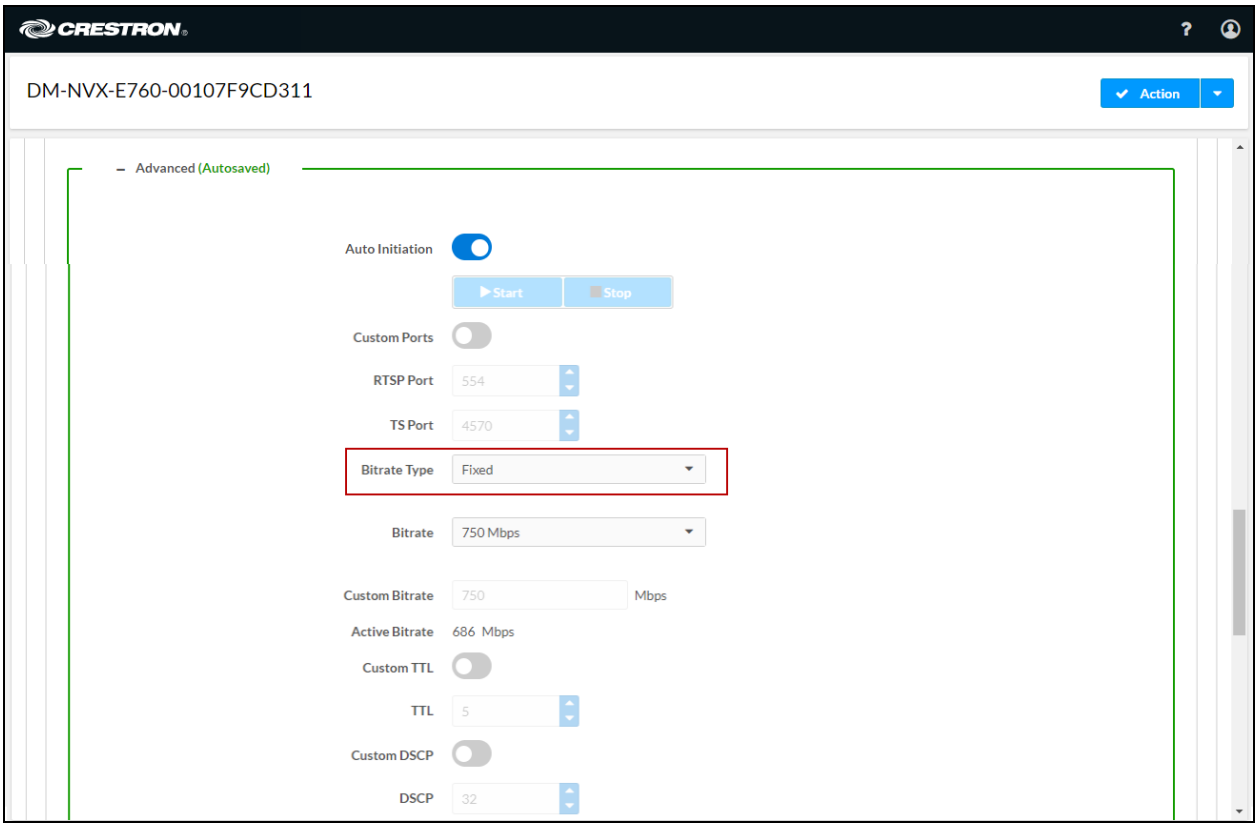
To select the bit rate type:

1. Click the **Settings** tab and then click **Stream**.
2. In the **Advanced** section, select the bit rate type in the **Bitrate Type** drop-down list: **Fixed**, **Adaptive**, or **Variable**.

   If **Fixed** is selected, select a bit rate in the **Bitrate** drop-down list. If **Custom** is selected as the **Fixed** bit rate, enter a custom bit rate value in the **Custom Bitrate** text box. The custom bit rate must be a value ranging from 200 Mbps to 950 Mbps.

   > **NOTE:** For 4K60 video, a bit rate below 350 Mbps may display a black screen.

Settings Tab - Stream, Advanced, Bitrate Type



Using SIMPL Windows

In **Slot-01: Stream Transmit**, set the **<BitrateType>** analog input join to the desired bit rate type (**Constant Bitrate [Default]**, **ABR**, or **VBR**). For additional information, refer to the SIMPL Windows help file.

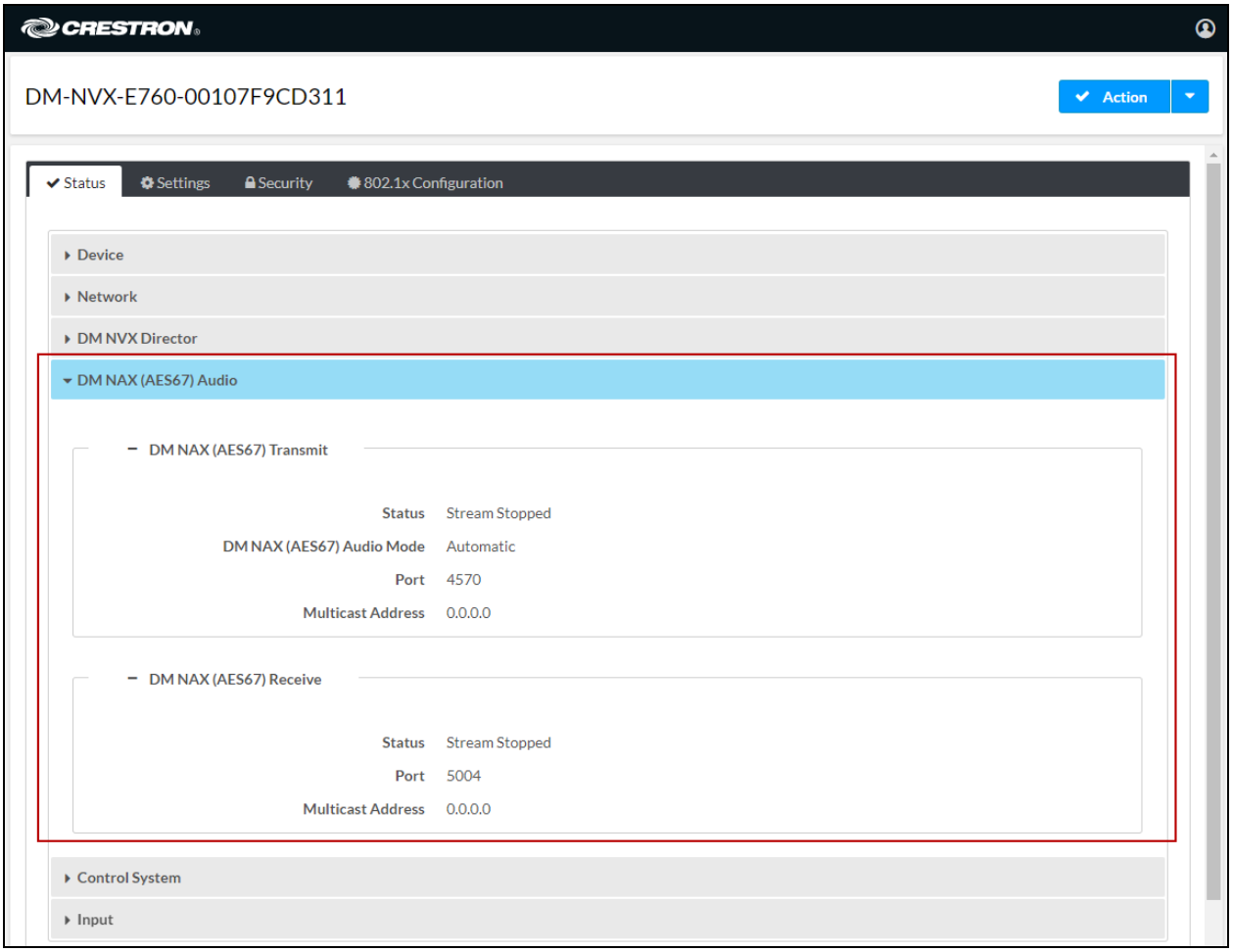
DM NAX Audio over IP (AES67)

DM NAX™ audio over IP supports the AES67 standard. AES67 support allows the selected audio source to be transmitted as a 2-channel AES67 audio stream while another 2-channel AES67 audio stream is received from a Crestron DSP or other third-party device and combined with the video signal. The received AES67 audio stream can be output via the analog audio output.

> **NOTE:** An AES67 audio stream that is received by an endpoint cannot be transmitted from that endpoint.

The current DM NAX (AES67) audio stream status can be viewed under the **Status** tab of the web interface.

Status Tab - DM NAX (AES67)



To configure DM NAX (AES67) audio, use the web interface or SIMPL Windows as discussed in the following sections.

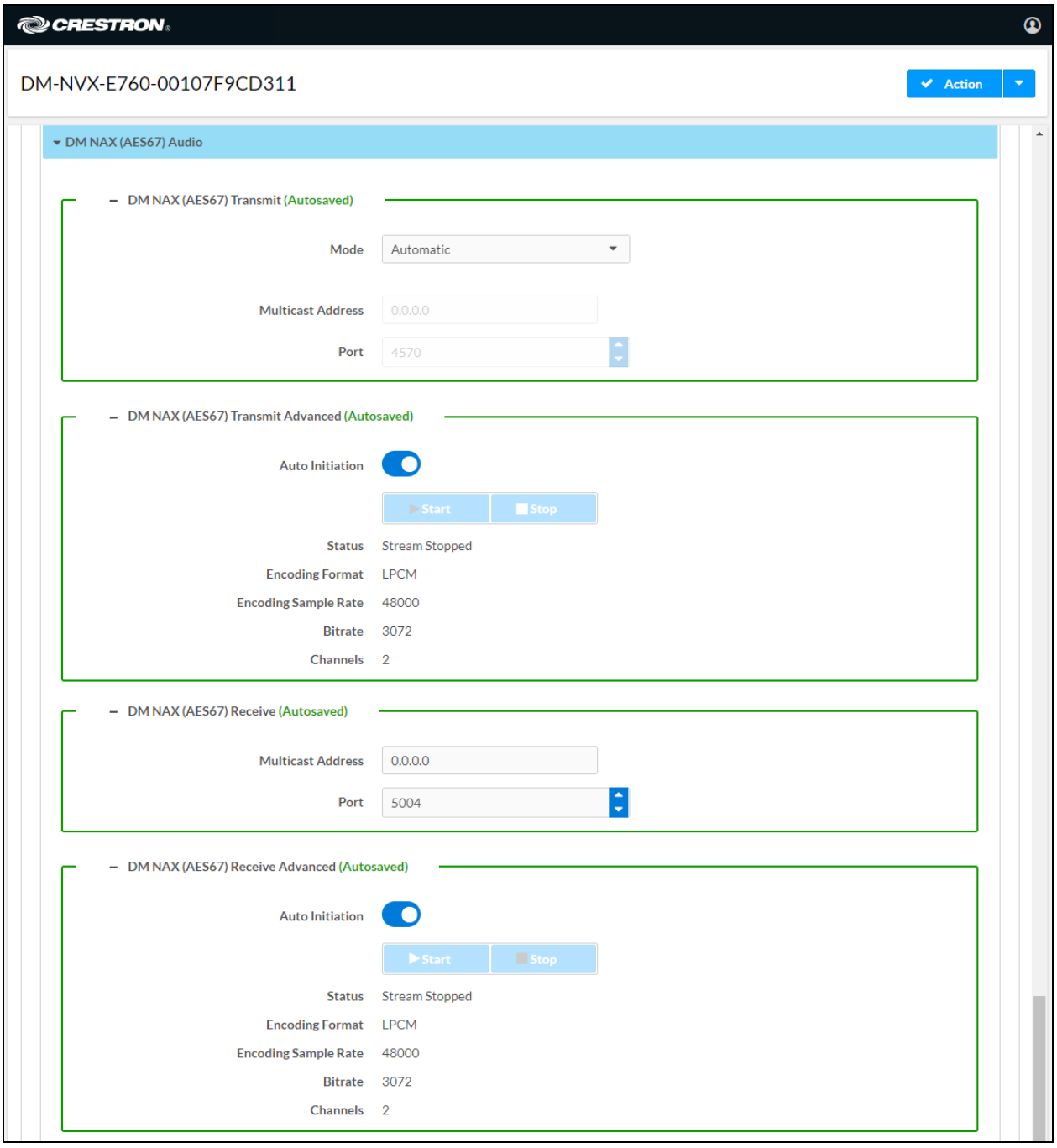
Using the Web Interface

Configure DM NAX (AES67) audio in the DM NAX (AES76) and Routing sections under the **Settings** tab.

Configuring DM NAX (AES67) Audio

Configure DM NAX (AES67) audio by clicking the **Settings** tab and then clicking **DM NAX (AES67) Audio**.

Settings Tab - DM NAX (AES67) Audio



Do the following:

- In the **DM NAX (AES67) Transmit** section:

  In the **Mode** drop-down list, select **Automatic**, **Disabled**, or **Manual**. The default setting is **Automatic**, which adds 1 to the outgoing video stream multicast address. For example, if the video multicast address is 239.8.0.0, the DM NAX (AES67) multicast address is automatically set to 239.8.0.1.

  If **Mode** is set to **Manual**, enter the desired multicast address and port number.

- In the **DM NAX (AES67) Transmit Advanced** section, do either of the following:
  - Enable **Auto Initiation** by setting the toggle switch in the On (right) position. By default, **Auto Initiation** is enabled.
  - Disable **Auto Initiation** by setting the toggle switch in the Off (left) position. If **Auto Initiation** is disabled, start or stop the stream as desired.

  The following AES67 audio stream information is displayed: status, encoding format, encoding sample rate, bit rate, and number of channels.

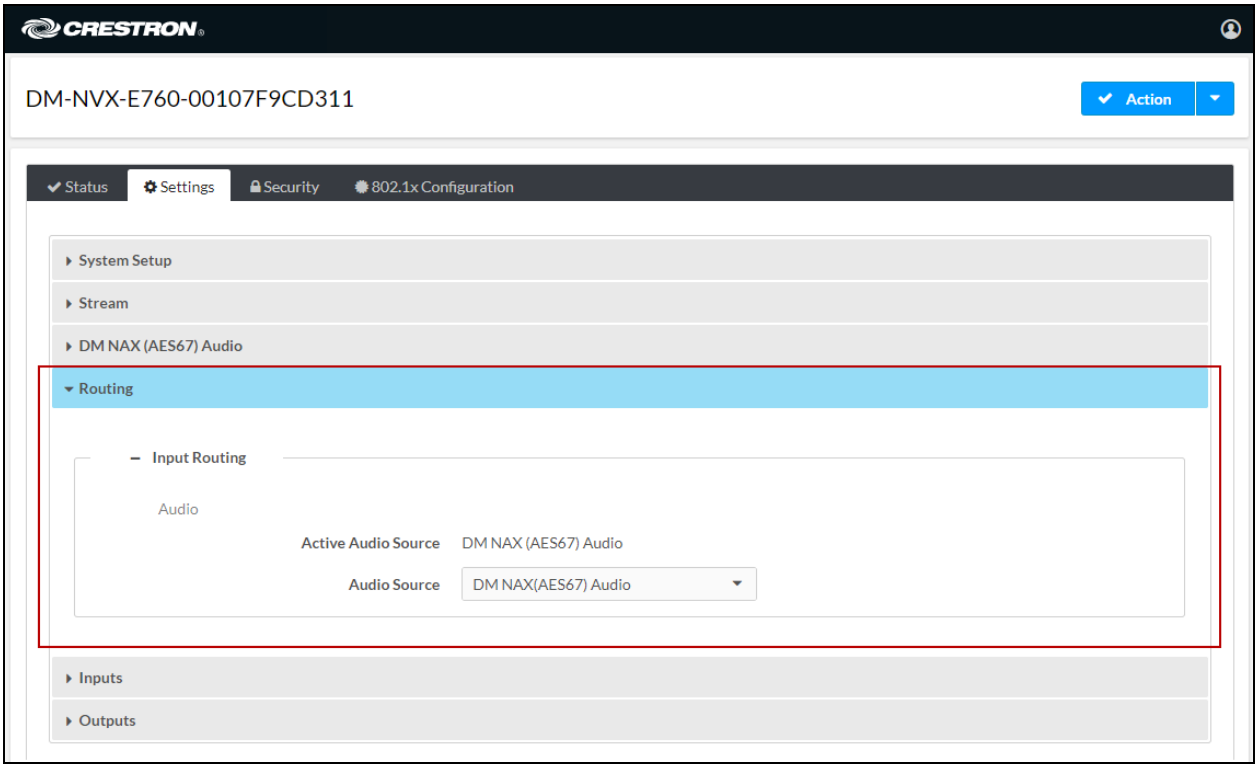
- In the **DM NAX (AES67) Receive** section, enter the multicast address and port number.
- In the **DM NAX (AES67) Receive Advanced** section, do either of the following:
  - Enable **Auto Initiation** by setting the **Auto Initiation** toggle switch in the On (right) position. By default, **Auto Initiation** is enabled.
  - Disable **Auto Initiation** by setting the **Auto Initiation** toggle switch in the Off (left) position. If **Auto Initiation** is disabled, start or stop the stream as desired.

  The following AES67 audio stream information is displayed: status, encoding format, encoding sample rate, bit rate, and number of channels.

Configuring DM NAX (AES67) Audio Routing

Configure DM NAX (AES67) audio routing by clicking the **Settings** tab and then clicking **Routing**. In the Input Routing section, set **Audio Source** to **DM NAX (AES67) Audio** and then click **Save Changes** in the upper-right corner of the web page. The **Active Audio Source** setting is displayed as **DM NAX (AES67) Audio**.

Settings Tab - Routing, DM NAX (AES67) Audio



Using SIMPL Windows

Using the top-level programming slot for the DM-NVX-E760(C) device, set the **<AnalogAudioSource>** analog input join to **DM NAX (AES67) audio** as the audio source for the analog audio output.

Configure DM NAX (AES67) audio routing in **Slot-18: DM NAX (AES67) Routing**. In order for the DM NVX device to transmit DM NAX (AES67) audio, configure DM NAX (AES67) audio in **Slot-18-01: DM NAX (AES67) TX**. In order for the DM NVX device to receive DM NAX (AES67) audio, configure DM NAX (AES67) audio in **Slot-18-33: DM NAX (AES67) RX**. For additional information, refer to the SIMPL Windows help file.

7.1 Surround Sound Audio

DM NVX technology supports the lossless transport of 7.1 surround sound audio signals, including Dolby® TrueHD, Dolby Atmos®, DTS HD®, DTS:X®, and uncompressed linear PCM.

To configure 7.1 surround sound audio, set the desired EDID. Refer to DM Input (on the next page) for additional information.

DM Input

The DM INPUT port on the DM-NVX-E760 and DM-NVX-E760C enables an AV signal from a DM 8G+® output device or DM Lite® transmitter to be transmitted over the network to one or more DM NVX decoders. The DM INPUT port can be connected to the DM 8G+ output of a DM switcher, transmitter, or other DM device. Examples of DM 8G+ output devices are the DMC-4KZ-CO-HD card and DMB-4K-O-C blade of DM switchers, the DM-TX-4KZ-100-C-1G transmitter, and the DMPS3-4K-350-C and DMPS3-4K-250-C presentation systems.

The DM INPUT port can also be connected to the DM Lite port of a DM Lite transmitter. Examples of DM Lite transmitters are the HD-TX-101-C-E and the HD-TX-101-C-1G-E.

To configure the DM INPUT port, use the web interface or SIMPL Windows.

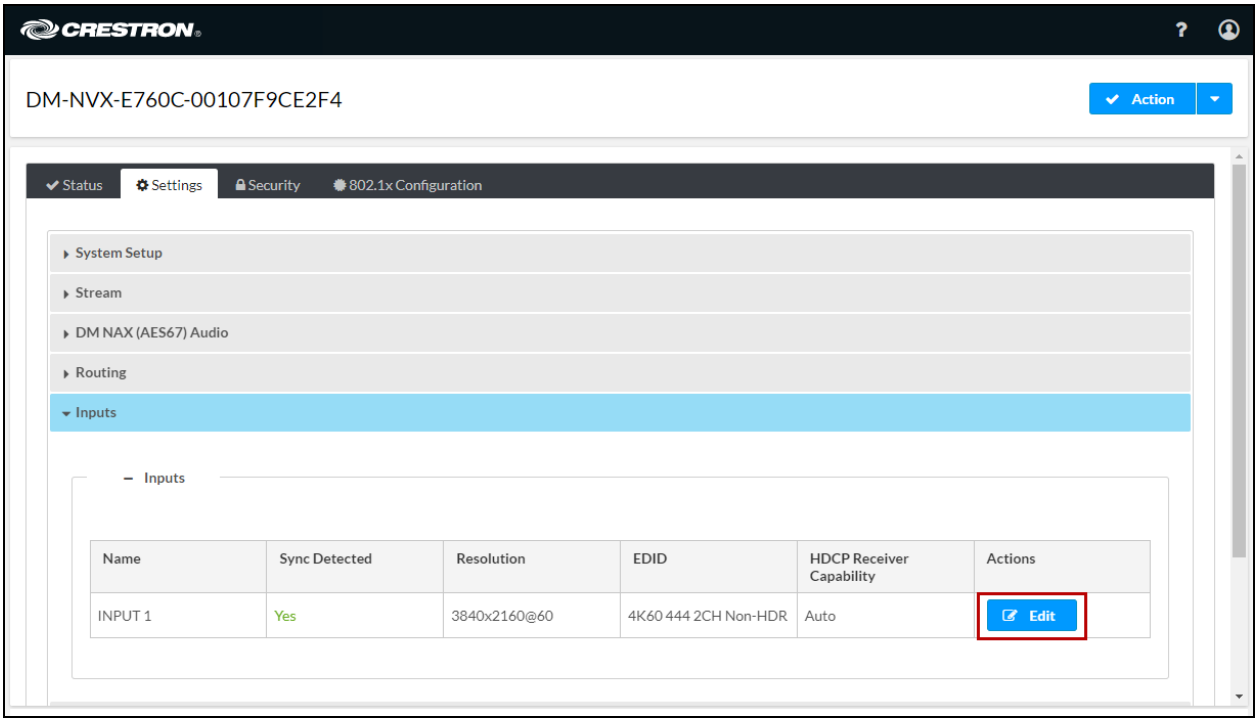
Using the Web Interface

Configure the DM INPUT port by clicking the **Settings** tab and then clicking **Inputs**. The Inputs table is displayed, showing the current status of the input.

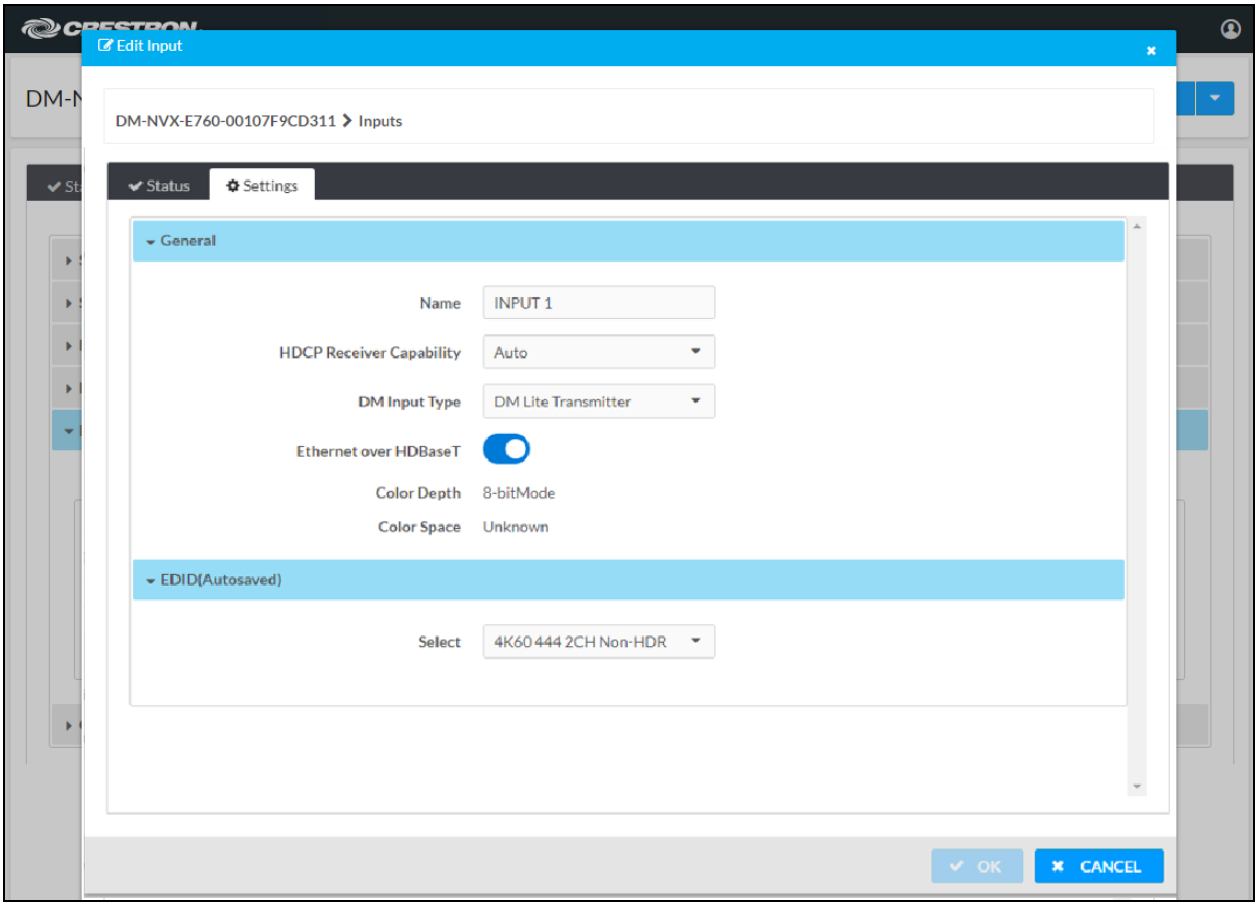
To configure the input:

1. In the **Actions** column, click **Edit**. The Edit Input pop-up dialog box opens.
2. In the General section of the page:
    a. In the **Name** text box, enter a name for the input.
    b. In the **HDCP Receiver Capability** drop-down list, select one of the following to control HDCP (High-bandwidth Digital Content Protection) support for the DM input:
        - **Auto:** (Default setting) Enables the DM input to transmit content based on the highest HDCP level of the connected source
        - **Disabled:** Disables HDCP, causing the DM input to transmit non-HDCP content only
        - **HDCP 1.4:** Sets the HDCP level to 1.4 for HDCP content transmission by the DM input
        - **HDCP 2.2:** Sets the HDCP level to 2.2 for HDCP content transmission by the DM input
    c. In the **DM Input Type** drop-down list, select the device type to be connected to the DM INPUT port: **DM Transmitter**, **DM Lite Transmitter**, or **DM Card**.
    d. **Ethernet over HDBaseT:** To be supported in a future release
3. In the EDID (Extended Display Identification Data) section of the page, select the desired EDID from the **Select** drop-down list and then click **Apply EDID**.
4. Click **OK** in the lower-right corner of the pop-up dialog box.

Settings Tab - Inputs



Edit Input Pop-Up Dialog Box



Using SIMPL Windows

Configure the DM input in **Slot-10: DM In**. Set the **<Name>** serial input join to the desired input name. Set the **<HdcpReceiverCapability>** and **<DMInputType>** analog input joins to the desired values. For additional information, refer to the SIMPL Windows help file.

Still Image Detection

Still image detection enables the DM-NVX-E760(C) endpoint to detect a still image and pass the information to a control system. Still image detection occurs when a sync is detected at the DM input and 5 seconds have elapsed in which no motion occurred within the image.

> **NOTE:** Detection of still images is not supported for certain sources in which pixel changing is occurring within the images but is not visible in the images.

Still image detection is reported in the top-level programming slot of SIMPL Windows via the **<StillImageDetection_F>** analog output join.

Network Port Selection

Network port selection enables network traffic to be managed and segregated based on traffic type. Internal VLANs are used to route different traffic types to specific external Ethernet ports, which can then be assigned to the various traffic types. AES67 audio can be separated from the primary video and control network resulting in a dedicated audio network.

> **CAUTION:** When network port selection is set to **Off** (default setting), multiple Ethernet ports cannot be connected to the same Ethernet switch. Doing so will cause a network loop and bring down the network.

> **NOTE:** If network port selection is enabled, daisy chain configuration is not supported.

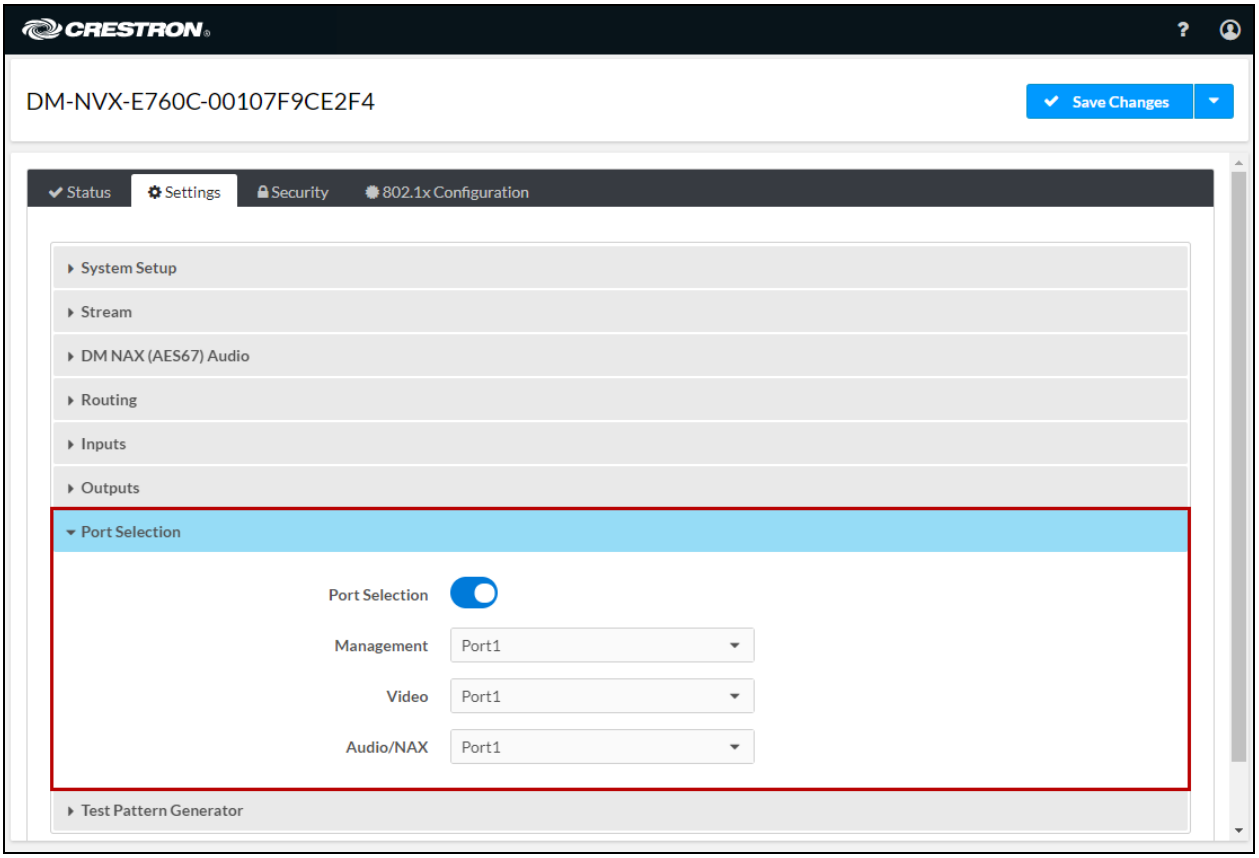
To configure network port selection:

1. Click the **Settings** tab and then click **Port Selection**.
2. Enable or disable network port selection by setting the **Port Selection** toggle switch in the **On** (right) or **Off** (left) position, respectively. The default setting is **Off**.
3. If **Port Selection** is set to **On**, assign each of the following traffic types to a specific Ethernet port:
    - Management (default setting is port 1). Ethernet ports 1, 2, and 3 are available for use.

      > **NOTE:** The management port controls the connection to the DM NVX web interface. Changing the port number will result in losing the connection to the web interface.

    - Video (default setting is port 1). Ethernet ports 1, 2, and 3 are available for use.
    - Audio/NAX (default setting is port 1) Ethernet ports 1, 2, and 3 are available for use.
4. Click **Save Changes** to apply the new settings.

Settings Tab, Port Selection (DM-NVX-E760C Page Shown)



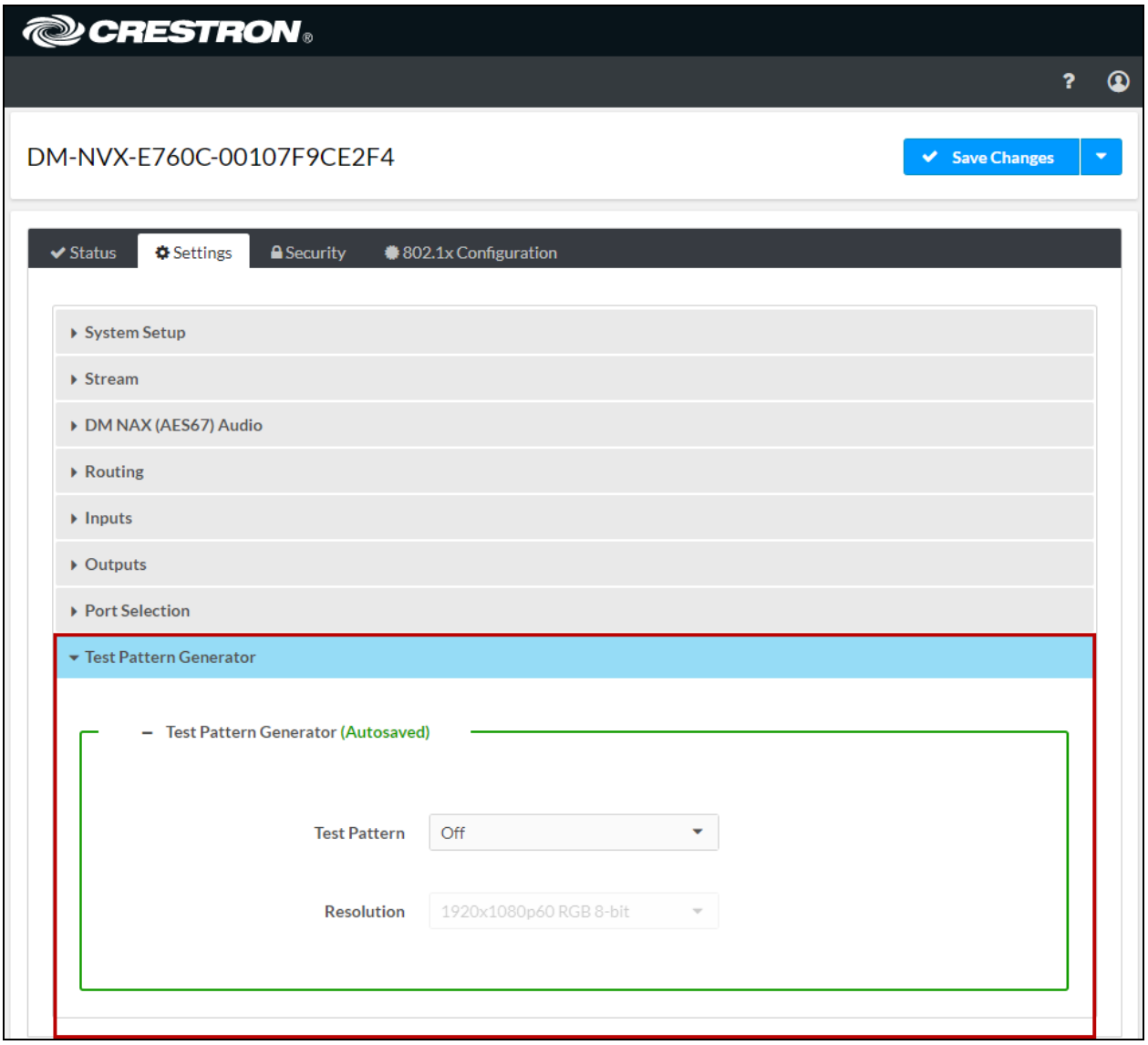
Test Pattern Generator

The built-in test pattern generator can be used to ensure that video streaming is occurring and can also be used as a tool for the adjustment, calibration, and alignment of displays, video walls, and projectors. The DM-NVX-E760(C) can send the test pattern to any routed DM NVX decoder. The test pattern generator can be configured using the web interface or SIMPL Windows.

Using the Web Interface

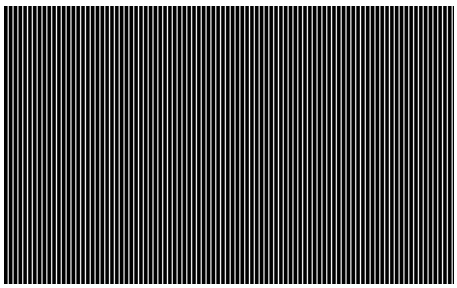
Configure the test pattern generator by clicking the **Settings** tab and then clicking **Test Pattern Generator**.

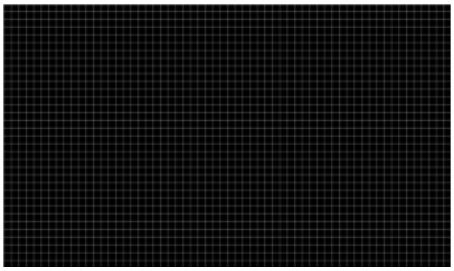
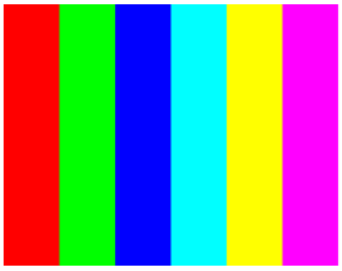
Settings Tab - Test Pattern Generator



In the **Test Pattern Generator** section, do the following:

1. In the **Test Pattern** drop-down list, select the desired test pattern. Available options are listed in the following table.

Test Pattern Option	Test Pattern
Off (default setting)	Disables the test pattern generator
SMPTE ColorBars	
Black	
White	
Vertical Lines	

Test Pattern Option	Test Pattern
Grid	
Color Bars	 
Gray Gradient	
RGB Gradient	
Frequency Adjust	

2. In the **Resolution** drop-down list, select the desired resolution of the test pattern. Available options are the following:

   3840x2160p60 RGB 8-bit

   3840x2160p60 Y420 8-bit

   3840x2160p30 RGB 8-bit

   1920x1080p60 RGB 8-bit

   720p60 RGB 8-bit

Using SIMPL Windows

Configure the test pattern generator in **Slot-12: Test Pattern Generator**. Set the **<TestPatternGenerator>** analog input join to the desired test pattern. Set the **<TestPatternResolution>** analog input join to the desired value. For additional information, refer to the SIMPL Windows help file.

Enterprise-Grade Security

DM NVX devices incorporate advanced security features such as user and group authentication management, IEEE 802.1X authentication, AES-128 content encryption, PKI authentication, TLS (Transport Layer Security), SSH (Secure Shell), and HTTPS (Hypertext Transfer Protocol Secure).

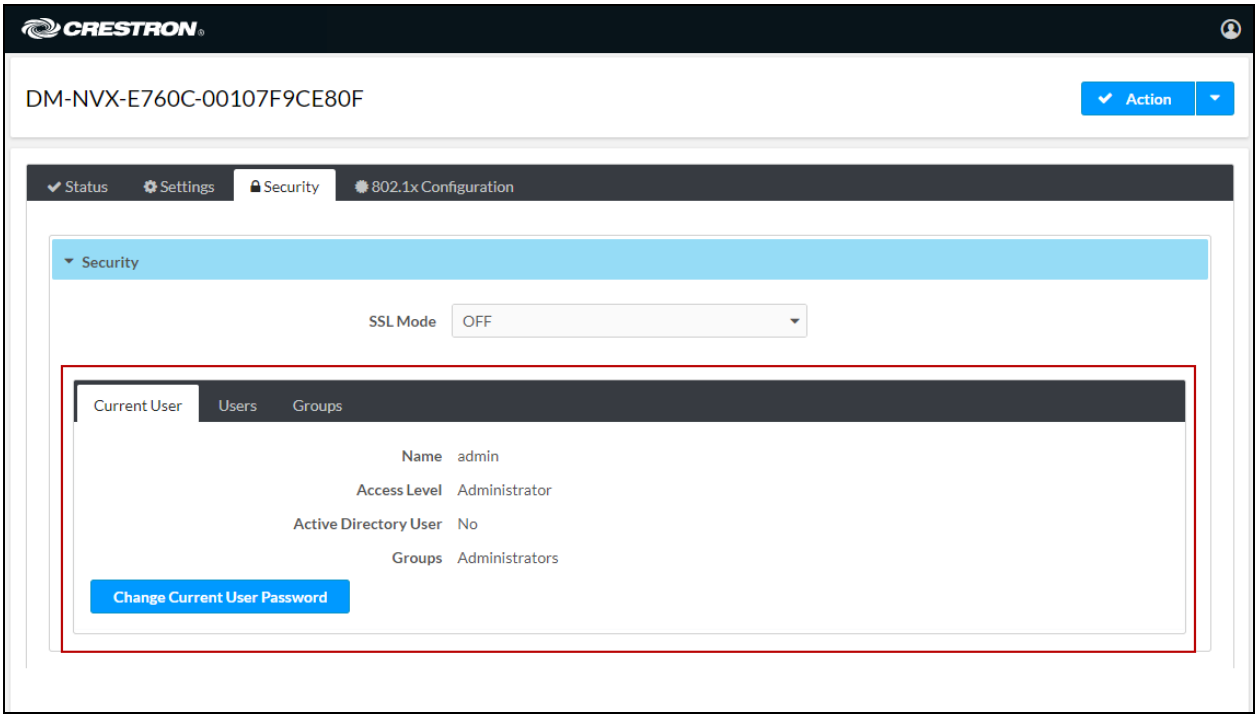
Configure user and group authentication management and IEEE 802.1X authentication using the web interface.

Authentication Management

Authentication management can be configured for users and groups including Active Directory® credential management groups. Predefined access levels can also be assigned.

Configure authentication management in the web interface by clicking the **Security** tab. For detailed information, refer to the online help of the web interface.

Security Tab - Authentication Management of Users and Groups

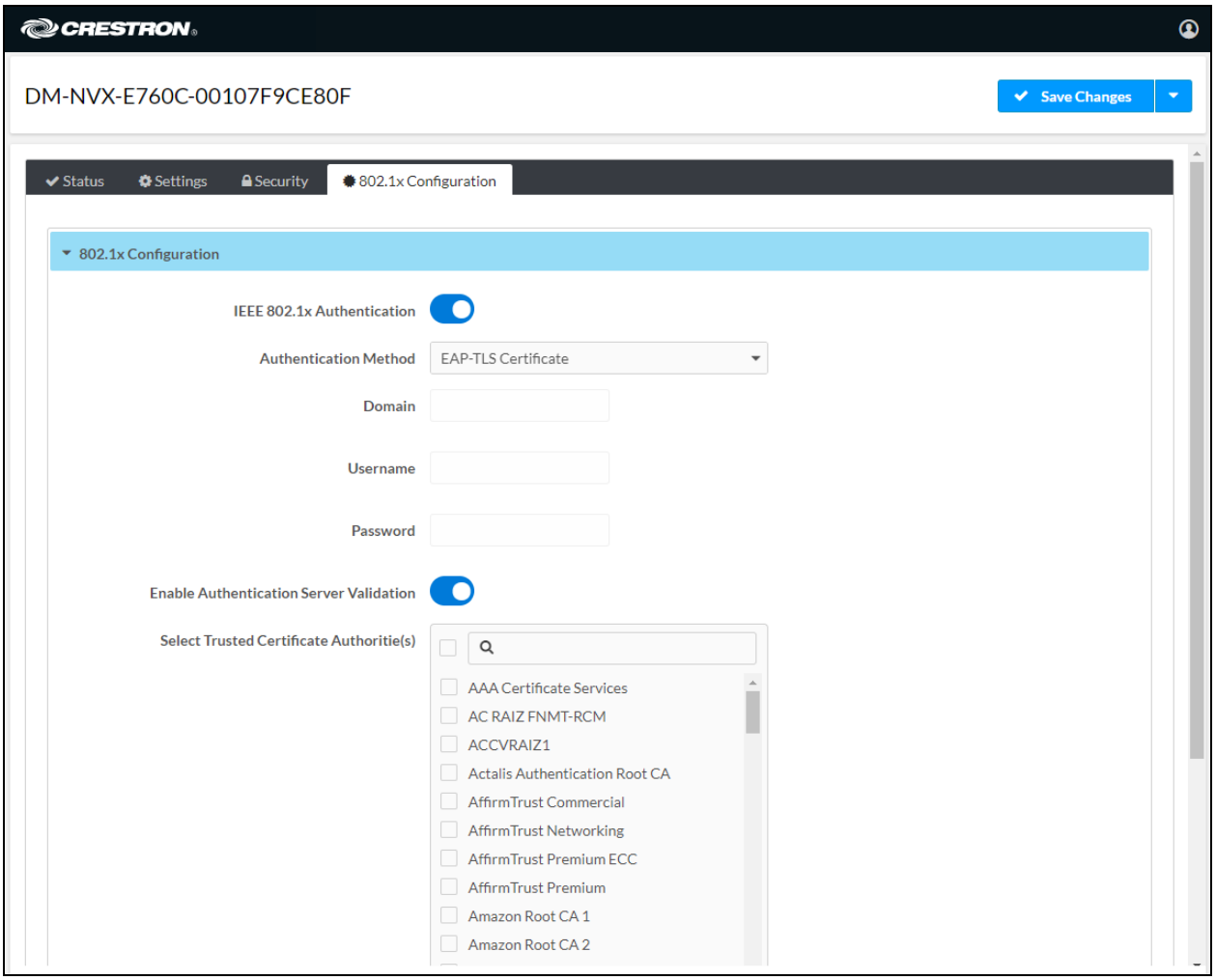


IEEE 802.1X Authentication

IEEE 802.1X is a network standard designed to enhance the security of wireless and wired LANs. The standard defines how to provide authentication for devices trying to connect to other devices on the LAN.

Configure IEEE 802.1X authentication in the web interface by clicking the **802.1x Configuration** tab. For detailed information, refer to the online help of the web interface.

802.1X Authentication Tab



Automatic Firmware Update

A DM NXV device can be automatically updated with the latest firmware at scheduled intervals. To configure automatic firmware update:

1. Using the Crestron Auto Update Tool, generate a manifest file (*. mft). The file is placed on an FTP (File Transfer Protocol) or SFTP (Secure File Transfer Protocol) server.
2. Using the DM NVX web interface, configure automatic firmware update by clicking the **Settings** tab and configuring the following items in the **Auto Update** section:
    a. If **Auto Update** is disabled, enable the function by setting the toggle switch in the On (right) position. By default, **Auto Update** is enabled.
    b. If **Custom URL** is disabled, enable the function by setting the toggle switch in the On (right) position. By default, **Custom URL** is disabled.
    c. In the **Custom URL Path** text box, enter the path to the manifest file in the following FTP or SFTP URL format:

        ftp://*username*:*password*@*host*:*port*/*path*/*filename*

        or

        sftp://*username*:*password*@*host*:*port*/*path*/*filename*

        where:

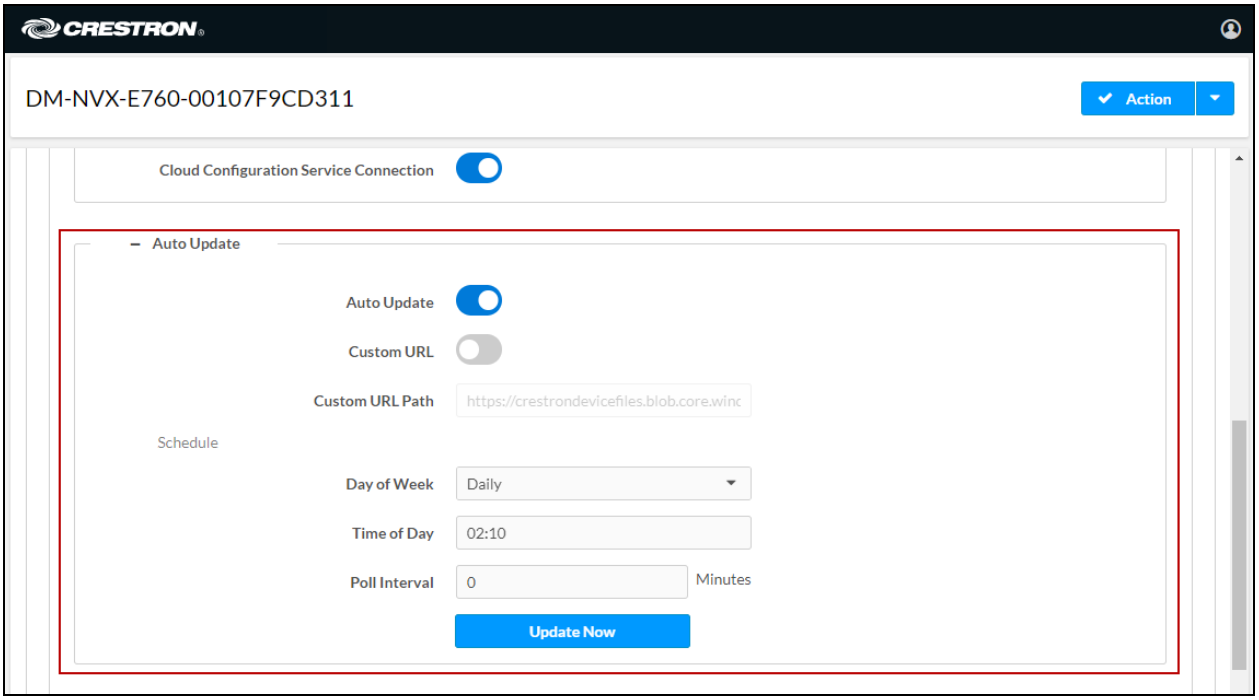
        - *username* is the username on the FTP or SFTP server
        - *password* is the password for the username
        - *host* is the fully qualified domain name or IP address of the FTP or SFTP server
        - *port* is the connection port on the host

        > **NOTE:** The default FTP port number is 21. The default SFTP port number is 22. Entry of a port number is necessary only if the port number differs from the default value of 21 or 22.

        - *path* is the path to the manifest file
        - *filename* consists of the name and extension (.mft) of the manifest file
    d. Set a schedule for the automatic firmware update by doing either of the following:
        - Select the desired **Day of Week** and **Time of Day** (24-hour format) values.
        - Set the **Poll Interval** by entering a value from **60** to **65535** minutes. A value of **0** disables the Poll Interval.
3. Click **Save Changes**.

Clicking **Update Now** causes the firmware to be updated at the current time; however, the schedule that is set in step 2d above remains in effect.

Settings Tab - Auto Update



Troubleshooting

The following table provides troubleshooting information. If further assistance is required, contact a Crestron customer service representative.

DM-NVX-E760(C) Troubleshooting

PROBLEM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
4K60 4:4:4 2-channel non-HDR or 4K60 4:4:4 2-channel HDR video is intermittent.	The CATx cable connection to the DM INPUT port is faulty.	Check that the cable is terminated properly and connected securely. If necessary, replace the cable.
	Crestron HDMI® cable is not being used.	Use Crestron HDMI cable only.
	Crestron HDMI cable exceeds the maximum length of 20 ft (6.1 m).	Use Crestron HDMI cable that does not exceed 20 ft (6.1 m).
The display flashes to a black screen momentarily.	Switching between HDR and non-HDR content is occurring.	No action required. Flashing to a black screen may occur on certain TVs.
The video is not being displayed, but the audio can be heard.	The HDCP settings of one or more DigitalMedia™ devices in the signal path do not support the HDCP level of the source.	Ensure that the HDCP settings of all DigitalMedia devices in the signal path support the HDCP level of the source.
	The display does not support the HDCP level of the source.	Ensure that the display supports the HDCP level of the source.
	An incorrect video source is selected.	Switch the video source to the correct input.
The video is intermittent.	The Ethernet or DM input cable connection is faulty.	Verify that the cable is terminated properly and connected securely. If necessary, replace the cable.
A message indicating that the resolution is unsupported appears on the display.	The incorrect EDID is selected.	Select the correct EDID.
	The resolution of the input is not supported.	Change the resolution of the input.
There is no video or audio.	Cable connections are faulty.	Verify that all cables are connected securely.
	The incorrect EDID is selected for the input.	Select the EDID supported by the devices in the signal path.

PROBLEM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
The video flickers or drops when the DM NVX device is touched or when metal in the vicinity of the device is touched.	The DM NVX device is not properly grounded.	Properly ground the DM NVX device.
The DM NVX device indicates that the stream has started, but video is not being displayed.	Neither IGMPv2 nor IGMPv3 is enabled in the IGMP snooping configuration.	Ensure that IGMPv2 or IGMPv3 is enabled on the network switch.
Video is flickering or video is not displayed when multiple DM NVX devices connect to a network switch.	Neither IGMPv2 nor IGMPv3 snooping is enabled in the network switch for the associated port or VLAN.	Enable IGMPv2 or IGMPv3 snooping in the correct VLAN.
Video is flickering when multiple DM NVX transmitters connect to a network switch.	The IGMP filter is not set to drop an unknown multicast IP address.	Configure the network switch to drop the unknown multicast IP address.
A DM NVX multicast stream stopped.	The multicast address is not set properly on the DM NVX device.	Ensure that the multicast address is not a duplicate of a multicast address that is set on another DM NVX device. Use a valid multicast address on the DM NVX device.
DM NVX streaming video is not seen in the receiver.	The DM NVX receiver is not configured with the correct streaming URL and multicast IP address.	Configure the DM NVX receiver using the correct streaming URL and multicast IP address.
Video stops suddenly, and the IGMP reports disappear in the network switch.	The IGMP querier is not configured correctly.	Configure the IGMP querier correctly. The recommended setting is the default setting of the network switch.

If, for any reason, the factory default settings of a DM NVX device must be restored, do one of the following:

- In the **Action** menu located in the upper-right corner of the web interface, click **Restore**.
- From the **Tools** menu in the Crestron Toolbox software, select **Text Console** and issue the restore command.
- Power cycle the device 11 times. After the eleventh power cycle, wait until the PWR LED lights amber and then green, and then press the **SETUP** button for 5 seconds.

Appendix: Device Discovery

A DM NVX device can be discovered on the network by using the Device Discovery Tool within the Crestron Toolbox software. To discover a DM NVX device:

1. Open the Crestron Toolbox software.
2. From the **Tools** menu, select **Device Discovery Tool**.

   > NOTES:
   >
   > - You can also access the Device Discovery Tool by clicking the Device Discovery Tool button ( ) in the Crestron Toolbox software toolbar.
   > - The security software running on the computer may send a program alert regarding the attempt of the Crestron Toolbox software to connect to the network. Allow the connection so that the Device Discovery Tool can be used.

   The DM NVX device is discovered and is listed in the device list on the left side of the screen. The associated host name, IP address, and firmware version are also displayed.

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Product Manual — Doc. 8918C

03/15/22
Specifications subject to
change without notice.